

National Park Service
U.S. Department of the Interior

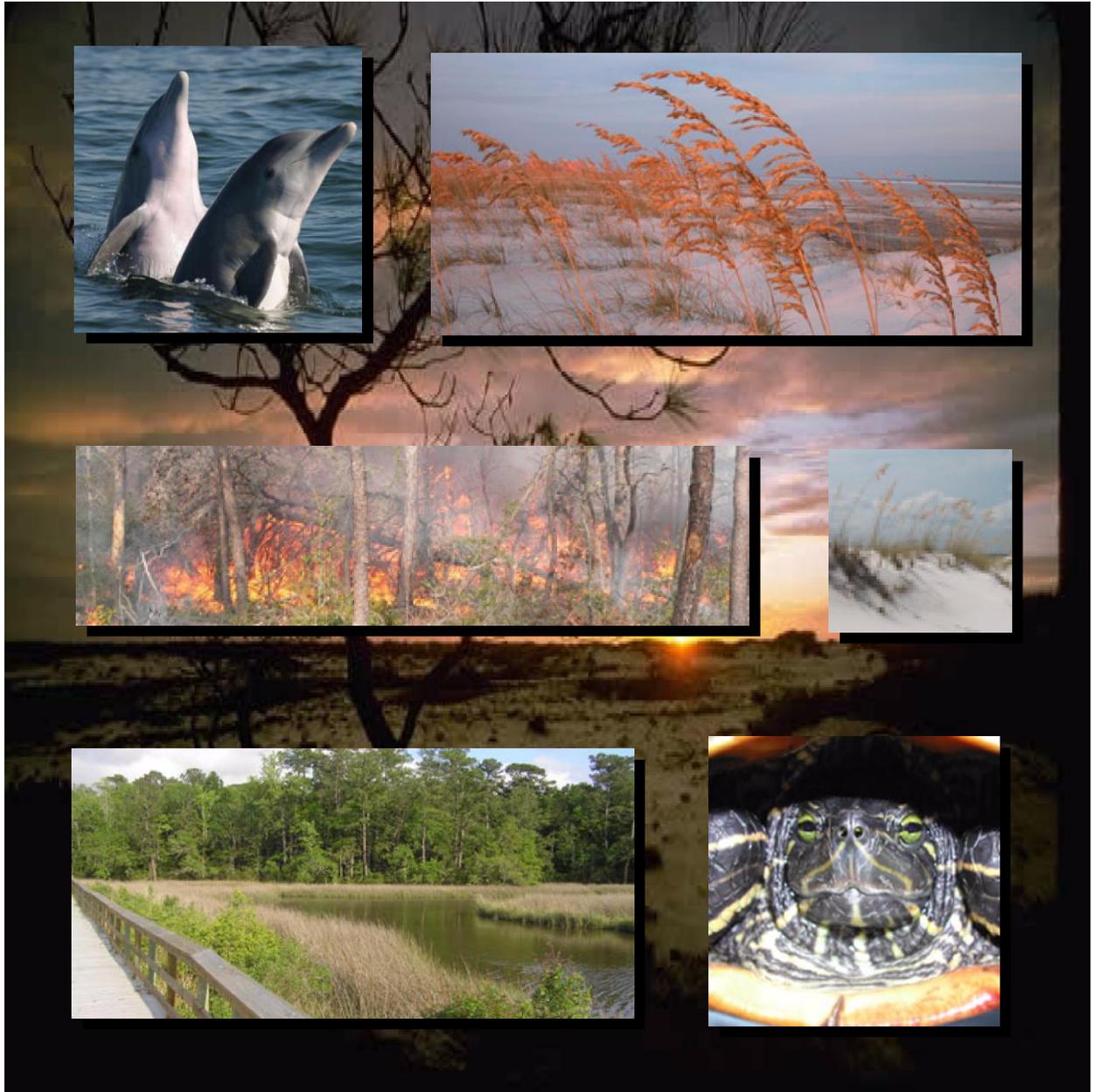
Gulf Islands National Seashore
Florida and Mississippi



Fire Management Plan

Environmental Assessment

April 2008



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Gulf Islands National Seashore Fire Management Plan

Environmental Assessment

**National Park Service
U.S. Department of the Interior**

**Gulf Islands National Seashore
1801 Gulf Breeze Parkway
Gulf Breeze, FL 32563**

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Chapter 1 Purpose and Need

1.1 INTRODUCTION

This Environmental Assessment (EA) documents the results of a study of the potential environmental impacts of alternatives for fire management on the Gulf Island National Seashore (GUIS).

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.

1.2 PROPOSED ACTION

The Superintendent of Gulf Islands National Seashore is faced with a decision to revise the Seashore's 1999 Fire Management Plan (FMP) as described below. This decision would be made within the overall management framework established in the 1978 GUIS National Seashore General Management Plan¹ and the 1998 GUIS 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

¹ A revision of the 1978 GMP is currently underway. The Fire Management Plan may be adjusted as appropriate once the new GMP is completed.

be consistent with the concepts established in the 1978 General Management Plan and the 2001 Federal Wildland Fire Management Policy and Guidelines.

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 Gulf Islands 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 Gulf Islands National Seashore on January 8, 1971, through Public Law 91-660. It was established to

"Preserve for public use and enjoyment certain areas possessing outstanding natural, historic, and recreational values; To conserve and manage the wildlife and natural resources; and To preserve as wilderness any areas within the Seashore found to be suitable and so designated in accordance with the provisions the Wilderness Act (78 Stat. 890)."

Gulf Islands National Seashore is comprised of approximately 140,000 acres of barrier islands, coastal mainland tracts, and their adjacent waters stretching nearly 150 miles from northwest Florida to coastal Mississippi. Maintained in a relatively undeveloped state, they are among the last surviving portions of a natural ecological continuum that once extended from Cape Cod to Mexico.

1.3 PURPOSE AND NEED

Fire has always been an integral component of habitats found throughout Florida and Mississippi. The climate of the region promotes fires through seasonal dry periods and frequent thunderstorms that produce lightning. The flora and fauna of Florida and Mississippi have evolved with 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 animal and plant species depends on periodic burning. Fire suppression and landscape fragmentation have led to altered ecosystems and dangerous fuel build-ups across much of the Southeastern United States.

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 becoming increasingly 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.

1.4 BACKGROUND

Gulf Islands National Seashore (GUIS) is situated in the northeastern portion of the Gulf of Mexico and includes a widely spaced chain of barrier islands extending nearly 150 miles from West Ship Island in Mississippi to the tip of Santa Rosa Island in Florida (Figures 1-1 through 1-3). Islands in the Seashore include Horn, Petit Bois, East Ship, and West Ship Islands in Mississippi and portions of Santa Rosa Island and Perdido Key in Florida. The Seashore also includes mainland tracts at the Pensacola Forts onboard the Naval Air Station in Pensacola; the Naval Live Oaks Reservation near Gulf Breeze, Florida; Davis Bayou, adjacent to Ocean Springs, Mississippi; and a small parcel of land on Okaloosa Island, Fort Walton Beach, Florida. The total authorized size of the Seashore is 139,775 acres, including the portion of Cat Island that has been acquired as of this date. Of this total acreage, 19,445 acres are fastlands (above water) and 119,730 acres are submerged lands (source for acreages The National Parks: Index 2001-2003). The remaining 600 acres is a portion of Cat Island.

Resources within the Seashore include remote wilderness islands with limited visitation, remnant marsh and woodland communities abutted by dense urban development, and readily accessible recreational beaches visited by several million people each year. The protected and undeveloped areas of the Seashore provide an enclave for the complex plant and animal communities, both terrestrial and aquatic, which characterize the northern Gulf Coast; as such, the Seashore's holdings fully exemplify the natural processes which shape this unique area.

Figure 1-1 Gulf Islands National Seashore



Figure 1-2 Gulf Islands National Seashore – Mississippi District

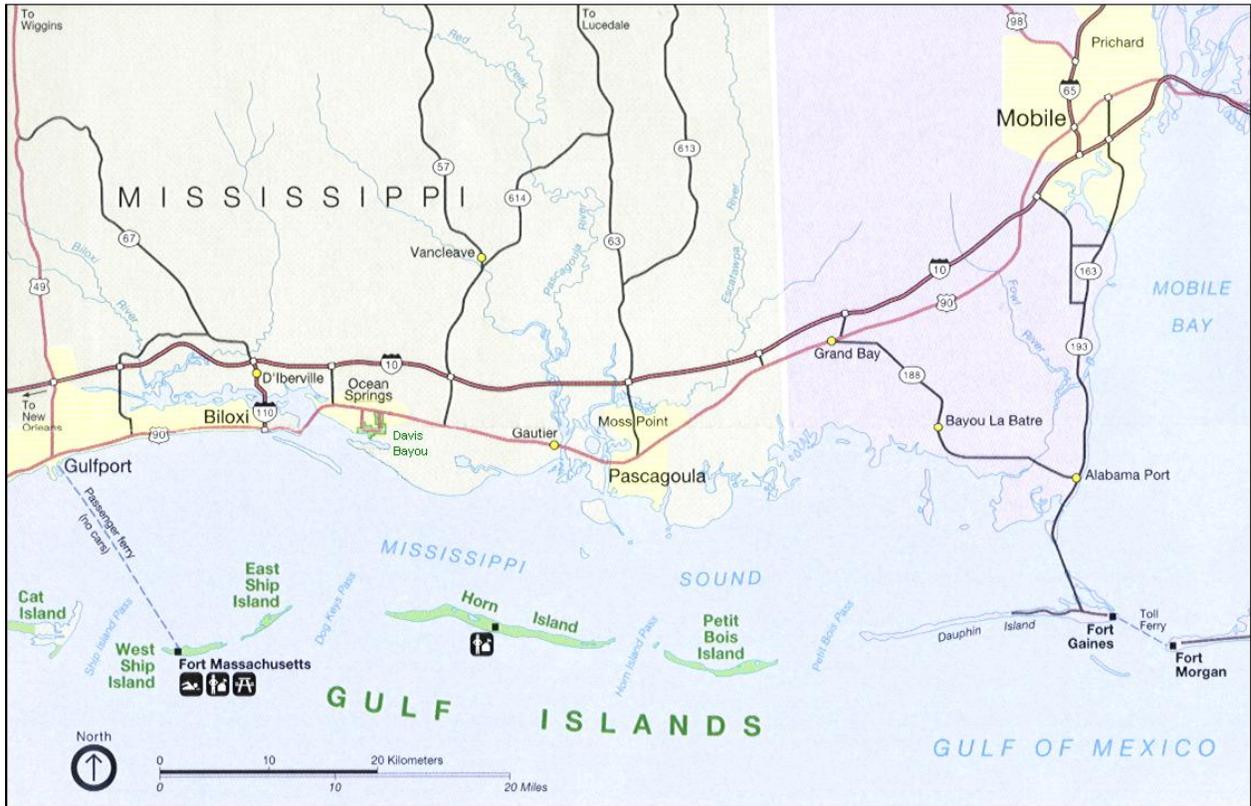


Figure 1-3 Gulf Islands National Seashore – Florida District



1.5 FIRE MANAGEMENT OBJECTIVES

As mentioned above, 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 will not be used at Gulf Islands National Seashore to achieve resource management objectives.

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

The purpose of the Fire Management Plan (FMP) is to provide a detailed plan for the management of wildland fire in such a manner as to safely accomplish resource management objectives. Throughout much of the Seashore, the artificial exclusion of fire from the area's natural communities has led to the presence of two specific problems: First, the crowding out of indigenous plant and animal species by understory growth which would otherwise be checked by fire, and second, the endangerment of structures and property through the unnatural buildup of readily combustible ground fuels. Under DO-18, fire activity is divided into two broad categories: wildland fire (including any unplanned ignition, whether natural or human caused) and prescribed fire (fire ignited by management for the purpose of achieving specific, predetermined objectives). Accordingly, this FMP articulates a comprehensive plan for the restoration of a healthy and safe fire environment at Gulf Islands National Seashore through the effective and appropriate management of both wildland and prescribed fire.

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.

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.

This FMP 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 Statement for Management, Resource Management Plan, and Wilderness Management Plan objectives, as well as its enabling legislation. Specifically:

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."

- Wildland fire suppression will serve to protect human life, property, and natural and cultural resources from the adverse effects of unwanted fire.
- Prescribed fire will serve to promote ecosystem sustainability. The plant communities at GUIs are largely 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 will also serve to improve habitat for seashore wildlife, such as the gopher tortoise.
- Prescribed fire and non-fire applications will 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 wildland fire. It also improves conditions for firefighter and public safety.
- Wilderness values will be protected during fire management activities by adhering to the objectives and guidance provided by the seashore's 2004 Wilderness Management Plan. Minimum impact suppression tactics will be used in managing all fires that occur in the wilderness, and the seashore superintendent will approve final management decisions.
- Maintaining existing defensible space around seashore structures will serve to protect them in the event of a wildland fire.
- Creating and/or maintaining hazard fuels breaks along sections of the seashore perimeter will help prevent the spread of fire to and from adjacent non-agency land.

Fire management goals at GUIs are:

- Suppress all wildland fire in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.

- Use prescribed fire to:
 - Promote ecosystem sustainability.
 - Reduce hazard fuels accumulations, which in turn:
 - Initiate nutrient recycling for healthy soil conditions.
- Use non-fire applications to:
 - Promote ecosystem sustainability and reduce hazard fuels accumulations in areas where conditions preclude the safe implementation of prescribed fire.
 - Maintain existing defensible space around seashore structures.
 - Create and/or maintain hazard fuels breaks along sections of the seashore perimeter.
- Provide seashore employees with fire operations training and experience so as to develop and maintain fully-qualified personnel.
- 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.
- Maintain coordination with federal, state, and local fire management agencies in order to continue close working relationships and mutual cooperation regarding fire management activities, and to manage natural fire regimes across administrative boundaries.
- Conduct a monitoring program that facilitates the identification of short- and long-term fire effects, and use the information gained to continually evaluate and improve the fire management program.
- Integrate knowledge gained through natural resource research into future fire management decisions and actions.
- Foster a greater public awareness of fire ecology and sound fire management.
- Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective fire management program.
- Plan and conduct all fire management activities in accordance with all applicable laws, policies and regulations.
- Incorporate the minimum impact tactics policy into all fire management activities, to the greatest extent feasible and appropriate.
- Protect wilderness values during all fire management activities by adhering to the objectives and guidance provided by the seashore's 2004 Wilderness Management Plan.

1.6 SCOPING ISSUES AND IMPACT TOPICS

1.6.1 Scoping

On October 30, 2008, GUI National Seashore announced to the public its intentions to update and prepare a Draft Fire Management Plan. This new FMP is intended to replace the prior FMP from 1999. The announcements were made through a press release sent to local news agencies. The plan was available for public viewing on the National Park Services Seashore's PEPC website. The public scoping period ended on December 22, 2008. Comments were received and evaluated.

1.6.2 Important Issues Raised During Scoping

The major issues and concerns that came from the interdisciplinary team, and other public input (e.g. written correspondence) were evaluated. Issues determined to be important were those related to the effects of the proposed action, and those not already adequately addressed by laws, regulations, and policies. Important issues were considered in developing and evaluating the alternatives to the Proposed Action discussed in this EA.

1.6.3 Impact Topics Evaluated 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. Impacts to soils are therefore analyzed in this EA.

Water Resources (including wetlands and floodplains): NPS policies require protection of water resources consistent with the Federal Clean Water Act. EO 11990 also 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.

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: 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. The seashore is a permanent or seasonal home to 29 federally- and/or state-listed species. Therefore, impacts to federally-listed T&E species are analyzed in this EA.

Air Quality: The 1970 Federal 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 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 are considered 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. Horn Island and Petit Bois Island have been designated as wilderness areas. Therefore, the potential effects of the FMP alternatives on wilderness areas are considered in this EA.

Human Health and Safety: Wildfires can be extremely hazardous, even life-threatening, to humans. Current federal fire management policies emphasize that firefighter and public safety is the first priority and 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. The seashore has about 170 known archeological sites (NPS 2004). Sites include prehistoric shell middens and mounds; historic cemeteries, shipwrecks, lighthouse complexes, and coastal defense fortifications spanning more than two centuries of military activity. These cultural resources can

be affected by fire itself and fire suppression activities, thus potential impacts to cultural resources are addressed in this EA.

1.6.4 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, trucks, and tractors. Use of this equipment would be infrequent (on the order of hours, days, or at most weeks per year), and it limited to a small area of the park to create defensible spaces around structures. This is not frequent or widespread 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 substantial 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: Substantial construction work is not proposed under any of the alternatives and, therefore, will not likely impact above and below-ground telephone, electrical, natural gas, water, and sewer lines and cables. Nor will proposed actions 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. 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 Gulf Islands 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 Gulf Islands National Seashore; therefore, this impact topic is not evaluated further 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 Gulf Islands National Seashore Draft FMP EA

Impact Topic	Retained or Dismissed from Further Evaluation	Relevant Regulations or Policies
Soils	Retained	<i>NPS Management Policies 2001</i>
Water Resources (including wetlands and floodplains)	Retained	Clean Water Act; Executive Order 12088; <i>NPS Management Policies</i> ; Executive Order 11988; Executive Order 11990; Rivers and Harbors Act; Clean Water Act; DO 77-1; DO 77-2
Vegetation	Retained	<i>NPS Management Policies</i>
Wildlife	Retained	<i>NPS Management Policies</i> ; Endangered Species Act
Air Quality	Retained	Federal Clean Air Act (CAA); CAA Amendments of 1990; <i>NPS Management Policies</i>
Visitor Use and Experience (including park operations)	Retained	<i>NPS Management Policies</i>
Wilderness	Retained	The Wilderness Act; Director's Order #41; <i>NPS Management Policies</i>
Human Health & Safety	Retained	<i>NPS Management Policies</i>
Cultural Resources	Retained	Section 106; National Historic Preservation Act; 36 CFR 800; NEPA; Executive Order 13007; Director's Order #28; <i>NPS Management Policies</i>
Noise	Dismissed	<i>NPS Management Policies</i>
Waste Management	Dismissed	<i>NPS Management Policies</i>
Utilities	Dismissed	<i>NPS Management Policies</i>
Land Use	Dismissed	<i>NPS Management Policies</i>
Socioeconomics	Dismissed	40 CFR Regulations for Implementing NEPA; <i>NPS Management Policies</i>
Transportation	Dismissed	<i>NPS 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
Resource Conservation, Including Energy, and Pollution Prevention	Dismissed	NEPA; <i>NPS Guiding Principles of Sustainable Design</i> ; <i>NPS Management Policies</i>

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 fire suppression only

CEQ regulations for implementing NEPA require that Federal agencies explore and objectively evaluate all reasonable alternatives to a proposed action, and to briefly discuss the rationale for eliminating any alternatives that were initially considered but not evaluated in detail. A single alternative, implementation of a Fire Management Plan to include wildland fire suppression only, was considered in addition to the No Action and Proposed Action alternatives, but was dismissed from further analysis.

Under this alternative, all human and naturally caused wild fires within the Seashore's boundaries would be suppressed. In addition, prescribed burning or other fire management activities, including debris burns and manual/mechanical fuel treatments, would not be utilized. This alternative was considered, but not in detail because it would not meet 2001 Federal Fire Policy goals to incorporate fire management into the planning process, or previously identified GUI National Seashore policies to re-establish fire as a natural component of the park ecosystem. In addition, elimination of prescribed burning and fuel treatments from management practices would increase the fire hazard throughout the park and lead to increased risks to human health and safety.

2.2 ALTERNATIVES CONSIDERED AND ANALYZED IN THIS EA

2.2.1 Alternative 1 (No Action Alternative) – Continue to operate under the 1999 Fire Management Plan

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. Currently, fire management on the Seashore is regulated by the 1999 FMP. Under this alternative, human-caused wildland fires would be suppressed under all circumstances, while allowing for the management and limited use of naturally-caused wildland fires in some Fire Management Units (FMUs). In addition, prescribed fires, debris burns, and manual/mechanical fuel treatments would be utilized to reduce fire hazard and restore ecological communities.

Under the current plan, eleven areas within the Seashore's holdings are designated as discrete FMUs that fall into one of three categories. Two are full suppression zones, five provide for use of naturally ignited wildland fire, and the remaining four allow for planned ignition. The management objectives and the units to which they apply are as follows (detailed descriptions of each unit are provided under the Proposed Action alternative):

Full Suppression: The objective within this type of FMU is to protect human life, cultural resources, park facilities, and/or commercial and residential property adjacent to the park. All wildland fire would be suppressed, and there would be no use of prescribed fire. Mechanical fuel reduction may be used to reduce fuel loads and maintain natural conditions.

- a) Okaloosa Unit
- b) Fort Barrancas Unit

Wildland Fire Use: A chief objective in this type of area is the restoration and preservation of natural conditions. Because fire control risks are low in the Wildland Fire Use FMUs, alternative management strategies can be considered in the case of naturally caused wildland fires. Such fire activity may be permitted, provided that predetermined parameters for environmental conditions and resource availability are not exceeded. Adherence to these parameters would be determined through daily monitoring by trained personnel of fire size, location, rate of spread, intensity, and potential threat.

All human-caused wildland fire within the Seashore's Wildland Fire Use FMUs would be suppressed. Whenever possible, however, incident commanders working in GUIIS Wildland Fire Use FMUs would consult with resource management specialists before authorizing fire suppression activities. (Special concerns within these Seashore units include slow-healing relic dune communities and the Red Wolf reproduction program.) Prescribed fire may be implemented by management in the Seashore's Wildland Fire Use FMUs.

- a) Horn Island Unit
- b) Petit Bois Island Unit
- c) West Ship Island Unit
- d) East Ship Island Unit
- e) Santa Rosa Unit

Prescribed Fire Use: In this type of FMU, an attempt is made to strike a balance between the protection of life and property inside and outside of the park and the restoration and the perpetuation of fire-dependent ecosystems. The objective is to duplicate the frequency and intensity of natural fires at times and places when safety and control can be assured. Mechanical fuel reduction is permitted, and should be considered when conditions otherwise preclude the achievement of resource management objectives or the mitigation of hazard fuel loads. Because uncontrolled fires in this type of FMU pose a direct threat to property, facilities, and/or cultural resources, all wildland fires would be suppressed.

Prescribed fires would be conducted in designated burn units and within specified weather and fuel moisture parameters. Prescriptions may be adjusted, as warranted by information gained

from monitoring and through research burns. (Research burns must be approved by the Superintendent and are subject to the same requirements as any other prescribed fire.) Priorities for prescribed fires will be determined by the length of time since the previous burn, current fuel loading and vegetative conditions, topographic advantage, and by personnel and logistical factors. Whenever possible, prescribed burns will be conducted with the direct aid and cooperation of any agencies holding lands contiguous to the burn unit.

- a) Davis Bayou Unit
- b) Naval Live Oaks

Other Activities

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.

No prescribed fire burn plan is required for simple, isolated burns lacking significant threats to safety or control, as long as the type of burn in question has routinely been carried out within the Seashore in the past (e.g., the burning of slash piles). In such cases, a burn proposal is submitted to the Chief Ranger for evaluation. Personnel involved in such operations needn't be qualified firefighters, but they must wear appropriate personal protective equipment (boots, nomex shirt and pants, gloves, hardhat and fire shelter). The burn supervisor is responsible for making all necessary notifications (fire departments, air quality contacts, neighbors, etc.), for obtaining necessary permits, and for the development of an appropriate safety and evacuation plan. The burn crew must include someone who has previously conducted a similar burn.

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 (Proposed Action) – Implement revised FMP

Under this alternative an additional FMU would be added based on the inclusion of Cat Island to the Seashore's holdings, bringing the total number to twelve. In addition, the overall fire management objectives for several FMUs would be altered. Specifically, management within each unit would include a combination of the following methods:

Wildland Fire Suppression: A wildland fire is defined as any nonstructural fire, other than prescribed fire, that occurs in the wildland. All wildland fires at GUIS, regardless of origin, would be suppressed. Wildland fire use for resource benefits would not occur at the seashore.

Prescribed Fire: Prescribed fire would be used primarily to promote ecosystem sustainability and to reduce hazard fuels accumulations, which in turn would initiate nutrient recycling for healthy soil conditions. Seashore planning documents would guide the use of prescribed fire.

Non-Fire Applications: Non-fire fuels treatment at GUIS would include general grounds-care operations such as mowing and weedeating open areas during the growing season; reducing hazard fuels accumulations and promoting ecosystem sustainability in areas where conditions preclude the safe implementation of prescribed fire; maintaining existing defensible space around seashore structures; maintaining existing firebreaks (including refurbishing existing holding lines around prescribed fire units prior to burning them); and creating and/or maintaining hazard fuels breaks along sections of the seashore perimeter to help prevent the spread of fire to and from adjacent non-agency land.

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

Manual and Mechanical Fuels Treatment (i.e. Thinning): Non-fire fuels treatment at GUIS would include general grounds-care operations such as mowing and weedeating open areas during the growing season; reducing hazard fuels accumulations and promoting ecosystem sustainability in areas where conditions preclude the safe implementation of prescribed fire; maintaining existing defensible space around seashore structures; maintaining existing firebreaks (including refurbishing existing holding lines around prescribed fire units prior to burning them); and creating and/or maintaining hazard fuels breaks along sections of the seashore perimeter to help prevent the spread of fire to and from adjacent non-agency land.

Reducing hazard fuels accumulations, Maintenance of existing defensible space, refurbishing existing holding lines, and treating units prior to prescribed burning, may involve mowing, weedeating, raking, chainsawing, or bush hogging.

Descriptions and specific fire management objectives for each of the 12 FMUs are listed below. Table 2-1 illustrates the overall management objectives for each FMU, and a five-year prescribed burn plan, including maps, is included in Appendix B.

Fire Management Unit #1: Davis Bayou Unit

Figure 2-1 FMU #1



This FMU, containing approximately 401 acres, is located on the mainland within the Mississippi District. Most of the land is adjacent to the coast along three marshy bayous, but the unit also includes a narrow access corridor extending northward to U.S. Highway 90.

Development within the unit includes the Mississippi District headquarters (a visitor center/administrative building with associated parking); a boat operations complex; a maintenance complex; three NPS housing units; a jon-boat tour facility; a campground with 51 sites; a group campground for 40 people; two picnic areas with a combined total of approximately 120 tables, five shelters, and four restrooms; two boat launch ramps; a .5-mile-long nature trail; and a boardwalk. Concentrated residential development is located along narrow greenbelt corridors.

Cultural resources within the unit include the remains of a Civilian Conservation Corps camp and a 4-H club site.

Seashore firefighters, with assistance as needed from the Ocean Springs Fire Department (as per memorandum of understanding), will perform initial attack on wildland fires within this FMU. Fire hydrants are located along the entrance road into the unit and in the visitor center/administrative building parking lot area.

Fire Management Objectives for FMU #1

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Prescribed burns over the next five years, totaling 116 acres, to promote ecosystem sustainability and reduce hazard fuels accumulations.
- Maintain existing hazard fuels breaks along sections of the FMU boundary, bordering adjacent development.

- Maintain existing defensible space around seashore structures.

Figure 2-2 FMUs #2 (Cat Island), #3 (West Ship Island), #4 (East Ship Island), #5 (Horn Island), and #6 (Petit Bois Island)



Fire Management Unit #2: Cat Island Unit

Cat Island is a 2,802-acre barrier island with a unique and distinct “T”-shaped configuration, located six miles off the Mississippi Gulf Coast. It is the westernmost barrier island within seashore boundaries (Mississippi District). The majority of the island has been owned by the Boddie family since 1911. The land up to mean high tide level (tidal wetlands) is owned by the State of Mississippi. During World War II, the island was used by the U.S. Army Signal Corps to train service dogs for the military.

In 2002, The Trust for Public Land purchased approximately 1,000 acres from the Boddie family and transferred that acreage to the NPS for inclusion in the seashore. Over the next several years, The Trust for Public Lands will purchase the remaining sections of the island for the NPS, with the exception of 150 acres, which will be retained by the Boddie family for their private use, and several individual lots which are owned by other private citizens. There is no development located on those portions of Cat Island presently owned by the NPS, nor are there any recorded cultural resources. The island is accessible by watercraft.

Seashore firefighters, with assistance as needed from Mississippi Sandhill Crane National Wildlife Refuge firefighters, will conduct initial attack on wildland fires within this FMU.

Fire Management Objectives for FMU #2

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.

- Mechanically create and maintain a hazard fuels break along a section of the seashore boundary, to help prevent the spread of wildland fire to and from adjacent non-agency land.

Fire Management Unit #3: West Ship Island Unit

The next barrier island to the east of Cat Island, West Ship Island², is about 3.7 miles in length, 0.16 to 0.34 miles in width, and contains approximately 555 acres. It is located within the Mississippi District of the seashore. The island is accessible by watercraft.

Development within this FMU includes a ranger office/first aid facility; a concession facility; three NPS housing units; a picnic area with tables, two shelters, and two restrooms; and a boat dock.

Cultural resources within this FMU include the Fort Massachusetts complex, the Ship Island Lighthouse complex, and a Confederate prisoner of war camp site. Fort Massachusetts is listed in the National Register of Historic Places.

Seashore firefighters, with assistance as needed from Mississippi Sandhill Crane National Wildlife Refuge firefighters, will conduct initial attack on wildland fires within this FMU.

Fire Management Objectives for FMU #3

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Maintain existing defensible space around seashore structures.

Fire Management Unit #4: East Ship Island Unit

East Ship Island is about 2.6 miles in length, 0.09 to 0.53 miles in width, and contains approximately 362 acres. It is located within the Mississippi District of the seashore. There is no development on the island. The island is accessible by watercraft.

Cultural resources located within this FMU include the French Warehouse Site and the Quarantine Station complex. The French Warehouse Site is listed in the National Register of Historic Places.

Seashore firefighters, with assistance as needed from Mississippi Sandhill Crane National Wildlife Refuge firefighters, will conduct initial attack on wildland fires within this FMU.

² Prior to hurricane Camille in 1969, Ship Island was a single island about seven miles in length. Hurricane Camille severed the island into three sections. Sand accretion since 1969 has resulted in the lengthening of West Ship Island and the merging of the eastern two islands to form East Ship Island.

Fire Management Objectives for FMU #4

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.

Fire Management Unit #5: Horn Island Unit

The next barrier island to the east of East Ship Island is Horn Island. It is 14.3 miles in length, 0.37 to 0.75 miles in width, and contains approximately 3,650 acres. It is located within the Mississippi District of the seashore. The island is classified entirely as Wilderness except for an enclave of about seven acres that holds a boat dock, a generator building, a fenced compound holding an NPS housing unit and a maintenance building with primitive sleeping quarters, and a fenced area holding a Mississippi Air National Guard telecommunications tower and two photovoltaic panels. The island is accessible by watercraft.

Horn Island was the site of a chemical and biological warfare testing installation during World War II. Associated cultural resources include the chimney of the incinerator, and several concrete building foundations.

Seashore firefighters, with assistance as needed from Mississippi Sandhill Crane National Wildlife Refuge firefighters, will conduct initial attack on wildland fires within this FMU.

Fire Management Objectives for FMU #5

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Maintain existing defensible space around seashore structures.
- Protect wilderness values during all fire management activities by adhering to the objectives and guidance provided by the seashore's 2004 Wilderness Management Plan.

Fire Management Unit #6: Petit Bois Island Unit

Petit Bois Island is 7.5 miles in length, 0.19 to 0.75 miles in width, and contains approximately 1,466 acres. The island is classified entirely as Wilderness. It is the easternmost of the barrier islands within the seashore's Mississippi District. There is no development on the island, nor are there any recorded cultural resources. The island is accessible by watercraft.

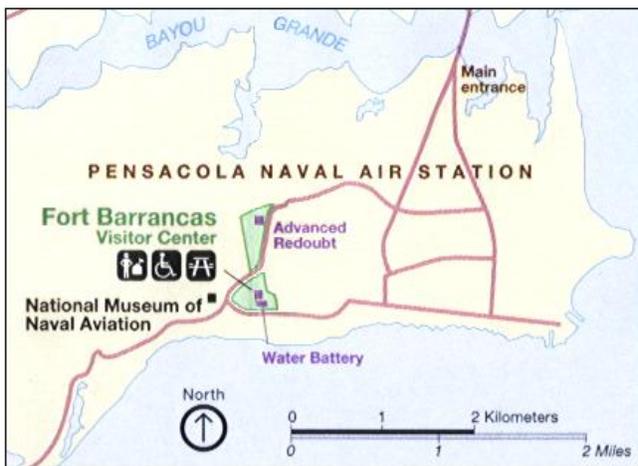
Seashore firefighters, with assistance as needed from Mississippi Sandhill Crane National Wildlife Refuge firefighters, will conduct initial attack on wildland fires within this FMU.

Fire Management Objectives for FMU #6

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Protect wilderness values during all fire management activities by adhering to the objectives and guidance provided by the seashore's 2004 Wilderness Management Plan.

Fire Management Unit #7: Fort Barrancas Unit

Figure 2-3 FMU #7



This 64-acre FMU is located on the mainland within the Florida District of the seashore, at Pensacola Naval Air Station. Development within the unit includes a visitor center with restrooms, and a picnic area with 10 tables.

Cultural resources within this FMU include the Pensacola Lighthouse complex, and the nineteenth-century Fort Barrancas complex, which includes three fortifications: Fort Barrancas, the Advanced Redoubt of Fort Barrancas, and the Fort Barrancas Water Battery. The Fort Barrancas Historic

District is listed in the National Register of Historic Places; the fort is also a National Historic Landmark.

Seashore firefighters, with assistance as needed from the Pensacola Naval Air Station Fire Department (as per memorandum of understanding), will perform initial attack on wildland fires within this FMU.

Fire Management Objectives for FMU #7

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Maintain existing defensible space around seashore structures.

Fire Management Unit #8: Naval Live Oaks Unit

Figure 2-4 FMU #8



This FMU, containing approximately 1,378 acres, is located on the mainland within the Florida District. Development within the unit includes the Florida District headquarters (a visitor center/administrative building with associated parking); a picnic area with 25 tables, a shelter, and a restroom; and a group campground for 40 people. A four-lane highway (U.S. Highway 98) bisects the unit, and an above-ground power line parallels the road. Residential development is located along the northern and eastern sides of the unit.

The Naval Live Oaks Historic District and the Naval Live Oaks Reservation are listed in the National Register of Historic Places (NRHP). The unit includes a number of prehistoric sites, three of which are listed in the NRHP: Butcherpen Mound, Big Heart West, and Third Gulf Breeze. Also located within the unit is the First American Road in Florida, listed in the NRHP.

This FMU contains gopher tortoise habitat. However, due largely to past fire exclusion, stands dominated by sand pine and longleaf pine exhibit severe crowding by hardwood and understory species, threatening the suitability of the habitat. It is essential to continue conducting prescribed burns (begun in 1999) within the unit to restore and maintain this habitat.

Seashore firefighters, with assistance as needed from the Gulf Breeze Fire Department (as per memoranda of agreement), will perform initial attack on wildland fires within this FMU. Florida DOF will be contacted as needed. Fire hydrants are located in the visitor center/administrative building area, and in the central portion of the unit where one of the seashore fire caches is located.

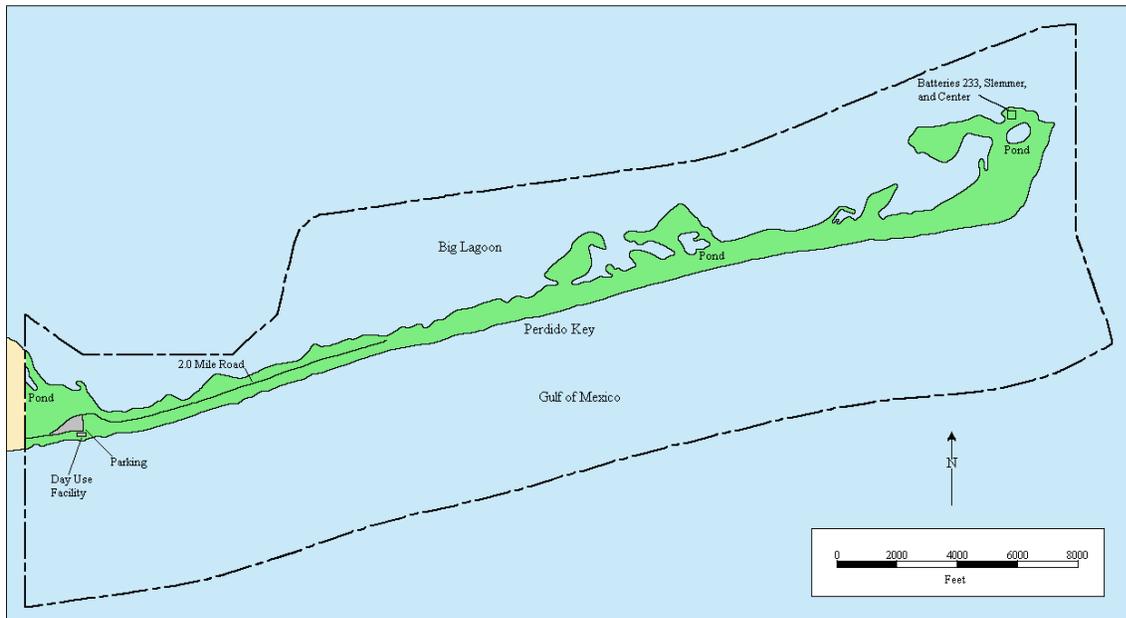
Fire Management Objectives for FMU #8

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Prescribed burn 668 acres over the next five years to promote ecosystem sustainability (including gopher tortoise habitat restoration and maintenance) and reduce hazard fuels accumulations.

- Maintain existing hazard fuels breaks along sections of the FMU boundary, bordering adjacent residential development.
- Maintain existing defensible space around seashore structures.

Fire Management Unit #9: Perdido Key Unit

Figure 2-5 FMU #9



This FMU, located on the eastern portion of Perdido Key, a barrier island within the Florida District of the seashore, contains approximately 1,041 acres. Development within the unit includes a ranger office/first aid facility; a concession facility; and a picnic area with approximately 64 tables, five shelters, and two restrooms. The island is accessible by vehicle bridges and watercraft.

Cultural resources located within unit boundaries include the nineteenth-century Fort McRee complex (the fort was formerly located on the eastern tip of Perdido Key, but is now under the waters of Pensacola Bay due to the westward migration of Perdido Key lands), and the sites of three concrete coast artillery batteries: Battery Slemmer, Battery Center, and Battery 233. The Perdido Key Historic District is listed in the National Register of Historic Places.

Seashore firefighters, with assistance as needed from the Escambia County Fire Services (ECFS) (as per memorandum of agreement), will perform initial attack on wildland fires within this FMU.

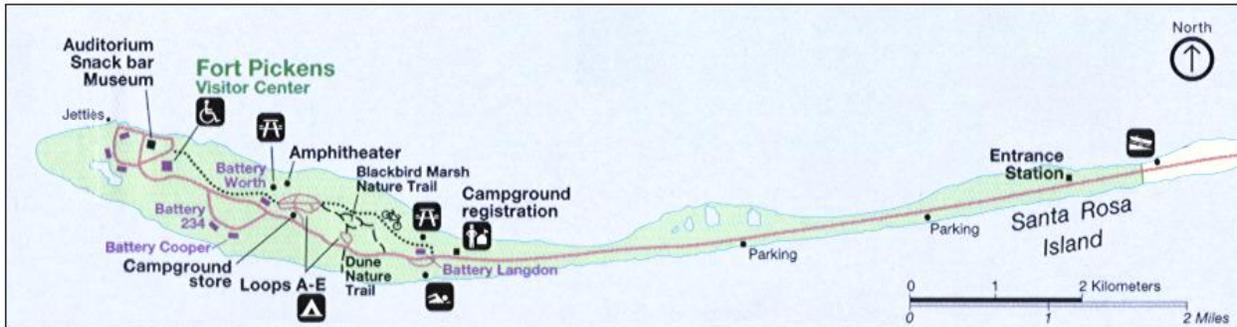
Fire Management Objectives for FMU #9

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.

- Maintain existing defensible space around seashore structures.

Fire Management Unit #10: Fort Pickens Unit

Figure 2-6 FMU #10



This FMU, located on the western portion of Santa Rosa Island, a barrier island within the Florida District of the seashore, contains approximately 2,742 acres. Development within the unit includes a visitor center; three concession facilities; a campground with 200 sites; a group campground for 50 people; three picnic areas with a combined total of approximately 80 tables, three shelters, and three restrooms; and a fishing pier. The island is accessible by vehicle bridges and watercraft.

Cultural resources located within this FMU include Fort Pickens, listed in the National Register of Historic Places, and a number of historic shipwrecks located in surrounding waters.

Seashore firefighters, with assistance as needed from the ECFS (as per memorandum of agreement), will perform initial attack on wildland fires within this FMU.

Fire Management Objectives for FMU #10

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Maintain existing defensible space around seashore structures.

Fire Management Unit #11: Santa Rosa Unit

Figure 2-7 FMUs 11 & 12



This FMU, located within the central portion of Santa Rosa Island, contains approximately 1,598 acres. Development within the unit includes a concession facility; an NPS housing unit; and a picnic area with approximately 110 tables, 51 shelters, and three restrooms. The island is accessible by vehicle bridges and watercraft.

Cultural resources located within this FMU include various prehistoric sites, the Bomb Target complex, and a number of historic shipwrecks located in surrounding waters.

Seashore firefighters, with assistance as needed from the ECFS and the Navarre Beach fire departments (as per memoranda of agreement), will perform initial attack on wildland fires within this FMU.

Fire Management Objectives for FMU #11

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Maintain existing defensible space around seashore structures.

Fire Management Unit #12: Okaloosa Unit

This FMU, located on U.S. Highway 98 just east of Fort Walton Beach, contains approximately 19 acres. Development within the unit includes a picnic area with approximately 18 tables and a restroom, and two boat launch ramps. There are no recorded cultural resources located within the unit.

Seashore firefighters, with assistance as needed from the Okaloosa Island VFD (as per memorandum of understanding), will perform initial attack on wildland fires within this FMU.

Fire Management Objectives for FMU #12

- Suppress all wildland fires in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Maintain existing defensible space around seashore structures.

Table 2-1 Fire Management Objectives per FMU

FMU	Full suppression	Maintain existing defensible space	Maintain existing hazardous fuels breaks	Mechanically create & maintain hazardous fuels breaks	Prescribed burn	Protect wilderness values
1	Yes	Yes	Yes		Yes	
2	Yes			Yes		
3	Yes	Yes				
4	Yes					
5	Yes	Yes				Yes
6	Yes					Yes
7	Yes	Yes				
8	Yes	Yes	Yes		Yes	
9	Yes	Yes				
10	Yes	Yes				
11	Yes	Yes				
12	Yes	Yes				

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 alternative for Gulf Island 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

NPS Fire Monitoring Handbook

The NPS has established a well-defined set of monitoring protocols and recommended standards that are useful in the development of a monitoring program. These guidelines and methods are presented in the *NPS Fire Monitoring Handbook* (NPS, 2003). The fire effects monitoring program established at GUIS follows the guidelines and recommendations described in the *NPS Fire Monitoring Handbook* with some modifications.

Recommended Standard Monitoring Levels

FMH 2003 provides recommended standards, divided into four monitoring levels, which constitute the lowest level of fire monitoring to be conducted by NPS units. Table 2-2 illustrates how these monitoring levels correspond to the given management strategy.

Table 2-2 Management Strategies and Recommended Standard (RS) Monitoring Levels

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

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

Wildland and Prescribed Fire Monitoring

Environmental monitoring provides a basic level of data that can be collected before a burn event and may consist of basic environmental monitoring data already being taken in a park. Examples of environmental monitoring include weather, fire danger rating, fuel conditions, resource availability, protection of structures and values, historical and archeological data, as well as other biological, geographical, geological and social data. Fire observation monitoring provides a physical description of a fire event. Data collected for fire observation monitoring include fire cause, ignition point, fire location and size, logistical information, fuels and vegetation descriptions, current and predicted fire behavior, fire spread potential, current and forecasted weather events, resource threats, safety concerns, and smoke volume and movement measures.

Short- and long-term levels of monitoring require more detailed descriptive measures of fuel and vegetation changes in response to management actions within specific monitoring types that provide a quantitative assessment of whether a management objective was met. While both short- and long-term monitoring may use similar measurement protocols, they differ in timing and emphasis. Short-term monitoring can be effective in management programs with short-term objectives but may be extended to long-term monitoring if trends or longer-term response changes are of interest. Both short- and long-term monitoring are required for a prescribed fire program.

The objective of the monitoring program at GUIS is to characterize the effects of management treatments such as prescribed burning and mechanical treatment on changes in species composition and structure of selected plant communities within the seashore. This information will be provided to fire and resource managers to assess the effectiveness of the management treatment and desired outcomes and consequences of treatments. **The *Gulf Islands National Seashore Fire Effects Monitoring Plan*, currently in draft form, will be included as an appendix upon its completion.**

2.3.1 Fire Management Activities

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

- 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.
- 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 will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position).
- No fire management operation will be initiated until all personnel involved have received a safety briefing describing known hazards and mitigating actions (LCES*), current fire season conditions, and current and predicted fire weather and behavior. Hazards specific to the seashore include:
 - Snags and dead trees with weak root systems.
 - Volatile fuels and unnaturally high fuels accumulations that preclude direct attack.
 - Stinging/biting insects, scorpions, ticks, and poisonous snakes.
 - Dehydration, heat exhaustion and heat stroke.
 - Boat transport.
- Wildland fire incident commanders and prescribed fire bosses will minimize firefighter exposure to heavy smoke by incorporating the recommendations outlined in the publication *Health Hazards of Smoke* (Sharkey, 1997), available from the Missoula Technology and Development Center.
- Prescribed burning will not be conducted when atmospheric conditions exist that could permit degradation of air quality to a degree that negatively affects public health. Federal, state, and local air quality standards will be the basis for this decision.

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

- Seashore neighbors, visitors and local residents will be notified of all planned and unplanned fire management events that have the potential to impact them.
- The GUIIS superintendent or designee may, as a safety precaution, temporarily close parts of the seashore to the visiting public. In the case of prescribed fire, areas needing to be closed for visitor protection will be closed prior to the initiation of prescribed burning.
- Smoke on roadways will be monitored and traffic control provisions taken to ensure motorist safety during fire events at the seashore.

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.

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.

2.3.5 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 2-3 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 Gulf Island National Seashore planning documents.

Table 2-3 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 inside and outside 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, they may be extensive, and their success could not be guaranteed.	<p>Short Term Recovers in less than 3 years</p> <p>Long Term Takes more than 3 years to recover</p>

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
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.	<p>Short Term Recovers in less than 1 year</p> <p>Long Term Takes more than 1 year to recover</p>
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>Short Term Recovers in less than 3 years</p> <p>Long Term Takes more than 3 years to recover</p>

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
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>Short Term Recovers in less than 1 year</p> <p>Long Term 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>Short Term Recovers in 7 days or less</p> <p>Long Term 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.	Short Term Occurs only during the treatment effect Long Term Occurs after the treatment effect
Wilderness	A change in the wilderness character and associated values would occur, but it would be small and, if measurable, would be highly localized.	A change in wilderness character and associated values would occur. It would be measurable, but localized.	A noticeable change in the wilderness character and associated values would occur. It would be measurable, and would have a substantial or possibly permanent consequence.	Short-Term Recovers in less than 3 years Long-Term Takes more than 3 years to recover.
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.	Short Term Occurs only during the treatment effect Long Term Occurs after the treatment effect
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	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	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	Short term Treatment effects on the natural elements of a cultural landscape (e.g., three to five

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
	National Register of Historic Places eligible or listed structure, district, or cultural landscape.	jeopardized.	jeopardized.	years until new vegetation returns) <u>Long term</u> Because most cultural resources are non-renewable, any effects would be long term
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.	<u>Short term-</u> Effects lasting for the duration of the treatment action <u>Long term-</u> Effects lasting longer than the duration of the treatment action.

2.5 COMPARISON OF ALTERNATIVES

Table 2-4 briefly summarizes the environmental effects of the various alternatives. It provides a brief comparison of how well the alternatives respond to the project need, objectives, important issues and impact topics. Chapter 3 outlines the environmental consequences of each of the alternatives in detail.

Table 2-4 Comparison of Alternatives

Impact Topics	Alternative 1 - No Action Alternative	Alternative 2 – Implement updated and revised FMP
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

Impact Topics	Alternative 1 - No Action Alternative	Alternative 2 – Implement updated and revised FMP
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
Wilderness	Negligible to minor short-term impacts from wildland fire suppression activities. Beneficial - fire helps retain the "wilderness character."	Negligible to minor short-term impacts from wildland fire suppression activities. Beneficial - fire helps retain the "wilderness character."
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

Impact Topics	Alternative 1 - No Action Alternative	Alternative 2 – Implement updated and revised FMP
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 No-Action and Proposed 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 1978 General Management Plan, 1998 Resource Management Plan and other relevant documents.

3.1 SOILS AND GEOLOGY

3.1.1 Affected Environment

Gulf Islands National Seashore consists of beaches along the coastlines of Florida and Mississippi, as well as barrier islands on the low-lying continental shelf. Each of the nine national seashores lies along the very gentle slope that extends hundreds of miles from the landward edge of the coastal plain to the seaward edge of the continental shelf. Over this distance, elevation changes by only about 1000 feet, from 400 feet above sea level to 600 feet below. The average slope is thus only about 3 feet per mile (Lillie, 1999).

Most of the seashore soils have been naturally formed by materials deposited or reworked by wind or water. Except in tidal marsh areas and in the Davis Bayou unit, soils are almost exclusively sands (NPS, 1978).

The beach surface deposits are predominantly white quartz sand. These deposits are typically layered, with occasional bands of dark-colored heavy minerals appearing in the soil profile. Gulf-side sands are generally coarser than sands along the sound side of the islands due to the smaller sediment supply and weaker littoral currents. Between the Gulf and sound sides of the barriers, the surface deposits are mostly of Aeolian origin. Sand is transported, from the beach to the dunes and from the dune zone to areas behind it, by onshore winds. When the blowing sand encounters a stationary object, such as a zone of vegetation, the sand drops to the ground, causing a buildup of material. The stability of sand in a particular area depends on the amount and type of vegetation; the area's orientation, with respect to prevailing winds; the configuration of the local topography; susceptibility to flooding; and other factors. In most places, no distinct soil structure, usually indicated by the development of discrete zones called soil horizons, is present (NPS, 1978).

In the forested areas that have remained stable for long periods of time, rudimentary soils have formed. These soils are sandy to loamy in texture and are poorly layered. Beneath the surface layer are litter, humus, and several weakly defined subsurface zones. The soils are moderately to rapidly permeable and during rainy periods may have seasonally high water tables (about 1-2 feet below the surface). Flooding occurs periodically, and the soils are generally unsuitable for septic-tank/ leachfield systems (NPS, 1978).

The Mississippi coast, where Davis Bayou is located, is generally classified as an alluvial coast or a terraced deltaic plain (NPS, 1978). The soil characteristics in this unit consist of coastal plain hills (well-drained sandy soils), coastal flatwood (poorly drained), sandy and clayey land (prone to excessive runoff and erosion due to the preponderance of clay), swamps (frequently flooded with standing water for 6 to 9 months a year), and tidal marsh (located in inundated coastal areas; water levels and flows are a result of tides).

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)

Activities with the potential to impact soils under the No Action Alternative include building and maintaining fire lines; excessive use of water during wildland fire suppression activities; the use of heavy equipment to contain and control human-caused ignitions or certain naturally caused ignitions; thinning activities; and the use of limited wildland fire and prescribed burning. Minor and localized soil compaction would occur from wildfire suppression and thinning activities, and vehicle use would be restricted primarily to existing roads. Fire line construction and excessive use of water during wildland fire suppression would result in soil disturbance and could lead to increased erosion. During all suppression activities, Minimum Impact Suppression Tactics (MIST) would be incorporated to the greatest extent possible, 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.* powersaws, mowers, handtools) would be utilized to simulate natural fire effects, reduce fuel loads, and pretreat for prescribed fire use. 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 and limited wildland fire would release nutrients into the soil and the fertilization effects of ash would provide an important source of nutrition for new growth. Soil organic matter also increases as ash and charcoal residue resulting from incomplete combustion builds up in the soil profile, contributing to soil porosity; decreased compaction; and surface areas for essential microorganisms, micorrhizal fungi, and roots. 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).

Where highly-flammable fuels have built up over time, and under undesirable weather conditions, wildfires can be very damaging. Such severe burns can lead to consumption of soil

organic matter and creation of water repellent soil layers. This may also occur if prescribed burns exceed the burn prescription and burn too hot. Fire management personnel would ensure that conditions under which wildfires are permitted to burn or prescribed fires are carried out are appropriate and that all fires are contained, thereby minimizing the possibility that any wildland or prescribed fire would become a high-burn severity fire that might damage soils.

3.1.2.2 Alternative 2 (Proposed Action)

General soil impacts and mitigation measures would be similar to those described under the “No Action” Alternative, except the impacts to soils, both detrimental and beneficial, would no longer occur in areas that previously allowed for fire management using wildland fires.

Conclusion

Both alternatives would have minor, localized, and short-term soil compaction and erosion impacts resulting from suppression, mechanical thinning, fuels reduction, limited wildland fire, and/or prescribed fire activities. Under Alternative 2, soil impacts would not occur in areas 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

There are no streams within the Seashore, except at Davis Bayou. Open freshwater areas consist of a few small scattered ponds and marshes in Fort Pickens and Naval Live Oaks Reservation where the water table is either permanently or intermittently at the surface. These ponds provide the only fresh water for wildlife in the area, and are extremely sensitive to disturbances. Because of its position at the interface of land and sea, the Seashore is extremely vulnerable to flooding during major storms (NPS, 1978).

All of the Mississippi barrier islands except for West Ship Island have small isolated brackish water ponds. The interior water bodies of these islands are narrow, seldom wider than 650 to 980 feet. Their lengths range to about 1 mile (west Horn Island) (NPS, 1978).

Water Quality

Mississippi District: Because the islands in the seashore’s Mississippi District are between 6 and 14 miles offshore and are undeveloped, water quality has not been substantially impacted by

human activities. The primary pollution sources include mainland urban storm water and agricultural runoff, recreational boating, and commercial shipping in the Intracoastal Waterway and navigational channels in the passes. There are over 20 marinas along the Mississippi Sound in Jackson and Harrison counties.

Florida District: The waters surrounding the Florida District at GUIs have been impacted by numerous non-point and point source pollution resulting in a reduction of natural biodiversity and productivity. Non-point sources include urban storm water runoff, agricultural runoff, marinas, boat traffic, the drainage of wetlands, and seepage of contaminated groundwater into surface waters. Point sources include effluent from two sewer outlets near Pensacola, septic systems on Gulf Breeze peninsula, a chemical plant and coal-fired electric power plant on the Escambia River, a paper mill on the Perdido River, the American Creosote Works superfund site, the port of Pensacola, and Pensacola Naval Air Station, which contains a number of superfund sites.

Wetlands and Floodplains

Over 80% of the total land area at GUIs is comprised of wetland ecosystems. The vast majority of this is estuarine and marine deepwater wetland (Table 3-1). The Fort Pickens unit contains primarily freshwater emergent wetland and the Cat Island unit contains primarily freshwater forested/shrub wetland. Aside from these two and the Fort Barrancas and Okaloosa units, which contain no wetland areas, all of the units are comprised primarily of estuarine and marine/marine deepwater wetlands. These wetlands consist of vegetated and non-vegetated brackish and saltwater marsh, shrubs, beach, bar, open water estuaries, bay, sound, and open ocean. The Davis Bayou FMU also contains approximately 144 acres of wetland area consisting of fresh and salt water tidal marsh, bayhead swamp, wet pine savanna, wet pine flatwood, and portions of transitional wetland forest, which occurs on the sloping wet soil areas between tidal marsh and adjacent upland areas (MSU, 2002). Significant portions of the Seashore (approximately 76,000 acres) also lie within the 100 year floodplain.

Table 3-1 Wetland Ecosystems within GUIs boundaries

Wetland Type	Acreage
Estuarine and Marine Deepwater	106,341
Estuarine and Marine Wetland	6,890
Freshwater Emergent Wetland	676
Freshwater Forested/Shrub Wetland	1,041
Freshwater Pond	105
Total	115,053

Source: USFWS National Wetlands Inventory

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)

Activities under the No Action Alternative with the potential to impact water resources include building fire lines, employing fire retardants or foams, limited use of wildland fire, prescribed burning, and thinning. These activities may cause minor damage to or loss of the litter/humus layer and minor sedimentation and may cause increased turbidity and chemical contamination. 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 minor, if any, direct impacts on surface water resources, in the park.

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, 1999).

As described under the soils section above, the use of limited wildland fire, prescribed burning, and mechanical fuels reduction would result in minimal soil erosion and compaction. Minor degradation is anticipated to water resources in the extreme local area. Riparian/vegetative buffers will be maintained to the extent possible during fire operations.

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 have minor impact to 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 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). Fire retardant has not been used in the park during its 38 year history.

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 (Proposed Action)

Proposed activities with the potential to impact water resources include building fire lines, employing fire retardants or foams, prescribed fire use, and mechanical fuels reduction. General water resources impacts associated with these activities would be the same as those described in the No Action Alternative.

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

Gulf Island National Seashore is located in the heart of the East Gulf Coastal Plain, with a climate that produces the highest frequency of lightning activity in the nation. Historically, lightning-ignited fires occurred frequently across the landscape. The communities that compose GUIS are therefore fire-dependent or fire-adapted.

The majority of the terrestrial portion of the seashore is dominated by pine forest, which is one of the forest types in the southeastern U.S. that is naturally maintained by frequent, low-intensity fires. Many of the plant species associated with the pine forest (longleaf and slash) of GUIS are not killed by fire, but rather have characteristics that allow the plant to regenerate either vegetatively or reproductively following fire. In the presence of frequent fire, these pine forest areas develop into an open pine stand with little to no midstory trees or shrubs present and a rich diverse layer of grasses and herbs in the understory. In the absence of fire, shrubs and small trees begin to invade these stands and can have a significant shading impact on native herbaceous vegetation in as little as three years, thus significantly reducing native plant diversity. As heavy fuels build up in fire-excluded areas, the potential for higher intensity fire behavior increases.

The *Fire Effects Monitoring Plan* identifies the following vegetative communities at GUIS: pine flatwoods, wet pine savanna, sand pine-scrub, scrub, xeric sandhills, live oak hammock, coastal grassland, palustrine marsh, palustrine shrub, estuarine marsh, estuarine shrub, and beach dune. Discussion of each follows, as per that document.

- Pine flatwoods: The overstory of this community consists primarily of slash pine, but may also include scattered sweetgum, cabbage palm, Virginia live oak, and other oaks. Frequently burned sites have very few midstory species; however, less frequently burned sites may include regenerating overstory species as well as red maple, common persimmon, fetterbush, sweetbay, wax myrtle, red bay, dwarf live oak, myrtle oak, water oak, and sparkleberry. The understory includes regenerating overstory and midstory species, as well as huckleberry, St. John's-wort, gallberry, winged sumac, dewberry species, greenbrier species, eastern poison ivy, Darrow's blueberry, and shiny blueberry.

Under natural conditions with frequent fire (once every 3 to 5 years) this community is characterized by an open to closed canopy of pine trees with little to no midstory, or an understory of either continuous saw palmetto or a rich grass and herb ground cover. In fire suppressed sites, this community will have a dense hardwood component, including significant height growth of palmetto in the midstory and understory, and a loss of native herbs and grasses in the ground cover.

Frequent, low-intensity surface fires are essential to preserving and restoring this community. Frequent fire promotes the dominance of native ground cover and decreases the encroachment of woody vegetation into the midstory. In the absence of fire, open pine flatwoods are quickly invaded by hardwoods and shrubs that shade out and out-compete native species in the understory. Furthermore, the increased presence of hardwoods and shrubs in the midstory changes the behavior and intensity of fires as they burn through the stand. Increased woody vegetation in the midstory results in greater amounts of vertical fuels present and can lead to torching and crowning up into the canopy, creating more intense fire behavior and a higher potential for catastrophic fires.

Pine flatwoods at GUIS are best represented by NFDRS fuel model D, except in cases where the shrub understory is particularly dense and tall. Fuel models are discussed in Appendix C.

- Wet pine savanna: The overstory of this community includes scattered slash pine and/or longleaf pine, but may also include large bay trees, sweetgum, gum trees, red maple, or cypress. Frequently burned sites have few midstory species; however, less frequently burned sites may include regenerating overstory species as well as wax myrtle, persimmon, and gallberry. The understory includes regenerating overstory and midstory species as well as huckleberry, St. John's-wort, gallberry, winged sumac, dewberry species, greenbrier species, eastern poison ivy, Darrow's blueberry, and shiny blueberry.

Under natural conditions with frequent fire frequency (once every 2 to 5 years), this community is characterized by a very open canopy of scattered pine trees to treeless plain with a dense, diverse herbaceous ground cover in the understory. There is little to no midstory component in frequently burned sites. In fire suppressed sites, a dense understory

and midstory layer of shrubs and hardwoods will develop over time. A well-developed midstory will shade out herbaceous species, resulting in little diversity in the ground cover.

Frequent, low-intensity surface fires are essential to preserving and restoring this community. Frequent fire promotes the dominance of native ground cover and decreases the encroachment of woody vegetation into the midstory. In the absence of fire, wet pine savannas are quickly invaded by hardwoods and shrubs that shade out and out-compete native species in the understory. Furthermore, the increased presence of hardwoods and shrubs in the midstory changes the behavior and intensity of fires as they burn through the stand. Increased woody vegetation in the midstory results in greater amounts of vertical fuels present and can lead to torching and crowning up into the canopy, creating more intense fire behavior and a higher potential for catastrophic fires.

Wet pine savanna at GUI is best represented by NFDRS fuel model D, except in cases where the shrub understory is particularly dense and tall.

- **Sand pine-scrub:** The overstory in this community is dominated by sand pine, with the occasional slash pine. The midstory varies with fire history. Less frequently burned sites may include Florida rosemary, rusty staggerbush, scrub oak species, and saw palmetto. More frequently burned sites will not have a well-developed shrub layer. The understory includes regenerating midstory species as well as false rosemary, saw greenbrier, Darrow's blueberry, shiny blueberry, and yucca.

This community is considered both woodland and shrubland, depending on the fire history of the site. In a more mature stand that has not had recent fire in the past 30 or more years, the community takes on more of a woodland appearance as the scrub oaks and sand pine enter into the canopy. In more recently burned sites where there is no canopy layer of scrub oak trees, the community appears as a shrubland. At this stage, dense thickets of younger scrub oaks and scrub shrubs dominate the midstory and understory layers with little ground cover.

Fire is an important ecological process of this community, with natural fire frequency estimated to be once every 20 to 80+ years. Because frequent surface fires are not prevalent in this system, fires are stand-replacing (i.e., consuming and killing most vegetation), with the vegetation species exhibiting adaptations to such. Serotinous species such as sand pine, for example, will open their cones and release seeds only under high heat conditions. Other plants have underground root systems that allow the plant to re-sprout immediately following fire. Fire thus begins a regeneration process in this community.

Sand pine-scrub at GUI is best represented by NFDRS fuel model O.

- **Scrub:** There are typically no overstory species in this community, although an occasional slash pine tree may be present. The midstory is a well-developed tall shrubland in less frequently burned sites and may include Florida rosemary, rusty staggerbush, scrub oak species, and saw palmetto. More frequently burned sites will not have a well-developed shrub layer. The understory includes regenerating midstory species and may also include false rosemary, earleaf greenbrier, Darrow's blueberry, shiny blueberry, and yucca.

Fire is an important ecological process of this community, with natural fire frequency estimated to be once every 20 to 80+ years. Because frequent surface fires are not prevalent in this system, fires are stand-replacement (i.e., consuming and killing most vegetation), with the vegetation species exhibiting adaptations to such. Serotinous species such as sand pine, for example, will open their cones and release seeds only under high heat conditions. Other plants have underground root systems that allow the plant to re-sprout immediately following fire. Fire thus begins a regeneration process in this community.

Scrub at GUIS is best represented by NFDRS fuel model O.

- Xeric sandhills: Dominant species include longleaf pine, with various large oaks present in the canopy in fire suppressed sites. Depending on the fire history of a site, xeric sandhills may develop a dense midstory of regenerating canopy species including sweetgum, yaupon, sand post oak, sparkleberry, persimmon, and sumac. A dense understory of regenerating canopy and midstory species is present in areas that are fire suppressed. Additional species present may include saw palmetto, American holly, and huckleberry.

In mature forests, this community appears as a fairly open canopied forest with widely spaced trees. There is little to no midstory in frequently burned sites. The understory is sparse and composed of deciduous oaks. A fairly dense ground cover of grasses and herbs can be present.

Fire is a dominant factor in the ecology of this community. Sandhill communities are dependent on frequent ground fires to reduce hardwoods and promote pines and grasses. It is estimated that this community type burned once every 2 to 5 years, under lightning ignitions. In the absence of frequent fire, xeric sandhills can develop into live oak hammocks or turkey oak woodlands.

Xeric sandhills at GUIS are best represented by NFDRS fuel model D, except in cases where the shrub understory is particularly dense and tall.

- Live oak hammock: The dominant overstory species in this community is live oak. The midstory is sparse and includes regenerating live oaks as well as American beautyberry, common persimmon, hollies, southern magnolia, and other oaks. The understory may include regenerating midstory species, false rosemary, saw palmetto, and blueberry.

This community is considered to be a late successional stage of scrub vegetation, and develops in the absence of fire for more than 30 years. In general, it is fire resistant, with natural fire frequency estimated to be once every 30+ years. The dominance of live oak trees and other hardwoods in the canopy and midstory of the hammock produce poor fuel conditions due to the incombustible oak leaf litter. However, under drought conditions, the palmetto understory may promote the spread of fire throughout a site. In general, fires that do burn through this community are stand-replacing, consuming and killing most vegetation within the hammock.

Live oak hammock at GUIs is best represented by NFDRS fuel model R under average fire weather parameters. Under extreme fire weather parameters, live oak hammock is better represented by NFDRS fuel model D.

- Coastal grassland: This community is characterized as an open, treeless grassland, with a sparse to dense ground cover of grasses, prostrate vines, and herbaceous species that are exposed to beach and coastline conditions. On more established sites, small clusters of pine trees or shrubs may occur.

Frequent fire may play an important role in this community by reducing woody growth and maintaining a grass-dominated ground cover. While fires probably ignite in adjacent pine flatwoods, the fine fuels of this community promote the spread of fire. Natural fire frequency in this community is probably once every 3 to 5 years.

Coastal grassland at GUIs is best represented by NFDRS fuel model L.

- Palustrine marsh: This community is characterized as an open, treeless grassland that has standing water in it a good portion of the year. The vegetation is composed mainly of herbaceous, emergent wetland species that form a continuous ground cover. Where vegetation includes woody shrubs and small trees the community is considered a palustrine shrub class.

Fire may play an important ecological role in palustrine marsh; periodic surface and ground fires are common. Natural fire frequency for this community is estimated to be once every 1 to 3 years. Frequent fires reduce the invasion of shrubs and woody growth, and promote the presence of a grass-dominated ecosystem. In frequently burned sites where soils are saturated, fine fuels of grass and dead grass litter promote fire spread. Under drier conditions when soils are not saturated, a ground fire can occur where the organic peat layer ignites and can continue to burn underground for long periods of time.

Palustrine marsh at GUIs is best represented by NFDRS fuel model N.

- Palustrine shrub: Palustrine shrub is ecologically similar to palustrine marsh. This is a water-dependent community where the vegetation is composed of wetland-dependent species. Overstory species may include red maple, sweetbay, sourgum, red bay, Carolina willow, and baldcypress. The midstory can be a thicket of tall shrubs, including red maple, buttonbush, buckwheat tree, titi, huckleberry, hollies, corkwood, sweetbay, wax myrtle, red bay, swamp bay, sourgum, and Carolina willow. In addition to midstory species, the understory can include peppervine, St. John's-wort, and dewberry.

Fire may influence the abundance, composition, and structure of palustrine shrub vegetation. This community is more resistant to frequent fire than palustrine marsh. The fuels are poor, and mostly composed of incombustible materials. Natural fire frequency is probably once every 5 to 10 years. Under drier conditions, fires can carry across this community, consuming and killing all vegetation present. However, re-sprouting occurs immediately

following fire. Although fire is currently used as a management tool to reduce woody growth in this community, the effects of different seasons of burn are unclear.

Palustrine shrub at GUI is best represented by NFDRS fuel model O.

- Estuarine marsh: This grassland community has few overstory species present, although cabbage palms may occur infrequently throughout a site. The midstory is sparse, but may include falsewillow, marshelder, and wax myrtle, which make up the majority of tall shrubs if present. In addition to occasional midstory species, the understory may include amaranth, saltbush, rosemallow, saltmarsh mallow, and common reeds. The ground cover may include saltwort, sedges, Jamaica swamp sawgrass, saltgrasses, rushes, and cordgrasses.

Estuarine marshes are, by definition, exposed to tidal influence at least once daily. The natural fire frequency and importance of natural fire to this community are not well understood. Current management of estuarine marshes includes fire use to produce young plant shoots as a food source for migrating waterfowl and shorebirds. Fire also reduces woody growth into open salt marshes and maintains a grass and herb ground cover. Fire is promoted in areas as frequently as once a year to once every 3 years.

Estuarine marsh at GUI is best represented by NFDRS fuel model N.

- Estuarine shrub: Although similar in ecology to estuarine marsh vegetation, this community is characterized as a shrubland. The overstory is similar to estuarine marsh, with cabbage palm occurring occasionally. The midstory is more prominent in this community, and is composed of a thicket of shrubs including saltwater falsewillow, marshelder, and wax myrtle. The understory is similar to estuarine marsh species, and includes amaranth, saltbush, rosemallow, saltmarsh mallow, and common reeds. The ground cover is similar to that of estuarine marsh.

This community is considered a more mature area of estuarine marsh where thickets of salt-tolerant shrubs have invaded higher elevation areas that may not be exposed to tidal influence. The natural fire frequency and importance of natural fire to this community are not well understood. Current management of estuarine shrub includes fire use to reduce woody growth, so as to develop more open salt marshes and maintain a grass and herb ground cover. Fire is promoted in areas as frequently as once a year to once every 3 years.

Estuarine shrub at GUI is best represented by NFDRS fuel model O.

- Beach dune: This community occurs on the foredune or first dune parallel to the shore. Very few species occur in the overstory, but they may include red cedar, slash pine, or cabbage palm. The midstory is not prominent, and may include isolated individuals of saltwater falsewillow, marshelder, and regenerating overstory species. The understory may include saltbush, and juveniles of midstory species. The ground cover is mostly barren.

Fire does not play a significant role in the structure or composition of this community. Fires will occasionally burn into beach vegetation, but due to its sparse nature it generally does not promote fire spread.

The report entitled *Wetland Delineation and Hydrologic/Community Survey of the Davis Bayou Area of Gulf Islands National Seashore* (MSU, 2002) provides detailed discussion of vegetative communities/habitats that occur within the Davis Bayou unit of GUIIS, as well as fire management recommendations for these areas.

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)

Activities proposed under the No Action Alternative 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.

Suppression of human-caused wildland fire and most naturally-caused wildland fires would occur in all eleven of the currently designated FMUs. 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 for unplanned ignition, there is a danger that wildland fire could pose risks to vegetation communities if fires become severe. When fuel concentrations are very high, even fire-adapted species are likely to be killed by an intense wildfire. In addition to the soil impacts described above, high severity fires may kill tree cambium and below-ground plant components, thereby reducing seedling establishment and regeneration. 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).

The use of prescribed fire would have long-term beneficial impacts to the vegetation found within each fire management unit. Prescribed fires would serve to restore proper ecosystem function because fire plays an essential role in maintaining successional stages. 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 an absence of fire favors fire-intolerant species over fire-dependent ones, efforts to restore historic fire regimes would improve plant habitat and diversity. Fuel loadings would be reduced, thereby reducing the probability of high-intensity wildfires that may cause considerable vegetation damage. After the initial prescribed burn, the area would be monitored for the return of exotic species, which would be removed if found.

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 present in those areas.

3.3.2.2 Alternative 2 (Proposed Action)

Proposed activities with the potential to affect vegetation include the addition of the Cat Island 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.

The addition of Cat Island would have little additional impact on vegetation. There have been no recorded wildland fires on this FMU; therefore, extensive fire suppression efforts would not likely be necessary. Mechanical creation and maintenance of fuel breaks would result in the mortality of some plants and trees; however, these 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 as a whole.

Although all wildland fire would be suppressed under this alternative, attempts would be made to maintain natural fire cycles through prescribed burning.

Conclusion

Alternatives 1 and 2 would both contribute to improved vegetation conditions at GUIIS, and neither is likely to cause substantial damage to existing vegetation. There are vegetation risks associated with limited wildland fire use, as permitted in the “No Action” alternative.

Alternative 2 would attain the widest range of beneficial uses without contributing to potentially substantial vegetation damage.

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

A wide variety of wildlife species inhabit the Seashore, many in numbers not found outside of seashore boundaries. The faunal community includes permanent resident species, as well as species present only on a seasonal or transitory basis. Twenty-three of the faunal species identified at GUIS are federally- and/or state-listed (see Table 3-2, below).

The following mammals, reptiles and amphibians occur at the seashore.

- Mammals: Virginia opossum, eastern mole, little brown myotis (bat), nine-banded armadillo, eastern cottontail (rabbit), American beaver, house mouse, eastern woodrat, marsh rice rat, cotton mouse, Santa Rosa beach mouse, Perdido Key beach mouse, black rat, eastern gray squirrel, hispid cotton rat, coyote, common gray fox, red fox, black bear, common raccoon, striped skunk, northern river otter, manatee, bottle-nosed dolphin.
- Reptiles: loggerhead sea turtle, green sea turtle, snapping turtle, leatherback sea turtle, gopher tortoise, eastern mud turtle, Kemp's ridley sea turtle, common cooter, eastern box turtle, slider, American alligator, green anole, six-lined racerunner, mole skink, broadhead skink, eastern glass lizard, southern fence lizard, ground skink, cottonmouth, scarlet snake, southern black racer, eastern diamondback rattlesnake, corn snake, southern hognose snake, coachwhip, eastern coral snake, plainbelly water snake, southern water snake, banded water snake, Florida green water snake, brown water snake, rough green snake, pigmy rattlesnake, redbelly snake, southeastern crowned snake, eastern ribbon snake, common garter snake.
- Amphibians: southern cricket frog, green treefrog, pine woods treefrog, barking treefrog, squirrel treefrog, ornate chorus frog, pig frog, southern leopard frog, two-toed amphiuma, eastern newt, slimy salamander, oak toad, southern toad, eastern narrowmouth toad.
- Birds: More than 280 species of birds use the seashore for loafing, nesting, feeding, wintering, or migratory rest stops. They include songbirds, waterfowl, wading birds, birds of prey, marine birds, and shorebirds, with numbers varying according to the season. Common species include the common loon, pied-bill grebe, double-crested cormorant, blue-winged teal, lesser scaup, red-breasted merganser, clapper rail, black-

bellied plover, American coot, killdeer, willet, ruddy turnstone, sanderling, spotted sandpiper, dunlin, laughing gull, common nighthawk, chuck-will's widow, red-bellied woodpecker, least tern, pine warbler, common yellowthroat, cattle egret, green heron, yellow-crowned night-heron, royal tern, mourning dove, eastern screech owl, northern flicker, great crested flycatcher, eastern kingbird, purple martin, marsh wren, eastern towhee, broad-winged hawk, western sandpiper, yellow warbler, white-eyed vireo, common goldeneye, bufflehead, downy woodpecker, blue jay, tufted titmouse, brown-headed nuthatch, and brown thrasher.

- **Fish and Aquatic Invertebrates:** More than 200 species of fish occur within Seashore waters, with numbers varying according to the season. Common species include anchovy, bluefish, cobia, croaker, grouper, pompano, sea trout, snapper, saltwater mullet, flounder, red fish, king mackerel, channel bass, kingfish, jack, tarpon, and several species of sharks and rays.

Several species of shellfish that are of commercial, recreational, and ecological importance occur at GUIs, including blue crabs, stone crabs, and shrimp. Water bottoms around the seashore in the Mississippi and Florida districts are important nursery areas for most species of shellfish.

Threatened and Endangered Species, and Designated Critical Habitat

The seashore is a permanent or seasonal home to the following federally- and/or state-listed species:

Table 3-2 Federally- and State-Listed Species Identified at GUIs

Common Name	Scientific Name	Federal Status	FL Status	MS Status
Marine Mammals				
Florida (West Indian) manatee	<i>Trichechus manatus latirostris</i>	E	E	SZ
Terrestrial Mammals				
Louisiana black bear	<i>Ursus americanus luteolus</i>	T	-	T
Perdido Key beach mouse	<i>Peromyscus polionotus trissyllepsis</i>	E	E	-
Santa Rosa beach mouse	<i>Peromyscus polionotus leucocephalus</i>	-	SC	-
Aquatic Reptiles				
American alligator	<i>Alligator mississippiensis</i>	T (S/A)	SC	-
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E	E	SZN
Atlantic green turtle	<i>Chelonia mydas mydas</i>	E	E	SZN
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E	E	S1N
Atlantic loggerhead sea turtle	<i>Caretta caretta</i>	T	T	S1B, SZN
Alligator snapping turtle	<i>Macroclmys temorincki</i>	-	SC	-
Alabama Red-bellied turtle	<i>Pseudemys alabamensis</i>	E	-	-
Terrestrial Reptiles				
Gopher tortoise	<i>Gopherus polyphemus</i>	T (MS)	SC	S2
Fish				
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>	T	SC	S1
Saltmarsh topminnow	<i>Fundulus jenkinsi</i>	-	SC	-
Birds				
Brown pelican	<i>Pelecanus occidentalis</i>	E (MS)	SC	S1N

Piping plover	<i>Charadrius melodus</i>	T	T	SZN
Peregrine falcon	<i>Falco peregrinus</i>	Delisted	E	SZN
Southeastern snowy plover	<i>Charadrius alexandrinus tenuirostris</i>	-	T	S2B, SZN
Least tern	<i>Sterna antillarum</i>	-	T	S3B
Southeastern American kestrel	<i>Falco sparverius paulus</i>	-	T	-
Black skimmer	<i>Rynchops niger</i>	-	SC	S3
Reddish egret	<i>Egretta rufescens</i>	-	SC	-
Little blue heron	<i>Egretta caerulea</i>	-	SC	-
Snowy egret	<i>Egretta thula</i>	-	SC	-
Mississippi sandhill crane		E	-	E
Aquatic Plants				
Louisiana quillwort	<i>Isoetes louisianensis</i>	E	-	E
Terrestrial Plants				
White-top pitcher plant	<i>Sarracenia leucophylla</i>	-	E	S2S3
Cruise's golden aster	<i>Chrysopsis gossypina ssp. cruiseana</i>	-	E	-
Godfrey's golden aster	<i>Chrysopsis godfreyi</i>	-	E	-
Gulf Coast lupine	<i>Lupinus westianus</i>	-	T	-
Curtiss' sandgrass	<i>Calamovilfa curtissii</i>	-	T	-
Large-leaved jointweed	<i>Polygonella macrophylla</i>	-	T	-

Keys to table: E = endangered; SC = species of special concern; T = threatened; T (S/A) = similar appearance to a threatened taxon; S1 = critically imperiled in MS because of extreme rarity or because of some factor(s) of its biology making it especially vulnerable to extirpation; S2 = imperiled in MS because of rarity or because of some factor(s) demonstrably making it very vulnerable to extirpation; S3 = rare or uncommon in MS; SZ = zero occurrences in MS, not of practical conservation concern in the state, because there are no definable occurrences, although the taxon is native and appears regularly in the state; B = breeding status; N = non-breeding status
Source: NPS, 2004

Although the bald eagle has the potential to occur on the Seashore, the status of the bald eagle is no longer threatened. The final rule for delisting the bald eagle was published in the Federal Register on July 9, 2007. While no longer protected under the Act, the bald eagle continues to be managed under two Federal laws: the Bald and Golden Eagle Protection Act (BGEPA) and Migratory Bird Treaty Act (MBTA).

In compliance with Section 7 of the Endangered Species Act, the U.S. Fish and Wildlife Service (FWS) reviewed the proposed Fire Management Plan (Appendix A). The FWS provided determinations of species in the park, as listed above, and provided comments regarding potential species-specific impacts (listed below, under Environmental Consequences). 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.

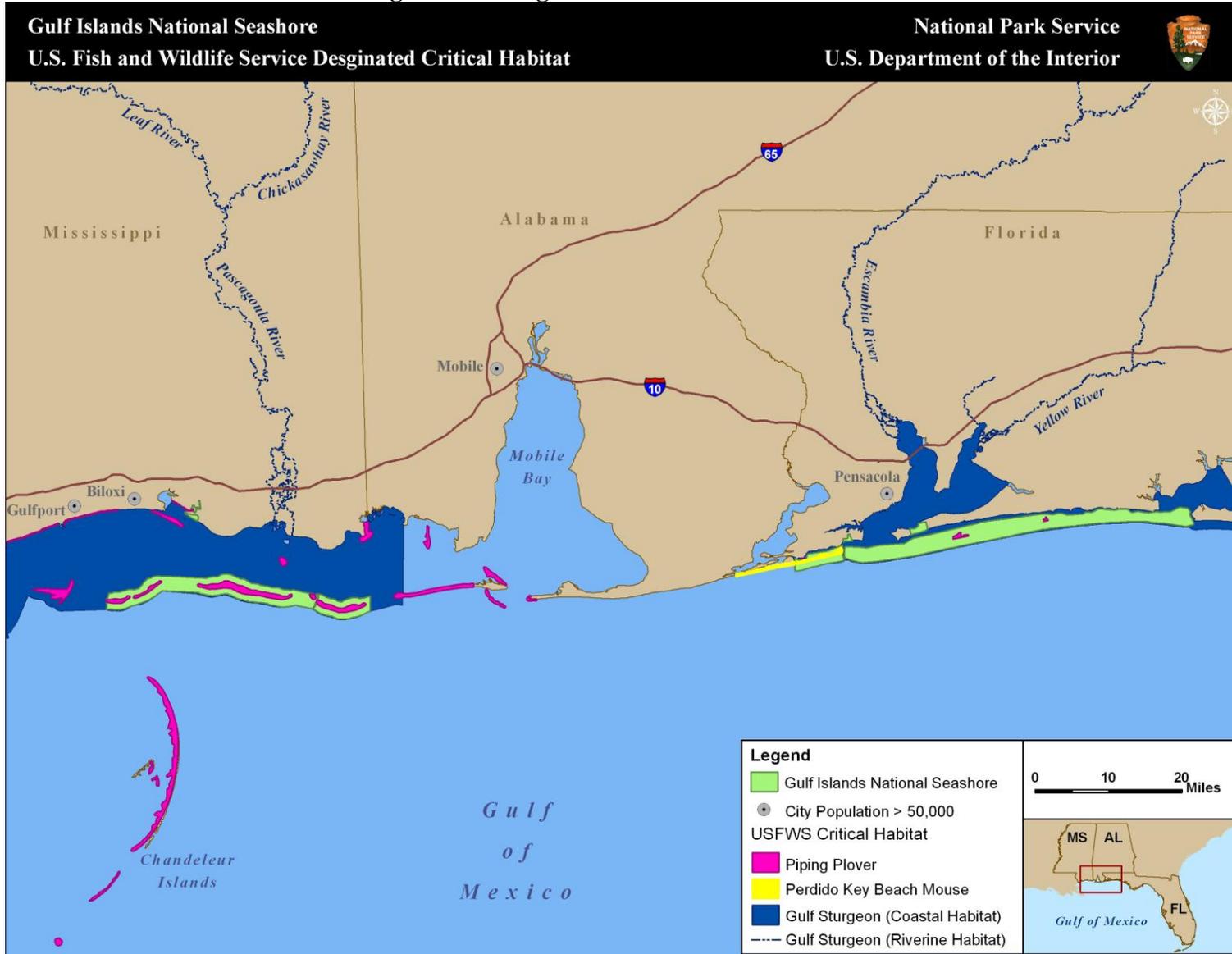
Designated Critical Habitat (Figure 3.1)

- Perdido Key Beach Mouse: Within the Florida District of GUIs, the Perdido Key area of the seashore is designated critical habitat for the Perdido Key beach mouse.
- Gulf Sturgeon: Within the Mississippi District of GUIs, designated critical habitat includes areas within one nautical mile offshore of the barrier islands of the Mississippi Sound, as well as the passes (Ship Island Pass, Dog Keys Pass, Horn Island Pass and Petit Bois Pass). Within the Florida District of GUIs, nearshore waters within one nautical

mile of the mainland from Pensacola Pass to Apachicola Bay and the Perdido Key area, and the area north of Santa Rosa Island are designated as critical habitat.

- Piping Plover: Within the Mississippi District of GUIIS, critical habitat for wintering piping plovers has been designated on the barrier islands. No critical habitat has been designated within the Florida District of GUIIS; however, according to the U.S. Fish and Wildlife Service, any place that GUIIS staff observe wintering piping plovers within the seashore will be treated the same as critical habitat (NPS, 2004).

Figure 3-1 Designated critical habitat at GUIS



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)

Activities under the No Action Alternative 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).

Threatened and endangered wildlife species have not been observed in areas currently proposed for prescribed burning activities. However, 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).

Wildland fire resulting from natural causes, such as lightning, may impact various species or their habitat. However, proper monitoring and mitigation would likely reduce adverse effects to wildlife during unplanned fire events.

Non-fire fuels treatments would include mowing open areas during the growing season, reducing hazard fuels accumulations, maintaining existing defensible space around structures, maintaining existing firebreaks, and creating and maintaining hazardous fuels breaks along a section of the Seashore's perimeter to help prevent the spread of fire to and from adjacent non-agency land. These activities have the potential to harm individuals of wildlife populations and/or their habitats. However, these adverse impacts would be minor and short term and would, therefore, not jeopardize the viability of the populations on and adjacent to the Seashore.

Endangered Species

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

As stated in the National Park System's 2001 Management Policies, active management programs would be undertaken to inventory, monitor, restore, and maintain federally- or state-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.

Wildland fire due to natural causes, such as lightning, has the potential to impact critical habitat for threatened and endangered species. However, proper monitoring and mitigation would likely reduce adverse effects on species during unplanned fire events.

Potential Species-Specific Impacts

Manual and mechanical vegetation management treatments have the potential to impact beach mice. Beach mice habitat would therefore be avoided to the greatest extent possible, and FWS staff would be contacted prior to conducting any potentially harmful treatments.

The National Bald Eagle Management Guidelines specify that selective thinning (including the proposed hazardous fuel reductions treatments), as well as prescribed burning close to an eagle's nest tree, should be undertaken outside the breeding season. Precautions such as raking leaves and woody debris from around the nest tree should be taken to prevent crown fire or fire climbing the nest tree. If it is determined that a burn during the breeding season is beneficial, then, to ensure that no take or disturbance will occur, these activities should be conducted only when neither adult eagles nor young are present at the nest tree (i.e. at the beginning of, or end of, the breeding season, either before the particular nest is active or after the young have fledged from that nest). Appropriate Federal and State biologists would be consulted before any prescribed burning is conducted during the breeding season. If aerial ignition is employed during burning operation, avoid operating aircraft within 1,000 feet of a nest during breeding season. Aircraft pilots should be made aware of the presence of any and all nests in the vicinity of burning operations.

To avoid collapsing gopher tortoise burrows during any proposed activities, equipment would remain at least 25 feet away from burrows. In areas where tortoises could potentially occur, operators would be made aware of the status of the species and its protection under Federal (in Mississippi) and State laws.

The occurrence of any listed species would be included on burn plan maps with any appropriate avoidance and minimization measures included in the burn plan.

3.4.2.2 Alternative 2 (Proposed Action)

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 treatments. Under this alternative, there would be no use of unplanned ignition.

Impacts of wildland fire suppression, prescribed fire, debris burns, and mechanical fuels treatments would be similar to the impacts described under the No Action Alternative.

The addition of the Cat Island FMU would contribute to minor impacts on wildlife in the area due to fire suppression efforts and the use of non-fire fuels treatments, as described above. In all units, natural fire cycles that are beneficial to wildlife habitat would be maintained as much as possible through prescribed burning and mechanical fuels treatments.

Endangered Species

Potential impacts to endangered or threatened wildlife species or species of concern resulting from proposed treatments, and corresponding mitigation measures, would be the same as in the No Action alternative.

Conclusion

Habitat conditions for many wildlife species would improve with the restoration of historic fire regime characteristics. 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, Gulf Islands National Seashore is designated as a Class II airshed. 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.

Gulf Islands National Seashore has generally good air quality because it is remote from major sources of pollution. Breton Islands National Refuge/National Wilderness Area is located 40 miles south of East Ship and West Ship islands. This area has been designated as a Class I airshed and is managed by the U.S. Fish and Wildlife Service. Park Service personnel must, therefore, ensure that burning activities at GUIs do not interfere with the more stringent air quality standards at Breton Islands.

3.5.2 Environmental Consequences

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

3.5.2.1 Alternative 1 (No Action)

The use of prescribed fire and debris burns has the potential to impact air quality. Smoke consists of dispersed airborne solid 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 use of heavy machinery such as brush hogs and mowers for mechanical fuels treatments would also contribute to minor increases in fossil fuel emissions in the area of their use.

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.

The Mississippi Department of Environmental Quality (DEQ) is responsible for regulating air quality standards within the state, and the Mississippi Forestry Commission (MFC) handles agricultural and silvicultural burning regulations. The MFC issues permits based on daily fire weather forecasts.

For prescribed fires, there are three principle strategies to manage smoke and reduce air quality impacts. 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 through manual thinning 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 Florida DOF or the MFC of all fire management activities, as follows:

- A copy of GUIIS's annual prescribed fire program would be sent to the appropriate agency prior to the burning season, and agency personnel invited to observe prescribed burns.
- A burning permit would be obtained from the agency for each prescribed burn; the Seashore would comply with all limitations stated within the permit.
- Notification would be given to the agency 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 degrade air quality to a degree that negatively affects public health. If weather conditions change unexpectedly during a prescribed fire, and there is potential for violating air quality standards, immediate suppression action would be taken.

To avoid adverse smoke impacts on 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, and in light of current air quality in the areas and approval of the burn permits by the Florida DOF or the MFC, 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 (Proposed Action)

Under Alternative 2, air quality impacts would be similar to those described under the No Action alternative. Suppression of all wildland fires would reduce potential air quality impacts. 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 WILDERNESS AREAS

3.6.1 Affected Environment

In 1978, Horn Island and Petit Bois Island were designated as wilderness areas. All land on Horn Island (3,650 acres) is wilderness or potential wilderness. The potential wilderness is property that is partially owned by private individuals, and a seven-acre enclave with NPS administrative facilities. Negotiations to acquire non-federal interests in land on Horn Island are underway. All land on Petit Bois Island (1,466 acres) is wilderness, with no enclaves or inholdings.

As per the seashore's 2004 Wilderness Management Plan (WMP), the seashore will manage its wilderness in such a way as to "ensure the protection, preservation, restoration, appreciation, and enjoyment of this wilderness for future generations in an unimpaired condition." The WMP's objectives are:

- To manage with a minimum of intrusion.
- To provide for solitude and primitive, unconfined recreation.
- To preserve the character of the wilderness.
- To control nonconforming use and to prevent unnecessary or undue reduction of wilderness values.

The WMP states that all activities conducted in the Gulf Islands Wilderness will follow a decision process, and the process recorded and archived in the Seashore's administrative record. This will serve to meet a desired future condition of a wilderness unaffected by the works and acts of humankind; and to provide a permanent record of decisions. Projects will be assessed first for their suitability within the Gulf Islands Wilderness and, for projects determined to be suitable, the selection of the minimum tool or technique to use in the completion of the project will be made based on this process. When necessary, the minimum decision process will be accompanied by appropriate environmental documentation.

GUIS will use the established decision process to determine the minimum requirements for a specific management activity in the Gulf Islands Wilderness. All proposed management actions will be evaluated using this process. The seashore superintendent will approve final management decisions.

3.6.2 Environmental Consequences

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

3.6.2.1 Alternative 1 (No Action)

Activities with the potential to impact wilderness areas include fire suppression, prescribed burning, and maintenance of existing defensible space around Seashore structures. These proposed activities would not seriously compromise wilderness values. As per the WMP, minimum impact suppression tactics will be used in managing all fires that may occur in the Gulf Islands Wilderness. Horn and Petit Bois islands will be zoned into fire management blocks. Wildland fires would be managed by indirect attack in those blocks. Natural fire breaks would be utilized first.

On Horn and Petit Bois islands, chainsaws and portable pumps would be used only with the approval of the seashore superintendent or designee, except when necessary for the protection of human life, structures, and/or sensitive natural or cultural resources. No other mechanized equipment would be used except in life-threatening situations or with the approval of the seashore superintendent or designee.

The use of prescribed fire to maintain natural fire regimes is consistent with the restoration and preservation of wilderness values as described in the Wilderness Act, and would have long-term beneficial impacts to the wilderness character. Adverse impacts to designated wilderness would likely be short-term and minor.

3.6.2.2 Alternative 2 (Proposed Action)

Impacts to wilderness areas associated with the proposed action would be identical to those described under Alternative 1.

Conclusion

Negative impacts to wilderness areas, under either alternative, would be very minor and temporary during suppression, prescribed burning, and manual thinning activities. The use of fire for resource management purposes in both alternatives is consistent with the restoration and preservation of wilderness values as described in the Wilderness Act. In addition, temporary effects (*e.g.* noise, visual impacts) on the wilderness would be mitigated through the use of Minimum Impact Suppression Tactics. The implementation of either alternative would not significantly impact wilderness areas at GUIS 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.

3.7 VISITOR USE AND EXPERIENCE (INCLUDING PARK OPERATIONS)

3.7.1 Affected Environment

Gulf Islands National Seashore was visited by nearly 2 million people in 2006 (NPS, 2006). Visitors typically engage in activities such as developed and primitive camping, bicycling, swimming, snorkeling, fishing, hiking, beach combing, bird watching, and boating.

Each section of the Seashore offers unique attractions. For example, Santa Rosa Island was the site of the Battle of Santa Rosa Island in the Civil War; Perdido Key is one of the few remaining unchanged portions of wilderness in the Florida Panhandle, offering numerous opportunities for wildlife viewing; and Horn Island offers beautiful beach views and unique habitats.

Undeveloped camping is permitted in the Mississippi District on Horn, Petit Bois, East Ship, and Cat Islands. In Florida, visitors may camp on Perdido Key and at the Fort Pickens Loop A Campground. Several picnic pavilions are also located throughout both districts.

3.7.2 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.

3.7.2.1 Alternative 1 (No Action)

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

Seashore operations may be temporarily affected during wildfire or prescribed fire events depending on the severity of the fire and situation at hand. With careful planning and preparation, these impacts would be largely minimized.

3.7.2.2 Alternative 2 (Proposed Action)

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

Suppression of all wildfire events would result in diminished impacts to visitor use, and 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.

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 are 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). However, the implementation of any of the alternatives would not significantly impact the visitor use and experience at GUIS 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.

3.8 HUMAN HEALTH AND SAFETY

3.8.1 Affected Environment

Prior to the ignition of any prescribed fire in the park, all the burn parameters of the existing and approved prescribed 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.

3.8.2 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.

3.8.2.1 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 relate 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 fire to 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 replacing fire.

3.8.2.2 Alternative 2 (Proposed Action)

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 and relatively short-term.

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 through fire management activities by reducing the probability of severe wildland fire.

3.9 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.

3.9.1 Affected Environment

The Gulf Islands vicinity has experienced over 2,500 years of human habitation. The variety of prehistoric middens within seashore boundaries and the known history of the Gulf Coast sites indicate an established American Indian culture until first contact in 1590. By the first historic settlement in 1599, local Indian populations were reduced to the point of near annihilation through epidemic diseases introduced by Europeans and attacks by aggressive tribes located in the Mobile Bay area. Early Spanish mission establishment in the early 1600s was followed by invasion of British and Creek Indian forces in the 1700s. The Creeks, later known as the Seminoles, occupied areas previously inhabited by the Spanish and various Indian tribes (NPS, 2004).

This portion of the Gulf Coast has been influenced by several different regions of the world. The first development on East Ship and West Ship islands dates from the late 1600s French Louisiana period when Biloxi was the regional capital. When the Spanish ceded the lands that would become the state of Florida in 1819, the United States gained one of the best deep-water harbors on the Gulf Coast. Andrew Jackson served as the first governor for the new Florida Territory in 1821 (FDHR, n.d.). In the 1830s, the United States began building a critical system of military defensive works. The fortification system, including Fort Pickens, Fort McRee, Fort Barrancas, and the Advanced Redoubt, was designed to protect the Pensacola Navy Yard. Seashore waters contain many shipwrecks, some dating from the Spanish exploration period.

The seashore has about 170 known archeological sites (NPS, 2004). Sites include prehistoric shell middens and mounds; historic cemeteries, shipwrecks, lighthouse complexes, and coastal defense fortifications spanning more than two centuries of military activity.

Cultural resources at GUIS that are listed in the National Register of Historic Places include:

- Fort Barrancas Historic District (#66000263); the fort is also a National Historic Landmark
- Fort Massachusetts (#71000067)
- Fort Pickens (#72000096)
- Naval Live Oaks Historic District (#78003528)
- Perdido Key Historic District (#80000404)
- French Warehouse Site (#91001768)
- Butcherpen Mound (#98001165)
- Big Heart West (#98001167)
- First American Road in Florida (#98001168)
- Naval Live Oaks Reservation (#98001169)
- Third Gulf Breeze (#98001164)

GUIS maintains two museum collections, one within the Mississippi District and the other within the Florida District. Collections include prehistoric and historic objects, biological specimens, and archival materials. Cultural materials are stored at the seashore, at the NPS Southeastern Archeological Center in Tallahassee, and in outside repositories such as the University of West Florida.

3.9.2 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.

3.9.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact known and unknown cultural resources include fire suppression, constructing fuel breaks, thinning, and prescribed fire. The Florida Department of State, Division of Historical Resources and the Mississippi Department of Archives and History, determined that the draft FMP adequately addresses the concern for prehistoric and historic resources located within the Gulf Islands National Seashore and the potential impacts from fire and fire management activities. The consultation responses can be found in Appendix A. Per recommendations from the Mississippi Department of Archives and History, a cultural resources survey would be performed prior to the construction of any fire breaks, fire lanes, or roads, or any other activity which may cause ground disturbance. The Seashore would also strive to protect cultural resources by implementing the following fire management practices:

- The GUIS resource management specialist would continue coordination with the Southeast Archaeological Center to ensure that GUIS 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 GUIS 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 GUIS 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 GUIS 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

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.

3.9.2.2 Alternative 2 (Proposed Action)

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.

3.10 CUMULATIVE IMPACTS

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (42 USC 4321 *et seq.*), require assessment of cumulative impacts in the decision-making process for Federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

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.

The most substantial cumulative impact to the Seashore's resources has been development along the park boundaries and a corresponding increase in park visitation. These developments have led to increased pressure on soil, air, and water resources; vegetation damage; and wildlife impacts. The fire management activities proposed described in both the No Action and the Proposed Action alternatives would contribute to only minor, temporary increases in these impacts. In many instances, the proposed fire management activities would benefit both the adjacent developments and the interior forest by reducing hazardous fuels levels in the wildland-urban interface. This, in turn, would reduce the likelihood of intense wildfires that may cause considerable damage to structures as well as park resources.

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APPENDIX A

CONSULTATIONS WITH
U.S. FISH AND WILDLIFE SERVICE,

MISSISSIPPI DIVISION OF ARCHIVES AND HISTORY,

and

FLORIDA DEPARTMENT OF STATE:
DIVISION OF HISTORICAL RESOURCES

Insert USFWS Consultation letter here.

MISSISSIPPI DEPARTMENT *of* ARCHIVES AND HISTORY



HISTORIC PRESERVATION
Ken P'Pool, Director
PO Box 571, Jackson, MS 39205-0571
601-576-6940 • Fax 601-576-6955
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November 21, 2007

Jennifer Karanian
Project Manager
Mangi Environmental Group, Inc.
7915 Jones Branch Drive
McLean, Virginia 22102

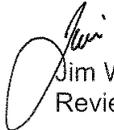
RE: Draft Gulf Islands National Seashore Fire Management Plan, MDAH Project Log
#10-194-07, Jackson County

Dear Jennifer:

We have reviewed the Draft Gulf Islands National Seashore Fire Management Plan, received on October 25, 2007, for the above referenced project in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, it is our recommendation that in implementing the fire management plan, a cultural resources survey should be performed prior to the construction of any fire breaks, fire lanes or road building, or any other activity which may cause ground disturbance. With that recommendation, we concur with the proposed fire management plan.

If you have any questions, please contact Pamela Lieb, MDAH Chief Archaeologist, at 601-576-6940.

Sincerely,


Jim Woodrick
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

c: Clearinghouse for Federal Programs



FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Jennifer Karanian
Mangi Environmental Group, Inc.
7915 Jones Branch Drive
McLean, Virginia 22101

November 30, 2007

RE: DHR Project File Number: 2007-8238
National Park Service
Environmental Assessment - Gulf Islands National Seashore Draft Fire Management Plan
Escambia County

Dear Ms. Karanian:

Our office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value. The review was conducted 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 *National Environmental Policy Act of 1969*, as amended and the implementing state regulations.

It is the opinion of this office that the *Draft Fire Management Plan* adequately addresses the concern for prehistoric and historic resources located within the Gulf Islands 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 sedwards@dos.state.fl.us, or at 850-245-6333 or 800-847-7278.

Sincerely,

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

500 S. Bronough Street • Tallahassee, FL 32399-0250 • <http://www.flheritage.com>

<input type="checkbox"/> Director's Office (850) 245-6300 • FAX: 245-6436	<input type="checkbox"/> Archaeological Research (850) 245-6444 • FAX: 245-6452	<input checked="" type="checkbox"/> Historic Preservation (850) 245-6333 • FAX: 245-6437	<input type="checkbox"/> Historical Museums (850) 245-6400 • FAX: 245-6433
<input type="checkbox"/> Southeast Regional Office (561) 416-2115 • FAX: 416-2149	<input type="checkbox"/> Northeast Regional Office (904) 825-5045 • FAX: 825-5044	<input type="checkbox"/> Central Florida Regional Office (813) 272-3843 • FAX: 272-2340	

APPENDIX B

Five Year Prescribed Burn Plan

Year	FMU	Burn Unit Name	Acres	Year Accomplished
1999	Naval Live Oaks	NLO-8	33	02/1999
1999	Naval Live Oaks	NLO-7A	30	02/1999
2000	Naval Live Oaks	NLO-7B	64	03/2000
2000	Naval Live Oaks	NLO-9 (Villa Venyce)	90	02/2000
2000	Naval Live Oaks	NLO-5 Gopher Tortoise "Attempt"	8.5	03/2000
2002	Davis Bayou Unit	Pitcher Plant	8	02/2002
2002	Naval Live Oaks	NLO-6	60	03/2002
2002	Naval Live Oaks	NLO-5 Gopher Tortoise "Attempt 2"	19	03/2002
2003	Naval Live Oaks	NLO-5B (Pinelands)	44	03/2003
2003	Naval Live Oaks	NLO-7A	30	03/2003
2006	Naval Live Oaks	NLO-8	35	March, 2006
2007	Naval Live Oaks	NLO-8	37	2007
2007	Naval Live Oaks	NLO-6	60	2007
2007	Naval Live Oaks	NLO-7B	64	2007
2007	Naval Live Oaks	NLO-9	90	2007
2007	Naval Live Oaks	NLO-10	25	2007
2008	Naval Live Oaks	NLO-4d	91.5	
2008	Naval Live Oaks	NLO-4c	50	
2008	Davis Bayou	Park Block (South Savanna)	59.7	
2008	Naval Live Oaks	NLO-1 with NLO-2A (possible)	100	
2008	Naval Live Oaks	NLO-5B	44	
2008	Naval Live Oaks	NLO-7A	30	
2009	Naval Live Oaks	NLO-4A	40	
2009	Davis Bayou	Trail Block (Pine Uplands)	41.9	
2009	Naval Live Oaks	NLO-9	90	
2009	Naval Live Oaks	NLO-5A	93	

Year	FMU	Burn Unit Name	Acres	Year Accomplished
2010	Naval Live Oaks	NLO-8	72	
2010	Naval Live Oaks	NLO-7B	64	
2010	Naval Live Oaks	NLO-6	60	
2010	Davis Bayou	Eagle Block and HQ Block	14	
2011	Naval Live Oaks	NLO-5B	44	
2011	Davis Bayou	Park Block (South Savanna)	59.7	
2011	Naval Live Oaks	NLO-10	25	
2011	Naval Live Oaks	NLO-4d	50	
2012	Naval Live Oaks	NLO-7A	30	
2012	Naval Live Oaks	NLO-4A	40	
2012	Davis Bayou	Trail Block (Pine Uplands)	41.9	
2012	Naval Live Oaks	NLO-5A	93	
2012	Naval Live Oaks	NLO-9 (Villa Venyce)	90	

APPENDIX C

Fuel Characteristics and Fire Behavior

The primary fuel types represented at GUIS have been classified according to the National Fire Danger Rating System (NFDRS) and the Northern Forest Fire Laboratory Fire Behavior Prediction System (FBPS) (Deeming et al 1978:30, Anderson 1982). Figures 4 and 5 delineate fuel model boundaries within the Davis Bayou and Naval Live Oaks units, respectively.

- ❖ NFDRS Fuel Model D (FBPS Fuel Model 7): This model is specifically for the palmetto-gallberry understory/pine overstory association of the southeastern coastal plains. It can also be used for the so-called “low pocosins” where fuel model O might be too severe. This model should only be used in the Southeast because of a high moisture of extinction.

At GUIS, fuel model D best represents pine flatwoods, wet pine savanna, and xeric sandhills, all with an understory shrub component. If the understory shrub component is particularly dense and tall, these areas are better represented by fuel model O (FBPS fuel model 4).

- ❖ NFDRS Fuel Model L (FBPS Fuel Model 1): This model is meant to represent western grasslands vegetated by perennial grasses. The principal species are coarser and heavier than those represented by fuel model A. Otherwise the situations are very similar; shrubs and trees occupy less than one-third of the area.

At GUIS, fuel model L best represents coastal grassland and beach dune vegetation.

- ❖ NFDRS Fuel Model N (FBPS Fuel Model 3): This model was constructed specifically for the sawgrass prairies of south Florida. It may be useful in other marsh situations where the fuel is coarse and reed-like. This model assumes that one-third of the aerial portion of the plants are dead. Fast-spreading, intense fires can occur even over standing water.

At GUIS, fuel model N best represents palustrine marsh and estuarine marsh.

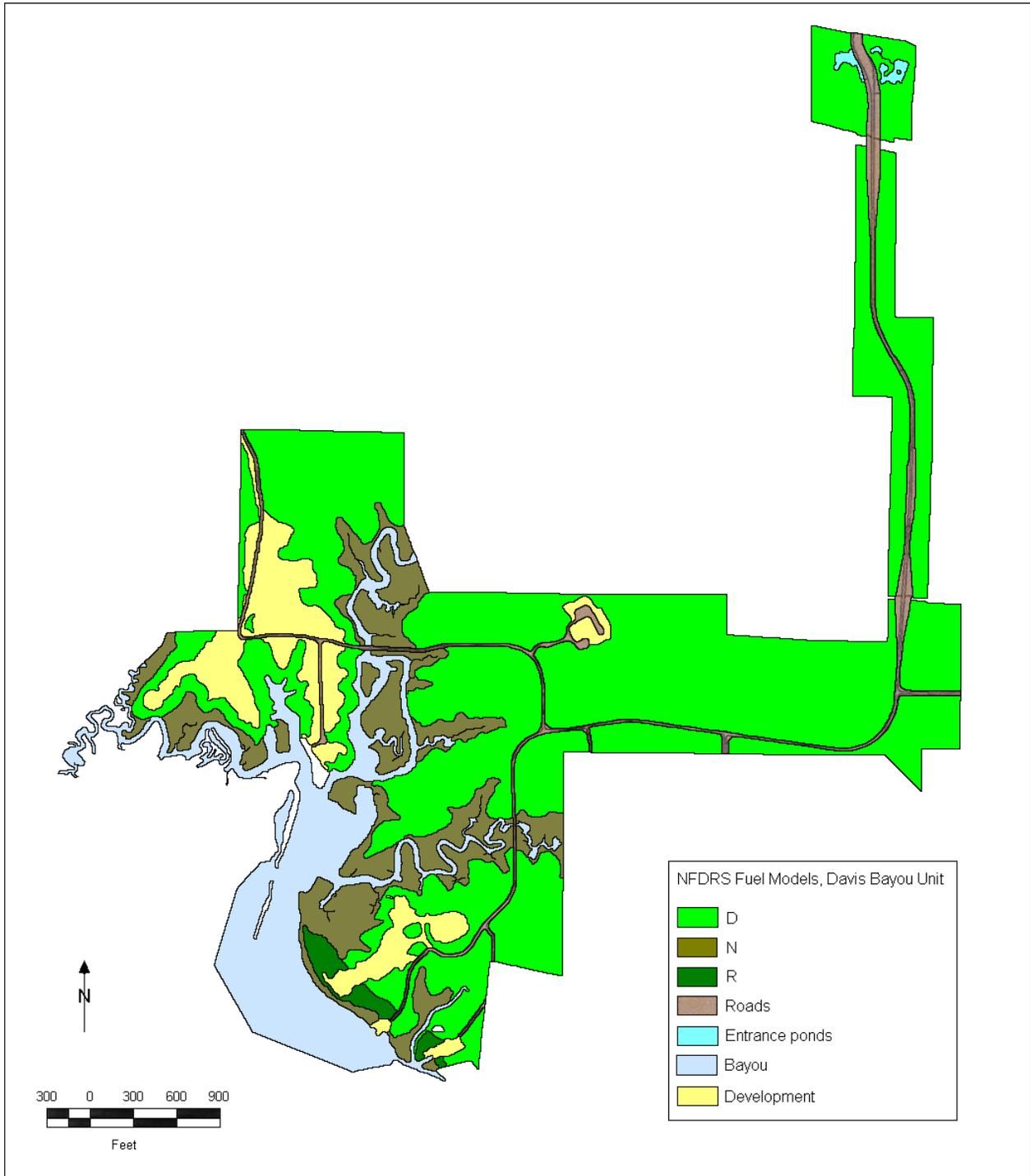
- ❖ NFDRS Fuel Model O (FBPS Fuel Model 4): This model applies to dense, brush-like fuels of the Southeast. O fuels, except for the deep litter layer, are almost entirely living. The foliage burns readily except during the active growing season. The plants are typically over six feet tall and are often found under open pine. If the plants do not reach the six-foot criteria, fuel model D should be used.

At GUIS, fuel model O best represents sand pine-scrub, scrub, palustrine shrub, and estuarine shrub.

- ❖ NFDRS Fuel Model R (FBPS Fuel Model 8): This model represents hardwood areas after the canopies leaf out in the spring. It is provided as the off-season substitute for E. It should be used during the summer in all hardwoods and mixed conifer-hardwood stands where more than half of the overstory is deciduous.

At GUIS, fuel model R best represents live oak hammock under average fire weather parameters. Under extreme fire weather parameters, live oak hammock is better represented by NFDRS fuel model D (FBPS fuel model 7).

Figure 4: NFDRS Fuel Models, FMU #1 (Davis Bayou Unit)
Map based upon a vegetative communities map provided in the report entitled *Wetland*



Delineation and Hydrologic/Community Survey of the Davis Bayou Area of Gulf Islands National Seashore (MSU 2002)

Figure 5: NFDRS Fuel Models, FMU #8 (Naval Live Oaks Unit)

Map based upon a vegetative communities map provided in the GUIS Final Environmental Statement, General Management Plan/Development Concept Plan: Santa Rosa Unit, Naval Live Oaks Reservation Unit, Davis Bayou Unit (1978b). Vegetative community boundaries have undoubtedly shifted since 1978, but this provides a baseline until re-mapping of vegetation within the Naval Live Oaks unit, currently underway, is completed.



Tables 2 and 3 illustrate historic fire weather parameters at “average” and “extreme” levels for the seashore fire season within the Mississippi District and the Florida District, respectively.

Table 2: Historic Fire Weather Parameters for GUIS Fire Season (October 1 – May 31), Mississippi District, NFDRS Station 228202

Fire Weather Parameters	Average Fire Season Weather	97th Percentile Fire Season Weather
20-foot wind speed	7 miles/hour	11 miles/hour
Maximum temperature	75 degrees Fahrenheit	88 degrees Fahrenheit
Minimum relative humidity	50%	22%
1-hour fuel moisture	12%	7%
Live woody fuel moisture	150%	70%

Table 3: Historic Fire Weather Parameters for GUIS Fire Season (October 1 – May 31), Florida District, NFDRS Station 080202

Fire Weather Parameters	Average Fire Season Weather	97th Percentile Fire Season Weather
20-foot wind speed	7 miles/hour	11 miles/hour
Maximum temperature	74 degrees Fahrenheit	88 degrees Fahrenheit
Minimum relative humidity	54%	23%
1-hour fuel moisture	11%	5%
Live woody fuel moisture	130%	70%

Tables 4 and 5 demonstrate anticipated fire behavior at GUIs (within the Mississippi District and the Florida District, respectively) under these average and extreme conditions, as well as critical threshold values influencing fire controllability. The values were calculated using the BEHAVE (Andrews 1986) fire behavior prediction model utilizing weather inputs from the U.S. Fish and Wildlife Service RAWS station at Mississippi Sandhill Crane National Wildlife Refuge (NFDRS 228202) to represent the Mississippi District, and the seashore RAWS station at Naval Live Oaks (080202) to represent the Florida District. The weather data utilized for the Mississippi District cover the 13-year period from 1993-2005, and the weather data utilized for the Florida District cover the 11-year period from 1995-2005. The weather indices were calculated using the FireFamily Plus (Bradshaw 2004) software package. It should be recognized that the table values are based upon models rather than direct observation of fire behavior in these fuel types. As GUIs managers have the opportunity to observe and monitor fire behavior, these values may be refined and the model calibrated to better reflect local fuel and weather conditions.

Table 4: Potential Fire Behavior under Average and Extreme Conditions, Mississippi District

NFDRS Model	FBPS Model	Fire Behavior; Average Conditions		Fire Behavior; Extreme Conditions	
		Flame Length	Rate of Spread	Flame Length	Rate of Spread
D	7	4 ft	14 chains/hr	6 ft	24 chains/hr
L	1	*0 ft	*0 chains/hr	4 ft	57 chains/hr
N	3	**8 ft	45 chain/hr	**11 ft	83 chains/hr
O	4	**15 ft	42 chains/hr	**19 ft	70 chains/hr
R	8	1 ft	1 chain/hr	1 ft	1 chain/hr

Average conditions = 1993-2005 NFDRS station 228202 mean fire season weather conditions

Extreme conditions = 1993-2005 NFDRS station 228202 97% percentile fire season weather conditions

*Due to moisture of extinction under average conditions

**Exceeds direct attack capabilities, i.e., flame lengths greater than 8 feet

Table 5: Potential Fire Behavior under Average and Extreme Conditions, Florida District

NFDRS Model	FBPS Model	Fire Behavior; Average Conditions	Fire Behavior; Extreme Conditions
-------------	------------	-----------------------------------	-----------------------------------

		Flame Length	Rate of Spread	Flame Length	Rate of Spread
D	7	4 ft	14 chains/hr	6 ft	26 chains/hr
L	1	1 ft	12 chains/hr	4 ft	65 chains/hr
N	3	**8 ft	47 chain/hr	**13 ft	97 chains/hr
O	4	**15 ft	43 chains/hr	**20 ft	75 chains/hr
R	8	1 ft	1 chain/hr	1 ft	2 chains/hr

Average conditions = 1995-2005 NFDRS station 080202 mean fire season weather conditions
 Extreme conditions = 1995-2005 NFDRS station 080202 97% percentile fire season weather conditions

**Exceeds direct attack capabilities, i.e., flame lengths greater than 8 feet

In regard to flame length, the USDA Forest Service research paper entitled *Help in Making Fuel Management Decisions* (1975) provides the following interpretations:

Table 6: Flame Length Interpretations

Flame Length (ft)	Interpretations
0-4	Fires can generally be attacked at the head or flanks by persons using hand tools. Handline should hold the fire.
4-8	Fires are too intense for direct attack on the head by persons using hand tools. Handline cannot be relied on to hold fire. Equipment such as dozers, engines, and retardant aircraft can be effective.
8-11	Fires may present serious control problems—torching out, crowning, and spotting. Control efforts at the head of the fire will probably be ineffective.
11+	Crowning, spotting, and major runs are common. Control efforts at the head of the fire are ineffective.

Table 7 outlines potential critical weather parameters that would result in fire behavior exceeding direct attack capabilities (flame lengths greater than eight feet). These values were calculated using the RX Window Module of the BEHAVE program (Andrews 1986). Such values are useful both for facilitating recognition of potential extreme fire behavior conditions, as well as for assisting in prescription development for the prescribed fire program. It should be noted that generally two or three weather parameters must be aligned in order for extreme conditions to result. It should also be noted that these are modeled values and should serve only as guidelines. As the opportunity arises, fire monitoring data collection on both wildland fires and prescribed fires will facilitate refinement of these values as well as development of critical values for additional parameters. Last, it should be noted that while the values listed will potentially result in flame lengths greater than eight feet, this does not necessarily indicate a sustained, uncontrollable wildland fire. Rather, they indicate that direct attack is not a safe strategy at the head of the fire. Furthermore, these conditions, particularly wind speed, can vary greatly within a short time period and be fleeting in nature.

Table 7: Critical Weather Parameters Resulting in Need for Indirect Attack, Mississippi District

NFDRS Model	FBPS Model	Moisture of Extinction	Critical Weather Parameters Resulting in Fire Behavior Exceeding Direct Attack Capabilities
D	7	40%	Live fuel moisture <100% and 1-hr fuel moisture <12% and eye-level wind speed >9 mph

L	1	12%	1-hr fuel moisture <5% and eye-level wind speed >10 mph
N	3	25%	1-hr fuel moisture <12% and eye-level wind speed >2 mph
O	4	20%	Fire under any conditions in this type is unsafe for direct attack
R	8	30%	Flame lengths unlikely to exceed 8 feet even under extreme conditions

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