TIMUCUAN ECOLOGICAL AND HISTORIC PRESERVE
RIBAULT MONUMENT SHORELINE AND EMBANKMENT STABILIZATION
(JACKSONVILLE, FLORIDA)

FINAL ENVIRONMENTAL ASSESSMENT
OCTOBER 2010

Timucuan Ecological and Historic Preserve
Ribault Monument Shoreline and Embankment Stabilization Environmental Assessment

National Park Service
U.S. Department of the Interior

Timucuan Ecological and Historic Preserve
13165 Mt. Pleasant Rd
Jacksonville, FL 32225

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Chapter 1 - Purpose and Need

1.1 INTRODUCTION

This Environmental Assessment (EA) documents the potential environmental impacts from actions proposed in the Timucuan Ecological and Historic Preserve for shoreline and embankment stabilization at the Ribault Monument.

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 will 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 documents, such as this EA, focus on providing relevant information to assist the agency in making appropriate decisions. In this case, the Superintendent of Timucuan Ecological and Historic Preserve is faced with a decision to address shoreline and embankment erosion as described below. This decision will be made within the overall management framework already established in the 1995 Timucuan Ecological and Historic Preserve General Management Plan. The alternative courses of action to be considered at this time are, unless otherwise noted, crafted to be consistent with the concepts established in the General Management Plan.

In making decisions about National Park Service (NPS) administered resources, the NPS 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 will 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."

Timucuan Ecological and Historic Preserve was established by Public Law 100-249 on February 16, 1988, "to administer those lands…within the preserve in such a manner as to protect the natural ecology of such land and water areas in accordance with this Act and the provisions of the law generally applicable to units of the National Park System."

With designation of the preserve, Congress sought to protect the complex salt marsh/estuarine ecosystem and historic and prehistoric sites in the valley between the lower St. Johns and Nassau Rivers, Florida, and to provide opportunities for the public to understand, enjoy, and appreciate these resources. Timucuan was designated a national preserve rather than a national park because Congress envisioned it to be a place that could accommodate public and private uses not traditionally found in national parks.

The preserve's enabling legislation also directed the Secretary of the Interior to incorporate Fort Caroline National Memorial, established in 1950 (64 Stat. 897), into the preserve, stating: "Such historical park shall serve as the principal interpretive center and administrative facility for the ecological, historic and prehistoric resources made available under this legislation."

The requirements placed on the NPS by these laws, especially the Organic Act, mandate that resources are passed on to future generations "unimpaired" (NPS, 2001). An impairment is an impact that, in the professional judgment of the responsible NPS 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 an 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 (NPS, 2001). This EA addresses whether the actions of the various alternatives proposed by Timucuan Ecological and Historic Preserve impair 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.

1.2 PURPOSE AND NEED

The Ribault Monument commemorates the 1562 landing of Jean Ribault near the mouth of the St. Johns River. Ribault erected a stone column bearing the coat of arms of his French King Charles IX to claim Florida for France.

The current Ribault Monument donated in 1957 by the Daughter's of the American Revolution, is located on a sandy bluff about 84 feet above the St. Johns River and Jacksonville Harbor. Situated atop St. Johns Bluff, the monument provides a commanding view of the St. Johns River. On a clear day, you can see the Atlantic Ocean and Mayport Naval Station five miles to the east, and river activity, wildlife, and marshes below.

The sandy nature and steep slope make this embankment subject to the erosive forces of runoff, currents, tides, waves, and ship wake. A portion of the shoreline is protected by an aging wooden sea wall and rip rap. The unprotected portion is showing loss of embankment to erosion. The protected portion is showing limited erosion. However, the wooden sea wall was originally built in the 1960's and is reaching the end of its useful life without major rehabilitation or replacement. Erosive forces of the St. Johns River could be affected by the changing use and configuration of Jacksonville Harbor (changes in current patterns and ship wake). Potential climate change (resulting in rise in sea level and/or increase in storm activity) could further increase erosive forces. In its current condition, the shoreline will continue to erode, destabilizing the slope further. Resulting shoreline erosion increases slope substrate (soil, shrubs, trees) sliding towards the riverbank.

Increased erosion of the riverbank and associated slope has the potential to impact resources, infrastructure, and visitor enjoyment of the facility. Several archeological and cultural resources have been indentified in the Ribault Monument area, which are sensitive to continued slope erosion. Water quality and sediment load in St. Johns Creek are being negatively impacted by continued sloughing of slope material into the creek due to undercutting of the creek bank. Long-term protection of the column and surrounding facilities are necessary to continue operations and allow visitor enjoyment of the column and bluff.

1.3 BACKGROUND

Timucuan Ecological and Historic Preserve is located in Duval County of northeastern Florida. It includes the river valley formed by the Nassau River to the north and the St. Johns River to the south (except for a small preserve parcel south of the St. Johns River), the Atlantic Ocean to the

east (excluding Little Talbot Island), and Browns Creek to the west. The NPS currently manages approximately 9,000 acres of the 46,000-acre preserve.

Ribault Monument is a part of Ft. Caroline National Memorial. The 1988 Congressional legislation establishing Timucuan Preserve incorporated all areas of Ft. Caroline including Ribault Monument within the administration of Timucuan Preserve. Much of the preserve is at or near sea level. Most of the area within existing boundaries is open water or salt marsh that is submerged at mean high tide. Upland areas range from barely above water level to above 60 feet elevation at two locations. The highest point, about 85 feet above sea level, is on St. Johns Bluff on the south bank of the St. Johns River. It is this area which is the subject of this proposed shoreline and embankment stabilization. The estuarine system below is predominately salt marsh, coastal hammock, and marine and brackish waters. Much of the salt marsh is among the least disturbed on the southern Atlantic Coast. Many resident, migratory, and rare species rely on the important habitats within the preserve.

The preserve provides a large open area for recreation within the boundaries of a major metropolitan area. Existing water-based recreation resources include the Intracoastal Waterway, fish camps, fisheries, shellfish waters, and the St. Johns and Nassau rivers. The Theodore Roosevelt area provides trails and picnic areas. State parks in and adjacent to the preserve have beaches, trails, and

Figure 1-1 Ribault Monument Vicinity

other recreational resources. Huguenot Memorial Park and Sisters Creek Park and boat ramp, operated by the city of Jacksonville, offer water access and day use activities. The E. Dale Joyner Nature Preserve at Pelotes Island, operated by JEA and also within the preserve boundary, provides environmental education opportunities to school groups on a reservation basis.

Cultural resource areas provide opportunities for recreational as well as educational experiences. Fort Caroline National Memorial and Kingsley Plantation offer trails and/or picnic tables.

1.4 MANAGEMENT OBJECTIVES

The preserve's 1996 Final General Management Plan (GMP) provides management guidance for concerns of the preserve related to protection of the important ecosystem; impacts on plant and animal species, especially those listed as threatened, endangered, or of special concern; threats to important cultural resources; land ownership or land control and land uses; interpretation of the preserve's diverse resources and unique ecology for residents and visitors; and appropriate types and levels of use by humans for residing, working, commuting, recreating, learning, hunting, and fishing.

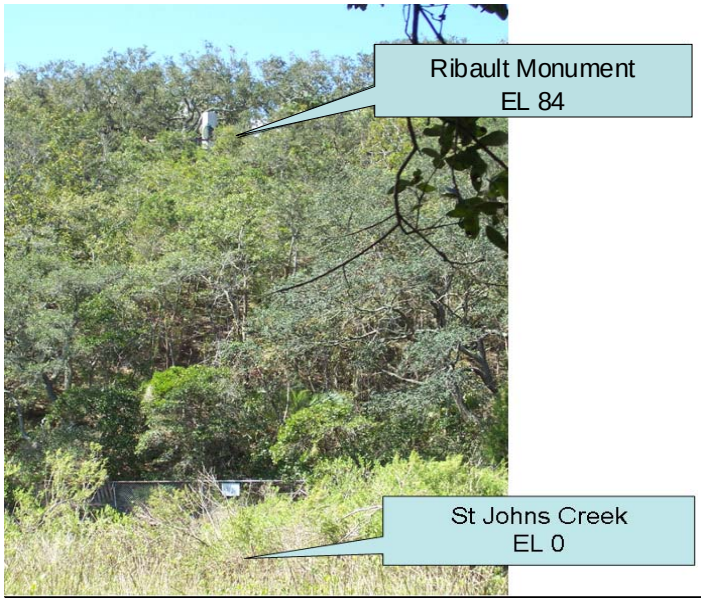
As part of management at the preserve, shoreline stabilization is an important aspect. Objectives and benefits of shoreline stabilization include:

Reduced shoreline erosion: Continued erosion around the monument banks contributes to increased shoaling of the mouth of St. Johns Creek.

Slope stabilization: Undercutting of sediments from erosion has resulted in soil and vegetation sliding down towards the waterline. Areas of the failed slope show loss of vegetation and habitat. Increased sediments from failed slopes contributes to siltation of St. Johns Creek

Protection of historical and cultural resources: The area around Ribault Monument is included in the National Register of Historic Places. The close proximity of the monument to St. Johns Creek increases the likelihood of disturbing or damaging historical/cultural resources in the area from erosion and failing of slopes.

Safety: Continued erosion and slope failure could affect the visitors area at the monument site, including monument, parking area, and viewing platform. Erosion of surrounding soils could undermine concrete and asphalt structures resulting in unsafe conditions.



1.5 VALUE ANALYSIS PROCESS

A Value Analysis (VA) process was conducted 16 July 2009 for the proposed project at the TIMU headquarters building. Participants included representatives from Timucuan Ecological and Historic Preserve, the US Army Corps of Engineers, and the NPS Regional Office. The purpose of the VA was to analyze the proposed alternatives and determine which alternative meets the best interests of the NPS and its management goals.

Six alternatives were evaluated during the VA process:

Alternative 1 – No Action
Alternative 2 – Full Slope Stabilization
Alternative 3 - Partial Slope Stabilization
Alternative 4 - Sheet Pile Seawall Only with Bench
Alternative 5 - Sheet Pile Seawall Only without Bench
Alternative 6 - Identify Setback of Monument Area

Criteria for the selection of the preferred alternative included: human health and safety, historic/cultural resources, noise, visitor enjoyment, shoreline erosion, and natural resources. After the factors were rated and scored for each alternative, the sheet pile wall with bench (Alternative 4) scored the highest or best of the six alternatives. Factors that contributed to this alternative scoring the highest included reduced impacts to cultural resources, natural resources, and visitor enjoyment.

Alternatives 2 and 3 were scored low from potential significant impacts to cultural/natural resources. Alternative 5 scored the second highest but had increased noise and impacts to visitor enjoyment as heavier and deeper sheet pile would be needed to secure the slope. Alternatives 1 and 6 scored lowest from the increased risk of complete slope failure impacting human safety.

In conclusion, the VA process determined that Alternative 4 is preferred since it avoids archaeological resources, provides stability to the slope, has reduced natural resource impacts, and would not interfere with visitor experience. Therefore, this alternative was carried forward in this EA as the Preferred Alternative.

1.6 PERMITS

The NPS will obtain an Environmental Resource Permit from the Florida Department of Environmental Protection (FDEP) for the proposed action. In addition, the NPS will obtain a Department of the Army Permit under Section 10 of the Rivers and Harbors Act for the proposed action. The United States Army Corps of Engineers (USACE) with the NPS will conduct consultations with the National Marine Fisheries Service (NMFS) and the Fish and Wildlife

Service (FWS) for the effects on species protected under the Endangered Species Act of 1973 (ESA). USACE will act as the lead agency for ESA consultations.

1.7 SCOPING ISSUES AND IMPACT TOPICS

A Notice of Availability for the Draft EA was sent to interested and affected agencies and the public. Recipients of the notice include two U.S. Senators, a U.S. Representative, a State Senator, The Nature Conservancy, Audubon of Florida, National Parks Conservation Association, Sierra Club, local newspapers, preserve neighbors in the vicinity of Ft. Caroline and Ribault Monument, City Council members, Florida State Historic Preservation Office, U.S. Fish and Wildlife Service, Okefenokee National Wildlife Refuge, Osceola National Forest, Cumberland Island National Seashore, North Florida Regional Planning Council, Florida Department of Environmental Protection, Talbot Island State Park, Canaveral National Seashore, St. Johns River Water Management District, Florida State Clearing House, the Jacksonville Port Authority, and the U.S. Army Corps of Engineers. The Draft EA was made available on the internet as indicated in the Notice of Availability.

1.7.1 *Impact Topics Considered in this EA*

Impact topics are derived from issues raised during internal and external scoping. Not every conceivable impact of a proposed action is substantive enough to warrant analysis. Initially, the following topics, however, merit consideration in this EA.

Soils: The undermining and erosion of soils along the slope and on the bluff impacts the stability of the soil, its fertility, and its ability to support vegetation.

Water Resources (including Floodplains): NPS policies require protection of water resources consistent with the federal Clean Water Act. The preserve includes the seaward confluence of the Nassau and St. Johns rivers, which forms an extensive estuarine system of predominately salt marsh, coastal hammock, and marine and brackish waters. The U.S. Fish and Wildlife Service has classified the majority of the preserve as an estuarine, intertidal wetland with persistent, emergent vegetation The migration of soils from the slope and bluff into the marsh and river could impact those water resources. Therefore, impacts to water resources are analyzed in this EA.

Vegetation: Much of the preserve contains a mix of coastal salt marsh, and hardwood hammocks and forest. While no rare plant species would be involved, the slope and the bluff subject to erosion contains vegetation communities. Adjacent marshes also contain vegetation. Impacts to vegetation are analyzed in this EA.

Wildlife: There are resident populations of various species of reptiles, amphibians, birds, mammals, fish, and invertebrates on the slope or bluff and in adjacent marsh and waters that can be adversely and/or beneficially impacted by shoreline and embankment stabilization. The *Migratory Bird Treaty Act* of 1918, as amended [16 USC 703 et. seq.], provides for the

protection of migratory birds and prohibits their unlawful take or possession. Concurrently, the development of a Memorandum of Understanding (MOU) between the FWS and the NPS to implement Presidential Executive Order (EO) 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (US Government 2000), calls for integration of programs and recommendations of existing bird conservation efforts into park planning and operations. Therefore, impacts to wildlife are evaluated in this EA.

Threatened and Endangered Species: 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. Federally-listed threatened or endangered species, along with many state-listed and species of concern, occur within the boundaries of the preserve. Therefore, impacts to T&E species are analyzed in this EA.

Air Quality: The federal 1970 Clean Air Act stipulates that federal agencies have an affirmative responsibility to protect a park's air quality from adverse air pollution impacts. While only temporary, the construction activities may generate dust and fumes 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: The 1916 NPS 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 will leave them unimpaired for the enjoyment of future generations." The stabilization of the shoreline and embankment would help preserve the Ribault Monument and St. Johns Bluff for public enjoyment of the scenery, wildlife, and natural and historic resources. Therefore, potential impacts of the proposed action on visitor use and experience are addressed in this EA.

Human Health and Safety: An eroding or unstable slope or bluff could present a safety hazard. 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. There are many prehistoric and historic cultural resources within the preserve that contribute to the understanding of human use and life in the region. The preserve contains sites representing almost every cultural period: Archaic, Orange, Woodland, Mississippian, Protohistoric, Mission Period, First Spanish Period, British Period, Second Spanish Period, and 19th century American to the present. These sites represent several thousand years of human occupation of the area. Perhaps the oldest documented ceramic culture habitation site in the state of Florida (dating back 6,000 years) is found on preserve lands (NPS 1983). At present, there are 192 prehistoric and historic sites at the preserve listed in the Archeological Sites Management Information System. The bluff and monument likely contain and are themselves cultural resources that can be affected by erosion and bank instability; thus potential impacts to cultural resources are addressed in this EA.

Noise: Noise is defined as unwanted sound. Construction activities would potentially involve heavy machinery. Visitors to the area, as well as neighboring landowners would be affected by the construction equipment. Therefore, this impact topic shall be addressed in this EA.

Park Operations: The development of a safety hazard from erosion and bank instability could require restriction of public access and park operations. Thus, the potential effects on park operations will be considered in this EA.

1.7.2 *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 shoreline and embankment stabilization alternatives considered in this EA. These topics are listed and briefly described below, and the rationale provided for considering them, but dropping them from further analysis.

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

Coastal Zone Management: Several of the proposed alternatives include some impacts to coastal waters covered under coastal zone management regulations. It is expected that the state of Florida will concur with the proposed coastal zone consistency statement. Therefore coastal zone management will not be detailed further in this EA.

Ecological Critical Areas: The term "critical habitat" for a threatened or endangered species means: (1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act (ESA), on which are found those physical or biological features. No critical habitat has been identified at the project site, therefore ecological critical areas will not be discussed in this EA.

Utilities: Generally speaking, some kinds of projects, especially those involving construction, may temporarily impact above and below-ground telephone, electrical, natural gas, water, and sewer lines and cables, potentially disrupting service to customers. There are no expected utility concerns above temporary needs for construction, therefore utilities are not included for further analysis in this EA.

Land Use: Visitor parking and pathways to the Ribault Monument exist adjacent to the project site. Alternatives are not expected to affect land use other than temporary construction activities; 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. Shoreline stabilization activities may bring a short-term need for additional personnel in the preserve, 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 not included for further analysis in this EA.

Transportation: None of the alternatives would substantively affect road, railroad, water-based, or aerial transportation in and around the preserve. Passage in and out of St. Johns Creek could temporarily be impacted during construction, but long term negative impacts to transportation are expected. Therefore, this topic is dismissed from any further analysis.

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 Timucuan Ecological and Historic Preserve 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 Timucuan Ecological and Historic Preserve; therefore, this impact topic is not evaluated further in this EA.

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

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

Table 1-1 Impact Topics for Timucuan Ecological and Historic Preserve Ribault Monument Shoreline and Embankment Stabilization EA

Impact Topic	Retained or Dismissed from Further Evaluation	Relevant Regulations or Policies
Soils	Retained	NPS *Management Policies 2001*
Water Resources	Retained	Clean Water Act; Executive Order 12088; NPS *Management Policies*
Floodplains and Wetlands	Retained	Executive Order 11988; Executive Order 11990; Rivers and Harbors Act; Clean Water Act; Director's Order 77-1; NPS *Management Policies*
Vegetation	Retained	NPS *Management Policies*
Wildlife	Retained	NPS *Management Policies* The *Migratory Bird Treaty Act* of 1918 Executive Order (EO) 13186
Threatened and Endangered Species and their Habitats	Retained	Endangered Species Act; NPS *Management Policies*
Air Quality	Retained	Federal Clean Air Act (CAA); CAA Amendments of 1990; NPS *Management Policies*
Visitor Use and Experience	Retained	NPS *Management Policies*
Human Health & Safety	Retained	NPS *Management Policies*
Cultural Resources	Retained	Section 106; National Historic Preservation Act; 36 CFR 800; NEPA; Executive Order 13007; Director's Order #28; NPS *Management Policies*
Noise	Retained	NPS *Management Policies*
Park Operations	Retained	NPS *Management Policies*
Waste Management	Dismissed	NPS *Management Policies*
Coastal Zone Management	Dismissed	U.S. Code 16 Ch. 33;NPS *Management Policies*
Ecological Critical Areas	Dismissed	Endangered Species Act (ESA); NPS *Management Policies*
Utilities	Dismissed	NPS *Management Policies*
Land Use	Dismissed	NPS *Management Policies*
Socioeconomics	Dismissed	40 CFR Regulations for Implementing NEPA; NPS *Management Policies*
Transportation	Dismissed	NPS *Management Policies*
Environmental Justice	Dismissed	Executive Order 12898
Indian Trust Resources	Dismissed	Department of the Interior Secretarial Orders No. 3206 and No. 3175
Prime and Unique Agricultural Lands	Dismissed	Council on Environmental Quality 1980 memorandum on prime and unique farmlands
Wilderness	Dismissed	The Wilderness Act; Director's Order #41; NPS *Management Policies*
Resource Conservation, Including Energy, and Pollution Prevention	Dismissed	NEPA; NPS *Guiding Principles of Sustainable Design*; NPS *Management Policies*

Figure 1-2 Timucuan Ecological and Historic Preserve Vicinity

Chapter 2 - Issues and Alternatives

This chapter describes the range of alternatives, including the Preferred Alternative 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 park staff.

2.1 Alternatives Considered But Not Analyzed Further in This EA

2.1.1 Selective Removal of Vegetation on Slope Face

The removal of existing vegetation on the slope entails physical extraction of trees and shrubs by machinery. Selective removal involves partial removal of vegetation, leaving healthy trees and shrubs intact while removing fallen or damaged vegetation, as opposed to complete denuding the slope of all vegetation.

This alternative was considered but not analyzed further in this EA due to the fact that the partial removal of vegetation would not allow for slope stabilization using engineering methods such as erosion control mats and soil nails. For the slope to be protected by engineering methods including soil nails and erosion control mats, the entire slope face must be free of vegetation.

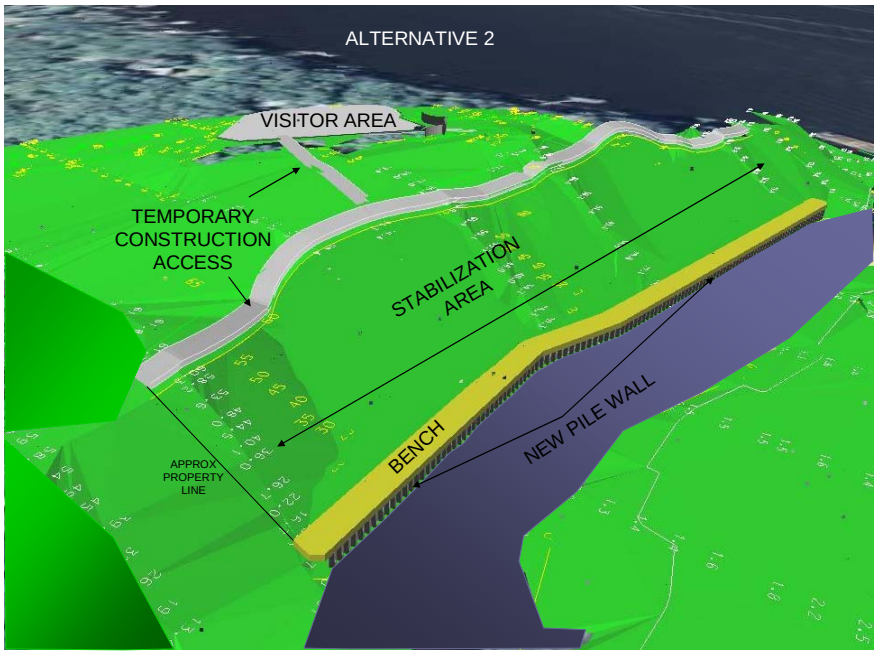
2.2 Alternatives Considered and Analyzed in This EA

2.2.1 Alternative 1 - No Action Alternative

Under this alternative, the park would continue to operate without improvement to the slope face or installing shoreline stabilization structures.

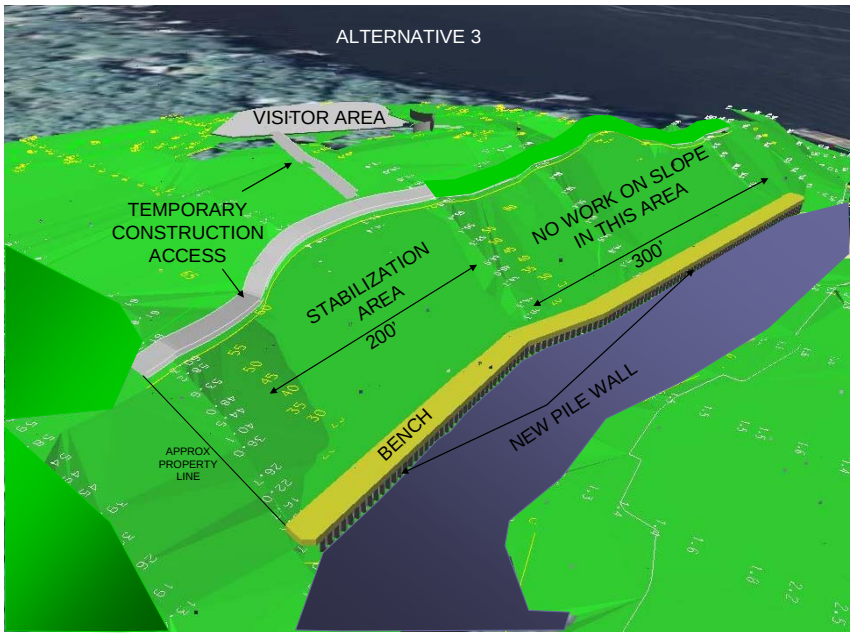
2.2.2 Alternative 2– Full Slope Stabilization

Under this alternative, the entire 500 foot length of shoreline slope would be denuded of vegetation. Soil nails (long steel tubes) will be driven into the slope to a predetermined depth. Erosion control fabric would be installed throughout the surface of the slope. Due to erosion up stream of the existing seawall and the advanced age of the existing seawall, steel sheet pile would be driven creek-side of the existing wall to form a new wall. The existing wall would be left in place. Due to the extent of clearing and construction operations, access from the top and bottom of the slope would be required. Therefore construction of a temporary earthen road at the top of the slope to allow machinery access would be required. The road would run the length of the bluff and be approximately 12 feet wide. Additionally, an earthen bench would be constructed slope-side of the sheet pile wall to facilitate machinery access from the bottom. The bench would be cut into the slope face by excavating soils and vegetation resulting in a flat platform. The permanent bench would also include a system to allow water pressure equalization across the sheet pile wall due to tidal fluctuation and rainfall accumulation. Lower slope access for construction equipment would be by barge and placement of multiple temporary timbers within the creek to allow vehicle access from Buck Island. Additional access would be provided by roads through Buck Island, located directly across St. Johns Creek to the east.



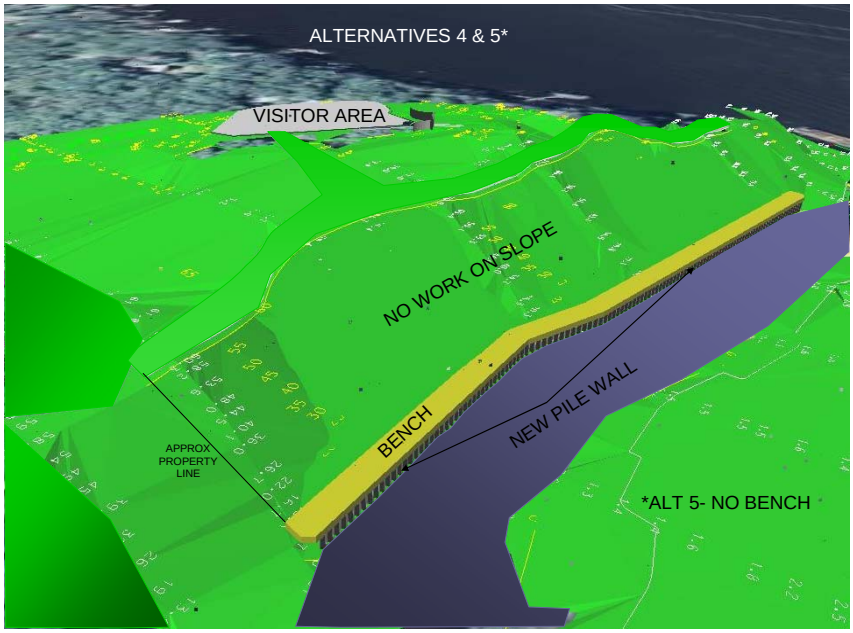
2.2.3 Alternative 3 – Partial Slope Stabilization

Under this alternative the 200 foot section of slope up stream of the existing seawall would receive identical treatment as Alternative 2 (Full Slope Stabilization). Due to the existing pile wall not extending the full length of the slope and a curve in the creek increasing erosive forces this area has the highest need of shoreline stabilization and protection from further erosion. The remaining 300 feet of bluff would remain in its current state with no vegetation removal. The sheet pile seawall and bench up to 15 feet wide would be constructed for the entire 500 feet of shoreline. Construction of a temporary earthen road at the top of the slope to allow machinery access would be required. The road would run the length of the 200 foot section and be approximately 12 feet wide. Additionally, an earthen bench would be constructed slope-side of the sheet pile wall to facilitate machinery access from the bottom. The bench would be cut into the slope face by excavating soils and vegetation resulting in a flat platform. The permanent bench would also include a system to allow water pressure equalization across the sheet pile wall due to tidal fluctuation and rainfall accumulation. Lower slope access for construction equipment would be by barge and placement of multiple temporary timbers within the creek to allow vehicle access from Buck Island. Additional access would be provided by roads through Buck Island, located directly across St. Johns Creek to the east.



2.2.4 Alternative 4 - Sheet Pile Seawall Only with Bench (Preferred Alternative)

Under this alternative, no vegetation removal would occur on the bluff slope. The entire 500 feet of shoreline would have a bench up to 15 feet wide and sheet pile seawall constructed as discussed in alternative 2 (Full Slope Stabilization) and 3 (Partial Slope Stabilization). The bench would be cut into the slope face by excavating soils and vegetation resulting in a flat platform. The permanent bench would also include a system to allow water pressure equalization across the sheet pile wall due to tidal fluctuation and rainfall accumulation. Lower slope access for construction equipment would be by barge and placement of multiple temporary timbers within the creek to allow vehicle access from Buck Island. Additional access would be provided by roads through Buck Island, located directly across St. Johns Creek to the east.



2.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

This option would allow the elimination of the pressure equalization system and subsequently the bench by driving thicker and considerably longer sheet piles thereby greatly increasing the ability of the wall to withstand the differential pressures generated by rainfall and tidal fluctuations. Lower slope access for construction equipment would be by barge and placement of multiple temporary timbers within the creek to allow vehicle access from Buck Island. Additional access would be provided by roads through Buck Island, located directly across St. Johns Creek to the east.

2.2.6 Alternative 6 - Identify Setback of Monument Area

Under this alternative, the area designated to be high risk of slope failure would be identified. The identified setback would exclude visitors from the risk area, which may or may not include the existing Ribault Monument and associated concrete platform. This alternative may result in the requirement to relocate the monument and viewing platform.

2.2.6 Environmentally Preferred Alternative (Alternative 4)

The National Park Service is required to identify the environmentally preferred alternative(s) for any of its proposed projects. That alternative is the alternative that will 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 will 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). Alternative 4, the preferred alternative has been identified as the environmentally preferred alternative from reduced cultural and natural resource impacts while providing the required slope stabilization.

2.3 IMPACT DEFINITIONS

2.3.1 Methods for Evaluating Environmental Effects

The method of analysis of potential effects is based on the *Director's Order* #12 Handbook [sec 5.4(f)]. Four categories of effects are considered: direct effects, indirect effects, cumulative effects and impairment. The context, duration, and intensity of the impacts must also be defined. Intensity of effects and thresholds of significance are defined for both beneficial and adverse effects. These are further defined in Section 4.1.2.2.

Where quantitative data were not available, best professional judgment was used to determine impacts. In general, the thresholds used come from existing literature, consultation with subject experts, and appropriate agencies.

To analyze impacts, methods were selected to predict the potential change in park resources that would occur with the implementation of the alternatives. Evaluation factors were established for each impact

topic to assess the changes in resource conditions of the alternative. The study area was defined to include resources within TIMU and the region that might reasonably be affected. Because resources vary in function and relation to environmental factors, the study area was defined independently for each impact topic.

2.3.1.1 Impact Categories

Three impact categories are used in this analysis and defined below.

Direct Effects – Direct effects are impacts that are caused by the alternative at the same time and in the same place as the action.

Indirect Effects – Indirect effects are impacts caused by the alternatives, that occur later in time or farther in distance than the action.

Impairment - The NPS *Management Policies 2006* requires an analysis of potential effects to determine whether or not actions would impair park resources. The primary purpose of the NPS, as established by the Organic Act and reaffirmed by the General Authorities Act, as amended, is to conserve park resources and values. Impacts to park resources and values are allowed when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Impairment is an impact that would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values.

NPS Management Policies conducted an analysis to determine whether the magnitude of impacts identified for specific impact topics reached the level of "impairment," as defined. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; or
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated.

An impact that may, but would not necessarily, lead to impairment may result from visitor activities; NPS administrative activities; or activities undertaken by concessionaires, contractors, and others operating in the park. Impairment may also result from sources or activities outside the park (NPS 2006b).

2.3.1.2 Impact Definitions

Each potential impact is described in terms of its context (site-specific, local, or regional), duration (short-term or long-term), and intensity (negligible, minor, moderate, or major). For the purposes of analysis, the following definitions, unless stated otherwise, are used for all impact topics:

Duration

Short-term impacts: Impacts that might occur during the site preparation and construction phases of the project.

Long-term impacts: Those impacts occurring from the implementation of the project through the next 10 years.

Intensity

Negligible: Impacts would have no measurable or perceptible changes to the resource.

Minor

Adverse: Impacts would be measurable or perceptible but would be localized within a relatively small area. The overall viability of the resource would not be affected and, if left alone, would recover.

Beneficial: Resource improvement would be perceptible, but barely, and localized within a small area of the park.

Moderate

Adverse: Impacts would cause a change in the resource; however, the impact would remain localized.

Beneficial: Resource improvements would be measurable, enhancing the viability of the resource within the park.

Major

Adverse: Impacts to the resource would be substantial, highly noticeable, and permanent.

Beneficial: Resource improvements would be substantial, enhancing the viability of the resource within the park, the surrounding community, and beyond.

Table 2-1 depicts the impact definitions used in this Environmental Assessment. The analysis of impacts considers direct, indirect, and cumulative impacts, with a particular emphasis on the potential for any impact or action to impair the resources or values of the site. Significant impact thresholds for the various key resources were determined in light of compliance with existing state and federal laws, and compliance with existing Timucuan Ecological and Historic Preserve planning documents.

Key Resources	"Minor" Impact	"Moderate" Impact	"Major" Impact	Duration
Soils	The beneficial/adverse 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 beneficial/adverse effects 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; 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 beneficial/adverse effects on soil productivity or fertility would be readily apparent, long-term, and substantially change the character of the soils over a large area in and out of the park. Damage to or loss of the litter/humus layers that would increase soil loss from erosion on a substantial portion of the slope area; sloughing of soils that may cause long term loss of soil productivity and that may alter or destroy the vegetation community over most of the slope area; long-term and widespread soil compaction that affects a large number of acres and prohibits re-vegetation; mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.	**Short-Term** Recovers in less than 3 years **Long-Term** Takes more than 3 years to recover
Water Resources (Including Wetlands and Floodplains)	Adverse changes in water quality would be measurable, although small, likely short-term, indirect, 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.	Adverse changes in water quality would be measurable and long-term but would be relatively local, direct and/or indirect; 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 a 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.	Adverse changes in water quality would be readily measurable, would have substantial consequences, direct and/or indirect, 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.	**Short-Term** Recovers in less than 1 year **Long-Term** Takes more than 1 year to recover

Key Resources	"Minor" Impact	"Moderate" Impact	"Major" Impact	Duration
Vegetation	Beneficial/adverse short-term direct effects to 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; mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.	The beneficial/adverse effects 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; increases in invasive species do not jeopardize the overall native plant communities; mitigation to offset adverse effects could be extensive, but would likely be successful; some species of special concern could also be affected.	Considerable beneficial/adverse long-term direct effects 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.	**Short-Term** Recovers in less than 3 years **Long-Term** Takes more than 3 years to recover
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.	Beneficial/adverse direct and indirect 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.	Beneficial/adverse direct and indirect 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.	**Short-Term** Recovers in less than 1 year **Long-Term** Takes more than 1 year to recover
Air Quality	Adverse changes in air quality would be measurable, although the changes would be small, short-term, and the effects would be localized; temporary and limited exhaust from machinery; no air quality mitigation measures would be necessary.	Adverse 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.	Adverse 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; air quality mitigation measures would be necessary and the success of the measures could not be guaranteed.	**Short-Term** Recovers in 7 days or less **Long-Term** Takes more than 7 days to recover

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; The visitor would be aware of the effects associated with the alternative, but the effects would be slight.	Beneficial/adverse direct 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; 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 construction **Long-Term** Occurs after construction
Human Health & Safety	The effects 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); 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; 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; extensive mitigation measures would be needed, and their success would not be guaranteed.	**Short-Term** Occurs only during construction **Long-Term** Occurs after construction

Key Resources	"Minor" Impact	"Moderate" Impact	"Major" Impact	Duration
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 effect to the character defining features of a National Register of Historic Places eligible or listed structure, district, or cultural landscape.	For archeological resources, the impact affects an archeological site(s) with high data potential and no significant ties to a living community's cultural identity; temporary adverse effects to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties, but would not diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized.	For archeological resources, the impact affects an archeological site(s) with exceptional data potential or that has significant ties to a living community's cultural identity; long-term adverse impacts to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties that would diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized.	**Short-Term** Treatment effects on the natural elements of a cultural landscape (e.g., three to five years until new vegetation returns) **Long-Term** Because most cultural resources are non-renewable, any effects would be long term
Park Operations	The beneficial/adverse direct and indirect effects would be detectable and likely short-term, but would be of a magnitude that would not have an appreciable effect on park operations; closure of monument area during construction activities only; if mitigation were needed to offset adverse effects, it would be relatively simple and likely successful.	The beneficial/adverse 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; closure of monument area during construction activities only; detectable adverse impacts to park buildings and structures; mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The beneficial/adverse 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 closure of the monument and surrounding area; substantial adverse impacts to monument area; mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.	**Short-Term** Effects lasting for the duration of construction **Long-Term** Effects lasting longer than the duration construction

2.4 COMPARISON OF ALTERNATIVES

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

ENVIRONMENTAL FACTOR	Alternative 1 No Action Status Quo	Alternative 2 Soil Nails, Erosion Control Mat, Sheet Pile Wall, Access Road at Top entire 500 feet of project with bench	Alternative 3 Soil Nails, Erosion Control Mat, Sheet Pile Wall, Access Road at Top Only the 200' stretch without existing seawall with bench	Alternative 4 Only Construct Sheet-Pile Wall with bench	Alternative 5 Only Construct Sheet-Pile Wall without bench	Alternative 6 Setback, Retreat, or Exclude Visitors from Risk Area
HUMAN HEALTH AND SAFETY	No immediate impacts to safety	Reduces risk of slope failure	Reduces risk of slope failure for 200'	Somewhat Reduces risk of slope failure	Somewhat Reduces risk of slope failure	Reduces risk to visitors from slope failure
HISTORIC PROPERTIES	No impact	Access road results in potential major impact to historic sites.	Access road results in potential major impact to the 200' stretch	No impact	No impact	No impact
AESTHETICS AND HISTORIC SETTING	Vegetation and slope not removed but risk of erosion or bank failure	Initially removes all vegetation from slope. Unnatural slope could impact historic setting.	Initially removes vegetation along 200' stretch	Minor impact to vegetation at toe of slope	Minor impact to vegetation at toe of slope	Vegetation and slope not removed but risk of erosion or bank failure
NOISE	No change unless embankment failure	Machinery and equipment noise during construction. Initially, little vegetation to buffer noise.	For 200', noise during construction. Initially, less vegetation to buffer noise.	construction noise more limited to embankment toe and creek area	construction noise more limited to embankment toe and creek area	No change unless embank-ment failure

ENVIRONMENTAL FACTOR	Alternative 1 No Action Status Quo	Alternative 2 Soil Nails, Erosion Control Mat, Sheet Pile Wall, Access Road at Top entire 500 feet of project with bench	Alternative 3 Soil Nails, Erosion Control Mat, Sheet Pile Wall, Access Road at Top Only the 200' stretch without existing seawall with bench	Alternative 4 Only Construct Sheet-Pile Wall with bench	Alternative 5 Only Construct Sheet-Pile Wall without bench	Alternative 6 Setback, Retreat, or Exclude Visitors from Risk Area
VISITOR ENJOYMENT	No impact to enjoyment until slope failure encroachment	Temporary un-natural appearance	Temporary un-natural appearance limited to 200' stretch	Minor impact during construction	Minor impact during construction	Reduces access to vista
SHORELINE EROSION	Continued erosion and risk of slope failure	Low risk of erosion or slope failure, 500' except during construction	Low risk of erosion or slope failure, 200' except during construction	Low risk of erosion, continued slope sloughing until stabilized and revegetated	Low risk of erosion, continued slope sloughing until stabilized and revegetated	Continued erosion and risk of slope failure
PROTECTED SPECIES	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
FISH AND WILDLIFE RESOURCES	Continued risk to slope and creek /marsh below.	Creek/marsh fill plus temporary disturbance of entire slope habitat, 500'	Creek/marsh fill plus temporary disturbance of entire slope habitat, 200'	Temporary disturbance at toe/creek during construction creek/marsh fill	Temporary disturbance at toe/creek during construction, creek/marsh fill	Continued risk to slope and creek/marsh below.
VEGETATION	Risk loss of slope and burial of Creek and marsh	Remove all vegetation from slope, crest, and toe. (500'X180')	Remove all vegetation from 200' of slope, crest, and toe (200'X180')	Bury some vegetation at toe of slope plus impact additional vegetation for bench	Bury vegetation at toe of slope	Risk loss of slope and burial of Creek and marsh
WATER QUALITY	No impact to water quality until slope failure	Impact from work in creek and marsh. Will meet State WQ requirement	Impact from work in creek and marsh. Will meet State WQ requirement	Impact from work in creek and marsh. Will meet State WQ requirement	Impact from work in creek and marsh. Will meet State WQ requirement	No impact to water quality until slope failure

ENVIRONMENTAL FACTOR	Alternative 1 No Action Status Quo	Alternative 2 Soil Nails, Erosion Control Mat, Sheet Pile Wall, Access Road at Top entire 500 feet of project with bench	Alternative 3 Soil Nails, Erosion Control Mat, Sheet Pile Wall, Access Road at Top Only the 200' stretch without existing seawall with bench	Alternative 4 Only Construct Sheet-Pile Wall with bench	Alternative 5 Only Construct Sheet-Pile Wall without bench	Alternative 6 Setback, Retreat, or Exclude Visitors from Risk Area
AQUATIC RESOURCES, WETLAND, AND ESSENTIAL FISH HABITAT	Bluff may erode or slide into creek /marsh	Impact marsh and creek bed during construction	Impact marsh and creek bed during construction	Impact marsh and creek bed during construction	Impact marsh and creek bed during construction	Bluff may erode or slide into creek/marsh
COASTAL ZONE AND ECOLOGICALLY CRITICAL AREAS	No action. No change. No Ecologically Critical Area.	Expect Florida concurrence with coastal zone consistency. No Ecologically Critical Area.	Expect Florida concurrence with coastal zone consistency. No Ecologically Critical Area.	Expect Florida concurrence with coastal zone consistency. No Ecologically Critical Area.	Expect Florida concurrence with coastal zone consistency. No Ecologically Critical Area.	Expect Florida concurrence with coastal zone consistency. No Ecologically Critical Area.
AIR QUALITY	Remain unchanged unless/until slope failure	Temporary dust and equipment exhaust during construction	Temporary dust and equipment exhaust during construction	Temporary dust and equipment exhaust during construction	Temporary dust and equipment exhaust during construction	Remain unchanged unless/until slope failure

Chapter 3 – Environmental Analysis

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

3.1 SOILS AND GEOLOGY

3.1.1 *Affected Environment*

The regional geology of the project area (in Duval County) is characterized by Pleistocene and Holocene age, marine terrace and beach ridge sediments, which were deposited on an irregular and undulating surface. The thickness of these deposits ranges from less than 10 feet in the St. Johns River valley to about 100 feet in western Duval County. The deposits are thickest below the ridges and in places where they overlie depressions. The deposits consist primarily of tan to yellow, medium to fine grained quartz sands, which are locally stained rusty brown or red due to iron oxide. Locally thin gray sandy clay beds are present, which contain occasional mollusk shells, particularly near the coast. Discontinuous layers of rusty brown hardpan, composed of slightly well indurated iron oxide cemented quartz underlie some of the higher areas. The hardpan is generally encountered 2 to 3 feet below the surface and ranges in thickness from 6 inches to 20 feet.

Underneath these sediments follow upper Miocene or Pliocene deposits, consisting of tan or light gray sand, shell, sandy clay, and limestone. Due to the deposition on the irregular surface of the underlying Hawthorn Group, the thickness of the upper Miocene or Pliocene deposits ranges from as little as 10 feet in the extreme southwest part of Duval County to as much as 130 feet in the west-central part of the county. There are no known exposures of the upper Miocene or Pliocene deposits in Duval County. However, dredge spoil indicates that the river may be incised into the deposits, particularly in east Jacksonville.

The Hawthorn Group, of middle Miocene age, consists mainly of dark gray and olive green sandy to silty clay, clayey sand, clay, sandy limestone, and contains moderate to large amounts of black phosphate sand, granules, and pebbles. The Hawthorn Group ranges in thickness from about 250 to as much as 500 feet. Although the formation thickens generally to the northeast, it varies in thickness from place to place because of both an irregular upper and lower surface. The Hawthorn Group is not exposed in Duval County but occurs at depths ranging from approximately 50 to 200 feet below land surface throughout the county.

Initial slope stability analyses were based on a combination of known and estimated soil parameters. A second drilling assignment was completed so that a better confidence level could be obtained. Once the soil parameters could be better refined, additional analysis were completed using the revised parameters. A cross section showing the revised soil parameters and the existing condition can be found in Figure 3-1.

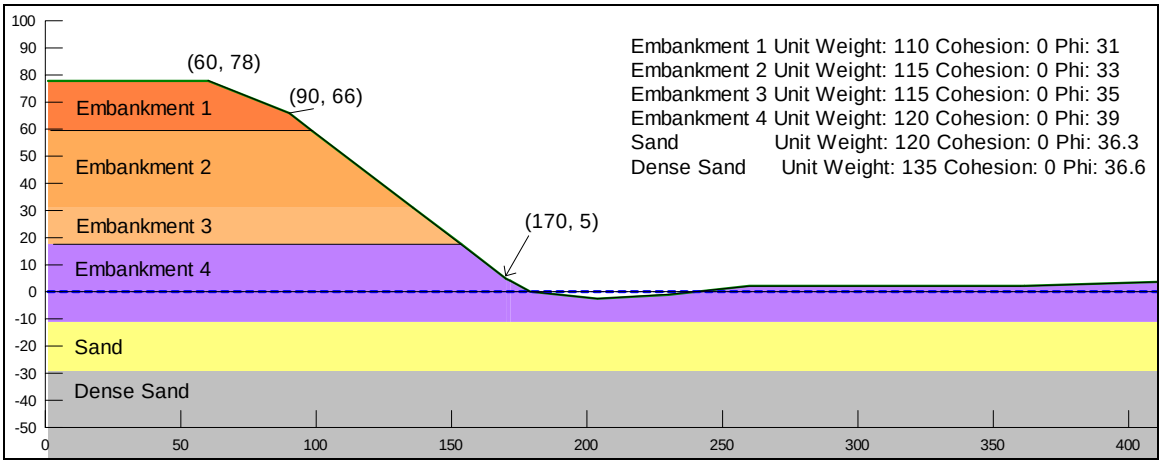


Figure 3-1 Soil Parameters at Ribault Monument Project Site

3.1.2 *Environmental Consequences*

Soil impacts were qualitatively assessed using professional judgment based on investigations of soil characteristics and information from the preserve's 1996 General Management Plan.

3.1.2.1 Alternative 1 (No Action)

Soils would continue to erode at the water interface along the 200 foot stretch without a seawall would result in continued destabilization of the slope face and associated vegetation. Minor sloughing would continue in the area with the existing wooden seawall. Eventually, the wooden seawall would fail and soils would be impacted by wave actions, resulting in sloughing of the entire slope face and collapse of the slope into the creek.

3.1.2.2 Alternative 2 – Full Slope Stabilization

Denuding the slope of vegetation and stabilizing of the slope face with soil nails and erosion control mats will provide long term protection of the project site from erosion and sloughing of the slope for the entire 500 feet. The sheet pile seawall will provide long-term stability for shoreline erosion and reduce the chances of slope collapse. There is potential for additional sloughing and possible collapse of the slope during the clearing process. Large rainfall events, vibration from machinery, or delays in installation of mats and nails could all contribute to sloughing or collapse of the slope face.

3.1.2.3 Alternative 3 – Partial Slope Stabilization

Denuding the slope of vegetation and stabilizing of the slope face with soil nails and erosion control mats will provide long term protection for the 200 foot section which presently does not have a seawall. The remaining 300 feet of slope with the existing seawall will remain intact with existing vegetation. The sheet pile seawall will provide long-term stability for shoreline erosion and reduce the chances of slope collapse. There is potential for additional sloughing and possible collapse of the slope during the clearing

process within the 200 foot stretch of slope being cleared. Large rainfall events, vibration from machinery, or delays in installation of mats and nails could all contribute to sloughing or collapse of the slope face.

3.1.2.4 Alternative 4 – Sheet Pile Seawall Only with Bench (Preferred & Env. Preferred Alternative)

The sheet pile seawall will provide long-term stability for shoreline erosion and reduce the chances of slope collapse. There will be potential sloughing of slope materials at 200 foot section without an existing seawall until slope soils stabilize against the new seawall.

3.1.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

The sheet pile seawall will provide long-term stability for shoreline erosion and reduce the chances of slope collapse. There will be potential sloughing of slope materials along the 200 foot section without an existing seawall until slope soils stabilize against the new seawall. Slightly greater chance of slope sloughing during construction as sheet pile used is heavier and deeper and thus requiring longer times for sinking/driving wall into sediment.

3.1.2.6 Alternative 6 – Identify Setback of Monument Area

Soils would continue to erode at the water interface along the 200 foot stretch without a seawall would result in continued destabilization of the slope face and associated vegetation. Minor sloughing would continue in the area with the existing wooden seawall. Eventual failure of the existing wooden bulkhead may result in slope failure.

Conclusion

The "No Action" and "Setback" alternatives would have no short term effects on the soils at the project site. However, though short term effects would occur for all construction alternatives, long term slope stabilization and erosion control would be increased. Alternative 2 would impact soils the most from the removal of all vegetation on the slope, although provide the most long term benefits from soil nails and erosion control mats. There remains a possibility of additional sloughing or slope collapse during clearing operations associated with alternatives 2 and 3.

Long-term negative impacts to the project site are more likely with the "No Action" and "Setback" alternatives as continued erosion of the creek bank, in addition to the eventual collapse of the wooden seawall would result in increased sloughing and erosion of slope soils, and potentially collapse of the slope. All construction alternatives would provide long-term benefits to slope soils through stabilization of the creek bank.

3.2 WATER RESOURCES (INCLUDING FLOODPLAINS)

3.2.1 *Affected Environment*

TIMU is bounded by the Nassau River in the north, St. Johns River in the south, and the Atlantic Ocean in the east. The project site includes the confluence of St. Johns Creek and the St. Johns River. The preserve forms an extensive estuarine system comprised of salt marsh, coastal hammock, and marine and brackish waters. This estuarine makes up approximately 75 percent of the preserve. The St. Johns River is the longest river in the state of Florida; its watershed comprises 9,430 square miles. The St. Johns River flows in a northerly direction from southern to northeastern Florida. The rivers drainage basin is divided into three regions. TIMU falls into the lower drainage basin, which is the area in Northeast Florida from Putnam County to the river's mouth in Duval County.

Water quality in the St. Johns River varies greatly; overall, the long-term trend appears to be towards the general degradation of water quality despite improvements in certain segments. The entire river is designated class III, which means that its intended use is for recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife. However, only 29 of the 52 river segments making up the St. Johns River meet their intended use requirements.

The estuarine waters and salt marshes that surround islands between the St. Johns River and the Nassau River are part of the Nassau River-St. Johns River Marshes State Aquatic Preserve. This area contains Duval County's last remaining class II waters suitable for shellfish harvesting. The Florida Department of Environmental Protection has designated all waters in the preserve as Outstanding Florida Waters, with stringent water quality criteria. Extensive floodplain areas exist in the preserve because of the slight elevations of land above sea level and the relatively flat topographic relief of the land surface.

In July 2008, the Southeast Coast Network and the University of Georgia conducted an assessment of water and sediment quality at Timucuan Ecological and Historic Preserve (TIMU) as a part of the Network's Vital Signs Monitoring program (DeVivo et al., 2008). The monitoring was conducted in estuarine and tidal creek waters following the methods developed by the Environmental Protection Agency's National Coastal Assessment Program (U.S. EPA 2001).

One sampling location was at the confluence of St. Johns River and St. Johns Creek, in the vicinity of the project area. Results from this assessment included: 1) Water quality at preserve was determined to be *Fair*. This rating was determined based on the fact that more than 50% of the sites sampled were in either *Fair* or *Poor* condition. 2) Concentrations of total dissolved phosphorus, chlorophyll a, and total organic carbon most frequently caused sites to rank as *Poor*. 3) Sites ranked most frequently as *Poor* were concentrated in the headwaters of the Nassau River, not in the area of the Ribault Monument. Results from the sampling point nearest the project site indicate the waters are relatively healthy, with only chlorophyll a, dissolved organic nitrogen and phosphorus receiving fair scores. All other parameters scored a good rating based on the EPA testing protocols.

Floodplain Management, Executive Order 11988 issued 24 May 1977, directs all Federal agencies to avoid both long- and short-term adverse effects associated with occupancy, modification, and development in the 100-year floodplain, when possible. Floodplains are defined in this order as "the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of

offshore islands, including at a minimum, that area subject to a one percent greater chance of flooding in any given year." All federal agencies are required to avoid building in a 100-year floodplain unless no other practical alternative exists. NPS has adopted guidelines pursuant to Executive Order 11998 stating that NPS policy is to restore and preserve natural floodplain values and avoid environmental impacts associated with the occupation and modification of floodplains.

3.2.2 *Environmental Consequences*

Water resource impacts were qualitatively assessed using professional judgment based on literature reviews, general knowledge of the project area, and discussions with park staff.

3.2.2.1 Alternative 1 (No Action)

The potential for an increase in turbidity and sediment delivery into either the St. Johns Creek or St. Johns River as result of soil erosion exists. For the 200 foot section with no seawall, continued undercutting of the shoreline from St. Johns Creek could result in increased sloughing of slope soils into the creek. Increased sediment load into the creek continues to contribute to the shoaling seen at the mouth of the creek. Eventually the existing seawall will fail and the potential of slope collapse will increase. Collapse of the slope face could completely block St. Johns Creek.

3.2.2.2 Alternative 2 – Full Slope Stabilization

Proposed activities with the potential to impact water resources include construction of the seawall, equipment associated with clearing vegetation from the slope face and the long term effects of reduced sediment load.

Construction activities will temporarily impact the St. Johns Creek as machinery will need to be moved to the project site and have access to the shoreline for installing the seawall. Proposed methods to accomplish these tasks include building a temporary wooden platform across the creek by submerging timbers in the creek bed. This would likely cause increased short term turbidity during the construction of the seawall and removal of vegetation, but would not cause long term impacts to the creek.

Long term reduction in sediment deposition from slope stabilization and the sheet pile seawall would lessen the impact on the water resources. Reduced shoaling at the mouth of the creek would also likely occur.

3.2.2.3 Alternative 3 – Partial Slope Stabilization

Impacts to water resources would be similar to alternative 2, with a reduced construction period as vegetation clearing would only occur on the 200 foot section without a seawall.

3.2.2.4 Alternative 4 – Sheet Pile Seawall Only with Bench (Preferred & Env. Preferred Alternative)

Impacts would be similar to alternative 2, as construction work areas at the creek shoreline would be present, impacting turbidity during construction, although construction would be expected to be shorter in duration as no clearing of vegetation is included.

3.2.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

Impacts would be similar to alternative 2, as construction work areas at the creek shoreline would be present, impacting turbidity during construction, although construction would be expected to be shorter in duration as no clearing of vegetation is included.

3.2.2.6 Alternative 6 – Identify Setback of Monument Area

The potential for an increase in turbidity and sediment delivery into either the St. Johns Creek or St. Johns River as result of soil erosion exists. For the 200 foot section with no seawall, continued undercutting of the shoreline from St. Johns Creek could result in increased sloughing of slope soils into the creek. Increased sediment load into creek continues to contribute to the shoaling seen at the mouth of the creek. Collapse of the slope face could completely block St. Johns Creek.

Conclusion

The general impacts to water quality among the four construction alternatives would be similar in nature and only occur during construction. Alternatives 1 and 6 would not involve any construction impacts to water resources, although there would be continued loss of sediment into St Johns Creek from slope destabilization, and possible slope collapse causing a major impact to the creek. 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 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.

3.3 VEGETATION

3.3.1 *Affected Environment*

Vegetation in the project area ranges from hardwood hammock forest on the bluffs to coastal salt marsh at the slope/creek interface. The established stable portion of the project site (300 feet x 85 feet) is dominated by oaks and other hardwoods species such as hickory, with a dense canopy and limited undergrowth. The portion of the slope which has experienced continual sloughing and erosion (200 feet x 85 feet) contains sparse coverage of oaks and other hardwoods with an open canopy and exposed understory. The coastal salt marsh runs the length of the project site on both sides of the creek, approximately 700 feet, and is primarily vegetated by *Spartina* and *Juncus.*

Exotic vegetation species targeted for management at the preserve include salt cedar (*Tamarix spp.*), paper mulberry (*Broussonetia papyrifera*), Boston fern (*Nephrolepis cordifolia*), mimosa (*Albizia julibrissin*), Chinese tallow (*Sapium sebiferum*), Chinese wisteria (*Wisteria seninsis*), air potato (*Dioscorea bulbifera*), winged yam (*D. atropurpurea*), English ivy (*Hedera helix*), Chinaberry (*Melia azederach*), kudzu (*Pueraria montana*), water hyacinth (*Eichhornia crassipes*), Japanese climbing fern (*Lygodium japonicum*), green wandering Jew (*Tradescantia fluminensis*), asparagus fern (*Asparagus*

densiflorus), cogon grass (*Imperata cylindrica*), Japanese honeysuckle (*Lonicera japonica*), coral ardisia (*Ardisia crenata*), cat's claw vine (*Macfadyena ungis-cati*), and Peruvian primrose willow (*Ludwigia peruviana*).

3.3.2 *Environmental Consequences*

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

3.3.2.1 Alternative 1 (No Action)

Currently, the 200 foot stretch of slope without a seawall has experienced several partial collapses of the slope face, causing uprooted vegetation and fallen trees. Without project construction, the continued sloughing would not allow vegetation to root and stabilize the soils. The remaining 300 feet has a vegetated slope with only a few areas of fallen trees and uprooted vegetation. Over time, the existing wooden seawall would become less effective and eventually the slope face could experience increased uprooted vegetation and fallen trees. The marsh vegetation at the creek would experience occasional burial from sloughing and possibly complete burial from a slope collapse.

3.3.2.2 Alternative 2 – Full Slope Stabilization

This alternative involves complete removal of slope vegetation for the 500 feet length of the project. Additional short term impacts to vegetation at the top of the bluff due to access road needed for construction activities, as well as burial of marsh vegetation and compaction of soils from construction of the seawall. Construction of temporary bridge across the creek would bury marsh vegetation on both sides. Mechanical measures to clear slope vegetation and construct seawall involve the use of heavy equipment. This action would result in the direct mortality of plant species. These impacts are expected to be minor because the loss of individual members of a given plant species, however, would not jeopardize the viability of the populations on and adjacent to the park and limited to project area. The clearing of slope vegetation and installation of soil nails and mats would provide open soils for revegetation of native species but also provide disturbed soils preferred by many invasive species. These areas would need to be monitored for invasive species to ensure a natural revegetation of the slope face.

3.3.2.3 Alternative 3 – Partial Slope Stabilization

Effects would be identical to alternative 2 for the 200 foot section which does not have a seawall. Marsh vegetation would be impacted from the construction activities for the seawall, including temporary burial and compaction of soils. Construction of temporary bridge across the creek would bury marsh vegetation on both sides.

3.3.2.4 Alternative 4 – Sheet Pile Seawall Only with Bench (Preferred & Env. Preferred Alternative)

Impacts to vegetation would likely only occur to marsh species as described in the previous alternatives. Short term burial of existing vegetation and compaction of soils could occur from construction of seawall. Construction of temporary bridge across the creek would bury marsh vegetation on both sides. Some loss

of slope vegetation would occur from construction activities of cutting into slope face to create a bench. Continued loss of vegetation on the 200 foot section without a seawall could continue until soils stabilize.

3.3.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

Impacts to vegetation would likely only occur to marsh species as described in the previous alternatives. Short term burial of existing vegetation and compaction of soils would occur from construction of seawall. Construction of temporary bridge across the creek would bury marsh vegetation on both sides. Continued loss of vegetation on the 200 foot section without a seawall could continue until soils stabilize.

3.3.2.6 Alternative 6 – Identify Setback of Monument Area

Same impacts as alternative 1(no action).

Conclusion

Under all four construction alternatives, short-term, adverse impacts from construction could result in the mortality of plants and trees along the creek marsh. All construction alternatives would involve the creation of a temporary bridge for the equipment to access the slope from the far side of the creek. This would impact marsh vegetation on both sides of the creek, although once removed, the vegetation would likely return to pre-project conditions in the long term. Alternatives 2 and 3 would also impact vegetation at the top of the slope due to construction of an access road as well as complete loss of vegetation on the slope in construction areas.

Alternative 1 and 6 have the least short term impact on vegetation, but with potentially the most impacts long term as slope stability decreased over time.

The implementation of any of the alternatives 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 INCLUDING THREATENED AND ENDANGERED SPECIES

3.4.1 *Affected Environment*

The preserve encompasses both aquatic and terrestrial communities. Examples of preserve fauna are provided below (NPS 1995). Table 3-1 identifies federally- or state-listed species that occur at the project site.

- Fish: According to the Florida Game and Fish Commission, there are 55 freshwater and 115 marine and estuarine fish species in the St. Johns River basin. Several families of finfish contribute to recreational and commercial fisheries in the lower St. Johns River and in northeast Florida. The most important of these families to commercial fisheries

and estuary predators is the Sciaenidae, which includes whitings (*Menticirrhus* spp.), spotted seatrout (*Cynoscion nebulosus*), weakfish (*C. regalis*), croaker (*Micropogon undulatus*), spot (*Leiostomus xanthurus*), black drum (*Pogoias cromis*), red drum (*Scianeops ocellatus*), and shortnose sturgeon (*Acipenser brevirostrum*). The young and juvenile of these species require estuaries for nursery grounds, and adults are either permanent residents of estuaries or inhabitants of shallow coastal waters.

- Shellfish: Common shellfish species and invertebrates that are found throughout the saltmarsh and estuary of TIMU include the fiddler crab (*Uca pugnax*), mud snails (*Nassaius vibex*), periwinkle snails (*Littorina littorea*), American oyster (*Crassostera virginica*), Atlantic ribbed mussel (*Geukensia demissa*) and blue crabs (*Callinectes sapidus*). White shrimp (*Penaeus setiferus*) are also common throughout the estuary. This species is typically found during late spring or early summer when the species is spawning.

- Mammals: Mammals documented to occur at the preserve include the white-tailed deer (*Odocoileus virginianus*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), Florida mink (*Mustela vison lutensis*), river otter (*Lutra canadensis*), raccoon (*Procyan lotor*), Virginia opossum (*Didelphis virginiana*), unidentified bats (Vespertilionidae or Molossidae), eastern mole (*Scalopus aquaticus*), eastern gray squirrel (*Sciurus carolinensis*), marsh rabbit (*Sylvilagus palustris*), eastern cottontail (*S. floridanus*), rice rat (*Oryzomys palustris*), round-tailed muskrat (*Neofiber alleni*), cotton mouse (*Peromyscus gossypinus*), manatee (*Trichechus manatus*), and wild hog (*Sus* spp.).

- Reptiles and Amphibians: Few reptiles and no amphibians are regular residents in the preserve salt marshes; most inhabit the upland areas. Reptiles documented to occur at the preserve include the American alligator (*Alligator mississippiensis*), six-lined race runner (*Cnemidophorus sexlineatus*), southern fence lizard (*Sceloporus undulatus*), eastern glass lizard (*Ophisaurus vantralis*), broad-headed skink (*E. laticepa*), gopher tortoise (*Gopherus polyphemus*), eastern mud turtle (*Kinosternon subrubrum*), Florida softshell (*Apalone ferox*), Florida cottonmouth (*Agkistrodon piscivorous*), eastern diamondback rattlesnake (*Crotalus adamanteus*), corn snake (*Elaphe guttata*), yellow rat snake (*E. obsoleta quadrivittata*), scarlet king snake (*Lampropeltis triangulum*), eastern coachwhip (*Masticophis flagellum*), rough green snake (*Opheodrys aestivus*), green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), and Kemp's ridley turtle (*Lepidochelys kempii*).

  Amphibians documented to occur at the preserve include the slimy salamander (*Plethodon glutinosus*), southern cricket frog (*Acris gryllus*), greenhouse frog (*Eleutherodactylus planirostris*), green tree frog (*Hyla cinerea*), squirrel tree frog (*Hyla squirella*), southern leopard frog (*Rana sphenocephala*), Florida gopher frog (*R. areolata aesopus*), southern toad (*Bufo terrestris*), eastern narrowmouth toad (*Gastrophryne carolinensis*), and eastern spadefoot toad (*Scaphiopus holbrooki*).

- Birds: Approximately 324 bird species are known to occur within TIMU (NPS 2007a). Birds at the preserve include permanent resident species, as well as winter or summer residents, and migrants. Species documented to occur within or adjacent to the preserve

include the brown pelican (*Pelecanus occidentalis*), double-crested cormorant (*Phalacrocorax auritus*), white ibis (*Eudocimus albus*), wood stork (*Mycteria americana*), wood duck (*Aix sponsa*), black vulture (*Coragyps atratus*), osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), red-shouldered hawk (*Bureo lineatus*), wild turkey (*Meleagris galloavo*), Wilson's plover (*Charadrius wilsonia*), American oystercatcher (*Haematopus palliatus*), ring-billed gull (*Larus delawarensis*), royal tern (*Sterna maxima*), Forster's tern (*S. forsteri*), black skimmer (*Rynchos niger*), eastern screech owl (*Otus asio*), great horned owl (*Bubo virginianus*), belted kingfisher (*Megaceryle alcyon*), red-headed woodpecker (*Melanerpes erythrocephalus*), pileated woodpecker (*Dryocous pileatus*), purple martin (*Progne subis*), Carolina wren (*Thryothorus ludovicianus*), gray catbird (*Dumetella carolinensis*), palm warbler (*Dendroica palmarum*), pine warbler (*D. pinus*), summer tanager (*Piranga rubra*), rose-breasted grosbeak (*Pheucticus ludovicianus*), and orchard oriole (*Icterus spurius*).

Table 3-1 Federally- or State-Listed Species that May Occur in the Project Area

Scientific and Common Names	Federal Status	State Listing
Acipenser brevirostrum Shortnose Sturgeon	LE	LE
Mycteria americana Wood Stork	LE	LE
Trichechus manatus West Indian Manatee	LE	LE
Acipenser oxyrinchus oxyrinchus Atlantic Sturgeon	C	LS
Alligator mississippiensis American Alligator	SAT	LS
Arnoglossum diversifolium Variable-leaved Indian-plantain	N	LT
Athene cunicularia floridana Florida Burrowing Owl	N	LS
Calydorea coelestina Bartram's Ixia	N	LE
Chamaesyce cumulicola Sand-dune Spurge	N	LE
Cistothorus palustris griseus Worthington's Marsh Wren	N	LS
Drymarchon couperi Eastern Indigo Snake	LT	LT
Gopherus polyphemus Gopher Tortoise	N	LT
Matelea floridana Florida Spiny-pod	N	LE
Nemastylis floridana Celestial Lily	N	LE
Picoides borealis Red-cockaded Woodpecker	LE	LS
Pituophis melanoleucus mugitus Florida Pine Snake	N	LS
Pteroglossaspis ecristata Giant Orchid	N	LT
Pycnanthemum floridanum Florida Mountain-mint	N	LT
Salix floridana Florida Willow	N	LE

Source: 2009 park list and occurrence records obtained from Florida Natural Areas Inventory,
Keys to table: C = candidate for listing; LE = endangered; N = not currently listed, nor currently being considered for listing; LS = species of special concern; LT = threatened; SAT = Treated as threatened due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.

The U.S. Fish and Wildlife Service noted that marine turtles are observed from time to time in the waters of the preserve. Only the loggerhead is expected to nest in the vicinity of the preserve (NPS 1996).

According to preserve staff, there is no record of active or inactive red-cockaded woodpecker colonies within preserve boundaries; however, if mature pine stands occur, there is the potential for this species.

The Eastern Indigo snake has not been observed within the preserve, although the park is within its known range.

An active bald eagle nest is present on Pearson Island. Pearson Island is within the overall Preserve boundaries, but is considered a legislated exclusion and is not owned or managed by the NPS. The Florida Game and Fish Commission monitors Florida bald eagle nests on an annual basis (NPS 1996).

Manatees are known to occupy large activity ranges in the St. Johns River. Manatees occupy the Intracoastal Waterway during the warm months, and individuals have been recorded at Ft. Caroline. The manatee is the only federally-listed species that occurs within preserve boundaries with a critical habitat designation. All preserve waters are within the critical habitat for the manatee (NPS 1996). The current shallow depth of St. Johns Creek precludes manatees from inhabiting the creek, therefore no construction activities would affect the manatee. However, mobilization of construction equipment is likely to include the use of barges on the St. Johns River, where manatees are known to inhabit. The project alternatives are not likely to adversely affect the manatee because the USFWS standard "Manatee Protection Measures" will be incorporated into the standard plans and specifications.

Gopher tortoises are known to inhabit the project site, mainly on the upper slopes. As a listed threatened species in the state of Florida, special precautions shall be undertaken to prevent the disturbance or harassment of this species. Pre-construction surveys shall be conducted after coordinating with Florida Wildlife Conservation Commission (FWC) to ensure proper protocols are followed. Identified burrows shall be marked and no activities shall occur within 25 feet. If relocation is required, proper permitting shall occur before undertaking any actions to handle or relocate individuals per FWC protocols.

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)

Impacts to wildlife under the no action alternative would occur from continued sloughing and possible collapse of the slope face. A large collapse would bury marsh wildlife directly under the collapsed area. Impacts to aquatic species in the area could occur from blockage of the St. Johns Creek, as well as increased turbidity and sediment load in the downstream water column.

3.4.2.2 Alternative 2 – Full Slope Stabilization

Short term impacts would occur to species residing and utilizing the slope vegetation. Species of birds, reptiles, small mammals and numerous insects would be driven from the area or killed during removal of the vegetation. Gopher tortoise surveys would be performed before construction, existing burrows marked off or relocation of individuals would occur. Long term stability of the slope face could have beneficial impacts to these species. Marsh and aquatic species would be impacted from the machinery used to construct the seawall and construction of a temporary bridge within the creek by burial, displacement, obstruction and death. Pioneering species adapted to disturbance would recolonize the area in the short term post construction. Long term stability of the shoreline would promote climax species which rely on stable environments to succeed.

3.4.2.3 Alternative 3 – Partial Slope Stabilization

Impacts from this alternative would be similar to alternative 2, although slightly less for species dependant on the slope from reduced vegetation removal. Gopher tortoise surveys would be performed before construction, existing burrows marked off or relocation of individuals would occur. Marsh species would have the same impacts from alternative 2.

3.4.2.4 Alternative 4 – Sheet Pile Seawall Only with Bench (Preferred & Env. Preferred Alternative)

Impacts from this alternative would be similar to alternative 2, for marsh species, whereas species dependant on the slope vegetation habitat would not be impacted except during construction. Gopher tortoise surveys would be performed before construction, existing burrows marked off or relocation of individuals would occur.

3.4.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

Impacts from this alternative would be similar to alternative 2, for marsh species, whereas species dependant on the slope vegetation habitat would not be impacted except during construction. Gopher tortoise surveys would be performed before construction, existing burrows marked off or relocation of individuals would occur.

3.4.2.6 Alternative 6 – Identify Setback of Monument Area

This alternative would have the same impacts as described in alternative 1.

Conclusion

Species would be disrupted from all alternatives involving construction activities. Alternative 2 and 3 would have the most short term impacts on local wildlife species as habitat along the slope face would be cleared. Long term stability would provide positive impacts to climax species which rely on established stable conditions. All construction alternatives would include possible barging of construction equipment to the site via the St. Johns River. Established USFWS standard “Manatee Protection Measures” will be incorporated into the standard plans and specifications regarding the use of barges, therefore the project is not likely to adversely affect manatees.

Potential Gopher tortoise burrows will be identified and marked prior to construction. In the event that relocation is needed, the established FWC protocols for Gopher tortoise will be followed to ensure no adverse affects on the species. Alternatives 2 and 3 would have the greatest potential impact on Gopher tortoises as burrows are generally found on upper slopes where water intrusion is unlikely.

Nesting shorebirds such as least terns are known to be attracted to disturbed sites and have the potential to nest on Buck Island. If nesting shorebirds are present, buffers of 100 meters will be used to the maximum extent practicable.

All construction activities would impact marsh and aquatic species, although only short term during construction. Temporary access from bridge construction would impact marsh species on both sides of the creek during construction activities. Possible blockage of the creek would impact fish and other aquatic species that inhabit the creek bed, although these impacts would be temporary in nature. The implementation of any of the alternatives would not impair wildlife 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.

3.5 AIR QUALITY

3.5.1 *Affected Environment*

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

Air quality is a major concern at the preserve, because of its location in a large and growing metropolitan area. Although limited industrial development is located within preserve boundaries, there is heavy industry around the southern portion of the preserve. All shipping traffic bound to and from the Port of Jacksonville passes through the preserve on the St. Johns River, and commercial barge traffic passes through on the Intracoastal Waterway. Mobile and stationary sources contribute to air quality degradation. There are 34 major permitted stationary sources of air pollution in Duval County, most of which are located in the vicinity of the preserve, including the largest coal-fired power plant in Florida (JCCI, 2007). There are several other sources in northeastern Florida as well as along the nearby Georgia coast.

As the EPA has modified and tightened standards, the City of Jacksonville has continued to meet them. Duval County was designated in attainment for the new ozone standards in 2004 and for new particulate matter standards, PM2.5, in 2005 (JCCI, 2007). In 2006, the Air Quality Index measured 305 days in the "Good" range, up from 275 days in 2005. The number of days that were reported as "Unhealthy for Sensitive Groups" decreased from five in 2005 to one in 2006.

3.5.2 *Environmental Consequences*

Impacts to air quality were qualitatively assessed using professional judgment based on consideration of the equipment assumed to be needed, literature review, and time frame to complete the alternatives.

3.5.2.1 Alternative 1 (No Action)

Under this alternative, no impacts to air quality are expected. Ongoing sloughing activity increases particulates into the surrounding air, but only for short term and infrequent duration.

3.5.2.2 Alternative 2 – Full Slope Stabilization

Impacts to air quality from construction machinery would be short term and would not be expected to exceed EPA thresholds. Sources of air pollution would be from diesel engines exhaust and dust particulates from vegetation clearing, soil nailing activities, excavating soils in creating a bench, and driving sheet pile.

3.5.2.3 Alternative 3 – Partial Slope Stabilization

Impacts to air quality from construction machinery would be short term and would not be expected to exceed EPA thresholds. Sources of air pollution would be from diesel engines exhaust and dust particulates from vegetation clearing, soil nailing activities, excavating soils in creating a bench, and driving sheet pile.

3.5.2.4 Alternative 4 – Sheet Pile Seawall Only with Bench (Preferred & Env. Preferred Alternative)

Impacts to air quality from construction machinery would be short term and would not be expected to exceed EPA thresholds. Sources of air pollution would be from diesel engines exhaust and dust particulates from excavating soils in creating a bench and driving sheet pile.

3.5.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

Impacts to air quality from construction machinery would be short term and would not be expected to exceed EPA thresholds. Sources of air pollution would be from diesel engines exhaust and dust particulates from driving sheet pile.

3.5.2.6 Alternative 6 – Identify Setback of Monument Area

Under this alternative, no impacts to air quality are expected. Ongoing sloughing activity increases particulates into the surrounding air, but only for short term and infrequent duration.

Conclusion

The “No Action” alternative and Alternative 6 would not have any impacts on air quality, while all construction alternatives would have only very minor and temporary impacts resulting from machinery and particulates from construction activities.

The implementation of any of the alternatives would not impair air quality 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.

3.6 VISITOR USE AND EXPERIENCE (INCLUDING PARK OPERATIONS)

3.6.1 *Affected Environment*

The current Ribault Monument is located on a sandy bluff about 84 feet above the St. Johns River and Jacksonville Harbor. Situated atop St. Johns Bluff, the monument platform provides a commanding view of the St. Johns River. On a clear day, you can see the Atlantic Ocean and Mayport Naval Station five miles to the east, and river activity, wildlife, and marshes below. The monument area includes an asphalt parking area, with concrete and wooden walkways leading up the monument which sits within a concrete platform atop the bluff. Immediately adjacent to park property are residential homes which have access to the water via St. Johns River and/or St. Johns Creek.

3.6.2 *Environmental Consequences*

Visual resource impacts in this environmental assessment were assessed in terms of scenic integrity, visual wholeness, and unity of the landscape. While impacts to park operations were qualitatively assessed using professional judgment based on consideration of the overall size of the site, National Park Service personnel, and park structures. Possible closure of the Ribault Monument area during construction would impact visitor use and enjoyment. Neighbors adjacent to the park will be impacted by blockage of St. Johns Creek during construction. Creation of a temporary bridge across the creek would not allow neighbors located on St. Johns Creek to access the St. Johns River.

3.6.2.1 Alternative 1 - (No Action)

No short term impacts would occur as park visitors would continue to utilize the monument. Continued slope erosion and sloughing could result in loss of soils adjacent to the monument site, affecting vegetation surrounding the platform, resulting in less visually pleasing experience to the visitor and possibly permanent closure of the monument site.

3.6.2.2 Alternative 2 – Full Slope Stabilization

Adverse impacts to visitor use from alternative 2 would be short-term before and during construction activities. Impacts to the scenic integrity would include the creation of the access road on top of the bluff, as well as loss of all vegetation from the slope area. Visitor experience would be impacted until slope vegetation is established. Impacts to visitor experience from construction could occur during construction

as the monument may be closed during construction. Blockage of the creek during construction of the seawall would impact neighbors wanting to utilize the creek for passage to the St. Johns River, although impacts would only be during construction.

3.6.2.3 Alternative 3 – Partial Slope Stabilization

Impacts to visitor use and experience would be similar to alternative 2 as the monument could be closed during construction. The removal of vegetation on the 200 feet section without a seawall would not likely impact visitor experience as this area is not directly next to the viewing platform. Blockage of the creek during construction of the seawall would impact neighbors wanting to utilize the creek for passage to the St. Johns River, although impacts would only be during construction.

3.6.2.4 Alternative 4 – Sheet Pile Seawall Only with Bench (Preferred & Env. Preferred Alternative)

Visitor impacts from this alternative would be minimal as the construction area would be confined to the creek bed, allowing the monument to remain open. Short term impacts from noise and visible equipment would occur but only during construction. Blockage of the creek during construction of the seawall would impact neighbors wanting to utilize the creek for passage to the St. Johns River, although impacts would only be during construction.

3.6.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

Visitor impacts from this alternative would be minimal as the construction area would be confined to the creek bed, allowing the monument to remain open. Short term impacts from noise and visible equipment would occur but only during construction. Blockage of the creek during construction of the seawall would impact neighbors wanting to utilize the creek for passage to the St. Johns River, although impacts would only be during construction.

3.6.2.6 Alternative 6 – Identify Setback of Monument Area

Creating a setback could cause a major impact to visitor use and experience as the setback could include the viewing platform, parking area and associated walkways. The monument area could be deemed unsafe and subsequently closed to visitors.

Conclusion

Impacts to the visitor use of the monument area under alternatives 2, 3, 4, and 5 would be minor and temporary during construction activities. Loss of vegetation on the slope from alternative 2 and 3 would result in the some impact on visitor experience and would continue until vegetation is re-established. Possible closure of the monument during construction under alternatives 2 and 3 would impact visitor enjoyment and affect park operations. The potential for long term closure of certain areas of the monument area are increased under Alternative 6 and would have the most impact on visitor use. All construction alternatives would impact neighbors of the park by blocking access of St. Johns Creek into the St. Johns River, although the blockage would only be during construction of the seawall.

3.7 HUMAN HEALTH AND SAFETY

3.7.1 *Affected Environment*

In the event of potentially hazardous slope collapse at the monument area, the preserve superintendent would coordinate public notification efforts within and outside the preserve. The extent of public notice would depend on the situation. In every case, ensuring visitor and preserve staff safety would take priority over other activities.

3.7.2 *Environmental Consequences*

Safety of platform could be impacted by a large scale collapse of the slope, possibly causing a closure of the facility. Sediment sloughing into the creek during a collapse would not likely endanger human safety as persons are not normally present at the creek area.

3.7.2.1 Alternative 1 - No Action

Currently the site is determined to be reasonably safe for visitor access, with no major impacts to health and safety. No action will result in continued slope failure of the 22 foot unstabilized section and the eventual deterioration of the existing wooden bulkhead with resulting slope failures below Ribault Monument. Either consequence will pose and increased danger to visitors at the site and result in eventual closure of the monument area. Continued unprotected slope failures would eventually affect adjacent resident homes. An on-going risk exists to the users of the creek below.

3.7.2.2 Alternative 2 – Full Slope Stabilization

This alternative would provide the most long term benefits to human safety from complete stabilization of the slope and construction of the seawall. Other than potential injuries to construction personnel, no impacts to human health and safety are expected from this alternative. Overall safety is improved greatly with the construction of the seawall.

3.7.2.3 Alternative 3 – Partial Slope Stabilization

The general impacts to human health and safety under Alternative 3 would be similar to those described in Alternative 2 because the 200 foot unstabilized portion of the slope would be reinforced. The potential for slope failure collapse on the remaining 300 feet which would not be cleared and soil nailed has been determined unlikely to impact health and safety at the monument area. A reduced risk will exist for anyone on St. Johns Creek. Overall safety is greatly improved with the construction of the seawall, which replaces the wall that stabilized the slope since 1962.

3.7.2.4 Alternative 4 – Sheet Pile Seawall Only with Bench (Preferred & Env. Preferred Alternative)

Impacts to the human health and safety are slightly greater than alternatives 2 and 3 because the slope face is not soil nailed in the unstable 200 foot section. The seawall construction reduces the risk of a slope failure impacts the monument area and provided long term stability of the toe of the slope. Overall safety

is improved with the construction of the seawall, which replaces the wall that stabilized the 300 foot section since 1962. The addition of the bench and higher seawall reduces the risk to users of St. johns Creek from the no action or setback alternatives, but not as much as the soil nailed alternatives.

3.7.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

Impacts from this alternative are the same as Alternative 4 with two exceptions. The additional impact on safety during construction for the workers due to heavier and longer sheet pile driving represents a slightly higher risk of slope failure during construction from vibration and the elimination of the bench possibly increases risk to users of the creek as any slope failure must rely on the wall to retain the soils.

3.7.2.6 Alternative 6 – Identify Setback of Monument Area

This alternative provides the least impact on human health and safety for visitors to the monument by providing a setback form the potential risk area. It does not reduce the risk to users of the creek, nor the residents living adjacent to the monument or to workers who might be required to maintain or monitor the perimeter area.

Conclusion

Under all four construction alternatives there is the potential for injury to workers from operating machinery and working in an unstable slope environment. Alternative 2 and 3 have the greatest impacts on safety during construction, due to the additional work in steep slopes, particularly in the steep unstable 200 foot section. Alternative 2 also has the additional construction safety impact of the steep slope work on the 300 foot stabilized section above the existing wall. Alternative 4 and 5 have less impact on construction worker safety as a result, with Alternative 4 having the least risk to workers due to the 15 foot bench distance of sheet pile driving operations from the unstable 200 foot section of the bluff. Worker safety impacts are eliminated temporarily for Alternative 1 and 6, until the major slope failures block the creek or begin to encroach upon adjacent residences, necessitating worker risk then.

All construction alternatives provide reduced long term human health and safety impacts, with Alternative 2 providing the least safety impacts and the greatest reduction in risk, having the toe and slope face of the entire bluff stabilized to a high degree of certainty. Alternative 3 does not clear and soil nail the 300 foot bluff face below the monument which has remained vegetated and stabilized since 1962 with the construction of the wooden bulkhead. This represents a slight increase in safety impacts, primarily to occupants and users of St. Johns Creek below. Monument visitors are not reasonably expected to be affected by a slope face failure with this Alternative. Alternative 4 and 5 do not clear and soil nail any of the bluff slope face. As such they represent a slight increase in safety impacts, again primarily to users of St. Johns Creek below. Slope face failures with these alternatives are not reasonably expected to impact visitors to the monument.

All construction alternatives provide substantially reduced long term impacts to human health and safety, with Alternative 2 and 3 providing slightly greater reduction in health and safety impacts from Alternative 4 and 5, but only marginally so. The No Action alternative represents the greatest long term impacts to human health and safety. Setback Alternative 6 has the least long term impacts initially, until encroachment of the bluff slope increases impacts to adjacent residents.

3.8 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their proposals on historic properties, and to provide state historic preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation, a reasonable opportunity to review and comment on these actions.

3.8.1 *Affected Environment*

Ten sites specifically related to the preserve's history were identified in the enabling legislation. Only four of these 10 sites have extant remains that have been located: the antebellum Zephaniah Kingsley Plantation, Yellow Bluff Fort, Spanish-American War fortification, and San Juan del Puerto mission site. The other six sites—San Estaban, San Gabriel, Dos Hermanas, Thomas Creek Battlefield, Fort St. George, and St. Johns Town—have not been found.

There are, however, many other prehistoric and historic cultural resources within the preserve not cited in the legislation that contribute to the understanding of human use and life in the region. The preserve contains sites representing almost every cultural period: Archaic, Orange, Woodland, Mississippian, Protohistoric, Mission Period, First Spanish Period, British Period, Second Spanish Period, and 19th century American to the present. These sites represent several thousand years of human occupation of the area. Perhaps the oldest documented ceramic culture habitation site in the state of Florida (dating back 6,000 years) is found on preserve lands. At present, there are 192 prehistoric and historic sites at the preserve listed in the Archeological Sites Management Information System.

Archeological testing in the Ribault Monument area was performed in 1983 by the National Park Service. From this study, three sites were identified to contain cultural or historical resources. St. Johns Bluff Mound (8Du7) was first identified in the late 1800's by C.B. Moore and Jeffries Wyman. Today, no remainder of this site is evident, as it is believed to have washed away due to erosion of the bank on which the site was situated (NPS 1983). The site was not relocated during the recent site assessment survey undertaken between 2006 and 2008.

The St. Johns Bluff Midden (8Du8) was identified by Wyman, who collected ceramics from the site which were analyzed by James B. Griffin. In 1980, Moore determined much of the site had eroded into the St. Johns River and called for its preservation. Recent surveys between 2006 and 2008 did not return any objects of cultural value and it is thought that the remaining resources had washed into the river.

Site 8Du111 is a large site multi-component site with the following sub-sites located within it:

1) St. Johns Bluff West occupies the shoreline and adjacent high ground (St. Johns Bluff) fronting the St. Johns River within the main unit of the park (between the fort exhibit and the eastern boundary of the park). Historical documentation and archeological investigations have shown a long historical sequence of occupation beginning some 4000 years ago during the Orange period (c. 2000-500 B.C.), continuing on through the prehistoric St. Johns cultural periods (c. 500 B.C. - A.D. 1562), and the establishment of the Revolutionary War era British settlement of St. Johns Town (c.1779-1783).

2) Ribault Monument corresponds with the Ribault Monument Area tract and occupies the highest point of land along St. Johns Bluff overlooking the confluence of St. Johns Creek and the St. Johns River.

3) Ribault Column is a representation of the column shown in the DeBry engraving done in 1591 (based, presumably, on a LeMoyne sketch from his recollection of 1564). The original column was placed at the mouth of the St. Johns River by the French to claim the land in 1562. In 1924, the "replica" column was placed at Mayport by the Daughters of the American Revolution. In 1957, the "replica" was moved to St. Johns Bluff, its present location.

4) Spanish American Earthworks includes a temporary gun battery constructed on St. Johns Bluff in 1898 as part of the U.S. military defenses of the Spanish American War. The battery was constructed to house two 5-inch guns and two 7-inch howitzers. The battery was dismantled sometime during the early 1900s, with the battery site later recontoured for the placement of the Ribault Column in 1957. Archeological components associated with this defensive structure are still preserved within the Ribault platform area.

3.8.2 *Environmental Consequences*

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources, literature review, and discussions with park staff.

3.8.2.1 Alternative 1 (No Action)

The potential impacts to cultural and historical resources occur from erosion of the slope face, which could continue under this alternative. Long term negative impacts to these identified resources could occur from continued sloughing and possible collapse of the slope. There are no short term impacts to cultural and historical resources under this alternative.

3.8.2.2 Alternative 2 – Full Slope Stabilization

Construction of an access road at the top of the bluff to facilitate clearing of vegetation creates a major impact to cultural resources. As the majority of these resources are archeological features, it would be very difficult to mitigate these impacts. Construction of the seawall would not impact any resources.

3.8.2.3 Alternative 3 – Partial Slope Stabilization

Impacts from this alternative are identical to those described in alternative 2.

3.8.2.4 Alternative 4 – Sheet Pile Seawall Only with Bench (Preferred & Env. Preferred Alternative)

As all cultural and historical resources were identified on the bluff, construction of the seawall would have no impacts on cultural or historical resources.

3.8.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

As all cultural and historical resources were identified on the bluff, construction of the seawall would have no impacts on cultural or historical resources.

3.8.2.6 Alternative 6 – Identify Setback of Monument Area

Alternative 6 would have the same impacts as those described in alternative 1.

Conclusion

All identified cultural and historical resources are located on the bluff, where impacts would occur with the construction of an access road for the removal of vegetation as described in alternatives 2 and 3. The long term protection of these resources would benefit from slope stabilization as erosive forces threaten to undercut these resources from slope failures.

The implementation of alternatives 1, 4, 5, or 6 would not impair cultural 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.

3.9 NOISE

3.9.1 *Affected Environment*

The location of the monument provides a natural setting with little background noise sources. Visitors to the monument would be sensitive to any noise source associated with machinery or other man made source. Land owners adjacent to the monument would also be affected by man made noise sources as private landowners reside directly on the monuments boundaries.

3.9.2 *Environmental Consequences*

Impacts to noise were qualitatively assessed using professional judgment based on consideration of the equipment assumed to be needed, discussion with project engineers, and time frame to complete the alternatives.

3.9.2.1 Alternative 1 (No Action)

No construction activities are included in this alternative therefore no external noise sources would exist.

3.9.2.2 Alternative 2

Machinery associated with construction of this alternative would have temporary noise impacts. Removal of vegetation, creation of the access road, and installation of the seawall would all require heavy machinery. Noise impacts would all be short term and would return to background levels once construction was complete. Construction activities associated with driving sheet pile would be especially

noisy to neighbors of the monument facility. Mitigative measures include driving of sheet pile only during normal business hours 8am to 5pm Monday through Friday.

3.9.2.3 Alternative 3

Impacts from this alternative are identical to those described in alternative 2, although slightly shorter in duration. Noise impacts would all be short term and would return to background levels once construction was complete. Construction activities associated with driving sheet pile would be especially noisy to neighbors of the monument facility. Mitigative measures include driving of sheet pile only during normal business hours 8am to 5pm Monday through Friday.

3.9.2.4 Alternative 4 – Sheet Pile Seawall Only with Bench (Preferred & Env. Preferred Alternative)

Noise impacts would originate from the creek bed, therefore visitors to the monument would be less exposed than impacts from alternative 2 and 3 where machinery was functioning at the top of the bluff. Noise impacts would all be short term and would return to background levels once construction was complete. Construction activities associated with driving sheet pile would be especially noisy to neighbors of the monument facility. Mitigative measures include driving of sheet pile only during normal business hours 8am to 5pm Monday through Friday.

3.9.2.5 Alternative 5 – Sheet Pile Seawall Only without Bench

Noise impacts would originate from the creek bed, therefore visitors to the monument would be less exposed than impacts from alternative 2 and 3 where machinery was functioning at the top of the bluff. Noise impacts would all be short term and would return to background levels once construction was complete. Construction activities associated with driving sheet pile would be especially noisy to neighbors of the monument facility. Mitigative measures include driving of sheet pile only during normal business hours 8am to 5pm Monday through Friday.

3.9.2.6 Alternative 6 – Identify Setback of Monument Area

Alternative 6 would have the same impacts as those described in alternative 1.

Conclusion

All construction alternatives would have associated noise from heavy machinery required during construction. All impacts would be temporary in nature and noise would return to background levels once construction was complete. As mentioned in all construction alternatives, mitigative measures for noise would include driving of sheet pile only during normal business hours 8am to 5pm Monday through Friday.

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).

Dredged material is currently disposed of at the Buck Island upland disposal site, where material is recycled for beneficial use along the shoreline for beach nourishment (starting at the jetties and working south); or in the Jacksonville Offshore Dredge Material Disposal Site. USACE Jacksonville District, in cooperation with JAXPORT, is studying the feasibility of further deepening the port. Ongoing projects in the St. Johns River and the Port of Jacksonville include:

1. Construction to complete deepening of the harbor to at least -40 feet MLLW throughout the port. Incremental analysis of increased depths shall be examined, up to a maximum of 50 feet. Increased depth of the channel allows salt water to flow further up river, potentially altering the flora and fauna of the river, depending on salinity fluxuations.

2. A feasibility study on ebb-tide restrictions and shoreline erosion at Mile point to include rebuilding the training wall, dredging and potential disposal at Buck Island, adjacent to the project site.

3. Homeporting of Naval vessels at Naval Station Mayport which would include dredging to increase overall depth at Mayport.

Other than the above mentioned projects, the USACE and NPS are not aware of any future state or Federal activities that are reasonably certain to occur within the project area.

Chapter 4 – Environmental Consequences

The NEPA requires the disclosure of environmental impacts associated with the preferred alternative and other alternatives including the No Action Alternative. This section presents the environmental impacts of the preferred alternative (Sheet Pile Seawall Only with Bench), alternatives not selected, and the No Action Alternative on soils, water resources, vegetation, wildlife, air quality, visitor use, human safety, cultural resources, and noise. These analyses provide the basis for comparing the effects of the alternatives. NEPA requires consideration of context, intensity and duration of impacts, indirect impacts, cumulative impacts, and measures to mitigate for impacts. NPS policy also requires that “impairment” of resources be evaluated in all environmental documents.

Chapter 4 describes and analyzes potential environmental effects on the physical, natural and human environment associated with the proposed action alternatives and the No Action Alternative. In addition, cumulative impacts, as defined in regulations developed by the CEQ[1], are discussed throughout this chapter for each resource. A cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

[1] Code of Federal Regulations, Title 40, Section 1508.7.

Primary laws and guidance documents that guided the development of this EA are:

- National Park Service Organic Act of 1916 (16U.S.C. 1-4, et seq.) – Created the National Park Service to promote and regulate the use of national parks, monuments, and reservations, by such means and measures as to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the land in such manner as will leave them unimpaired for the enjoyment of future generations.

- The National Historic Preservation Act of 1966 as amended (16 U.S.C. 470) – To protect and preserve historic districts, sites and structures, and archeological, architectural and cultural resources. Section 106 and Section 110 (36 CFR 800) respectively require consultation with the State Historic Preservation Office and that NPS nominate all eligible resources under its jurisdiction to the National Register of Historic Places.

- The National Environmental Policy Act of 1969 – Public Law 91-190 established a broad national policy to improve the relationship between humans and their environment and sets out policies and goals to ensure that environmental considerations are given careful attention and appropriate weight in all decisions of the federal government. This legislation requires and guides the preparation of this EA.

- National Park Service Regulations and Policies – Actions proposed in this document are subject to the NPS Director's Order #28 (Cultural Resource Management), Director's Order #2 (Park Planning), Director's Order #12 (Conservation Planning, Environmental Impact Analysis, and Decision-making), and Director's Order #77 (Natural Resource Protection). Actions are also subject to the service-wide policy document, Management Policies (NPS 2006b).

4.1 SOILS

This section discusses the impacts of the alternatives including the No Action Alternative on the soil.

4.1.1 *No Action*

Under the No Action Alternative the soils of the project area would continue to slough into the creek and eventually slope collapse could occur.

4.1.2 *Full Slope Stabilization*

The construction phase of the proposed project would have short-term, minor, adverse impacts to soils; however these impacts would be localized at the site. Removal of all vegetation on approximately 500 feet of slope soils would increase the probability of increased sloughing and possible collapse of the slope face during construction until soil nails and mats were installed. Construction of an access road at the top of the slope would result in compaction of soils from heavy equipment utilizing the road during clearing of vegetation. Impacts to sediments at the slope creek interface would include approximately 500 feet of shoreline. Impacts include compaction of soils from machinery installing the seawall and removal of slope soils would be needed to create a bench behind the seawall. There would be potential of sloughing

of slope soils during construction, as well as continued sloughing after construction until soils settle against the new seawall.

4.1.3 *Partial Slope Stabilization*

The construction phase of the proposed project would have short-term, minor, adverse impacts to soils; however these impacts would be localized at the site. Removal of all vegetation on approximately 200 feet of slope soils would increase the probability of increased sloughing and possible collapse of the slope face in the 200 foot section where clearing would take place during construction until the installation of soil nails and mats was complete. Installation of an access road at the top of the slope would result in compaction of soils from heavy equipment utilizing the road during clearing of vegetation. Impacts to sediments at the slope creek interface would include approximately 500 feet of shoreline. Impacts include compaction of soils from machinery installing the seawall and removal of slope soils would be needed to create a bench behind the seawall. There would be potential of sloughing of slope soils during construction, as well as continued sloughing after construction until soils settle against the new seawall.

4.1.4 *Preferred Alternative (Sheet Pile Seawall Only with Bench)*

The construction phase of the proposed project would have short-term, minor, adverse impacts to soils; however these impacts would be localized at the site. Impacts to sediments at the slope creek interface would include approximately 500 feet of shoreline. Impacts include compaction of soils from machinery installing the seawall and removal of slope soils would be needed to create a bench behind the seawall. There would be potential of sloughing of slope soils during construction, as well as continued sloughing after construction until soils settle against the new seawall.

4.1.5 *Sheet Pile Seawall without Bench*

The construction phase of the proposed project would have short-term, minor, adverse impacts to soils; however these impacts would be localized at the site. Impacts to sediments at the slope creek interface would include approximately 500 feet of shoreline. Impacts include compaction of soils from machinery installing the seawall and removal of slope soils would be needed to create a bench behind the seawall. There would be potential of sloughing of slope soils during construction, as well as continued sloughing after construction until soils settle against the new seawall.

4.1.6 *Identify Setback of Monument Area*

Under this alternative the soils of the project area would continue to slough into the creek and eventually slope collapse could occur as the old wooden seawall becomes unstable.

Conclusion

The proposed project would result in short-term, minor, adverse impacts to soil during all construction alternatives. Alternatives including clearing of vegetation result in the greatest impacts to soils, whereas all construction alternatives have similar impacts to soils at the shoreline. The potential for erosion would be minimized through the use of sediment and control measures including silt fences and/or hay bales.

The preferred alternative provides long term stability to soils and will not cause any impairment to the project area.

Cumulative Impacts

Following comparisons of the Preferred Alternative and the other alternatives, all construction alternatives result in short-term minor impacts to soil. Cumulative impacts to soils are not anticipated.

4.2 WATER RESOURCES (INCLUDING FLOODPLAINS)

This section discusses the impacts of the alternatives including the No Action Alternative on the water resources of the project area.

4.2.1 *No Action*

Under the No Action Alternative the continued sloughing of slope sediments into the St. Johns Creek would result in increased turbidity and sediment load. Long term impacts are potentially major from collapse of the slope and blockage of the creek.

4.2.2 *Full Slope Stabilization*

Removal of all vegetation on approximately 500 feet of slope soils would increase the probability of increased sloughing and possible collapse of the slope face while removing vegetation. Impacts to the creek would include approximately 500 feet of shoreline and include increased suspended sediments from construction activities. Long term reduction of sediment load and turbidity would occur from the stabilized slope face and new seawall.

4.2.3 *Partial Slope Stabilization*

Removal of all vegetation on approximately 200 feet of slope soils would increase the probability of increased sloughing and possible collapse of the slope face while removing vegetation. Impacts to the creek would include approximately 500 feet of shoreline and include increased suspended sediments from construction activities. Long term reduction of sediment load and turbidity would occur from the stabilized slope face and new seawall.

4.2.4 *Preferred Alternative (Sheet Pile Seawall Only with Bench)*

The construction phase of the proposed project would have short-term, minor, adverse impacts to water quality; however these impacts would be localized at the site. Impacts to the creek would include approximately 500 feet of shoreline and include increased suspended sediments from construction activities. Long term reduction of sediment load and turbidity would occur from the stabilized slope face and new seawall.

4.2.5 *Sheet Pile Seawall without Bench*

The construction phase of the proposed project would have short-term, minor, adverse impacts to water quality; however these impacts would be localized at the site. Impacts to the creek would include

approximately 500 feet of shoreline and include increased suspended sediments from construction activities. Long term reduction of sediment load and turbidity would occur from the stabilized slope face and new seawall.

4.2.6 *Identify Setback of Monument Area*

Under the No Action Alternative the continued sloughing of slope sediments into the St. Johns Creek would result in increased turbidity and sediment load. Long term impacts are potentially major from collapse of the slope and blockage of the creek.

Conclusion

The proposed project would result in short-term, minor, adverse impacts to water quality for all construction alternatives. Alternatives including clearing of vegetation result in the greatest short term impacts to water quality from storm water runoff during construction and prior to soil nails and mats. The potential for erosion would be minimized through the use of sediment and control measures including silt fences and/or hay bales. The preferred alternative provides long term benefits to water quality by stabilizing the slope face and will not cause any impairment to the project area.

Cumulative Impacts

Following comparisons of the alternatives, all construction alternatives result in short-term minor impacts to water quality. Cumulative impacts to water quality are not anticipated.

4.3 VEGETATION

This section discusses the impacts of the alternatives including the No Action Alternative on the vegetation of the project area.

4.3.1 *No Action*

Under the No Action Alternative, the continued sloughing of slope soils along the 200 feet without a seawall lead to sparse vegetation coverage. Without stabilization, this area will continue to erode and prevent long term establishment of vegetation. Eventually the wooden seawall will collapse and erosion along the currently stable 300 foot section of slope would impact the established vegetation. Marsh vegetation along the shoreline would be buried from any collapse of the slope, but impacts to those species would likely be temporary.

4.3.2 *Full Slope Stabilization*

Clearing of all vegetation on approximately 500 feet of the slope would remove a large area of established vegetation including hundreds of mature trees. Marsh vegetation would be temporarily buried from construction activities at the shoreline. Long term, stabilization of the entire slope face would result in mature trees and associated understory along the slope face, as well as provide habitat for emergent marsh grasses at the shoreline.

4.3.3 *Partial Slope Stabilization*

Removal of all vegetation on approximately 200 feet of the slope would impact several trees from the eroded area, as well as shrub and grasses which currently inhabit the slope. Marsh vegetation would be temporarily buried from construction activities at the shoreline. Long term, stabilization of the 200 foot of slope face would result in mature trees and associated understory along the slope face, as well as provide habitat for emergent marsh grasses at the shoreline.

4.3.4 *Preferred Alternative (Sheet Pile Seawall Only with Bench)*

The construction phase of the proposed project would have short-term, minor, adverse impacts to emergent marsh grasses from construction of the seawall. Impacts to the creek would include approximately 500 feet of shoreline associated marsh vegetation, as well as some loss of slope vegetation from the construction of a bench behind the seawall. Long term, reduction of sediment load from construction of the new seawall would provide stable habitat for marsh vegetation. Stability to the slope face would allow slope vegetation to become established.

4.3.5 *Sheet Pile Seawall without Bench*

The construction phase of the proposed project would have short-term, minor, adverse impacts to emergent marsh grasses from construction of the seawall. Impacts to the creek would include approximately 500 feet of shoreline associated marsh vegetation. Long term, reduction of sediment load from construction of the new seawall would provide stable habitat for marsh vegetation. Stability to the slope face would allow slope vegetation to become established.

4.3.6 Identify Setback of Monument Area

Under the No Action Alternative the continued sloughing of slope soils along the 200 foot without a seawall lead to sparse vegetation coverage. Without stabilization, this area will continue to erode and prevent long term establishment of vegetation. Eventually the wooden seawall will collapse and erosion along the currently stable 300 foot section of slope would impact the established vegetation. Marsh vegetation along the shoreline would be buried from any collapse of the slope, but impacts to those species would likely be temporary.

Conclusion

The proposed project would result in short-term, minor, adverse impacts to site vegetation for all construction alternatives. Alternatives including clearing of vegetation result in the greatest short term potential impacts to vegetation. Long-term negative impacts to vegetation are greatest under the No Action or Setback option, as potential collapse of the slope would result in loss of established trees and understory. The preferred alternative provides long term benefits to vegetation by stabilizing the slope face and will not cause any impairment to the project area.

Cumulative Impacts

Following comparisons of the Preferred Alternative and the other alternatives, all construction alternatives result in short-term minor impacts to vegetation, while providing long-term stability. Cumulative impacts to vegetation are not anticipated.

4.4 WILDLIFE INCLUDING THREATENED AND ENDANGERED SPECIES

This section discusses the impacts of the alternatives including the No Action Alternative on the wildlife of the project area. One terrestrial species of concern in the project area, the gopher tortoise, could potentially be impacted by all construction alternatives. To address this concern, gopher tortoise surveys would be performed before construction with existing burrows marked for relocation. One aquatic species, the West Indian manatee, could be impacted by barging of equipment up the St. Johns River. The USFWS "Manatee Protection Measures" would be incorporated into all alternatives to ensure maximum protection of manatees.

4.4.1 *No Action*

Under the No Action Alternative the continued sloughing of slope soils along the 200 foot without a seawall result in poor habitat for several species, including the gopher tortoise. Increased turbidity and sediment load could negatively impact several aquatic species. Total collapse of the slope could block off the creek, resulting in a major negative impact to aquatic species which rely on tidal currents.

4.4.2 *Full Slope Stabilization*

Removal of all vegetation on approximately 500 feet of the slope would remove a large area of habitat, cover, and food for wildlife species. During construction, there would be loss of marsh and aquatic animals from burial by construction equipment used to install the seawall. Once construction is complete, species would reestablish on the slope face over time with the return of vegetation. Reduction of sediments and turbidity would benefit aquatic species as well.

4.4.3 *Partial Slope Stabilization*

Removal of all vegetation on approximately 200 feet of the slope would remove habitat, cover, and food for wildlife species which utilize that area. During construction, there would be loss of marsh and aquatic animals from burial by construction equipment used to install the seawall. Once construction is complete, species would reestablish on the slope face over time with the return of vegetation. Reduction of sediments and turbidity would benefit aquatic species as well.

4.4.4 *Preferred Alternative (Sheet Pile Seawall Only with Bench)*

During construction, there would be loss of marsh and aquatic animals from burial by construction equipment used to install the seawall. Once construction is complete, species would reestablish on the

slope face over time with the return of vegetation. Reduction of sediments and turbidity would benefit aquatic species as well.

4.4.5 *Sheet Pile Seawall without Bench*

During construction, there would be loss of marsh and aquatic animals from burial by construction equipment used to install the seawall. Once construction is complete, species would reestablish on the slope face over time with the return of vegetation. Reduction of sediments and turbidity would benefit aquatic species as well.

4.4.6 Identify Setback of Monument Area

Under the No Action Alternative the continued sloughing of slope soils along the 200 foot without a seawall result in poor habitat for several species, including the gopher tortoise. Increased turbidity and sediment load could negatively impact several aquatic species. Total collapse of the slope could block off the creek, resulting in a major negative impact to aquatic species which rely on tidal currents.

Conclusion

The proposed project would result in short-term, minor, adverse impacts to wildlife species for all construction alternatives. Alternatives including clearing of vegetation result in the greatest short term potential impacts to wildlife, removing existing habitat, including the gopher tortoise. Long-term negative impacts to wildlife are greatest under the No Action or Setback option, as potential collapse of the slope would result in loss of established habitat. The preferred alternative provides long term benefits to wildlife by stabilizing the slope face and reducing impacts to water quality. This project is not expected to adversely affect any listed threatened or endangered species. Coordination with the USFWS and NMFS will commence at a later date to discuss Section 7 consultation on these species. The proposed project alternatives will not cause any impairment to project area wildlife.

Cumulative Impacts

Following comparisons of the Preferred Alternative and the other alternatives, all construction alternatives result in short-term minor impacts to wildlife species, while providing long-term stability. Cumulative impacts to wildlife are not anticipated.

4.5 AIR QUALITY

4.5.1 *Impacts Common to all construction alternatives*

The construction phase of the proposed project would have short-term, minor, adverse impacts on air quality. During the construction phase of the project, the operation of equipment would generate pollutant emissions, including carbon monoxide, nitrogen oxides, and particulate matter. However, these emissions would be minimal since the proposed construction activities are temporary. Short-term fugitive gas emissions would be generated primarily from the land-disturbing activities to install the seawall.

Overall, these impacts would be short-term in nature, lasting only the duration of the construction activities.

4.5.2 No Action and Setback Alternatives

Under these alternatives, no construction would take place and therefore no increase in air quality pollutants would be expected.

Conclusion

The implementation of the proposed project would result in minor, short-term, adverse impacts to air quality due to the construction of the seawall and for clearing of slope vegetation. The No Action Alternative and the Setback Alternative would not impact air quality. None of the alternatives would cause impairment to park resources.

Cumulative Impacts

Cumulative impacts to air quality are not anticipated. A short-term, minor impact on air quality during construction is expected.

4.6 VISITOR USE AND EXPERIENCE

4.6.1 *Impacts Common to all Construction Alternatives*

Short-term, minor, adverse impacts to visitor use and experience are anticipated during the construction phase of the project. These impacts are expected to be temporary and last only the duration of the construction period. Alternatives which involve clearing of slope vegetation and construction of an access road may result in closure of the monument during construction. All construction alternatives include blocking of the St. Johns Creek during construction. This could affect park neighbors wanting to utilize the creek to access the St Johns River.

4.6.2 *No Action Alternative*

Under the No Action Alternative, the area would remain unchanged. Continued erosion of slope sediments could ultimately affect the view from the bluff.

4.6.3 *Identify Setback of Monument Area*

This alternative could have the greatest impact to visitor experience as the monument viewing platform could be deemed unsafe and be closed to the public.

Conclusion

Short-term, minor, adverse impacts to visitor use and experience are expected during the construction phase of the project. Long term, protection of the slope and surrounding areas described in the

construction alternatives would provide the most benefits for the visitor. Only the Setback alternative would possibly cause impairment to park resources.

Cumulative Impacts

In the long-term, implementation of the proposed project would cumulatively benefit the overall visitor experience in the park.

4.7 HUMAN HEALTH AND SAFETY

4.7.1 *Impacts Common to all Construction Alternatives*

Short-term, adverse impacts to human safety are possible during the construction phase of the project. Alternatives which involve clearing of slope vegetation and construction of an access road have higher possible impacts due to work performed on steep slopes and using equipment for removal of large amounts of vegetation.

4.7.2 *No Action Alternative*

Under the No Action Alternative, the area would remain unchanged. Continued erosion of slope sediments could cause impacts to safety as the monument structure could be deemed unsafe for visitor use.

4.7.3 *Identify Setback of Monument Area*

This alternative could have the least impact to visitor safety as the monument viewing platform could be deemed unsafe and be closed to the public.

Conclusion

Potential adverse impacts to human safety are possible during the construction phase of the project. Worker safety would be a concern for all construction activities. The greatest potential impacts are from work involved with clearing vegetation from the slope face. The No Action and Setback alternatives have no worker safety issues, but could result in slope collapse and possible closure of the monument area. No alternative would cause impairment to park resources.

Cumulative Impacts

In the long-term, implementation of the proposed project would cumulatively benefit the overall visitor safety in the park.

4.8 CULTURAL RESOURCES

This section describes the potential impacts of the project on archaeological and historical resources at project site. The types of effects considered include direct impacts to archaeological and historical sites of TIMU.

4.7.1 *No Action*

Under the No Action Alternative, there are no immediate impacts to cultural resources. Long term impacts could occur from continued sloughing and potential collapse of the slope face, impacting the cultural resources located at the top of the slope.

4.7.2 *Full Slope Stabilization*

This alternative would have the greatest impacts to cultural resources from the construction of an access road. The identified sites are all located at the top of the slope and would result in a major impact if an access road was constructed. There would be no impacts at the shoreline from construction of the seawall as no identified resources are located at the bottom of the slope.

4.7.3 *Partial Slope Stabilization*

This alternative would also have the great impacts to cultural resources from the construction of an access road. The identified sites are all located at the top of the slope and would result in a major impact if an access road was constructed. There would be no impacts at the shoreline from construction of the seawall as no identified resources are located at the bottom of the slope.

4.7.4 *Preferred Alternative (Sheet Pile Seawall Only with Bench)*

There would be no impacts to cultural resources with this alternative as all identified resources are located on the bluff.

4.7.5 *Sheet Pile Seawall without Bench*

There would be no impacts to cultural resources with this alternative as all identified resources are located on the bluff.

4.7.6 *Identify Setback of Monument Area*

Impacts from this alternative would be identical to the No Action alternative.

Conclusion

As all identified cultural resources are located on the bluff, only alternatives which involve constructing an access road would have any impact. Only alternatives two and three would have any impairment on park resources.

Cumulative Impacts

There would be no cumulative impacts to cultural resources at Ribault Monument associated with the construction and implementation of the proposed project for the Preferred Alternative.

4.8 NOISE

4.8.1 *Impacts Common to all Construction Alternatives*

The construction phase of the project is expected to create minor, short-term, adverse impacts on noise at the monument site. These impacts would be short-term in nature, lasting for the duration of construction activities. Noise is expected, but noise impacts would be temporary and localized in the vicinity of the construction site and would not disrupt the surrounding area. Short-term sources of noise include the clearing of vegetation, construction of temporary bridge across the creek, and most importantly the driving of sheet pile. Construction close to the water has the greatest potential to create noise disturbance, as sound can be heard at greater distances over water rather than land. The driving of sheet pile would be especially noisy for neighboring land owners. Mitigative measures include driving of sheet pile only during normal business hours 8am – 5pm Monday to Friday.

4.8.2 *No Action and Setback Alternative*

Under these alternatives, there would be no impacts on noise over background levels.

Conclusion

Noise impacts would be short term, minor, and only during construction. The driving of sheet pile would be the largest contributor to noise impacts, and would be mitigated by only driving sheet pile during normal business hours. The No Action and Setback alternatives have no noise impacts. No alternative would cause impairment to park resources based on noise.

Cumulative Impacts

There would be no cumulative impacts from noise at Ribault Monument associated with the construction and implementation of the proposed project for the Preferred Alternative.

4.9 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.9.1 *National Environmental Policy Act of 1969*

Environmental information on the project has been compiled and a Draft Environmental Assessment, was prepared and circulated for public review and comment. The project is in compliance with the National Environmental Policy Act.

4.9.2 *Endangered Species Act of 1973*

Consultation was initiated with USFWS on April 2, 2010, and was completed when the FWS concurred with the NPS determination on May 10, 2010. This project was fully coordinated under the ESA and is therefore, in full compliance with the Act.

4.9.3 Fish *and Wildlife Coordination Act of 1958*

This project was coordinated with the USFWS through the NEPA process with this EA. This project is in full compliance with the Act.

4.9.4 *National Historic Preservation Act of 1966*

(PL 89-665, the Archeology and Historic Preservation Act (PL 93-291), and executive order 11593), and (executive order 11593) Archival research, field investigations, and consultation with the Florida State Historic Preservation Officer (SHPO), have been conducted in accordance with the National Historic Preservation Act, as amended; the Archeological and Historic Preservation Act, as amended and Executive Order 11593. The project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places per the letter dated February 8, 2010. The project is in compliance with each of these Federal laws.

4.9.5 *Clean Water Act of 1972*

The project is in compliance with this Act. All State water quality standards would be met.

4.9.6 *Clean Air Act of 1972*

No air quality permits would be required for this project. This project is in compliance with Section 309 of the Act.

4.9.7 *Coastal Zone Management Act of 1972*

State consistency review was conducted during the coordination of the draft EA. A letter dated March 15, 2010 stated the project was consistent with Florida Coastal Management Program.

4.9.8 *Farmland Protection Policy Act of 1981*

No prime or unique farmland would be impacted by implementation of this project. This act is not applicable.

4.9.9 *Wild and Scenic River Act of 1968*

No designated Wild and Scenic river reaches would be affected by project related activities. This act is not applicable.

4.9.10 *Marine Mammal Protection Act of 1972*

The NPS does not anticipate the take of any marine mammal during any activities associated with the project. Appropriate actions will be taken to avoid listed and protected marine mammal species effects during project construction. If a marine mammal is identified within the project boundaries, they will be provided protections equal the ESA species that have had consultations completed, and as a result of this the project is in compliance with the Act.

4.9.11 *Estuary Protection Act of 1968*

No designated estuary would be affected by project activities. This act is not applicable.

4.9.12 *Federal Water Project Recreation Act*

This project does not contain any recreational areas associated with this act.

4.9.13 *Submerged Lands Act of 1953*

The project would occur on submerged lands of the State of Florida. The project has been coordinated with the State and is in compliance with the act.

4.9.14 *Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990*

There are no designated coastal barrier resources in the project area that would be affected by this project. These acts are not applicable.

4.9.15 *Rivers and Harbors Act of 1899*

The proposed work would not obstruct navigable waters of the United States. The project is in full compliance.

4.9.16 *Anadromous Fish Conservation Act*

Anadromous fish species would not be affected. The project has been coordinated with the National Marine Fisheries Service and is in compliance with the act.

4.9.17 *Migratory Bird Treaty Act and Migratory Bird Conservation Act*

No migratory birds would be affected by project activities. The project is in compliance with these acts.

4.9.18 *Marine Protection, Research and Sanctuaries Act*

This project does not fall under a protected marine sanctuary. Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project.

4.9.19 *Magnuson-Stevens Fishery Conservation and Management Act*

This act requires the preparation of an EFH Assessment and coordination with NMFS. The EFH Assessment was coordinated with NMFS during the normal NEPA coordination. The project is in compliance with this act.

4.9.20 *E.O. 11990, Protection of Wetlands*

No wetlands would be permanently affected by project activities. This project is in compliance with the goals of this Executive Order.

4.9.21 *E.O. 11988, Flood Plain Management*

The project is in the base flood plain (100-year flood) and has been evaluated in accordance with this Executive Order. Project is in compliance.

4.9.22 *E.O. 12898, Environmental Justice*

The proposed action would not result in adverse human health or environmental effects, nor would the activity impact substance consumption of fish or wildlife. Project is in compliance.

4.9.23 *E.O. 13089, Coral Reef Protection*

Project does not occur in areas with coral reef. This E.O. does not apply.

4.9.24 *E.O. 13112, Invasive Species*

The proposed action would not affect the status of any invasive species in the project area. The proposed project is in compliance.

Chapter 5 - Mitigation Measures

Because disturbed soils are susceptible to erosion until re-vegetation takes place, best management practices and sediment and erosion control measures would be used during the implementation of the proposed project. Sediment and control measures would include silt fences and/or sand bags and storm water management techniques.

The NPS, USACE, and their contractors commit to avoid, minimize or mitigate for adverse effects during construction activities by including the following commitments in the contract specifications:

- The NPS and USACE will comply with all requirements of any consultation documents provided under the Endangered Species Act from either the US Fish and Wildlife Service or the National Marine Fisheries Service associated with the project.

- The NPS and USACE will implement the Standard Manatee Construction Protection Specifications to ensure manatee protection.

- The NPS and USACE will implement the terms and conditions of the latest State of Florida Water Quality Certification for this project.

- The NPS and USACE will implement the FWC Gopher tortoise protocols for surveying, marking and possible relocation of tortoises.

- The NPS and USACE will implement NMFS Essential Fish Habitat (EFH) recommendations to the maximum extent practicable.

Chapter 6 – Environmental Commitments

6.1 Unavoidable Adverse Impacts

Unavoidable adverse effects are impacts that cannot be fully mitigated or avoided. The following unavoidable adverse effects would occur from the implementation of the proposed project:

- Construction within a coastal zone;
- Minor, short-term impacts to terrestrial and aquatic wildlife;
- Minor, short-term impacts to vegetation;
- Minor, short-term impacts to physical resources (soil, air quality, water quality, and noise).

6.2 Irreversible or Irretrievable Commitments of Resources

This section discusses irreversible and irretrievable commitments of resources. A resource commitment is considered irreversible when primary or secondary impacts from its use limit future options. Irreversible commitment applies primarily to nonrenewable resources, such as minerals or cultural resources, and to those resources that are only renewable over long time spans, such as soil productivity. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for use by future generations.

Irreversible

Irreversible commitments are those that cannot be reversed, except perhaps in the extreme long term. Irreversible environmental changes to natural resources associated with the implementation of the preferred alternative would include the commitment of energy as a result of the construction, operation, and maintenance of the proposed action. The only other irreversible commitment of resources would be the expenditure of Federal funds to complete the work.

Irretrievable

An irretrievable commitment of resources refers to the effects to resources that, once gone, cannot be replaced. The proposed project is not expected to cause irretrievable commitments of resources at the project site.

6.3 SUMMARY OF ENVIRONMENTAL COMMITMENTS

Several unavoidable adverse effects would occur to the terrestrial and aquatic wildlife, vegetation, soil, air and water quality, and noise from the implementation of the proposed project; however, these effects would be minor and temporary. Additionally, an irreversible commitment of energy and funding associated with the implementation of the project is expected; however, wherever possible, energy conservation would be applied and sustainable resources would be used. The preferred alternative does not result in an impairment to the Ribault Monument or the TIMU.

Chapter 7 – Public Involvement and Agency Coordination

Scoping is an effort to involve agencies and the general public in determining the scope of issues to be addressed in the environmental document. Among other tasks, scoping determines important issues and eliminates issues determined to be not important; allocates assignments among the interdisciplinary team members and/or participating agents; identifies related projects and associated documents; identifies other permits, surveys, consultations, etc. required by other agencies; and creates a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made. Scoping includes consultation with any interested agency, or any agency with jurisdiction by law or expertise to obtain early input.

7.1 AGENCY AND STAKEHOLDER COORDINATION

This EA was mailed and distributed to a list of agencies and stakeholders requesting comments regarding the proposed project at TIMU. A list of agencies and stakeholders that received a copy of this EA can be found in Appendix A.

7.2 PUBLIC SCOPING

A scoping letter was mailed to individuals, organizations, stakeholders, and agencies in order to notify the public of the proposed construction and implementation of the proposed action at the Ribault Monument. The letter notified the public of the availability of the Draft EA for comment. The comment period for the EA was 30 days.

7.3 COMMENTS TO DRAFT EA

Responses were received from the Florida Historic Preservation Officer who, in a letter dated February 8, 2010, agreed with the NPS determination that the Preferred Alternative will have no adverse effects on historic properties. Florida Department of Environmental Protection replied on March 15, 2010 and agreed with our proposed mitigation efforts and had no objections to the project.

Comments were received from 12 neighbors who live adjacent to, or nearby, the proposed construction area. Eleven of the 12 comments from neighbors were combined into a single letter with 11 signatures. The final comment from a park neighbor was received via email. There were no objections to the selected alternative.

Chapter 8 – List of Preparers

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APPENDIX A: PERTINENT CORRESPONDANCE