



# Fort Sumter and Fort Moultrie National Historical Park

## Fort Sumter and Fort Moultrie Dock Replacement Environmental Assessment



January 2024

# US DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE

## FORT SUMTER AND FORT MOULTRIE DOCK REPLACEMENT ENVIRONMENTAL ASSESSMENT

Fort Sumter and Fort Moultrie National Historical Park (the park) is located southeast of Charleston, South Carolina near the entrance of Charleston Harbor. Fort Sumter is located on a man-made island in the harbor, east of James Island. Fort Moultrie is located on Sullivan's Island, just outside of Charleston. The park contains rich history dating back to the American Revolutionary War and continuing through World War II. Much of the park is of national cultural and historical significance.

The docks provide access to park sites for visitors, park staff, law enforcement, and emergency services personnel and support operational needs for moving equipment and supplies between the mainland and Fort Sumter. Fort Sumter can only be accessed by boat. Visitors travel to Fort Sumter on concessionaire operated ferry boats that depart from two locations: Liberty Square Visitor Education Center in downtown Charleston and Patriots Point Naval and Maritime Museum in Mount Pleasant. The Fort Moultrie dock is located on the cove side of the park property on Sullivan's Island. The dock at Fort Moultrie is the docking and storage location for all park boats, supporting parkwide operations. The Fort Moultrie dock also provides public access for fishing and other recreational activities; however, the public is not permitted to dock private boats at the dock.

The National Park Service (NPS) is proposing to replace the docks at Fort Sumter and Fort Moultrie. Both docks have reached the end of their life cycles and are currently deteriorating.

This environmental assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended. This EA has been prepared to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet the objectives of the proposal, 2) evaluates potential issues and impacts on the park's resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts.

### How to Comment

We invite you to comment on this Fort Sumter and Fort Moultrie dock replacement project during the 30-day public review period. The NPS is seeking public review and comments under NEPA and in accordance with Section 106 of the National Historic Preservation Act.

The preferred method of providing comments is through the NPS's Planning, Environment, and Public Comment (PEPC) website for the park at: <http://parkplanning.nps.gov/SumterMoultrieDocks>. You may also submit written comments to:

Dock Replacement  
Attn: Superintendent  
1214 Middle Street  
Sullivan's Island, SC 29482

Please submit your written comments postmarked no later than 30 days from the posting of the availability of the environmental assessment, which will be posted on the PEPC website. Please be aware that your entire comment will become part of the public record. If you wish to remain anonymous, please clearly state that within your correspondence; however, the NPS cannot guarantee that personal information, such as email address, phone number, etc. will be withheld.

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## ACRONYMS AND ABBREVIATIONS

ABA	Architectural Barriers Act
BMP	Best Management Practice
CFR	Code of Federal Regulations
EA	Environmental Assessment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
GHG	Greenhouse Gases
IPaC	Information for Planning and Consultation
MBTA	Migratory Bird Treaty Act
MSA	Magnuson-Stevens Fisheries Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRHP	National Register of Historic Places
park	Fort Sumter and Fort Moultrie National Historical Park
PEPC	Planning, Environment, and Public Comment
SAFMC	South Atlantic Fishery Management Council
SCDNR	South Carolina Department of Natural Resources
SCDHEC OCRM	South Carolina Department of Health and Environmental Control Office of Coastal Resource Management
SHPO	State Historic Preservation Office
USC	United States Code
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service

## CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

Fort Sumter and Fort Moultrie National Historical Park (the park) is located southeast of Charleston, South Carolina near the entrance of Charleston Harbor. Fort Sumter is located on a man-made island in the harbor, east of James Island. Fort Moultrie is located on Sullivan’s Island, just outside of Charleston (Figure 1). The docks at each fort are an essential part of the functionality of the park; the docks provide access to park sites for visitors, park staff, law enforcement, and emergency services personnel and support operational needs for moving equipment and supplies between the mainland and Fort Sumter. Both the Fort Sumter and Fort Moultrie docks have reached the end of their life cycle and are currently deteriorating. The National Park Service (NPS) is proposing to replace the docks at Fort Sumter and Fort Moultrie.

Fort Sumter, one of the park’s significant resources and primary destination for visitors, can only be accessed by boat. Visitors travel to Fort Sumter on concessionaire operated ferry boats that depart from two locations: Liberty Square Visitor Education Center in downtown Charleston and Patriots Point Naval and Maritime Museum in Mount Pleasant. When ferries arrive at Fort Sumter, visitors disembark at the Fort Sumter dock located on the northwest side of the island (Figure 2). This dock also provides administrative access for park staff and periodic access for emergency services personnel and law enforcement agencies. The Fort Sumter dock is a concrete, T-shaped pier that recently underwent emergency stabilization repair in January 2022. Despite this repair, a subsequent Emergency Dock Inspection Report (June 2022) (DHM Design 2022a) for this dock identified new structural deficiencies (e.g., newly developed cracks in existing deck planks, cracks and spalling in several lower deck planks at the “T” section of the dock), which may contribute to future failure of the dock. Additionally, damage from Hurricane Ian in September 2022 has further shortened the lifespan of the dock (DHM Design 2022b).

The Fort Moultrie dock is located on the cove side of the park property on Sullivan’s Island (Figure 3). The dock at Fort Moultrie is the docking and storage location for all park boats, supporting parkwide operations, and is partially open to visitors for recreational use. The Fort Moultrie dock also provides public access for fishing. The dock is 45 years old and is showing advanced signs of deterioration.

Figure 1. Location of Fort Sumter and Fort Moultrie Project Study Areas





Figure 3. Fort Moultrie Study Area



## Purpose and Need

The NPS is proposing to replace the deteriorated docks at Fort Sumter and Fort Moultrie. The construction of the new docks would eliminate structural deficiencies of the current docks, provide critical infrastructure for greater than 30 years, and account for potential impacts from climate change and increasing harbor traffic projections. The replacement of the dock at Fort Sumter would better accommodate vessels, enhance visitor experience, and ensure safe, continuous public and administrative access to the fort. The replacement of the dock at Fort Moultrie would also ensure administrative access for park operations and facilities at Sullivan’s Island that service Fort Sumter and provide enhanced public recreational use.

The replacement of the dock at Fort Sumter is needed to address findings documented in the June 2022 Emergency Dock Inspection Report. Without the dock, the public would lose access to the fort and NPS staff would lose access for maintenance and law enforcement. The replacement of the dock at Fort Moultrie is needed, as the dock is showing advanced signs of deterioration. The current dock configuration also results in conflict between visitor use and administrative use because visitors are unable to use the dock for recreational purposes without disturbing administrative tasks. A failure of the Fort Moultrie dock would have significant impacts on park operations. Without the dock, administrative access to Fort Sumter and opportunities for public recreation would be lost.

## Issues and Resource Topics Retained for Detailed Analysis

Identifying issues — potential problems, concerns, conflicts, obstacles, or benefits that would result if an action were implemented — is an important part of the environmental review process. It is standard practice to organize issues by resource impact topics. Impact topics for this proposed project have been identified based on federal laws and regulations; the NPS National Environmental Policy Act (NEPA) Handbook (NPS 2015a); NPS *Management Policies 2006*; and NPS knowledge of resources at the park.

Issues should be retained for consideration and discussed in detail if:

- The environmental impacts associated with the issue are central to the proposal or of critical importance.
- A detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives.
- The environmental impacts associated with the issue are a big point of contention among the public or other agencies.
- There are potentially significant impacts on resources associated with the issue.

Impact topics that are carried forward for further analysis in this environmental assessment (EA) include the following:

- Floodplains
- Wetlands
- Marine and Estuarine Resources
- Special-status Species: Marine Mammals, Shorebirds, Sea Turtles, and Vascular Plants
- Essential Fish Habitat
- Cultural Landscapes

- Archeological Resources
- Visitor Use and Experience

## **Issues and Resource Topics Dismissed from Detailed Analysis**

This section presents an overview of resource topics that were considered for full analysis during the development of the EA but were ultimately dismissed from further consideration for the following reasons: potential environmental impacts associated with the issue are not central to the proposal or of critical importance, and/or a detailed analysis of environmental impacts related to the issue is not necessary to make a reasoned choice between alternatives. In cases where impacts on a resource are not anticipated or expected to be minimal, the impact topics were dismissed. These resource topics and the reason(s) that further analysis was not warranted are presented in this section.

### **Air Quality**

The 1963 Clean Air Act, as amended (42 United States Code [USC] § 7401 et seq.) requires federal land managers to protect air quality and meet all federal, state, and local air pollution standards. The US Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS). Current standards are set for criteria pollutants including sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, particulate matter equal to or less than 10 microns in size, particulate matter equal to or less than 2.5 microns in size, and lead. The proposed project is in Charleston County, South Carolina, which is currently in attainment for the criteria pollutants (USEPA 2023). The action alternatives could have a slight effect on air quality from the use of vehicles, vessels, and heavy equipment during construction activities; however, the effects would be localized and temporary, lasting only for the duration of construction. For these reasons, air quality is dismissed from further analysis.

Consistent with section 102(2)(C) of NEPA, federal agencies must disclose and consider the reasonably foreseeable effects of how proposed actions would result in greenhouse gas (GHG) emissions that contribute to climate change. Rising GHG levels are causing corresponding increases in average global temperatures and in the frequency and severity of natural disasters including storms, flooding, and wildfires. The use of construction equipment and the construction of the docks would contribute to a temporary increase in carbon dioxide emissions within the local area. Mitigation measures would be implemented to reduce the amount of carbon dioxide throughout the construction phase.

### **Water Quality and Quantity**

Construction and operation of the new docks would not require withdrawal of water from the Atlantic Ocean; therefore, there would be no impact on water quantity. Impacts on water quality from construction of the docks could include erosion, discharge of fill material, runoff from contaminants, increased turbidity, and spills from fuels and other liquids used during construction. These potential impacts would be localized and temporary, ceasing after construction is finished. In addition, best management practices (BMPs), such as turbidity curtains, would be employed to reduce the potential for impacts on water resources. The NPS would work with the design team to determine appropriate mitigation measures and construction BMPs. Further, turbidity control, water quality management, and implementation of BMPs during construction would be carried out in accordance with all federal and state permitting and regulatory requirements. Because impacts on water resources would be localized, temporary, and mitigated through the use of BMPs and include stipulations in required permits, water quality was dismissed from detailed analysis.

## Marine Sediments

The project would be constructed in marine sediments. Pilings would be driven into the sediment as part of the construction but would have no appreciable effect on the marine sediment due to the presence of the existing docks. Additionally, no dredging would occur as part of this project. For these reasons, marine sediments were dismissed from detailed analysis.

## Wildlife and Wildlife Habitat

The park supports a variety of wildlife species including mammal, bird, amphibian, reptile, and invertebrate species. The project area is a previously developed area with the habitat already disturbed by the numerous construction and improvement projects at the park throughout the history of the forts. Permanent and temporary loss of habitat would be minimal and would be very small relative to the total amount of wildlife habitat available in the park. Project activities would result in temporary disturbances to wildlife due to human presence and noise generation from equipment that may displace some wildlife during the construction activities. Potential impacts on birds and mammals would result primarily from construction noise, which can increase physiological stress, change behavior, such as less time foraging and more time watching the surroundings, and alter movement patterns (displacement to nearby habitat). The short-term impacts on wildlife and wildlife habitat during construction would be similar among the action alternatives. The long-term impacts from the action alternatives would be similar to current conditions since there are currently pre-existing docks. BMPs would be employed to reduce impacts on wildlife, such as limiting construction activities to daylight hours and using properly maintained equipment to minimize noise impacts. Because impacts on wildlife and wildlife habitat would be minimal and only limited to the construction period, this topic was dismissed from additional analysis.

## Vegetation

Limited vegetation is present at Fort Sumter. Submerged aquatic vegetation is present near the docks and could be displaced or disturbed temporarily by construction activities. Marsh grass is present outside of the project area on the southwest side of the fort with the dominant species being smooth cordgrass (*Sporobolus alterniflorus*). Black needle rush (*Juncus* sp.), salt meadow cordgrass (*Spartina patens*), glasswort (*Sarcornia perennis*), and sea oxeye (*Borrchia frutescens*) are also present but would not be disturbed by the project.

Fort Moultrie contains three distinct vegetation areas including a maintained lawn, salt marsh, and maritime forest. The maintained lawn at Fort Moultrie is dominated by Bermuda (*Cyndodon dactylon*) and centipede (*Eremochloa ophiuroides*) grasses. This area also contains interspersed wax myrtle (*Myrica certifera*), palmetto (*Sabal palmetto*), and juniper (*Juniperus* sp.). The salt marsh near the dock contains stands of black needle rush and cordgrass. The maritime forest at Fort Moultrie contains live oak (*Quercus virginiana*), wax myrtle, yaupon (*Ilex vomitoria*), and red cedar (*Juniperus virginiana*).

Proposed construction would include measures to minimize impacts on vegetation. Additionally, impacts on vegetation would be temporary and limited to the construction period since there is an existing dock already in place at both forts. For these reasons, vegetation was dismissed from detailed analysis.

## Invasive Species

Vegetation removal and soil disturbance could facilitate the spread of invasive plant species, potentially altering vegetation communities. To avoid and minimize the risk of invasive species being introduced or spread, construction vehicles would be washed and inspected prior to use in the project area. If invasive plant species were to occur due to project activities, they would be controlled through active management.

Because the introduction and spread of invasive species would be controlled through these resource protection measures, this topic was not carried forward for detailed analysis.

### **Special Status Species Terrestrial Mammals, Upland Birds, Upland Vascular Plants**

Several federally listed species are present in the US Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) database with the potential to occur in or near the project area. These species include the northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), eastern black rail (*Laterallus jamaicensis ssp. jamaicensis*), red-cockaded woodpecker (*Picoides borealis*), American chaffseed (*Schwalbea americana*), Canby's dropwort (*Oxypolis canbyi*), and Bachman's warbler (*Vernivora bachmanii*), which is presumed to be extinct. These species have not been documented within the park, and the project area does not support habitat for these species. For these reasons, these species were dismissed from the special status species detailed analysis.

### **Historic Resources**

The regulations implementing Section 106 of the National Historic Preservation Act (NHPA) (36 Code of Federal Regulations [CFR] 800) define a historic property as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior.” Fort Sumter and Fort Moultrie are listed as historic structures in the NRHP. Historic structures at Fort Moultrie are located in two sections divided by Middle Street, which is the main throughfare for the town of Sullivan's Island (NPS 1998). Historic structures at Fort Moultrie include the existing fort and several associated military structures and resources. At Fort Sumter, all construction activities would occur outside of historic structures; therefore, no impacts are expected.

Historic structures at Fort Moultrie include the existing fort and several associated military structures and resources. The staging area for the Fort Moultrie dock construction would be located in the visitor center parking lot. The access route from the staging area to the dock would not include any historic resources. Landside historic structures, such as the General William Moultrie grave, would be protected in place. An historic light pole in the concrete plaza would be reinstalled by the NPS post-construction. The construction of the new docks would have no adverse effect on historic resources. For this reason, historic resources was dismissed from detailed analysis.

### **Ethnographic Resources**

Ethnographic resources are the cultural and natural features of a park that are of significance to traditionally associated peoples and can include sites, structures, objects, landscapes, or a natural resource feature assigned legendary, religious, subsistence, or other significance in the cultural system of a traditionally associated group. The NPS initiated consultation with twelve federally recognized tribes located in the park's vicinity. The tribes will be consulted with throughout the duration of the project.

The only ethnographic resource currently identified by the NPS in the park is the final resting place of Osceola at Fort Moultrie, which is located outside of the project area and thus would not be impacted by project activities, including landside staging. Since no ethnographic resources have been identified at Fort Sumter, the proposed dock construction would not have any new effects on ethnographic resources. Since the proposed project would have no adverse effect on ethnographic resources, this topic was dismissed from detailed analysis.

## **Museum Collection**

The museum collection at the park includes various objects, photographs, artwork, textiles, and ordnance pieces. The museum collection includes the largest projectile collection in the NPS with 25 tons of shot and shells. The museum collection also includes the most extensive assemblage of artillery in the United States in the form of cannons and other large guns. Flags in the museum collection include the 33-star Fort Sumter Storm and Garrison flags, the Palmetto Flag, and the 35-star U.S. “Colorado” flag. The museum collection is housed in administrative buildings in the park and is not present in the project area. For this reason, museum collection was dismissed from detailed analysis.

## **Nightscales**

Construction would only occur during daylight hours; therefore, there would be no change to the existing nightscape during the construction period. No additional artificial lighting is proposed to be constructed on the docks or surrounding areas. Therefore, nightscales was dismissed from detailed analysis.

## **Soundscapes**

Human-caused sounds would increase during construction activities, which would include the use of heavy equipment, vehicular traffic, vessel traffic, and construction crews. Construction noise would be temporary, lasting only as long as the construction activity. Project-related construction noise would be minimized through the use of noise abatement BMPs, including limiting work to daylight hours and properly maintaining construction equipment to minimize noise. Additionally, the project would not increase the amount of traffic on the roads near Fort Moultrie and would therefore not increase vehicular noise over current conditions. For these reasons, soundscapes was dismissed from detailed analysis.

## **Land Use**

The replacement of the docks at Fort Sumter and Fort Moultrie would not change land use in the area. After construction, the only alterations would be at the new docks, which would serve the same purpose as the original docks. Therefore, land use was dismissed from detailed analysis.

## **Environmental Justice**

Most of the populations surrounding Fort Sumter and Fort Moultrie are predominantly white, with most of the surrounding areas containing less than 10% racially diverse populations. The dock replacements in the park would not negatively impact minority populations, and in fact, could have positive impacts on minority populations due to improved accessibility to the park. Additionally, the need for construction workers during the construction period would provide local job opportunities for citizens.

Construction activities could cause some temporary disruptions in access to the park that may result in changes to concessionaire run ferry schedules. However, the proposed project would be designed to allow for continued visitor access during construction. Because impacts on concessionaires would be minimal and short-term and minority populations are unlikely to be negatively affected by the project, socioeconomics was not carried forward for detailed analysis.

## CHAPTER 2: ALTERNATIVES

This chapter presents three alternatives at each dock, the no-action alternative and two action alternatives, Alternative 1 and Alternative 2; the NPS has identified Alternative 1 as the preferred alternative at both docks. This chapter also describes other alternative dock layouts, configurations, and elements that were initially considered but dismissed from detailed analysis and presents mitigation measures for the action alternative.

### No-action Alternative

Under the no-action alternative, both docks would remain in their current states, which do not comply with the Architectural Barriers Act (ABA) of 1968 (Public Law 90-480) requirements. Continued issues at the docks would include unsafe docking conditions at Fort Moultrie due to conflicts between recreational use and administrative use of the dock, lack of accommodation of a variety of sizes of concessionaire vessels at Fort Sumter, and advanced signs of deterioration and failure at both docks. The park would continue to repair and stabilize the docks as needed; however, the docks would continue to deteriorate. Should the dock at Fort Sumter fail, NPS boats would lose access to the fort for all operations including maintenance and law enforcement, concessionaire vessels would be unable to dock at the fort, and public access to the fort would cease. Failure of the dock at Fort Moultrie would prohibit park administrative and maintenance staff from docking, complicating administrative operations including access to Fort Sumter.

### Common to All Action Alternatives

This section presents elements that would be similar for the two action alternatives for replacing the docks at Fort Sumter and Fort Moultrie. Table 1 includes details on the types of materials that would be used for both docks.

#### Fort Sumter

- In conformance with applicable laws and regulations, specifically the ABA, the Rehabilitation Act of 1973 (Public Law 93-112), and the 1984 Uniform Federal Accessibility Standards (49 CFR 31528), the dock would be physically accessible and would include ramps for offloading and guardrails along the dock. The new dock would eliminate an elevated portion of the dock that is currently only accessible by stairs and would include updated gangways to comply with new ABA standards.
- The dock would be designed/constructed using methods that improve resiliency to projected sea level rise and flooding. The docks would be more resistant to increased wind and wave action, including an increase in the number of batter pilings (pilings driven at an angle), which help reduce lateral loading (piling deformation due to natural stressors).
- The dock would include a bump out (extension off of the main pier) for visitor interpretation.
- The Fort Sumter park sign would be relocated from the landside to a bump out on the dock. The area where the sign is located would be allowed to naturally revegetate.
- The dock walkway width would remain the same.
- The drainage at the fort entry would be improved.
- There would be no improvements to site furnishings.

- Utilities would include shore power, convenience power, site lighting, access control (gating), two new hose bibs, and an empty conduit.
- New guardrails would be installed and would include an aluminum top rail and posts, wire mesh panels, bird deterrent, and a containment edge.
- Disturbed areas would be revegetated to match existing conditions.
- All pilings and timber fenders would be installed using a pile driver to drive directly into the mudline. No excavation would be required during pile driving. Six-inch steel pilings and wood pilings would be installed via vibration, and concrete and 24-inch steel pilings would be installed via air or hydraulic driver.
- The proposed staging area at Fort Sumter is on a barge, which would be transported to the construction area via boat. The barge would be located directly adjacent to the location of the work and may be moved as needed.
- Anchoring of barges would be prohibited in or near any known archeological sites. Spud barges would be anchored with two steel pilings, which would be driven by vibration.
- A scissor lift would be installed to facilitate visitors onboarding and offloading at different tide levels.
- The dock would accommodate a crane for NPS loading and unloading of materials, contain a wheel stop curb on the dock, and would likely be on the NPS operations main pier.
- An ABA-compliant drain would be installed at the base of the pier to keep runoff from the pier away from the sally port.
- Methods to demolish the dock would be determined by the construction contractor but would involve removal of decking using a crane, removing the substructure, and pulling the pilings separately. The pilings would likely be cut below the mudline of the piling if they break off upon their attempted removal.
- Construction would begin in August 2024 and last approximately 22 months.

## **Fort Moultrie**

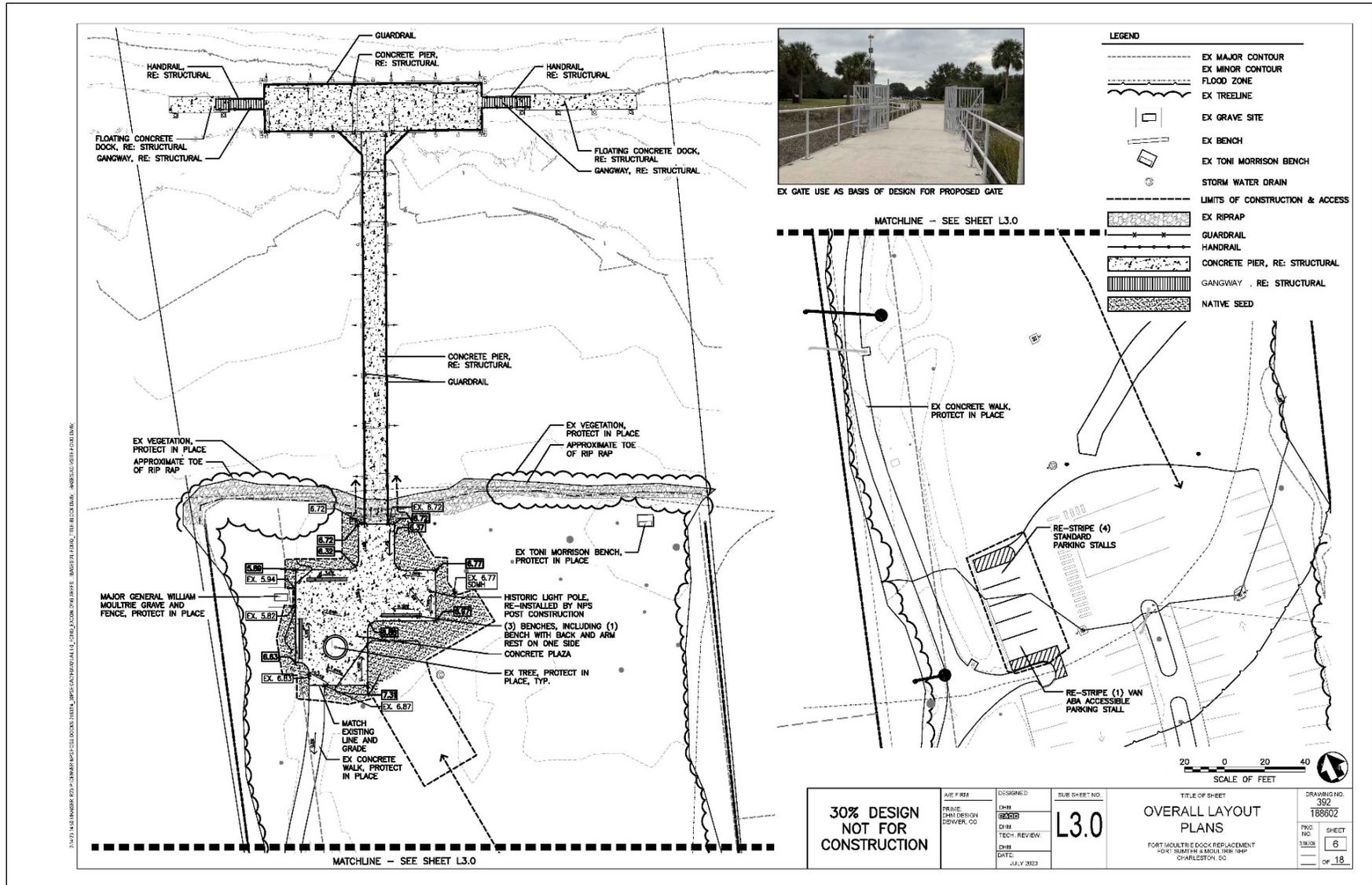
- In conformance with applicable laws and regulations, specifically the ABA, the Rehabilitation Act of 1973, and the 1984 Uniform Federal Accessibility Standards, the dock would be physically accessible and would include ramps for offloading and guardrails along the dock. Additionally, the new dock would include cutouts throughout its guardrail that are low enough to allow individuals in wheelchairs to fish from the dock.
- The dock would be designed/constructed using methods that improve resiliency to projected sea level rise and flooding. The docks would be more resistant to increased wind and wave action including an increase in the number of batter pilings which help reduce lateral loading.
- The Toni Morrison bench, existing vegetation, Major General William Moultrie's grave and fence, and the existing concrete walk would be protected in place. However, the addition of a walkway around the gravesite to provide access to the area around the nearby flagpole is also being considered. Design plans, which include landside alterations, can be found in Figure 4.
- The historic light pole in the east end of the parking lot would be re-installed by the NPS post-construction (Figure 4).
- Four parking stalls and one van parking stall would be re-striped (Figure 4).
- The site would include ABA fishing access and an ABA parking stall closer to the dock.

- Utilities would include shore power, convenience power, site lighting, access control, two new hose bibs, and an empty conduit.
- New guardrails would be installed and would include an aluminum top rail and posts, wire mesh panels, and a containment edge.
- All pilings and timber fenders would be installed by using a pile driver to drive directly into the mudline. No excavation would be required during pile driving. Six-inch steel pilings and wood pilings would be installed via vibration while concrete and 24-inch steel pilings would be installed via air or hydraulic impact.
- The proposed staging area at Fort Moultrie is within the parking lot for the fort. Supplies would be transported to the construction area over the lawn and would require the use of construction mats.
- A barge would be used to house a crane and other construction equipment and would be located adjacent to work areas.
- Anchoring of barges would be prohibited in or near any known archeological sites. Spud barges would be anchored with two steel pilings which would be driven by vibration.
- The dock would accommodate a crane for NPS loading and unloading of materials, contain a wheel stop curb on the dock, and protection of the historic light pole.
- Methods to demolish the dock would be determined by the construction contractor but would involve removal of decking using a crane, removing the substructure, and removing the pilings separately. The pilings would likely be cut below the mudline of the piling if they break off upon their attempted removal. Demolition of the dock would occur prior to the construction of the new dock.
- Construction would begin in August 2024 and last approximately 22 months.

**Table 1. Equipment and Materials Used for Dock Construction**

<b>Equipment</b>	<b>Materials</b>
Piling	Steel, Timber, Concrete
Pile Fendering	Plastic, Rubber
Pile Jackets	Galvanic Zinc Mesh
Deck	Precast Concrete
Guardrail	Aluminum
Connections and Hardware	Hot Dipped Galvanized Material

Figure 4. Fort Moultrie Common to All Design Plan



## Fort Sumter

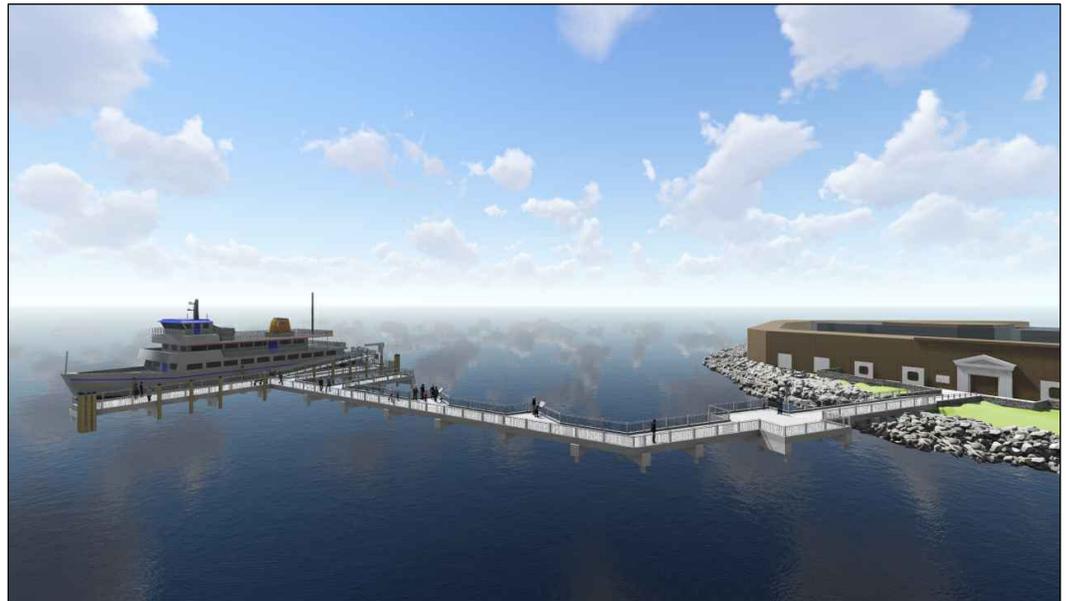
### Alternative 1: T-Pier Adjacent to Existing Dock (Preferred Alternative)

Alternative 1, the preferred alternative, is the proposed action. The preferred alternative at Fort Sumter is to demolish the existing dock and replace it with an ABA-compliant dock. The new dock would improve NPS and concessionaire loading and unloading operations. Additionally, the proposed action would include removal of existing park signage on land, construction of new signage on the dock, and incorporation of new interpretive panels on the dock. The preferred alternative would require the use of a temporary barge as a staging area, which would likely be moved to all sides of the existing dock during construction and demolition. The barge would be located west of the new dock during construction and east of the existing dock during demolition.

The new dock would be built adjacent to the existing dock and include an approximately 130-foot-long and 24-foot-wide pierhead, which is the same width as the existing pierhead. The pierhead would be connected to an approximately 307-foot-long and 12-foot-wide concrete pier. An approximately 40-foot-long and 10-foot-wide finger pier reserved for NPS use would be added on the east side of the pier and south of the pierhead. A boat lift may be attached to the north side of the NPS finger pier to allow the NPS to store boats out of the water during storms or periods of heavy wave action. The lift would require up to four steel piles and accommodate boats up to 24 feet in length. Two bump outs for visitor use and interpretation and one park sign bump out would be added on the east and west side of the dock. The pierhead would be equipped with approximately 33 24-inch steel pipe pilings fitted with pipe sleeves for protective covering of the pipe on the north side of the dock. Three timber fenders would be installed at each corner of the pierhead, and approximately 24 additional timber fenders would be installed on the south side of the pierhead, along the finger pier, and along both sides of the concrete pier. A timber fender system is a type of bumper that protects marine vessels from damage when they bump against the dock.

Approximately 105 square concrete pilings would be installed along the pierhead and the pier. Two cleats would be installed on the curb of the pier near its base. The handrail that extends from the end of the dock towards the fort entry plaza does not meet current safety standards and would be raised

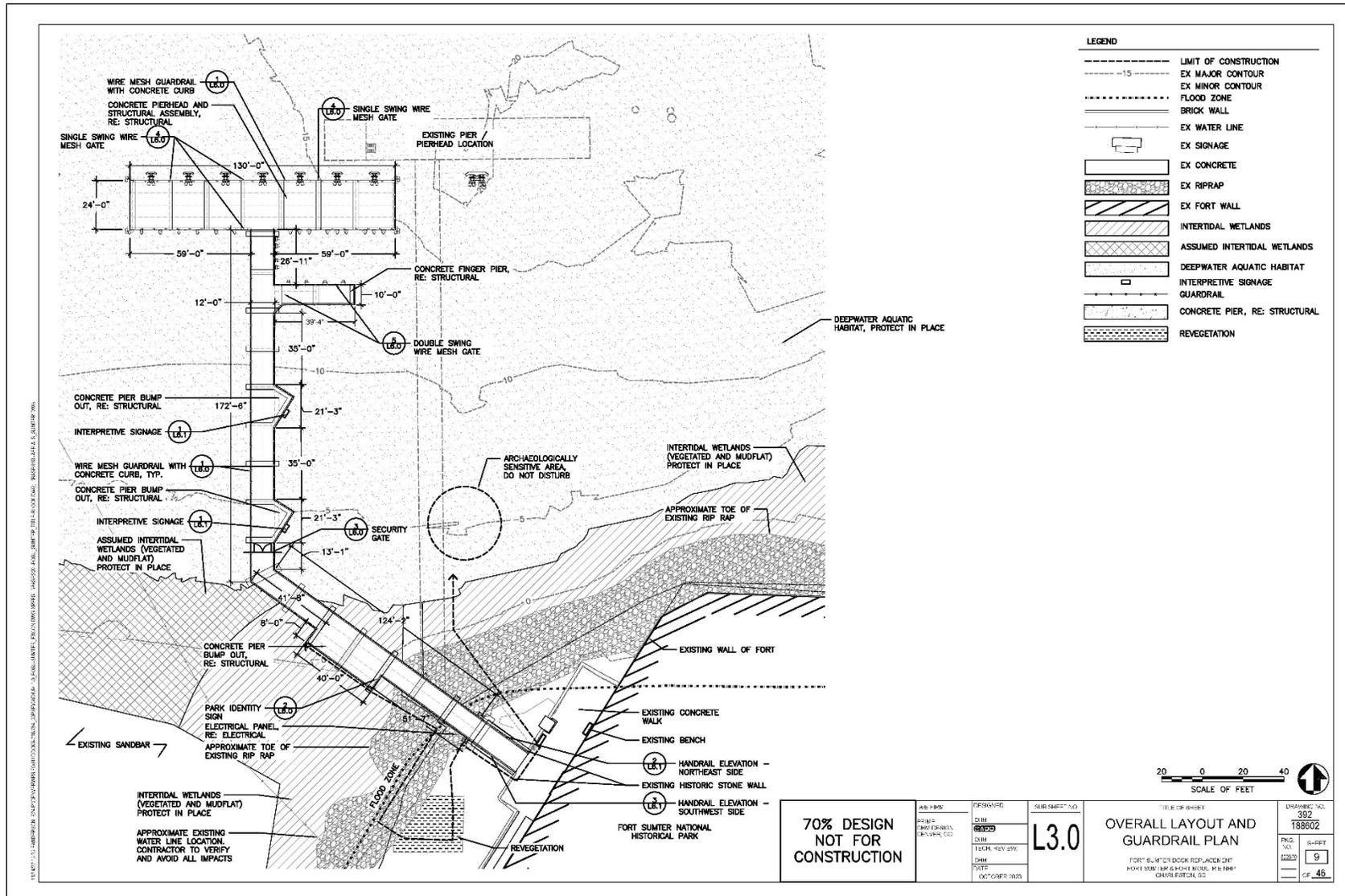
approximately six inches. The handrail would be replaced



*Simulation of the Fort Sumter Dock under Alternative 1. Note: The preferred alternative only includes a bump out to the east, rather than two as shown.*

in the same location, but the connection point may need to be adjusted to accommodate the minor increase in rail height (i.e., six inches higher than existing). Additionally, deteriorated portions of the wall may be repaired, including re-setting displaced stones and select repointing. Since the dock would not be constructed within the footprint of the existing dock, minimal obstruction to current operations would occur. The preliminary design for the preferred alternative can be found in Figure 5 and a simulation of the dock is presented in the image to the right.

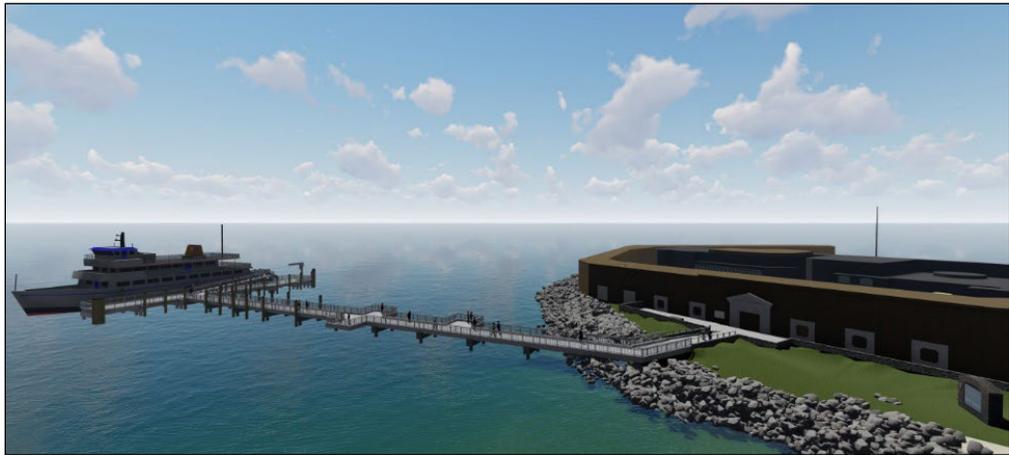
Figure 5. Fort Sumter Dock Replacement under Alternative 1 (Preferred Alternative)



## Alternative 2: T-Pier or Pier with Finger Piers in Footprint of Existing Dock

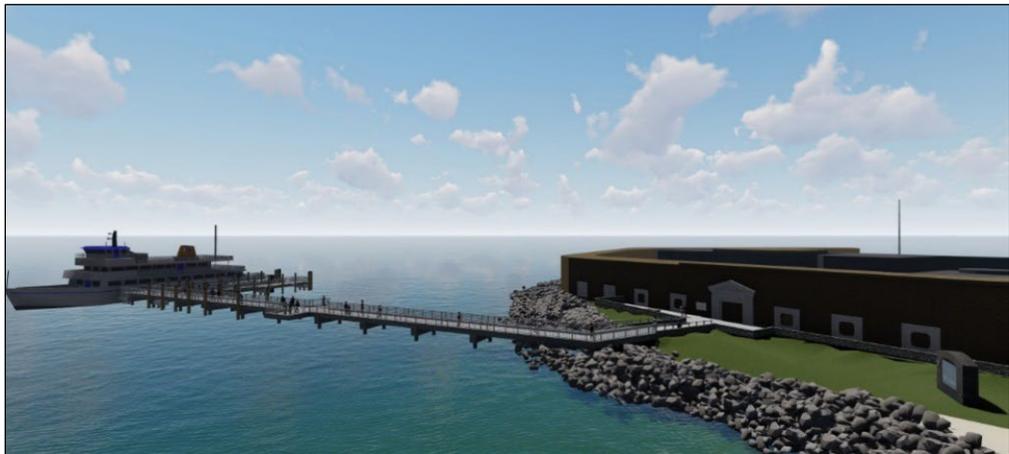
Alternative 2 would include the demolition and replacement of the existing dock with an ABA-compliant dock, which would provide NPS and concessionaire loading/unloading operations. Alternative 2 would include removal of existing park identity signs on land and construction of new signs on the dock, while also incorporating new interpretive panels on the dock. Alternative 2 would require the use of a temporary barge and float for visitor loading/offloading and NPS operations during construction. Alternative 2 includes two different design layouts which would be located within the footprint of the existing dock. Both layouts would be approximately 266-feet long and 12-feet wide. Since construction of Alternative 2 would occur within the footprint of the existing dock, possible impacts to the operating schedule could occur. Conceptual designs for Alternative 2 are presented in Figure 6, and simulations of the two layouts are presented below.

Layout 2A would include a rebuild of the existing T-shaped pierhead. Three pedestrian bump outs would be placed on both the west and east sides of the dock. Two of the bump outs would be parallel to each other.



*Simulation of the Fort Sumter Dock under Alternative 2A*

Layout 2B would include a finger pier pierhead, which would be substantially smaller than the existing pierhead. An additional finger pier would be installed approximately 35 feet south of the pierhead. Each finger pier would be approximately



*Simulation of the Fort Sumter Dock under Alternative 2B*

60-feet long and 10-feet wide. One rectangular and one triangular bump out would be installed parallel to each other at the approximate midpoint of the dock. Bump outs could be adjusted to be parallel to the fort or angled to face the fort entrance.

Figure 6. Fort Sumter Dock Replacement under Alternative 2, including Layouts 2A and 2B



## Fort Moultrie

### Alternative 1: Floating Dock (Preferred Action)

The preferred alternative at Fort Moultrie is to demolish the existing dock and replace it with an ABA-compliant dock. The new dock would be constructed using a pierhead and floating dock system and would improve loading and unloading operations. Additionally, the proposed work would include the removal and installation of a new concrete pad and benches at the dock entry. The new dock would be constructed within the same footprint as the existing dock and would contain an approximately 108-foot-long and 24-foot-wide pierhead. An approximately 195-foot and 12-foot-wide concrete pier would connect to the pierhead. Two 30-inch square concrete beams would support the pierhead's connection to the main dock. Three timber pilings would be installed in each corner of the pierhead and an additional total of ten timber pilings would be installed along the out shore face of the pierhead. Approximately 66 square concrete pilings would be installed along the pierhead and the pier. The preferred alternative would include a 60-foot-long and 8-foot-wide floating dock with four 16-inch steel pipe pilings attached to the east side of the pierhead. An additional 30-foot-long and 8-foot-wide floating dock would be attached to the west side of the pierhead and would contain two 16-inch steel pipe pilings. The floating piers would be attached to the pierhead via gangways. Visitors would have access to the pierhead, but the floating docks would be reserved for NPS operations. The preliminary design for the preferred alternative can be found in Figure 7 and a simulation of the dock is presented in the image below.



*Simulation of the Fort Moultrie Dock under Alternative 1*



## Alternative 2: Floating Dock with Finger Piers

Alternative 2 would include the demolition and replacement of the existing dock with an ABA-compliant dock, which would provide loading/unloading operations on a pierhead and floating dock system. The proposed work would include the removal and installation of a new concrete pad and benches at the dock entry. Alternative 2 would contain one of two layouts, which would occur within the footprint of the existing dock. Both layouts would contain an approximately 199-foot-long and 12-foot-wide concrete pier capped by an approximately 75-foot-wide and 24-foot-wide T-shaped pierhead. A square concrete beam on each side of the base of the pierhead would stabilize the pierhead's connection to the main dock in both layouts. Two 64-foot long and 8-foot-wide floating concrete docks would be constructed on both the west and east side of the pierhead. One of the floating docks would be available for public use and the other reserved for NPS operations. The floating docks would each contain 14-foot finger piers extending off their north side. However, layout 2A would contain two finger piers on its western floating dock while layout 2B would contain two finger piers on its eastern floating dock. Conceptual designs for Alternative 2 can be found in Figure 8, and simulations of the two layouts are below.



*Simulation of the Fort Moultrie Dock under Alternative 2A*



*Simulation of the Fort Moultrie Dock under Alternative 2B*

Figure 8. Fort Sumter Dock Replacement under Alternative 2, including Layouts 2A and 2B



## Resource Protection Measures

To minimize impacts related to the action alternatives, the NPS would implement BMPs and mitigation measures whenever feasible. Subject to the final design and approval of plans by relevant agencies, mitigation measures would include, but would not be limited to, the items listed below.

- Erosion control measures would be implemented to minimize impacts on water quality during construction activities. Additionally, overwater protection measures would be implemented as needed.
- In the event of a tropical storm, construction materials and vehicles would be temporarily dismantled, if applicable, relocated, and stored to be re-mobilized when work is deemed safe following the storm. The Contracting Officer would coordinate this effort.
- To minimize risks to marine protected species, all construction would follow the National Oceanic and Atmospheric Administration (NOAA) Southeast Regional Office Protected Species Construction Conditions (NOAA 2021).
- To minimize risks to the federally threatened West Indian manatee (*Trichechus manatus*), the NPS would implement the Manatee Protection Measures for South Carolina proposed by the USFWS (presented in Appendix A).
- To minimize risks to sea turtles and other protected marine species, the NPS would use turbidity booms to mitigate impacts to water quality.
- Construction would only occur during daylight hours and artificial lighting would not be used. No additional artificial lighting is proposed for the docks or surrounding areas.
- All on-site project personnel would be responsible for observing water-related activities for the presence of protected species.
- If a sea turtle is observed within 150 feet of the construction area, construction would cease until the sea turtle is observed departing the project area on its own or after 20 minutes have passed since the sea turtle is last observed within the construction area. Additional monitoring of sea turtles would be conducted, as necessary.
- Park biologists would conduct a survey for West Indian manatee and federally listed sea turtles in the project area prior to construction. If signs of these species are identified within the project area, mitigation measures to avoid impacts to the manatee and sea turtles would be employed, including restricting construction to periods of inactivity (typically November through March) to the extent possible.
- To protect birds under the Migratory Bird Treaty Act (MBTA, 16 USC 703–712), all construction work performed between February 1 and August 31 would require a site survey performed by trained NPS staff. The survey would be completed within two weeks prior to the start of construction. Additional surveys would be required after periods of no work exceeding two weeks.
- Operations of moving equipment shall cease if a protected species is observed within 150 feet of operations. Activities shall not resume until the protected species has departed the project area of its own volition. All on-site project personnel are responsible for observing water-related activities for the presence of protected species.

- BMPs such as noise abatement, avoiding vessel strikes, and following the Marine Mammal Protection Act would be implemented to mitigate risks to marine mammals. Noise is the primary route of disturbance to marine mammals and would be reduced by using pile driving techniques, when possible, which minimize pounding.
- Limits on decibels produced by construction equipment would be implemented to minimize ambient noise for both the human and natural environment. The maximum permissible ambient noise level would be 70 decibels for no more than twelve minutes. The underwater noise level for pile driving is not to exceed 105 decibels at 50 feet. Noise production would be continually monitored throughout the construction process.
- To minimize risks to sturgeon (*Acipenser* spp.), BMPs identified by the South Carolina Department of Natural Resources would be implemented for pile driving. These BMPs include installing pilings using a vibratory hammer. In the event standard pile driving (impact hammer) is used, a soft-strike procedure (three strikes at 40%-60% energy level once a minute for 3 minutes) would be conducted prior to beginning pile driving activities and after any pile driving interruptions of more than 30 minutes. Pile driving activities would be limited to 12 hours per day with a 12-hour rest period between pile driving activities.
- When possible, soils would be placed on top of asphalt, paved areas, planks, or tarps to reduce ground and vegetation disturbance. Soil piles would be covered and delineated by erosion control products (i.e., wattles or silt fence) to prevent wind and water dispersal.
- Work would be completed without damage to stone walls or earthworks. Trees would also not be removed.
- The temporary chain link fence around the construction area would have no ground-penetrating posts to reduce impacts to soil and ground disturbance.
- Work would generally be performed between 7:00 a.m. and 5:00 p.m., Monday through Friday to minimize disturbance to the surrounding neighborhoods.
- Staging and heavy equipment storage for Fort Moultrie would be restricted to hardened areas to minimize risk to the natural environment. Following construction, disturbance in the staging and stockpiling areas adjacent to each fort would be restored to natural conditions to the extent possible.
- Where revegetation work is required, the NPS would use conserved topsoil and revegetation design would be based on existing conditions. Following revegetation, restored areas would be monitored and managed to prevent colonization by nonnative invasive species.
- Any imported topsoil, sod, or erosion control products (wattles, mats, logs, silt fences) used during revegetation of disturbed areas would be approved by the park to avoid the introduction of nonnative invasive species.
- To avoid the transport of nonnative species to the project area, all construction vehicles would be washed and inspected before use.
- BMPs for construction equipment would be followed to avoid exposure of the environment to risks, such as oil leaks and fuel spills. For example, all refueling of equipment would have spill containment pads in position prior to refueling activities; and equipment must be free of any fluid leaks (e.g., fuel, oil, hydraulic fluid) upon arrival at the work site and would be inspected at the beginning of each shift for leaks. Leaking equipment would be removed off site for necessary repairs before the commencement of work.

- Equipment storage and staging areas would be outside of identified wetlands areas. Construction activities required to occur in wetlands would remain inside the limits of disturbance to protect adjacent wetlands. Limits of disturbance adjacent to wetlands would be surveyed prior to construction to aid in this effort.
- Should unknown archeological resources be uncovered during construction, work would be halted in the discovery area and the park staff would consult with the South Carolina State Historic Preservation Office (SHPO) according to 36 CFR 800.13 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990.
- Known submerged cultural resources would be avoided and some may be relocated depending on their significance. If additional submerged resources were to be encountered during construction, the SHPO would be consulted. Objects identified at Fort Sumter that do not contribute to the park's Civil War-era significance would still be avoided, and possibly relocated.

## Alternatives Considered but Dismissed

During the initial design process for this project, the NPS considered other options to replace the dock at Fort Sumter. The following alternatives were considered for project implementation but were dismissed from further analysis because these options did not individually meet the purpose and need for the project or were determined to be infeasible.

- **Construct a Straight-Line Pier with a Separate Berthing Facility.** A straight-line dock would be constructed to the west of the current dock and include a separate berthing facility. Berthing dolphins (pilings or similar structure that extends above the water surface) would be installed and would allow two separate access points for vessels loading and unloading during high and low tide. Three bump outs would be constructed for visitors. The existing dock would remain in operation during construction, and the new dock would be constructed in a different footprint. This alternative was dismissed from further analysis because the configuration would prevent boats from docking safely in the wind and create operational interruptions.
- **Construct a Straight-Line Pier to the West of the Existing Dock.** A straight-line dock would extend from the fort at an angle to the west and the T-shaped pierhead would be in line with the existing pierhead. The new "T" dock would maintain a similar docking procedure and could be built with minimal obstruction to the current operations. Three bump outs would be constructed for visitors. This alternative was dismissed from further analysis because there would be a higher potential for operational interruptions due to the active shoaling that is growing to the west of the current pierhead.
- **Construct a Dock to the East of the Existing Dock.** A dock would extend from the existing concrete walkway to the east of the existing dock. The new dock would be built with minimal obstruction to the current operations. Two bump outs would be constructed for visitors. This alternative was dismissed from further analysis because the pier, pierhead, ferries, and visitors would be exposed to the park's worst sea conditions that have an east and/or northeast fetch. The poor sea conditions would push the boat against the dock and increase the difficulty of docking. This would create unsafe docking conditions that would leave park staff, concessioners, and visitors at risk of injury. Additionally, this could eliminate the ability to dock during poor sea conditions, which would reduce visitor access to the park.

- **Construct a Dock with No Pierhead and Berthing Dolphins.** A straight-line dock would be constructed with berthing dolphins and a straight gangway. This alternative would not include a pierhead. This alternative was dismissed due to operational and safety issues. The straight gangway would require a much wider pier stem to allow for access to move materials from the crane finger pier to the fort. The lack of a pierhead would provide only one position for ferry berthing and leaves the maintenance area exposed to wave and wind action causing operational and safety issues for loading and offloading of personnel and materials. The dolphin positions would need to be designed to meet the docking requirements of the current ferry vessels and would potentially preclude vessels of varying sizes, including future ferry design, NPS boats, and emergency vessels. In addition, if a ferry is docked and the maintenance pier is in use by NPS, there is no safe berthing area for Harbor Patrol, US Coast Guard, NPS law enforcement, or others needing docking for immediate berthing for medical or other emergencies on the island.

## CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing condition of resources retained for analysis that could be impacted by implementing the alternatives, as well as a description of the potential impacts. The descriptions of the resources provided in this chapter serve as an account of the baseline conditions within the project area. The impacts of all actions proposed under the alternatives for both docks were considered. Resource protection measures are part of the action alternatives, as presented in chapter 2. Where appropriate, the resource protection measures for adverse impacts are also described and incorporated into the evaluation of impacts. These impact analyses and conclusions are generally based on a review of existing literature, studies, and research performed by park staff, information provided by experts within the NPS and other agencies and institutions, professional judgment, park staff expertise and insights, and public input.

### Scenario for Cumulative Impact Analysis

Cumulative impacts are defined as “effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.” (40 CFR 1508.1(g)(3)). To determine potential cumulative impacts, past, present, and reasonably foreseeable future actions and land uses were identified along or near the docks at Fort Sumter and Fort Moultrie. These actions were then assessed in conjunction with the impacts of the alternatives to determine if they would have any added adverse or beneficial effects on a particular natural or cultural resource or visitor use. The evaluation of cumulative impacts was based on available information. The projects described in Table 2 were considered in the cumulative impact analysis for each resource analyzed in detail:

**Table 2. List of Past, Ongoing, and Potential Future Actions**

Project	Project Description	Status	Resources Affected
Fort Sumter Breakwater	The breakwater surrounding Fort Sumter would be rehabilitated and a living shoreline would be constructed.	Future (2024-2025)	Floodplains Wetlands Special-status species Essential fish habitat Cultural landscape
Fort Sumter Flank Wall	The right flank wall at Fort Sumter will be repointed.	Current (2023-2024)	Historic resources Cultural landscape Visitor use and experience
Fort Sumter Gorge Wall	The Gorge Wall at Fort Sumter will be repointed.	Current (2023-2024)	Historic resources Cultural landscape Visitor use and experience
Battery Huger	The metal stairs, handrails, and guard rails at Battery Huger will be repaired.	Ongoing (2023-2024)	Historic resources Cultural landscape Visitor use and experience
Fort Sumter Mortar	The mortar of the Gorge angle, left flank, and portions of the interior fort will be repointed.	Ongoing (2023-2024)	Historic resources Cultural landscape Visitor use and experience

Project	Project Description	Status	Resources Affected
Fort Sumter Left Wall	The left face wall and salient at Fort Sumter will be repointed.	Future (2024)	Historic resources Cultural landscape Visitor use and experience
Fort Sumter Septic System	Cyclic maintenance of the Fort Sumter septic system will occur.	Future (2024)	Historic resources Cultural landscape Visitor use and experience
Fort Sumter HVAC System	The HVAC system at Fort System will be replaced.	Future (2024)	Historic resources Cultural landscape Visitor use and experience
Battery Huger	The metal doors at Battery Huger will be replaced.	Future (2024-2026)	Historic resources Cultural landscape Visitor use and experience
Fort Sumter Mortar	The mortar of the left face, salient angle, and portions of the interior fort will be repointed.	Future (2025)	Historic resources Cultural landscape Visitor use and experience
Charleston Harbor Deepening	The Charleston Harbor deepening project was completed in 2022.	Past (2022)	Floodplains Special-status species Marine resources Essential Fish Habitat

## Floodplains

### Affected Environment

The entirety of the park is located in the Federal Emergency Management Agency (FEMA) AE and VE flood zones (FEMA 2023). The designation zone AE indicates that the park is in the base floodplain at a heightened risk of flooding. The designation VE indicates that the park is in a high-risk coastal area where flooding and storm surge can cause extensive damage. The park is located on the FEMA Federal Insurance Rate Map numbers 45019C0519K and 45019C0538K (FEMA 2023).

A desktop survey was conducted to assess the current conditions, including floodplain functions and values, previous stabilization efforts, and recent floodplain studies to assess the potential impacts of the proposed activities. Both docks are located near the entrance to Charleston Harbor and are elevated on pilings at an elevation of 10 feet above mean low water. The Atlantic Coast has historically experienced tropical storm activity that presents a hazard to infrastructure located in coastline area. In Zone VE, wave heights are equal to or greater than 3 feet indicating that the docks are at a high-risk for flooding and storm surge. Per Director's Order 77-2: *Floodplain Management*, the dock replacement project is considered a Class III action because the project is located within a high hazard area, or extreme floodplain. The extreme floodplain is defined generally as the area inundated during a flood with the largest magnitude possible at a site.

### ***Environmental Trends and Planned Actions***

Climate change would cause an increase in storm frequency and intensity, storm surge, sea level rise, and wave action within the extreme floodplain, which would heighten the already high-risk of flooding within the park. Issues arising from climate change could adversely impact the planned projects and actions

detailed in Table 2, especially the deepening of Charleston Harbor and the rehabilitation of the Fort Sumter breakwater.

## **Impacts Assessment**

Executive Order 11988, “Floodplain Management” directs all federal agencies to avoid, to the extent possible, both long- and short-term adverse impacts on floodplains. All federal agencies are required to avoid building permanent structures within the 1% annual chance floodplain unless no other practical alternative exists. In the absence of such alternatives, agencies must modify actions to preserve and enhance floodplain values and minimize degradation. NPS Director’s Order 77-2: *Floodplain Management* implements Executive Order 11988 and establishes NPS policy to preserve floodplain values and minimize potentially hazardous conditions associated with flooding. In accordance with Director’s Order 77-2, a floodplains statement of findings has been developed for this project and is included in Appendix B.

### ***Impacts of the Fort Sumter No-Action Alternative***

Under the no-action alternative, the Fort Sumter dock would remain in its current state. The park would continue to repair and stabilize the dock as needed; however, the dock would continue to deteriorate. The Fort Sumter dock is located directly within the floodplain. The dock includes pilings submerged in the ocean bottom, while these pilings can obstruct flow in the immediate vicinity of each piling, their individual and collective impact on floodplain function is minimal and the floodplain would continue to be able to convey flood flows. If the dock were to fail, additional adverse impacts on the floodplain would occur as the debris would further prevent the natural movement and flow of the water.

### ***Impacts of Fort Sumter Alternative 1: T-Pier Adjacent to Existing Dock (Preferred Alternative)***

Alternative 1 would include the construction of a new dock and demolition of the existing dock. During construction, a temporary barge would be staged within the project area. Barge spuds would be lowered and installed in the sediment to hold the barge in place. During construction of the new dock and demolition of the existing dock, the temporary barge would be moved around as needed and the barge spuds would be re-installed with each move. The addition of the temporary barge within the floodplain would further impede the natural floodplain functions; however, this would be minimal and temporary, only lasting the length of the construction period. The construction of the new dock would be located within the floodplain. The new dock would have a similar layout to the existing dock; however, it would include three bump outs and a finger pier that would require the installation of additional pilings within the floodplain. The new dock would have slightly greater impacts on the floodplain when compared to the no-action alternative due to the increased number of pilings. However, the floodplain would continue to convey floodwater and provide storm surge protection. During construction, two docks would be present in the project area while the new dock is being constructed. However, two docks would only be present temporarily prior to the demolition of the existing dock at the conclusion of the new dock’s construction. Alternative 1 includes drainage improvements near the sally port, which would help reduce the destructive power of floodwaters within the entrance of Fort Sumter.

The construction of the dock would occur within the 100-year regulatory floodplain, as described above, and face elevated risk of flooding and impacts from storm events, both of which are expected to increase with climate change. There is no alternative location for placing the dock outside of the floodplain, and the dock would be designed and constructed to enhance future resiliency with a 30-year life cycle to withstand the anticipated impacts of flooding, storms, and a projected sea level rise of 21.36 inches (1.78

feet). The extreme tide is calculated by using the highest astronomical tide (7.07 feet) plus the extreme end of sea level rise (1.78 feet). Therefore, the extreme tide would be 8.85 feet which would be below the 10-foot dock elevation. The dock would be constructed to resist increased wind and wave action. This includes an increased number of batter pilings, which help reduce lateral loading.

### ***Impacts of Fort Sumter Alternative 2: T-Pier or Pier with Finger Piers in Footprint of Existing Dock***

Alternative 2 would include the removal of the existing dock and the construction of a new dock within the footprint of the current dock. During construction, a temporary barge would be located within the project area that would stage construction equipment. In addition, a second temporary barge would be used to allow Fort Sumter visitors access to the fort from the tour boat. Impacts on the floodplain from the temporary barges would be similar to Alternative 1 but slightly greater as additional spuds would be installed, and the barge would further impede floodplain functionality. Although the new dock would be constructed within the same footprint as the existing dock, greater impacts on the floodplain would occur. Layout 2A would include three additional bump outs, which would require additional pilings to be installed. Layout 2B would include two bump outs and an additional finger pier, also requiring more pilings. Although the additional pilings would further impede the flow of water, the floodplain would still function. Alternative 2 also includes drainage improvements within the sally port, which would help reduce the destructive power of floodwaters within the entrance of Fort Sumter. As described for Alternative 1, the new dock would be constructed to resist increased wind and wave action and would be elevated at a height greater than that of an extreme tide.

### ***Impacts of the Fort Moultrie No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Moultrie. The dock would continue to be located within the floodplain and would continue to have minimal impacts on the natural water movement of the cove. Impacts to the functionality of the floodplain would be minimal, as the floodplain would still convey flood waters.

### ***Impacts of Fort Moultrie Alternative 1: Floating Dock (Preferred Alternative)***

During construction, a temporary barge would be located north of the pierhead of the existing dock. The barge would temporarily impede water flow within the project area. The construction of the new dock would be located within the footprint of the existing dock. The removal of the old dock and construction of the new dock would result in minimal change to the current impacts on the floodplain. The pilings located within the floodplain and the floating docks would minimally impede natural water movement. Similar to Fort Sumter, the floodplain would continue to function by conveying flood flows and reducing the destructive power of floodwaters. Similar to Fort Sumter, the new dock would be constructed to resist increased wind and wave action and would be elevated at a height greater than that of an extreme tide.

### ***Impacts of Fort Moultrie Alternative 2: Floating Dock with Finger Piers***

Impacts to the floodplain under Alternative 2 would be the same as described for Alternative 1. The addition of the finger piers in Layout 2A and Layout 2B would cause further obstruction of water flow within the floodplain; however, floodplain impacts would still be minimal.

### ***Cumulative Impacts***

The rehabilitation of the breakwater surrounding Fort Sumter and creation of the living shoreline is located within the 1% annual chance floodplain. In addition, the deepening of the Charleston Harbor is

also located within the 1% annual chance floodplain. Issues evolving from climate change and sea level rise could create adverse impacts to the floodplain. The dock replacement project for Alternatives 1 and 2 would contribute to potential adverse cumulative impacts on the floodplain when considered with environmental trends and past, present, and reasonably foreseeable future projects at Fort Sumter. However, the overall cumulative impact on floodplains would be minimal.

There are no past, present, or reasonably foreseeable projects identified at Fort Moultrie that would create substantial impacts on the floodplain because the projects are localized and similar to other past projects conducted in the area; therefore, when considered with environmental trends the replacement of the dock would contribute only a slight adverse impact to cumulative impacts at Fort Moultrie.

## **Conclusion**

Under the no-action alternative, impacts on the floodplain would remain the same as current conditions. If the docks were to fail, adverse impacts on the floodplain would occur due to debris in the floodplain.

At Fort Sumter, the addition of the temporary barges during construction would further impede the natural flow of water within the floodplain. Impacts would be slightly greater under Alternative 2 because of the additional barge and float required during the construction period. Impacts to the floodplain from the new dock would be slightly greater under Alternatives 1 and 2 when compared to the no-action alternative due to the additional pilings required in the floodplain for the bump outs and finger piers.

At Fort Moultrie, similar impacts would occur from the temporary barge during construction. Additionally, impacts on the floodplain would be slightly greater under Alternative 2 due to the additional structures (finger piers) located in the floodplain. The proposed dock construction would contribute to cumulative adverse impacts on the floodplain, but the overall impacts on the floodplain would be minor.

## **Wetlands**

### **Affected Environment**

A desktop review of previous wetland delineations at Fort Sumter was conducted and the results were compiled to prepare the current wetland delineation report for the fort (EA 2018; NPS 2020). Wetlands surrounding the fort include a 1.43-acre estuarine intertidal rocky shore rubble artificial wetland and a 2.78-acre estuarine subtidal unconsolidated bottom sand wetland. Two wetlands are present on the southwestern portion of the island including a 0.66-acre estuarine intertidal emergent wetland and a 0.07-acre estuarine intertidal unconsolidated bottom wetland. The wetlands contain typical coastal wetland vegetation, such as seaside amaranth (*Amaranthus pumilus*), perennial glasswort, smooth cordgrass, saltmeadow hay (*Sporobolus pumilius*), and sea oxeye. The landside boundary of these wetlands is mean lower low water. Where the riprap armor for the breakwater is intact, the wetland boundary is poorly defined due to absence of soils and vegetation. Therefore, the wetland boundary was aligned to the top edge of the riprap. These wetlands continue to the west and east of the dock at Fort Sumter. Additionally, deepwater habitat was identified at Fort Sumter waterward of the mean lower low water (Figure 9). The dock at Fort Sumter is primarily present within deepwater habitat. The wetlands at Fort Sumter provide ecosystem benefits such as fish and shellfish habitat, shorebird habitat, and sediment and shoreline stabilization. However, the lack of vegetation, presence of riprap and artificial boundary limit the overall function, quality, and ecosystem services of these wetlands.

A wetland delineation was conducted in December 2022 at Fort Moultrie (NPS 2023a), which identified two wetlands (Figure 10). Wetland 1 was classified as a 0.84-acre intertidal emergent wetland dominated

by smooth cordgrass. The wetland is a part of a larger saltmarsh complex that continues to the east and west of the dock at Fort Moultrie. Portions of the wetland were unvegetated during the December 2022 onsite survey; however, these areas may support vegetation during the growing season. The upper boundary of Wetland 1 is an artificially constructed riprap revetment with higher elevations behind the rock that is comprised of a thin buffer of coastal maritime forest with a large, maintained lawn area. Wetland 2 was classified as a 0.21-acre intertidal unvegetated wetland. Wetland 2 displayed crab burrows and eastern oysters (*Crassostrea virginica*), which indicated hydrology. Mean lower low water defines the lower boundary of Wetland 2 where it transitions to subtidal lands. Wetland 2 continues to the east and west of the dock at Fort Moultrie. Wetlands 1 and 2 are part of the same marsh complex and wetland system. Each provides numerous ecosystem services, such as flood flow attenuation, fish and shellfish habitat, and sediment and shoreline stabilization. Additionally, deepwater habitat was identified at Fort Moultrie waterward of the mean lower low water (Figure 10).

### ***Environmental Trends and Planned Actions***

Climate change would cause an increase in storm frequency and intensity, storm surge, sea level rise, rising temperatures, and wave action, which will impact wetlands. Sea level rise has the potential to degrade wetlands and convert wetlands to open water as water becomes too deep for wetlands to persist. Storm surge, storm intensity, and wave action will degrade and destroy wetland habitats as these phenomena become more common. Converting wetlands to open water eliminates the functions and benefits of coastal wetlands in the area.

### **Impacts Assessment**

Executive Order 11990 “Protection of Wetlands” directs all federal agencies to avoid, to the extent possible, both long- and short-term adverse impacts on wetlands. The evaluation of impacts on wetlands was based on both a quantitative (acreage affected) and a qualitative assessment of how each proposed alternative would affect the functions and values. Impacts were determined based on changes to functions and values, including the ability to support vegetation and wildlife. Per Director’s Order 77-1: *Wetland Protection*, areas classified as aquatic deepwater habitat under the Cowardin system are not considered wetlands and are not subject to these procedures.

The action alternatives would occur directly within existing marine wetlands at Fort Sumter and estuarine wetlands at Fort Moultrie. The completion of the docks would have temporary and permanent impacts on wetlands.

### ***Impacts of the Fort Sumter No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Sumter. Impacts to wetlands would continue to occur from the shading of wetland vegetation from the existing dock. Shading of wetlands reduces the amount of growth in wetland vegetation. The existing dock is approximately 6,001 square feet causing approximately 795 square feet of intertidal wetlands to be shaded. No additional impacts on wetlands are expected under the no-action alternative, as there would be no change to the footprint of the existing dock, no installation of new pilings, and no use of construction equipment within the intertidal vegetated wetlands and mudflats located with the Fort Sumter project area. However, if the dock continues to deteriorate and associated debris falls into the wetlands, this would negatively impact the functions and values of the wetlands within the immediate vicinity of the dock.

Figure 9. Wetlands and Deepwater Aquatic Habitat at Fort Sumter



Figure 10. Wetlands and Deepwater Aquatic Habitat at Fort Moultrie



### ***Impacts of Fort Sumter Alternative 1: T-Pier Adjacent to Existing Dock (Preferred Alternative)***

Construction activities under Alternative 1 would occur directly within the intertidal vegetated wetland and mudflats. Temporary impacts would occur to the sediment within the intertidal vegetated wetland and mudflats as a result of project activities. The removal of existing pilings would create temporary impacts on wetlands until the area of piling removal naturally fills and settles. Permanent impacts on intertidal wetlands surrounding Fort Sumter would occur from shading due to the installation of new pilings, timber fender system, and decking for the new dock. The new dock would shade approximately 1,515 square feet of intertidal wetlands (Figure 11). Shading from the dock reduces light availability for plants to grow in the vegetated wetlands below the dock, reducing the overall amount of wetland vegetation. To minimize the impacts to wetland vegetation, the dock would be constructed in an area with little to no wetland vegetation. Following construction, the existing pier would be removed, allowing the previously shaded area, approximately 725 square feet of intertidal wetlands, to restore naturally.

### ***Impacts of Fort Sumter Alternative 2: T-Pier or Pier with Finger Piers in Footprint of Existing Dock***

Permanent direct impacts on wetlands would also be similar to Alternative 1. Although the new dock would be constructed within the existing footprint of the current dock, new pilings, timber fender systems, and decking would be installed, which would have permanent adverse impacts on wetlands from shading. Since the dock would be constructed within the existing footprint of the original dock, shading impacts would be minimal, as approximately 795 square feet of intertidal wetlands in this area have been previously shaded.

### ***Impacts of the Fort Moultrie No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Moultrie. Impacts to wetlands would occur from the shading of wetland vegetation from the current dock. Shading wetlands reduces the amount of growth in wetland vegetation. A total of approximately 1,267 square feet of intertidal unvegetated mudflats and approximately 2,142 square feet of intertidal emergent wetlands would continue to be shaded from the existing dock. No additional impacts on wetlands are expected under the no-action alternative, as there would be no change to the footprint of the existing dock, no installation of new pilings, and no use of construction equipment within wetlands located within the Fort Moultrie project area. However, if the dock continues to deteriorate and associated debris falls into the wetlands it would negatively impact the functions and values of the wetlands within the immediate vicinity of the dock.

### ***Impacts of Fort Moultrie Alternative 1: Floating Dock (Preferred Alternative)***

Temporary impacts would occur to the sediment and vegetation within the intertidal emergent wetland as a result of construction activities. Following construction, any vegetation that was disturbed during construction would likely re-establish. The proposed dock at Fort Moultrie would be located within intertidal emergent wetlands and intertidal unvegetated mudflats. Impacts on wetlands would occur from shading due to the installation of the dock and support pilings and timber fenders. Approximately 2,019 square feet of intertidal emergent wetlands and approximately 1,242 square feet of intertidal unvegetated mudflats would be shaded from the new dock (Figure 12). To minimize the impacts to wetlands, the dock would be constructed within the footprint of the existing dock, which currently shades approximately 5,885 square feet of wetlands and waters of the US. The preferred alternative would have an impact on an

additional 158 square feet of intertidal wetlands compared to current shading impacts. This would reduce the functions and values of the wetland that was shaded by the dock by reducing the nutrient removal capacity and wildlife habitat value for the additional 158 square feet of wetland area impacted.

### ***Impacts of Fort Moultrie Alternative 2: Floating Dock with Finger Piers***

Wetland impacts under Alternative 2 would be similar to those described for Alternative 1. Temporary impacts would also result from any disturbance of intertidal emergent vegetation during construction activities. Permanent wetland impacts would result from shading of intertidal wetlands from the installation of pilings, timber fenders, and decking similar to Alternative 1. Alternative 2 includes the addition of finger piers. In both Layout 2A and Layout 2B, finger piers would be located in areas of deepwater habitat. Therefore, no additional impacts to the intertidal wetlands are expected. To minimize the impacts to wetlands, the dock would be constructed within the footprint of the existing dock, which currently shades approximately 5,701 square feet of wetlands and waters of the US. Alternative 2 would have an impact on approximately 150 square feet of additional intertidal wetlands. Similar to Alternative 1, the functions and values of the additional shaded wetland (150 square feet) would be reduced.

### ***Cumulative Impacts***

The rehabilitation of the breakwater surrounding Fort Sumter and creation of the living shoreline would increase wetlands extent within the area, creating a beneficial impact. The dock replacement project would contribute to potential cumulative impacts on wetlands due to shading when considered with environmental trends and past, present, and reasonably foreseeable future projects at Fort Sumter. However, the overall cumulative impact on intertidal wetlands would be minor.

There are no past, present, or reasonably foreseeable projects identified at Fort Moultrie that would create impacts on wetlands due to the proposed dock's similarity to the existing dock; therefore, when considered with environmental trends the replacement of the dock would contribute only a slight adverse impact to cumulative impacts at Fort Moultrie. Continued impacts to wetlands would not change beyond the current minor impacts.

### ***Conclusion***

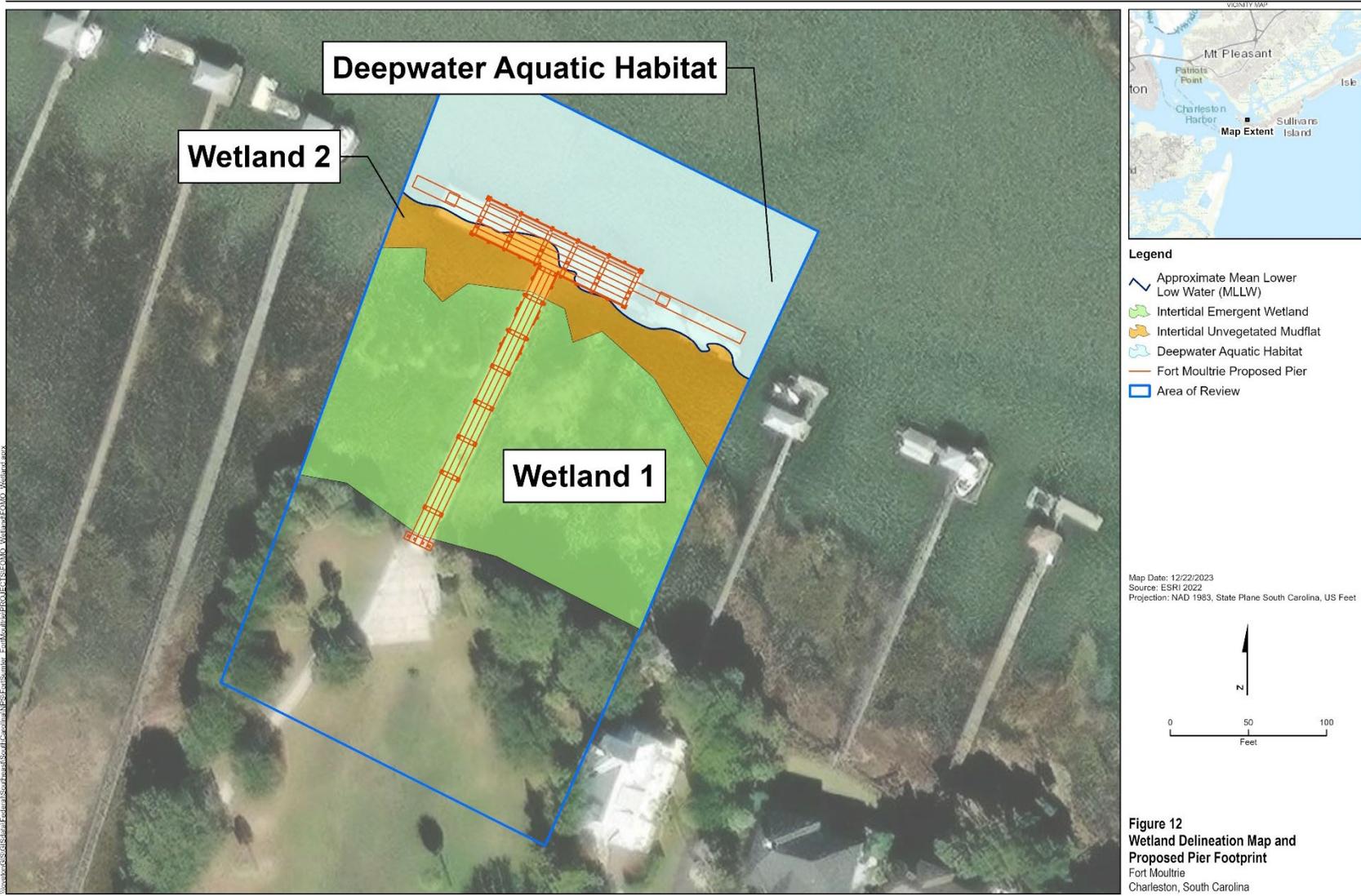
Under the no-action alternative, there would be no additional impacts on wetlands. Under Alternatives 1 and 2 at both Fort Sumter and Fort Moultrie, permanent impacts on wetlands would occur from the installation of the pilings and fender system to support the new docks and shading of both vegetated and unvegetated wetlands. Removing the existing docks would remove a longstanding structure from the environment and installing a new dock would result in equivalent wetland impacts. At Fort Sumter, wetland systems would likely recover because pilings would have little impact on wetland function. Holes from pilings of the existing docks would rapidly refill with sediment. Since the preferred alternative at Fort Sumter would be constructed outside of the footprint of the existing dock, the removal of pier decking during demolition of the existing dock would remove the current shading and restore wetland function and habitat for aquatic vegetation and organisms. The wetland systems would likely function similarly to before construction given the similarity of the new structures to the existing. Impacts to wetlands at Fort Moultrie would be minimized as the new dock would be constructed within the existing footprint.

Figure 11. Fort Sumter Alternative 1 Wetland Impacts



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Figure 12. Fort Moultrie Alternative 1 Wetland Impacts



## Marine and Estuarine Resources

### Affected Environment

Marine and estuarine resources may be found both in the benthic and pelagic zones around both docks. Marine resources in areas surrounding Fort Sumter include macroinvertebrates, fish, and marine mammals, including dolphins. The Marine Mammal Protection Act prevents the take and import of marine mammals and defines the federal responsibility for conservation of marine mammals (USFWS 2023a). Careful consideration of marine mammals would be necessary during the proposed work due to the various marine mammals that can be found in the project area.

The intertidal wetlands within the project area provide important habitat for invertebrates, including benthic organisms such as polychaete worms, crustaceans such as crabs, and bivalves such as clams and oysters, all of which are a key element to the aquatic food chain. Fish use the intertidal wetlands and deepwater habitat within the project area for foraging, cover, spawning, and nursery habitat. Dolphins frequent the area surrounding Fort Sumter and use the habitat for feeding.

Macroinvertebrate populations are a foundational biomass that are important to the rest of the food chain, and their presence or absence can indicate local habitat conditions. Polychaetes are the dominant macroinvertebrate near Fort Sumter, specifically *Paraprionospio pinnata* and *Streblospio benedicti* (Hymel 2009). In general, the macroinvertebrate habitat around Fort Sumter is in good condition (Hymel 2009).

Estuarine resources within the Fort Moultrie project area include macroinvertebrates, fish, and dolphins. Macroinvertebrates, such as crabs and oysters, use the emergent wetlands, intertidal unvegetated mudflats, and the existing dock pilings as habitat. Crabs and oysters were observed during the wetland delineation conducted at Fort Moultrie. The intertidal unvegetated mudflats also provide habitat that produce microalgae and phytoplankton, which are used by a variety of consumers, such as benthic invertebrates, a main food source for crabs, shrimp, and fish. Fort Moultrie is located within a more protected area; however, the macroinvertebrate community can be impacted by recreational boating.

### ***Environmental Trends and Planned Actions***

Benthic macroinvertebrates are impacted by both natural and human-caused stressors. The decline of tidal creeks and open water habitat in South Carolina has increased in recent years due to stressors such as metals, polynuclear aromatic hydrocarbons, nutrient runoff from fertilized areas, and changes in salinity due to drought or rainfall (Hymel 2009). Boat traffic can disturb soft-bottom benthic habitat, cause erosion of shorelines, and alter the grain size of sediments. Benthic macroinvertebrates are also influenced by activity associated with the Charleston Harbor Shipping Channel and potential oil spills. Nutrients, debris, and pollutants are transferred into sediments, which can kill many pollutant-sensitive benthic macroinvertebrates (Hymel 2009). Climate change will cause an increase in storm frequency and intensity, storm surge, sea level rise, rising temperatures, and wave action, which could impact marine resources by destroying or decreasing the production of marine habitats. An increase in storms and abnormal tide events can alter salinity and carry debris into waters, affecting marine and estuarine resources. In addition, rising water temperatures and low oxygen levels can result in marine heat waves and die offs of marine organisms.

## **Impacts Assessment**

Construction activities could disturb benthic habitats and increased vessel traffic could increase human interaction with pelagic species, which in turn, could increase the risk of vessel strikes and stress on pelagic species. The analysis of impacts to marine and estuarine resources considers how the proposed dock construction would alter habitat, habitat use, behavior, risk of vessel strikes, and potential for increased human interaction.

### ***Impacts of the Fort Sumter No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Sumter. Because the primary cause of disturbance to marine and estuarine resources is construction activities, there would be no new changes resulting from the no-action alternative. Existing impacts on marine and estuarine resources would continue as described in the “Affected Environment” section. However, if the dock continues to deteriorate and eventually fails, the deterioration and associated debris could negatively impact marine resources within the immediate vicinity of the dock.

### ***Impacts of Fort Sumter Alternative 1: T-Pier Adjacent to Existing Dock (Preferred Alternative)***

The construction of the dock at Fort Sumter would impact marine resources including macroinvertebrates, fish, and marine mammals. Under Alternative 1, construction of the new dock would result in ground disturbance from the barge spuds and from pile driving, which would increase the turbidity of the water due to movement of sediments and impact the habitat of burrowing invertebrates. The increase in boat traffic to and from the project area would also increase turbidity. Impacts to marine resources from an increase in turbidity include clogging fish gills or the filter-feeding systems of some invertebrates. High turbidity also hinders visibility for aquatic organisms, making it difficult for predators to find prey and for prey to escape predation. Impacts to marine resources from the increase in turbidity would be temporary and only last the duration of the construction activities. Additional impacts on marine resources could include a degradation of water quality if fuel, oil, or hydraulic fuel from the construction equipment or vessels were to enter the water. To reduce impacts on turbidity and water quality, BMPs such as the use of turbidity booms, spill containment pads, and equipment inspection, would be implemented.

Noise associated with pile driving would also cause impacts on marine resources, specifically dolphins and fish. High sound pressure levels associated with pile driving could potentially prevent fish from finding food and acoustically locating mates and interfere with echolocation of dolphins. Additionally, noise can interfere with marine organisms’ ability to communicate, especially cetaceans. Interfering with marine organism communication can disrupt their ability to perform ecological tasks essential to their survival and subsequently displace them from their habitat. Noise would be reduced by using non-pounding techniques when possible while driving pilings into the sediment and may propagate from the pile driving source at 105 decibels at 50-feet.

### ***Impacts of Fort Sumter Alternative 2: T-Pier or Pier with Finger Piers in Footprint of Existing Dock***

Impacts on marine and estuarine resources are the same as described for Alternative 1.

### ***Impacts of the Fort Moultrie No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Moultrie. The dock would continue to deteriorate and eventually fail. Because the primary route of disturbance to marine and estuarine resources is through construction activities, there would be no new changes resulting from the no-action alternative. Existing impacts on marine and estuarine resources would continue as described in the “Affected Environment” section. However, if the dock continues to deteriorate and eventually fails, the deterioration and associated debris could negatively impact estuarine resources within the immediate vicinity of the dock.

### ***Impacts of Fort Moultrie Alternative 1: Floating Dock (Preferred Alternative)***

The construction of the dock at Fort Moultrie would impact estuarine resources including macroinvertebrates, fish, and dolphins. During construction, the existing dock would be removed and replaced with a new dock. Ground disturbance could impact the habitat of burrowing invertebrates. Oysters and mussels that have colonized on the existing pilings would be impacted by the dock removal because the pilings would be directly removed from the marine environment. During construction, estuarine resources would be impacted by an increase in turbidity, noise, and potential degradation of water quality. The removal of pilings and installation of barge spuds and new pilings would cause sediment disturbance increasing turbidity. Increase in turbidity can impact invertebrates, fish, and dolphins. Impacts include gill clogging, issues with filtering, and feeding. Turbidity would be minimized through the use of turbidity booms. To reduce the risk of oil and fuel from entering the water, BMPs similar to those used at Fort Sumter would be implemented. Estuarine resources would also be impacted by the noise associated with construction. Noise would be reduced by using non-pounding techniques when possible while driving pilings into the sediment.

### ***Impacts of Fort Moultrie Alternative 2: Floating Dock with Finger Piers***

Impacts to estuarine resources are the same as described for Alternative 1.

### **Cumulative Impacts**

The rehabilitation of the breakwater surrounding Fort Sumter and the deepening of Charleston Harbor would have adverse impacts to marine resources during construction of these projects. The dock replacement project would contribute to potential adverse cumulative impacts on marine resources when considered with environmental trends and past, present, and reasonably foreseeable future projects at Fort Sumter.

There are no past, present, or reasonably foreseeable projects identified at Fort Moultrie that would create impacts on estuarine resources; therefore, when considered with environmental trends the replacement of the dock would contribute only a slight adverse impact to cumulative impacts at Fort Moultrie.

### **Conclusion**

Under the no-action alternative, impacts on marine and estuarine resources would remain the same as current conditions. Alternatives 1 and 2 at Fort Sumter and Fort Moultrie would include various construction activities, most notably pile driving, which would disturb benthic ecosystems, increase water turbidity, and increase ambient aquatic noise. These activities would temporarily impact marine and estuarine resources by affecting colonization and feeding. Once the new docks are installed, impacts to marine and estuarine resources would be similar to current impacts due to the operation of the existing docks as described in the “Affected Environment” section.

## Special-status Species

Management goals in NPS *Management Policies 2006* for the management of threatened or endangered plants and animals include protecting and recovering these species fully under the obligations of the NPS Organic Act and the Endangered Species Act (ESA) (NPS 2006). As required by Section 7 of the ESA, the NPS consulted with the USFWS regarding the potential effects of the preferred alternative on federally listed species. Details on consultation are in *Chapter 4: Consultation and Coordination*. The habitats within the park contain potential habitat for many special-status species including coastal birds, sea turtles, marine mammals, and plants. This section addresses species listed by the USFWS as endangered, threatened, or candidate species and species listed by the State of South Carolina (USFWS 2023b; SCDNR 2023) that could be affected by this dock replacement project.

## Affected Environment

**West Indian Manatee (*Trichechus manatus*).** The West Indian manatee is federally listed as threatened and is listed as endangered by the state of South Carolina. The manatee can be found in marine, brackish, and freshwater habitats in coastal and riverine areas. Manatees prefer habitat near the shore that features underwater vegetation, especially eelgrass (*Zostera* spp.) and other seagrasses. When feeding, manatees will occupy the margins of grass beds with access to deeper channels where they can flee easily when threatened. Manatees require warmer waters and cannot tolerate water temperatures below 68 °F for an extended period of time. However, manatees may expand their range from the southeastern United States during the summer months when waters are warmer elsewhere (USFWS 2023c). The park does not overlap with critical habitat for the West Indian manatee (USFWS 2023b). Although the park does not provide ideal habitat for manatees due to a lack of seagrasses, individuals are occasionally found visiting the park's shallow water (NPS 2019a).

**Leatherback Sea Turtle (*Dermochelys coriacea*) and Loggerhead Sea Turtle (*Caretta caretta*).** The USFWS IPaC mapper identifies four sea turtle species as potentially occurring in the project area including the leatherback sea turtle, loggerhead sea turtle, Kemp's Ridley sea turtle (*Lepidochelys kempii*), and green sea turtle (*Chelonia mydas*) (USFWS 2023b). However, only leatherback sea turtles and loggerhead sea turtles have been officially documented at the park.

The leatherback sea turtle is federally endangered, and the loggerhead sea turtle is federally threatened with the loggerhead sea turtle listed as endangered in Charleston County, South Carolina. Sea turtle species share similar habitats and are widely distributed throughout their range occupying vast open ocean habitat and inshore areas, such as bays, creeks, lagoons, and salt marshes. Sea turtle adults are benthic feeders in lagoons, estuaries, bays, river mouths, and shallow coastal waters. Sea turtle young live a pelagic existence before returning inshore as they mature. The primary diet of sea turtles can vary by species and includes marine vegetation, mollusks, crustaceans, fish, and other small marine animals. Loggerhead sea turtles primarily feed on animals rather than plants; however, they are still omnivorous (USFWS 2023f-g). Sea turtles may use the park's shallow water resources and are occasionally observed at the park (NPS 2019a). Leatherback sea turtles are considered rare in the park and loggerhead sea turtles are occasionally observed in the park.

**Piping Plover (*Charadrius melodus*).** The piping plover is a small migratory shorebird that is federally listed as threatened and state listed as endangered. The bird nests and feeds along coastal sand and gravel beaches. The piping plover can use various habitat patches to suit its needs throughout different seasons, weather events, and tidal conditions, including sand spits, small islands, tidal flats, shoals, and sandbars. Piping plovers primarily hunt invertebrates in sandy mud flats, ephemeral pools, and seasonally emergent

seagrass beds. Breeding occurs on sandy beaches where males will create a shallow depression on the ground, lined with pebbles by both adults in a breeding pair. The piping plover is primarily found along the United States' Atlantic coast but can be found as far inland as the midwestern United States (USFWS 2023d). Numerous sources of habitat exist in the project area for the piping plover at both Fort Sumter and Fort Moultrie with the most notable being mudflats and intertidal areas available at both locations.

**Red Knot (*Calidris canutus rufa*).** The red knot is a small coastal shorebird that is federally listed as threatened. The red knot occupies coastal marine and estuarine habitats with large areas of exposed intertidal sediments, much of which is present in the project area at both forts. The red knot has been sighted within the park; however, it is not a commonly observed species. Red knots are long-distance migrants and may use a variety of habitats along their route to take breaks and build up fat reserves. They may migrate over both high energy ocean or bay front areas, as well as tidal flats or other sheltered habitats. Wintering habitat preferences include muddy or sandy coastal areas, such as bays, estuaries, tidal flats, and unimproved tidal inlets. Red knots will typically not use saltwater habitats during their summer breeding season and will nest in dry, elevated tundra locations (USFWS 2023e).

**Pondberry (*Lindera melissifolia*).** Pondberry is federally listed as endangered. Pondberry is a coastal plain-dwelling deciduous shrub that can grow to approximately six feet tall. Pondberry sprouts pale yellow flowers in the spring before leaves emerge. It contains oval-shaped fruits that turn from green in the summer to bright red in the fall. Pondberry occupies wetland habitats, such as bottomland and hardwoods in the interior areas and margins of sinks, ponds, and other depressions in coastal sites (USFWS 2023h). The wetlands present in the park could support pondberry populations, but they were not observed during the 2022 delineation (NPS 2023a).

### ***Environmental Trends and Planned Actions***

Climate change would impact special-status species and their habitats. Notable impacts include habitat loss and decreased habitat production due to increased sea surface temperatures, storm frequency and intensity, and sea level rise. Erosion and increased storm surge can also cause habitat destruction for inshore and intertidal dwelling species. In addition, the projected increase in boat traffic within Charleston Bay may lead to degraded water quality and an increase in vessel strikes to aquatic listed species.

## **Impacts Assessment**

### ***Impacts of the Fort Sumter No-Action Alternative***

The no-action alternative would not appreciably change the current conditions in the project area. Existing impacts on special-status species would continue as described in the "Affected Environment" section. These species would continue to be at risk from habitat loss due to climate change and vessel strikes due to concessionaires accessing the dock, but there would be no new risks to special-status species.

### ***Impacts of Fort Sumter Alternative 1: T-Pier Adjacent to Existing Dock***

**West Indian Manatee.** Under Alternative 1, construction activities would occur in areas that currently experience consistent vessel traffic and light disturbances to manatee habitat. An increase in disturbances could cause manatees to alter their route of travel through Charleston Harbor. Potential impacts on the West Indian manatee include an increased risk of mortality or injury due to vessel strikes during construction and disturbance to their habitat due to the barge and noise from construction equipment. Disturbing manatee habitat could result in the temporary loss of habitat by deterring the animals from

occupying habitats at Fort Sumter during construction activities. However, the project area does not contain many of the habitat requirements of manatees, such as seagrass beds.

Under Alternative 1, the new dock would be built outside the footprint of the current dock, resulting in a temporary increase in existing structures present in the environment prior to the demolition of the current dock. Increased water turbidity could occur due to increased vessel activity and in-water construction activities. An increase in turbidity could adversely affect manatees by reducing water quality and hindering vision.

Mitigation measures to minimize noise from construction activities would be implemented. Turbidity booms would be installed to minimize increases in turbidity in the project area. All applicable regulations included in the NOAA Southeast Regional Office *Protected Species Construction Conditions* and the *Manatee Protection Measures for South Carolina* proposed by the USFWS would be implemented at the site. Park biologists would conduct a survey for West Indian manatee in the project area prior to construction. If signs of these species are identified within the project area, mitigation measures to avoid impacts on the manatee would be implemented, including restricting construction to periods of inactivity (typically November through March) to the extent possible.

Pursuant to Section 7 of the ESA, the proposed action *may affect but is not likely to adversely affect* the West Indian manatee. The proposed action has the potential to affect the West Indian manatee through vessel traffic, noise, and habitat disturbance; however, given the temporary nature of the potential impacts and implementation of the above-referenced BMPs, effects resulting from habitat disturbance and noise are expected to be insignificant, and effects resulting from potential vessel strikes are considered discountable.

**Leatherback Sea Turtle and Loggerhead Sea Turtle.** Potential impacts on sea turtles would be similar to those of the West Indian manatee. Sea turtles may pass through the project area in search of feeding grounds, or they may feed in the project area itself. Construction activities would occur in areas that currently experience consistent vessel traffic and light disturbances to sea turtle habitat. An increase in disturbances could cause sea turtles to alter their route of travel through Charleston Harbor. Potential impacts on the sea turtles include an increased risk of mortality or injury due to vessel strikes during construction and disturbance to their habitat due to the barge and noise from construction equipment. During construction, sea turtles could be impacted from an increase in turbidity due to the disturbance associated with the removal and installation of pilings. An increase in turbidity could adversely affect sea turtles by reducing water quality, hindering vision, and altering feeding. To minimize risks to sea turtles, turbidity booms to mitigate impacts on water quality would be implemented. All on-site project personnel would be responsible for observing water-related activities for the presence of protected species. If a sea turtle is observed within 150 feet of the construction area, construction would cease until the sea turtle is observed departing the project area on its own or after 20 minutes have passed since the sea turtle is last observed within the construction area. Additional monitoring of sea turtles would be conducted, as necessary.

Pursuant to Section 7 of the ESA, the proposed action *may affect but is not likely to adversely affect* leatherback sea turtle and loggerhead sea turtle. The proposed action has the potential to affect leatherback and loggerhead sea turtles through vessel traffic, noise, and habitat disturbance; however, given the temporary nature of the potential impacts and implementation of the above-referenced BMPs, effects resulting from habitat disturbance and noise are expected to be insignificant, and effects resulting from potential vessel strikes are considered discountable.

**Piping Plover.** At Fort Sumter, piping plovers use the intertidal wetlands for foraging. During construction, piping plovers may be impacted due to noise disturbance and may avoid the area. Potential nesting habitat for piping plover occurs in the sandy beach area well south of the project area. To minimize impacts on the piping plover, if this species enters the construction area while construction operation is underway, construction would cease until the bird has left the area. In addition, park staff would ensure no active nests are located in the beach area south of the project area from mid- March through August. Pursuant to Section 7 of the ESA, the proposed action *may affect but is not likely to adversely affect* the piping plover.

**Red Knot.** The red knot has been observed at Fort Sumter; however, this species is not common. Red knots will use tidal flats in the winter, but they migrate to summer breeding habitat in tundra environments. If red knots are in the vicinity of the project area during construction, there is potential for impacts due to noise disturbance. Like the piping plover, if this species enters the construction area while construction operation is underway, construction would cease until the bird has left the area. Pursuant to Section 7 of the ESA, the proposed action *may affect but is not likely to adversely affect* the red knot.

**Pondberry.** Although there is potential for pondberry to occur within wetland areas, this species has not been observed within the Fort Sumter project area. If this species is encountered during construction, project staff would ensure it is not disturbed by avoiding it. Pursuant to Section 7 of the ESA, the proposed action would have *no effect* on pondberry.

### ***Impacts of Fort Sumter Alternative 2: T-Pier or Pier with Finger Piers in Footprint of Existing Dock***

Potential impacts and mitigation measures for Alternative 2 would be the same as those described above for Alternative 1. Pursuant to Section 7 of the ESA, effects determinations for the West Indian manatee, loggerhead sea turtle, leatherback sea turtle, red knot, and piping plover would be *may affect, not likely to adversely affect* and *no effect* for pondberry.

### ***Impacts of the Fort Moultrie No-Action Alternative***

The no-action alternative would not appreciably change the current conditions in the project area. Existing impacts on special-status species would continue as described in the “Affected Environment” section. These species would continue to be at risk from habitat loss due to climate change and vessel strikes due to administrative staff and emergency responders accessing the dock, but there would be no new risks to special-status species.

### ***Impacts of Fort Moultrie Alternative 1: Floating Dock***

Impacts to federally listed species potentially occurring within the Fort Moultrie project area would be similar to those described above for Fort Sumter.

**West Indian Manatee.** Alternative 1 has the potential to affect the West Indian manatee through vessel traffic, noise, and habitat disturbance; however, given the temporary nature of the potential impacts and implementation of mitigation measures, effects resulting from habitat disturbance and noise are expected to be insignificant and effects resulting from potential vessel strikes are considered discountable. Additionally, there are limited opportunities for foraging in the project area due to a lack of ideal habitat for manatees. Mitigation measures to minimize noise from construction activities would be implemented. Turbidity booms would be installed to minimize increases in turbidity in the project area. Applicable regulations, including the NOAA Southeast Regional Office *Protected Species Construction Conditions* and the *Manatee Protection Measures for South Carolina*, proposed by the USFWS would be

implemented at the site. Pursuant to Section 7 of the ESA, the proposed action *may affect, but is not likely to adversely affect* the West Indian manatee.

**Leatherback Sea Turtle and Loggerhead Sea Turtle.** Pursuant to Section 7 of the ESA, the proposed action *may affect, but is not likely to adversely affect* the leatherback sea turtle and loggerhead sea turtle. The proposed action has the potential to affect the leatherback and loggerhead sea turtle through vessel traffic, noise, and habitat disturbance; however, given the temporary nature of the potential impacts and implementation BMPs, effects resulting from habitat disturbance and noise are expected to be insignificant and effects resulting from potential vessel strikes are considered discountable. To minimize risks to sea turtles, turbidity booms to mitigate impacts on water quality would be implemented. Additional monitoring of sea turtles would be conducted, as necessary.

**Piping Plover.** At Fort Moultrie, piping plovers use the unvegetated mud flats and emergent wetlands for foraging. There is potential for impacts to occur from noise associated with construction. To minimize impacts on the piping plover, if this species enters the construction area while construction operation is underway, construction would cease until the bird has left the area. Pursuant to Section 7 of the ESA, the proposed action *may affect, but is not likely to adversely affect* the piping plover.

**Red Knot.** At Fort Moultrie, there is potential for the red knot to occur within the intertidal mudflats and emergent wetlands within the project area. Noise associated with construction of the dock has the potential to impact the red knot. If this species enters the construction area while construction operation is underway, construction would cease until the bird has left the area. Pursuant to Section 7 of the ESA, the proposed action *may affect, but is not likely to adversely affect* the red knot.

**Pondberry.** Although there is potential for pondberry to occur within wetland areas, this species has not been observed within the Fort Moultrie project area. If this species is encountered during construction, project staff would ensure it is not disturbed. Pursuant to Section 7 of the ESA, the proposed action would have *no effect* on pondberry.

### ***Impacts of Fort Moultrie Alternative 2: Floating Dock with Finger Piers***

Pursuant to Section 7 of the ESA, effects determinations for the West Indian manatee, loggerhead sea turtle, leatherback sea turtle, red knot, and piping plover would be *may affect, but is not likely to adversely affect* and *no effect* for pondberry. Potential impacts and mitigation measures would be the same as those described above for Alternative 1.

### **Cumulative Impacts**

The rehabilitation of the breakwater surrounding Fort Sumter and the deepening of Charleston Harbor would have adverse impacts to special-status species including the West Indian manatee, loggerhead sea turtle, leatherback sea turtle, red knot, and piping plover during construction. The dock replacement project would contribute to potential insignificant cumulative impacts on special-status species when considered with environmental trends and past, present, and reasonably foreseeable future projects at Fort Sumter.

There are no past, present, or reasonably foreseeable projects identified at Fort Moultrie that would create impacts on special-status species; therefore, when considered with environmental trends the replacement of the dock would contribute only a minimal impact to cumulative impacts at Fort Moultrie.

## Conclusion

The no-action alternative would not result in any new impacts on special-status species. No construction work would occur, and special-status species would continue to use existing habitats within the project area. Alternatives 1 and 2 at Fort Sumter and Fort Moultrie would involve construction activities that could cause impacts on shorebirds, manatees, and sea turtles through habitat disturbance, increased vessel traffic, and noise. Construction activities and impacts associated with them would be localized and temporary. Additionally, an increase in vessel traffic for construction activities near the park would occur in an area which currently experiences regular vessel traffic. BMPs and mitigation measures would be implemented to ensure that impacts on these species would be minimized. After the installation of the new dock, impacts on special-status species would continue to be as described in the “Affected Environment” section.

## Essential Fish Habitat

The Magnuson-Stevens Fisheries Conservation and Management Act (MSA) of 1976 establishes guidelines to prevent overfishing, rebuild overfished stocks, increase long-term economic benefits, ensure a safe and sustainable supply of seafood, and protect habitat that fish need to spawn, breed, grow, and feed to reach maturity (NOAA 2023a).

## Affected Environment

The waters surrounding Fort Sumter and Fort Moultrie provide important habitat for fish and aquatic species and are within designated Essential Fish Habitat (EFH) for several species (NOAA 2023b). As defined in the MSA, EFH is “those waters and substrates necessary to fish for spawning, breeding, feeding, or growing to maturity” as determined by regional fishery management councils. The South Atlantic Fishery Management Council (SAFMC) manages fisheries in federal waters from North Carolina to Florida and defines the following estuarine/inshore habitats as EFH (SAFMC 2009):

- Marshes
- Estuarine shrub/scrub
- Seagrasses
- Oyster reefs and shell banks
- Intertidal flats
- Estuarine water column
- Soft bottom/subtidal

The SAFMC manages more than 64 species of finfish, crustaceans, and corals through eight fishery management plans. Two fisheries are identified within the project area — snapper grouper and spiny lobster. These fisheries are summarized below.

Snapper grouper EFH consists of all US waters from the North Carolina/Virginia boundary to the Dry Tortugas in Florida. Specific habitats that support snapper grouper in this EFH include relatively shallow areas with attached macroalgae, seagrasses, estuarine emergent wetlands, tidal creeks, estuarine scrub/shrub, oyster reefs and shell banks, unconsolidated bottom, artificial reefs, and coral reefs and live/hard bottom (SAFMC 2021). Both forts fall within snapper grouper EFH. The Fort Sumter project area provides unconsolidated bottom and oyster reefs. The Fort Moultrie project area provides estuarine emergent wetlands, unconsolidated bottom, and oyster reefs. The snapper grouper management complex

includes 59 species within 10 families, but not all of these species would be expected to occur in the project area. Species that have the potential to use habitats within the project area are noted in Table 3.

Spiny lobster EFH consists of all US waters from North Carolina/Virginia boundary to the Dry Tortugas in Florida. Habitats within this EFH include nearshore shelf/oceanic waters, shallow subtidal bottom, seagrass habitat, unconsolidated bottom, coral and live/hard bottom habitat, sponges, algal communities, and mangrove habitat (SAFMC 2021). Fort Moultrie falls within spiny lobster EFH.

Habitat preferences can vary significantly for different species during the various life stages. To assess whether suitable habitat is present in the project area for the species anticipated to occur within the project area and their life stages with EFH designation, habitat preferences for the different life stages were identified for each species. This information is presented in Table 3. Those species for which the habitat within the project area is unlikely to constitute EFH were eliminated from further consideration based on parameters such as depth, benthic habitat, and habitat preferences. Table 3 presents those species that are likely to occur within the project area and the life stages in which they may occur, as well as their habitat preferences. Table 3 was compiled using the NOAA Fisheries mapper tool, appropriate literature on the species habitat, and through consultation with NOAA Fisheries. Consultation with NOAA Fisheries was initiated with letters sent on May 18, 2023. See chapter 4 for more information on agency consultation.

### ***Environmental Trends and Planned Actions***

Climate change would impact EFH and EFH designated species. Notable impacts include habitat loss and decreased habitat production due to increased sea surface temperatures, storm frequency and intensity, and sea level rise. Erosion and increased storm surge can also cause habitat destruction for inshore and intertidal dwelling species. In addition, the projected increase in boat traffic within Charleston Bay may lead to degraded water quality and an increase in vessel strikes to species that use EFH.

### **Impacts Assessment**

This section presents impacts on EFH under the three alternatives. Appendix C includes an EFH Assessment to further analyze impacts on EFH from implantation of the preferred alternative.

#### ***Impacts of the Fort Sumter No-Action Alternative***

The no-action alternative would not have direct adverse impacts on EFH as no construction activities would occur. There would be no disturbance to the sediments that constitute EFH, no impact on the foraging species, and no impact that would reduce the quality or quantity of the marine bottom substrates for any of the life stages of the EFH species. The potential for direct vessel strikes from concessionaire boats would continue to occur.

**Table 3. Life Stage Presence and Habitat Requirements for Species Likely to Occur within Designated EFH in the Vicinity of the Project Area**

Essential Fish Habitat	Species	Eggs/ Gametes	Larvae/ Post- Larvae	Juveniles	Adults	Occurrence
Snapper Grouper	Gag ( <i>Mycteroperca microlepis</i> )	--	X	X	--	Estuarine-dependent; oyster reefs; salt marsh creeks (post-larval and juvenile); adults use offshore hardbottom
Snapper Grouper	Black sea bass ( <i>Centropristis striata</i> )	--	--	X	--	Juveniles: nearshore and high-salinity estuarine waters near oyster reefs Adults: open-shelf and edge waters over live or hard bottom
Snapper Grouper	Red snapper ( <i>Lutjanus campechanus</i> )	--	--	X	X	Offshore waters, nearshore subtidal reefs
Snapper Grouper	Tomtate ( <i>Haemulon aurolineatum</i> )	--	--	X	X	Seagrass beds, sand flats, live-bottomed reefs
Snapper Grouper	Atlantic spadefish ( <i>Chaetodipterus faber</i> )	--	X	X	X	Estuaries, harbors, rivers, and tidal creeks; nearshore coastal waters; inshore waters over live-bottom habitat; juveniles occur in salt marsh habitats
Spiny Lobster	Caribbean Spiny Lobster ( <i>Panilurus argus</i> )	--	--	--	X	Nearshore estuarine areas

Source: NPS 2019a

Notes: X = present; -- = Not present

### ***Impacts of Fort Sumter Alternative 1: T-Pier Adjacent to Existing Dock (Preferred Alternative)***

Habitat for EFH species in the Fort Sumter project area includes unvegetated subtidal flats and coastal nearshore water. Species within the Snapper Grouper Fishery potentially occurring at Fort Sumter include gag, black sea bass, red snapper, tomtate, and Atlantic spadefish. Alternative 1 has the potential to affect EFH through physical impacts, such as marine vessel strikes, noise, and increases in turbidity. If the species are present during construction activities, the increase in boat traffic to and from the site and the movement of the barge could increase vessel strikes. Impacts from construction noise, specifically pile driving, could impact foraging and spawning behavior. Impacts would occur within the immediate area of pile driving and would only last the duration of the pile driving. Pile driving is expected to take between 10 minutes to one hour per piling. To reduce noise impacts, vibratory pile driving would be implemented when possible. An increase in turbidity from the sediment disturbance during dock removal and installation of barge spuds and pilings would impact EFH species. Increases in turbidity can clog gills, hinder vision, and disrupt foraging behaviors. Impacts from turbidity would also only occur within the immediate area of pile driving. The use of a turbidity boom would reduce impacts and prevent species from entering the project area. EFH species potentially occurring within the project area are highly mobile and would likely move away from the project area during active construction. Impacts could also occur from the disruption of the food web due to impacted benthic communities, loss of foraging habitat, altered habitat conditions, and altered access to foraging areas. Given the mobility of most species in the area, and the fact that these impacts would be limited to the construction period, it is anticipated that impacts on EFH species would be temporary and minimal.

### ***Impacts of Fort Sumter Alternative 2: T-Pier or Pier with Finger Piers in Footprint of Existing Dock***

Potential impacts on EFH species and mitigation measures would be the same as those described above for Alternative 1.

### ***Impacts of the Fort Moultrie No-Action Alternative***

The no-action alternative would not have direct adverse impacts on EFH, as no construction activities would occur. There would be no disturbance to the sediments that constitute EFH, impact the foraging species, or reduce the quality or quantity of the marine bottom substrates for any of the life stages of the EFH species. The potential for direct vessel strikes from NPS operated boats would continue to occur.

### ***Impacts of Fort Moultrie Alternative 1: Floating Dock (Preferred Alternative)***

Habitat for EFH species in the Fort Moultrie project area includes unvegetated subtidal mudflats, emergent wetlands, and estuarine areas. Species within the Snapper Grouper Fishery potentially occurring at Fort Moultrie include gag, black sea bass, red snapper, tomtate, and Atlantic spadefish. Another EFH species, the Caribbean Spiny lobster, also has the potential to occur at Fort Moultrie. Impacts to EFH would be similar to those described above for Fort Sumter. Alternative 1 has the potential to affect EFH through physical effects, such as vessel strikes, noise, increases in turbidity, and change in food availability. The presence and movement of the barge throughout the project area has the potential to impact EFH through vessel strikes if EFH species are present during active construction. Noise associated with barge spudding and pile driving can impact foraging behavior. The increase in turbidity from pile driving and barge spudding has the potential to clog gills, reduce visibility, and alter foraging. Impacts to the benthic community would also impact food availability for many EFH species. To reduce impacts,

non-pounding pile driving techniques would be implemented when possible and a turbidity boom would be installed. Impacts to EFH species would be temporary and minimal.

### ***Impacts of Fort Moultrie Alternative 2: Floating Dock with Finger Piers***

Potential impacts on EFH species and mitigation measures would be the same as those described above for Alternative 1.

### **Cumulative Impacts**

The rehabilitation of the breakwater surrounding Fort Sumter and the deepening of Charleston Harbor are located in areas with EFH and have the potential to adversely affect EFH-designated species. EFH impacts from these projects would include potential marine vessel strikes, noise, turbidity, and a change in available habitat. The creation of salt marsh during the rehabilitation of the breakwater would also benefit some EFH-designated species. The dock replacement project would contribute slightly to potential cumulative impacts on EFH and EFH-designated species when considered with environmental trends and past, present, and reasonably foreseeable future projects at Fort Sumter.

There are no past, present, or reasonably foreseeable projects identified at Fort Moultrie that would create impacts on EFH; therefore, when considered with environmental trends the replacement of the dock would contribute only a slight impact to cumulative impacts at Fort Moultrie.

### **Conclusion**

The no-action alternative would not result in any new impacts on EFH species. No construction work would occur, and EFH species would continue to use existing habitats within the project area. The proposed alternatives would result in construction activities that could cause disturbance to EFH species, including increased turbidity, noise impacts, and potential harm from vessel and barge movement. BMPs, including a turbidity boom and non-pounding pile driving techniques, would be implemented to ensure the impacts on EFH-designated species are minimized. EFH species are managed under the MSA; pursuant to the requirements of this act and its implementing regulations, it is anticipated that there would be minimal impact on habitats designated as EFH.

### **Cultural Landscape**

#### **Affected Environment**

Cultural landscapes are defined as a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values. Cultural landscapes are listed in the NRHP as historic sites or historic districts when their significant cultural values have been documented and evaluated within appropriate thematic contexts, and physical investigation determines that they retain integrity.

Although construction was not initiated at Fort Sumter until 1829, it had been a strategic location for many years. Given that the fort is the site of the first shots fired during the Civil War, it contains many culturally and historically significant resources. The docks themselves are not historic structures; however, their function as the main park access points assists in the public's ability to enjoy the park's cultural landscape and the park's ability to maintain the cultural resources at Fort Sumter.

The foundation walls and other elements of the fort, including the concrete entry plaza and surrounding stone retaining walls, and the natural components of the man-made island, comprise the cultural landscape of Fort Sumter. Some of the natural systems and features contributing to Fort Sumter's cultural

landscape include the Charleston Harbor, the main navigation channel, the north and south jetties, estuarine wetland coastal grasses, and the natural shoal on which Fort Sumter was built. Views and sightlines to the nearby Fort Moultrie, Castle Pinckney, and downtown Charleston and the concrete entry plaza also contribute to the cultural landscape (NPS 2017).

The fort sustained heavy damage during the Civil War and underwent repairs through the 1870s to make it operational. Concrete structures were installed in the fort in the late 1890s, and modernization of the fort was completed during the first decade of the 20th century, including advanced weaponry and new barracks. During World War I, a small garrison of Coast Artillery Corps troops staffed Fort Sumter. Beginning in 1926, as traveling became popular, commercial harbor tours to Fort Sumter were established. Tours to Fort Sumter increased from under 1,000 visitors in 1934 to nearly 5,000 people touring the fort in 1941. Fort Sumter remained a military property under the responsibility of the Army and Coast Guard. As World War II broke out, the fort continued to evolve and was used during that time as a communications and navigation post rather than a military installation until its ultimate decommissioning in 1947. The fort was established as a national monument on April 28, 1948 and was restored to its Civil War era appearance (NPS 2015b). In the late 1960s, a project to install riprap to form a breakwater against the foundation walls was started. This altered the cultural landscape since the walls were originally left unprotected; however, this riprap is now considered a contributing feature to the cultural landscape. The park has made it a priority to preserve and protect the fort from the harsh marine environment in which it is located.

The first Fort Moultrie was established during the Revolutionary War on the west end of Sullivan's Island. The first Fort Moultrie was neglected and fell into disrepair. From 1794 to 1798 the fort on Sullivan's Island was rebuilt as the second Fort Moultrie. The second Fort Moultrie was damaged by high tides and hurricanes a few years later and was abandoned. In 1808, the fort was rebuilt, and the third Fort Moultrie was placed into service in December 1809. The third Fort Moultrie is the present-day fort. The War of 1812 did not directly impact Fort Moultrie, and Garrisons were stationed intermittently at the fort depending on the status of conflicts elsewhere in the country. In 1838, the fort served as an internment camp for approximately 200 Indigenous people from Florida who were captured during the Second Seminole War. During the Civil War, Confederate forces took over Fort Moultrie and left the fort abandoned in 1865. Between 1871 and 1877, the US Congress addressed issues at Fort Moultrie by making a number of repairs and improvements. Fort Moultrie underwent another period of rebuilding and expansion at the end of the 19th and beginning of the 20th century. Fort Moultrie was used as a training facility before and after World War I. The fort saw its last period of military activity during World War II when thousands of troops were stationed at the fort during the crisis. The Army decommissioned the fort in 1947 (NPS 2022).

Many features of Fort Moultrie contribute to the cultural landscape. During the historic period, natural systems and features greatly informed the development of Fort Moultrie. The location of the fort on Sullivan's Island was selected because of its proximity to the Maffitt's Channel and Charleston Harbor. The cove provided a safe docking site and was located north of the fort. Landscape features that contribute to Fort Moultrie's cultural landscape include the generally flat terrain, the cove/salt marsh, Charleston Harbor, Atlantic Ocean, and Maffitt's Channel. In addition, many of the original buildings and structures, which convey a long history of coastal defense, contribute to the cultural landscape. Some of these buildings and structures include the third Fort Moultrie, magazines, the sally port complex, batteries, timber bulkhead, and riprap (NPS 2019b).

## ***Environmental Trends and Planned Actions***

Climate change is causing sea level rise and increased storms, which in turn, result in flooding and increased wave action. This would especially impact the walls at the forts and could cause them to become unstable and eventually deteriorate. These changes pose a threat to park structures through inundation, erosion, and other damage. Although work has been conducted to protect the park and its historic resources, the acceleration of climate change and subsequent sea level rise and increased frequency and intensity of storms could render such improvements less effective over time.

## **Impacts Assessment**

NPS Director's Order 28, *Cultural Resource Management* directs the NPS to "protect and manage cultural resources in its custody..." Environmental consequences from each of the alternatives to these resources were evaluated based on their potential to cause adverse effects to the integrity of the resource as it relates to their listing or eligibility for listing on the NRHP. Impacts are considered adverse if the action may alter the characteristics of the historic property that qualify it for inclusion in the NRHP in a manner that would diminish the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5). The types of impacts on cultural resources can include physical destruction/damage/disturbance to the resource, changes in the character of the resource, or loss of integrity of association or relationship to its historic context. The potential impacts of the alternatives are described below.

### ***Impacts of the Fort Sumter No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Sumter. However, should the dock fail, park staff would lose access to the park to perform maintenance and other administrative tasks. The no-action alternative would have substantial impacts on the cultural landscape at Fort Sumter, likely resulting in the deterioration of contributing features of the landscape, such as the foundation walls and rip rap breakwater, due to lack of access.

### ***Impacts of Fort Sumter Alternative 1: T-Pier Adjacent to Existing Dock (Preferred Alternative)***

Contributing elements of the cultural landscape of Fort Sumter would be impacted during construction of the new dock. There would be an increase of vessels to and from the project area and the addition of a barge housing construction equipment. Deteriorated portions of the stone wall at the fort entry plaza may be repaired, including re-setting displaced stones and select repointing. All work involving the wall will be consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines. Additionally, the handrail at the fort entry plaza does not meet current safety standards and would need to be replaced. The handrail would be replaced in the same location but the connection points on the stone wall may need to be adjusted to accommodate an increase in rail height. Care would be taken to minimize new connection points and subsequent impacts to the stone wall. Although the handrail replacement and potential wall repair would result in some alteration of the stone retaining wall, it would retain integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, contributing features within the Fort Sumter entry area including the concrete entry plaza, granite gun mount, and stone retaining walls would be protected in place during construction. With the exception of the changes to the handrail replacement and potential wall repair, impacts to the cultural landscape would be temporary and only last the duration of the construction period. The proposed dock would be constructed using materials and a layout similar to the existing dock. Following

construction, the overall viewshed from the fort and from the water would be similar to the current state. The new dock would have *no adverse effect* on the cultural landscape at Fort Sumter.

### ***Impacts of Fort Sumter Alternative 2: T-Pier or Pier with Finger Piers in Footprint of Existing Dock***

Under Alternative 2, impacts on the cultural landscape would be similar as described for Alternative 1. Alternative 2 would include an additional barge and float to allow visitors access during the construction period. The addition of the barge and float would have more of an impact on the cultural landscape as compared to Alternative 1. These impacts would only be temporary for the duration of the construction period. The new dock would be built within the existing footprint of the current dock and would be built with similar materials and a similar configuration. The new dock would have *no adverse effect* on the cultural landscape.

### ***Impacts of the Fort Moultrie No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Moultrie, but the dock is currently equipped with a layout unsafe for docking and would continue to deteriorate. Should the dock fail, park staff would lose vessel access to Fort Sumter to perform maintenance, resource protection, and other administrative tasks. Adverse impacts would occur because of a lack of maintenance and administrative access to Fort Sumter.

### ***Impacts of Fort Moultrie Alternative 1: Floating Dock (Preferred Alternative)***

Contributing features of the cultural landscape at Fort Moultrie include the flat terrain, the cove/salt marsh, and Maffitt's Channel. During construction, adverse impacts on the cultural landscape would occur. The addition of the barge and construction equipment on the barge and in the staging area would alter the viewshed of the cove/salt marsh. Construction impacts would be temporary and only last the duration of the construction period. Following the construction of the dock, minimal changes to the cultural landscape would occur. The new dock would be made of similar materials, consist of a similar layout, and would be built within the footprint of the existing dock. Views of the cultural landscape from the parking lot and from the cove/salt marsh would be similar to current views. The new dock would have *no adverse effect* on the cultural landscape at Fort Moultrie.

### ***Impacts of Fort Moultrie Alternative 2: Floating Dock with Finger Piers***

Impacts on cultural landscapes would be similar to those described for Alternative 1. Construction impacts would be temporary and only last the duration of the construction period. Under Alternative 2, finger piers would be included as Layout 2A and Layout 2B. Although the layout would slightly alter the viewshed when compared to Alternative 1, the impacts would be the same and there would be *no adverse effect* on the cultural landscape.

## **Cumulative Impacts**

The rehabilitation of the breakwater surrounding Fort Sumter would have both adverse and beneficial impacts on the cultural landscape at Fort Sumter due to the change in riprap but would provide extra protection for the fort. The deepening of the Charleston Harbor would accommodate larger ships in the channel, adversely impacting the cultural landscape from Fort Sumter. The maintenance of Fort Sumter walls and flanks, septic system, Battery Huger, and replacement of the HVAC system would have temporary impacts to the cultural landscape while the projects occur. The dock replacement project would have no adverse effect and therefore would not contribute to potential adverse cumulative impacts on the

cultural landscape when considered with environmental trends and past, present, and reasonably foreseeable future projects at Fort Sumter.

There are no past, present, or reasonably foreseeable projects identified at Fort Moultrie that would create impacts on the cultural landscape. The dock replacement project would have no adverse effect and therefore would not contribute to potential adverse cumulative impacts on the cultural landscape when considered with environmental trends and past, present, and reasonably foreseeable future projects at Fort Moultrie.

## Conclusion

The no-action alternative would result in adverse impacts on the cultural landscapes at both forts. Alternatives 1 and 2 would allow park staff to continue to maintain the historic structures at the forts and would allow visitors to continue to visit the fort and experience the cultural landscapes and historic structures. The construction of a new dock would not alter the characteristics of the forts that qualify them for inclusion in the NRHP; therefore, there would be *no adverse effect* on cultural landscapes.

## Archeological Resources

### Affected Environment

Intertidal and submerged archeological resources have been investigated at both forts; however, most of the items identified are present at or around Fort Sumter. The items identified include:

- A possible World War II-era boiler
- A late 19th century I-beam
- Two sets of footers at Fort Sumter's north face associated with a late 19th century wharf and watch over walkway
- A set of pilings on Fort Sumter's south face
- A cluster of three coke bottles
- An unidentified hollow concrete cylinder
- A rectangular rubble pile associated with Fort Sumter's north face footers
- An unidentified rectangular frame
- Multiple isolated pilings or rubble pilings
- A probable mooring dolphin

A Phase I Marine and Terrestrial Archeological Resource Survey (NPS 2023b) was conducted at the park to confirm the presence of resources that have been previously identified and discover any unidentified resources. The survey found no underwater materials of historic interest at Fort Moultrie and three potentially historic objects at Fort Sumter, which included the World War II-era boiler. The three objects identified at Fort Sumter do not contribute to the park's Civil War-era significance, but avoidance of the objects would occur and relocation of the objects may occur where possible. Several magnetic anomalies were located surrounding Fort Sumter during the 2022 survey but were buried and could not be identified. Although unidentified, magnetic anomalies are recommended to be avoided during staging and construction as a cautionary measure. Multiple items, including the boiler, were found within the project area, but were not deemed significant enough to delay construction (NPS 2023b). These artifacts and features have been determined to not contribute to the park's Civil War-era historical significance;

however, it has been recommended that the park consider relocating the boiler and I-beam to outside the study area displayed in Figure 1 (NPS 2023b).

The terrestrial magnetometer survey located several deeply buried and thus inaccessible magnetic anomalies north of the visitor parking lot at Fort Moultrie. Shovel testing identified architectural and household materials dating to the late 19th and early 20th centuries. These materials include coal deposits and a brick feature, which are not likely to be adversely affected by the project activities. Several features associated with World War II-era activities were identified at Fort Sumter. A rectangular-shaped feature intersected by a pipe related to the World War II-era structures and utilities that once occupied the western side of the fort are the only terrestrial features that appeared to be potentially historic at Fort Sumter (NPS 2023b).

### ***Environmental Trends and Planned Actions***

Climate change is causing sea level rise and an increase in storms, which in turn, are causing increased wave action and flooding. These phenomena will cause an increase in inundation and erosion, which pose a threat to archeological resources.

### **Impacts Assessment**

NPS Director's Order 28, *Cultural Resource Management* directs the NPS to "protect and manage cultural resources in its custody..." which includes archeological resources that may be of historic significance.

#### ***Impacts of the Fort Sumter No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Sumter. The dock would continue to deteriorate and eventually fail. Because the primary route of disturbance to archeological resources is through construction activities, there would be no new changes resulting from the no-action alternative.

#### ***Impacts of Fort Sumter Alternative 1: T-Pier Adjacent to Existing Dock (Preferred Alternative)***

Construction and demolition activities from Alternative 1 could impact potential marine archeological resources. Despite not being identified as contributing to the park's Civil War-era significance, the archeological features identified during the Phase I Marine and Terrestrial Archaeological Resource Survey would be avoided during staging and construction as a precautionary measure. Some resources may be relocated, the most notable of which is the World War II-era boiler.

Archeological resources could be impacted by pile driving or barge spudding. The anomalies identified are present in and around the footprint of the new dock and the barge staging area. Should unknown archeological resources be uncovered during construction, work would be halted, and park staff would consult with the SHPO. Based on the results of the archeological investigations and the implementation of mitigations, the undertaking would have *no adverse effect* on archeological resources at Fort Sumter.

#### ***Impacts of Fort Sumter Alternative 2: T-Pier or Pier with Finger Piers in Footprint of Existing Dock***

Impacts on archeological resources are similar to those described for Alternative 1. Alternative 2 would have *no adverse effect* on archeological resources.

### ***Impacts of the Fort Moultrie No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Sumter. The dock would continue to deteriorate and eventually fail. Because the primary route of disturbance to archeological resources is through construction activities, there would be no new changes resulting from the no-action alternative.

### ***Impacts of Fort Moultrie Alternative 1: Floating Dock (Preferred Alternative)***

The lack of submerged archeological resources at Fort Moultrie would result in no impact from in-water activities. Although staging and limited work would occur landside, deeply buried archeological resources of potential historic significance are not anticipated to be impacted by project activities. Based on the results of the archeological investigations and the implementation of mitigations, the undertaking would have *no adverse effect* on archeological resources at Fort Moultrie.

### ***Impacts of Fort Moultrie Alternative 2: Floating Dock with Finger Piers***

Impacts on archeological resources are the same as described for Alternative 1. Alternative 2 would have *no adverse effect* on archeological resources.

### **Cumulative Impacts**

The rehabilitation of the breakwater surrounding Fort Sumter, deepening of the Charleston Harbor, and maintenance projects at Fort Sumter would have no adverse impact on known archeological resources. The dock replacement project would not contribute to cumulative impacts on the cultural landscape when considered with environmental trends and past, present, and reasonably foreseeable future projects at Fort Sumter.

There are no past, present, or reasonably foreseeable projects identified at Fort Moultrie that would create impacts on archaeological resources. The dock replacement project would have no adverse effect and therefore would not contribute to potential adverse cumulative impacts on the archeological resources when considered with environmental trends and past, present, and reasonably foreseeable future projects at Fort Moultrie.

### **Conclusion**

The no-action alternatives would result in no new changes or impacts on archeological resources. Under Alternatives 1 and 2, archeological resources at Fort Sumter could be impacted if they are not carefully avoided or relocated. None of the resources identified at Fort Sumter contribute to the fort's Civil War-era significance, nor are they significant enough in and of themselves to warrant delaying construction and do not require further archeological documentation prior to construction. However, if these items were to be encountered it is possible that they would be relocated. No submerged archeological resources were identified at Fort Moultrie and most terrestrial resources identified were deeply buried and unlikely to be affected by construction activities. Shovel testing revealed architectural and household materials dating to the late 19th and early 20th centuries, but none of these items contribute to the historic significance of the fort. Based on the results of the archeological investigations and mitigations, the undertaking would have *no adverse effect* on archeological resources at Fort Sumter and Fort Moultrie.

## Visitor Use and Experience

### Affected Environment

Visitor demographics for the park vary by season. During the summer, families with children on vacation frequent the park. During the fall and spring, school tours and adult tour groups visit the park. Seniors and adults without children are the primary group during the winter. Many of the visitors to the park come from the Carolinas, and most of the visitors come from states in the southeast (NPS 1998).

At the park, visitors may participate in a variety of activities, many of which have to do with interpretation and education. Visitors can participate in guided tours at both forts, visit the museums in the Fort Sumter or Fort Moultrie Visitor Centers, listen to talks and interpretation on historical structures, seek views throughout the park, enjoy birding, and self-guide themselves through the park. Self-guided tours throughout the park can be easily completed by visitors due to the robust resources available in the form of brochures, interpretive signage, and publications pertaining to the park. Park staff and volunteers are generally available to provide orientation and information to visitors in the park. The museum at Fort Sumter tells the story of growing strife between the North and the South during the Civil War and how that led to the ultimate eruption of the war at Fort Sumter. The museum at Fort Moultrie documents the story of American seacoast defenses from 1776 to 1947 and visitors can enjoy a 22-minute orientation film shown at this museum every half hour. Both museums serve as important resources for visitor interpretation at the park.

The sole access to Fort Sumter is by ferry. Visitors may catch the ferry from the Liberty Square Ferry Terminal in downtown Charleston or from the Patriots Point Ferry Terminal in Mount Pleasant. Parking is readily available, at or near each terminal and public transportation is available to the Liberty Square Ferry Terminal in Charleston. Fort Moultrie is accessible by car and contains parking onsite for cars, buses, and large vehicles such as recreational vehicles (NPS 2023c). The docks at both forts are not currently ABA-compliant and do not serve a variety of vessel types. The dock at Fort Sumter is failing and could become unsafe for docking procedures if a long-term repair is not completed. The dock at Fort Moultrie is the docking and storage location for all park boats and is partially open to visitors for recreational use. The dock is used for passive walking on the dock and for fishing, no visitor boats are moored at the dock. The dock is 45 years old and showing advanced signs of deterioration. The current use of the dock results in conflict between visitor use and administrative use.

The park began to experience a substantial increase in visitation during the late 1990s and early 2000s, with visitation spiking by almost 300% between 2000 and 2001 (319,147 visitors to 919,443 visitors). Visitation numbers remained high until the COVID-19 pandemic in 2020 when visitation fell by almost 150% between 2019 and 2020 (Table 4). The majority of visitors to the park since the COVID-19 pandemic have visited Fort Sumter, which sees an average of approximately 300,000 visitors per year.

**Table 4. Yearly Recreational Visits to the Park**

Year	Total Recreation Visits
2022	385,472
2021	349,492
2020	365,133
2019	877,894
2018	859,880

Source: NPS 2023d

## ***Environmental Trends and Planned Actions***

Flood risk in the park could present a risk to visitor health and safety in the future and result in park closures, reducing opportunities for park visitors to experience the park. The walls at the forts are in danger of instability due to increased wave action, increased storm frequency and intensity, and erosion from sea level rise. The maintenance of fort walls and improved access to the foundation of the forts for maintenance would benefit the health and safety for visitors and park staff (NPS 2019b). Visitor use has the potential to increase as tourism continues to grow.

## **Impacts Assessment**

For the analysis, potential effects of the proposed project alternatives on visitors within the park are assessed based on the current description of visitor use and experience presented in the “Affected Environment” section. Resource-specific context for assessing impacts of alternatives on visitor use and experience is based on the fundamental recreational and educational values of the park, including guided tours at both forts, visiting the museums in the Fort Sumter or Fort Moultrie Visitor Centers, listening to talks and interpretation on historical structures, seeking views throughout the park, enjoying birding, and self-guided tours through the park.

### ***Impacts of the Fort Sumter No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Sumter. However, should the dock fail, visitors would lose access to the park because the only way to access Fort Sumter is by vessel. Losing access to the fort would remove the public’s ability to enjoy the aforementioned recreational and educational opportunities. Additionally, as long as the existing dock remains in operation, it would not be ABA-compliant, limiting accessibility and safety for some visitors. The dock as is currently built contains an elevated area only accessible by using stairs and gangways that are not up to current ABA standards. Overall, under the no-action alternative, visitor use and experience would degrade until it is eventually lost when the dock fails.

### ***Impacts of Fort Sumter Alternative 1: T-Pier Adjacent to Existing Dock (Preferred Alternative)***

Alternative 1 would result in the construction of an ABA-compliant dock, which would provide the necessary accessibility and safety to visitors with disabilities. The dock’s life would be extended several decades and would allow continued visitation of the fort by the public. Several improvements would be made to the dock, including visitor bump outs, NPS loading bump outs, and a drain near the base of the pier. The visitor bump outs would offer views of the fort and surrounding area and interpretation opportunities. The new dock would also better accommodate concessionaire vessels transporting visitors to the fort and would ensure safe docking procedures. The park receives several hundred thousand visitors per year from diverse backgrounds. Constructing a new dock would preserve these visitors’ ability to experience the rich and important history within the park.

Minimal impacts are anticipated from construction activities. Visitors would still be able to access the fort because the existing dock would remain open during construction of the new dock. Noise from construction activities and undesirable views could potentially adversely impact visitor use and experience during construction. Noise would be minimized by not exceeding maximum allowable decibel levels for a variety of construction equipment. These impacts would not extend beyond the construction period.

### ***Impacts of Fort Sumter Alternative 2: T-Pier or Pier with Finger Piers in Footprint of Existing Dock***

Impacts on visitor use and experience are similar to those described for Alternative 1. However, visitors would have to access the fort via a temporary barge and float layout rather than through the existing dock. Depending on tides and timing of tour boats, the barge and float would likely be less accessible than the existing dock, depending on tides which would adversely impact visitor experience during the duration of construction.

### ***Impacts of the Fort Moultrie No-Action Alternative***

Under the no-action alternative, the park would continue to manage and use the dock at Fort Moultrie. However, should the dock fail, park administrative staff would lose one of their main access points to Fort Sumter, which would negatively affect visitor use and experience in the park. Dock failure would also result in high emergency response times due to emergency responders' use of the dock. Additionally, the current dock does not serve visitor recreational opportunities, such as kayak launching and fishing. The existing dock is not ABA-compliant and would continue to limit accessibility for visitors and park staff. The dock currently contains a guardrail of uniform height along the entirety of the dock which makes fishing difficult for individuals in wheelchairs. The current configuration of the dock also results in conflict between visitor recreational opportunities and park operations. Fishing is of particular conflict with park operations because fishing lines can end up in the path of park boats. Continued use of the current dock would negatively impact visitor use and experience until the dock eventually failed.

### ***Impacts of Fort Moultrie Alternative 1: Floating Dock (Preferred Alternative)***

Alternative 1 would result in the construction of an ABA-compliant dock, which would provide the necessary accessibility and safety for visitors. The dock's life would be extended for several decades. Several improvements would be made to the dock to ensure safe docking procedures could be achieved for park administrative staff and emergency responders.

During construction, adverse impacts on the visitor experience would occur. During dock construction visitors would not have access to the dock area, as the construction area would be fenced off. Visitors would not have the opportunity to fish or view the cove/salt marsh from the dock. In addition, construction staging would occur in the visitor center parking lot, which would reduce the number of parking spaces available. Visitors would still have access to Fort Moultrie because it is only accessible to visitors by vehicle, and closure of the dock would not impact visitor use and experience. Additional impacts on visitor experience would include noise during construction. Noise would be minimized by not exceeding maximum allowable decibel levels for construction equipment. These impacts on visitor experience would be temporary and only last the duration of the construction period. However, visitors would not have access to the two floating docks attached to the main pier after construction. Despite the lack of access to the floating docks, conflicts between park operations and recreation would be reduced because park staff would be able to use the upstream dock allowing visitors to remain out of the way of park operations.

### ***Impacts of Fort Moultrie Alternative 2: Floating Dock with Finger Piers***

Impacts on visitor use and experience are similar as described for Alternative 1 with the difference being that visitors would have access to one of the floating docks.

## **Cumulative Impacts**

The rehabilitation of the breakwater surrounding Fort Sumter and maintenance projects at the fort would have temporary adverse impacts to visitor use and experience. During construction and repair projects, the presence of equipment and noise associated with the projects could adversely impact Fort Sumter visitor's experience. However, these projects would benefit the long-term visitor experience as Fort Sumter would continue to be maintained allowing visitors to continue to experience the fort. The dock replacement project would contribute to long-term beneficial impacts to visitor use and experience when considered with past, present, and reasonably foreseeable future projects at Fort Sumter.

There are no past, present, or reasonably foreseeable projects identified at Fort Moultrie that would create impacts on the visitor use and experience; therefore, the replacement of the dock would not contribute to cumulative impacts at Fort Moultrie.

## **Conclusion**

The no-action alternative would result in adverse impacts on the visitor use and experience at both forts. The proposed dock construction would allow visitors to continue accessing Fort Sumter and allow park staff to continue to maintain the historic structures at the forts for the enjoyment of the public. Alternative 1 would not allow visitors to use the floating docks while Alternative 2 would allow visitors to use one of the floating docks. Increased noise from construction activities may adversely impact visitor use and experience but would be limited to the construction period. Additionally, the public's ability to view cultural landscapes may be adversely affected by the presence of construction equipment, but the impacts would be limited to the construction period and the new docks would not alter cultural landscapes at the conclusion of construction.

## CHAPTER 4: CONSULTATION AND COORDINATION

This chapter summarizes the consultation and coordination process for the Dock Replacement project.

### Public Participation

**Civic Engagement.** The NPS notified the public of the proposed dock replacement project through a press release on May 17, 2023. The press release was posted on the park's website and on social media. Additionally, the NPS released a project newsletter containing preliminary options for dock replacement for public review and comment on the NPS Planning, Environment, and Public Comment (PEPC) website. The project newsletter was available for public review until June 16, 2023. During the comment period, the NPS held a virtual public meeting on May 25, 2023. The public was encouraged to submit their comments electronically through the NPS PEPC website. The park also accepted public comments in writing via mail and email.

Comments and concerns were related to access of the docks by private boaters and kayakers, cultural landscape and viewshed alteration, accommodation of larger vessel types to allow other concessionaire contractors to bid on access to the dock at Fort Sumter, and that the docks should be constructed with climate change under consideration. These comments were considered when developing the alternatives carried forward in this EA for full analysis.

### Agency Consultation

The park is consulting with the USFWS, NOAA National Marine Fisheries Service (NMFS), SHPO, and South Carolina Department of Natural Resources (SCDNR) pursuant to the ESA, MSA, and NHPA, respectively. Consultation is ongoing.

**South Carolina State Historic Preservation Office.** As required by Section 106 of the NHPA, the park initiated consultation with the SHPO on March 10, 2023. In this letter, the park presented the draft concept designs. In response to the SHPO's letter dated on April 4, 2023, the NPS provided the SHPO with a second letter on September 29, 2023, which included a description of the proposed undertaking and area of potential effects, the Final Phase I Marine and Terrestrial Archeological Resource Report, and the updated concept designs. The park received a response from the SHPO on November 13, 2023. The response letter stated concurrence with the findings of the Phase I Marine and Terrestrial Resource Survey Report.

**US Fish and Wildlife Service.** As required by Section 7 of the ESA, the NPS consulted with the USFWS regarding the potential effects of the preferred alternative on federally listed species. The NPS initiated consultation for this project with the USFWS on May 18, 2023. Per USFWS, the park used the USFWS IPaC online tool to determine effects on special-status species within the project areas. The IPaC online tool was used to receive concurrence and consistency determinations with ESA analysis on July 13, 2023.

**National Marine Fisheries Service.** As required by Section 7 of the ESA and the MSA, the NPS consulted with the NMFS regarding the potential effects of the preferred alternative on marine species and EFH. The NPS initiated consultation for this project with NMFS on May 18, 2023. A response was received on June 23, 2023, requesting for the park to use the Expedited Consultation Format. The park sent the Expedited Consultation letter on December 11, 2023. In addition, the park sent an EFH Assessment to NMFS on December 14, 2023. To date no response has been received from the NMFS.

**South Carolina Department of Natural Resources.** As required by Section 7 of the ESA, the NPS consulted with the SCDNR regarding the potential effects of the preferred alternative on state-listed species. The NPS initiated consultation for this project with the SCDNR on May 18, 2023. A response was received from the SCDNR on August 17, 2023, identifying possible species that may be impacted by the proposed project and mitigations.

**South Carolina Office of Coastal Resource Management.** The NPS initiated consultation with the South Carolina Department of Health and Environmental Control Office of Coastal Resource Management (SCDHEC OCRM) on November 20, 2023 by providing a consistency determination letter for the proposed work. To date no response has been received from the SCDHEC OCRM.

## **Tribal Consultation**

The park consults with Tribal Nations that have tribal lands within or adjacent to Fort Sumter and Fort Moultrie National Historical Park, and with Tribal Nations that attach historic and cultural significance to resources within the park. The NPS sent a letter initiating consultation to twelve Tribal Nations on March 10, 2023, which included a copy of the draft concepts for the Fort Sumter and Fort Moultrie docks. Responses were received from the Catawba Indian Nation, Eastern Shawnee Tribe of Oklahoma, and Shawnee Tribe. Each of the Tribal Nations indicated no immediate concerns with the proposed project; however, each requested to be notified if any Native American artifacts or human remains are located during construction. The park sent the same Tribal Nations a second letter on October 2, 2023 that included a description of the proposed undertaking and area of potential effects, the Final Phase I Marine and Terrestrial Archeological Resource Report, and the updated concept designs. The park will continue to consult with the Tribal Nations throughout this process.

## **Stakeholder Outreach**

The following agencies, Tribal Nations, and organizations were contacted and invited to participate in the planning process.

### **Federal Agencies and Officials**

- Congressional representatives/staff
- US Fish and Wildlife Service
- National Oceanic and Atmospheric Administration National Marine Fisheries Service
- US Army Corps of Engineers, Charleston District
- US Coast Guard
- Francis Marion National Forest
- Cape Romain National Wildlife Refuge
- South Carolina Lowcountry National Wildlife Refuges

### **Tribal Nations**

- Absentee Shawnee Tribe
- Catawba Indian Nation
- Eastern Shawnee Tribe of Oklahoma
- Kialegee Tribal Town
- Miccosukee Tribe of Indians

- Muscogee Creek Nation
- Poarch Band of Creek Indians
- Seminole Nation of Oklahoma
- Seminole Tribe of Florida
- Shawnee Tribe
- Thlopthlocco Tribal Town
- Tuscarora Nation

### **State Agencies and Officials**

- State Historic Preservation Office
- South Carolina Department of Natural Resources
- South Carolina Department of Health and Environmental Control, Division of Ocean and Coastal Management
- South Carolina State Parks
- South Carolina Department of Parks, Recreation, and Tourism

### **Community**

- Park visitors (past, present, and future)
- General public
- Neighboring landowners (federal, state, tribal and private land)
- Administrators of nearby public lands and waters

### **Local Officials and Stakeholders**

- City of Charleston
- Charleston County Parks and Recreation
- City of Charleston Department of Parks
- Charleston County
- Town of Sullivans Island
- Town of Mount Pleasant

### **Businesses**

- Authorized Commercial Users
  - Fort Sumter Tours
- Local Business Owners

### **Travel Councils/Organizations**

- Charleston Area Convention and Visitors Bureau

## **Media Outlets**

- Charleston *Post and Courier*
- Charleston City Paper
- Island Eye News

## **Non-profit Organizations/Other Organizations**

- Friends of Charleston National Parks
- Historic Charleston Foundation
- South Carolina Historical Society
- Preservation Society of Charleston
- National Trust for Historic Preservation
- Charleston Museum
- South Carolina Sea Grant Consortium
- Gullah-Geechee National Heritage Corridor
- South Carolina Aquarium
- International African American Museum
- Charleston Harbor Resort and Marina
- Toni Morrison Society
- Charleston Area Branch Association of the Study of African American Life and History
- Conservation Commission

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**APPENDIX A: MANATEE PROTECTION MEASURES FOR SOUTH CAROLINA**

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## APPENDIX A: MANATEE PROTECTION MEASURES FOR SOUTH CAROLINA

The following mitigation measures were proposed by the US Fish and Wildlife Service during Section 7 consultation for this project to reduce the potential for impacts to the federally threatened West Indian manatee (*Trichechus manatus*).

1. The permittee should instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel must monitor water-related activities for the presence of manatee(s).
2. The permittee should advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973.
3. Barriers must not impede manatee movement and additionally any siltation barriers used during the project should be made of material in which manatees cannot become entangled and must be properly secured, and regularly monitored to avoid manatee entrapment.
4. Vessels associated with the project should operate at “no wake/idle” speeds while in the construction area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.
5. If manatee(s) are seen within 100 yards of the active construction area, appropriate precautions should be implemented to ensure protection of the manatee. These precautions would include the operation of moving equipment no closer than 50 feet to a manatee. Operation of equipment closer than 50 feet to a manatee would necessitate immediate shutdown of that equipment. Activities would not resume until the manatee(s) has departed the project area of its own volition, or until 30 minutes has elapsed if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.
6. The permittee understands and agrees that in-water lines (rope, chain, and cable, including the lines to secure turbidity booms) must be stiff, taut, and non-looping. Examples of such lines are heavy metal chains or heavy cables that do not readily loop and tangle. Flexible in-water lines, such as nylon rope or any lines that could loop or tangle, must be enclosed in a plastic or rubber sleeve/tube to add rigidity and prevent the line from looping and tangling. No excess line is allowed in the water. Where appropriate, in water wires, cables, should be fitted with PVC sleeve from the surface to the bottom to prevent any potential scraping of the passing manatees.

Any collision with and/or injury to a manatee would be reported immediately to the U.S. Fish and Wildlife Service contacts: Melanie Olds, South Carolina Manatee Lead, Charleston Field Office, at 843-727-4707 ext. 40413; or Terri Calleson, Manatee Recovery Coordinator, North Florida Field Office, at 904-731-3286.

**APPENDIX B: FLOODPLAINS STATEMENT OF FINDINGS**

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**Statement of Findings for  
NPS Director's Order 77-2, *Floodplain Management***

**Fort Sumter and Fort Moultrie Dock Replacement  
Environmental Assessment  
Fort Sumter and Fort Moultrie National Historical Park**

**Recommended:**

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Superintendent Date  
Fort Sumter and Fort Moultrie National Historical Park  
NPS

**Certified for Technical Adequacy and Servicewide Consistency**

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Chief Date  
NPS, Water Resources Division

**Concurred:**

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Safety Officer Date  
NPS, IR 2

**Approved:**

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Regional Director Date  
NPS, IR 2

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## FLOODPLAINS STATEMENT OF FINDINGS

Executive Order (EO) 11988, “Floodplain Management” and EO 13690, “Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input,” require the National Park Service (NPS) and other federal agencies to evaluate the likely impacts of actions in floodplains. The objectives of EO 11988 are to avoid, to the extent possible, the long-term and short-term adverse impacts associated with occupancy, modification, or destruction of floodplains and to avoid indirect support of development and new construction in such areas wherever there is a practicable alternative. EO 13690 was issued to establish a Flood Risk Management Standard for federally funded projects to enhance resiliency and reduce flood risk when possible and to ensure new federal infrastructure will last as long as intended.

The NPS administers floodplain policy through Director’s Order 77-2: *Floodplain Management* (DO 77-2) and Procedural Manual 77-2 *Floodplain Management* (PM 77-2). It is NPS policy to preserve floodplain functions and values and minimize potentially hazardous conditions associated with flooding, including threats to human health/life, risk to capital (NPS) investment, and impacts on natural and beneficial floodplain values. If a proposed action is found to be in an applicable regulatory floodplain with associated impacts and relocating the action to a non-floodplain site is considered not to be a practicable alternative, then a formal floodplain Statement of Findings (SOF) must be prepared. The SOF must (a) quantify flood conditions and associated hazards as a basis for management decision making, (b) describe the rationale for selection of a floodplain site, (c) disclose the resources and amount of risk associated with the chosen site, and (d) explain flood mitigation plans. The SOF will be available for public review and comment through the National Environmental Policy Act Environmental Assessment. Pursuant to EO 11988 and DO 77-2, flooding hazards have been evaluated related to the preferred alternative for the dock replacement project at Fort Sumter and Fort Moultrie National Historical Park.

### Project Area

Fort Sumter and Fort Moultrie National Historical Park (the park) is located southeast of Charleston, South Carolina near the entrance of Charleston Harbor. Fort Sumter is located on a man-made island in the harbor, east of James Island. Fort Moultrie is located on Sullivan’s Island, just outside of Charleston (Figure 1). The park is the site of the first shots fired during the Civil War when Confederate troops fired on Federal troops at Fort Sumter on April 12, 1861. Fort Sumter continued to be the focal point in Charleston throughout the Civil War. The park contains rich history dating back to the American Revolutionary War and continuing through World War II. Much of the park is of national cultural and historical significance (NPS 2023).

The Fort Sumter and Fort Moultrie docks are essential for functionality of the park. The docks provide access for visitors, park staff, and law enforcement emergency services personnel to park sites, and support operational needs for moving equipment and supplies between the mainland and Fort Sumter. Fort Sumter can only be accessed by boat. Visitors travel to Fort Sumter on concessionaire operated ferry boats that depart from two locations, Liberty Square Visitor Education Center in downtown Charleston and Patriots Point Naval and Maritime Museum in Mount Pleasant. When ferries arrive at Fort Sumter, visitors disembark at the Fort Sumter dock located on the northwest side of the island (Figure 2). This dock also provides administrative access for park staff, as well as periodic access to first responder and law enforcement agencies. The Fort Moultrie dock is located on the cove side of the park property on Sullivan’s Island (Figure 3). The dock at Fort Moultrie is the docking and storage location for all park

boats, supporting parkwide operations. The Fort Moultrie dock also provides public access for fishing and other recreational activities; however, the public is not permitted to dock private boats at the dock.

Both the Fort Sumter and Fort Moultrie docks have reached the end of their life cycles and are currently deteriorating; therefore, the NPS is proposing to replace the docks.

## Proposed Action

The docks at Fort Sumter and Fort Moultrie are deteriorating and need to be replaced. The Fort Sumter dock is a concrete, T-shaped pier that recently underwent emergency stabilization repair in January 2022. Despite this repair, a subsequent Emergency Dock Inspection Report (June 2022) for this dock identified new structural deficiencies (e.g., newly developed cracks in existing deck planks, cracks and spalling in several lower deck planks at the “T” section of the dock), which may contribute to failure of the dock. Additionally, damage from Hurricane Ian in September 2022 has further shortened the lifespan of the dock (DHM Design 2022b). The Fort Moultrie dock is 45 years old and is showing advanced signs of deterioration. The NPS is proposing to replace both docks with Architectural Barriers Act (ABA) compliant docks.

**Fort Sumter.** At Fort Sumter, the NPS proposes to build a new dock adjacent to the existing dock then demolish the existing dock. This action would require the use of a temporary barge as a staging area, which would likely be moved to all sides of the existing dock during construction and demolition. The new dock would include an approximately 130-foot-long and 24-foot-wide pierhead, which are similar widths as the existing 20-foot wide pierhead. The pierhead would be connected to an approximately 307-foot-long and 12-foot-wide concrete pier. An approximately 40-foot-long and 10-foot-wide finger pier reserved for NPS use would be added on the east side of the pier and south of the pierhead. Two visitor bump outs and one park signage bump out would be added on the east and west side of the dock. Additionally, the proposed action would include the removal of existing park signage on land, construction of new signage on the dock, and the incorporation of new interpretive panels on the dock. The proposed design of the Fort Sumter dock replacement is illustrated in Figure 4.

**Fort Moultrie.** At Fort Moultrie, the NPS proposes to demolish the existing dock then construct a new dock within the same footprint as the existing dock. The new dock would be constructed using a pierhead and floating dock system and would improve loading and unloading operations. Additionally, the proposed work would include the removal and installation of a new concrete pad and benches at the dock entry. The new dock would be constructed within the same footprint as the existing dock and would contain an approximately 108-foot-long and 24-foot-wide pierhead. An approximately 195-foot and 12-foot-wide concrete pier would connect to the pierhead. The new dock would also include a 60-foot-long and 8-foot-wide floating dock with four 16-inch steel pipe pilings attached to the east side of the pierhead. An additional 30-foot-long and 8-foot-wide floating dock would be attached to the west side of the pierhead and would contain two 16-inch steel pipe pilings. The floating piers would be attached to the pierhead via gangways. The proposed design of the Fort Moultrie dock replacement is illustrated in Figure 5.

Figure 1. Location of Fort Sumter and Fort Moultrie Project Study Area

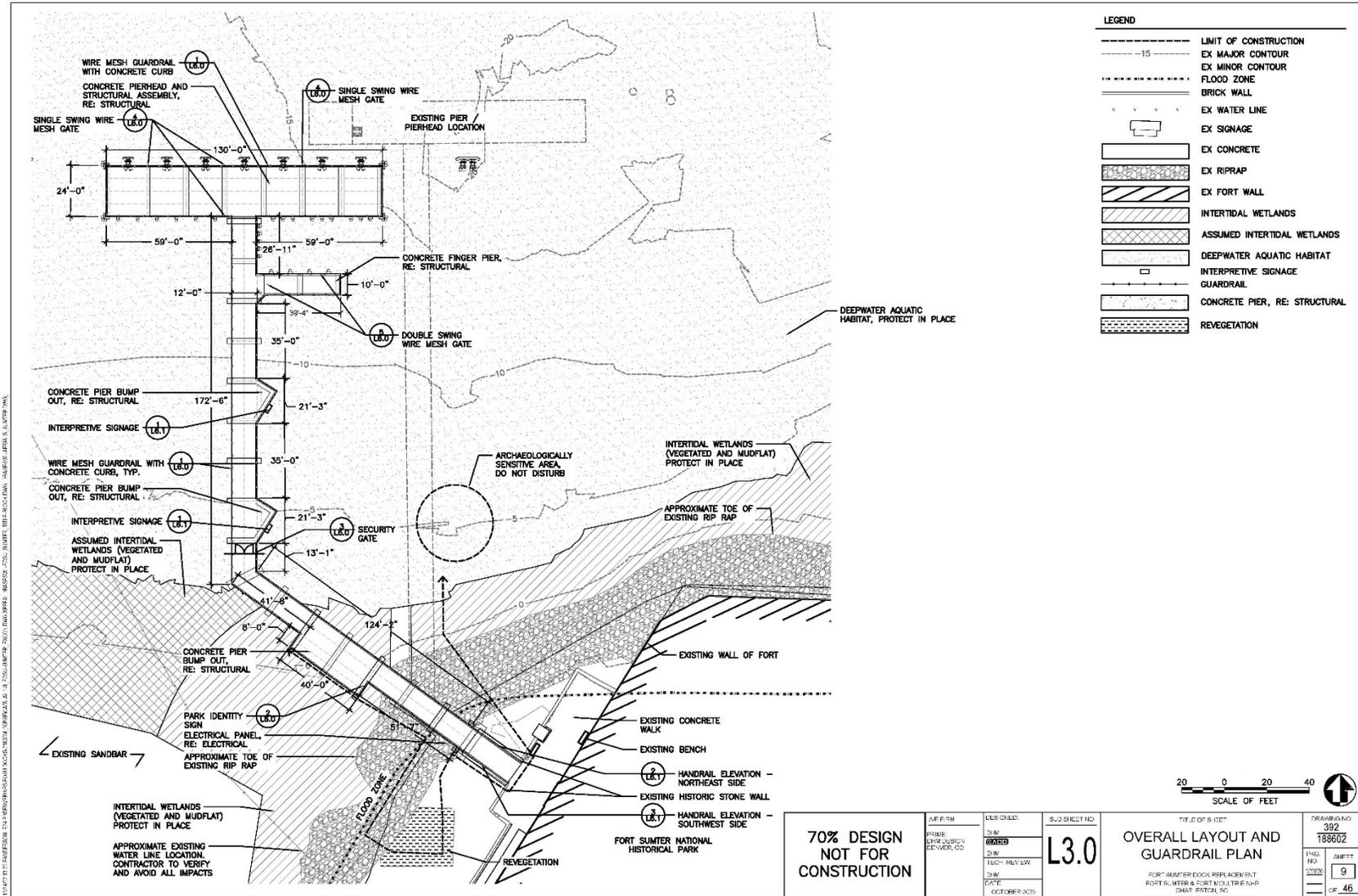


Figure 2. Fort Sumter Study Area





Figure 4. Proposed Fort Sumter Dock Replacement





## Site and Flood Hazard Description

Both docks are located at the entrance to Charleston Harbor, on the Atlantic Coast, at an elevation of 10 feet above mean low water (MLW) North American Vertical Datum of 1988 (NAVD88). Both Fort Sumter and Fort Moultrie experience two low tides and two high tides a day. The NOAA Station 8665530, Charleston, SC provides historic and predicted tide and water elevation information and gives a mean tidal range of 5.22 ft (NOAA 2023a). The sites experience coastal flooding, most typically associated with tropical cyclones and other coastal storms. September and October are the most active months of the year for coastal flooding that present a hazard to infrastructure located in the coastline area (NOAA 2023b).

The Federal Emergency Management Agency (FEMA) uses two main categories for delineating coastal flood hazard zones: a velocity zone (“VE” designation) and an inundation zone (“AE” designation). Zone VE, also known as the coastal high hazard zone, is where wave action and fast-moving water can cause extensive damage during a base flood event. Zone AE indicates areas that have at least a 1% annual chance of being flooded, but where wave heights are less than 3 feet. VE zones are typically associated with significant construction restrictions such as prohibiting the use of fill for structural support of buildings and requiring new or substantially improved construction to be pile-supported with the lowest finished floor elevated above the 100-year base flood (Office of the Federal Register National Archives and Records Administration 2022).

Regulatory flood hazards in the area can be delineated by the FEMA Insurance Rate Map (FIRM) produced by the most recent Flood Insurance Study (FIS) conducted for Charleston County, South Carolina in 2023. The effective date of the resultant FIRM containing the project site is May 24, 2023. According to this 2023 map, both the Fort Moultrie and Fort Sumter project areas are within the 1% annual chance flood hazard area (1% annual chance floodplain) and are designated as a FEMA Zone AE and Zone VE (Figure 6 and Figure 7). Location in Zone VE is considered a Coastal High Hazard Area. In Zone VE, wave heights are equal to or greater than 3 feet. This indicates the docks are at a high-risk for flooding and storm surge.

The Base Flood Elevation (BFE) for Fort Sumter is +14 feet NAVD88. The BFE is the elevation of the surface water resulting from a flood that has a 1% chance of being equaled or exceeded in any given year and includes the effects of wave action. FEMA’s Flood Insurance Study (FIS) No. 45019CV000B shows the site to be located near Transect No. 98. The still water elevation with the 1% annual chance of being equaled or exceeded at this transect is 9.8 feet NAVD 88 (FEMA 2021). The still water is defined as the average water surface elevation excluding local variations due to wave action. The BFE for Fort Moultrie is +13 feet NAVD88. FEMA’s Flood Insurance Study (FIS) No. 45019CV000B shows the site to be located nearest Transect No. 46. The stillwater elevation with the 1% annual chance of being equaled or exceeded at this transect is 9.8 feet NAVD 88 (FEMA 2021). A site-specific wave analysis using the Automated Coastal Engineering System (ACES) software was performed by Childs Engineering (Childs Engineering 2023). The analysis found a 1% significant wave height of annual chance of 4.32 feet. The significant wave is defined as an average measurement of the largest 33% of waves in a wave spectrum. It is commonly used in coastal engineering because these waves may result in damage and/or erosion.

Per DO 77-2, the dock replacement project is considered a Class III action because the project is located within a high hazard area, or extreme floodplain. The extreme floodplain is defined generally as the area inundated during a flood with the largest magnitude possible at a site.

The mean sea level in Charleston Harbor is expected to rise as a result of climate change over the design life of the proposed new docks, further increasing flood risk. Sea level rise over a 25-year period from the assumed completion of the project, ranges from 7.19 inches to 21.36 inches (Sea Level Rise 2017). The new docks would have an estimated service life of approximately 30 years before significant maintenance or rehabilitation would be needed. The extreme tide is calculated by using the highest astronomical tide (7.07 feet) for NOAA Station 8665530 (NOAA 2023a) plus the extreme end of sea level rise (1.78 feet). Using the mean low water, the projected mean higher high water (MHHW) level is predicted to be 7.36 feet (5.58 feet plus extreme end of sea level rise). The projected MHHW is 2.64 feet below the proposed deck elevation. The BFE plus the extreme sea level rise is 15.78 feet for Fort Sumter and 14.78 feet for Fort Moultrie. It is noted that the Interagency Sea Level Rise Scenario Tool (Sweet et al. 2022) indicates a sea level rise at the Charleston, SC Station (8665530) of 13.8 inches to 25.6 inches by the year 2055, which encompasses the expected 30-year life span of the docks. These projections are higher than the initial numbers considered in this analysis. Adding this range (13.8 inches to 25.6 inches) to the current highest astronomical tide (7.07 feet) results in a water height just below the elevation of the proposed dock (8.22 feet to 9.20 feet). The 1% annual chance base flood event plus sea level rise is 16.13 feet at Fort Sumter and 15.13 feet at Fort Moultrie. Although the extreme flood is projected to be about 6 feet above the proposed dock elevation of 10 feet, the docks would incorporate design elements to be resilient to flooding and storm events, described further below.

## **Justification for the Use of the Floodplain**

As previously discussed, Fort Sumter and Fort Moultrie are of national cultural and historical significance. The park attracts over 300,000 visitors annually. The docks are critical to the operations and maintenance of the park. The Fort Sumter dock is the main access point to the fort, providing access for visitors, park staff, and first responder and law enforcement agencies. The replacement of the dock at Fort Sumter would better accommodate vessels, enhance visitor experience, and ensure safe, continuous public and administrative access to the fort. Without the dock, the public would lose access to the fort, concessionaire ferry services would cease operation, and NPS staff would lose access for providing public programming, maintenance, and law enforcement. The Fort Moultrie dock is used for docking and storage for all park boats, supporting parkwide operations. The replacement of the dock at Fort Moultrie would ensure administrative access for park operations and facilities at Sullivan's Island that service Fort Sumter and provide enhanced public recreational use. A failure of the Fort Moultrie dock would have significant impacts on park operations.

In addition, the construction of the new docks would eliminate structural deficiencies of the current docks, provide critical infrastructure for greater than 30 years, and would account for potential impacts from climate change and increasing harbor traffic projections.

Despite its location within a FEMA regulatory floodplain and within a special flood hazard area, there is no practicable alternative to locating the new docks in the regulatory floodplain. The docks would be designed and constructed to withstand the anticipated impacts of flooding, storms, and a projected sea level rise of 21.36 inches (1.78 feet). Furthermore, despite the flood hazards present, the docks would not be in operation during flooding events — only by trained emergency personnel trained to operate in those conditions, thus the docks pose no significant risk of harm to the public.

Figure 6. Fort Sumter Floodplain Map

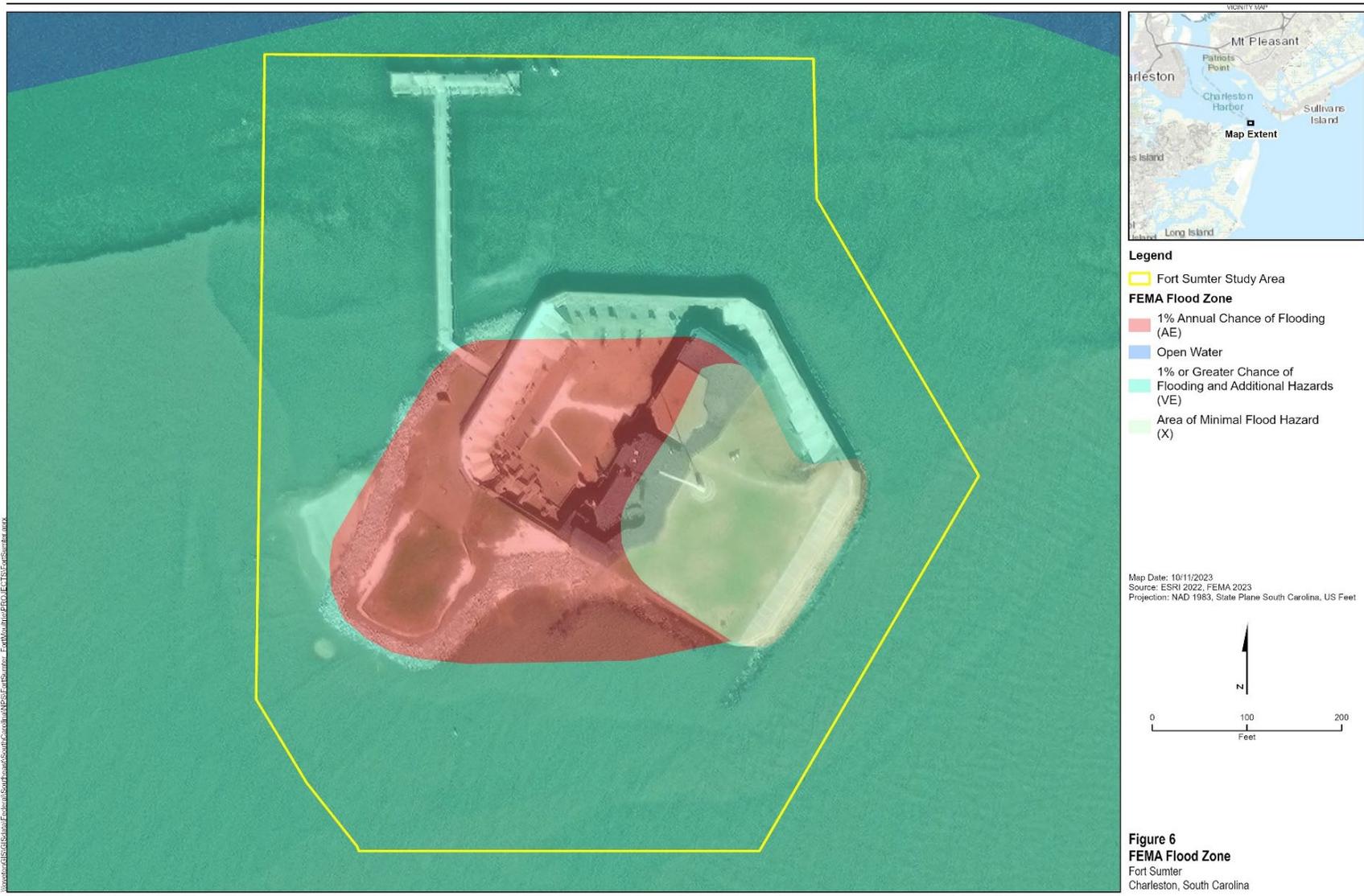


Figure 7. Fort Moultrie Floodplain Map



## Flood Risks

The proposed action would occur within the 1% annual chance floodplain, as described above, and face elevated risk of flooding and impacts from storm events, both of which are expected to increase with climate change. There is no alternative location for placing the docks outside of the floodplain, and the docks are designed and will be constructed to enhance future resiliency with a 30-year life cycle to withstand the anticipated impacts of flooding, storms, and sea level rise. The 1% annual chance flood event was considered during design; however, the design team indicates that once the structures are overtopped, the loads associated with this event will decrease. The dock designs allow water to flow over the deck during wave overtopping and temporary flooding events. The docks would be constructed to resist increased wind and wave action and have been designed to withstand code governing loads. This includes an increased number of batter pilings which help reduce lateral loading and construction with reinforced concrete, which is stronger and more durable than timber and more resistant to corrosion than steel. The docks have also been designed to withstand the projected sea level rise of 21.36 inches (1.78 feet). The new docks would be the same elevation as the existing docks because the current dock elevation is higher than the ground elevation at the access point. If the ground at the access point has flooded or is underwater, the docks would not be functional and access to the forts would not be possible. In addition, the forts themselves would likely be flooded if water levels were over 10 feet. The extreme tide is calculated by using the highest astronomical tide (7.07 feet) for NOAA Station 8665530 (NOAA 2023a) plus the extreme end of sea level rise (1.78 feet). Therefore, the extreme tide would be 8.85 feet which is below the 10-foot dock elevations. The flood risk for the proposed new docks is the same as that of the existing docks. The human health and safety risk for flooding events are also the same since the docks are not in use during flooding events. The proposed docks do address the structural instability of the existing docks, decreasing the risk of large-scale damage to the structures themselves and the surrounding environment during a flooding event.

**Natural and Beneficial Floodplain Values.** Emergent tidal wetlands were identified during a delineation in November 2022 within the Fort Moultrie project site limits. These wetlands have the primary functions of groundwater recharge, flood flow attenuation, and sediment/shoreline stabilization. The wetlands receive and detain excessive floodwater resulting from major storm surge from Charleston Harbor and the Atlantic Ocean, as well as typical runoff from the developed portion of the project site. Intertidal vegetated wetlands and mudflats were identified within the Fort Sumter project site limits. The proposed dock at Fort Moultrie would be located within intertidal emergent wetlands and intertidal unvegetated mudflats. Impacts on wetlands would occur from shading due to the installation of the dock and support pilings and timber fenders. To minimize the impacts to wetlands, the dock would be constructed within the footprint of the existing dock, which currently shades approximately 5,885 square feet of wetlands and waters of the US. The preferred alternative would have an impact on an additional 158 square feet of intertidal wetlands compared to current shading impacts. This would reduce the functions and values of the wetland that was shaded by the dock by reducing the nutrient removal capacity and wildlife habitat value for the additional 158 square feet of wetland area impacted.

Permanent impacts on intertidal wetlands surrounding Fort Sumter would occur from shading due to the installation of new pilings, timber fender system, and decking for the new dock. The new dock would shade approximately 1,515 square feet of intertidal wetlands. Shading from the dock reduces light availability for plants to grow in the vegetated wetlands below the dock, reducing the overall amount of wetland vegetation. To minimize the impacts to wetland vegetation, the dock would be constructed in an area with little to no wetland vegetation. Following construction, the existing pier would be removed,

allowing the previously shaded area, approximately 725 square feet of intertidal wetlands, to restore naturally.

**Impacts of the Fort Sumter Proposed Action.** The proposed action at Fort Sumter includes the construction of a new dock adjacent to the existing dock and the subsequent demolition of the existing dock. The new dock would be 7,687 square feet, larger than the existing 6,001 square foot dock. During construction, a temporary barge would be staged within the project area. Barge spuds would be lowered and installed in the sediment to hold the barge in place. During construction of the new dock and demolition of the existing dock, the temporary barge would be moved around as needed and the barge spuds would be re-installed with each move. The addition of the temporary barge within the floodplain would further impede the natural floodplain functions; however, this would be minimal and temporary, only lasting the length of the construction period (approximately 22 months). The barge would only be located in deepwater habitat to prevent it from resting on the bottom and would not impact wetlands. The construction of the new dock would be located within the floodplain. The new dock would have a similar layout to the existing dock however it would include two bump outs and a finger pier that would require the installation of additional pilings within the floodplain. The new dock would have a slightly greater impact on the floodplain because it further impedes the natural water movement due to increased number of pilings and surface area. However, as a flow-through structure the impacts are minimal and localized at the pilings. Overall, the floodplain would continue to function as floodwater and storm surge protection. Additionally, two docks would be present in the project area after the new dock has been constructed and prior to the existing dock's demolition. The removal of the existing dock would restore the functionality of the floodplain within the immediate area of the dock. The proposed project also includes drainage improvements near the sally port, which would help reduce floodwaters within the entrance of Fort Sumter.

**Impacts of the Fort Moultrie Proposed Action.** The proposed action at Fort Moultrie includes the demolition of the existing dock and the subsequent construction of a new dock. The new 5,965 square foot dock would be slightly larger than the existing 5,885 square foot dock. During construction (approximately 22 months), a temporary barge would be located north of the pierhead of the existing dock. The barge would temporarily impede water flow within the project area but would be located in deepwater habitat and not impact wetlands. The construction of the new dock would be located within the footprint of the existing dock. The removal of the old dock and construction of the new dock would result in minimal change to the current impacts on the floodplain. Like Fort Sumter, the floodplain would continue to function by conveying flood flows and reducing the destructive power of floodwaters.

**Capital Investment.** A negligible change in flood risk (described in the preceding sections), and the critical need to update the park docks justify the investment in the proposed action within the regulatory floodplain. These new docks would provide critical infrastructure for greater than 30 years and would account for potential impacts from climate change and increasing harbor traffic.

**Human Health and Safety.** As discussed above, the docks at Fort Sumter and Fort Moultrie are at the end of their life cycles and deteriorating. The current docks pose human health and safety hazards in their current condition. If the docks are not replaced, park visitors and other dock users will experience degrading dock performance until the dock is eventually lost when it fails. Also, the docks need to be replaced with ABA-compliant docks, as in their current state, the docks do not provide ABA-related accessibility and safety for disabled visitors. New docks would resolve the current dock structural deficiencies, thus mitigating related hazards, and provide safer and more equitable access to all park visitors. Finally, as previously discussed, there is a minimal risk to human health and safety due to flooding as the docks would not be in operation for the public during flooding conditions.

## Flood Mitigation Measures

Mitigation measures would reduce hazards to human life and health, protect capital investment, and protect natural and beneficial floodplain values. The proposed action involves replacement of existing deteriorated docks with new docks in the regulatory floodplain, Zone VE. Flood mitigation measures would include a construction methodology designed to minimize the impact of the proposed action on the health of local tidal wetlands and their beneficial floodplain functions, as well as improving nearby drainage conditions to further support floodplain function.

The proposed action would implement mitigation measures to prevent the introduction of non-native species and, when possible, support native species. No imported topsoil or erosion control products (wattles, mats, logs, silt fences) would be used during revegetation of staging areas, to avoid the introduction of exotic plant species or inappropriate genetic stock of native plant species. Trees would also not be removed. To avoid the transport of nonnative species to the project area, all construction vehicles would be washed and inspected before use. If any revegetation work is required, the NPS would use conserved topsoil and native species from genetic stocks originating in the park. Revegetation design would be based on distribution, abundance, and diversity of native plant species. Following revegetation, restored areas would be monitored and managed to prevent colonization by nonnative invasive species.

The proposed action would also mitigate the impacts of construction on local watershed characteristics, including water quality measures that may impact tidal wetlands. Erosion control measures would be implemented to minimize impacts on water quality during construction activities. Additionally, overwater protection measures are under consideration. When possible, soils would be placed on top of asphalt, paved areas, planks, or tarps to reduce ground and vegetation disturbance. Soil pilings would be covered and delineated by erosion control products (i.e., wattles or silt fence) to prevent wind and water dispersal. Best management practices for construction equipment would be followed to avoid exposure of the environment to risks, such as oil leaks and fuel spills. For example, all refueling of equipment would have spill containment pads in position prior to refueling activities, and equipment must be free of any fluid leaks (fuel, oil, hydraulic fluid, etc.) on arrival at the work site and would be inspected at the beginning of each shift for leaks. Leaking equipment would be removed off site for necessary repairs before the commencement of work. Equipment storage and staging areas would be outside of identified wetlands areas. Construction activities required to occur in wetlands would remain inside the limits of disturbance to protect adjacent wetlands. Limits of disturbance adjacent to wetlands would be surveyed prior to construction to aid in this effort. In addition, to reduce impacts to wetlands, the Fort Moultrie dock would be constructed within the same footprint as the existing dock with a minimal increase in potential wetland shading. At Fort Sumter, the wetland shading is only slightly greater than the existing shading, and the dock is located in unvegetated wetlands. The use of floating docks at Fort Moultrie also mitigates impacts from sea level rise.

As discussed previously, the local tidal wetlands assist with ground water recharge, sediment/shoreline stabilization, and absorbing floodwater, reducing flood flow and storm surge from extreme events from Charleston Harbor and the Atlantic Ocean, as well as typical runoff from the developed portion of the project site. By mitigating impacts on tidal wetlands through the above proposed measures, these crucial wetland functions would be maintained for the overall benefit of the floodplain.

Finally, the proposed action would include drainage improvements near the sally port, which would help reduce floodwaters within the entrance of Fort Sumter.

## Summary

The NPS plans to replace the docks at Fort Sumter and Fort Moultrie. These docks are at the end of their life cycle, are in poor condition, posing hazards to current users, and will continue to degrade until they fail. These docks are vital to the use and operations of the park. The NPS proposes to build a new dock immediately adjacent to the existing dock at Fort Sumter then remove the old dock, and to remove the existing dock at Fort Moultrie and build a new dock in the footprint of the existing dock. These new docks would be built within a 1% annual chance floodplain with special flood risk, but no alternative building site exists. Furthermore, the new docks would be located in essentially the same area as the existing docks and result in little change to the floodplain. Therefore, floodplain and nearby tidal wetland functions are predicted to remain the same.

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2023a National Oceanic and Atmospheric Administration (NOAA). *Tides and Currents: Charleston, SC – Station ID: 8665530.* [https://tidesandcurrents.noaa.gov/stationhome.html?id=8665530.](https://tidesandcurrents.noaa.gov/stationhome.html?id=8665530)

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Sea Level Rise

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## **APPENDIX C: ESSENTIAL FISH HABITAT ASSESSMENT**

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# United States Department of the Interior

NATIONAL PARK SERVICE  
Fort Sumter and Fort Moultrie National Historical Park  
1214 Middle Street  
Sullivan's Island, South Carolina 29482  
(843) 883-3123



December 14, 2023

IN REPLY REFER TO  
FOSU Dock Replacement

David Dale  
NOAA National Marine Fisheries Service  
263 13th Avenue South  
St. Petersburg, FL 33701

RE: Essential Fish Habitat Assessment for the Preferred Alternative, Proposed Dock Replacement at Fort Sumter and Fort Moultrie National Historical Park

Dear Mr. Dale:

The purpose of this letter is to request concurrence from NOAA Fisheries with the Fish and Wildlife Coordination Act, Section 7 of the Endangered Species Act (ESA), and the Magnuson-Stevens Fishery Conservation and Management Act. This letter collectively provides the mandatory elements of an Essential Fish Habitat (EFH) assessment [50 CFR 600.920(e)(3)] for the proposed dock replacement at Fort Sumter and Fort Moultrie National Historical Park located in the Charleston Harbor, South Carolina. The EFH assessment includes a description of the action, an analysis of the potential adverse effects of the action on EFH and the managed species, the federal agency's conclusions regarding the effects of the action on EFH, and applicable mitigation. The NPS proposes to replace the existing docks at Fort Sumter and Fort Moultrie.

## **Project Area**

Fort Sumter is located on a man-made island in the Charleston Harbor, east of James Island. The proposed study area includes the existing dock and surrounding waters (Figure 1). Fort Moultrie is located on Sullivan's Island, just outside of Charleston. The proposed study area includes the existing dock, surrounding waters, and upland areas from the dock to the Fort Moultrie Visitor Center (Figure 2).



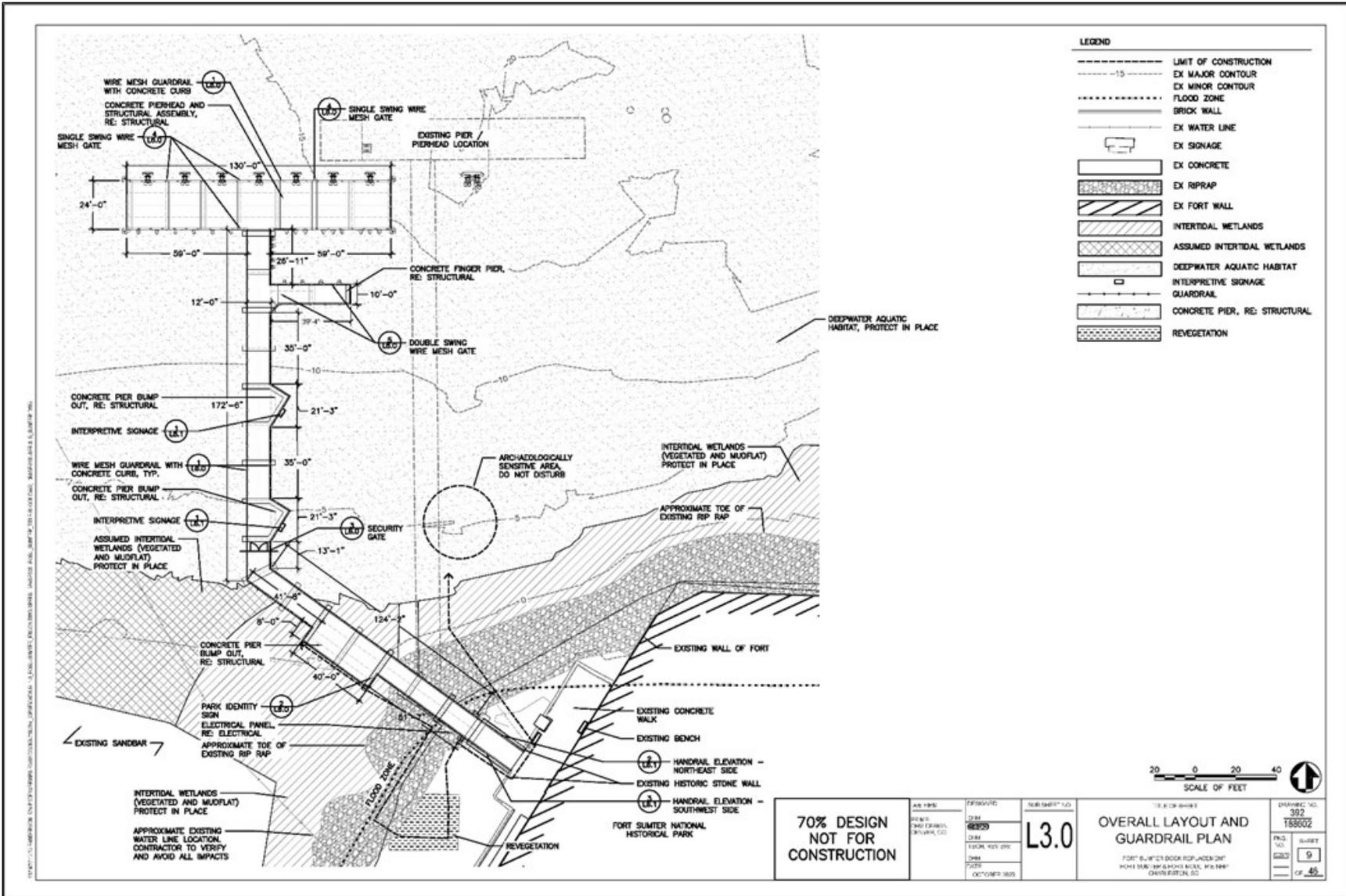


## Description of the Action

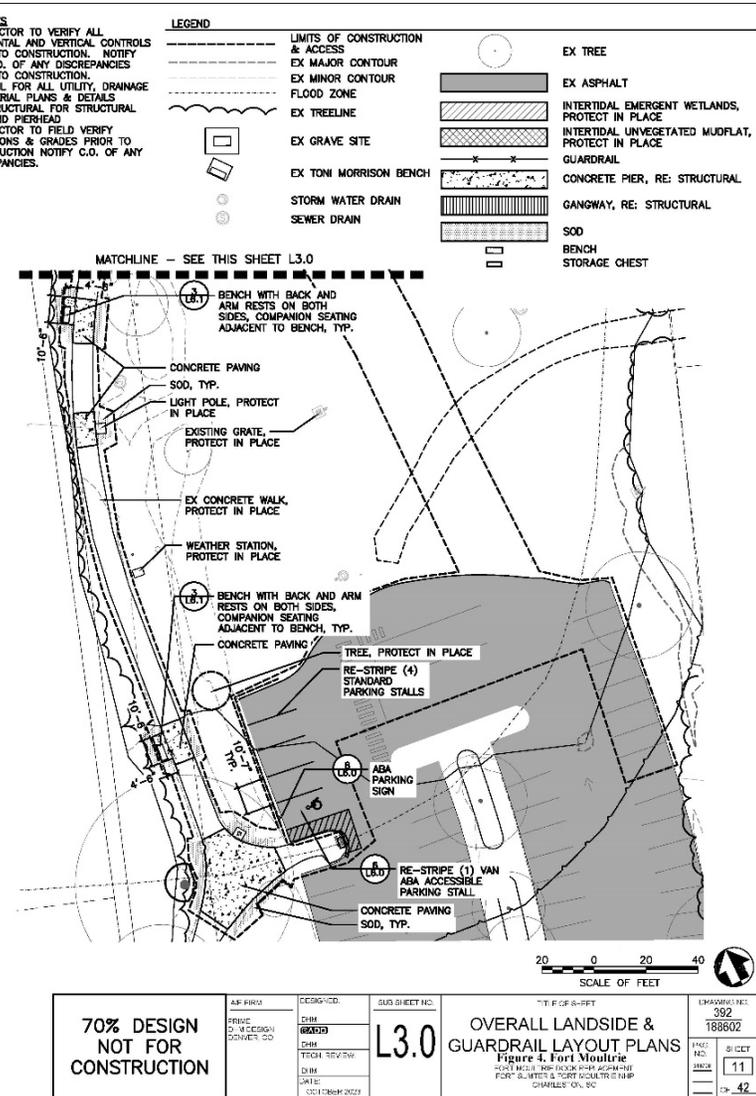
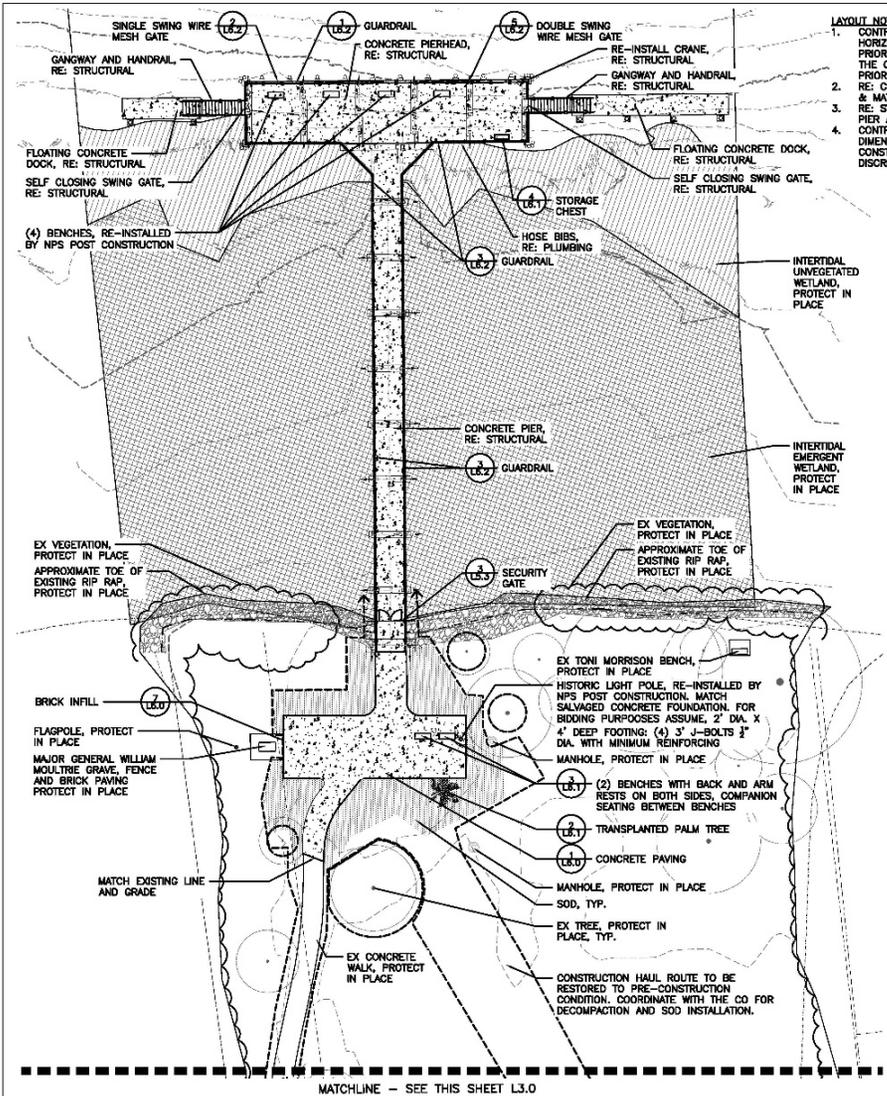
The preferred alternative would include the replacement of the current docks at Fort Sumter and Fort Moultrie. The docks provide access to park sites for visitors, park staff, law enforcement and emergency services personnel, and support operational needs for moving equipment and supplies between the mainland and Fort Sumter. Both the Fort Sumter and Fort Moultrie docks have reached the end of their life cycle and are currently deteriorating.

The preferred alternative at Fort Sumter is to demolish the existing dock and replace it with an Architectural Barriers Act (ABA)-compliant dock (see Figure 3). The new dock would improve NPS and concessionaire loading and unloading operations. Additionally, the preferred alternative would include removal of existing park signage on land, construction of new signage on the dock, and incorporation of new interpretive panels on the dock. The preferred alternative would require the use of a temporary barge as a staging area, which would likely be moved to all sides of the existing dock during construction and demolition. The barge would be located west of the new dock during construction and east of the existing dock during demolition. The new dock would be built west of the existing dock and include an approximately 130-foot-long and 24-foot-wide pierhead, which is similar to the width as the existing pierhead. The pierhead would be connected to an approximately 307-foot-long and 12-foot-wide concrete pier. An approximately 40-foot-long and 10-foot-wide finger pier reserved for NPS use would be added on the east side of the pier and south of the pierhead. A boat lift may be attached to the north side of the NPS finger pier to allow the NPS to store boats out of the water during storms or periods of heavy wave action. The lift would require up to 4 steel piles and accommodate boats up to 24 feet in length. Two visitor bump outs, and one park signage bump out, would be added on the east and west side of the dock. The pierhead would be equipped with approximately thirty-three 24-inch steel pipe pilings fitted with pipe sleeves for protective covering of the pipe on the north side of the dock. Approximately three timber fenders would be installed at each corner of the pierhead, and approximately 24 timber fenders would be installed on the south side of the pierhead, along the finger pier, and along both sides of the concrete pier. A timber fender system is a type of bumper that protects marine vessels from damage when they bump against the dock. Approximately 105 square concrete pilings would be installed along the pierhead and the pier. Two cleats would be installed on the curb of the pier near its base.

The preferred alternative at Fort Moultrie is to demolish the existing dock and replace it with an ABA-compliant dock (see Figure 4). The new dock would be constructed using a pierhead and floating dock system and would improve loading and unloading operations. Additionally, the proposed work would include the removal and installation of a new concrete pad and benches at the dock entry. The new dock would be constructed within the same footprint as the existing dock and would contain an approximately 108-foot-long and 24-foot-wide pierhead. An approximately 195-foot long and 12-foot-wide concrete pier would connect to the pierhead. Two 30-inch square concrete beams would support the pierhead's connection to the main dock. Three timber pilings would be installed in each corner of the pierhead and an additional total of ten timber pilings would be installed along the out shore face of the pierhead. Approximately 66 square concrete pilings would be installed along the pierhead and the pier. The preferred alternative would include a 60-foot-long and 8-foot-wide floating dock with four 16-inch steel pipe pilings attached to the east side of the pierhead. An additional 30-foot-long and 8-foot-wide floating dock would be attached to the west side of the pierhead and would contain two 16-inch steel pipe pilings. The floating piers would be attached to the pierhead via gangways.



10/20/21 11:45 AM SITE PLAN FOR FORT MONTELEONE, 3000 WEST 10TH AVENUE, DENVER, CO 80202. THE INFORMATION CONTAINED HEREIN IS THE PROPERTY OF THE ENGINEER AND IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM. THE INFORMATION CONTAINED HEREIN IS FOR THE USE OF THE CLIENT ONLY AND IS NOT TO BE USED FOR ANY OTHER PURPOSE. THE ENGINEER ASSUMES NO LIABILITY FOR THE ACCURACY OF THE INFORMATION CONTAINED HEREIN. THE CLIENT IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE INFORMATION CONTAINED HEREIN. THE ENGINEER'S LIABILITY IS LIMITED TO THE PROFESSIONAL SERVICES PROVIDED HEREIN. THE ENGINEER'S LIABILITY DOES NOT EXTEND TO ANY OTHER SERVICES PROVIDED BY THE ENGINEER OR ANY OTHER PERSONS. THE ENGINEER'S LIABILITY DOES NOT EXTEND TO ANY OTHER PERSONS. THE ENGINEER'S LIABILITY DOES NOT EXTEND TO ANY OTHER PERSONS.



<b>70% DESIGN NOT FOR CONSTRUCTION</b>	A/E FIRM PRINC. & DESIGN OWNER: CO	DESIGN NO. (6000)	SUB SHEET NO. <b>L3.0</b>	TITLE OF SHEET <b>OVERALL LANDSIDE &amp; GUARDRAIL LAYOUT PLANS</b> Figure 4: Fort Montrie <small>FORT MONTRIE, 3000 WEST 10TH AVENUE, DENVER, CO 80202</small>	DRAWING NO. 392 188602
	DATE: OCTOBER 2021	TECH. REVIEWER DATE: OCTOBER 2021	PAGES 11 OF 11	SHEET 11 OF 42	

## Resources within the Project Area

### *Fort Sumter*

An estuarine intertidal saltmarsh wetland with both persistent emergent vegetation and sandy unconsolidated shore was identified extending from the southern point to the northern point of Fort Sumter along the west side of the fort. The wetland contains typical coastal wetland vegetation, such as seaside amaranth (*Amaranthus pumilus*), perennial glasswort (*Sarcocornia perennis*), smooth cordgrass (*Sporobolus alterniflorus*), saltmeadow hay (*Sporobolus pumilius*), and sea oxeye (*Borrchia frutescens*). Intertidal wetlands (vegetated and unvegetated) were identified at Fort Sumter at the northern portion of the fort. The lower boundary of these wetlands is mean lower low water. These wetlands continue to the west and east of the dock at Fort Sumter. Additionally, deepwater habitat was identified at Fort Sumter waterward of the mean lower low water.

### *Fort Moultrie*

Wetlands within the project area at Fort Moultrie include a 0.84-acre intertidal emergent wetland dominated by smooth cordgrass. The wetland is a part of a larger saltmarsh complex that continues to the east and west of the dock at Fort Moultrie. Portions of the wetland were unvegetated during the December 2022 onsite survey; however, these areas may support vegetation during the growing season. The upper boundary of this wetland is an artificially constructed riprap revetment with higher elevations behind the rock that is comprised of a thin buffer of coastal maritime forest with a large, maintained lawn area. The project area also contains a 0.21-acre intertidal unvegetated wetland. This wetland displayed crab burrows and eastern oysters (*Crassostrea virginica*), which indicated hydrology. Mean lower low water defines the lower boundary of this intertidal unvegetated wetland where it transitions to subtidal lands. This wetland continues to the east and west of the dock at Fort Moultrie. Both the intertidal emergent and unvegetated wetland are part of the same marsh complex and wetland system. Each provides ecosystem services, such as flood flow alteration, fish and shellfish habitat, and sediment and shoreline stabilization. Additionally, deepwater habitat was identified at Fort Moultrie waterward of the mean lower low water.

### *Essential Fish Habitat Present*

The waters surrounding Fort Sumter and Fort Moultrie provide important habitat for fish and aquatic species and are within EFH for several species (NOAA 2023b). As defined in the Magnuson–Stevens Fishery Conservation and Management Act, EFH is “those waters and substrates necessary to fish for spawning, breeding, feeding, or growing to maturity” as determined by regional fishery management councils. The South Atlantic Fishery Management Council (SAFMC) manages fisheries in federal waters from North Carolina to Florida and defines the following estuarine/inshore habitats as EFH (SAFMC 2009):

- Marshes
- Estuarine shrub/scrub
- Seagrasses
- Oyster reefs and shell banks
- Intertidal flats
- Estuarine water column
- Soft bottom/subtidal

The SAFMC manages more than 64 species of finfish, crustaceans, and corals through eight fishery management plans. One fishery was identified within the project area for Fort Sumter – snapper grouper. Two fisheries are identified within the project area for Fort Moultrie — snapper grouper and spiny lobster. These fisheries are summarized below.

Snapper grouper EFH consists of all U.S. waters from the North Carolina/Virginia boundary to the Dry Tortugas in Florida. Specific habitats that support snapper grouper in this EFH include relatively shallow areas with attached macroalgae, seagrasses, estuarine emergent wetlands, tidal creeks, estuarine scrub/shrub, oyster reefs and shell banks, unconsolidated bottom, artificial reefs, and coral reefs and live/hard bottom (SAFMC 2021). Both forts fall within snapper grouper EFH and the project area provides estuarine emergent wetlands, unconsolidated bottom, and oyster reefs. The snapper grouper management complex includes 59 species within 10 families, but not all of these species would be expected to occur in the project area. Species that have the potential to use habitats within the project area are noted in Table 1.

Spiny lobster EFH consists of all U.S. waters from North Carolina/Virginia boundary to the Dry Tortugas in Florida. Habitats within this EFH include nearshore shelf/oceanic waters, shallow subtidal bottom, seagrass habitat, unconsolidated bottom, coral and live/hard bottom habitat, sponges, algal communities, and mangrove habitat (SAFMC 2021). Fort Moultrie falls within spiny lobster EFH.

Habitat preferences can vary significantly for different species during the various life stages. To assess whether suitable habitat is present in the project area for the species anticipated to occur within the project area and their life stages with EFH designation, habitat preferences for the different life stages were identified for each species. This information is presented in Table 1. Those species for which the habitat within the project area is unlikely to constitute EFH were eliminated from further consideration based on parameters such as depth, benthic habitat, and habitat preferences. Table 1 presents those species that are likely to occur within the project area and the life stages in which they may occur, as well as their habitat preferences.

### **Analysis of Potential Effects of the Action on EFH**

The construction of the docks at Fort Sumter and Fort Moultrie would have similar impacts to EFH-designated species and their habitats at each site. Construction of each dock would include the use of a spud barge, for staging and equipment, and pile driving. Construction within the EFH habitat including intertidal and emergent wetlands and soft bottomed areas would be impacted temporarily during construction from the placement and removal of pilings. There would be no long-term impacts on EFH because the construction of the new docks would be a replacement in kind.

The spud barge would be located in waters at least 6-feet deep, considered deepwater habitat. The spudding of the barge has the potential to temporarily increase turbidity. The installation of pilings also would increase turbidity and would result in noise impacts. An increase in boat traffic is expected in the immediate vicinity of Fort Sumter, resulting in an increased potential for vessel strikes. It is likely that most EFH-designated species would avoid the project area during construction, but potential noise and water quality impacts could affect EFH as a result of the project. These potential impacts are described in the paragraphs below.

**Table 1. Life Stage Presence and Habitat Requirements for Species Likely to Occur within Designated EFH in the Vicinity of the Project Area**

Essential Fish Habitat	Species	Eggs/ Gametes	Larvae/ Post- Larvae	Juveniles	Adults	Occurrence
Snapper Grouper	Gag ( <i>Mycteroperca microlepis</i> )	--	X	X	--	Estuarine-dependent; oyster reefs; salt marsh creeks (post-larval and juvenile); adults use offshore hardbottom
Snapper Grouper	Black sea bass ( <i>Centropristis striata</i> )	--	--	X	--	Juveniles: nearshore and high-salinity estuarine waters near oyster reefs Adults: open-shelf and edge waters over live or hard bottom
Snapper Grouper	Red snapper ( <i>Lutjanus campechanus</i> )	--	--	X	X	Offshore waters, nearshore subtidal reefs
Snapper Grouper	Tomtate ( <i>Haemulon aurolineatum</i> )	--	--	X	X	Seagrass beds, sand flats, live-bottomed reefs
Snapper Grouper	Atlantic spadefish ( <i>Chaetodipterus faber</i> )	--	X	X	X	Estuaries, harbors, rivers, and tidal creeks; nearshore coastal waters; inshore waters over live-bottom habitat; juveniles occur in salt marsh habitats
Spiny Lobster	Caribbean Spiny Lobster ( <i>Panilurus argus</i> )	--	--	--	X	Nearshore estuarine areas

Source: NPS 2019

Notes: X = present; -- = Not present

### ***Potential Water Quality Effects***

The placement and removal of barge spuds, pilings, and timber fenders would disturb bottom sediments and may cause temporary increases in suspended sediment within the immediate project areas for both Fort Sumter and Fort Moultrie. A small resulting sediment plume is expected to settle out of the water column within a few hours. Studies of the effects of turbid water on fish suggest that total suspended solids (TSS) concentrations can reach thousands of milligrams per liter before an acute toxic reaction is expected (NOAA 2023b). The TSS levels expected for pile driving (5.0 to 100.0 mg/L above background levels within 300 feet of pile driven) are below those shown to have adverse effects on fish (580 mg/L for the most sensitive species, with 1,000 mg/L more typical) and benthic communities (390 mg/L) (NOAA 2023b). TSS levels will likely not reach levels that are toxic to benthic communities; therefore, it is unlikely to result in reductions of food availability for EFH-designated juvenile and adult fish such as gag, black sea bass, red snapper, tomtate, and Atlantic spadefish potentially occurring in the Fort Sumter and Fort Moultrie project areas. An increase in TSS can affect EFH-designated species if a plume causes a barrier to normal behaviors. Increases in turbidity could temporarily hinder vision and disrupt foraging behaviors of EFH-designated species, specifically larval gag and Atlantic spadefish. It is expected juvenile and adult fish would temporarily avoid the plumes during construction activities. The effects of the slight increase in turbidity resulting from spud, piling, and timber fender installation when added to baseline conditions, would be small and likely insignificant to EFH-designated species and their habitat.

### ***Potential Noise Impacts***

The dock at Fort Sumter would include the construction of a pierhead equipped with approximately thirteen 24-inch steel pipe pilings on the north side of the dock. Five timber fenders would be installed at each corner of the pierhead, and approximately 39 timber fenders would be installed on the south side of the pierhead, along the finger pier, and along both sides of the concrete pier. Approximately 72 square concrete pilings would be installed along the pierhead and the pier.

The dock at Fort Moultrie would include the construction of a pierhead with five timber fenders installed in each corner of the pierhead and approximately 23 timber fenders installed along both sides of the concrete pier and the pierhead. Approximately 38 square concrete pilings would be installed along the pierhead and the pier. The preferred alternative would include a 60-foot-long and 8-foot-wide floating dock with four 6-inch steel pipe pilings attached to the east side of the pierhead. An additional 30-foot-long and 8-foot-wide floating dock would be attached to the west side of the pierhead and would contain two 6-inch steel pipe pilings. The floating piers would be attached to the pierhead via gangways.

Table 2 includes the installation methods of the different types and sizes of pilings proposed for Fort Sumter and Fort Moultrie.

**Table 2. Piling Installation**

<b>File Details</b>	<b>Round Steel Pile</b>	<b>Round Wood Pile</b>	<b>Square Concrete Pile</b>	<b>Round Steel Pile</b>
Piling Diameter (inches)	16-in	12-in	16-in	24-in
Number of Pilings Total	6	85	175	35
Installation Method	Vibratory	Vibratory	Air or Hydraulic Impact	Air or Hydraulic Impact
Number of Strikes per Piling (if using impact hammer) or Number of Seconds of Vibration per Piling (if using vibratory hammer)	45-60	60-120	30-100 strikes per minute	30-100 strikes per minute
Number of Pilings Installed per Day (if using impact or vibratory hammer)	No more than 5	No more than 5	2-4	2-4
Duration of pile driving activity (days)	3-5	20-40	45-85	8-16
Substrate and water depth in piling installation area	Sand/Silt, 0-20 ft	Sand/Silt, 0-20 ft	Sand/Silt, 0-20 ft	Sand/Silt, 0-20 ft
Confined Space or Open Water?	Open Water	Open Water	Open Water	Open Water
Noise abatement used	Nylon cushion block, vibratory means	Nylon cushion block, vibratory means	Nylon cushion block, enclosed impact area and bellow section around the pile	Nylon cushion block, enclosed impact area and bellow section around the pile
Peak (decibel, dB)	196	172	191	203
Single Strike Sound Exposure Level (SEL) (dB)	NA	NA	159	177
Root-Mean-Square (RMS) Sound Pressure Level (dB)	158	162	166	190
Cumulative Sound Expose Level (dB) at measured distance (10 meters)	190	194	177	195

This project would include two different types of pile driving. When a pile driving (impact) hammer strikes a piling, a pulse is created that propagates through the piling and radiates sound into the water, the ground substrate, and the air. Sound pressure pulse as a function of time is referred to as the waveform. In terms of acoustics, these sounds are described by the peak pressure, the root-mean-square pressure (RMS), and the sound exposure level (SEL). Vibratory pile installation results in much lower amplitude sound levels. The peak sound level for underwater noise thresholds used by NMFS that may result in injury to fish is 206 decibels (dB). The cumulative SEL that may result in injury for fish greater than 2 grams is 187 dB and 183 dB for fish less than 2 grams. The RMS threshold for impacting fish behavior is 150 dB (NOAA 2023c).

For 24-inch steel pilings installed using air or hydraulic impact, the peak noise (203 dB) falls slightly below the peak thresholds for fish; however, the cumulative SEL (195 dB) is greater for both fish greater than and less than 2 grams. The projected 150 dB disturbance threshold for fish would extend approximately 15,228 feet (4,641 meters) from the impact point. For 16-inch concrete pilings being installed using air or hydraulic impact, the peak noise (191 dB) and cumulative SEL (177 dB) fall below the threshold for injuring fish. The projected 150 dB disturbance threshold for fish would conservatively extend approximately 382 feet (116 meters) from the impact point.

For 12-inch timber pilings installed using vibratory means, the peak noise (182 dB) falls below the threshold for fish; however, the cumulative SEL (194 dB) is greater for both fish greater than and less than 2 grams. The projected 150 dB disturbance threshold for fish would conservatively extend approximately 207 feet (63 meters) from the impact point. For 16-inch steel pilings being installed using vibratory means, the peak noise (196 dB) falls below the threshold for fish; however, the cumulative SEL (190 dB) is greater for both fish greater than and less than 2 grams. The projected 150 dB disturbance threshold for fish would conservatively extend approximately 112 feet (34 meters) from the impact point.

Should fish enter into the 150 dB area of influence, it is likely that they would move away from the noise source. This possible modification of normal movement patterns of some individuals is expected to be insignificant because underwater noise would be limited in duration, affect only a small area within the harbor, and would not pose a barrier to migration or the availability of other more suitable habitat. Thus, interference with feeding, reproduction, migration, or other activities necessary for survival is not expected.

### ***Potential Vessel Strikes***

During construction at Fort Sumter, a barge would be located within the project area and would be used as the project staging area. The barge would take two trips over the project duration, lasting approximately one hour each at speeds of 5 knots. Additional trips may be needed during storm events to move the barge in more protected areas. The barge would also move within the project area several times. Construction crew and equipment would be transported to and from the site via a small vessel. It is likely that four trips would be taken each construction day lasting 30-minutes each at speeds up to 15 knots. At Fort Moultrie, a barge would be located adjacent to the existing pierhead; however, project staging would be landside in the parking lot.

Adding one to four project vessels to the existing baseline at Fort Sumter will not increase the risk that any vessel in the area would strike an individual or would increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected.

## **Proposed Mitigation Measures and Best Management Practices**

As stated above, there may be short-term localized impacts to water quality from the suspension of sediments and a short-term impact due to noise. However, proposed mitigation measures and best management practices (BMPs) would minimize these impacts to EFH and are described in more detail in the paragraphs that follow.

### ***Underwater Noise***

Pilings would be driven and installed using vibratory means and also air or hydraulic impact. To mitigate the potential effects of underwater noise caused by pile driving, a nylon cushion block would be used for all pile driving. In addition, an enclosed impact area and bellow section around the pilings would be used for air and hydraulic impact. The construction staff would also be encouraged to start the vibratory action slowly by using a reduced energy setting on the equipment, and then increasing the vibratory energy in a progressive, slow manner until the required oscillation/frequency is achieved. This use of a soft start of the vibratory hammer would give fish, sea turtles, and manatees the opportunity to vacate the area before sound levels rise further and reduce the potential exposure risk. Pile driving activities would be limited to 12 hours per day with a 12-hour rest period between pile driving activities to avoid potential cumulative noise impacts.

### ***Water Quality***

Turbidity booms would be used to control and reduce turbidity. A turbidity boom would be installed around the immediate work area during in-water construction operations and would remain in place post-construction until all turbidity and siltation subsides from in-water construction. The turbidity boom would be repositioned as necessary as work progresses to always contain water-based construction work. Additional conservation measures would include inspecting equipment for leaks and failure and all equipment would have spill containment pads placed beneath them.

## **Conclusion Regarding the Effects of the Action on EFH**

Pursuant to the regulations of the Fish and Wildlife Coordination Act, Section 7 of the Endangered Species Act, and the Magnuson-Stevens Fishery Conservation and Management Act, the NPS respectfully requests the concurrence of NOAA Fisheries Service with our determination that the proposed action ***may affect but is not likely adversely affect*** Essential Fish Habitat.

Sincerely,

J. Tracy Stakely  
Superintendent  
Fort Sumter and Fort Moultrie National Historical Park

## References

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