Kingsley Plantation Seawall Repair and Extension for Shoreline Stabilization

Timucuan Ecological and Historic Preserve

Floodplain Statement of Findings

PMIS #335507

Recommended:

Chris Hughes — Date
Superintendent, Timucuan Ecological and Historic Preserve

Certified for Technical Adequacy and Servicewide Consistency:

Terry Fisk — Date
Acting Chief, Water Resources Division

Approved:

Darrell Echols — Date
Acting Regional Director, Region 2

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FLOODPLAIN STATEMENT OF FINDINGS

1 INTRODUCTION

Executive Order (EO) 11988, *Floodplain Management*, requires the National Park Service (NPS) and other federal agencies to evaluate the likely impacts of actions in floodplains. The objective of EO 11988 is 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. 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). NPS also complies with departmental guidance outlined in 520 DM 1, *Floodplain Management and Wetlands Protection Policy and Responsibilities*, and 520 DM 2, *Floodplain Management and Wetlands Protection Program Requirements*.

It is NPS policy to preserve floodplain functions and values and minimize potentially hazardous conditions associated with flooding, including threats to human health and safety, risk to NPS capital investment, and impacts on natural and beneficial floodplain values. If a proposed action is found to be in, or possibly affecting a floodplain, and relocating the action to a non-floodplain site is considered not to be a viable alternative, then a formal Floodplain Statement of Findings (FSOF) must be prepared unless the action is considered excepted. The FSOF must (a) describe the rationale for selection of a floodplain site, (b) disclose the degree of risk associated with the chosen site (with respect to human life, health and safety, resource protection, and capital investment), and (c) explain strategies for mitigation of flood risk. The FSOF will be available for public review in coordination with the National Environmental Policy Act (NEPA) and other compliance procedures, as applicable. If public review is not provided through the NEPA process (e.g. environmental assessment), another opportunity for public review is required.

This FSOF provides:

1. A detailed justification for selecting a proposed action that would adversely impact the Federal Flood Risk Management Standard (FFRMS) floodplain (Section 2).
2. A detailed and comprehensive description of the flood hazard and risk associated with implementation of the proposed action (Section 3).
3. A thorough description of mitigation measures chosen to minimize or eliminate adverse floodplain impacts associated with the proposed action(s) (Section 4).

1.1 PREPARER

In accordance with DO 77-2 and PM 77-2, I, Erin Benford, the author of this FSOF, affirm I am a Professional Geologist with AECOM Technical Services, Inc. and am technically qualified to prepare this document. Additional support for non-technical elements of the document was provided by Hanna Panagrossi and Meredith Allen.

1.2 LOCATION

Kingsley Plantation is located on the northwest end of Fort George Island within Timucuan Ecological and Historic Preserve (TIMU) in the City of Jacksonville, Duval County, Florida (**Figure 1**.). TIMU encompasses the natural ecology of over 46,000 acres of lands and waters and over 6,000 years of human history along the St. Johns and Nassau rivers in northeast Florida. The proposed shoreline stabilization is located on the northern end of the property along 850 linear feet (ft) of bluff shoreline. Approximately 417 linear ft of the existing shoreline is armored with a vinyl sheet pile seawall (30. 44045°, -81.43794°). NPS is the sole owner of Kingsley Plantation. The proposed work will be constructed partially on NPS property and partially on Florida state submerged lands. The official boundary between NPS property and state lands is the Mean High-Water (MHW) line. Construction staging, equipment access, and pile hammering will be conducted from the adjacent upland area on NPS property.

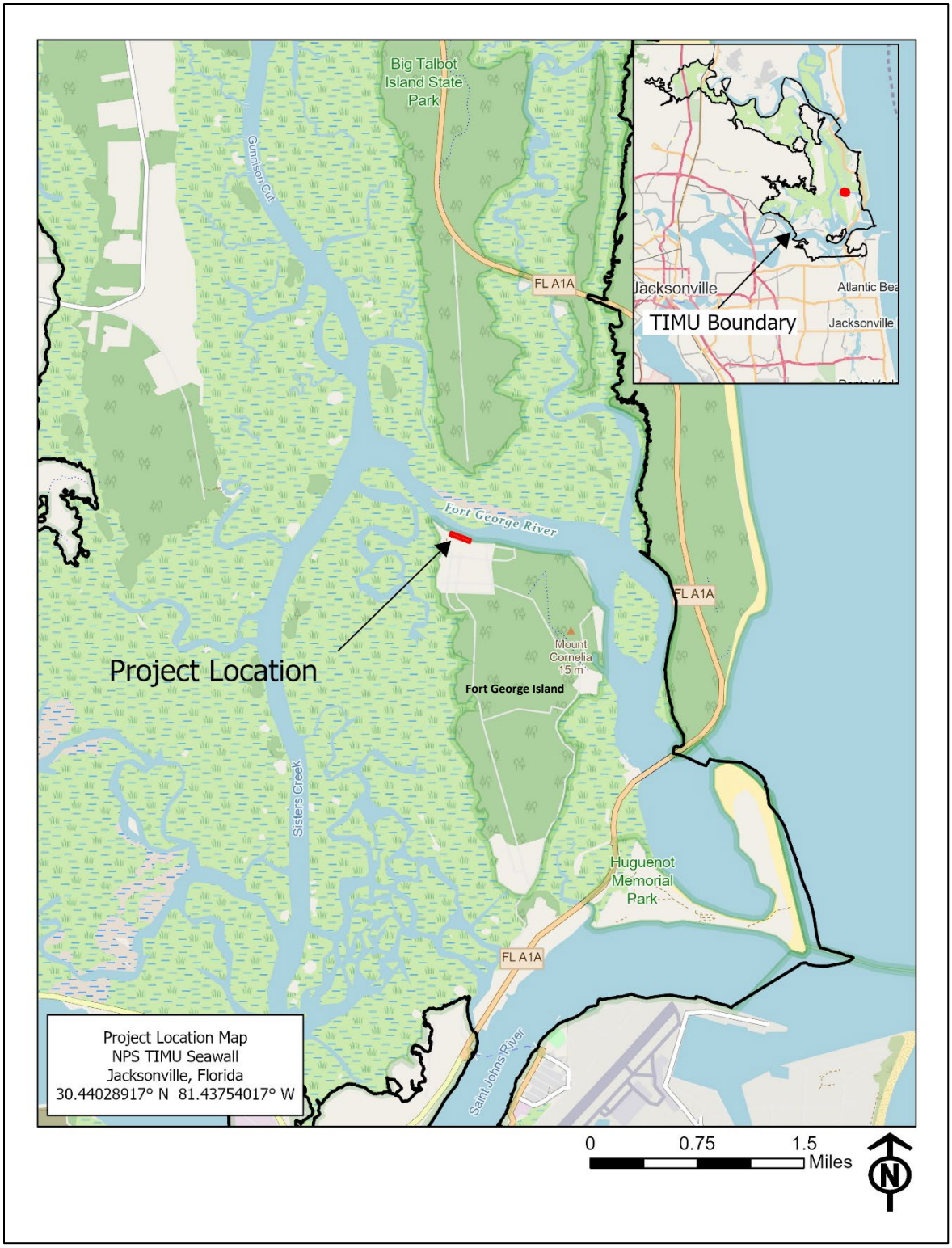

Figure 1. Project Location

The general site conditions and setting of the Kingsley Plantation are that of a typical sandy, relict dune field on a barrier island/sea island. The site is situated on a relatively elevated geographic high point,

approximately +10 ft North American Vertical Datum of 1988 (NAVD88) in elevation that is generally characterized by typical coastal scrub and barrier island vegetation including scrub oak and palms. The northern side of the site abuts the Fort George River. The western side borders a large tidal marsh and tidal creek associated with Sisters Creek. The immediate project area has been landscaped, and many hard and softwood shrub and tree species have been removed and replaced with maintained lawn grasses.

"Flooding in Duval County results from two major sources: rainfall runoff causing overflow of streams, ponding and sheet flow; and hurricane storm surge causing extreme water levels in coastal and tidal regions. Wave action that accompanies nor'easters can also cause flooding and serious erosion, although extreme 1-percent-annual-chance flooding levels are not to be expected from such storms. Heavy rainfall can occur with hurricanes, tropical storms, nor'easters, or localized thunderstorms." (FEMA, 2018)

1.3 PROPOSED ACTION

NPS is proposing to address shoreline erosion and increase future storm resiliency by replacing an existing damaged seawall with a new, taller seawall and adding a seawall extension east along the length of the cultural landscape. The existing seawall would be replaced with a new seawall constructed directly in front of the current structure. Riprap would be installed at the toe of the new wall to reduce future storm-driven erosion along the seawall face. In addition, a 330-foot-long cantilevered seawall would be installed directly to the east of the replacement wall with corresponding riprap scour protection (**Figure 2**).

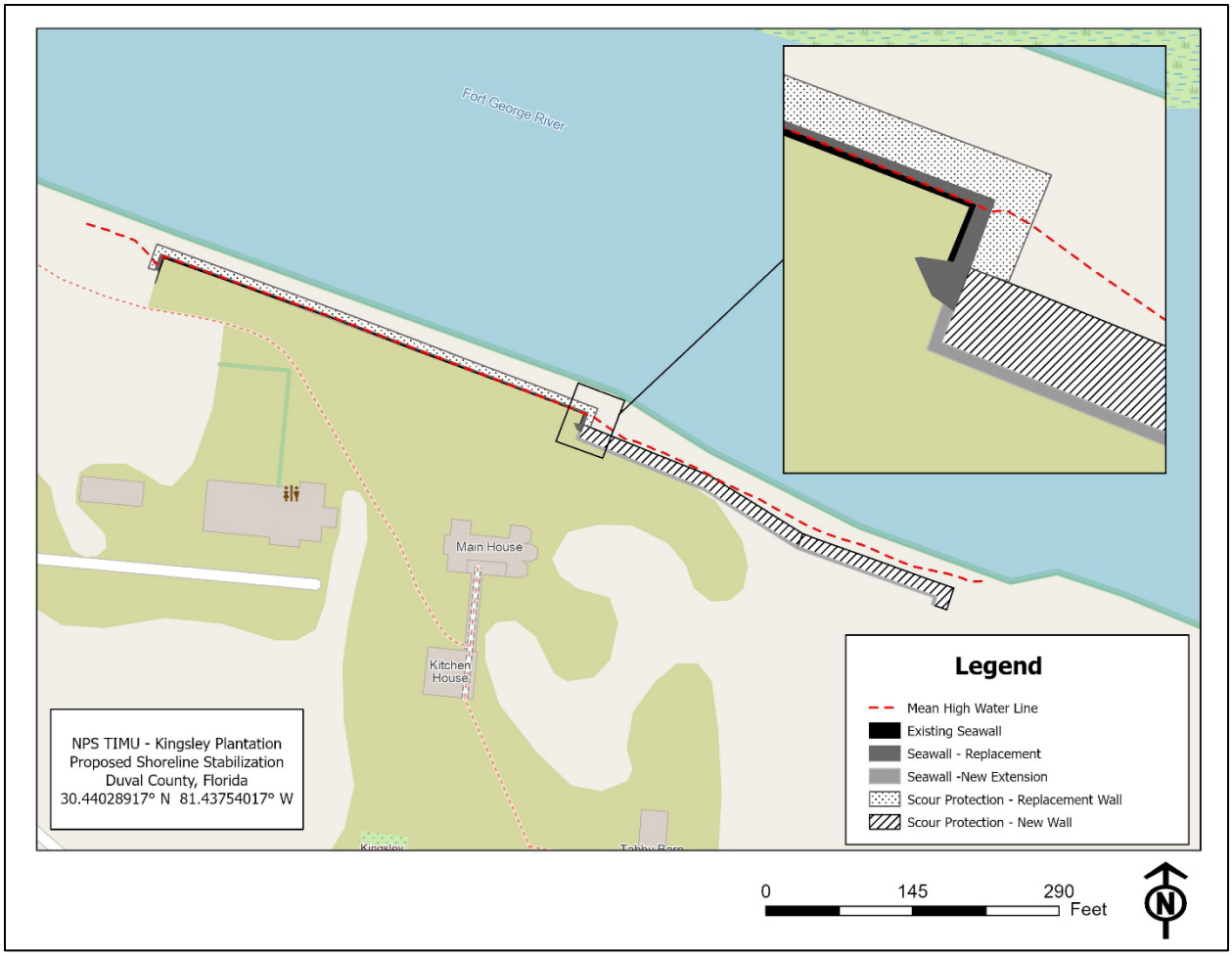

Figure 2. Proposed Shoreline Stabilization

In September 2022, Tropical Storm Ian caused sustained winds of 41 miles per hour (MPH) with gusts up to 62 MPH in TIMU. The storm generated 2–3 ft Mean Higher High Water (MHHW) of storm surge in coastal Duval County, Florida (NWS 2022). The storm caused extensive erosion to the area at the toe of the Kingsley Plantation seawall (**Figure 3**) as well as the adjacent (downstream) beach and bluff.

Figure 3. Exposed Seawall Toe in Area of Riverbed Soil Erosion

Loss of riverbed soil at the toe of the wall is increasing the volume/area of soil the seawall has to retain in the upland which in turn is decreasing the ability of the wall to properly retain upland soils. As a result, the existing wall is deflecting waterward in between the tie rods (**Figure 4**) and the tie rods themselves are overstressed and at risk of failure. In the area directly east of the seawall, the natural bluff is experiencing visible incising and landward retreat.

Figure 4. Seawall Deflections

NPS has attempted multiple nature-based projects to try and minimize erosion along the Fort George River Shoreline. In 2019, NPS constructed a 200 linear foot vegetated living shoreline by planting native *Spartina alterniflora* within 10 feet or less of the MHW line. The plantings were completed in an area of

erosion directly in front of the existing seawall. The plantings were ultimately unsuccessful. In 2023, NPS installed multiple artificial reefs (POSH/Reef Ball Modules) including one to approximately 350 linear feet east of the existing seawall and one approximately 1,200 linear feet west of the existing seawall with limited success. As a result, NPS is proposing a more structurally engineered solution to stabilize the existing shoreline in proximity to the existing seawall.

NPS is proposing to replace the approximately 407 linear ft of an existing polyvinyl chloride (PVC) sheet pile seawall with tie rods and a deadman anchor wall, by removing the existing timber fascia and installing a new, taller PVC sheet pile seawall (414 linear ft) within 18 inches of the existing seawall face (**Figure 5**). The top level of the new seawall will be +8.5 ft NAVD88 and the area behind the new wall is proposed to be sloped up until it reaches the existing ground level of +9 ft NAVD88. Limestone or shell rock riprap will be installed at the toe of the replacement wall to reduce future scouring/undermining.

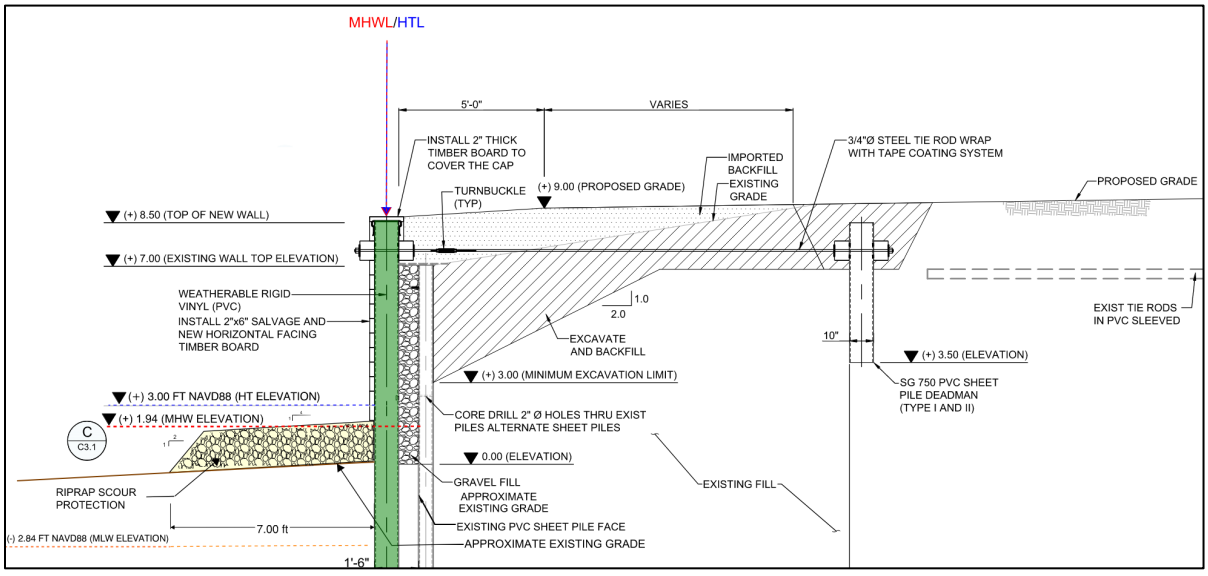

Figure 5. Proposed Seawall Replacement

In addition, NPS is proposing to construct a 330-foot-long cantilevered fiber reinforced polymer (FRP) seawall extension to the east of the existing wall (**Figure 6**). The top of the constructed seawall will be +8.5 ft NAVD88 and will slope up to the existing ground at +9 ft NAVD88. Limestone or shell rock riprap will be installed at the toe of the replacement wall to reduce future scouring/undermining.

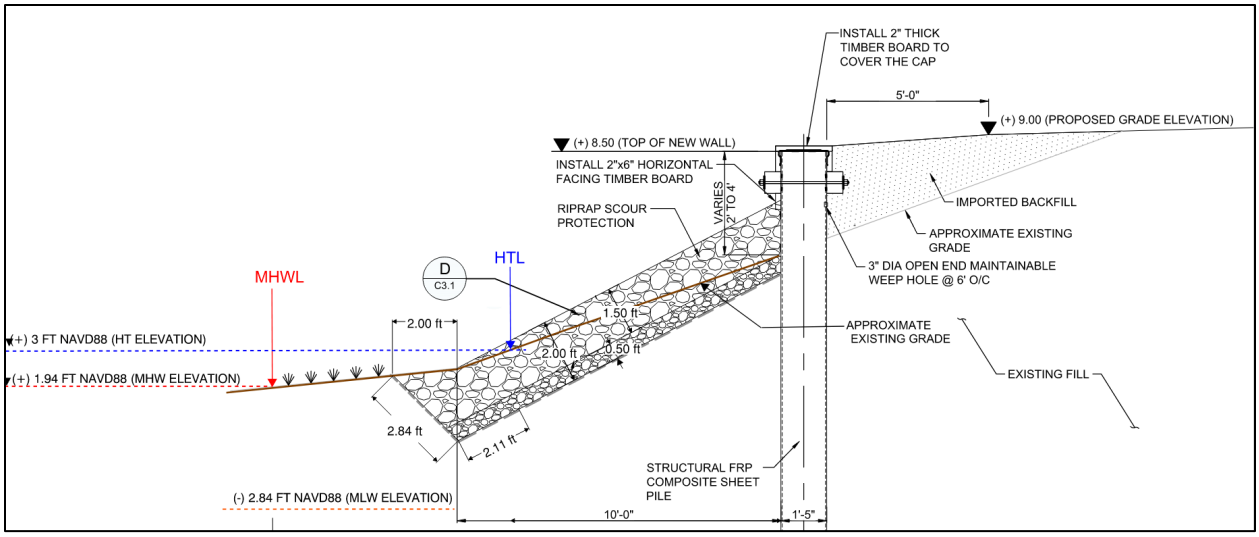

Figure 6. Proposed Seawall Extension

The original project scope was to increase the height of the existing seawall by 1.5 ft and construct a new seawall east of the existing wall by 100 meters (approximately 330 ft). However, the design team concluded that due to the existing construction materials and erosion, the height of the existing wall could not be increased, and the wall would require a full replacement.

Initially, three options for seawall construction (both the replacement seawall and the seawall extension) were evaluated: (1) a PVC sheet pile wall with tie rods and a deadman anchor, (2) a steel cantilever sheet pile wall, and (3) a rock revetment. During the initial permitting discussion with St John's River Water Management District (SJRWMD), it was understood that given the proposed work is in a state aquatic preserve, any replacement vertical structure would have to be installed no more than 18 inches from the existing wall face and any new vertical seawall extension could not be installed waterward of the MHW line. At the same time, while SJRWMD preferred a riprap rock revetment to a vertical seawall for the seawall extension, the U.S. Army Corps of Engineers (USACE) noted that the placement of such a large area of riprap may not comply with the Clean Water Act 404(b)(1) Guidelines. NPS preferred a cantilever sheet pile wall for the extension wall to avoid any major land excavation behind the wall to install tie rods or an anchor deadman. Therefore, the final locations of the replacement wall and extension wall were spatially limited. The replacement wall must be located no more than 18 inches waterward of the existing wall and the seawall extension alignment must be pushed landside towards the existing bluff (above MHW).

Based on the regulatory limitations, alternatives considered were limited to sheet pile wall types (cantilevered versus tie rods and deadman anchor) and sheet pile material types including steel, vinyl (PVC), or FRP. Each alternative that was considered is briefly described below:

No Action: The existing wall would remain as is with no replacement or seawall extension. The condition of the wall would continue to degrade with eventual failure. A failure of the seawall would result in sudden accelerated shoreline erosion, potential permanent loss of buried archaeological resources, including artifacts associated with Indigenous occupation, enslavement-era settlement, and post-emancipation history, and direct burial/smothering of live oysters, invertebrates, and sensitive habitat including marsh and tidal flat.

Alternative 1: Replacement of the existing wall with a new, higher PVC sheet pile wall with tie rod and deadman anchor and the addition of riprap scour protection. Installation of a new PVC sheet pile cantilever wall east along the along contour +4 to 6 ft NAVD88 and the addition of riprap scour protection.

Alternative 2: Replacement of the existing wall with a new, higher steel cantilevered sheet pile wall and the addition of riprap scour protection. Installation of a new steel sheet pile cantilever wall east along contour +2 ft NAVD88 and the addition of riprap scour protection.

Alternative 3: Replacement of the existing wall with a new, higher PVC sheet pile wall with tie rod and deadman anchor and the addition of riprap scour protection. Installation of a new FRP sheet pile cantilever wall east along contour +4 to 6 ft NAVD88 and the addition of riprap scour protection.

Ultimately, Alternative 3 was selected based on the reduced maintenance requirements of vinyl compared to steel for the replacement wall and the need for improved structural integrity of FRP for a cantilevered seawall extension.

1.4 DETERMINATION OF ACTION CLASS AND REGULATORY FLOODPLAIN

Following PM 77-2, three action classes were considered when establishing the regulatory floodplain:

1. Class I Actions (i.e., non-critical actions) include location or construction of administrative, residential, warehouse, and maintenance buildings; non-excepted parking lots; or other man-made features, which by their nature entice or require individuals to occupy the site, are prone to flood damage, or result in impacts to natural floodplain values.
2. Class II Actions (i.e., critical actions) include any activity for which even a slight chance of flooding is too great, such as construction of schools, medical facilities, emergency services, hazardous material storage, and records/collections storage.
3. Class III Actions include any action that involves human occupation or substantial human exposure in high hazard areas, such as drainages subject to flash flooding.

This project meets the definition of Class I Actions.

Proposed actions on NPS lands must comply with FFRMS for new construction, substantial improvement, or repairing substantial damage. Per departmental guidance, agencies may select one of three approaches to implement flood resiliency measures:

- **Climate-Informed Science Approach (CISA) –** The elevation and flood hazard area that result from using the best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding, including climate change and other physical processes (e.g., land-use change).
- **Freeboard Value Approach (FVA) –** The elevation and flood hazard area that result from adding an additional 2 ft to the base flood elevation (BFE) for non-critical actions and by adding an additional 3 ft to the BFE for critical actions.
- **0.2-Percent Annual-Chance Flood Approach (0.2 PFA) –** The area subject to flooding by the 0.2% (500-year) annual-chance flood.

A CISA establishing the NPS regulatory flood elevation is employed for this proposed action. Therefore, this SOF will not further address the FVA or 0.2 PFA approaches. The primary flood hazards at the project location are coastal flooding and inundation associated with storm surge and sea level rise (SLR). The primary reference sources used for this determination include the FEMA Flood Insurance Study (FIS) report, the corresponding Flood Insurance Rate Map (FIRM), and the NOAA's Office for Coastal Management Sea Level Rise Viewer.

According to the current FEMA FIRM Panel 12031C0230J, dated November 02, 2018, and FEMA FIRM Panel 12031C0233J, dated November 02, 2018, the open water area of the Fort George River adjacent to the project site is identified as Zone VE, which is subject to inundation by the 1% Annual-Exceedance-Probability (AEP) (100-year) flood elevation, and has a BFE of + 9 ft NAVD88 (**Figure 7**). The BFE of the area within the Fort George River is a combination of the Stillwater Elevation (SWEL) and the wave hazards associated with the 1%-AEP storm.

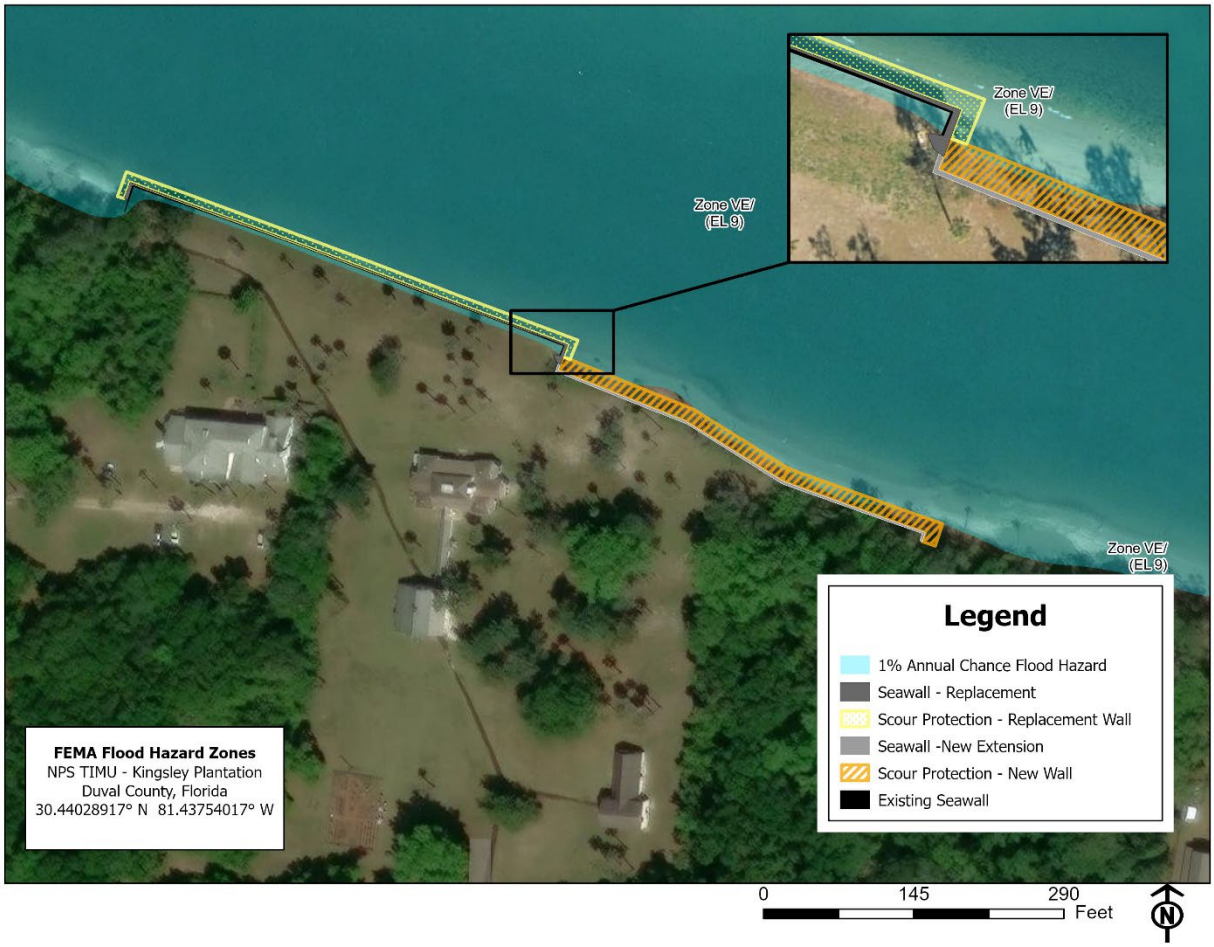

Figure 7. Proposed Project Area in relation to the FEMA Special Flood Hazard Areas

The relative sea level at Kingsley Plantation is expected to rise as a result of climate change. A conservative design life of 35 years for the proposed project correlates to the year 2060. NOAA's Sea Level Rise Viewer predicts 1.44 ft of SLR for the year 2060 (the intermediate scenario) (NOAA, 2026a). The potential area of SLR inundation in 2060 is indicated by the blue shaded areas in **Figure 8**.

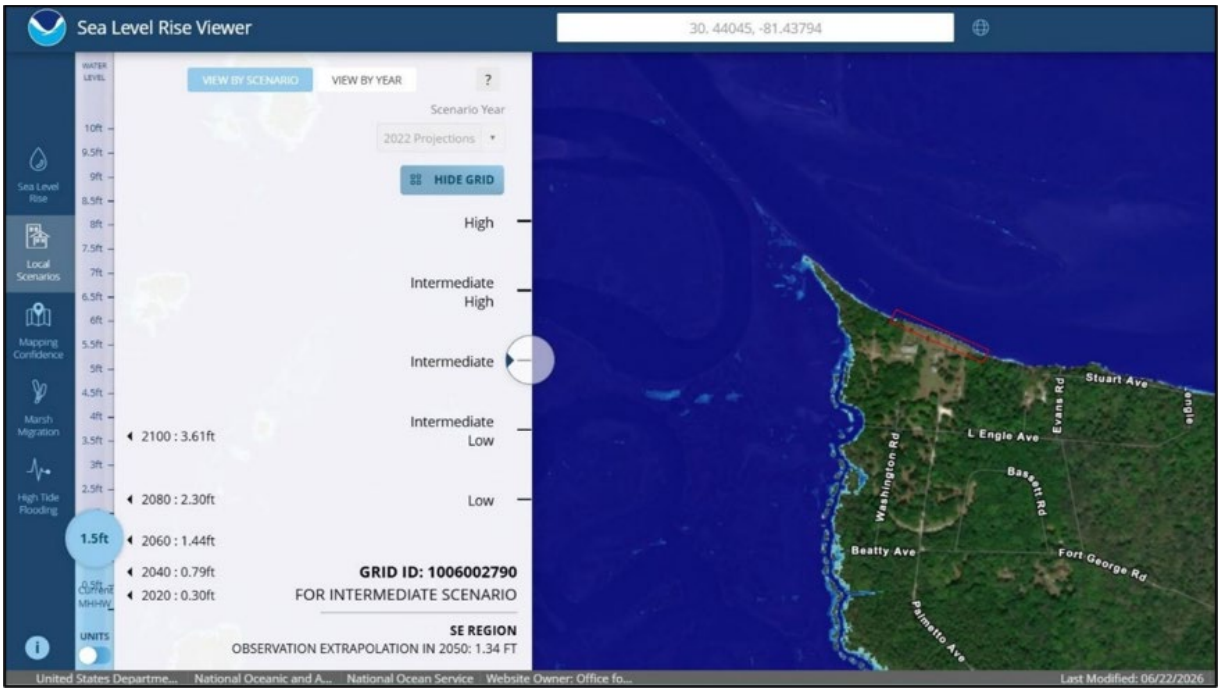

Figure 8. NOAA SLR Viewer (Local Scenario)

Therefore, the CISA regulatory flood elevation (BFE + SLR (rounded to the nearest foot)) would be +9 ft BFE plus 2 ft SLR resulting in +11 ft NAVD88 (**Figure 9**). The proposed project area is located within the CISA regulatory floodplain.

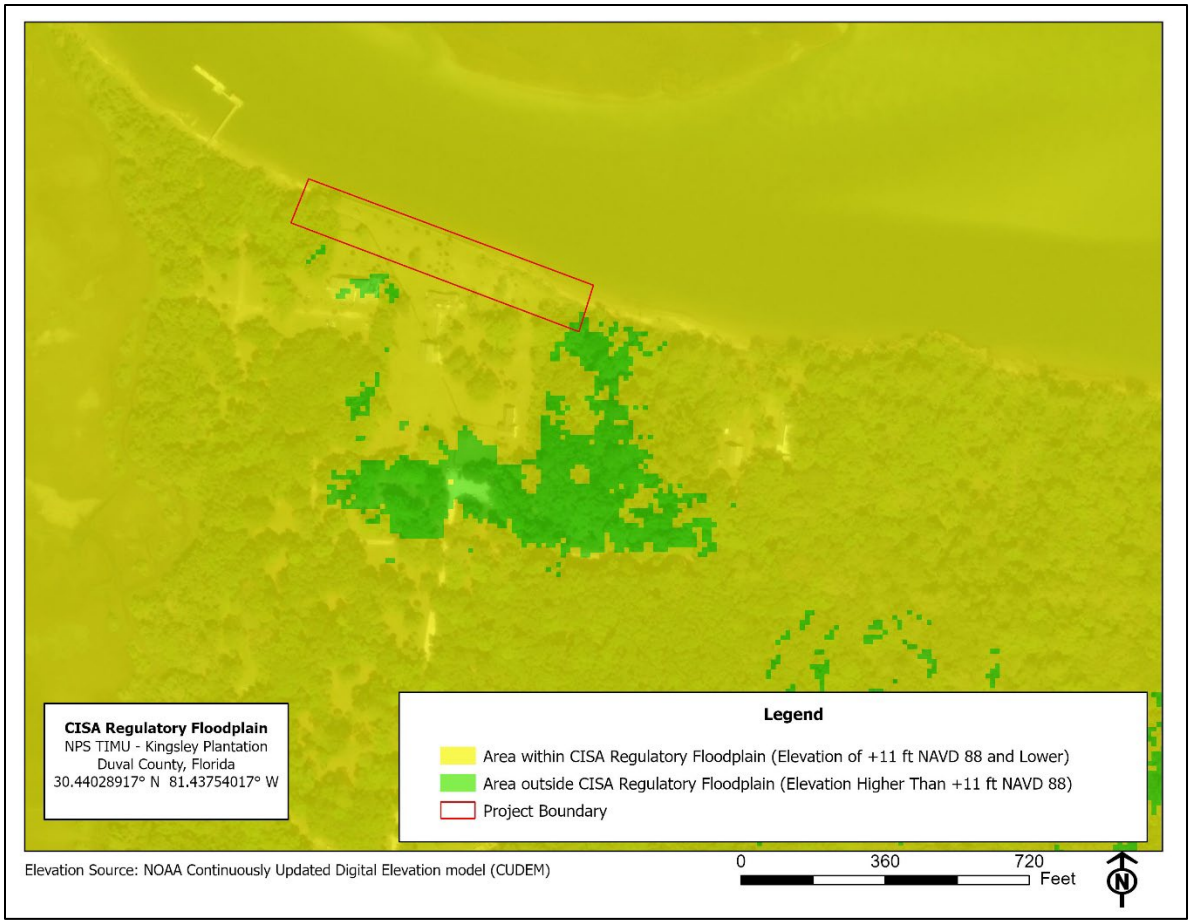

Figure 9. Delineation of CISA Regulatory Floodplain

2 JUSTIFICATION FOR USE OF THE FLOODPLAIN

The proposed action must occur within the floodplain because it addresses erosion and structural instability at an existing shoreline stabilization feature. The seawall is designed to stabilize the shoreline and increase the resiliency of Kingsley Plantation to storm-related impacts. Although complete avoidance of any storm-driven flood risks is unlikely, with implementation of the project, the shoreline will remain stable, cultural resources behind the wall will remain protected, and more of the overall cultural landscape will have protection. Relocation outside of the floodplain is not practicable as the proposed project's main purpose is intrinsically tied to stabilizing the shoreline at its current location. The no-action alternative would allow the wall to continue to degrade with eventual failure, increasing the possible loss of cultural resources behind the wall as well as the adverse impacts to intertidal habitat.

3 DETAILED FLOOD HAZARD AND FLOOD RISK ANALYSIS

3.1 DESCRIPTION OF SITE-SPECIFIC FLOOD HAZARD

Existing climate data indicates an average annual rainfall for the Jacksonville area is approximately 50–52 inches per year (Florida Climate Center, 2026). The project site's sandy, dune-type soils generally allow for high infiltration and permeability in the surface layers, with some areas near the marshes offering lower permeability and infiltration due to the shift in grain size to include higher concentrations of silts and clays. As a result, temporary ponding at the site may occur during particularly heavy rainfall events. However, prolonged inland flooding would not be expected without the additional condition of high coastal water levels that would reduce drainage into the nearby tidal creeks, salt marsh, and the Fort George River.

The current MHW elevation in the Fort George River at Kingsley Plantation is +1.94 ft NAVD88 (NOAA, 2026b). The current elevation at the top of the existing seawall is +7 ft NAVD88. Under normal conditions, the current wall height would provide protection from astronomical tides including king tides. However, during a 100-year coastal storm, the water around Kingsley Plantation is expected to rise approximately +6.6 ft NAVD88 (difference between 0 ft NAVD and SWEL) alone, not including any wind-generated waves or increases due to SLR. With the top of the seawall at +7 ft NAVD88, the risk of overtopping the wall still exists during a 100-year storm event. The wall was overtopped as recently as 2022.

3.2 DESCRIPTION OF SITE-SPECIFIC FLOOD RISK

The purpose of this project is to repair the existing damage to the shoreline and seawall at Kingsley Plantation as well as to provide future storm resiliency by extending the seawall to protect the extent of the cultural landscape east of existing seawall. During the site visit, it was found that the existing wall was not only damaged, but it was failing due to erosion in front of the wall.

The existing seawall would be replaced with a new seawall constructed directly waterward of the current structure, with riprap installed as scour protection at the toe to reduce future storm-driven erosion along the seawall face. In addition, the seawall would be extended eastward, with corresponding riprap scour protection, and tied back into the natural topography to the east. The proposed project will increase the height of the seawall from +7 ft NAVD to + 8.5 ft NAVD, addressing flooding associated with SLR for the estimated design life of 35 years and minimizing impacts associated with storm events. The increased height in the area of the replacement wall will reduce the impact landward of wind-driven waves. The addition of a seawall extension to the east will extend protection to the retreated bluff. The scour protection along both the seawall face and return walls may better protect impacts to the toe of the wall during smaller storms.

However, the project will not fully mitigate flood impacts inland of the wall during larger storm events including a 100-year storm or Category 3 or greater hurricane. It is recognized that the CISA defined regulatory floodplain is 11 ft NAVD88, while the seawall (replacement and extension) will be at +8.5 ft NAVD88. As a result, the wall will not prevent overtopping of larger regulatory flood events. However, this is acceptable because the primary concern is shoreline stabilization and mitigation of future erosion while maintaining the park viewshed. The seawall structure is designed to withstand such overtopping

and rip rap stones are designed to protect the toe of the new wall from erosion. Furthermore, there are alternative points of entry for wind and flood-driven water to the west and south of the wall.

Potential Risk to Human Health and Safety

Kingsley Plantation is a day use facility for park visitors to engage in recreational activities with no anticipated permanent occupancy. Risks to human health and safety are present, but no higher than adjacent recreational areas. The proposed action adds no additional risk to health and safety. The park has immediate access to local roads, which would be used as an evacuation route in the event of an emergency evacuation.

Potential Risk to Property

The increased height of the proposed replacement seawall and the addition of a seawall extension to the east along the bluff will provide enhanced protection against flooding and shoreline erosion during moderate storm events and/or projected SLR. This increased vertical elevation will also improve the seawall's ability to withstand wave action within the floodplain. The addition of riprap along the toe of the project will reduce scouring. Site-specific sediment modeling performed during the schematic design confirmed the proposed design is not expected to alter the existing flood dynamics or result in any measurable impact to the shoreline downstream of the wall extension. To further mitigate for the risk of loss of property, the proposed construction will utilize non-corrosive materials that reduce maintenance requirements and incorporate a cantilevered design for the extension to avoid direct impacts to the adjacent cultural landscape.

Potential Risk to Floodplain Values

Floodplain values include the attributes of floodplains, which contribute to overall ecosystem quality including water resources, living resources, cultural resources, and cultivated resources (44 CFR §9.4). Disturbances of the natural floodplain by floods can also contribute to ecosystem quality. Risks to floodplain natural resource values are expected to be slightly reduced because of the proposed action.

The proposed project would result in the permanent loss of 0.018 acre of intertidal waters due to the installation of the replacement wall and the conversion of 0.0490 acre of unconsolidated shore to consolidated natural/lime rock riprap.

The area surrounding the project includes tidal wetlands (salt marsh) and tidal flats. Tidal wetlands help stabilize the shoreline, provide wave attenuation, reduce erosion during storm events, and act as nursery habitat for aquatic and terrestrial fauna. Tidal flats provide unique habitat for benthic organisms, oysters, and juvenile marine life including fish as well as critical foraging area for shorebirds. Special aquatic sites including wetlands and tidal flats were identified and surveyed as part of an aquatic resource delineation conducted in December 2025. Construction activity will not encroach on any of the delineated wetlands or tidal flats. Construction will be conducted from the landward extent of the project area. Installation of limestone/natural riprap scour protection is limited to the amount necessary to protect the toe of the replacement wall. The riprap associated with the seawall extension will be placed landward of the MHW line and the new seawall extension will be placed landward of the annual high tide line. The riprap will provide surface area for potential reestablishment of *Spartina alterniflora/Spartina Patens* tidal marsh and a substrate for the colonization of oysters.

The seawall extension will consist of a cantilevered wall, avoiding the need for excavation and disturbance of the sensitive cultural landscape to install tie rods and an anchor deadman. The existing wall will be abandoned in place. The installation of the replacement wall directly waterward of the existing wall prior to any land disturbing activity will reduce the risk of loss of sensitive cultural resources currently protected behind the existing seawall as well as prevent any pollutants from entering the adjacent waters.

Site-specific sediment modeling has confirmed that the extension of the seawall east is not expected to alter the existing flood dynamics or result in any measurable impact to the shoreline downstream of the wall.

4 FLOODPLAIN IMPACT MITIGATION MEASURES

TIMU maintains and regularly updates a Severe Weather Emergency Action Plan (SWEAP, Appendix A), which outlines specific processes and procedures to ensure public and staff safety and protection of TIMU property and resources in advance of hurricanes and other severe storm events. The park is closed to visitors ahead of and during adverse weather conditions. TIMU's SWEAP includes storm preparation actions up to 96 hours in advance of storm fall, storm evacuation plans, and procedures for post-storm impacts. Regular reviews and updates to TIMU's SWEAP will mitigate against risk to human life, health, and safety during coastal flood hazards.

The location of the site in a Florida Aquatic Preserve required movement of the new wall back landward of the High Tide Line (HTL) outside the limits of the preserve and limited the replacement wall to no further than 18 inches from the existing face. Riprap scour protection was limited to no more than 10 ft waterward of the replacement wall and above the MHW line along the new wall extension, minimizing filling in the limits of the aquatic preserve. The current construction plans intend to encapsulate the existing seawall within the new wall to avoid the risk of losing pieces of the old wall or backfill into the Fort George River. To further mitigate for the risk of loss of property, the proposed construction will utilize non-corrosive materials that reduce maintenance requirements and incorporate a cantilevered design for the extension to avoid direct impacts to the adjacent cultural landscape. NPS is proposing to install natural rock riprap scour protection and proposing to plant a combination of *Spartina alterniflora* and *Spartina Patens* along the extension wall's riprap scour protection to reduce storm-driven erosion.

5 SUMMARY

NPS has determined that the proposed action to replace the existing seawall at Kingsley Plantation is necessary to address damage caused by Tropical Storm Ian in 2022 and consistent with EO 11988 and DO 77-2. The proposed action is a Class I action, which includes construction of man-made features that, by their nature, are prone to flood damage. The location of the proposed seawall repairs within the 1% AEP floodplain subjects the project to the floodplain policies and procedures of that floodplain. Mitigation measures against flood risks include regular reviews and updates to the park's SWEAP, the use of resilient materials during the proposed construction, minimization of the placement of fill below the MHW line, and the encapsulation of the existing wall to prevent pollutants from entering the abutting flood zone.

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