

**Charleston Peninsula Coastal Storm Risk Management Study, South Carolina**  
**Integrated Feasibility Report and Environmental Impact Statement**

**ERRATA**

**JUNE 9, 2022**

The following revisions or corrections are made to the Final Integrated Feasibility Report and Environmental Impact Statement (FR/EIS) of April 2022:

1. Throughout the FR/EIS, the 50-year period of analysis is changed from “2032 – 2082” to “2032 – 2081.
2. Throughout the FR/EIS, all instances of text reading “over the next 50 years” are deleted and replaced with “over the 50-year period of analysis.”
3. Throughout the FR/EIS, sea level rise at the intermediate rate is incorrectly described as 1.65 feet over the 50-year period of analysis when in fact the 1.65 rise in sea levels is estimated from the National Tidal Datum Epoch (NTDE) of 1992 through 2081. From the 1992 NTDE to 2032, the estimated sea level rise is 0.56 feet, therefore, the correct sea level rise over the 2032 – 2081 period of analysis is 1.09 feet. Each instance of “1.65” in reference to the period of analysis is deleted and replaced with “1.09.”
4. Throughout the FR/EIS, all instances of text reading “coastal“flood risk management” are changed to “coastal storm risk management”.
5. Executive Summary, Figure ES-1, page ES-1, the text “Estimated Duration: Minimum 50 Years” associated with the operations and maintenance phase is changed to “Duration: In perpetuity.”
6. Section 6.6, Wetlands, at the end of Section 6.6.1, No Action/Future Without Project Alternative, (immediately prior to Figure 6-4) the following is added: “At this time, the maximum extent of wetland acreage that may be impacted cannot be calculated with any certainty because the impact area could increase or decrease based on various engineering and design activities carried out in the next phase. Compared to the future without project condition, the estimated 35 acres of wetlands potentially affected by the project could change if the existing wetlands are lost in the future due to sea level rise or from changes in the project design resulting from engineering analysis. The Mitigation Plan will continue to develop throughout the project design phase to accurately reflect evolving data that may change the potential impacts to wetlands.”
7. Section 6.13.2, Aesthetic Effects, page 229, and paragraph beginning with “Final evaluation of aesthetic resources....” the phrase “authorization of a project and” and “, and prior to construction” are deleted from the first sentence of the paragraph.

8. Section 6.13.2 Alternative 2 (perimeter structure + nonstructural), page 230, the second full paragraph that begins with “Federal funding for aesthetic mitigation is .....”: add a third sentence that read “Current USACE guidance provides that increases in levels of project costs for aesthetics during Preconstruction Engineering and Design, beyond inflation, will not be approved.”
9. Section 8.5, Environmental Effects and Mitigation, page 283, in the first sentence of the first paragraph, the text “draft” is replaced with “final.”
10. Section 8.5.3, Irreversible and Irretrievable Commitment of Resources, page 285, second paragraph beginning with “The proposed Federal action...” in the last sentence, the text “draft” is replaced with “signed” and at the end of sentence before the period, the following text is added “(see Appendix A Visual-Aesthetic).”
11. Section 9.2, Endangered Species Act, page 294, the second sentence in the fourth paragraph insert is deleted and replaced with the following sentences:

“NMFS concurred with this determination in a letter dated June 2, 2022 to conclude informal consultation. NMFS determined that “[b]ecause all potential project effects to listed species and critical habitat were found to be extremely unlikely to occur, insignificant, or beneficial, we conclude that the proposed action is not likely to adversely affect listed species and critical habitat under NMFS’s purview.” In doing so, NMFS noted that the vegetation and water quality monitoring program for the salt marshes waterward of the storm surge wall and buffer zone to be developed during PED could provide additional insights into whether the project could be affecting ESA-listed species or designated critical habitat in ways not considered.”

12. Section 9.3.4, Magnuson-Stevens Fishery Conservation and Management Act, page 296, the last sentence in the second paragraph (which begins with “Consultation is expected to be completed prior ...”) is deleted and replaced with the following text:

“NMFS provided three EFH recommendations to USACE in a letter dated April 16, 2022. USACE responded in a letter dated May 11, 2022. USACE adopted the first recommendation, which was to develop during PED, and implement during and after construction, a vegetation and water quality monitoring program for the salt marshes waterward of the storm surge wall and buffer zone in order to evaluate the actual impacts and adjust, as necessary, the amounts and types of the compensatory mitigation. USACE likewise adopted the second recommendation, which was to follow NOAA’s and State guidelines and consult an interagency team when finalizing the design for the proposed living shorelines. USACE partially adopted the third recommendation, committing to engage the interagency team during PED to refine and finalize the mitigation plan, including with regard to any necessary adjustments due to changes in the Recommended Plan. While acknowledging a preference for mitigation within the Charleston Harbor estuary, USACE committed to following the substantive and procedural requirements of the Mitigation Rule. For details concerning both EFH recommendations and USACE

responses, see Appendix F, ESSENTIAL FISH HABITAT ASSESSMENT / MAGNUSON STEVENS ACT COMPLIANCE.

EFH consultation with NMFS was completed May 16, 2022. By letter of that date, NMFS confirmed that USACE has complied with the EFH requirements of the Magnuson-Stevens Fishery Conservation and Management Act.”

13. Section 9.20, Executive Order 14008, Tackling the Climate Crises at Home and Abroad, Section 219, and 223, page 306, in the second sentence of the second paragraph, which begins with “Pursuant to the order, and its corresponding Interim .....”the text “draft FR/EIS will include” are replaced with “final FR/EIS has included”.
14. Chapter 10, page 307, the first sentence which begins “I propose that the features...” is modified to include the following text at the end of the sentence: “...with such modification as in the discretion of the Commander, Headquarters, U.S. Army Corps of Engineers, may be advisable.”
15. Chapter 10, item a.2., page 307, “Provide all real property interests, including placement area improvements, and perform all relocations determined by the Federal government to be required for the project;” is deleted and replaced with the following text: “ 2. Provide all lands, easements, rights-of-way, and placement areas and perform all relocations determined by the Federal government to be required for the project;”
16. Chapters 11 and 12, in the footer of each page, the word “draft” is replaced with “final”.
17. APPENDIX F section, “ENDANGERED SPECIES ACT COMPLIANCE WITH NOAA FISHERIES’ (which begin at page count number 51) is modified to add at the end of the section (at page count number 98) the attached NOAA NMFS 2 June 2022 letter to USACE leading to and concluding formal consultation with NMFS.
18. APPENDIX F section, ESSENTIAL FISH HABITAT ASSESSMENT / MAGNUSON STEVENS ACT COMPLIANCE (which begin at page count number 99) is modified to add at the end of the section (at page count number 180) the attached letters, the USACE letter of 11 May 2022 to NOAA Fisheries, and the NOAA NMFS letters of 18 April 2022 and 16 May 2022 to USACE leading to the conclusion of EFH consultation.



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**NATIONAL MARINE FISHERIES SERVICE**  
 Southeast Regional Office  
 263 13<sup>th</sup> Avenue South  
 St. Petersburg, Florida 33701-5505  
<https://www.fisheries.noaa.gov/region/southeast>

06/02/2022

F/SER31:AH  
 SERO-2021-03491

Lt. Colonel Andrew Johannes, Commander  
 U.S. Army Corps of Engineers Charleston District  
 69 Hagood Avenue  
 Charleston, SC 29412

Attention: Nancy Parrish

This letter responds to your request for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act (ESA) for the Charleston Peninsula Coastal Flood Risk Management Feasibility Study.

Action Agency	SERO Number	Project Type(s)
U.S. Army Corps of Engineers – Charleston District	SERO-2021-03491	Feasibility Study

**Consultation History**

The U.S. Army Corps of Engineers-Charleston District (USACE-Charleston) is conducting a feasibility study to investigate and recommend potential structural and nonstructural solutions to reduce damages and life and safety impacts from coastal storms to the Charleston Peninsula in South Carolina. The study area covers approximately 8 square miles of the lower Charleston Peninsula that is within the City’s jurisdiction.

NMFS Protected Resources Division (NMFS-PRD), NMFS Habitat Conservation Division (NMFS-HCD), and the USACE-Charleston began coordination on this project in April 2021. NMFS-PRD, NMFS-HCD, and USACE-Charleston staff held additional meetings during the summer of 2021 to discuss additional details of the project and request additional information. NMFS received an initial request for consultation on September 24, 2021. In November 2021, NMFS-PRD and NMFS-HCD sent a request for additional information (RAI). The RAI relayed specific concerns/questions from NMFS-PRD and separate issues raised by NMFS-HCD. The RAI reiterated concerns that there was not enough information available to meaningfully consult on the potential adverse effects of the project. The RAI acknowledged that because feasibility studies are intended to identify problem areas, develop solutions to address them, and not provide specific engineering and design information, there is inherently less information available for considering impacts to ESA-listed species. It also provided specific examples of additional information NMFS-PRD needed to conduct a meaningful effects determination and provide an ESA consultation. USACE-Charleston’s response to the RAI was received on January 14, 2022. While the USACE-Charleston’s January 2022 RAI provided a number of additional details, it also indicated a number of items we requested to complete our consultation were beyond the scope of the feasibility study and would not be provided. In the absence of project-specific details, the effects analysis that follows is based on the information USACE-Charleston



was able to provide at this time. Unless otherwise noted, the project descriptions included below are derived primarily from the *Coastal Storm Risk Management Study – Final Feasibility Report/Environmental Impact Statement, April 2022* and the *Charleston Peninsula, South Carolina, A Coastal Storm Risk Management Study – Engineering Appendix – B, February 2022*.

During separate conversations, NMFS-HCD and USACE-Charleston continued to discuss Essential Fish Habitat (EFH) coordination, including specific EFH recommendations. In April 2022, NMFS-HCD provided three final EFH recommendations. In May 2022, USACE-Charleston responded formally adopted two and partially adopted the third EFH recommendation. As part of adopting those EFH recommendations USACE-Charleston has committed to re-engaging during the Preconstruction Engineering and Design phase with the Interagency Coordination Team that was assembled during the feasibility phase and included NMFS. During these meetings we anticipate additional information will become available to answer questions that could not be addressed during previous RAIs. Additionally, USACE-Charleston has agreed to a vegetation and water quality monitoring program for the salt marshes waterward of the storm surge wall and buffer zone. We believe the water quality monitoring program in particular will provide additional insights into whether the project could be affecting ESA-listed species or designated critical habitat in ways not considered below.

A final conversation/RAI between NMFS-PRD and USACE-Charleston staff was held in late May 2022. We received a final response to questions asked during that conversation on May 20, 2022, and initiated consultation that day. The project has been assigned a tracking number in our NMFS Environmental Consultation Organizer, SERO-2021-03491. Please refer to this number in any future inquiries regarding this project.

**Project Location**

Address	Latitude/Longitude	Water body
Charleston Peninsula, South Carolina	32.791064°N, 79.943891°W (midpoint) (North American Datum 1983)	Ashley River, Cooper River, Charleston Harbor





**Image of the project location and surrounding area**

**Existing Site Conditions**

Located between the Ashley and Cooper Rivers, the Charleston Peninsula is approximately 8 square miles. The two rivers join off the southern end of the peninsula to form the Charleston Harbor, which is a natural tidal estuary sheltered from the Atlantic Ocean by barrier islands. Early maps show that over one-third of the present-day Charleston peninsula has been “reclaimed”. Much of the landfilling occurred on the southern and western side of the peninsula. Because the proposed project spans much of the entire Charleston Peninsula, it includes multiple site locations. The majority of the project consists of storm wall construction that will occur from the uplands. However, approximately 1.3 miles of the wall will be constructed in marsh habitat and the remaining 0.2 miles will be constructed in open water just offshore from the United States Coast Guard (USCG) Station.

The marsh habitat in the project area includes perimeter tidal wetlands, primarily but not exclusively along the Ashley River. These wetlands have a salinity range between 18 and 30 ppt, and are characterized by smooth cordgrass and black rush. High marsh is limited in the project area, but typically includes sea oxeye, salt grass and salt meadow hay, along with estuarine scrub

shrub wetlands that support wax myrtle, salt marsh elder and groundsel tree.<sup>1</sup> Tidal flat habitat also occurs in the project area.

Portions of the project area also span open water in Ashley River immediately adjacent to the USCG station. This portion of the river is routinely dredged by the USCG. As result, the bottom sediments are silt/sand and do not support corals or submerged aquatic vegetation.<sup>2</sup> The Ashley River varies in width along the project area from approximately 900 feet (ft) to over 2,000 ft. The Cooper River varies in width from approximately 800 ft around Drum Island to over 4,000 ft around the Charleston Harbor.

## **Project Description**

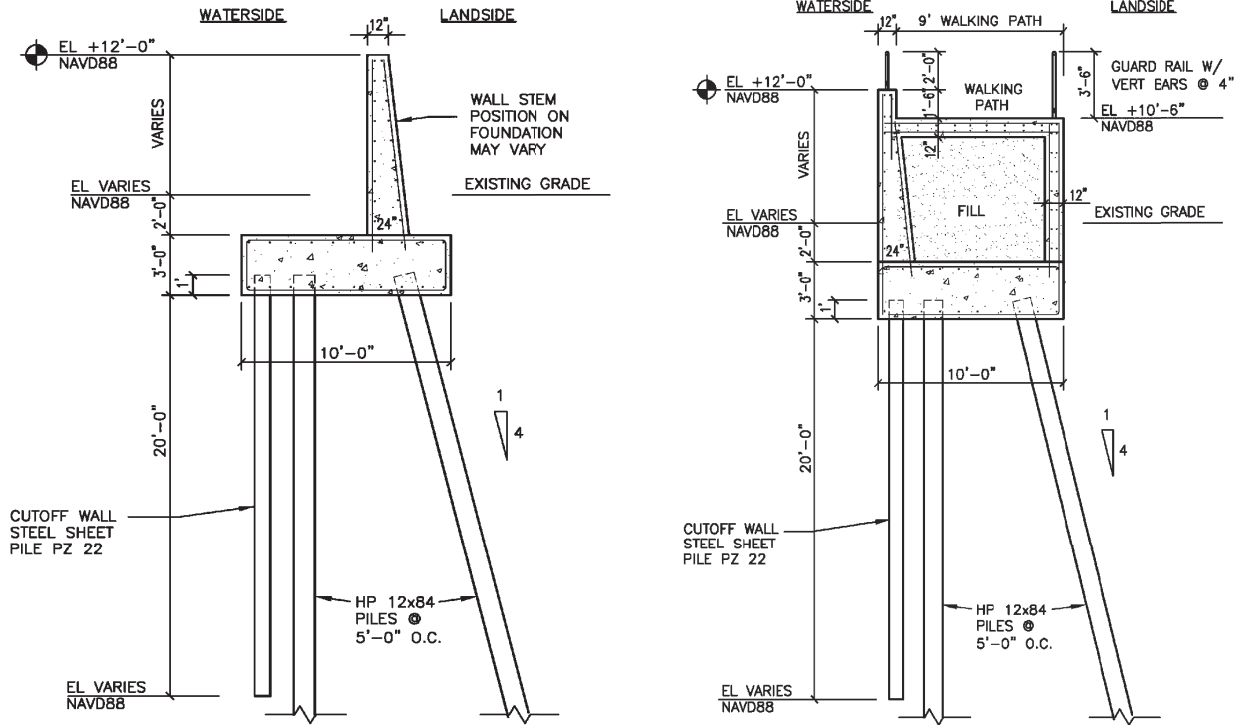
### *Storm Surge Wall*

The proposed project would build a storm surge wall, approximately 8.7 miles, along the perimeter of the Charleston Peninsula. It would be strategically aligned to minimize impacts to existing wetland habitat, cultural and aesthetic resources, and private property, while allowing continued operation of all port facilities, marinas, and the USCG Station. The T-wall would be approximately 7.2 miles long and constructed on the uplands with traditional concrete stem walls and pile supported bases. The T-walls consist of a reinforced concrete stem, a reinforced concrete foundation, sheet pile cutoff wall, and vertical and batter piles. A steel sheet pile cutoff will be installed to reduce underseepage and uplift on the wall. It was assumed that the sheet pile would be 20 ft long (depth) creating a wall 12 ft high. While the Draft Feasibility Report and Environmental Impact Statement indicated the specific pile types to be used for the T-walls had not been determined, the RAI response received January 14, 2022, indicated the 12-inch pre-stressed concrete piles would be used. These piles are driven to an assumed embedment depth of 5 ft. T-walls with walking paths are also expected in scenic areas.

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<sup>1</sup> Sanger, D. and C. Parker. 2016. Guide to Salt Marshes and Tidal Creeks in the Southeastern United States. South Carolina Department of Natural Resources, Columbia, SC, 100p.

<sup>2</sup> USACE-Charleston May 2022 response to NMFS-PRD request for additional information.

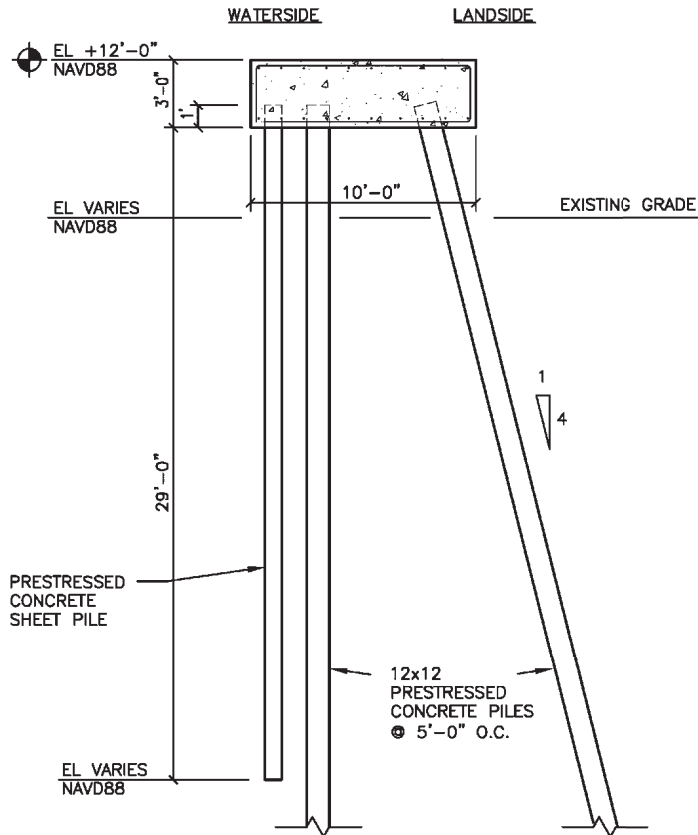


**Schematic of Proposed T-Wall Without (left) and With Walking Path (right)**

An additional, 1.5 miles of the wall would be constructed in marsh and open water habitat. This portion of the wall would be a combination wall (combo-wall) consisting of continuous vertical piles on the storm surge side (water-facing side) and battered pipe piles on the other side, connected by a concrete cap (see following schematic). Pre-augured holes (auger cast piles) will be drilled for the pilings so that the piles would only require impact hammering to their final depth.<sup>3</sup> The marsh wall would tie into high ground as appropriate, including the shoreline at the Citadel and the existing Battery Wall.

<sup>3</sup> USACE-Charleston January 14, 2022, response to NMFS-PRD request for additional information





### Schematic of Proposed Combo Wall

Of the proposed 1.5 miles of combo-wall, approximately 955 ft will be constructed in open water, 35 ft from shore, near the USCG station (see following map). Combo-wall piling spacing is anticipated to be every 5 ft. To cover 955 ft, approximately 200 piles are anticipated to be required. Assuming the same pile spacing, up to approximately 1,400 additional piles will be driven to complete the remaining 1.3 miles of marsh combo-wall.<sup>4</sup> USACE-Charleston expects to use pre-stressed concrete piles for the combo-walls. Because pile driving in both marsh and open water will be limited by tide and daylight hour operation requirements (see construction conditions), the installation of up to five pilings a day is anticipated.<sup>5</sup> The information on the number of strikes required to drive each pile is not currently available. In the absence of this information, we sought an exact analog, but one could not be identified. The best available analog was for a 24-in concrete pile, driven by an impact hammer, into sand/silt sediment, which estimated 184 strikes/pile.<sup>6</sup> Because both the proposed project and the analog occurred at sand/silt sediment sites and the proposed project will use smaller-diameter piles, we believe using 184 strikes/pile is appropriate but conservative. The use of pre-augured holes is likely to further reduce the number of strikes per pile but by how much is unknown.

<sup>4</sup> 7,920 ft total combo wall = 955 ft open-water combo wall + 6,965 ft marsh combo wall; 6,965 ft marsh combo wall ÷ 1 piling/5 ft = 1,393 pilings

<sup>5</sup> USACE-Charleston January 14, 2022, response to NMFS-PRD request for additional information

<sup>6</sup> WSDOT. 2017. Biological Assessment Preparation for Transportation Projects-Advanced Training Manual. Washington State Department of Transportation, Olympia, Washington. <http://www.wsdot.wa.gov/Environment/Biology/BA/BAGuidance.htm>, accessed May 10, 2017.



### Location of Open Water Combo-Wall Installation<sup>7</sup>

Pre-stressed concrete sheet piles will be installed via vibratory hammer and will be subject to the same time and tidal restrictions as the impact hammer pile driving.<sup>8</sup> The foundation may be precast in 10-ft x 10-ft sections and grouted into position to avoid the need for formwork. Precast units would include grouted keyways and post tensioning conduits to assure continuity and water-tightness. It was assumed that the sheet pile would be 40 ft long for EL. 12 wall.

#### *Temporary Work Trestle*

A temporary work trestle was determined to be necessary to construct the combo wall, which will allow sufficient width to operate a crane and receive materials. The temporary work trestle would be similar to that currently being used by the City of Charleston for construction of another project that is made of wood. The work trestle is expected to be approximate 30 ft wide and will be constructed parallel to the combo-wall, not perpendicular to the shore/river flow. The trestle will be constructed in sequence as the combo-wall is installed. The exact length of the work trestle and the method of pile driving will not be known until the PED phase. However, given that the combo-wall is approximately 1.5 miles in length, the work trestle may ultimately be of similar length. Of those 1.5 miles, only approximately 955 ft (0.18 miles) is expected to be constructed in open water, near the USCG station. As with other pile driving elsewhere for the

<sup>7</sup> USACE-Charleston January 14, 2022, response to NMFS-PRD request for additional information.

<sup>8</sup> Ibid.

project, work-trestle pile driving will be limited to low tide for a water depth of approximately 1-2m and will occur only during daylight hours. Daylight hour and low tide restrictions mean pile driving is likely to occur only once daily. Where possible auger cast piles will be to limit the extent of pile driving by hammer. Given construction uncertainties, the number of pilings required for construction of work trestle is unknown.<sup>9</sup> Based on information available regarding the construction of a temporary work trestle for a road construction project on the Ashley River, NMFS estimates timber support pilings will likely be required every 20 ft. This assumption indicates approximately 50 timber piles will be installed to complete the open-water portion of the wall.<sup>10</sup> The information on the number of strikes required to drive each pile is not currently available. As with the combo wall, we assume 184 strikes/pile is appropriate but conservative.

### Pile Installation

Pile type(s)	Number of Piles	Total Area Affected (ft <sup>2</sup> )	Installation Method	Project Purpose - Location
12-in concrete	200	200	Impact Hammer	Combo Wall - Open Water
12-in concrete	1,400	1,400	Impact Hammer	Combo Wall - Marsh
12-in timber	50	39	Impact Hammer	Work Trestle – Open Water
12-in timber	350	273	Impact Hammer	Work Trestle – Marsh

### Storm Gates

The proposed project will also include the construction of storm gates. Storm gates would remain open most of the time to allow normal passage of overland flow, ebb, and flow of the tide, etc. The gates will only be closed to protect against a coastal storm event based on storm surge predictions from an authoritative source. When major flooding is expected, storm gates would be closed at low tide, to keep the rising tide levels from taking storage needed for associated rainfall. Gate operation procedures would be refined during the PED phase with input from the City of Charleston, emergency management experts, and weather experts.

The term “storm gates” is a broad one used to describe gates that will be installed in areas where water flows (i.e., creeks or marshes). The exact size and type of gate installed depends on the individual location and area it is protecting, and the ecological conditions. For areas that require wider spans of opening to account for more flow, several smaller gates will be utilized as opposed to one larger gate. USACE-Charleston anticipates using sluice gates primarily for their simplicity and ease of operation. Sluice gates are generally just a metal gate that can be raised and lowered on a track and seal an opening in the wall area. The preliminary locations of storm gates can be seen in the figure immediately following. Storm gates are expected to only be installed at tidal creeks, including creeks that are currently partially restricted by culverts. For non-culvert storm gates (i.e., Halsey Creek and Vardell’s Creek), gate closure will be done manually and will only after the gate operator has visually inspected, when feasible, the area behind the wall to ensure no marine mammals, sea turtles or sturgeon are trapped.<sup>11</sup>

<sup>9</sup> USACE-Charleston May 2022 response to NMFS-PRD request for additional information.

<sup>10</sup> 955 ft open-water work trestle ÷ 1 piling/20 ft = 48 pilings; 6,965 ft marsh work trestle ÷ 1 piling/20 ft = 349 pilings.

<sup>11</sup> USACE-Charleston January 14, 2022, response to NMFS-PRD request for additional information.





**Map Showing Location of Storm Gates and Storm Surge Wall**

*Permanent and Mobile Floodwater Pumping Stations*

Interior pumping stations will also be constructed. The project calls for five temporary and five permanent, small to medium hydraulic pump stations to mitigate interior flooding caused by the storm surge wall. The proposed pumps would treat the stormwater using the same criteria required for the existing permitted stormwater management pump stations.<sup>12</sup> The five permanent locations will be at Halsey Creek, Marsh behind the Baseball Stadium, Longs Pond, by the USCG station, and at Newmarket Creek (red flags in the following map image). All five permanent pumping locations will be constructed and operated from the uplands.

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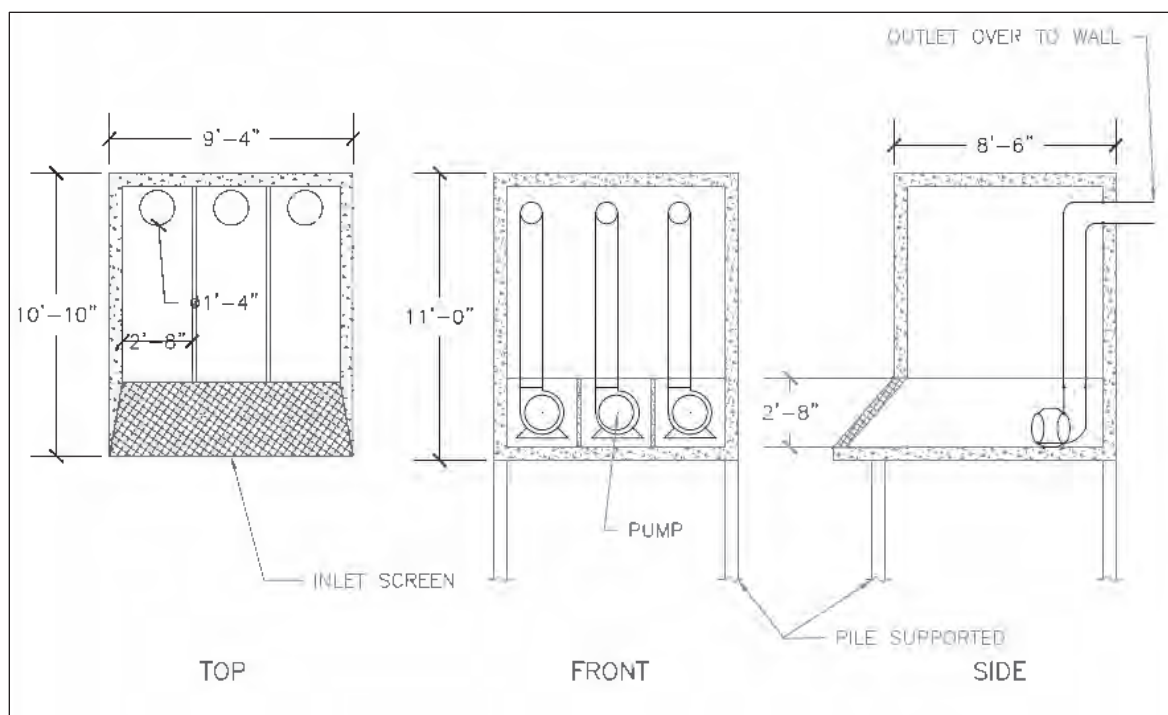
<sup>12</sup> Ibid.



**Map Showing the Locations of the Mobile (blue flags) and Permanent (red flags) Pump Stations**

Permanent pump stations would consist of a wet well installed in a low-lying area (e.g., marsh or tidal creek) where water collects naturally and a pump house. The pump house will be elevated above the potential flood elevation and hold the electrical infrastructure, backup generator, etc. The wet wells will consist of a concrete inlet box with mesh screens to exclude debris and wildlife, a hinged lid so pumps can be accessed or removed to perform maintenance. The outlet from the wet well will be routed to the wall and will either pass over the wall or through it with a check valve to prevent inflow from the riverside.

To minimize impacts to marsh habitats, the permanent pump houses will be constructed on the uplands with only the wet well-located marsh adjacent. Pumps will be electric powered and will have a back-up diesel-powered generator. Each pump station will have a total of three equally sized pumps. This will allow for two-thirds redundancy where even if one pump fails, the station is still able to operate at two-thirds capacity.



**Schematic of Permanent Pump House**

Additional temporary/mobile pumps will also be deployed as needed to five locations around the peninsula. These proposed locations are along the battery on the south end of the peninsula and on the Cooper River side (blue flags pump location map). These pumps will be deployed in areas without natural low-lying areas, such as tidal marsh, but their ultimate location may change in PED phase after the subsurface system is analyzed. The mobile pumps will alleviate flooding by increasing the drainage rate of the existing stormwater management system. During storm events, the portable pumps would be brought to the mobile pump location and hooked up to an inlet pipe from the existing stormwater management system and an outlet pipe to pump the rainfall over the wall. This will alleviate the “bathtub effect” the new wall will otherwise impart. Other than the inlet and outlet pipes, only a small pad with anchors and an electrical box to connect the pumps to grid power will be installed. Any construction associated with the deployment of the temporary/mobile pumps will occur entirely from the uplands.

*Natural and Nature-Based Features*

Approximately 9,300 ft of oyster reef-based living shoreline sills would be installed in the Ashley River, anticipated height of the sills are 1-2 ft off the bottom. Construction of the living shoreline sills will require in-water work with small, shallow boats to reach the intertidal zone to avoid damage to the marsh during construction, and during low tide for proper placement. Small outboard motor boats ranging from roughly 13 to 23 ft in length are typically used. There are several boat landings within in a few nautical miles of the sill locations so travel distances/times are anticipated to be short.<sup>13</sup> The materials used would be limited to those that are proven as successful substrates for oyster recruitment in South Carolina tidal waters to form the reef-based sills desired (e.g., bagged oyster shells, oyster castles, or manufactured wire reefs). The materials

<sup>13</sup> Ibid.



will be dependent on the site conditions at each of the planned locations for the sills.<sup>14</sup> Per the adoption of the EFH recommendations, USACE-Charleston has agreed to assemble an interagency team of living shoreline experts to inform the site suitability surveys and final engineering design that will be performed for the living shorelines during the PED phase. The final design will become part of plans and specifications required for construction. This feature is meant to reduce impacts to natural shorelines and other resources seaward of the storm surge wall. The living shoreline sills would reduce marsh scour at the proposed storm surge wall and reduce erosion of the shoreline edge. The reef-based living shoreline materials/design would be determined during the PED phase.

### *Nonstructural Measures*

The project also proposes nonstructural measures for residential areas where construction of the storm surge wall would be impracticable. Measures such as elevating structures and/or utilities in flood prone areas are being considered. However, all these actions would occur in the uplands so we anticipate they will have no effect of ESA-listed species or designated critical habitat.

The construction schedule for the entire project is based on the assumption that the PED phase will last three years. Once design is complete, construction is anticipated to take approximately seven years and include a multi-phase construction period. Construction phases will be broken into the five different model areas, and each model area may require phasing as well. Early phases will focus on the model areas at the end of the peninsula such as the battery, marina, and port. Further detail on the construction schedule will be developed during the PED Phase.

### **Construction Conditions**

The applicant has agreed to adhere to NMFS' *Measures for Reducing Entrapment Risk to Protected Species*<sup>15</sup>, as well as the NMFS Southeast Region's *Protected Species Construction Conditions*<sup>16</sup> and *Vessel Strike Avoidance Measures and Reporting for Mariners*.<sup>17</sup> Additionally, The City of Charleston has a noise ordinance that will limit pile driving to the hours of 7:00 a.m. to 7:00 p.m. on weekdays, and 9:00 a.m. to 7:00 p.m. on Saturdays, Sundays, and certain holidays. USACE-Charleston has also agreed to only conduct pile driving in open water environments (i.e., around the USCG station) during low tide.<sup>18</sup>

The USACE-Charleston also indicated turbidity curtains will likely be used temporarily during construction of the storm surge wall in open water by the USCG station. It is expected they would be placed roughly 25 ft seaward and parallel to the construction footprint of the wall. They also indicate all in-water work and construction in estuarine wetlands of either the storm surge wall or living shorelines would occur parallel and in close proximity to the shoreline and would not block migratory pathways for listed species.<sup>19</sup>

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<sup>14</sup> Ibid.

<sup>15</sup> [https://media.fisheries.noaa.gov/dam-migration/entrapment\\_bmps\\_final.pdf](https://media.fisheries.noaa.gov/dam-migration/entrapment_bmps_final.pdf)

<sup>16</sup> [https://media.fisheries.noaa.gov/2021-06/Protected\\_Species\\_Construction\\_Conditions\\_1.pdf?null](https://media.fisheries.noaa.gov/2021-06/Protected_Species_Construction_Conditions_1.pdf?null)

<sup>17</sup> [https://media.fisheries.noaa.gov/dam-migration/vessel\\_strike\\_avoidance\\_february\\_2008.pdf](https://media.fisheries.noaa.gov/dam-migration/vessel_strike_avoidance_february_2008.pdf)

<sup>18</sup> USACE-Charleston January 14, 2022, response to NMFS-PRD request for additional information.

<sup>19</sup> Ibid.

**Effects Determination(s) for Species the Action Agency or NMFS Believes May Be Affected by the Proposed Action. Please note abbreviations used in the table below: E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect; NE = no effect.**

Species	ESA Listing Status	Action Agency Effect Determination	NMFS Effect Determination
<b>Sea Turtles</b>			
Green (North Atlantic [NA] distinct population segment [DPS])	T	NLAA	NLAA
Green (South Atlantic [SA] DPS)	T	NLAA	NLAA
Kemp's ridley	E	NLAA	NLAA
Leatherback	E	NLAA	NE
Loggerhead (Northwest Atlantic [NWA] DPS)	T	NLAA	NLAA
<b>Fish</b>			
Shortnose sturgeon	E	NLAA	NLAA
Atlantic sturgeon (Carolina DPS)	E	NLAA	NLAA

We believe the project will have no effect on leatherback sea turtles, due to the species' very specific life history strategies, which are not supported at the project site. Leatherback sea turtles have pelagic, deepwater life history, where they forage primarily on jellyfish.

### Critical Habitat

The project is located immediately adjacent to Atlantic sturgeon critical habitat Carolina Unit 7 (Santee-Cooper River). Based on our current understanding of the project's areal scope, construction and operation, we anticipate only the following physical and biological features (PBFs) are present in Unit 7 and may be affected by the proposed action: water quality.

<b>Atlantic Sturgeon Critical Habitat – Physical and Biological Features (PBF)</b>		
	<b>PBF</b>	<b>Purpose/Function of PBF</b>
“ <i>Water Quality</i> ”	Water quality conditions, especially in the bottom meter of the water column with temperature and oxygen values necessary to support spawning; annual and inter-annual adult survival	Necessary to support: <ul style="list-style-type: none"> <li>• Spawning;</li> <li>• Annual and inter-annual adult, subadult, larval, and juvenile survival; and</li> <li>• Larval, juvenile, and subadult growth, development, and recruitment.</li> </ul> Appropriate temperature and oxygen values will vary interdependently, and depending on salinity in a particular habitat.

### Analysis of Potential Routes of Effects to Species

Sturgeon and sea turtles could be physically injured if struck by construction equipment, vessels, or materials. However, the majority of the storm surge wall construction will be in the uplands, away from ESA-listed species. Thus, we believe injuries to sturgeon or sea turtles from upland construction are extremely unlikely to occur. The applicant's implementation of NMFS Southeast Region *Protected Species Construction Conditions* will reduce risk of injury from in-water work. Operation of any mechanical construction equipment will cease immediately if a sea turtle or sturgeon is seen within a 150-ft radius of the equipment. Activities will not resume until

the protected species has departed the project area of its own volition. All living shoreline material will be placed by hand in the intertidal zone where sturgeon and sea turtles are uncommon and will not have any entangling components (e.g., line). Additionally, sturgeon and sea turtles are able to move away from or avoid entirely the project area if disturbed.

Construction activities and related construction noise may prevent or deter sturgeon and sea turtles from using the project area. We believe the effects to these species from temporary exclusion from the project area due to construction activities, including related noise, will be insignificant. Up to 200 concrete combo wall pilings and 50 timberwork trestle pilings will be installed in open water potentially accessible to sturgeon and sea turtles. Following installation of these pilings sturgeon and sea turtles would be excluded from a maximum area of 239 square feet (ft<sup>2</sup>), with 39 ft<sup>2</sup> becoming accessible again once the temporary work trestle pilings are removed.<sup>20</sup>

Noise created by pile driving activities can physically injure animals or change animal behavior in the affected areas. Animals can be physically injured in two ways. First, immediate adverse effects can occur if a single noise event exceeds the threshold for direct physical injury. Second, adverse physical effects can result from prolonged exposure to noise levels that exceed the daily cumulative sound exposure level for the animals. Noise can also interfere with an animal's behavior, such as migrating, feeding, resting, or reproducing and such disturbances could constitute adverse behavioral effects.

When an impact hammer strikes a pile, a pulse is created that propagates through the pile and radiates sound into the water, the ground substrate, and the air. Pulsed sounds underwater are typically high volume events that have the potential to cause hearing injury. Vibratory pile driving produces continuous, non-pulsed sounds that can be tonal or broadband. In terms of acoustics, the sound pressure wave is described by the peak sound pressure level (PK, which is the greatest value of the sound signal), the root-mean-square pressure level (RMS, which is the average intensity of the sound signal over time), and the sound exposure level (SEL, which is a measure of the energy that takes into account both received level and duration of exposure). Further, the cumulative sound exposure level (SELcum) is a measure of the energy that takes into account the received sound pressure level over a 24-hour period. Please see the following website for more information related to measuring underwater sound and the NMFS-accepted pile driving sound measurement thresholds for species in the NMFS Southeast Region: <https://www.fisheries.noaa.gov/southeast/consultations/section-7-consultation-guidance>.

We use the NMFS Multi-species Pile Driving Tool (dated May 2022) to calculate the radii of physical injury and behavioral effects on ESA-listed species that may be located in the project area based on the NMFS-accepted pile driving sound measurement thresholds for species in the NMFS Southeast Region reference above. We anticipate up to 200, 12-in concrete piles and 50, 12-in timber piles will be installed in open water of the Ashley River near the USCG station to support the combo wall and work trestle, respectively. We define an open-water environment as any area where an animal would be able to move away from the noise source without being forced to pass through the radius of noise effects. For the purposes of our analysis, we assumed

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<sup>20</sup> 200 concrete combo wall pilings x 1 ft<sup>2</sup> per piling = 200 ft<sup>2</sup>; 50 timber work trestle piles x 0.78 ft<sup>2</sup> per piling = 39 ft<sup>2</sup>; 200 ft<sup>2</sup> + 39 ft<sup>2</sup> = 239 ft<sup>2</sup>.

an impact hammer will be used to drive both types of pilings. The information on the number of strikes required to drive these piles is not currently available. As noted previously, we estimated 184 strikes/pile is conservative but appropriate. Based on our noise calculations, installation of both 12-in concrete and 12-in timber piles could cause a single-strike or peak-pressure injurious noise effect at a distance of 1 ft for sturgeon; no injurious noise effects are anticipated for sea turtles. Sturgeon weighing greater than 2 grams (sturgeon weighing less than 2 grams will not be present in the project area) and sea turtles could also be injured by cumulative sound exposure, but we believe this route of effect is extremely unlikely to occur. The SELcum of multiple pile strikes over the course of a day may cause injury up to 42.4 ft away for sturgeon (timber piles); injury could occur to sea turtles occurring up to 3.1 ft away. Concrete piles may also cause SELcum impacts, but the radii of effect are less than what is reported for timber piles. Due to the mobility of sturgeon and seas turtles, we expect them to move away from noise disturbances. Additionally, piles will be driven at low tide, which may further reduce the distance harmful noise energy travels. Therefore, we believe this potential route of effect is extremely unlikely to occur.

For pile driving conducted in the marsh, we estimated up to 1,400, 12-in concrete piles and 350, 12-in timber piles will be installed. For the purposes of our analysis, we assumed an impact hammer will be used to drive both types of pilings. The information on the number of strikes required to drive these piles is not currently available. As noted previously, we estimated 184 strikes/pile is conservative but appropriate. We also assumed that driving piling into the marsh at low tide would provide 5dB noise attenuation. Based on these assumptions and our noise calculations, installation of both 12-in concrete and 12-in timber piles, could cause a single-strike or peak-pressure injurious noise effect at a distance of 1 ft for sturgeon, but no injurious noise effects are anticipated for sea turtles. Sturgeon weighing greater than 2 grams (sturgeon weighing less than 2 grams will not be present in the project area) and sea turtles could also be injured by cumulative sound exposure, but we believe this route of effect is extremely unlikely to occur. The SELcum of multiple pile strikes over the course of a day may cause injury up to 19.7 ft away for sturgeon (timber piles); injury could occur to sea turtles occurring up to 1 ft away. Concrete piles may also cause SELcum impacts, but the radii of effect are less than what is reported for timber piles. Because this portion of the project will occur in marsh habitat at low tide, it is very unlikely sturgeon or sea turtles will be within the impact zones mentioned. Additionally, due to the mobility of sturgeon and seas turtles, we expect them to move away from noise disturbances.

Sturgeon and sea turtle behavior (i.e., foraging, migrating, spawning) could also be adversely affected by pile driving via impact hammer use but we believe behavioral effects will be insignificant. Installation of 12-in timber and 12-in concrete piles via impact hammer in marsh habitat could cause behavioral effects to sturgeon up to 329 ft away and sea turtles up to 8 ft away. Impact hammer installation of 12-in timber and 12-in concrete piles in open water areas around the USCG station on the Ashley River could cause behavioral effects to sturgeon up to 707 ft away and sea turtles up to 15 ft away. Because pile driving in the marsh will occur at low tide, it is very unlikely sturgeon or sea turtles will be able to physically access areas potentially subject to behavioral impacts. In open-water areas around USCG, station the Ashley River is over 2,000 ft in width. We anticipate this will provide sufficient room for sturgeon and sea turtles to avoid areas where noise may affect their behavior. Additionally, pile driving is anticipated to

occur only a single time daily and those previously ensonified areas will be available for use once pile driving stops.

Sea turtles and sturgeon could be physically injured or harmed if trapped behind sea wall when the storm gates are closed. Accumulation of pollutants in stormwater runoff or debris floating in storm waters could cause injury if these animals are trapped behind the sea wall for a long period of time. We believe this route of effect is extremely unlikely to occur. We believe there is a low likelihood that a sea turtle or sturgeon would be behind the sea wall boundary at the moment the storm gates were closed. Additionally, for locations where sea turtles and sturgeon are more likely to become entrapped (Halsey Creek and at Vardell's Creek), USACE-Charleston has indicated that, when feasible, the storm gates will only be closed after the area is visually inspected to ensure it is clear of ESA-listed species. We believe these actions would further reduce the likelihood of a sea turtle or sturgeon suffer injury.

Sea turtles and sturgeon could be injured by localized and temporary reductions in water quality (i.e., lowered dissolved oxygen concentrations, chemical/pollutant discharge) caused by pumping stormwater from behind the storm wall during storm events, but we believe this effect will be insignificant. The proposed project would treat the stormwater using the same criteria required for the existing permitted stormwater management pump stations. Since the pumps will only be activated during storm/flooding events, the overall volume of pumped water will be relative small compared water entering the Ashley and Cooper rivers from natural sources. Similarly, because the pumps will only be active during storm events we anticipate the rivers will be turbulent and wave action is likely to increase mixing rates. Pumping is also expected to temporary, further reducing any potential adverse water quality effects.

#### **Analysis of Potential Routes of Effect to Critical Habitat**

No in-water work is currently planned within the boundaries of Unit 7; thus, we do not anticipate storm surge wall construction or living shoreline installation will impact any of the PBFs of critical habitat. The pumping of impounded stormwater from behind the storm surge wall may temporarily increase turbidity and degrade water quality (i.e., lower dissolved oxygen concentrations). Those changes could adversely affect the water quality PBF of Atlantic sturgeon critical habitat but we believe this effect will be insignificant. As noted previously, the proposed project would treat the stormwater using the same criteria required for the existing permitted stormwater management pump stations. Since the pumps will only be activated during storm/flooding events, the overall volume of pumped water will be relative small compared water entering the Ashley and Cooper rivers from natural sources. Similarly, because the pumps will only be active during storm events we anticipate the rivers will be turbulent and wave action is likely to increase mixing rates. Pumping is also expected to temporary, further reducing any potential adverse water quality effects.

#### **Conclusion**


Because all potential project effects to listed species and critical habitat were found to be extremely unlikely to occur, insignificant, or beneficial, we conclude that the proposed action is not likely to adversely affect listed species and critical habitat under NMFS's purview. This concludes your consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or if the identified action is subsequently modified in a manner that

causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. NMFS's findings on the project's potential effects are based on the project description in this response. Any changes to the proposed action may negate the findings of this consultation and may require reinitiation of consultation with NMFS.

We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact Andrew Herndon, Consultation Biologist, at (727) 824-5312, or by email at [Andrew.Herndon@noaa.gov](mailto:Andrew.Herndon@noaa.gov).

Sincerely,

SHOTTS.KELLY.M  
ARISE.1365865457



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SHOTTS.KELLY.MARISE.13658  
85457  
Date: 2022.06.02 13:52:09 -04'00'

for David Bernhart  
Assistant Regional Administrator  
for Protected Resources

File: 1514-22.f.2





DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, CHARLESTON DISTRICT  
69 A HAGOOD AVENUE  
CHARLESTON SC 29403-5107

May 11, 2022

Dr. Pace Wilber  
Habitat Conservation Division  
National Marine Fisheries Service  
331 Fort Johnson Road  
Charleston, South Carolina 29412-9110

Dear Dr. Wilber:

Thank you for your review of the Essential Fish Habitat Assessment for the Charleston Peninsula, South Carolina, Coastal Storm Risk Management Study and request for consultation under the Magnuson Stevens Fishery Conservation and Management Act (16 U.S. C. SS 1801et seq.) submitted to you on September 24, 2021. As you indicated, Section 305 (b)(4)(B) of the Magnuson-Stevens Act and implementing regulation at 50 CFR Section 600.920(k) require the US Army Corps of Engineers (USACE) to provide a written response to comments received from NOAA's National Marine Fisheries Service (NMFS) Habitat Conservation Division (HCD).

Over the last few months, USACE has worked with NMFS staff to resolve issues related to the completion of our Essential Fish Habitat (EFH) coordination. We received your conservation recommendations in a letter dated April 18, 2022. Additional feedback was provided by your office on April 26, 2022, to clarify those recommendations. The following paragraphs present our response to your conservation recommendations in accordance with 50 CFR Section 600.920 (k):

1. "EFH Recommendation: The USACE should develop during PED and implement during and after construction a vegetation and water quality monitoring program for the salt marshes waterward of the storm surge wall and buffer zone. Results from this adaptive management plan should be used to evaluate the actual impacts from the project and to adjust the amounts and types of the compensatory mitigation needed to fully offset the impacts."

Response: Adopt. USACE and the City of Charleston will work with NMFS during the PED phase to determine what monitoring is appropriate and justified for potential adverse effects on EFH or federally-managed fishery species waterward of the storm surge wall that are not already addressed by appropriate minimization or compensatory mitigation. We will develop a monitoring and adaptive management plan in consultation with NMFS during PED that would focus on post-construction monitoring in locations mutually agreed to be of greatest likelihood of effects and in a manner that is practicable for successfully evaluating with-project effects compared to without-project effects. We will also work together to identify thresholds for corrective action based on the results of the monitoring and a strategy for

identifying appropriate adjustments to minimization or compensatory mitigation if those thresholds are exceeded.

2. EFH Recommendation “The USACE should follow the best practices outlined in the NOAA’s Guidance for Considering the Use of Living Shorelines as well as state guidelines when finalizing the designs for the proposed living shorelines. Given the broad community interest in the living shorelines and frequent changes to the underlying science and engineering, an interagency team should be assembled during PED for finalizing the designs of the living shorelines and overseeing their construction.”

USACE Response: Adopt. USACE and the City of Charleston will assemble an interagency team of living shoreline experts to help inform the site suitability surveys and final engineering design that will be performed for the living shorelines during the PED phase; that final design will become part of plans and specifications required for construction. USACE is already recommending the construction of oyster reef-based living shorelines with substrate such as bagged oyster shells, manufactured wire traps, and/or other methods similar to those already used by NOAA for coastal resilience throughout the Charleston area (<https://www.habitatblueprint.noaa.gov/wp-content/uploads/2019/10/Fact-Sheet-2019-Living-Shorelines.pdf>), and only along the lower Ashley River. As such, USACE is confident that with the input of the interagency team, the living shorelines will be compliant with NOAA’s Guidance for Considering the Use of Living Shorelines, as well as State regulations. Finalizing the designs during PED would not include any deviation from the recommended plan in location, methods or substrate of a magnitude which would require supplemental compliance under various environmental laws and regulations.

3. EFH Recommendation: “The USACE should develop a mitigation plan focusing on benefiting public-trust, living marine resources within the Charleston Harbor estuary. The amounts and types of the mitigation should account for all impacts to tidally influenced habitat, including Vardell Creek. Mitigation amounts should be adjusted based results of the monitoring program discussed above. An interagency team should be assembled during PED to finalize the mitigation plan.”

USACE Response: Partially adopt. At this time, the Mitigation Plan is not final – it will be refined and ultimately finalized during the PED phase. Accordingly, a *new* Mitigation Plan is not needed, as the draft will appropriately evolve as more information is available (such as the development of engineering designs and final jurisdictional determinations), and it will be finalized prior to undertaking any construction. The same Interagency Coordination Team that was assembled during the feasibility phase will be re-engaged during the PED phase to provide input, along with the City of Charleston, to finalize Mitigation Plan.

It remains the intention of USACE and the City of Charleston that any changes in the recommended plan due to final engineering analysis (such as the refined interior hydrologic modeling), detailed engineering design (such as for the storm gate under the Johnson Street bridge at Vardell Creek), or other PED activities which result in new or unaccounted adverse effects on the environment would lead to additional minimization and compensatory mitigation, as appropriate, in the final Mitigation Plan. This could also include monitoring if

effective minimization or mitigation strategies are not clear. During the PED phase, USACE will incorporate the Monitoring and Adaptive Management Plan identified under EFH Recommendation 1 into the Mitigation Plan, which will include how to adapt the project through minimization or compensatory mitigation based on results of the monitoring.

USACE acknowledges the preference for a mitigation bank with a primary service area that includes the Charleston Harbor Estuary. Currently, there are no approved and permitted saltmarsh mitigation banks in this category. However, both USACE and NMFS recognize that there are banks with a primary service area including the Charleston watershed which are currently going through the process of approval/permitting that could be available for use for this project during the PED phase. As stated in the current draft of the Mitigation Plan, these other banks would be considered if/when they become available for use. In the current draft Mitigation Plan, USACE and the City of Charleston did not select a particular mitigation bank for use, but instead identified several known mitigation banks with available and sufficient credits to demonstrate a *feasible* plan for achieving the necessary mitigation for the recommended plan. Depending upon cost and availability, the use of approved saltmarsh mitigation banks with a secondary service area which includes the Charleston watershed is consistent with established procedures under the Mitigation Rule (33 CFR Parts 325 and 332) and relevant guidance. USACE expects to work with NMFS as part of the Interagency Coordination Team during PED to consider all of the available banks at that time, and ensure that the most appropriate option is selected.

If you have questions, please reach out to Ms. Hannah Hadley at (208) 220-0961 or via email at [hannah.f.hadley@usace.army.mil](mailto:hannah.f.hadley@usace.army.mil). Thank you very much.

Sincerely,

*Nancy Parrish*

Nancy Parrish  
Chief, Planning and Environmental Branch



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**NATIONAL MARINE FISHERIES SERVICE**  
Southeast Regional Office  
263 13<sup>th</sup> Avenue South  
St. Petersburg, Florida 33701-5505  
<https://www.fisheries.noaa.gov/region/southeast>

April 18, 2022

F/SER47:CC/pw

(Sent via Electronic Mail)

Lt. Colonel Andrew Johannes, Commander  
U.S. Army Corps of Engineers Charleston District  
69 Hagood Avenue  
Charleston, SC 29412

Attention: Nancy Parrish, Hannah Hadley, Bethney Ward

Dear Commander Johannes:

NOAA's National Marine Fisheries Service (NMFS) reviewed *Essential Fish Habitat Assessment for the Charleston Peninsula Coastal Flood Risk Management Study* provided to us by letter dated September 24, 2021 (EFH Assessment). The EFH Assessment reviews impacts to EFH from various structural, nonstructural, and natural/nature-based solutions the U.S. Army Corps of Engineers (USACE) and City of Charleston (City, local sponsor) propose for reducing damages and life safety impacts within the City from coastal storms. By correspondence, dated February 11, 2022, the USACE provided additional information needed for an EFH consultation under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) for the Charleston Peninsula Coastal Storm Surge Risk Management Study (Charleston Study). The USACE's initial determination is the proposed measures would have substantial individual or cumulative adverse impacts on EFH or federally managed fishery species. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the NMFS provides the following comments and recommendations pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Act.

#### *Project History*

NMFS has worked with the USACE during the feasibility stage of the Charleston Study since the fall of 2018 by participating in regular meetings, reviewing documents, providing technical assistance, and providing informal comments. In addition to the supplemental information provided in February and the EFH Assessment provided in September, the NMFS has reviewed the draft Feasibility Report/Environmental Impact Statement for the Charleston Study dated September 2021 (draft FR/EIS), information the USACE presented during Cooperating Agency meetings, and supplementary materials the USACE provided via email to address requests we made for additional or clarifying information. Our letter to the USACE dated November 23, 2021, provides more detail on the engagement history and information needed for the EFH consultation.

On several occasions, the NMFS voiced concerns regarding the sufficiency of information provided for the EFH consultation. Most recently, by letter dated January 21, 2022, the NMFS requested additional information on the proposed living shorelines, compensatory mitigation, and effects of project operations on water quality. While important aspects of these issues remain outstanding, the NMFS notified the USACE via email, dated February 18, 2022, that an EFH consultation can be conducted.

#### *Aquatic Habitats in the Project Area*

The EFH Assessment describes aquatic habitats in the study area the South Atlantic Fishery Management



Council (SAFMC) identifies as EFH and Habitat Areas of Particular Concern (HAPCs). In addition to serving as EFH and HAPCs for federally managed species, these areas provide habitat for numerous other species and their prey with commercial or recreational importance, including red drum (*Sciaenops ocellatus*), southern flounder (*Paralichthys lethostigma*), spotted seatrout (*Cynoscion nebulosus*), spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonias undulatus*), and blue crab (*Callinectes sapidus*). The tidal creeks and associated salt marshes within the study area are vital nursery habitats for larvae and juveniles for many species concentrating, feeding, and sheltering within these areas. While the project area is urbanized, these tidal creeks and salt marshes remain a valuable and essential part of the Charleston Harbor ecosystem.

#### *Description of the Proposed Project*

The draft FR/EIS identifies the No Action/Future Without Project Alternative and Alternative 2 as the final array of alternatives. Alternative 2, the tentatively selected plan, is comprised of a storm surge wall along the perimeter of the Charleston Peninsula, permanent and temporary pump stations, nonstructural measures, and natural/nature-based features. The EFH Assessment describes the proposed action, habitats and managed fishery resources within the study area, potential effects of the proposed action on those habitats and resources, and general steps the USACE would implement to reduce adverse effects to EFH and fishery resources.

It is important to note the USACE changed key elements of the project leading up to and since submitting the EFH Assessment, including realigning the storm surge wall to now incorporate the previously unimpacted Vardell Creek, further impacting Vardell Creek by adding a storm gate, and changing the fishery resources benefiting from the proposed mitigation. In addition, the current mitigation plan does not fully account for all the proposed impacts to tidal creeks and salt marshes. These changes are not unusual for a project in early planning stages, and the USACE has noted much of the information NMFS requested for the EFH consultation will only become available during the pre-construction, engineering, and design (PED) phase of the project. While deferring the EFH consultation to the PED phase would help both the USACE and NMFS to better understand the project's affects and risks to public-trust, living marine resources, the USACE maintains deferring the consultation is not practicable. Accordingly, the recommendations below focus on the PED phase and NMFS will likely amended the recommendations during PED as more information becomes available.

#### *Impacts to Essential Fish Habitat*

The EFH Assessment identifies a minimum of 34.8 acres of EFH requiring compensatory mitigation. This reflects adverse effects due to direct losses of salt marsh wetlands within the footprint of the wall (including the buffer region), as well as EFH located landward of the storm surge wall. This number does not include impacts at Vardell Creek. This number also does not include adverse impacts to EFH located near pumping station outfalls, downstream of storm gates, or waterward of the buffer region the USACE is using to estimate losses of salt marsh.

While the NMFS appreciates the supplemental information provided by the USACE, the NMFS continues to need to evaluate whether project operations (especially water discharges) will adversely affect emergent marsh, tidal creeks, and benthic habitat along the Ashley and Cooper Rivers used by fishery species, their prey, and species protected under the Endangered Species Act. The permanent pumping stations of greatest concern are those at Joe Riley Stadium, Long Lake, New Market, and Halsey's Creek due to their proximity to emergent wetlands and tidal creeks. Water quality impacts from discharges resulting from opening the gates and pumping concentrated stormwater are a concern. The USACE's current modeling is incomplete as it focuses only on the quantity of water discharged, not the quality. The modeling also needs updating because it assumed more discharge gates than currently planned. In the EFH Assessment (page 36), the USACE acknowledges pump discharges may adversely affect habitat outside the wall. Give the constraints the USACE is under to complete the feasibility phase of the



Charleston Study, the most practicable path forward is the USACE committing to developing an adaptive management plan during PED to verify project impacts during project construction and operation and to use the results to adjust mitigation amounts and the project's operation protocols.

NMFS also has concerns related to adverse impacts to EFH waterward of the wall. As described in Section 6.3.2 of the draft FR/EIS, reflected wave energy may adversely impact EFH waterward of the wall. There also is uncertainty regarding possible effects from release of water held behind storm gates; these effects will likely depend on gate operation (frequency and duration), which will remain unknown until the PED phase. The USACE and City could address these adverse impacts waterward of the wall by establishing a vegetation and water quality monitoring program within targeted salt marshes. This monitoring could assess if impacts are within the ranges mitigated so the USACE and/or City could provide additional mitigation if needed. The City also could use results from this monitoring to optimize project operation.

The supplemental information the USACE provided briefly discussed plans to create living shorelines along large sections of the Ashley River; however, the information needed to address NOAA's Guidance for Considering the Use of Living Shorelines and state guidelines will not become available until the PED phase. While the NMFS supports using living shorelines generally, especially to stem erosion, we recommend the USACE establish during PED an interagency team to finalize design of living shoreline features to ensure the design meets NOAA and state guidelines.

Due to changes in the project and compensatory mitigation commitments since the release of the draft FR/EIS and EFH Assessment, the project needs a new mitigation plan describing the full offsetting of project-related impacts. During a meeting on December 6, 2021, with the Cooperating Agencies, the USACE substantially revised the focus of the mitigation by choosing an approach benefiting fishery resources within the Savannah River estuary, rather than the Charleston Harbor estuary. In addition, the mitigation plan does not consider the impacts for all tidal creeks, including Vardell Creek. For more than ten years, the NMFS has opposed using benefits to fishery resources in the Savannah River estuary to offset impacts within Charleston Harbor due to the mismatch in location, landscape position, and salinity regime. The USACE should develop a new mitigation plan focused on benefiting Charleston Harbor resources and include all impacts to salt marshes and tidal creeks affected by the project. The NMFS recommends coupling the mitigation plan to the monitoring plan discussed previously to increase the amount of mitigation if monitoring shows more impacts occur than anticipated.

### **EFH Conservation Recommendations**

Section 305(b)(4)(A) of the Magnuson-Stevens Act requires the NMFS to provide EFH Conservation Recommendations for any federal action or permit which may result in adverse impacts to EFH. Therefore, the NMFS recommends the following to ensure the conservation of EFH and associated fishery resources:

1. The USACE should develop during PED and implement during and after construction a vegetation and water quality monitoring program for the salt marshes waterward of the storm surge wall and buffer zone. Results from this adaptive management plan should be used to evaluate the actual impacts from the project and to adjust the amounts and types of the compensatory mitigation needed to fully offset the impacts.
2. The USACE should follow the best practices outlined in the NOAA's Guidance for Considering the Use of Living Shorelines as well as state guidelines when finalizing the designs for the proposed living shorelines. Given the broad community interest in the living shorelines and frequent changes to the underlying science and engineering, an interagency team should be assembled during PED for finalizing the designs of the living shorelines and overseeing their construction.



3. The USACE should develop a mitigation plan focusing on benefiting public-trust, living marine resources within the Charleston Harbor estuary. The amounts and types of the mitigation should account for all impacts to tidally influenced habitat, including Vardell Creek. Mitigation amounts should be adjusted based results of the monitoring program discussed above. An interagency team should be assembled during PED to finalize the mitigation plan.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and implementing regulation at 50 CFR Section 600.920(k) require the Charleston District to provide a written response to this letter within 30 days of its receipt. If it is not possible to provide a substantive response within 30 days, an interim response should be provided. A detailed response then must be provided ten days prior to final approval of the action. The detailed response must include a description of measures proposed by the Charleston District to avoid, mitigate, or offset the adverse impacts of the activity. If the response is inconsistent with an EFH conservation recommendation, a substantive discussion justifying the reasons for not following the recommendation must be provided.

*Closing*

NMFS appreciates the opportunity to provide these comments. Please direct related correspondence to the attention of Cindy Cooksey at our Charleston Area Office. She may be reached at (843) 481-0496 or by e-mail at [Cynthia.Cooksey@noaa.gov](mailto:Cynthia.Cooksey@noaa.gov).

Sincerely,

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WILBER.THOMAS.PAYSON.13658  
20186  
Date: 2022.04.18 15:36:01 -04'00'

/ for

Virginia M. Fay  
Assistant Regional Administrator  
Habitat Conservation Division

cc: COE, Nancy.A.Parrish@usace.army.mil, Hannah.F.Hadley@usace.army.mil,  
Bethney.P.Ward@usace.army.mil  
DHEC, trumbumt@dhec.sc.gov  
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May 16, 2022

F/SER47:CC/pw

(Sent via Electronic Mail)

Colonel Andrew Johannes, District Commander  
Charleston District, U.S. Army Corps of Engineers  
69 Hagood Avenue  
Charleston, SC 29412

Attention: Nancy Parrish, Hannah Hadley, Bethney Ward

Dear Commander Johannes:

NOAA's National Marine Fisheries Service (NMFS) reviewed the correspondence, dated May 11, 2022, from the U.S. Army Corps of Engineers (USACE) responding to the Essential Fish Habitat (EFH) recommendations the NMFS provided for the Charleston Peninsula Coastal Storm Surge Risk Management Study (Charleston Study). By letter dated April 18, 2022, the NMFS recommended:

1. The USACE should develop during PED [Pre-construction Engineering and Design] and implement during and after construction a vegetation and water quality monitoring program for the salt marshes waterward of the storm surge wall and buffer zone. Results from this adaptive management plan should be used to evaluate the actual impacts from the project and to adjust the amounts and types of the compensatory mitigation needed to fully offset the impacts.
2. The USACE should follow the best practices outlined in the NOAA's Guidance for Considering the Use of Living Shorelines as well as state guidelines when finalizing the designs for the proposed living shorelines. Given the broad community interest in the living shorelines and frequent changes to the underlying science and engineering, an interagency team should be assembled during PED for finalizing the designs of the living shorelines and overseeing their construction.
3. The USACE should develop a mitigation plan focusing on benefiting public-trust, living marine resources within the Charleston Harbor estuary. The amounts and types of the mitigation should account for all impacts to tidally influenced habitat, including Vardell Creek. Mitigation amounts should be adjusted based results of the monitoring program discussed above. An interagency team should be assembled during PED to finalize the mitigation plan.

The USACE has responded by adopting conservation recommendations 1 and 2 and by partly adopting conservation recommendation 3. In response to all three conservation recommendations, the USACE committed to work with NMFS during PED, directly or as part of interagency coordination teams, to address these issues to support the habitat goals of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) for this project. While the USACE did not reduce the overall project area potentially affecting EFH, the



USACE's application of the conservation recommendations should increase the likelihood of recovery of impacted habitats and decrease the likelihood of unmitigated impacts beyond the project area. The NMFS notes the USACE has complied with section 305(b)(4)(B) of the Magnuson-Stevens Act and 50 CFR 600.920(k)(1).

The NMFS appreciates the opportunity to provide these comments, and we look forward to continuing to work with the USACE on this important project. Please direct related correspondence to the attention of Cindy Cooksey at our Charleston Area Office. She may be reached at (843) 481-0496 or by e-mail at [Cynthia.Cooksey@noaa.gov](mailto:Cynthia.Cooksey@noaa.gov).

Sincerely,

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