Coastal Storm Damage Risk Management Project
Validation Report
Edisto Beach, South Carolina

US Army Corps of Engineers
Charleston District
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1. Study Overview

1.1 Purpose

The U.S. Army Corps of Engineers, Charleston District, (USACE) is conducting this validation report to reexamine and verify the findings of the "Final Integrated Feasibility Report and Environmental Assessment, Coastal Storm Damage Reduction (CSDR) General Investigation Study, Edisto Beach, Colleton County, South Carolina" (FFR/EA or feasibility report), (USACE, 2014). This validation report will verify conditions, project description, and environmental effects described in the feasibility report are still valid as well as describe changes to the project since congressional authorization. The project was authorized to be carried out under the Water Infrastructure Improvements for the Nation Act of 2016 (WIIN Act, 2016). Authorization text can be found in Title 1, subtitle D, section 1401 of the WIIN Act, 2016. Construction funds were not appropriated until the Bipartisan Budget Act of 2018 (Public Law 115-123, Title IV). The Bipartisan Budget Act of 2018 appropriated supplemental funding for disaster recovery projects that have been previously authorized. Edisto Beach was on the list of projects to be funded for construction.

The authorized project consists of the construction of a dune to the elevation of 15-feet NAVD 88 and top width of 15-feet beginning at the northern end of the project and extending southward along the beach for 16,530 feet. This dune would be fronted by a berm at an elevation of 7-feet NAVD 88. The first 7,740 feet of berm length would have a width of 75 feet. The width would taper to 50-feet over the remaining length of the berm. The width of each end of the berm would taper to match the existing beach profile. Beginning at the southern end, the dune would transition to an elevation of 14-feet NAVD 88 and a top width of 15-feet that extends around the end of the island for 5,290 feet. No berm would be constructed in front of this dune because the existing beach profile provides an adequate berm. Total groin lengthening would equal 1,130 feet across 23 existing groins. Average lengthening would be 50 feet ranging between 20-feet and 100-feet per groin. Periodic nourishment of the beach sand would occur in 16-year intervals (USACE, 2014).

The authorized project would require about 924,000 cubic yards of borrow material for initial construction and about 476,000 cubic yards during each periodic nourishment cycle (based on 16 year intervals). During the projected 50 year project life, this would equate to initial construction and 3 periodic nourishment events. A total of about 2.4 million cubic yards of beach-compatible sand would be needed to construct and maintain the project (USACE, 2014) and (Fig. 1).

It is worth noting that the Edisto Beach State Park shoreline was initially a part of the study area. However, it was not included in the Recommended Plan because of a lack of existing infrastructure needed to generate enough benefits to justify the cost to protect that portion of beach. The recommended plan provides for coastal storm damage reduction of buildings and other infrastructure; protects the only evacuation route; protects important sea turtle and shorebird habitat; preserves existing recreation opportunities; and has the full support of the local sponsor and stakeholder agencies (USACE, 2014).

Protracted beach erosion has occurred at Edisto Beach as a result of five additional years of accumulated erosion and two federally declared coastal storm disasters since authorization of the project described in the feasibility report (Robert T. Stafford Disaster Relief and Emergency Assistance Act Pub. L. § 100, 707 U.S.C. 102, FEMA, 2016 and FEMA 2017). The purpose of this Validation Report is to update the cost and to demonstrate that the project remains justified for initial construction and the remaining periodic nourishment. For this Validation Report there are no significant changes to the project design function. The benefit used for the last authorizing document, 2014 Chief's Report, will be used with the new cost to estimate the benefit-cost-ratio over the 50-year Federal participation in the authorized project. The product is a validation report that will be used to inform the USACE Division Commander on allocating the supplemental appropriations.

Figure 1. 2014 authorized project (USACE, 2014).

1.2 Project Area

The Town of Edisto Beach is 45 miles southwest of Charleston, South Carolina and 20 miles northeast of Beaufort, South Carolina in southeastern South Carolina (Fig. 1). In 1975, the Town left Charleston County to become a part of Colleton County (Town of Edisto Beach, 2011).

Topography

Edisto Beach is bounded by Charleston County to the north, St Helena Sound to the southwest, and the Atlantic Ocean to the east. Big Bay Creek, Scott Creek, Jeremy Creek and salt marsh separate Edisto Beach from the main body of Edisto Island. The Town of Edisto Beach has a beachfront that is 4.4 miles long. The maximum width of the town is 1.5 miles including both high ground and marsh (Google Earth, 2020). There are 920 acres of high land and 464 acres of salt marsh (USACE, 2014). Elevations on the island range from sea level to 20 feet above sea level (9.1 m). Edisto Beach provides 63 percent of the sandy beachfront in Colleton County.

Geomorphology

Edisto Beach is at the southern end of what was once a classical prograding drumstick shaped barrier island common in South Carolina. Over time, a net longshore transport divergence has opened new tidal inlets (Frampton Inlet, Jeremy Inlet and an un-named inlet). Shoal features have developed at these inlets resulting in a loss of littoral sediments. Continued erosion has reduced the central barriers to little more than swash shoals that allow littoral material to wash over the barriers and become trapped in the coastal marshes. As a consequence, the Edisto Beach barrier island is transitioning to a landward migrating transgressive barrier island (USACE, 2014).

Shoreline Change

Net longshore sand transport along Edisto Beach is from north to south and the magnitude of the longshore sand transport rate tends to increase moving from north to south. Intra-annual reversals in the longshore transport direction at Edisto Beach can be significant and are readily observed by shoreline position changes within groin compartments. These intra-annual transport direction reversals are driven by seasonal changes in the incident wave direction. Generally, during the stormier late fall/winter/early-spring seasons, net transport direction is to the south, whereas during the milder weather in the late-spring and summer season the net transport direction is often directed to the north. Appendix A of the feasibility report shows the shoreline is largely erosional and a resultant decrease in beach width can be expected to occur in the future without project scenario (USACE, 2014).

Sea-level Rise

Consistent with guidance provided in Appendix C of ER 1105-2-100, an analysis of sea-level rise was conducted for incorporation into the 2014 Feasibility report (USACE, 2000 and USACE, 2014) and updated in this report. The purpose of the analysis is to examine whether the future with-project condition defined by the recommended plan in the Feasibility Report adequately addresses sea-level rise concerns at Edisto Beach for the 50-year period of analysis.

Relative sea-level trends (RSL or trend) are monitored by the National Oceanic and Atmospheric Administration (NOAA). NOAA measures relative sea-level trends using tide gauge measurements made with respect to a local fixed reference on land (NOAA, 2019). Edisto Beach is located between Charleston, SC and Savannah, GA where NOAA maintains tide gauges. This validation report assumes that sea-level rise near Edisto Beach will be within the very narrow range predictions for sea-level rise at these locations as shown in Table 1.

Table 1. Sea-Level Rise Predictions over the Life of the Project.

	Probability of Occurrence	
	50%	1%
2050		
Charleston, SC	29.6 in.	54.6 in.
Savannah, GA	29.5 in.	54.5 in.
2075		
Charleston, SC	44.7 in.	84.7 in.
Savannah, GA	44.6 in.	84.6 in.

1.3 Authorization and Prior Reports

Authorization

Technical feasibility, economic justification, and environmental acceptability for the Edisto Beach CSDR project were originally described in the feasibility report. In 2014, the Chief of Engineers submitted a report to the Secretary of the Army recommending authorization to construct the project (USACE, 2014). Congress agreed and authorized construction of the project by including it in the WIIN Act of 2014.

Prior Studies at Edisto Beach

The following studies have been previously conducted at Edisto Beach and are described in more detail in the feasibility report (USACE, 2014):

- A report on beach erosion at Pawleys Island, Folly, Edisto and Hunting Island Beaches, South Carolina was prepared in 1952. That report concluded that the best method of protection for Edisto Beach would require a system of groins and subsequent maintenance by artificial placement of beach material.
- An Interim Hurricane Survey Report was prepared in 1967. The report recommended that no improvement for hurricane protection be undertaken at Edisto Beach.
- A National Shoreline Study Report was prepared in 1973. The report documents that the north end of Edisto Beach, at the State Park, had eroded approximately 700 feet between 1856 and 1954, while one mile up from the southern end of Edisto Beach there had been virtually no change in the shoreline position. The report also documents that the southern end of Edisto Beach had accreted significantly. At a point 0.4 mile northeast from the southern tip of Edisto Beach, the shoreline had advanced 1,600 feet between 1856 and 1933 and then had receded 150 feet between 1933 and 1954, resulting in a net gain of 1,450 feet.
- A detailed project report on beach erosion control for Edisto Beach was prepared in 1970. The report concluded that the best plan of improvement was periodic beach nourishment to arrest erosion and stabilize the beach fronting Edisto Beach State Park. The report recommended no Federal participation in a project as it was not justified economically.
- A Reconnaissance 905(b) report on beach erosion was completed in 1973. The purpose of the reconnaissance study was to consolidate data on beach erosion at Edisto Beach to determine whether further study was warranted. The report concluded that there was little justification for a Federally-supported shore protection project at the south end of Edisto Beach, due to recently constructed groins. The report also concluded that, for Edisto Beach State Park, it was impossible to justify Federal participation in the cost of shore protection measures for that length of the beach.
- A Reconnaissance 905(b) report for storm damage reduction completed 1990. The report recommended that further Federal participation to alleviate storm damages at Edisto Beach was warranted. Upon completion, the sponsor opted to pursue another course of action for beach erosion control.
- A Reconnaissance 905(b) report was completed in 2006. This report recommended a feasibility report.
- There were non-federal beach nourishment projects at Edisto Beach in 1995, 2006, and 2016. The 2016 project placed 1,006,000 cubic yards of sand (Fig. 2) and lengthened 26 groins by 1,765 linear feet (Fig. 3). Costs of the project totaled $18,850,932 (SCDHEC, 2020), (USACE, 2020). The construction of the groins have been verified to meet or exceed the authorized project (USACE, personal communication).

1.4 Authorized Project Design

The authorized project consists of the construction of a dune to the elevation of 15-feet NAVD 88 and top width of 15-feet beginning at the northern end of the project and extending southward along the beach for 16,530 feet. This dune would be fronted by a berm at an elevation of 7-feet NAVD 88. The first 7,740 feet of berm length would have a width of 75 feet. The width would taper to 50-feet over the remaining length of the berm. The width of each end of the berm would taper to match the existing beach profile. Beginning at the southern end, the dune would transition to an elevation of 14-feet NAVD 88 and a top width of 15-feet that extends around the end of the island for 5,290 feet. No berm would be

constructed in front of this dune because the existing beach profile provides an adequate berm. Total groin lengthening would equal 1,130 feet across 23 existing groins. Average lengthening would be 50 feet ranging between 20-feet and 100-feet per groin. Periodic nourishment of the beach sand would occur in 16-year intervals (USACE, 2014).

The authorized project would require about 924,000 cubic yards of borrow material for initial construction and about 476,000 cubic yards during each periodic nourishment cycle (based on 16 year intervals). During the projected 50 year project life, this would equate to initial construction and 3 periodic nourishment events. A total of about 2.4 million cubic yards of beach-compatible sand would be needed to construct and maintain the project (USACE, 2014).

2. Overview of Conditions

2.1 Introduction

The conditions, project description, and environmental effects described in the FFR/EA are still valid. This validation report is designed to provide supplemental information to document compliance with National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) regulations and economic justification of the change in construction conditions. Supplementation of the FFR/EA is not required per 40 CFR 1502.9c because substantial changes to the proposed action have not occurred nor do the changes have significant bearing on the findings of the FFR/EA.

2.2 Economic Conditions

Demographics

The Town of Edisto Beach had an estimated population of 582 people in 2017. This is down 10% from the 2016 estimate. Five-hundred and fifty-nine people identify their races/ethnicity as white alone. Sixteen people identify as two or more races and 5 people identify as Asian alone (Data USA, 2020). The median age of people living in Edisto Beach is 66.5 years old. The median household income is $80,833 and the property value is $378,000. The poverty rate is 3.95%. Males between the ages of 45 and 54 are the largest demographic living in poverty in the Town of Edisto Beach. That is followed by females 65-74 then males over 75. All people living in poverty in the Town of Edisto Beach are white (Data USA, 2020).

Economy

As reported by Data USA, the economy of Edisto Beach, SC, employs 194 people with an employment rate of 30.8%. The largest industry is Retail employing 29 people followed by Accommodation & Food Services (20 people), then Health Care & Social Assistance (19 people). The highest paying industry in the Town of Edisto Beach is Construction with an average annual income of $91,250 followed by Retail ($65,313), then Professional, Scientific, & Technical Services ($63,750). Males employed in Edisto Beach, SC, have an average income of $56,080 which is 1.37 times higher than the average income of females. Female workers income on average $40,985 per year (Data USA, 2017). The Gini value (a measure of wealth distribution) between males and females in the Town of Edisto Beach, SC, is 0.46 or 46%. A Gini value of 0 (or 0%) represents perfect equality and a Gini value of 1 (OR 100%) represents perfect inequality (Farris, 2010). The Gini value for the United States using data from 2000 is 0.41 or 40.8% (United Nations Development Programme, 2006). Wage inequalities by race and ethnicity are not available for individual places in the state (Data USA, 2017).

Housing and Living

The median property value in Edisto Beach is $378,000. This is a property value decrease of 7.94% from 2016. Average property value for the nation is $229,700 (Data USA, 2017).

In 2017, the median annual income of households in Edisto Beach, SC, was $80,833. This was down 6.28% from the year before, but well above the median annual income for Colleton County, the State of South Carolina, and the Nation (Data USA, 2017).

2.3 Engineering Conditions

In 2016, the Town of Edisto Beach entered into an agreement with Marinex Construction Inc. for a beach nourishment project. More than 950,000 cubic yards were dredged and placed onto 19,300 linear feet of beach and 26 groins were lengthened. Sand placement cost $11.6 million and groin lengthening cost $5.3 million (Conceptrix, LLC, 2020). The project described in this validation report is the authorized project excluding the sand placed and the groin work done in 2016. The groin work has been reviewed by district engineers and it meets or exceeds what was authorized in the Chief's Report (USACE, personal communication), (USACE, 2014).

3. The Environment

This section was prepared in accordance with Section 13(d) of Engineer Regulation (ER) 200-2-2, *Procedures for Implementing the National Environmental Policy Act (NEPA)*, (USACE, 1988) and the Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] Parts 1500-1508). This section will describe federal and state consistency updates that occurred after project resumption in 2016. The conditions, project description, and environmental effects described in the FFR/EA are still valid, and this section is designed to provide supplemental information to document compliance with the National Environmental Policy Act and the Council on Environmental Quality regulations. Supplementation of the FFR/EA is not required per 40 CFR 1502.9c because substantial changes to the proposed action have not occurred nor do the changes have significant bearing on the findings of the FFR/EA.

3.1 Background

The Edisto Island FIFR/EA was conducted in response to a Congressional Resolution adopted on 22 April 1988 by the Committee on Environment and Public Works of the United States Senate. The study purpose was to investigate and make recommendations to reduce damages to coastal development along Edisto Island caused by wind-generated and tide-generated waves and currents. The Finding of No Significant Impacts (FONSI) was signed in 2014 and the study phase ended on 5 September 2014 with the issuance of the final Chief's Report. The project was authorized for construction by WIIN Act of 2016. However, construction was not appropriated for funding until the Bipartisan Budget Act of 2018 (Public Law 115-123, Title IV).

3.2 Compliance with Environmental Requirements

Borrow Area

The 2014 EA identified one borrow area for the nourishment of Edisto Island. The sand borrow area for the project is an approximately 1 square mile portion of the ebb tide delta located about 2 miles offshore of the west side of the island (Figure 4). It contains approximately 7.2 million cubic yards of beach quality material. The curves in the northern and eastern corners of the borrow area are due to cultural resource avoidance areas associated with two potential sites of prehistoric interest. Both areas will be avoided using a buffer with a radius of 1,500 feet placed around the center points. No hardbottom habitat was found in the borrow area or within a quarter mile buffer surrounding the area. The proposed borrow area was narrowed down from a larger area containing about 30 million cubic yards of material. In 2008, the larger area was evaluated and characterized based on 77 cores taken at approximately 1,000 foot spacing throughout the site (CSE, 2008). The average sediment composition of the borrow area, as compared to the composition of the native beach, is shown in Table 2. No other potential borrow areas

were considered because the selected borrow area contains an adequate quantity of beach quality material to nourish Edisto Beach over a 50 year period.

Table 2. Average Sediment Composition of Native Beach Material and Borrow Area.

	MEAN (phi)	STD DEV (phi)	% Passing #5	% Passing #10	% Passing #200*	% Passing #230	% Visual Shell
Edisto Native Beach	1.31	1.33	97.8	93.5	0.1	0.0	26.9
Borrow Area	1.75	1.31	94.7	90.0	.04	.02	18.8

*The % passing the #200 sieve is considered the % silt and clay.

National Environmental Policy Act of 1969 (42 U.S.C. §4321 *et seq*.)

USACE has previously described the affected environment and evaluated environmental effects of the Edisto Island Coastal Storm Risk Management Project in the 2014 FIFR/EA. The EA determined that the impacts from the proposed project would not result in impacts significant enough to warrant an Environmental Impact Statement (EIS) and led to a FONSI finalized in 2014. NEPA for the Federal project was also addressed under the Town's 10/404 permit. The findings of the 2014 EA/ FONSI and the EA/FONSI associated with the 10/404 permit are still valid as applied to the current Federal project.

Endangered Species Act of 1973 (16 U.S.C. §1531 *et seq*.)

Consultation with the U.S. Fish and Wildlife Service (USFWS) consistent with the Endangered Species Act (ESA) was completed for the 2014 EA. The January 9, 2014 Biological Assessment (BA) considered the effects of the proposed project on threatened and endangered species either known to be present or suspected to be present in the vicinity of the project. Based on conservation measures proposed in the BA, the USFWS concurred with the USACE determination that the proposed project was likely to adversely affect (LAA) the loggerhead sea turtle and not likely to adversely affect (NLAA) the leatherback sea turtle, piping plover, rufa red knot, and West Indian manatee. USFWS issued a 2014 Biological Opinion (BO) for the loggerhead sea turtle, the leatherback sea turtle, piping plover, and West Indian manatee, and a 2014 Conference Opinion (CO) for the red knot. By email dated February 6, 2020, USFWS advised that the current Federal project could be covered under a 2016 USFWS Biological Opinion (2016 BO) issued for the Town of Edisto Island Beach Nourishment Project (TEIBNP) because the Federal project footprint falls within the confines of the TEIBNP. USFWS advised the need for a formal request to adopt the 2016 BO for the Federal project since the 2014 consultation involved a Conference Opinion. A request to re-initiate consultation was submitted in March 2020. The 2016 BO addresses effects on the green sea turtle, leatherback sea turtle, Northwest Atlantic population of the loggerhead sea turtle and its critical habitat, piping plover and its critical habitat, rufa red knot, and the West Indian manatee. USFWS determined that the Town's project was not likely to adversely affect the green sea turtle, leatherback sea turtle, piping plover, rufa red knot, and West Indian manatee. The project may affect but is not likely to adversely affect the loggerhead turtle, or adversely modify or destroy designated critical habitat, provided work is performed in accordance with the terms and conditions (including reasonable and prudent measures, and conservation recommendations) contained in the 2016 BO. Incidental take of listed species that is in compliance with the terms and conditions of the 2016 BO is exempt from the prohibitions against take under the ESA. These terms and conditions will be incorporated into this and all future federal nourishment efforts. Consultation with the National Marine Fisheries Service with regard to marine species protected under the ESA is not required due to the

applicability of a Regional Biological Opinion (RBO) for the South Atlantic Region and the District's past and present commitment to adhere to the Terms and Conditions of the RBO.

Fish and Wildlife Coordination Act of 1958 (16 U.S.C. §661 *et seq.*)

Coordination with USFWS under this law was conducted through ongoing coordination and submission of Planning Aid letters as the project progressed. By letter dated January 25, 2012, the USFWS concurred that continued coordination and submission of necessary documentation or assessments would satisfy Section 2a of the FWCA and ensure that potential resource concerns would be adequately addressed. Since the project scope provided in the FFR/EA has been reduced, the storm damage reduction activities associated with the Federal project should not result in long-term adverse effects to the subtidal benthic infaunal community. Therefore, the findings are still valid.

National Historic Preservation Act of 1966 (16 U.S.C. §1531 *et seq*.)

Federal undertakings will comply with the Archaeological and Historical Preservation Act of 1974 (16 USC 469-469c), the Abandoned Shipwreck Act of 1987 (PL 100-298; 43 USC 2101- 2106), The National Historic Preservation Act (NHPA) of 1966, as amended (54 USC 306108) and the Advisory Council on Historic Preservation's implementing regulations 36 CFR Part 800 (protection of Historic Properties). Section 106 of NHPA requires Federal agencies to consider the impacts their undertaking may have on historic properties. The placement of sand on beaches and the use of sand from underwater borrow sites are typically subjected to cultural resources investigations in order to locate potentially significant resources, including historic properties for purposes of NHPA Section 106 review. There are no historical or archaeological resources within the beach nourishment zone which would be affected by the placement and movement of sand. A comprehensive cultural resources review was conducted in February 2013 for the proposed offshore borrow area, including a quarter mile buffer around the area. Two potential sites of prehistoric interest were identified in the survey area. The survey report was reviewed by the South Carolina Institute of Archaeology and Anthropology (SCIAA), and the South Carolina State Historic Preservation Office (SHPO). By letter dated April 12, 2013, SCIAA concurred with the recommendation to place a 1,500 ft. buffer zone around arbitrary points for the two sites as potential paleolandscape features. SCIAA advised that no additional surveys would be required.

Clean Water Act of 1972 (33 U.S.C. §1341 *et. seq*. and 33 U.S.C. §1344(b) *et seq.*)

The proposed project would occur within the open ocean and on an adjacent beach. These waters are classified as Class SA waters by the SC Department of Health and Environmental Control (SCDHEC). Class SA waters are tidal saltwaters suitable for primary and secondary contact recreation, crabbing, and fishing, except harvesting of clams, mussels, or oysters for market purposes or human consumption. They are also suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora. A 401 Water Quality Certification is not required for this project. SCDHEC has determined that beach nourishment activities have very few water quality impacts and has waived certifications for beach nourishment activities. Section 404 of the Clean Water Act governs the discharge of dredged or fill material into waters of the U.S. Although the USACE does not process and issue permits for its own activities, the USACE authorizes its own discharges of dredged or fill material by applying all applicable substantive legal requirements, including public notice, opportunity for public hearing, NEPA, and application of the Section 404(b)(1) guidelines. A Section 404(b)(1) evaluation was completed for the 2014 FFR/EA and more recently for the 10/404 permit issued to the Town. The findings of these evaluations are still valid as applied to the current Federal project.

Coastal Zone Management Act of 1972 (16 U.S.C. §1451 et seq.)

USACE determined that the project was consistent to the maximum extent practicable with the enforceable policies of the South Carolina Coastal Zone Management (CZM) Program and the Office of Coastal Resource Management (OCRM) concurred with the USACE determination by letter dated

December 23, 2019. By e-mail dated January 14, 2020, OCRM confirmed that the 2013 Coastal Zone Consistency determination would remain valid and nothing further would be required.

Coastal Barrier Resources Act of 1982 (16 U.S.C. §3501 et seq.) and Coastal Barrier Improvement Act of 1990 (16 U.S.C. §3501 *et seq.*)

Coastal barriers along the Atlantic and Gulf coasts provide quality habitat for migratory birds and other wildlife. This habitat is essential for spawning, nursery, nesting, and feeding for a variety of commercially and recreationally important species of finfish and shellfish. Recognizing this and the fact that barrier islands contain recreational and cultural resources and serve as natural protective buffers from storms, Congress passed the Coastal Barrier Resources Act in 1982. In this Act, Congress declared that the purpose of the act is to minimize the loss of human life, wasteful expenditure of Federal revenues, and the damage to fish, wildlife, and other natural resources by restricting future Federal expenditures and financial assistance that could potentially encourage development of barrier islands (16 U.S.C. 3501 et seq.).

The Town of Edisto Beach lies between two Coastal Barrier Resources Systems (CBRS) units, the Edisto Complex Unit (M09 and M09P) and the Otter Island Unit (M10) (Figure 5). Unit M09P is an "Otherwise Protected Area" (OPA) and is not a part of the CBRS. The Edisto Unit is composed of three small marsh islands, Botany Bay Island, Edingsville Beach, part of Jeremy Inlet, and Deveaux Bank. The Otter Island Unit includes the southwestern half of the South Edisto River, Pine Island, Otter Island, and the southeastern tips of Fenwick Island and Hutchinson Island. By letter dated January 27, 2010, the USFWS confirmed that the proposed borrow area is not located in the CBRS.

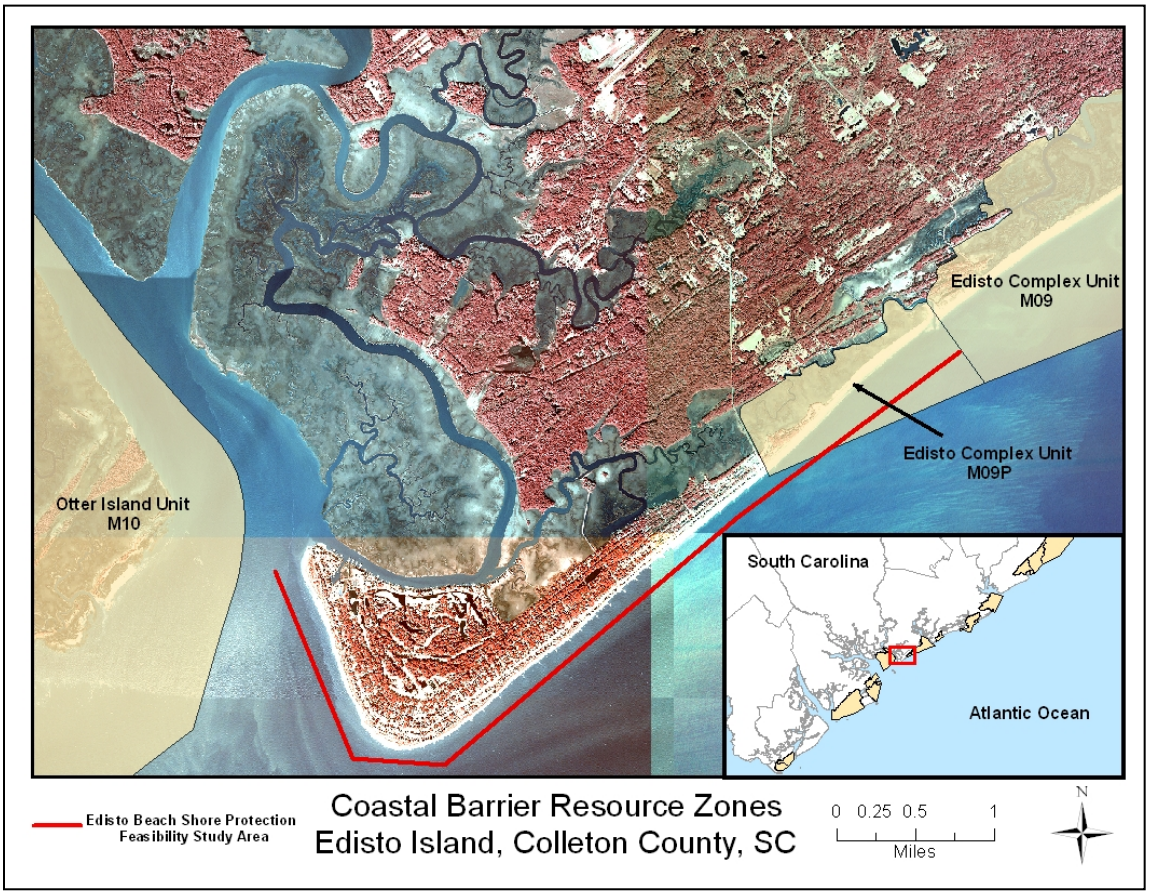

Figure 2. Location of Coastal Barrier Resource Zones in the vicinity of the project area.

Essential Fish Habitat (EFH) Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §1801 *et seq.)*

EFH is defined in the Magnuson-Stevens Fishery Conservation and Management Act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. 1802(10)." The definition for EFH may include habitat for an individual species or an assemblage of species, whichever is appropriate within each Fisheries Management Plan (FMP). Estuarine and inshore EFH within the vicinity of the project consists of the estuarine water column and wide expanses of salt marsh. An EFH Assessment was prepared for the 2014 FFR/EA and National Marine Fisheries Service (NMFS) concurred with the USACE determination that the proposed action would not have substantial individual or cumulative adverse impacts on EFH. In addition, an EFH assessment and consultation was conducted for the 10/404 permit for the Town's project in 2016, and that project has a larger geographic scope and similar ecological setting.

Clean Air Act of 1972 (42 U.S.C. §7401 *et seq.*)

The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to establish health and science-based standards for air pollutants that have the highest levels of potential harm to human health or the environment. These National Ambient Air Quality Standards (NAAQS) are in place for six air pollutants, also referred to as criteria pollutants. The six criteria pollutants are Ozone, Sulfur Dioxide, Particulate Matter, Lead, Nitrogen Dioxide, and Carbon monoxide. Of the six current criteria pollutants, particle pollution and ozone have the most widespread health threats, but they all have the potential to cause damage to human health and the environment. Areas of the country which persistently exceed the NAAQS are designated as "nonattainment" areas and those which meet or exceed the standards are designated "attainment" areas. Colleton County is designated as an attainment area. With regards to noise pollution, ambient noise levels along Edisto Beach are low to moderate and are typical of recreational environments and are not considered an issue or nuisance. The major noise producers include the breaking surf, residential areas, and traffic (vehicular and to a lesser extent, boat). Noise in the outside environment associated with beach construction activities would be expected to minimally exceed normal ambient noise in the project area. However, construction noise would be attenuated by background sounds from wind and surf. In-water noise would be expected in association with the dredging activities.

E.O. 11988, Floodplain Management

Executive Order 11988 requires Federal agencies avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The proposed project is in the base flood plain. Relocation of the project outside the floodplain would not be responsive to the problems and needs of the study areas, and was not considered further during project planning. Potential floodplain development would be restricted as a result of local ordinances and State law. The project would not induce development in the flood plain and the project will not impact the natural or beneficial flood plain values. This aspect was previously addressed in the FFR/EA and in the 10/404 permit issued to the Town.

3.3 Summary of Decision

USACE previously described the affected environment and evaluated environmental effects associated with the Edisto Island Coastal Storm Risk Management Project in the FFR/EA and determined the project would not result in impacts significant enough to warrant an EIS. USACE also evaluated the environmental effects of the Federal project in an EA/FONSI for the 10/404 permit issued to the Town which authorized groin extension and beach nourishment activities along 3.6 miles of shoreline, including the footprint of the Federal project. The Town completed the beach nourishment activities authorized under the 10/404 permit in 2017. The timing and scope of the Town's Federally-permitted project reduced the scope and the CY volume for the Federal civil works project. The revised Federal project will

involve placement of approximately 830,000 CY of beach quality sand to construct a 15-foot high, 15-foot wide dune and 7 foot high berm along 16,150 lf of shoreline. The modifications to the Federal project have been reviewed by the USACE for environmental compliance, and are not expected to result in any significant adverse environmental impacts as described by the National Environmental Policy Act of 1969.

4. Validation of Modified Project

4.1 Construction Modifications

Modifications to the authorized project consist of work done by the Town of Edisto Beach including more than 950,000 cubic yards of beach fill placed onto 19,300 linear feet of beach and the modification (lengthening) of 26 groins. Further, the two inlet reaches have been removed from the project footprint (Figure 3).

Figure 3. Modified project.

The modified project includes a 15-foot high (elevation), 15-foot wide dune beginning at the northern end of the project (the southern end of Edisto Beach State Park) and extending southward along the beach for 16,530 feet. This dune would be fronted by a 7-foot high (elevation) berm. The first 7,740 feet of berm length would have a design width of 75 feet (Table 3). The width would taper to a 50-foot design width over the remaining length of the berm. The initial construction berm would extend seaward of the design berm by a variable distance (approximately 100-150 ft.) to cover anticipated sand movement during and immediately after construction. The width of each end of the berm would taper to match the existing beach profile. Beginning at groin 29 near White Cap St., the dune would transition to a 14-foot high, 15-foot wide dune that extends around the end of the island to groin 32. No berm would be

constructed in front of this dune because the existing beach profile provides an adequate berm. 830,000 cubic yards of borrow material for the initial construction, and about 476,000 cubic yards during each periodic nourishment cycle would be needed. During the projected 50 year project life, this would equate to initial construction and 3 periodic nourishment events. A total of about 2.3 million cubic yards of beach-compatible sand would be needed to construct and maintain the project.

Table 3. Comparison of Authorized vs. Modified Project Construction Conditions.

Construction Comparisons		
Project Components	**Chief's Report**	**Modified Project**
Dune Elevation	15' (all other reaches)* 14' (inlet reach)**	15' (all other reaches) No dune (inlet reach)
Dune Width	15' (all other reaches) 15' (inlet reach)	15' (all other reaches) No dune (inlet reach)
Dune Length	16,530' (all other reaches) 5,290' (inlet reach)	16,530' (all other reaches) No dune (inlet reach)
Elevation of Berm (seaward of dune)	7' (all other reaches) No berm (inlet reach)	7' (all other reaches) No berm (inlet reach)
Berm Width (design)	75' wide for first 7,740' length of reach narrowing to 50' wide for remaining length of reach (all other reaches) No berm (inlet reach)	75' wide for first 7,740' length of reach narrowing to 50' wide for remaining length of reach (all other reaches) No berm (inlet reach)
Berm Width (initial construction - this berm is seaward of design berm)		100-150' (all other reaches)
Berm Tapers	Will match beach profile on either end of berm (all other reaches) No berm (inlet reach)	Will match beach profile on either end of berm (all other reaches) No berm (inlet reach)

* all other reaches are the reaches describe in the feasibility report from the south end of Edisto State park southeast to groin 32.
** inlet reaches are the reaches describe in the feasibility report from groin 32 northwest 5290' to the end of the island.

4.2 Cost Modifications

Based on the 2014 price level, the estimated total cost of the authorized plan is $53,871,000, which includes the project first cost of initial construction of $21,129,000 and a total of three periodic nourishments at a total cost of $32,742,000. Table 4 presents authorized project cost. The total initial construction costs of the modified project are based on the cost of beach replenishment; lands and damages; planning, engineering & design; and construction management. Costs are expressed in FY20 dollars for consistency with the costs found in the FFR/EA (Table 4).

Table 4. Authorized Project Annual Costs.

Cost Categories		FY14 Dollars
Initial Construction	$	21,129,000
1st Periodic nourishment	$	10,914,000
2nd Periodic nourishment	$	10,914,000
3rd Periodic nourishment	$	10,914,400
Total First Cost	$	53,871,000
Average Annual First Cost	$	1,418,000
O&M	**$**	**83,000**
Total Average Annual Cost	**$**	**1,501,000**

4.3 Economic Modifications

The scope of the project has changed since the Chief's Report of 5 September 2014. The Town of Edisto Beach has expressed interest in removing the inlet reaches, I1 and I2, of the project as authorized by Congress in 2014. Any changes to authorized projects must retain at least 20% of original benefits, based on the discretion of the USACE and non-federal Sponsor, without having to revisit the authorization by Congress. The project delivery team conducted an assessment of the impacts of removing the inlet reach from the authorized project.

The total benefits calculated for the authorized project are $2,545,560. Within I1 and I2, building the dune provided $374,406 benefits. Removing these reaches decreases the average annual benefit by 15 percent. The prorated benefits applied to this economic update are $2,171,154 for storm damage reduction.

The Edisto Beach periodic nourishment project will not be reformulated. The purpose of the project remains the same. The authorized project remains economically justified. Original project average annual benefits are constant over the project life. The basic plan from the Chief's Report will not be reopened for the validation report analysis. The period of analysis for initial construction and periodic nourishment period is 50 years.

4.4 Economic Benefit Assumptions

Structure Value Inventory

The primary National Economic Development (NED) benefits come in the form of storm damage reduction benefits, which are based on the number and value of property and contents within the project area located close to the shoreline. The current structural inventory was compared to that included in the 2014 Chief's Report.

In an effort to update the approximated total market value of the City's front beach structures, the Town of Edisto Beach Tax Assessor's records on the current inventory and value of structures in 2014 and 2018 were examined. Data obtained from the Non-federal Sponsor in February 2020 revealed that currently there are 760 oceanfront properties on Edisto Beach. The total estimated value of structures in 2014 was about $77,851,500 and $101,448,800 in 2018, a 30 percent increase in value in four years. A

letter obtained from the Town of Edisto Beach confirms that since 2014 all property within the project area is in good repair. Since 2014, three new structures have been built; eight structures have been demolished and rebuilt at higher value; two structures have been demolished and under construction; and four structures have been demolished and are currently vacant. None of the developments that have occurred will materially alter the assumptions that framed and supported the 2014 Chief's Report.

4.5 Benefit-Cost Ratio Update

Previously-Approved Benefits

Storm damage reduction benefits and recreation benefits from the 2014 Chief's Report were calculated at the discount rate of 3.5% based on FY14 price level. Costs and BCR from the 2014 Chief's Report are also shown in Table 5.

Table 5. Summary of Average Annual Benefits from the 2014 Chief's Report.

FY14 Price Level	Discount Rate 3.5%
Storm Damage Reduction Benefits	$ 2,894,000.00
Recreation Benefits	$ 573,200.00
Average Annual Benefits	$ 3,467,200.00
Average Annual Costs	$ 1,501,000.00
Benefit to Cost Ratio	2.3
Net Average Annual Benefits	$ 1,966,200.00

Current Project Costs Estimates

The quantity of material estimated to be placed on the project is 2.4 million cubic yards. That includes about 830,000 cubic yards of borrow material for initial construction and about 475,000 cubic yards during each periodic nourishment cycle (based on 16 year intervals).

Total project cost estimates for FY20 were used for the following calculations, based on instructions found in Section B-4-4 of EC 11-2-220 (31-March 2019). Table 6 displays the cost of periodic nourishments normalized to 2014 price level of the last approved report at the OMB 7% discount rate, FY20 discount rate (of 2.75%), project rate 3.5%, and the applicable rate 4%. These costs were normalized to 2014 price level using the Civil Works construction Cost Index System (CWCCIS) quarterly cost indexes from the September 30, 2019 report.

Table 6. Current Total Project Cost Summary 6.

Event	Year	Project Year	Base Cost	2014 Price Level PV @2.75%	2014 Price Level PV @3.5%	2014 Price Level PV @4%	2014 Price Level PV @7.0%
Initial Construction	2021	0	$19,635,000	$17,034,992	$17,034,992	$17,034,992	$17,034,992
1st Periodic nourishment	2037	16	$13,214,000	$7,427,387	$6,611,496	$6,120,852	$3,883,335
2nd Periodic nourishment	2053	32	$13,214,000	$4,812,013	$3,812,889	$3,267,973	$1,315,420
3rd Periodic nourishment	2069	48	$13,214,000	$3,117,579	$2,198,916	$1,744,798	$445,578
Total Project Cost			$59,277,000	$32,391,971	$29,658,292	$28,168,615	$22,679,326
IDC				$67,598	$86,070	$98,393	$172,475
Ave. Annual Cost				$1,202,332	$1,268,113	$1,315,835	$1,655,838

Updated BCR

The benefit cost ratio (BCR) was updated following instructions in Section B-4-4 of recently issued guidance memorandum EC 11-2-220 dated March 31, 2019. The prescribed discount rates in the guidance are the OMB rate of 7%, the current FY20 discount rate of 2.75%, and the applicable rate of 4.0%, which is defined as the rate in effect when construction funds were first appropriated for Edisto Beach. In addition, computations were done based on the last approved report's discount rate of 3.5% since the benefits are derived from the last approved report. A benefit to cost ratio for the total project

was computed for this economic update using total project cost estimates for FY20. The costs used to calculate the total average annual cost used in the benefit to cost ratio were normalized to 2014 price level so as to be consistent with the benefit stream of the last approved report.

Change in Average Annual Benefits

As already mentioned, the Town Edisto Beach has expressed interest in removing the inlet reaches I1 & I2 of the project, as authorized by Congress in 2014. Authorized projects may change up to 20%, based on the discretion of the USACE and the Non-federal Sponsor, without having to revisit the authorization by Congress. The project delivery team conducted an assessment of the impacts of removing the inlet reach from the authorized project.

The total benefit calculated for the authorized project is $2,545,560. Within I1 & I2, building the dune provided $374,406 benefit. Removing these reaches decreases the average annual benefit by 15 %. For the BCR computation, benefits were prorated according to the remaining benefits excluding the inlet reaches I1 and I2. The benefits applicable to this Validation is $2,171,154.

The total project BCR is shown in Table 7. The summary format of the BCR updates in the guidance format are shown in Table 8 for the OMB 7% discount rate and 4% applicable rate for the fiscal year of the appropriation of construction funds.

Table 7. Benefit to Cost Ratio for Total Project.

	FY20 Discount Rate at Price Level of Chief's Report	OMB Discount Rate at Price Level of Chief's Report	Last Approved Report Discount Rate	Applicable Discount Rate at Price Level of Chief's Report
Price Levels	2014 Price Level	2014 Price Level	2014 Price Level	2014 Price Level
Discount Rate	2.75%	7.00%	3.50%	4.00%
Year of Discount Rate	FY2020	OMB	FY2014	Default Rate
Annual Cost (FY14 price level)	$ 1,298,558	$ 1,752,064	$1,364,339	$1,412,061.00
Total Annual Benefits (FY14 price level)	$2,171,154*	$2,171,154	$2,171,154	$2,171,154
Net Benefits	$872,596	$419,090	$806,815	$759,093
BCR	1.67	1.24	1.59	1.54

*Annual Cost includes O&M cost of $96,226.

Table 8. Total Project Benefit Cost Ratio Update Summary

Project Name	**Edisto Beach CSDR, General Investigation Study**
Business Line	Beach Replenishment
District	South Atlantic Charleston (SAC)
BCR when initially authorized	2.3*
Date when originally authorized	2014
Title of last approved report	Edisto Beach Colleton County, South Carolina, Coastal Storm Damage Reduction General Investigations Study.
Date of last approved report	September 2014
Type of Report	Level 1 Update
Approval Authority	HQ
Discount Rate from last approved report	3.5%
Annual Benefits from last approved report (Chief's Report)	$3,467,200
Annual Cost from last approved report	$1,501,000
Annual Cost from last approved report at 7%	Not Available
Discounted Annual cost from current estimate at 7%	$1,752,064
Discounted Annual cost from current estimate at 4% (the applicable rate)	$1,412,061
BCR from last approved report	1.9**
BCR from last approved report at 7%	Not Available
Total Project BCR at 7%	1.24
Total Project BCR at applicable rate of 2.75%	1.67

*BCR listed in last approved report was 2.3 and included recreation benefits. Because benefits no longer include recreation benefits,
**BCR from last approved report is now calculated as 1.9.

4.6 Section 902 Limit Evaluation

The Edisto Beach CSDR Project was authorized after 1986, and therefore the language of the project authorization must be examined to determine the nature of the legal cost limitations imposed by Section 902 or WRDA 1986. Read in conjunction with Section 902, the language of the Edisto Beach project authorization results in a legal 902 limit for initial construction but no legal 902 limit for periodic nourishment (though there may still be an administrative limit on periodic nourishment as a matter of USACE policy). The Edisto Beach 902 limit for initial construction and any administrative limit (calculated in the same fashion as 902 limit) for periodic nourishment are summarized in Tables 9 and 10.

Table 9. Pursuant to Table G-4 (ER 1105-2-100 Appendix G)

FY20 – Thousand Dollars (000's) – Initial Construction		
Line 1		
a.	Current Project estimate at current price levels:	$19,635
b.	Current project estimate, inflated through construction:	$20,372
c.	Ratio: Line 1b / line 1a	1.0375
d.	Authorized cost at current price levels:	$24,437
e.	Authorized cost, inflated through construction:	$25,354
	(Line c x Line d)	
Line 2	Cost of modifications required by law:	$0
Line 3	20 percent of authorized cost:	$4,226
	.20 x (table G-3, columns (f) + (g)	
Line 4	Maximum cost limited by section 902:	$29,580
	Line 1e + line 2 + line 3	

Table 10. Pursuant to Table G-4 (ER 1105-2-100 Appendix G)

FY 20 – Thousand Dollars (000's) – 16-year Periodic nourishment		
Line 1		
a.	Current Project estimate at current price levels:	$39,642
b.	Current project estimate, inflated through construction:	$117,461
c.	Ratio: Line 1b / line 1a	2.9630
d.	Authorized cost at current price levels:	$37,737
e.	Authorized cost, inflated through construction:	$111,823
	(Line c x Line d)	
Line 2	Cost of modifications required by law:	$0
Line 3	20 percent of authorized cost:	$6,548
	.20 x (table G-3, columns (f) + (g)	
Line 4	Maximum cost limited by section 902:	$118,372
	Line 1e + line 2 + line 3	

5. Risk and Uncertainty

The risk and uncertainty described in this section is from the feasibility report and applies to the modified project.

The authorized plan would greatly reduce, but not completely eliminate, future storm damages. It will reduce coastal storm damages to structures and contents by approximately 62% over the 50-year life of the project. The authorized project is not designed to a particular category of hurricane or a certain frequency storm event. The berm-and-dune is not designed to prevent loss of life. The project would not prevent any damage from back-bay flooding of ground-level floors of structures and their contents or beyond the second row of houses. (USACE, 2014).

An estimated 2.3 million cubic yards of borrow material would be needed over the 50 year project. The required project volumes are well below the amount of compatible material that is estimated to be available at the offshore borrow location. The overall project is anticipated to utilize only about 25% of the total volume available at the borrow site. Therefore, the risk of running out of material over the 50 year project life is minimal (USACE, 2014).

6. Conclusions

The Validation Report provides current economic information for Edisto Beach Coastal Storm Damage Reduction project (CSDR) to confirm that, despite project modifications, the project remains economically viable. Current public access and parking was compared to the inventory of the last approved report, the 2014 Chief's Report. A survey conducted by the Town of Edisto Beach in February 2020 confirms that public parking spaces and access points have remained consistent since the last approved report. Therefore, benefits have not been limited by public parking.

The Edisto Beach CSDR project has a legal 902 limit for initial construction but no legal 902 limit for periodic nourishment. In this case, the total cost for initial construction did not exceed the administrative 902 limit for initial construction; the total cost for periodic nourishment does not exceed the administrative 902 limit for future periodic nourishment. Pursuant to the FY21 Budget Engineering Circular (EC 11-2-220 dated 31 March 2019), BCRs in the Economic Updates are to be based on primary hurricane and storm damage reduction benefits only and not include recreation benefit.

The Edisto Beach Coastal and Storm Damage Reduction Project remains justified with a BCR greater than one, without recreation benefits, for each of the applicable discount rates required pursuant to EC 11-2-220 (31-March, 2019) at the last approved report price level (2014 Chief's Report). The discount rates required by EC 11-2-220 are the OMB discount rate of 7.00%, the FY20 discount rate of 2.75%, and the applicable discount rate of 4% (default discount rate 4% applies since the project has not received funds for construction). Using the cost estimates and price level indexing all costs and benefits to the 2014 level, an updated Benefit Cost Ratio (BCR) was estimated. The results of the analysis show that the project is economically justified (without including recreation benefits) with BCR of 1.67 at the federal discount rate of 2.75%, 1.24 at the Office of Management and Budget (OMB) rate of 7.00%, and 1.54 at the applicable rate of 4.00%.

A summary of BCRs for total project for without recreation benefits for these discount rates at the 2014 Chiefs' Report price level are provided in Table 11.

Table 11. Summary of BCRs for Total Project Without Recreation Benefits

Benefits	BCR Total Project		
	FY20 2.75%	OMB 7%	Applicable Rate 4%
Without Recreation	1.67	1.24	1.54

7. Recommendation

Edisto Beach CSDR project is still economically viable. The authorized project remains economically justified by a positive benefit/cost ratio at the current discount rate, OMB rate and the applicable rate. The current cost estimate has not violated Section 902 Limit for both the initial construction and periodic nourishment. As there are agreed upon changes to the original project and based on the economic analysis, it is recommended that the initial construction of the modified project should proceed.

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