

## Appendix 10

Amendment to Biological Assessment of the  
Folly Beach Storm Damage Reduction Re-  
nourishment Project

November 2017



**US Army Corps  
of Engineers®**

**NOVEMBER 2017**

**AMENDMENT TO:**

**BIOLOGICAL ASSESSMENT  
OF THE FOLLY BEACH STORM DAMAGE  
REDUCTION RE-NOURISHMENT PROJECT  
FOLLY BEACH, SOUTH CAROLINA**

## **1.0 INTRODUCTION**

Folly Beach is located on the South Carolina coast in Charleston County, approximately 12 miles south of the downtown area of the City of Charleston and nine miles southwest of Sullivan's Island. The six-mile long island reaches from the confluence of the Stono and Folly Rivers at the west end to Lighthouse Creek at the east end. The Folly Beach Storm Damage Reduction Project, also referred to as the Folly Beach Shore Protection Project (Project), was authorized by Section 501 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, and modified by the Energy and Water Development Appropriations Act of 1992, Public Law 102-104. The purpose of the Project is to reduce damage to structures and shorefront property related to erosion and storms. Folly Beach has been renourished several times as part of the Project since the initial construction was completed in 1993, most recently in 2014.

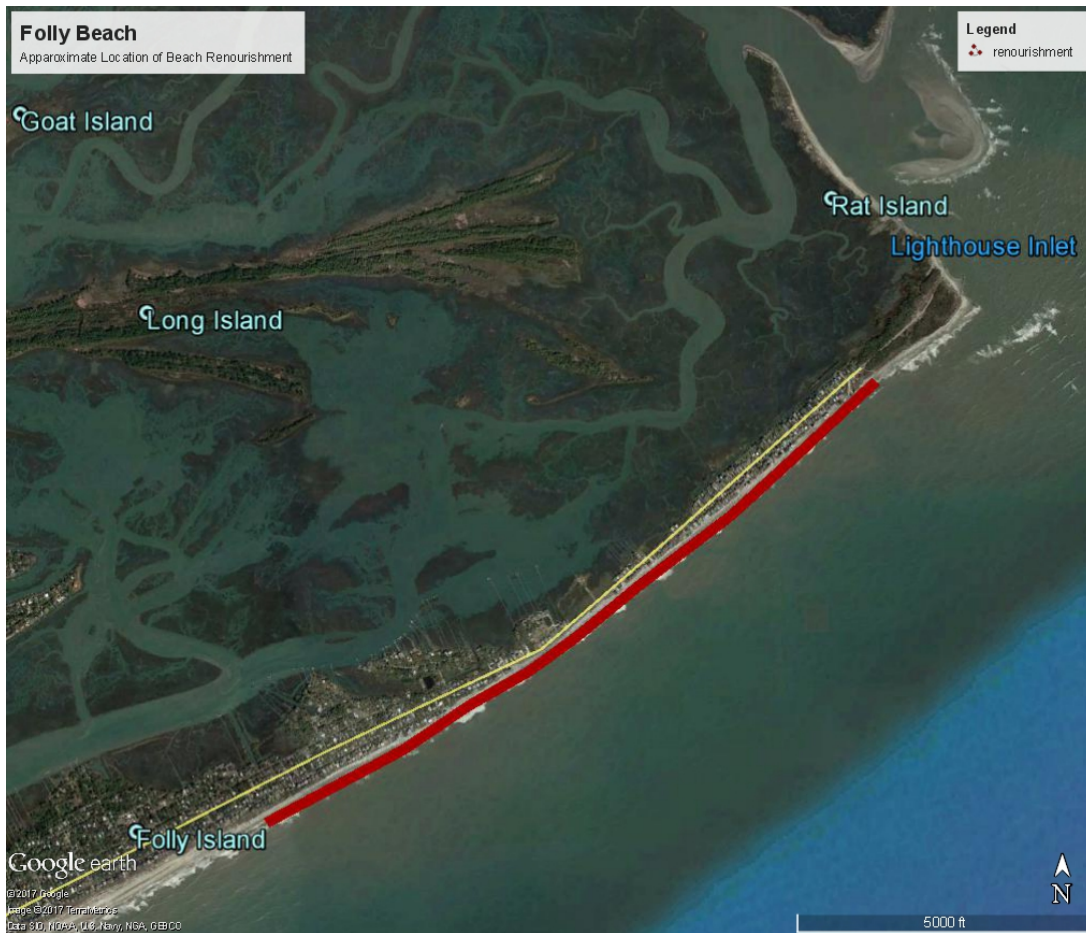
As a result of Hurricane Matthew in 2016 and Hurricane Irma in 2017, Folly Beach suffered significant erosion of the beach and dune system. The Project is currently below its authorized level of protection. Absent rehabilitation, public and private infrastructure are vulnerable to damage. The life and safety of residents and visitors is at risk, as is critical habitat. Emergency rehabilitation of Folly Beach has been authorized pursuant to the Food Control and Coastal Emergency (FCCE) Act (P.L. 84-99), 33 USC 701n, as a result of these significant storm events. The City of Folly Beach is the non-federal sponsor for this Project.

This document is an amendment to the previous Biological Assessment (BA) that was prepared in 2013 for the Project, hereby incorporated by reference (USACE 2013). This BA amendment summarizes the impacts that were evaluated in the 2013 BA on threatened and endangered species due to the placement of fill, and proposes similar protective measures. Since the borrow area for the emergency rehabilitation will be different than the borrow area assessed in the last BA, impacts on threatened and endangered species due to dredging and transporting the fill material are re-evaluated in this BA amendment. Additionally, potential impacts of beneficial placement of fill material onto the Bird Key Stono Seabird Sanctuary to threatened and endangered species are evaluated in this BA amendment. These proposed actions are described more fully below. Additionally, a supplemental Environmental Assessment (EA) has been prepared for use of the borrow area to assess the overall environmental impacts of the dredging and fill transport (USACE 2017). The supplemental EA references this BA as the source for evaluation of threatened and endangered species impacts.

## 2.0 PROPOSED PROJECT DESCRIPTION

### 2.1 Folly Beach Placement

The proposed emergency rehabilitation will place approximately 755,000 cy of sand on the north end of Folly Beach to restore it to pre-storm conditions, and completely fill the authorized construction template. This includes placement of approximately 307,000 cy of material for the beach fill lost due to Hurricane Matthew and approximately 446,000 cy of material resulting from damage during Hurricane Irma from a designated borrow area in the Folly River. Approximately 13,000 linear feet of shoreline will be renourished, extending from approximately 8<sup>th</sup> Street East to the last groin past the last structure on the east end of the island (see Figure 1). This is about half of the beach footprint that was renourished in 2014 and evaluated in the 2013 BA. The Project also includes an option, funding dependent, to add approximately 200,000 cy of additional material from the Folly River navigation channel to the beach for additional rehabilitation. The material will be applied to the same reach, but will allow for implementation of a wider protective berm.



**Figure 1. Location of Proposed Folly Beach Rehabilitation Area**

The desired beach profile will be the same as in 2014, with construction of a berm top-width of 15 feet and an elevation of 9.0 feet national geodetic vertical datum (NGVD). The material will be pumped along the roughly 13,000 linear feet reach of the beach, discharged as a slurry mix of sand and water. During construction, temporary training dikes of sand will be used to contain the discharge and control the fill placement. Fill sections will be graded by land-based equipment, such as bulldozers, articulated front-end loaders, and other equipment as necessary to achieve the desired beach profile. It is anticipated that construction, including mobilization, will extend from January to September 2018. This schedule could change due to funding constraints, contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

## 2.2 Folly River Dredging and Transport

Beach-compatible source material will come from a borrow area in the nearby Folly River, which lies within the Bird Key Unit (M-07) of the Coastal Barrier Resources System established by the Coastal Barrier Resources Act (CBRA) [16 U.S.C. 3501 et seq.]. The U.S. Fish and Wildlife Service (USFWS) has already determined that use of the Bird Key Unit for emergency rehabilitation of Folly Beach is allowable under the CBRA. Recent vibrocore sampling and lab testing confirm that beach quality material for Folly Beach is currently available. There is believed to be a littoral sand transport link between the two sites as demonstrated by the fact that sand placed on Folly Beach in previous beach renourishments has moved into the Bird Key Unit.

The Folly River is not a new borrow area; it was used as a source for initial Project construction in 1993. During formulation of the initial Project, the Folly River site was determined to be the most suitable and least costly source of nourishment, while having limited environmental impacts. The designated borrow area in the Folly River is located near the southern end of Folly Beach, and intersects the Folly River federal navigation channel (see Figure 2).



**Figure 2. Location of Proposed Borrow Area in the Folly River, SC (shown in blue)**



The river channel and portions of the channel shoulder will be dredged by means of a hydraulic cutter head dredge that will transport the sand through a pipeline. To minimize impacts to the beach and the environment, the City of Folly Beach requested the pipeline extend through the Folly River. It will run from the borrow area in the Folly River through the channel to an area across from the Washout. The pipeline will transverse from the channel through private property, over the road with a small bridge, to the beach to discharge the fill material. The pipeline is not expected to impact any saltmarsh, but if necessary it will extend over the shortest distance through the marsh utilizing pontoon pipe.

### 2.3 Bird Key Stono Seabird Sanctuary Placement

An additional aspect of the Project includes an option to add an estimated 40,000 cy of sand from the borrow area to the nearby Bird Key Stono Seabird Sanctuary to benefit piping plovers, red knot, and other resident birds. The Bird Key Stono Seabird Sanctuary (the Sanctuary) is a designated State Heritage Preserve by the South Carolina Department of Natural Resources (SCDNR) to protect nesting seabirds. It is an isolated sand spit island that encompasses approximately 35 acres, but varies in size from year to year due to erosion and deposition from nearby rivers, including the Folly River. Dependent on ongoing coordination with SCDNR and the USFWS, material will be placed over a proposed approximate 5-6 acre area on the northeast/backside of the Sanctuary prior to mid-March 2018 or after mid-October 2018 (see Figure 3). As done in the past on the Sanctuary, the material will be pumped onto the Sanctuary as a slurry, and graded/leveled with a backhoe. It should be noted that although this work is being conducted as part of the Project, it is being completed with a different source of funding.



**Figure 3. Potential Location of Sand Placement on Bird Key Stono Seabird Sanctuary**

## **2.4 Non-USACE Related Work**

Tangentially related to this Project, the City of Folly Beach (City) has proposed a separate project, the “Folly Beach Renourishment and Groin Rehabilitation Project.” The City’s groin project is intended to coincide with this Project.

## **3.0 PRIOR CONSULTATIONS**

Previous Section 7 formal or informal consultations under the Endangered Species Act occurred in support of the original Environmental Impact Statement completed in 1980, and original Environmental Assessment done in 1991. Additional consultations have occurred in support of the 2005 Environmental Assessment and the 2013 Environmental Assessment for subsequent renourishments under the Project. The USFWS issued a Biological Opinion in 2014 in response to the 2013 BA upon which BA amendment is based (USFWS 2014). Informal consultation has been initiated with USFWS for the 2017 Environmental Assessment referred to above for the using the Folly River borrow area (USACE 2017). Additionally, the USFWS has consulted on the City’s “Folly Beach Renourishment and Groin Rehabilitation Project” that resulted in issuance of a Biological Opinion on November 1, 2017 (USFWS 2017). Consultation for Operations and Maintenance dredging of the Folly River channel and for placement of material on the Sanctuary last occurred in 2006 (USACE 2006, USFWS 2006).

## **4.0 UPDATED LIST OF SPECIES**

Table 1 contains a list of threatened and endangered species under the jurisdiction of the USFWS and/or NOAA Fisheries that occur or possibly occur in Charleston County. It has been updated from the 2013 BA to reflect the current status of listings.

Table 1. FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES IN CHARLESTON COUNTY		
COMMON NAME	SCIENTIFIC NAME	STATUS
Frosted flatwoods salamander	<i>Ambystoma cingulatum</i>	T, CH
Bachman's warbler	<i>Vermivora bachmanii</i>	E
Piping plover	<i>Charadrius melodus</i>	E, CH
Red-cockaded woodpecker	<i>Picoides borealis</i>	E
Wood stork	<i>Mycteria americana</i>	T
Red knot	<i>Calidris canutus rufa</i>	T
Atlantic Sturgeon*	<i>Acipenser oxyrinchus</i>	E, CH
Shortnose sturgeon*	<i>Acipenser brevirostrum</i>	E
Finback whale*	<i>Balaenoptera physalus</i>	E
Humpback whale*	<i>Megaptera novaengliae</i>	E
North Atlantic right whale*	<i>Balaena glacialis*</i>	E, CH
Blue whale*	<i>Balaenoptera musculus</i>	E
Sei whale*	<i>Balaenoptera borealis</i>	E
Sperm whale*	<i>Physeter macrocephalus</i>	E
West Indian manatee	<i>Trichechus manatus</i>	E
American chaffseed	<i>Schwalbea americana</i>	E
Canby's dropwort	<i>Oxypolis canbyi</i>	E
Pondberry	<i>Lindera melissifolia</i>	E
Seabeach amaranth	<i>Amaranthus pumilus</i>	T
Green sea turtle*	<i>Chelonia mydas</i>	T
Hawksbill sea turtle*	<i>Eretmochelys imbricata</i>	E
Kemp's ridley sea turtle*	<i>Lepidochelys kempii</i>	E
Leatherback sea turtle*	<i>Dermochelys coriacea</i>	E
Loggerhead sea turtle*	<i>Caretta caretta</i>	T, CH
NOTES: E - Federally Endangered      T - Federally Threatened      CH - Critical Habitat * These species are either under the jurisdiction of National Marine Fisheries Service (NMFS) or their jurisdiction is shared by NMFS and US Fish and Wildlife Service. All other species are solely under the jurisdiction of US Fish and Wildlife Service.		

## 5.0 GENERAL EFFECTS ON LISTED SPECIE AND CRITICAL HABITAT

The proposed work will occur on the ocean-facing shoreline of Folly Beach and in the estuarine waters of the Folly River. Work is also proposed on the Sanctuary, which lies within Stono Inlet. As such, the proposed action will not affect any listed species occurring in forested or freshwater habitats, including the red-cockaded woodpecker, Bachman's warbler, forested flatwoods salamander, Canby's dropwort, Pondberry, American chaffseed, and bog asphodel. Since the proposed action will not take place in offshore or nearshore marine waters, blue, finback,

humpback, right, sei, and sperm whales will not be affected. The southern terminus of seabeach amaranth range is Folly Island; however, there are currently no known populations that occur on the island and thus, no viable seed source. As a result, none of these threatened and endangered species are further analyzed in this BA amendment.

Listed species that could be present in the area of the proposed action are the West Indian manatee; shortnose and Atlantic sturgeon; hawksbill, Kemp's ridley, leatherback, loggerhead, and green sea turtle; wood stork; piping plover; and rufa red knot. These species are addressed in section 6.0.

In general, the Florida manatee is unlikely to be in the area, but they do pass through when moving up the coast and have been seen in various locations throughout South Carolina. It is also unlikely that shortnose or Atlantic sturgeon would be in the project area. The Folly River is a high salinity system. It is not designated as Atlantic Sturgeon Critical Habitat. Wood storks could possibly be in the area of the Folly River if there is suitable foraging habitat but the Project activities are highly unlikely to impact them.

Loggerheads are the primary sea turtle nesters and Critical Habitat has been designated on Folly Beach (Unit LOGG-T-SC-09).

There is piping plover Critical Habitat on Bird Key Stono Seabird Sanctuary (Unit SC-9). The red knot is also a migrant visitor on the Sanctuary.

## **6.0 SPECIES ASSESSMENTS**

### **6.1 West Indian Manatee**

The biology of the West Indian manatee (*Trichechus manatus*) is described in the 2013 BA, and not repeated here. The manatee was listed as endangered on March 11, 1967, under a law that preceded the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.). Additional Federal protection is provided for this species under the Marine Mammal Protection Act of 1972, as amended (16 USC 1461 et seq.) The manatee population in the United States is confined during the winter months to the coastal waters of the southern half of peninsular Florida and to springs and warm water outfalls as far north as southeast Georgia. However, during the summer months, they may migrate as far north as coastal Virginia on the East Coast and as far west as Louisiana on the Gulf of Mexico. In 2016, a male manatee was rescued from cold stress in the Cooper River, SC. It is unknown how many manatees visit the South Carolina coast each year. Since the manatee is an infrequent visitor to South Carolina, the likelihood of a manatee in the Folly River is low.

#### **Effect Determination**

The proposed project is expected to extend into the warmer months when manatees may occur along the South Carolina coast. During this time, precautions will be taken to ensure that any manatees in the vicinity are not harmed or harassed. In addition, since the proposed work is to be performed with a hydraulic cutterhead pipeline dredge (dredge plants that are slow moving) and since manatees would be rare in borrow area, no impacts to the manatee are anticipated. For



these reasons, it has been determined that the proposed project is not likely to adversely affect the West Indian manatee.

## **6.2 Shortnose Sturgeon**

A description of the shortnose sturgeon (*Acipenser brevirostrum*) and its biological significance is described in the 2013 BA. With respect to its distribution and habitat for the proposed action, shortnose sturgeon do occur in rivers of the Atlantic Ocean from southern New Brunswick, Canada to northeastern Florida. The SCDNR reports that in South Carolina, they inhabit Winyah Bay rivers; rivers that drain into Lake Marion; the Santee, Cooper and Savannah Rivers; and the ACE Basin.

The shortnose sturgeon is principally a riverine species and is known to use three distinct portions of river systems: (1) non-tidal freshwater areas for spawning and occasional overwintering; (2) tidal areas in the vicinity of the fresh/saltwater mixing zone, year-round as juveniles and during the summer months as adults; and (3) high salinity estuarine areas (15 ppt salinity or greater) as adults during the winter. Habitat conditions suitable for juvenile and adult shortnose sturgeon could occur in the Folly River but the presence of juvenile shortnose sturgeon is not likely due to high salinity. Adults are found in shallow to deep water (6 to 30 feet) and, if present, would be expected to occupy the deeper waters during the day and the shallower areas adjacent to the deeper waters during the night. Entanglement in dredges is possible, but not likely since shortnose sturgeon are not usually found in the Folly River.

### **Effect Determination**

It is unlikely that the shortnose sturgeon occurs in the Folly River; however, should it occur, its habitat would be only minimally altered by the proposed action. Any shortnose sturgeons in the area should be able to avoid being taken by a slow moving hydraulic cutterhead pipeline dredge. For these reasons, it has been determined that the proposed project is not likely to adversely affect the shortnose sturgeon.

## **6.3 Atlantic Sturgeon**

A description of the Atlantic sturgeon (*Acipenser oxyrinchus*) and its biological significance is described in the 2013 BA. The species' historic range included major estuarine and riverine systems in the United States from St. Coix, ME to the Saint Johns River in Florida. In South Carolina, adult Atlantic sturgeons occur in most rivers and estuaries along the coast, mostly in the river mainstems and marine waters.

Atlantic sturgeon are diadromous; they spawn in freshwater, but spend most of their adult life in the marine environment. Juveniles spend several years in the freshwater or tidal portions of rivers prior to migrating to sea. Spawning has been observed in both fall and spring in South Carolina rivers, including the Pee Dee, Edisto, Combahee, and Savannah Rivers. Spawning may also occur in the Waccamaw River, and in the Santee and Cooper Rivers below the dams. Upon reaching a size of approximately 76-92 cm, the subadults move to marine waters, where populations may undertake long range migrations.

The Atlantic Sturgeon was listed as endangered in the southeast in 2012, and critical habitat was designated in August 2017. With respect to the proposed action, the Folly River is not designated as critical habitat for the Atlantic sturgeon.

Although Atlantic sturgeon are not likely to be found in the Folly River, potential direct and indirect impacts associated with dredging that may adversely impact sturgeon include entrainment and/or capture of adults or juveniles by dredging and closed net sea turtle relocation trawling activities, short-term impacts to foraging and refuge habitat, water quality, and sediment quality.

#### **Effect Determination**

It is unlikely that the Atlantic sturgeon occurs in the Folly River; however, should it occur, its habitat would be only minimally altered by the proposed project. Any Atlantic sturgeons in the area should be able to avoid being taken by a slow moving hydraulic cutterhead pipeline dredge. For these reasons, it has been determined that the proposed project is not likely to adversely affect the Atlantic sturgeon.

#### **6.4 Wood Stork**

Wood storks (*Mycteria Americana*) were not evaluated in the 2013 BA because there were no Project activities in their preferable habitat. Wood storks are currently listed as threatened (upgraded from endangered in 2014) and can be found in brackish and freshwater wetlands along the coast from North Carolina to Florida (and some Gulf coast states). These wading birds feed primarily on small estuarine fishes, such as sunfish. Wood storks could be in the vicinity of the Folly River, if suitable foraging habitat is present.

#### **Effect Determination**

Considering the habitat conditions of the Folly River overall, potential impacts to any wood storks is highly unlikely. The project is not expected to impact saltmarshes, and an incidental take is not anticipated. For these reasons, it has been determined that the proposed project is not likely to adversely affect wood storks.

#### **6.5 Piping Plover and Rufa Red Knot**

Descriptions of the piping plover (*Charadrius melodus*) and Rufa red knot (*Calidris canutus rufa*), their habitat ranges and considerations, and biological significances are covered extensively in the 2013 BA. With the respect to the proposed action, it is acknowledged that endangered Great Lakes populations and threatened Atlantic Coast populations of piping plovers utilize the South Carolina coast, especially during migration, as well as the threatened Rufa red knot. The Bird Key Stono Seabird Sanctuary and surrounding area were designated as Critical Habitat (Unit SC-9) for wintering piping plovers in 2001 (66[FR], 2001). Placement of sand onto the Sanctuary, which is constantly shifting in size, may have a short term impact on foraging areas for wintering listed species, but will ultimately benefit piping plovers, red knots, and other resident birds through enhancement of habitat.

#### **Effect Determination**

Placement of sand on the Sanctuary will not occur from mid March to mid October, in order to avoid the critical nesting and feeding seasons for listed species and other shorebirds. The

USACE is continuing to coordinate with SCDNR and USFWS regarding exact placement of material so that it beneficial to birds while minimizing short-term impacts. Direct loss of nests from the placement should not occur. Foraging areas may be impacted short-term, but placement and grading of material will be conducted to still allow overwash, and limit impacts to food resources including spawning horseshoe crabs and their eggs. Horseshoe crabs generally spawn from March through July, with the peak spawning activity occurring around the evening new and full moon high tides in May and June. Although the sand may shift after placement, past projects have shown that valuable habitat still forms on the Sanctuary. For these reasons, it has been determined that the proposed project is not likely to adversely affect the piping plover and rufa red knot. It has also been determined that the proposed project is not likely to adversely modify critical habitat for wintering piping plovers and will actually enhance habitat.

### **6.6 Kemp's ridley, leatherback, loggerhead, green, and hawksbill sea turtles**

There are five species of sea turtles on the Atlantic Coast: Kemp's ridley sea turtle (*Lepidochelys kempii*); leatherback sea turtle (*Dermochelys coriacea*); loggerhead sea turtle (*Caretta caretta*); green sea turtle (*Chelonia mydas*); and hawksbill sea turtle (*Eretmochelys imbricata*). The hawksbill, Kemp's ridley, and leatherback were listed as endangered in the Endangered Species Act in 1973. The green sea turtle and the loggerhead sea turtle were added to the list as threatened in 1978.

Substantial detail on the biology, habitat requirements, and threats to sea turtles in the south Atlantic is provided in the 2013 BA, and therefore is not repeated in this amendment. The habitat considerations as they relate to the proposed action are re-evaluated here, and the potential impacts and protective measure described in 2013 BA are summarized here.

As described in the 2013 BA, only the loggerhead is considered to be a regular nester in South Carolina. A small number of non-loggerhead nests have been documented on Folly Beach in the past decade, but for purposes of the Project, the loggerhead is considered to be the only species likely to nest in the area. Furthermore, Folly Beach has been identified as critical habitat for nesting by the loggerhead sea turtle. Of the five species of sea turtles, only the loggerhead sea turtle is analyzed in this BA amendment.

**6.6.1 Loggerhead Sea Turtle.** Loggerheads originating from nesting beaches from southern Virginia to the Georgia/Florida border are considered part of the Northern Recovery Unit of the Northwest Atlantic population of loggerhead sea turtles. In South Carolina, loggerheads regularly nest along the coast from Georgetown to the south, usually from mid-May to mid-August. Nesting activity is greatest in June and July. The number of loggerhead sea turtle nests has trended upward on both Folly Beach, and in South Carolina as a whole, in the last decade. Nesting is preferred on remote beaches, with juveniles preferring bays and estuaries. Loggerheads are known to nest from one to seven times within a nesting season. The inter-nesting interval varies around a mean of about 14 days. Loggerheads are nocturnal nesters, but exceptions to the rule do occur infrequently. Therefore, it can be surmised that the potential presence of loggerheads on Folly Beach is likely to occur during portions of the Project construction.

**6.6.2 Affected Sea Turtle Environment.** The area of loggerhead habitat that will be affected by the proposed action is 13,000 linear feet of Folly Beach along the Atlantic Ocean. The sand placement will result in an increase in the size of the dry beach; conversion of existing intertidal beach to dry beach and shifting the intertidal zone seaward from its existing location; and conversion of some subtidal beach to intertidal beach and shifting the subtidal zone seaward from its existing location. Due to the recent hurricanes, these beach zones have eroded or shifted already, resulting in limited suitable habitat for nesting turtles without the proposed rehabilitation. Near- and off-shore waters should not be affected by the proposed action since the dredging and fill-transport is not occurring in the ocean or along the beachfront.

**6.6.3 Summary of Factors Affecting Nesting Success and Cumulative Effects of Actions on Sea Turtles.** Predation contributes to sea turtle egg or hatchling mortality on almost all nesting beaches. Raccoons, foxes, ghost crabs, feral hogs, coyotes, and ants prey on incubating eggs and hatchling sea turtles. Bacterial diseases have been documented in wild loggerhead populations but not viral diseases. There have also be a few reports of fungal infections. Erosion of nesting beaches can result in partial or total loss of suitable nesting habitat, which may come from dynamic coastal processes, including sea level rise and storms. It is believed that declines in populations are also a direct result of human actions on sea turtle nesting habitat (NMFS and USFWS 2008).

People also interfere with these natural processes through coastal development and associated activities, resulting in accelerated erosion rates and interruption of natural shoreline migration. One type of shoreline engineering, collectively referred to as beach armoring, includes bulkheads, sea walls, rock revetments, soil retaining walls, sandbags, geotextile tubes, groins and jetties. Beach armoring can result in permanent loss of a dry nesting beach through accelerated erosion and prevention of natural beach/dune accretion; prevent or hamper nesting females from accessing suitable nesting sites; inundate and wash out clutches at high tide by increased wave action near the base of these structures; spread debris on the beach when they fail that may further impede access to suitable nesting sites or trap hatchlings and nesting turtles; or cause nesting turtles to abandon nesting attempts or to construct improperly sized and shaped egg cavities when inadequate amounts of sand cover these structures. Studies have also found that when turtles do emerge in the presence of armoring structures, more return to the water without nesting than those on non-armored beaches. Furthermore, nests made on suboptimal habitat are likely to lead to mortality. Groins and jetties, which are designed to trap sand during transport in longshore currents or to keep sand from flowing into channels, can also prevent normal sand transport and accrete beaches on one side of the structure while starving neighboring beaches on the other side. The instability of both eroding and accreting areas created by jetties may discourage loggerhead nesting. Groins can also lead to development of escarpments that impede female loggerheads from accessing suitable nesting habitat. Groins and geotextile tubes can fail and break apart which may impede, trap or entangle sea turtles. Disintegrating geotextile material could also be ingested by sea turtles (NMFS and USFWS 2008).

Recreational use of beaches can also result in negative impacts to nesting turtles, incubating egg clutches, and hatchlings. The most serious threat caused by increased human presence on the beach is the disturbance to nesting females. Disturbance can cause turtles to shift their nesting beaches, delay egg laying, and select poor nesting sites. Heavy pedestrian traffic on nesting

beaches may result in lowered hatchling emergence success rates due to compaction of sand above nests, and pedestrian tracks can interfere with the ability of hatchlings to reach the ocean. Recreational beach equipment can hamper or deter nesting females and trap or impede hatchlings. Beach cleaning or burying of debris and trash can also damage nests, eggs, and hatchlings. Night-time human activity can cause nesting females to abort nesting attempts at all stages of the behavioral process. Campfires and the use of flashlights on nesting beaches disorient hatchlings and can deter nesting females. Other sources of artificial lighting can adversely affect both nesting and hatchling sea turtles, including parking lots and passing cars at night, but the number of turtles affected is difficult to assess (NMFS and USFWS 2008).

Beach nourishment, including the pumping, trucking or scraping of sand onto the beach to rebuild what has been lost to erosion, is another human activity that can impact sea turtles. Beach nourishment can impact turtles through direct burial of nests and by disturbance to nesting turtles if conducted during the nesting season. Sand sources may be dissimilar from native beach sediments and can affect nest site selection, digging behavior, incubation temperature (and hence sex ratios), gas exchange parameters within incubating nests, hydric environment of the nest, hatching success and hatchling emergence success. Beach nourishment can result in severe compaction or concretion of the beach. Trucking of sand onto project beaches may increase the level of compaction. Significant reductions in nesting success have been documented on severely compacted nourished beaches. Nourished beaches often result in severe escarpments along the mid-beach and can hamper or prevent access to nesting sites. Constructed beaches that are wider can also result in greater washout of nests. Nourishment projects result in heavy machinery, pipelines, increased human activity and artificial lighting on the project beach. These activities are normally conducted on a 24-hour basis and can adversely affect nesting and hatching activities. Pipelines and heavy machinery can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls (non-nesting emergences). Increased human activity during construction at night may cause further disturbance to nesting females. The artificial lights along the project area may deter nesting females and disorient emergent hatchlings from adjacent non-project beaches (NMFS and USFWS 2008).

The dredging of fill material for beach nourishment projects can also impact sea turtles through degradation of habitat and incidental take of turtles. This usually applies to channelization of inshore and nearshore habitat and the disposal of dredged material in the marine environment that destroys or disrupts resting or foraging grounds. It can also affect nesting distribution through the alteration of physical features in the marine environment. Hopper dredges are responsible for incidental take and mortality of sea turtles during dredging operations, and possibly cutterhead dredges. Clamshell dredges have not been implicated in incidental take (NMFS and USFWS 2008).

However, nourishment of highly eroded beaches (especially those with a complete absence of dry beach) can be beneficial to sea turtles – resulting in increased nesting – if conducted properly. Beach nourishment projects are now conducted in compliance with state and USFWS criteria that accommodate loggerhead needs and do not degrade or eliminate nesting habitat (NMFS and USFWS 2008).

### **Effect Determination**

Nesting by loggerhead sea turtles has been recorded on Folly Beach in the past, and the area is designated as critical habitat. The placement of sand and associated construction activities could adversely affect any existing sea turtle nests and sea turtles attempting to nest, and any hatchlings. Since transport of the fill material will not run along the oceanfront shoreline, there should be minimal impacts from the pipeline. Dredging activities are not likely to affect sea turtles since the dredging will occur in the estuarine waters of the Folly River where sea turtles are not likely to occur, and will be conducted by a cutterhead dredge.

Project construction is currently scheduled to occur during the months of January through September. When construction work occurs during sea turtle nesting season, the following precautions will be taken to minimize the effects to nesting sea turtles and critical habitat:

- If any construction of the project occurs during the period between May 1 and November 30, daily nesting surveys will be conducted starting either May 1 or 65 days prior to the start of construction, whichever is later. These surveys will be performed between sunrise and 9:00 A.M. and will continue until the end of the project, or September 30, whichever is earlier. Any nests found in the area that will be impacted by construction activities will be moved to a safe location. The nesting surveys and nest relocations will only be performed by people with a valid SCDNR permit.
- If any construction of the project occurs during the period December 1 to April 30, no nesting surveys will be performed.
- For construction activities occurring during the period May 1 through November 30, staging areas for equipment and supplies will be located off of the beach to the maximum extent possible.
- For construction activities occurring during the period May 1 through November 30, all on-beach lighting associated with the project will be limited to the minimum amount necessary around active construction areas to satisfy Occupational Safety and Health Administration (OSHA) requirements.

Immediately after completion of the project, the USACE will perform cone penetrometer compaction testing of the newly constructed sand berm. This compaction testing will be repeated for three subsequent years, prior to May 1 of each year. If compaction testing shows sand compaction to be greater than 500 pounds per square inch (psi), then the following tilling protocol will be performed:

For a period of three years, starting at the most northern reach of the project, the sand placed on the beach will be tilled/untilled in alternating sections of 500 feet each. Sea turtle nesting data and false crawls will be monitored for this three-year period and analyzed to determine if tilling (or lack of tilling) has an effect on nesting behavior.



This tilling protocol is being proposed because informal observations and sporadic cone penetrometer testing throughout South Carolina has frequently shown nesting occurring where sand compaction is much greater than 500 psi. Since most previous turtle nesting/sand compaction research has been done in Florida, it is questionable as to whether those test results are applicable to South Carolina's shores. This tilling protocol, when combined with other data being collected in the state, should help answer the question of whether tilling is necessary on re-nourished beaches.

Visual surveys for escarpments along the project area will be made immediately after completion of the project and prior to May 1 for three subsequent years. Results of the surveys will be submitted to the USFWS prior to any action being taken. The USFWS will be contacted immediately if subsequent reformation of escarpments exceeding 18 inches in height for a distance of 100 feet occurs during nesting and hatching season. This coordination will determine what appropriate action must be taken. An annual summary of escarpment surveys and action taken will be submitted to the USFWS.

Adherence to the above precautions should minimize the effects to nesting loggerhead sea turtles and emerging loggerhead sea turtle hatchlings. The monitoring and relocation program will minimize potential adverse effects to nesting sea turtles. Completion of the project will re-establish lost habitat due to the storms, and protect people and infrastructure. However, because of the possibility of missing a sea turtle nest during the nest monitoring program or inadvertently breaking eggs during relocation, it has been determined that the proposed project may adversely affect the loggerhead sea turtle and may adversely modify critical nesting habitat for loggerhead sea turtles.

## **7.0 SUMMARY OF PROTECTIVE MEASURES**

### **West Indian Manatee**

When work occurs during the manatee migration period, personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing manatees. The Contractor may be held responsible for any manatee harmed, harassed, or killed as a result of vessel collisions or construction activities. Failure of the Contractor to follow these specifications is a violation of the Endangered Species Act and could result in prosecution of the Contractor under the Endangered Species Act or the Marine Mammals Protection Act. The standard manatee conditions will be implemented from April 1 to October 31. The Contractor will be instructed to take necessary precautions to avoid any contact with manatees. If manatees are sighted within 100 yards of the dredging area, all appropriate precautions will be implemented to insure protection of the manatee. The Contractor will stop, alter course, or maneuver as necessary to avoid operating moving equipment (including watercraft) any closer than 100 yards of the manatee. Operation of equipment closer than 50 feet to a manatee will necessitate immediate shutdown of that equipment.

### **Piping Plovers and Red Knot**

Construction on Bird Key Stono Seabird Sanctuary will only occur prior to mid-March or after mid-October to avoid critical migration periods for piping plovers and red knots. The sand will

be placed and graded in a manner to minimize disturbance to resident birds and to avoid compacting food sources by consulting with experts at SCDNR and USFWS. The USACE will monitor the spatial distribution of the sand placement via aerial imagery for one year following construction and report the status to SCDNR.

### **Sea Turtles**

Since construction is anticipated to occur during the loggerhead sea turtle nesting period in South Carolina, a beach monitoring and nest relocation program for sea turtles will be implemented in order to minimize impacts. This program will include daily patrols of sand placement areas at sunrise, relocation of any nests laid in areas to be impacted by sand placement, and monitoring of hatching success of the relocated nests. Sea turtle nests will be relocated to an area suitable to both the USFWS and the SCDNR. The USACE will perform any necessary maintenance of beach profile (tilling and shaping or knocking down escarpments) during construction and prior to each nesting season.

During construction of the Project, staging areas for construction equipment will be located off the beach to the maximum extent practicable. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities. All on-beach lighting associated with the Project will be limited to the immediate area of active construction only. Such lighting will be shielded, low-pressure sodium vapor lights to minimize illumination of the nesting beach and nearshore waters. Red filters will be placed over vehicle headlights (i.e., bulldozers, front end loaders). Lighting on any offshore equipment (although not anticipated) will be similarly minimized through reduction, shielding, lowering, and appropriate placement of lights to avoid excessive illumination of the water, while meeting all U.S. Coast Guard and OSHA requirements.

For transport of fill material from the borrow area, the pipeline will run along the Folly River, not the beachfront. This will avoid obstruction to nesting females and hatchlings.

## **8.0 SUMMARY OF EFFECT DETERMINATIONS**

This assessment serves as amendment to the Biological Assessment conducted in 2013 for the Folly Beach Storm Damage Reduction Project, also referred to as the Folly Beach Shore Protection Project. It summarizes the potential impacts of the proposed action on the critical habitat and listed species known to occur at the renourishment site (portions of Folly Beach) from the 2013 EA, and assesses impacts for dredging the borrow area (Folly River) and beneficial placement onto the Bird Key Stono Seabird Sanctuary. Based on these analyses, the following determinations have been made:

- It has been determined that the proposed project is not likely to adversely affect the West Indian manatee.
- It has been determined that the proposed project is not likely to adversely affect Kemp's ridley, leatherback, green, nor hawksbill sea turtles.
- It has been determined that the proposed project is not likely to adversely affect the shortnose sturgeon nor the Atlantic sturgeon.

- It has been determined that the proposed project is not likely to adversely affect the wood stork.
- It has been determined that the proposed project is not likely to adversely affect the piping plover.
- It has been determined that the proposed project is not likely to adversely affect the Rufa red knot.
- It has been determined that the proposed project may adversely affect the nesting loggerhead sea turtle.
- It has been determined that the proposed project may adversely modify critical nesting habitat for the loggerhead sea turtle.
- It has been determined that the proposed project is not likely to adversely modify critical habitat for wintering piping plovers.

## 9.0 REFERENCES

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 2008. Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*), Second Revision. National Marine Fisheries Service, Silver Spring, MD.

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