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ENVIRONMENTAL ASSESSMENT (EA)

HUNTING ISLAND

ECOSYSTEM RESTORATION STUDY

BEAUFORT COUNTY, SOUTH CAROLINA

U.S. Army Corps of Engineers
Charleston District

SEPTEMBER 2004

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Environmental Assessment (EA)

**Hunting Island
Ecosystem Restoration Study
Beaufort County, South Carolina**

I. INTRODUCTION

A. Project Authority, Purpose and Need. The Hunting Island Section 206 Ecosystem Restoration study is being conducted under authority of Section 206 of the Water Resources Development Act (WRDA) of 1996 (P.L. 104-303). This study was initiated following receipt of a July 1, 1999 letter request from the South Carolina Department of Parks, Recreation, and Tourism (SCPRT), which owns Hunting Island and operates it as Hunting Island State Park. The park experiences 268,000 annual overnight visitors in cabins and campgrounds and 1,000,000 annual day use visitors to the beaches and park facilities. Development on the island includes a few dozen vacation homes at the south end and a camping area at the north end with the rest of the island being mostly undeveloped with some light development for the park infrastructure and visitor parking. SCPRT will be responsible for the non-Federal portion of the project costs and maintenance of the project after completion.

Hunting Island is located on the South Carolina coast in Beaufort County, approximately 16 miles east of the City of Beaufort, 9 miles southwest of Edisto Beach, and approximately 45 miles northeast of Savannah, GA (see Figure 1). The 4-mile long island extends from Fripp Inlet at the south end to Johnson Creek at the north end and has an extensive sand beach facing the Atlantic Ocean (see Figure 2). This Environmental Assessment (EA) was prepared to evaluate the overall environmental impacts of the proposed project.

The purpose of this project is to protect the maritime forest covering most of this island from erosion and storm events, with a secondary benefit of providing additional beach and dune area that will facilitate more sea turtle nesting, as well as providing nesting and feeding habitat for shorebirds. The extreme north end of the island seems to be partially protected by a terminal groin, while the south end appears to be stable. However, significant erosion problems exist throughout the balance of the island. Shoreline erosion along most of Hunting Island averages approximately 20 feet (~10 acres) per year. This erosion has not only placed roads, buildings, and public use facilities in jeopardy, but is continuously destroying the mature maritime forest that makes this island so unique and has eliminated the natural dune system and placed sea turtle nesting in jeopardy.

B. Project Location and Description of Proposed Action. The study area for this project included the entire length of the island. For the environmental analysis, the study area was divided into nine impacted habitat zones: turtle habitat, maritime forest (undisturbed), maritime forest (campground), maritime forest (day use & parking), maritime forest (cabin area),



FIGURE 1: LOCATION OF HUNTING ISLAND

maritime shrub/scrub, saltwater lagoon, salt/fresh water lagoon, and saltwater marsh (see Figure 3). The southern portion of the island contains the cabins, while the park infrastructure is woven throughout the central reach. The small amount of turtle nesting habitat that exists is located at the southern end and northern tip of the island. The maritime forest exists throughout approximately 90% of the island and contains all of the park infrastructure. The saltwater lagoon is located behind the lower 40% of the island, and the freshwater lagoon covers only a few acres adjacent to the campground area in the northern portion of the island. The results of the study show that an ecosystem restoration project can be justified for almost the entire length of the island; however, limited project funds will keep it focused on the northern half (see Figure 4).

The proposed project consists of two components. One component is the Federal National Ecosystem Restoration (NER) plan. The NER plan will be cost shared with the sponsor (South Carolina Parks Recreation and Tourism – SCPRT) on a 65% Federal/35% non-Federal basis and

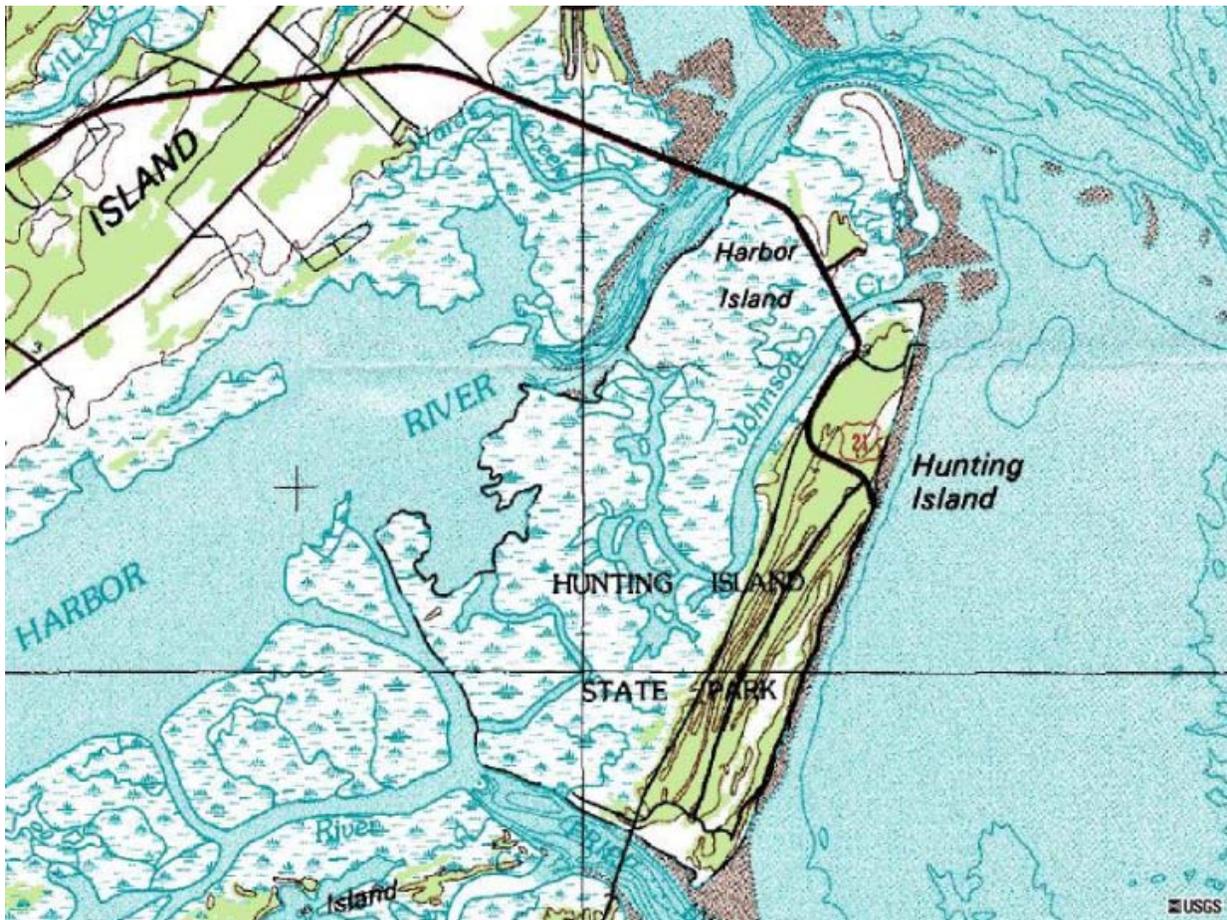


FIGURE 2: HUNTING ISLAND DETAIL MAP

includes nourishment of approximately 5,165 feet of beach beginning at the existing north terminal groin. Three 450-foot long groins spaced approximately 1,250 feet apart are included in the NER plan with a total of approximately 717,200 yd³ of sand being placed on the beach. The other component of the proposed project will be funded entirely by SCPRT and consists of additional nourishment of approximately 4,980 feet of beach. Three additional 450-foot long groins, spaced approximately 1,250 feet apart, are included in the SCPRT component of the project with approximately 744,700 yd³ of sand being placed on this portion of the beach. The overall project (referred to as the “locally preferred plan”) consists of these two components being combined into one effort and is summarized as follows:

The overall project consists of the nourishment of approximately 10,145 feet of beach beginning at the north terminal groin and construction of six 450-foot long groins spaced approximately 1,250 feet apart with the first groin being placed approximately 1,250 feet south of the north terminal groin (see Figure 4). The

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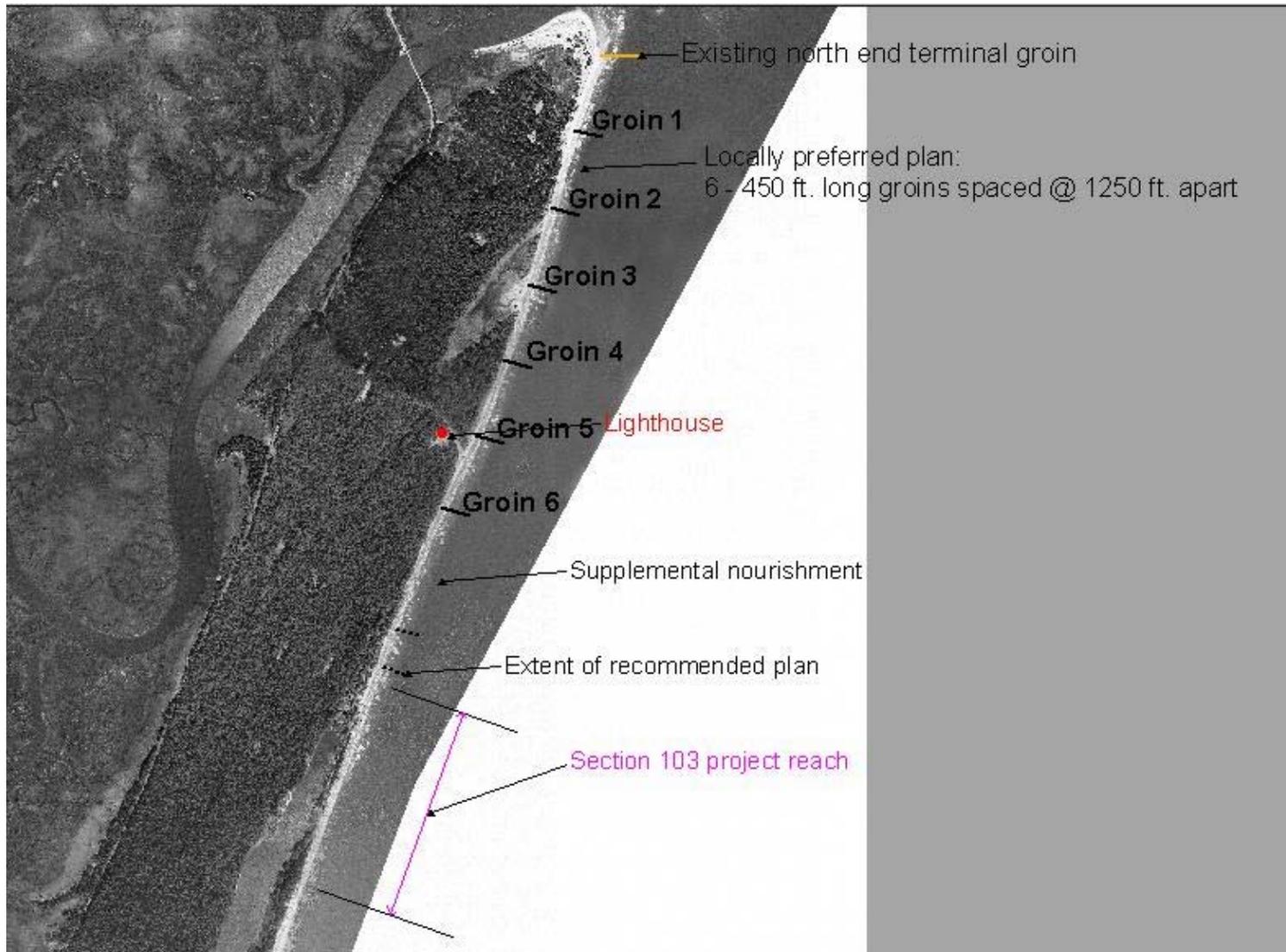
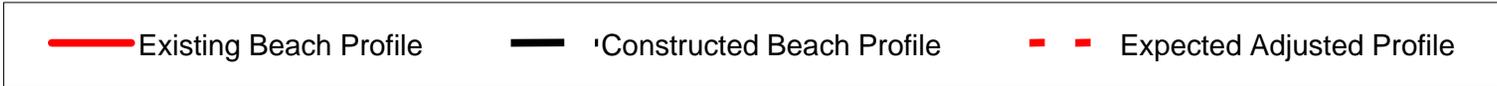
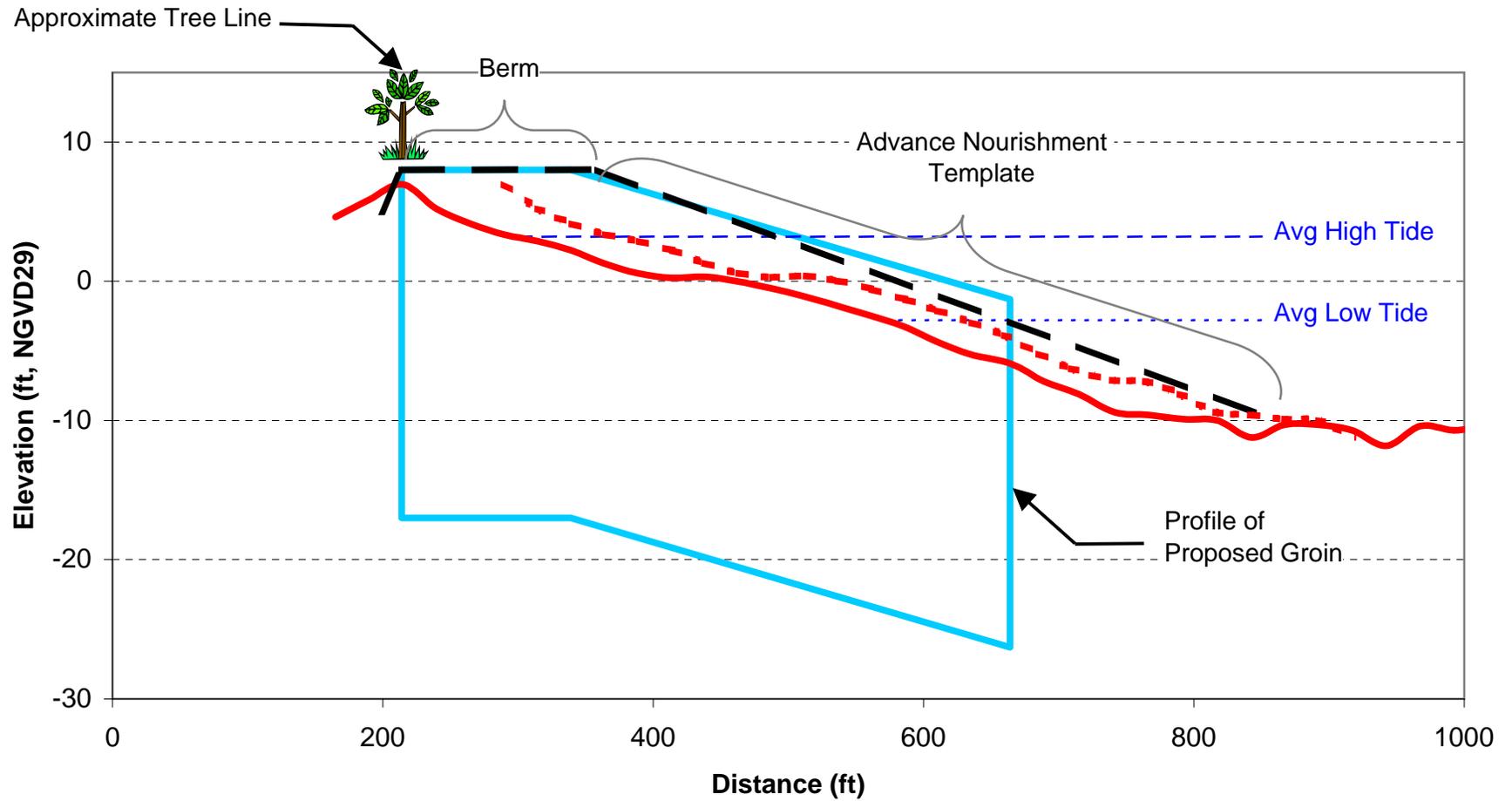


FIGURE 4: HUNTING ISLAND PROJECT LIMITS

Figure 5: Hunting Island Ecosystem Restoration Groin and Nourishment Cross Section



beach nourishment profile consists of a berm at elevation 8 feet (NGVD 29) fronted by an “advance nourishment template” that will support a 9-year periodic renourishment cycle; however, periodic renourishment is not a feature of this project (see Figure 5). Any future renourishment will be pursued as a separate project by the non-Federal sponsor. The full nourishment profile shown in Figure 5 will begin at the existing north terminal groin, extend through the new groin field, and terminate approximately 1,725 feet south of the sixth groin. An approximate 620-foot long “end-taper” will transition the nourishment profile into the existing beach profile (see Figure 4) with a total of approximately 1,461,900 yd³ of sand being placed on the beach.

The sand will cover an average width of approximately 100 feet of existing dry beach (approximately 25 acres), an average width of approximately 270 feet of existing intertidal zone (approximately 60 acres), and an average width of approximately 80 feet of existing subtidal zone (approximately 20 acres).

Construction will be by means of either a hydraulic cutterhead dredge or a hopper dredge that will transport the sand through a pipeline. The pipeline will run adjacent to the groins and parallel with the beach. Beach compatible material (sand) from the offshore source will be pumped along the approximately 10,145 linear feet reach of the project and will be discharged as a slurry. 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. Equipment will be selected based on whatever proves to be the most advantageous economically, as well as what generates only minimal and acceptable temporary environmental impacts. It is anticipated construction will begin in late-2005 and will require approximately 6 to 8 months for completion. This construction window should minimize impacts to sea turtles, fish, shellfish, and infauna. This schedule could change due to funding constraints, contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

The proposed borrow areas for beach compatible sand are designated in Figure 6. These areas total approximately 670 acres. The primary borrow area for this project, designated as Area #1, is a large rectangular area covering approximately 490 acres approximately 6000 feet offshore of the southern end of the island. The second area (approximately 40 acres) is less than a 1000 feet to the northeast of Area #1, and Area #3 (approximately 130 acres) is about 2,000 feet north of Area #2. None of the three areas are near any Coastal Barrier Resources Act (CBRA) zones, and all three are well within the 3-mile limit. The borrow areas have been surveyed by side-scan sonar, followed by the collection of numerous vibrocore samples in each of the potential borrow sites. This was done in order to avoid hard/live bottom areas during dredging, and to ensure that adequate quantities of beach compatible sand were available in the three areas. South Carolina Department of Natural Resources (SCDNR) also reviewed the reports and findings and helped clear these proposed borrow areas for use. The three borrow area acreages have been adjusted to match the amount of suitable sand depth. Larger areas had been

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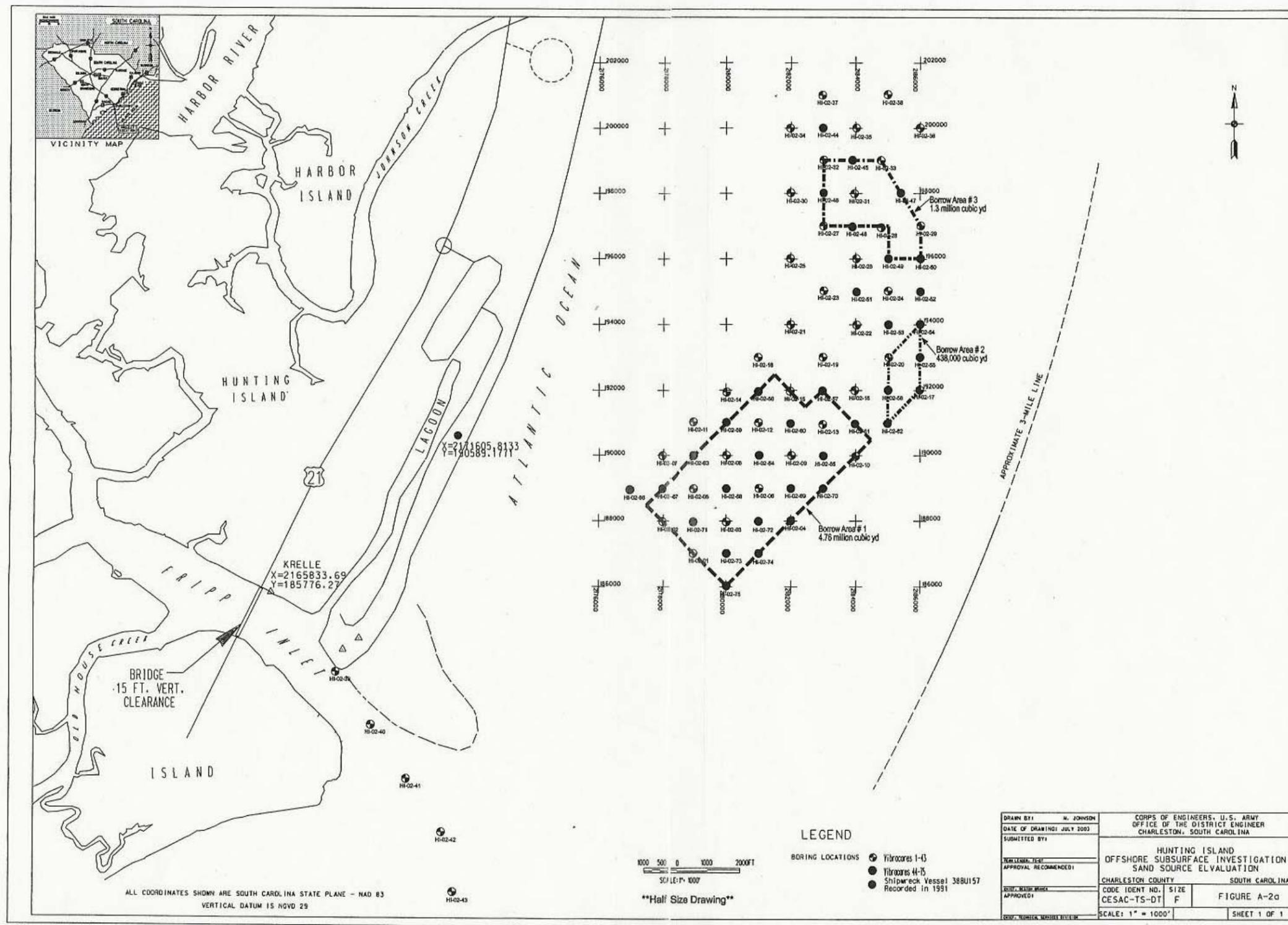


FIGURE 6: LOCATION OF PROPOSED BORROW AREAS

evaluated but the above listed acreages are what remained after the Corps of Engineers and SCDNR review and evaluation process. The volumes of sand in each borrow area (based on dredging to a depth of 6 feet) are as follows:

- Borrow Area #1: 4,760,000 cubic yards
- Borrow Area #2: 438,000 cubic yards
- Borrow Area #3: 1,300,000 cubic yards

Sand will be removed from the borrow areas to depths of 6 to 8 feet. Because of the dynamic nature of the coastal area and the constant movement of sand, it is expected that the borrow areas will fill with sand of the same grain size after the dredging has been completed.

II. ALTERNATIVES TO THE PROPOSED ACTION

Several alternatives were considered during this study to prevent beach erosion and continued loss of maritime forest. A combination of one non-structural measure and several structural measures were evaluated. These alternatives include the following:

A. No Action. The “no action” alternative would result in continued impacts to the island and park. The stability of the mature maritime forest could continue to be undermined and approximately 10 acres would continue to be lost to erosion every year. Viable habitat that supports many various plant and animal species would be lost. The freshwater wetland would be destroyed by erosion and ocean-strength saltwater intrusion. The saltmarsh and tree-lined lagoon, which acts as a nursery and feeding area for many saltwater animal species, is already impacted by the effects of erosion. This habitat would be further damaged as a result of the dissipation of the sand dunes and mature maritime forest that front the lagoon along the southern end of the island. Finally, what little sea turtle nesting habitat is currently available would be further eroded and few turtle nests would survive.

B. Renourishment Without Groins. Considering the short-term success of previous nourishment projects at Hunting Island and the continued excessive erosion rate that the island experiences, this alternative was not selected. Additional renourishment by itself will not provide the stabilization necessary to offset the erosional and tidal transport of sand away from the island. Further renourishment of the beach to support sea turtle nesting opportunities and to protect other coastal habitats will not be effective without consideration of structures that would provide for the retention of sand. The renourishment cycle for a project without groins is approximately every five years, while the renourishment cycle for a project with groins is approximately every 9 years.

C. Renourishment With Groins. This alternative will provide a longer-term solution to realizing the outputs of this study, by defending against the erosional and tidal impacts to the island. Addition and retention of sand within the system that influences Hunting Island is key to the stabilization that is necessary for the island’s continued existence. The proposed project will implement this alternative to provide the level of protection needed to allow the coastal habitat

and its varied plant and animal species to thrive in an undisturbed natural environment. Although the construction of groins is contrary to the natural environment existing at Hunting Island, it was deemed to be the only viable solution for long-term protection of this valuable resource.

D. Other Alternatives. Several variations of beach nourishment with groins (e.g., various lengths and spacing of groins, various quantities of sand fill, and various iterative combination of the two) were also evaluated before selecting the proposed alternative. Several other alternatives that were evaluated, but eliminated, included sand “bypassing” from Fripp Inlet, sand “bypassing” from St. Helena Sound, rock revetments, and breakwaters.

III. EXISTING ENVIRONMENTAL SETTING

A. General. The study area encompasses approximately 4 miles of South Carolina’s coastline and it’s environs from Johnson Creek to the north and Fripp Inlet to the south, and is 3,500 feet wide at it’s most narrow point. The study area also extends oceanward approximately 2½ miles in order to locate adequate sources of sand for borrow material. This straight to gently-curving shoreline bordered by the Atlantic Ocean is oriented in a northeast-southwest direction. On the basis of geomorphology, the Hunting Island is a Holocene Epoch barrier island. It is characterized by wide, flat beaches and breached by few tidal inlets. The average elevation of Hunting Island is about 12 feet MSL; and all the front-beach natural dunes have been eroded away. Although the center of the island is experiencing the greatest erosion rate, the entire 4 mile reach has historically been an area of erosion and is being cut away every year.

The beaches at Hunting Island are located within a dynamic coastal system that is predominantly affected by tides, winds, and storms (i.e., northeasters, tropical storms, and hurricanes). Hurricanes, Northeasters, and littoral currents have in the past (and continue to do so) caused breaches into a freshwater pond, made the beach mostly unusable for sea turtle nesting while tearing away at this rare mature maritime forest. They are also causing damage to properties, roadways, utilities, and public access to the beaches on the island. The estimated annual erosion rate at Hunting Island is approximately 20 feet/year.

At Hunting Island, the mean tide range is from 0.205 feet to 6.23 feet with a maximum tide range of 6.6 feet. Some of the highest observed storm tides in the area were produced by the hurricane of August 1940, when the storm tide reached 14.5 feet above mean low water (Survey Report, Cooperative Beach Erosion Study, Hunting Island Beach, South Carolina, USACE-Charleston District, March 1963). The entire island was inundated and the high water shoreline receded on an average of about 85 feet.

B. Water Quality. Ocean waters in the study area are generally considered to be of high quality and are used for numerous water oriented activities such as swimming and fishing. Salinity is very close to that of the open ocean due to a general lack of freshwater inflow.

C. Climate. The climate of the Hunting Island coastal vicinity is mild and temperate. The temperatures vary from an average highs and lows of 58 °F and 39 °F in January and 91 °F and 74 °F in July. The area's severest weather comes in the form of severe thunderstorms and hurricanes. Most severe thunderstorms occur from May through September. The hurricane season extends from June to November, producing infrequent storms, which affect the study area. Rainfall averages 48 inches annually, with the heaviest occurring in the late summer and early fall months. The highest precipitation occurs during the months of June, July, August, and September with July and August being the peak months. Measurable snowfall may occur twice in winter, during December and February. (Source: South Carolina Office of Climatology: <http://water.dnr.state.sc.us/climate/sco/>).

D. Threatened and Endangered Species. Table 1 contains a list of species that have been listed by the U.S. Fish and Wildlife Service as occurring or possibly occurring in Beaufort County. Table 2 contains a list of threatened and endangered species in South Carolina under the jurisdiction of NOAA Fisheries.

E. Biological Resources. A large and varied number of species of invertebrates, fishes, and birds, as well as mammals, amphibians, and reptiles, utilize the habitats in and around Hunting Island. The threatened loggerhead sea turtle utilizes the beach of Hunting Island for nesting, but eggs laid must be immediately transferred to a safe area of sufficient elevation to ensure their successful hatching.

1. **General:** The primary terrestrial habitat in the immediate study area consists of some residential dwellings, roads, utilities, public bathhouses, picnic shelters, parking areas, and appropriate support facilities. The majority of the dune system is totally lacking along most of the island, due to extensive erosion (see photos in Figure 7). Vegetative cover is absent, for the most part, in the beach area that has been severely eroded, with a slightly more natural condition at the north end where there is some accretion, due to the existence of the north terminal groin. As a result, what little vegetative cover there is, generally consists of perennial grasses such as sea oats (*Uniola paniculata*), and other salt tolerant grasses. Along most of the beach, there is an abrupt transition from the beach to the mature maritime forest. Other habitats in the study area include the beach and near shore ocean, and some very limited dunes and shrub thickets.

In most areas along the South Carolina coast, beaches are gently sloping transitional areas between open water and upland communities. These communities typically consist of a dry berm zone located beyond the high tide zone, an intertidal zone that is alternately covered and exposed by tidal action, and a subtidal zone that occurs below the low tide line and extends seaward. In the study area, the dry beach berm has been severely eroded and the intertidal areas are fairly wide due to the shallow slope of the beach.

Common Name	Scientific Name	Status	Occurrence
West Indian manatee	<i>Trichechus manatus</i>	E	Known
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	Known
Wood stork	<i>Mycteria americana</i>	E	Known
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	Known
Piping plover	<i>Charadrius melodus</i>	T, CH	Known
Kemp's ridley sea turtle	<i>Lepidochelys kempii*</i>	E	Known
Leatherback sea turtle	<i>Dermochelys coriacea*</i>	E	Known
Loggerhead sea turtle	<i>Caretta caretta</i>	T	Known
Green sea turtle	<i>Chelonia mydas*</i>	T	Known
Flatwoods salamander	<i>Ambystoma cingulatum</i>	T	Known
Shortnose sturgeon	<i>Acipenser brevirostrum*</i>	E	Known
Pondberry	<i>Lindera melissifolia</i>	E	Known
Canby's dropwort	<i>Oxypolis canbyi</i>	E	Possible
Chaff-seed	<i>Schwalbea americana</i>	E	Known
Southern Dusky Salamander	<i>Desmognathus auriculatus</i>	SC	Possible
Cupgrass	<i>Eriochloa michauxii</i>	SC	Known
Godfrey's privet	<i>Forestiera godfreyi</i>	SC	Known
Pondspice	<i>Litsea aestivalis</i>	SC	Known
Bachman's sparrow	<i>Aimophila aestivalis</i>	SC	Possible
Henslow's sparrow	<i>Ammodramus henslowii</i>	SC	Known
Red knot	<i>Calidris canutus</i>	SC	Possible
Swallow-tailed kite	<i>Elanoides forficatus forficatus</i>	SC	Known
American kestrel	<i>Falco sparverius</i>	SC	Possible
American oystercatcher	<i>Haematopus palliatus</i>	SC	Known
Loggerhead shrike	<i>Lanius ludovicianus</i>	SC	Possible
Swainson's warbler	<i>Limnothlypis swainsonii</i>	SC	Known
Painted bunting	<i>Passerina ciris ciris</i>	SC	Possible
Gull-billed tern	<i>Sterna nilotica</i>	SC	Known
Hilton Head white-tail deer	<i>Odocoileus virginianus hiltonensis</i>	SC	Known
Hunting Island white-tail deer	<i>Odocoileus virginianus venatoria</i>	SC	Known
Southeastern myotis	<i>Myotis austroriparius</i>	SC	Known
Southern hognose snake	<i>Heterodon simus</i>	SC	Known

E: Federally endangered T: Federally threatened CH: Critical Habitat
 SC: Federal Species of Concern. These species are rare or limited in distribution but are not currently legally protected under the Endangered Species Act.
 Species proposed for listing: None

* Contact NOAA Fisheries for more information on this species

TABLE 1: USF&WS THREATENED AND ENDANGERED SPECIES IN BEAUFORT COUNTY

2. Plant life: The entire eastern side of the island is composed of a sand beach. The vegetation along the landward edge of the beach on what few fragments of dunes that still exist, include sea oats (Unicola paniculata), sea ox-eye (Borrichia frutescens),

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glasswort (*Salicornia* sp.), pennywort (*Hydrocotyle* sp.), and wiregrass (*Spartina patens*). Cabbage palmettos (*Sabal palmetto*) are found adjacent to the western edge of the beach.

Species	Scientific Name	Status	Date Listed
Listed Marine Mammals			
Blue whale	<i>Balaenoptera musculus</i>	E	12/02/70
Finback whale	<i>Balaenoptera physalus</i>	E	12/02/70
Humpback whale	<i>Megaptera novaeangliae</i>	E	12/02/70
Right whale	<i>Eubaleana glacialis</i>	E	12/02/70
Sei whale	<i>Balaenoptera borealis</i>	E	12/02/70
Sperm whale	<i>Physeter macrocephalus</i>	E	12/02/70
Listed Sea Turtles			
Green sea turtle	<i>Chelonia mydas</i>	T*	07/28/78
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E	06/02/70
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E	12/02/70
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E	06/02/70
Loggerhead sea turtle	<i>Caretta caretta</i>	T	07/28/78
Listed Fish			
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	E	03/11/67
Species of Concern** – Fish			
Dusky shark	<i>Carcharhinus obscurus</i>		
Sand tiger shark	<i>Odontaspis taurus</i>		
Night shark	<i>Carcharhinus signatus</i>		
Atlantic sturgeon	<i>Acipenser oxyrinchus oxyrinchus</i>		
Speckled hind	<i>Epinephelus drummondhayi</i>		
Warsaw grouper	<i>Epinephelus nigritus</i>		
Goliath grouper	<i>Epinephelus itajara</i>		
White marlin	<i>Tetrapturus albidus</i>		
Species of Concern** – Invertebrates			
Ivory bush coral	<i>Oculina varicosa</i>		
Species proposed for listing: None Designated Critical Habitat: None in the area of this project Proposed Critical Habitat: None in the area of this project Candidate Species: None			

* Green turtles are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

** Species of Concern are not protected under the Endangered Species Act, but concerns about their status indicate that they may warrant listing in the future. Federal agencies and the public are encouraged to consider these species during project planning so that future listings may be avoided.

TABLE 2: NOAA FISHERIES THREATENED AND ENDANGERED SPECIES IN SOUTH CAROLINA

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There are extensive marsh areas on the western side of the island and smaller marsh areas on the northeastern and southern parts of the island. The major plant species in these marsh areas is smooth cordgrass (*Spartina alterniflora*). Other marsh plants include wiregrass, black needlerush (*Juncus roemerianus*), wax myrtle (*Myrica cerifera*), marsh elder (*Iva frutescens*), cabbage palmetto, groundsel tree (*Baccharis halimifolia*), rattlebox (*Crotalaria* sp.), sea ox-eye, bulrush (*Scirpus* sp.), coco (*Scirpus robustus*), and nut grass (*Cyperus* sp.).

Most of the island is upland with loblolly pine (*Pinus taeda*) being the major overstory species. The remainder of the overstory includes live oaks (*Quercus virginiana*), water oak (*Quercus nigra*), saw palmetto (*Sarenoa serrulata*), and cabbage palmetto, with a few sweetgums (*Liquidamber styraciflua*) and sassafras (*Sassafras albidum*). Understory plants include red cedar (*Juniperus virginiana*), dwarf palmetto (*Sabal minor*), holly (*Ilex* sp.), red bay (*Persea borbonia*), wildgrape (*Vitis* sp.), hawthorn (*Cretagus* sp.), green-briar (*Smilax* sp.), poison ivy (*Rhus radicans*), wild lettuce (*Lactusa* sp.), elder berry (*Sambucus canadensis*), poke (*Phytolacca americana*), French mulberry (*Callicarpa Americana*), willow (*Salix* sp.), dog fennel (*Eupatorium capillifolium*), ferns (*Thelypteris* sp., etc.), smartweed (*Polygonum* sp.), marsh elder, groundsel tree, dewberry (*Rubus* sp.), giant foxtail (*Setaria faberi*), sprangletop (*Leptochloa* sp.), Virginia creeper (*Parthenocissus quinquefolia*), barnyard grass (*Echinochloa* sp.), nut grass, buckvine (*Ampelopsis arborea*), broom sedge (*Andropogon* sp.), vervain (*Verbena* sp.), and various other annuals and perennials.

3. **Fish and Wildlife:** Relatively few species inhabit sandy beaches, but of those that are present, many frequently occur in large numbers. Typical inhabitants are beach fleas (*Orchestia aqilis*) and ghost crabs (*Ocypode albicans*) in the beach berm; coquina (*Donax variabilis*), mole crabs (*Emerita talpoidea*), amphipods, and various burrowing worms in the beach intertidal zone; and blue crabs, horse-shoe crabs, sand dollars, and a variety of clams and gastropod mollusks in the beach subtidal areas. In addition, many species of fish commonly occur in the surf zone and deeper nearshore waters. The Atlantic silverside (*Menidia menidia*), bay anchovy (*Anchoa mitchili*), spot (*Leiostomus xanthurus*), bluefish (*Pomatomus saltatrix*), mullet (*Mugil cephalus*), king fish (*Menticirrhus saxatilis*), red drum (*Sciaenops ocellata*), flounder (*Paralichthys* sp.), and seatrout (*Cynoscion nebulosus*) are the most common fishes. Although the beach zone is utilized by many species of wading and shore birds along much of the South Carolina coast, most of the project area provides somewhat less than ideal habitat for these species because of public use, and severe erosion problems.

The wildlife species occupying most of the remainder of the island include alligators (*Alligator mississippiensis*), whitetail deer (*Odocoileus virginianus*), raccoons (*Procyon lotor*), gray squirrels (*Sciurus carolinensis*), rabbits (*Sylvilagus* sp.), opossums (*Didelphis marsupialis*), osprey (*Pandion haliaetus*), brown pelicans (*Pelecanus*

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FIGURE 7: TYPICAL OCEAN FRONT EROSION OF MARITIME FOREST

occidentalis), little blue herons (Florida caerulea), belted kingfishers (Megaceryle alcyon), Louisiana herons (Hydranassa tricolor), common egrets (Casmerodius albus), mourning doves (Zenaidura macroura), and various shore birds and song birds.

Sampling done by the State of South Carolina, in past years, indicates that fauna of the intertidal zone at Hunting Island is comprised mainly of three groups of organisms: Pelecypod mollusks, polychaete worms, and amphipods. Coquina (Donax sp.) is the most abundant benthic organism followed by the polychaete (Glycera sp.) and amphipods (Haustorius sp.). Other forms found along the beach zone include tube worms, hermit crabs (Clibanarius vittatus), isopods, and moon snails (Lunatia sp.) although these organisms occur in insignificant numbers. Mole crabs (Emerita talpoida) a common inhabitant of many South Carolina beaches, were not found during this survey.

A variety of juvenile fish species occur in the area with the most common being bay anchovy (Anchoa mitchilli), silversides (Menidia sp.), king whittings (Menticirrhus sp.) mullet (Mugil sp.), and pompano (Trachinotus sp.).

4. Offshore Sites: Predominant organisms found in the areas offshore of the intertidal beach zone, include sea pansies (Renilla reniformes), various mollusks (Tellina sp., etc.), polychaete worms (Glycera sp., etc.), a wide variety of small crustaceans, and echinoderms. This area is typical of near shore bottom habitats utilized by shrimp trawlers in South Carolina and supports a wide variety of estuarine fishes and other commercially valuable species, including Penaeid shrimp (Penaeus sp.), Portunid crabs, and Sciaenids (drums). The proposed offshore ocean borrow sites have a sand bottom; therefore, animals commonly found on a hard substrate, such as sponges, corals, hydroids, bryozoans and ascidians, would not be found here. However, polychaetes, amphipods, oligochaetes, pelecypods, and decapods represent, among other taxa, would be found in association with the sand bottom in the proposed borrow sites.

F. Archaeological and Historical Resources. Past investigations into the National Register of Historic Places have shown that there are no properties listed within the area of project influence. In addition, the State Historic Preservation Officer has, in the past, determined that there are no sites of historical importance that will be adversely affected by the project. In view of the westward drift of sand in this area, this project will actually help to protect the Hunting Island Lighthouse. The current project is being coordinated with the state Site File Administrator, SHPO, and the Federally recognized tribes having a historical association with the State of South Carolina. If cultural resources are discovered during construction of this project, SHPO and the Federally recognized tribes will be notified and appropriate protective measures will be taken.

G. Socio-Economic. The study area associated with Hunting Island is located in Beaufort County South Carolina. Beaufort County covers 587 square miles and the population of the county area for the year 2000 is 120,937. The three major population centers for the county are the City of Beaufort, Hilton Head, and Port Royal. In 1997, the employment in the study area is diversified with accommodations and food service employing 7,838 people, followed by 7,444 in the wholesale and retail trade, and 2,006 in the professional, scientific, and technical services area. The per capita personal income (1999) for Beaufort County averages \$32,699 as compared with the per capita income of \$23,538 for the State of South Carolina and \$28,546 for the Nation.

H. Aesthetics and Noise. The aesthetics and noise levels of the Hunting Island area are comparable to those of any other barrier island that is a tourist destination point. The noise levels are generally limited to local auto traffic serving the island as well as boating traffic and recreators at play. There is also the occasional intrusion of bulldozers and front-loaders to perform emergency protection work for threatened island infrastructure.

I. Hazardous and Toxic Waste. There are no known hazardous or toxic waste sites located in the vicinity of this project.

J. Air Quality. Air quality in South Carolina is measured and regulated by the South Carolina Department of Health and Environmental Control. At the present time, the State of South Carolina, including the Beaufort County area, is in attainment with National Ambient Air Quality Standards.

K. South Carolina Coastal Zone Consistency. Section 307 of the Coastal Zone Management Act (CZMA) requires that activities subject to the CZMA, which a Federal agency conducts or supports must be consistent with the Federally, approved state management program to the maximum extent practicable. By copy of Public Notice (P/N) 2004-1R-178 dated August 27, 2004 (see Appendix A), the Charleston District requested concurrence from the South Carolina Department of Health and Environmental Control (SCDHEC), Office of Ocean and Coastal Resource Management (OCRM) that the proposed activity is consistent with the state's Coastal Zone Management Program (CZMP). This EA provides additional information to assist OCRM with their concurrence or non-concurrence that the project is consistent with the S.C CZMP.

IV. PROBABLE IMPACTS OF THE PROPOSED ACTION

A. Physical. The proposed physical changes to the existing ecosystem include the placement of sand along approximately 10,145 feet of beach beginning at the north terminal groin and construction of 6 groins spaced approximately 1250 feet apart. This sand, in addition to protecting the mature maritime forest, will provide a more suitable environment for sea turtle nesting and incidental protection of the state park facilities. There will be temporary disturbances of the sediments in the off-shore borrow area, but it will be short lived, ending upon completion of the project.

B. Water Quality. There will be short-term adverse water quality impacts during the construction period of this project. Dredging the proposed borrow area will generate turbidity and sedimentation impacts within the immediate vicinity of the operation, but the generally large grain size of the material will keep the area of impact small and will ensure that there are no impacts beyond the period of construction. Based on sampling of the borrow site, fine-grained soils (silt sizes) will constitute an average of 5 percent by weight of the total sample, and the average grain size diameter will be approximately 0.25 mm. Therefore, turbidity at the borrow site should be minor and localized to the immediate vicinity of the dredge intake. The period of construction will be approximately 6 to 8 months and similar short-term water quality impacts will occur at the deposition sites along the approximately 2 mile project shoreline. Fill operations will deliver a slurry of sand to the receiving shore, increasing turbidity in the immediate area. This effect, however, will not be significant since turbidity levels in the high-energy surf area are naturally high. Because of this, there is not expected to be any long term decrease in water quality at these sites. Any periodic beach renourishment, which is expected to be required every 9 years, will have water quality impacts similar to those for initial construction. Water Quality Certification has been requested from the South Carolina Department of Health and Environmental Control.

C. Climate. No changes in climate will occur as a result of this project.

D. Threatened and Endangered Species. Consultation with the U.S. Fish and Wildlife Service (USFWS) concerning the effects of the proposed project on threatened and endangered species is ongoing. A Biological Assessment (BA) has been prepared and forwarded to USFWS (see Appendix D). The findings of the BA are that the proposed project is not likely to adversely affect any listed species except for the loggerhead sea turtle. Because of concerns with the effect of the proposed project on nesting sea turtles and/or emerging hatchlings, the findings of the BA are that the proposed project may adversely affect the loggerhead sea turtle.

E. Biological Resources. The expected outputs of the proposed restoration project, in addition to protection for the mature maritime forest, will provide a more suitable beach for sea turtle nesting, and furnish more beach area for the potential use of the Piping Plover and other shorebirds for foraging, sheltering, and loafing.

1. **General:** The areas of affected environment for this proposed project are the three offshore borrow areas (an approximate 490 acre site, an approximate 40 acre site, and an approximate 130 acre site) and the placement of approximately 1,461,900 cubic yards of sand along 10,145 feet of beach. This 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. The approximate existing acreages of dry beach, intertidal beach, and subtidal beach that will be directly affected by the proposed project are as follows:

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- Dry Beach (i.e., between high tide and the tree line) - approximately 25 acres affected
- Intertidal (i.e., between high tide and low tide) - approximately 60 acres affected
- Subtidal (below low tide) - approximately 20 acres affected

Upon completion of the proposed project, the intertidal zone will be shifted seaward approximately 195 feet and the subtidal zone will be shifted seaward approximately 80 feet (see Figure 5). Upon completion the acreages of dry beach and intertidal beach will be as follows:

- Dry Beach - approximately 70 acres
- Intertidal - approximately 35 acres

Due to erosion, these acreages and the shifting of the intertidal and subtidal zones will change over time until being restored during periodic nourishments conducted by the non-Federal sponsor. The total existing area where sand will be placed encompasses approximately 105 acres. In areas of Hunting Island where there is little existing beach at high tide, the project will provide an increase in high tide beach area as the intertidal zone is moved offshore, while maintaining a gradual beach slope. Much of the increase in beach and beach slope will result in a net loss of shallow, near-shore subtidal zone.

The loss of shallow subtidal zone area will result in direct loss of benthic marine invertebrates; however, this loss is negligible in view of the vast amount of existing near-shore area that is inhabited by these animals. The loss of benthic marine invertebrates which currently inhabit the near-shore will be a short-term impact, since the new sand bottom will begin to be re-colonized shortly after construction ceases and re-colonization should be complete within three-to-six months following beach nourishment. Tidal zone species will eventually have an area of habitat equivalent to that at present. Nourishment materials will be clean sand having a grain size similar to that of the existing beach and should be rapidly re-colonized following completion of nourishment. Since animals associated with high energy beaches are continually subjected to effects of erosion and accretion and major physical changes resulting from storms and hurricanes, initial construction and any periodic nourishments (periodic nourishments will be performed by the non-Federal sponsor) will not unduly stress beach and inter-tidal animals beyond their adaptive capabilities.

2. Plant Life: The placement of additional sand on the beach will stop the current destruction of the maritime forest adjacent to the beach, and it will delay impacts to the balance of the island for as long as the project is maintained. The new dunes will also provide an opportunity for dune species to flourish, such as sea oats, sea ox-eye, glasswort, etc. These plants, therefore, should increase in number and flourish to a greater extent than before.

3. **Fish and Wildlife:** The proposed project will have a temporary adverse impact to coquina clam, mole crabs, and other invertebrate species inhabiting the beach intertidal zone. Aquatic organisms inhabiting the benthos of the offshore borrow site will also be temporarily adversely impacted. At both areas, these animals are important members of the food chain because they are preyed upon by a variety of commercially and recreationally important fish species and shore birds. However, there are no anticipated long-term impacts, and population levels should quickly return to normal.

Fish and bird species can easily move out of the way and will return to the area when construction work is completed. Most terrestrial species will not be impacted beyond the noise levels. Noise impacts will cease when the construction is completed.

F. Archaeological and Historical Resources. There will be no properties included in or eligible for inclusion in the National Register of Historic Places that will be negatively affected by the proposed project. The Hunting Island Lighthouse should receive a greater level of protection from the forces of erosion following completion of the proposed work.

G. Socio-Economic. Major socio-economic changes are not expected to result from the construction of this project. There should, however, with the protection of the maritime forest and restoration of a beach suitable for sea turtle nesting, be a positive impact on tourism with the creation of a larger dry beach.

H. Aesthetics and Noise. During the construction phase of this project, there will be a general increase in the ambient noise level. Operating dredges are generally quiet and contribute less to ambient noise levels than normal powerboat traffic; and offshore pumps are not expected to impact the ambient noise level. Bulldozers, however, will be working on the beach around the clock and may adversely impact the ambient noise level in their immediate vicinity. The bulldozers will be muffled though and impacts will be restricted to the immediate construction reach. In addition, the noise level and the visual impact of the project will be temporary and shift along the project reach as portions are completed and the equipment moves up or down the shoreline.

Visual and aesthetic features include the Atlantic Ocean and a narrow beach along much of the project length. Currently, there is very little evidence of a dune system along the project length. An increase in the berm height will not reduce the ocean view. Conversely, the nourishment project will provide an attractive and usable all-tide beach. Temporary degradation of aesthetics will occur on the beach during sand placement and movement.

Further, the noise and visual impacts will return to normal levels following project completion.

I. Hazardous and Toxic Waste. There are no known hazardous or toxic waste sites located in the vicinity of this project, so there will be no impacts.

J. Air Quality. Air pollution derived from the dredge and other construction equipment should be negligible during project construction. It is reasonable to assume that any impacts from the equipment use would be localized and of relatively short duration, quickly reverting to normal following project completion. Coastal winds prevent the buildup of automobile, boat, and construction produced air pollutants.

K. Environmental Justice. Executive Order 12898 requires Federal agencies to develop a strategy for its programs, policies, and activities to avoid disproportionately high and adverse impacts on minority and low income populations with respect to human health and the environment. The US Army Corps of Engineers is committed to the principles of environmental justice. Although the coastal side of Hunting Island is the project, all long-term impacts should be of a positive nature and benefit the island's natural resources and visitors with greater recreational opportunities and a higher level of storm protection.

L. Essential Fish Habitat. The submittal of this draft Environmental Assessment to the National Oceanic and Atmospheric Administration (NOAA) Fisheries initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Our current determination is that the proposed action would not have a substantial individual or cumulative adverse impact on EFH or fisheries managed by the South Atlantic Fishery Management Council and the NOAA Fisheries.

EFH Assessment

1) Description of the Site: Hunting Island is a coastal barrier island, characteristic of the sea island coastal region of South Carolina and Georgia, and is surrounded by sensitive coastal marine and estuarine habitats. Coastal barrier beaches, near-shore waters, inlets, and associated estuarine tidal wetlands provide high quality feeding, cover, spawning, and maturation sites for a variety of living marine resources. As such, any component of the project that may directly or indirectly reduce the quality, aerial extent, or natural character of the habitats involved should be identified. The project site is located in areas identified as Essential Fish Habitat (EFH) in the 1998 Amendment to Fishery Management Plans (FMP) that was prepared by the South Atlantic Fishery Management Council (SAFMC). This Amendment was prepared in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of 1996 (P.L. 94-265) and was approved by the Secretary of Commerce on June 3, 1999. Detailed information regarding EFH and species managed by the SAFMC can be found in the amended FMPs. EFH at the project site includes estuarine and coastal marine unconsolidated sand/mud bottoms, inter-tidal flats, emergent wetlands, and marine and estuarine water column.

2) Project Description: A description of the proposed action is located in Section I above.

3) Analysis of Individual and Cumulative Effects on EFH: Categories of EFH that would be impacted by this work include marine and estuarine water column and sand/mud bottom. Federally managed species associated with the above-mentioned habitats found at the proposed project site include post-larval, juvenile, and adult red drum (Sciaenops ocellata), white shrimp (Litopenaeus setiferus), and brown shrimp (Farfantepenaeus aztecus). Species under jurisdiction of the Mid-Atlantic Fishery Management Council also occur in the project area. These species and their associated EFH include juvenile and adult summer flounder (Paralichthys dentatus), which occur on marine and estuarine bottoms and in the water column, and juvenile and adult bluefish (Pomatomus saltatrix), which occur in the water column.

The project area also provides nursery and forage habitat for other species including black drum (Pogonias cromis), Atlantic menhaden (Brevoortia tyrannus), and blue crab (Callinectes sapidus) which serve as prey for other species (e.g., mackerels, snappers, and groupers) that are managed by the SAFMC, and for highly migratory species (e.g., billfishes and sharks) that are managed by the NMFS.

Macro invertebrate inhabitants of the near shore coastal zone are important components of coastal marine food webs and serve as prey for the aforementioned Federally managed fishes. Characteristic benthic fauna of southeastern beaches is diverse, including, including tropically important representatives such as haustoriid amphipods, polychaete worms, isopods, and ghost crab (Ocypode quadrata).

4) Corps of Engineers Views Regarding Effects on EFH: The Corps of Engineers has concluded that this project will not result in significant long-term harm to the ecologically diverse aquatic habitats, such as “live rock” and other stable bottoms. Most impacts are expected to be limited to relatively sparse benthic epifauna and infauna, which includes mollusks, crustaceans, and polychaete worms. These organisms would be at least temporarily eliminated through excavation and, in some locations, burial would result as inter-tidal zones are converted to beach and dune environments. Materials used for beach nourishment may also be transported onto other areas that support benthic communities; however, no hard bottoms or vegetated wetlands will be affected. Other expected impacts include localized turbidity elevation and possible reduction of dissolved oxygen in the surrounding water column. Elevated turbidity can reduce photosynthesis activity of pelagic and benthic algae. Suspended sediments can cause physical damage to respiratory structures of early life stages of fishes and invertebrates. Sand will be removed from the borrow areas to depths of 6 to 8 feet. Because of the dynamic nature of the coastal area and the constant movement of sand, it is expected that the borrow areas will fill with sand of the same grain size after the dredging has been completed.

5) Proposed mitigation: No EFH mitigation is considered necessary for this project.

M. Marine Protected Areas. Executive Order 13158 requires Federal agencies to avoid harm to the natural and cultural resources that are protected by a Marine Protected Area (MPA) to the extent permitted by law and to the maximum extent practicable when their actions affect those resources that are protected. It is not anticipated that there will be any impacts to MPA's as a result of this proposed project.

N. Cumulative Impacts. Because Hunting Island is owned by the State of South Carolina and is utilized as a state park, the proposed project will not result in any additional coastal development in the area. Any future re-nourishment performed by SCPRT is expected to result in the same environmental impacts as the initial construction.

The expected cumulative impacts of the proposed project will be protecting the mature maritime forest by slowing the forces of erosion and restoring the turtle nesting habitat while incidentally protecting park infrastructure. By implementing the proposed project, this unique natural resource will be preserved for years to come for use by the fish and wildlife as well as the general public.

O. South Carolina Coastal Zone Consistency. This project is consistent to the maximum extent practicable with the South Carolina Coastal Zone Management Program (CZMP). By copy of the previously published public notice (P/N 2004-1R-178 dated August 27, 2004), the Charleston District requests concurrence from the South Carolina Department of Health and Environmental Control (DHEC), Office of Ocean and Coastal Resource Management (OCRM) that the proposed activity is consistent with the State's CZMP. Concurrence is conclusively presumed if no state action is received within 45 days of their receipt of the above referenced notice. OCRM personnel have not expressed concerns regarding the inconsistency of the project with coastal zone management policy.

V. OUTPUTS

A. Measurement of Expected Outputs. According to park employees, there are now only 1200 acres of mature maritime forest remaining on this island. If the current rate of erosion being experienced over the last decade continues, the park will lose at least 10 acres per year, with no new forest being created. This project will stabilize the northern two-thirds of island from the forces of erosion. The dunes created to protect the forest will also provide more suitable nesting habitat for sea turtles. The last time (1991) that the island was nourished sea turtle nesting jumped from 80 nests in 1991 to 130 nests in 1992, a 62.5% increase. It seems reasonable to assume that there will be a corresponding increase in sea turtle nesting following this work. Also, when construction is completed, the dunes will protect the largest freshwater/brackish water wetland on Hunting Island. This 15-acre pond is currently experiencing salt water intrusion on a regular basis.

Due to the likelihood of financial restrictions against long-term monitoring efforts, at a minimum, the proposed project will be considered a success if the following takes place:

1. The mature maritime forest remains at 1200 acres and the beach is stabilized.
2. The number of loggerhead turtle nests increase after the construction work is completed and/or the number of aborted nesting attempts (i.e., false crawls) decreases.
3. Saltwater no long intrudes into the freshwater pond.

B. Importance of Expected Outputs.

Preservation of Maritime Forest:

Current estimates show approximately 1200 acres remaining of rare maritime forest community and it's associated habitat that has lost approximately 125 acres (3.2 acres per year) between 1959 and 1998. The current erosion rate seems to have now accelerated, and over the last decade and is increased to close to 10 acres per year. As has been stated elsewhere, residential development in the maritime forest communities on other barrier islands along the coast of South Carolina have sometimes preserved the overstory pine, oak, and magnolia but usually destroys most of the understory critical to many birds, small mammals, reptiles, and amphibians. Hunting Island contains one of the few relatively undisturbed rare maritime forests that still exist in South Carolina (reference: The Nature Conservancy's publication entitled "International Classification of Ecological Communities").

Rebuilding Nesting Turtle Populations:

The Federally protected loggerhead sea turtle is the only species that will be found routinely nesting on Hunting Island. Turtle nesting has increased with past nourishment efforts (for example in 1980 and 1991), but as the beach and shoreline currently exist, it has eroded back to the maritime forest, and nesting habitat has been all but eliminated. Since 1991 sea turtle nesting has decreased and nest relocations and false crawls have increased. Presently the entire island is monitored, and most nests are moved to a self-releasing hatchery that is located at the north end of the island. Historically, Hunting Island has averaged approximately 2 sea turtle false crawls for each sea turtle nest (2:1). By 1998, due to the erosion, the false crawl rate rose to 4:1. In 2000, the false crawl rate increased to 4.5:1. Since 1990, the number of sea turtle nests on Hunting Island has gone from a high in 1992 of 130 to a low in 2000 of 31. There was a slight increase in 2001 to 43. We now have an opportunity to restore good nesting habitat while eliminating the need for relocation work. As in the past, there should be a significant increase in successful nesting.

Protection of Freshwater/Brackish Water Wetland:

The Hunting Island State Park sewage treatment infrastructure has, in the past, used the 15-acre freshwater/brackish water wetland as a tertiary treatment for wastewater and sewage for some of the park facilities. This wetland has, in the past, also provided nesting and feeding habitat for wintering and migrating waterfowl. This usage has significantly reduced with the recent deterioration of this wetland. It is the largest freshwater/brackish water wetland habitat on Hunting Island and is located immediately behind what has historically been a dune system.

SCPRT now diverts that sewage flow to a drainage field located further back from the existing shoreline. SCPRT anticipates that restoration of the wetland could be pursued once the saltwater intrusion problem is dealt with. Once the protective dry beach and berm are placed along the ocean-facing length of the existing freshwater/brackish water wetland it will provide protection from saltwater intrusion, and then there will be an opportunity for restoration of the wetland under other study authority. This opportunity will be examined as a specific feature during the remainder of the feasibility phase.

C. Other Potential Benefits.

- Restoration and protection of nesting and foraging habitat for numerous shorebirds, including nesting habitat for the State of South Carolina- threatened Least Tern and Wilson's Plover.
- Protection of potential habitat for the Common Ground Dove (Columbina passerina). Habitat conditions on South Carolina sea islands and beaches are now critical, and these areas support the largest number of Common Ground Doves in the state.
- Protection of habitat for the Hunting Island Whitetail Deer (Odocoileus virginianus venatorius), a whitetail subspecies found on isolated islands and in small pockets of the Atlantic coast of South Carolina.
- Protection of potential habitat for the Island Glass Lizard (Ophisaurus compressus). They prefer xeric habitats in coastal pine and maritime forests and are found occasionally under tidal wrack on sandy beaches. Currently they are known to occur along the coast only in Charleston, Georgetown, and Jasper Counties.
- Protection of habitat for the Eastern Diamondback Rattlesnake (Crotalus adamanteus), a species of concern.
- Protection of the lighthouse, lighthouse keeper's house, a brick oil storage building, and several frame storage buildings that are listed on the National Register of Historic Places.

VI. UNAVOIDABLE ADVERSE ENVIRONMENTAL CONSEQUENCES

Adverse environmental impacts associated with this project are as follows:

1. There would be a temporary increase in noise and air pollution during the construction phase of this project.
2. A temporary increase in turbidity during construction may occur.
3. Aquatic organisms utilizing the construction areas will be displaced by the project.

VII. CONCLUSIONS

The proposed action does not constitute a major Federal action significantly affecting the quality of the human environment; therefore, the preparation of an Environmental Impact Statement (EIS) provided for under Section 102(c) of the National Environmental Policy Act of 1969 is not required.

VIII. FEDERAL, STATE, AND LOCAL AGENCY COORDINATION

A list of agencies with which this report is being coordinated as well as pertinent correspondence, is contained in the Appendices.

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Appendix A

Water Quality Certification Public Notice

JOINT
PUBLIC NOTICE

CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A HAGOOD AVENUE
CHARLESTON, SOUTH CAROLINA 29403-5107
and
THE S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Office of Environmental Quality Control
Water Quality Certification and Wetlands Programs Section
2600 Bull Street
Columbia, South Carolina 29201
and
Office of Ocean and Coastal Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405

NOTE: THIS IS A CORPS OF ENGINEERS
CIVIL WORKS PROJECT

CESAC-PM-TE

August 27, 2004

Refer to: P/N # 2004-1R-178

Hunting Island Section 206
Ecosystem Restoration and Protection Project
Beaufort County, South Carolina

The Charleston District, Corps of Engineers, Charleston, South Carolina, proposes to perform the work described herein with due consideration and review given to the relevant provisions of the following laws:

1. The Clean Water Act (33 U.S.C. 1251, et. seq.).
2. The Endangered Species Act of 1973, as amended (16 U.S.C. 1531, et. seq.).
3. The National Historic Preservation Act of 1966 (U.S.C. 470, et. seq.) and the Preservation of Historical Archeological Data Act of 1974 (16 U.S.C. 469, et. seq.).
4. The National Environmental Policy Act of 1969, (42 U.S.C. 4321).
5. The South Carolina Coastal Zone Management Act (48-39-10 et.seq.)

The purpose of this notice is to advise all interested parties of the proposed placement of sand on the northern end of Hunting Island and the construction of six (6) sheet-pile groins (see Figures 1 and 2).

In order to give all interested parties an opportunity to express their views

NOTICE

is hereby given that written statements regarding the proposed work will be received at this office until

12 O'CLOCK NOON, MONDAY, SEPTEMBER 27, 2004

from those interested in the activity and whose interests may be affected by the proposed work.

PROJECT INFORMATION

The Hunting Island Project will involve sand placement on the northern end of the island north of the Cabin Road Protection Project that was completed in March 2003. The Federal Project will involve sand placement beginning at the north terminal groin and moving south for approximately 10,145 linear feet of beach. Figure 2 shows the limits of the Section 103 (Cabin Road Protection) Project and the extent of the Federal project.

In addition to the sand placement, the project will also include the construction of six 450-foot rock-reinforced, sheet-pile groins, spaced approximately 1,250 feet apart, with sufficient cell nourishment to support a 9-year periodic nourishment cycle. Periodic renourishment is not part of this project and, if performed, will be pursued as a separate project by S.C. Parks, Recreation and Tourism. The additional groins will extend from the existing terminal groin and work southward. Approximately 1,461,000 cubic yards of sand will be placed on the beach.

Sand placement will be made with a hydraulic pipeline cutterhead dredge or a hopper dredge. Beach compatible material (sand) from the off-shore borrow sites will be pumped along the project length and will be discharged as a slurry to a design elevation of 8 feet NGVD. During construction, temporary training dikes of sand would be used to contain the discharge and control the fill placement. Fill sections will be graded by land based equipment, such as bulldozers and articulated front-end loaders, and other equipment as necessary. The sand will then be graded, raked, and tilled (on alternate segments) as necessary in coordination with recommendations and requirements from regulatory agencies. It is anticipated construction will begin in late-2005 and will require approximately 6 to 8 months for completion. This construction window should minimize impacts to sea turtles, fish, shellfish, and infauna. This schedule could change due to contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

The borrow areas being used for beach compatible sand are designated in Figure 3. These three areas total nearly 670 acres. The primary borrow area for this project is a large rectangular area covering approximately 490 acres to the SE off the coast of Hunting Island and is annotated as Area #1. It starts at roughly 6,000 feet off-shore the southern end of the island and is well within the 3-mile limit. The second area

(approximately 40 acres) is less than a 1000 feet to the NE of Area #1, and Area #3 (approximately 130 acres) is about 2,000 feet N of Area #2. Approximately 4.8 million cubic yards of sand are available from these three sites; however, the majority of the sand will be drawn from borrow site #1. Sand will be removed from the borrow area(s) to a depth of six (6) to eight (8) feet. Because of the dynamic nature of the coastal area and the constant movement of sand, it is expected that the borrow areas will fill with sand of the same grain size after dredging is completed. All three areas have been carefully mapped out to avoid live/hard bottom.

ADDITIONAL CONSIDERATIONS

This document serves as a public notice on behalf of the SCDHEC for water quality certification. A certification is required from DHEC stating that the proposed construction will be conducted in a manner consistent with the Clean Water Act. By this notice, the Charleston District requests DHEC to issue that certification. Persons wishing to comment on State Certification are invited to submit same in writing to SCDHEC, 2600 Bull Street, Columbia, South Carolina 29201, within 30 days of the date of this notice.

This project is consistent to the maximum extent practicable with the South Carolina Coastal Zone Management Program. By this notice, the Charleston District requests concurrence from the South Carolina Department of Health and Environmental Control (SCDHEC), Office of Ocean and Coastal Resource Management (OCRM) that the proposed activity, occurring in Beaufort County, is consistent with the State's Coastal Zone Management Program. Concurrence is conclusively presumed if no state action is received within 45 days of receipt of this notice.

The Charleston District is coordinating with Federally recognized tribes with a historic presence in South Carolina to determine the presence or absence of archeological and/or historic resources that may be present within the project site boundaries.

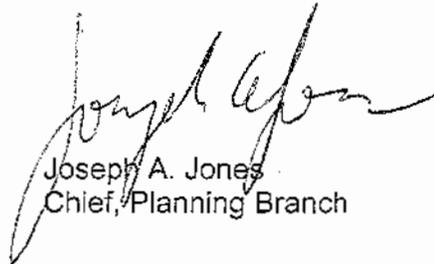
Pursuant to Section 7(c) of the Endangered Species Act of 1973 (as amended), the District Engineer has consulted the most recently available threatened and endangered species information and has initiated consultation with the U.S. Fish and Wildlife Service.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this proposed project. Requests for a public hearing shall state, with particularity, the reasons for holding a public hearing. These requests should be made to DHEC at the address listed above.

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to proceed with the

project. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Questions or comments concerning this notice should be directed to Mr. Alan Shirey of the District's Environmental Resources Team (PM-TE) at telephone numbers (843) 329-8166.



Joseph A. Jones
Chief, Planning Branch

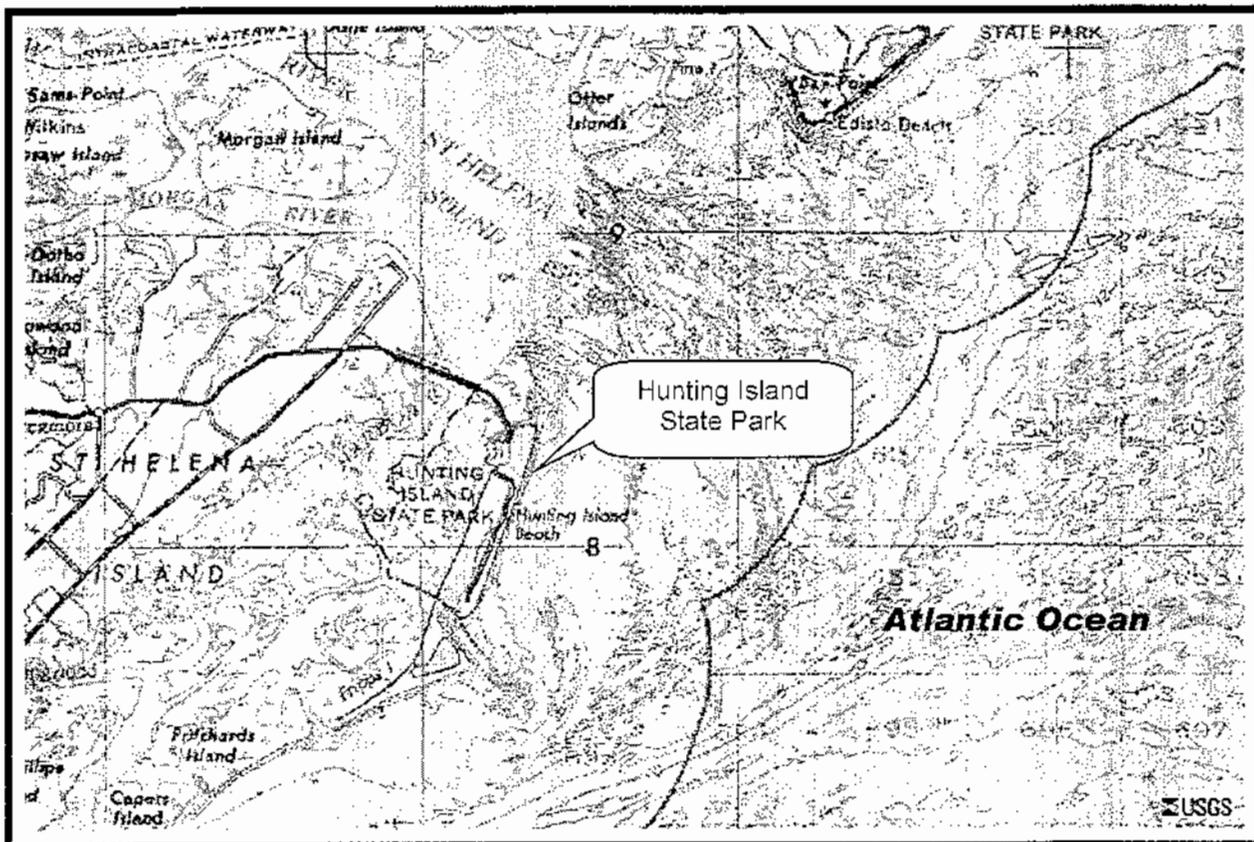
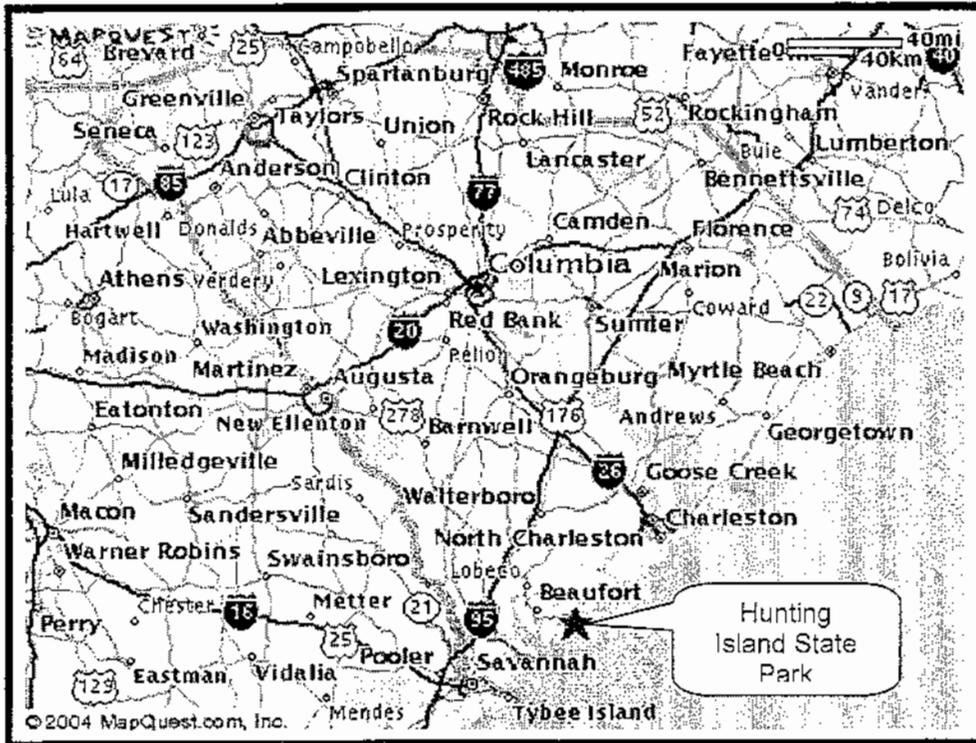


Figure 1 – Location Maps

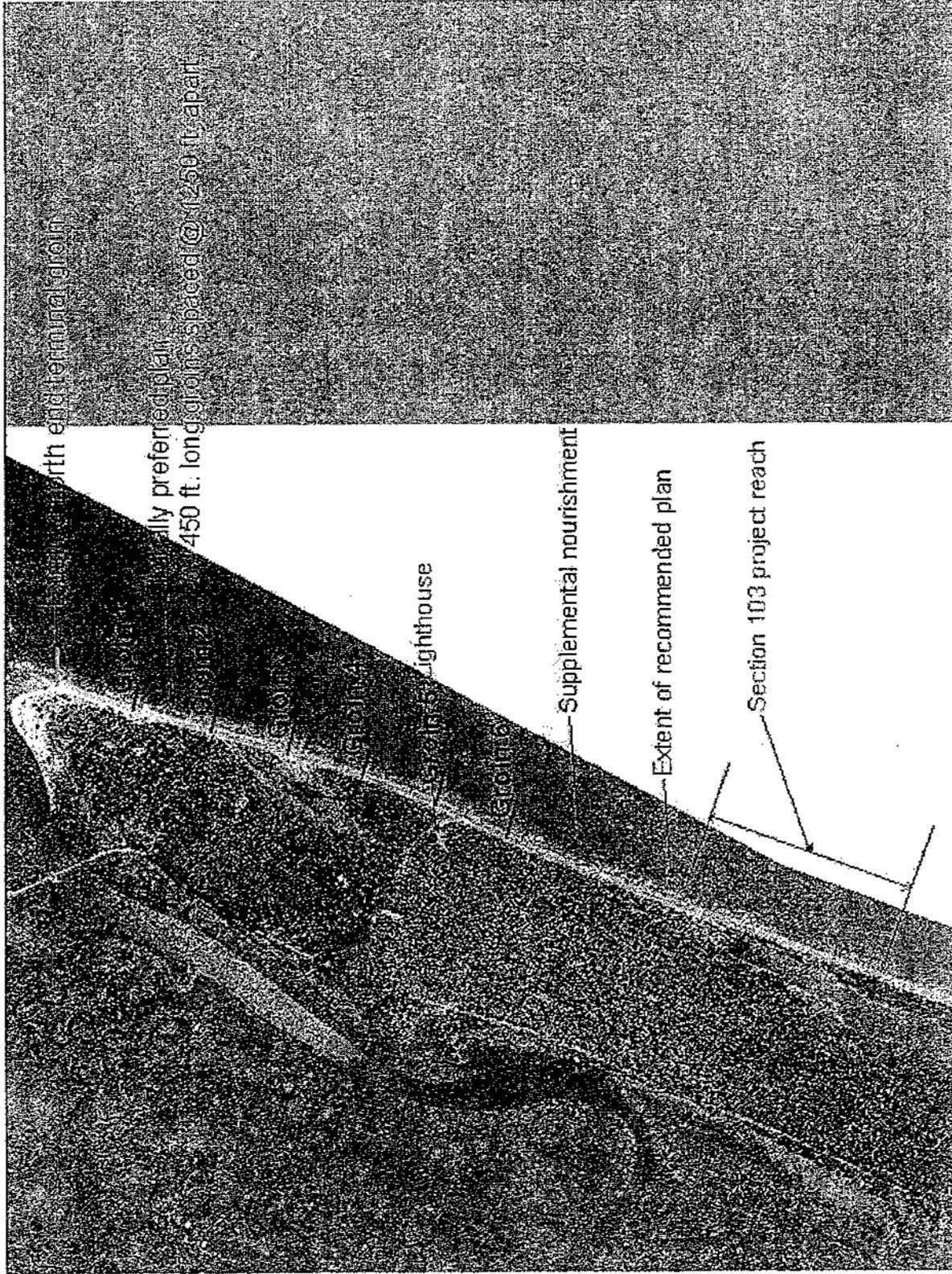


FIGURE 2: HUNTING ISLAND PROJECT LIMITS

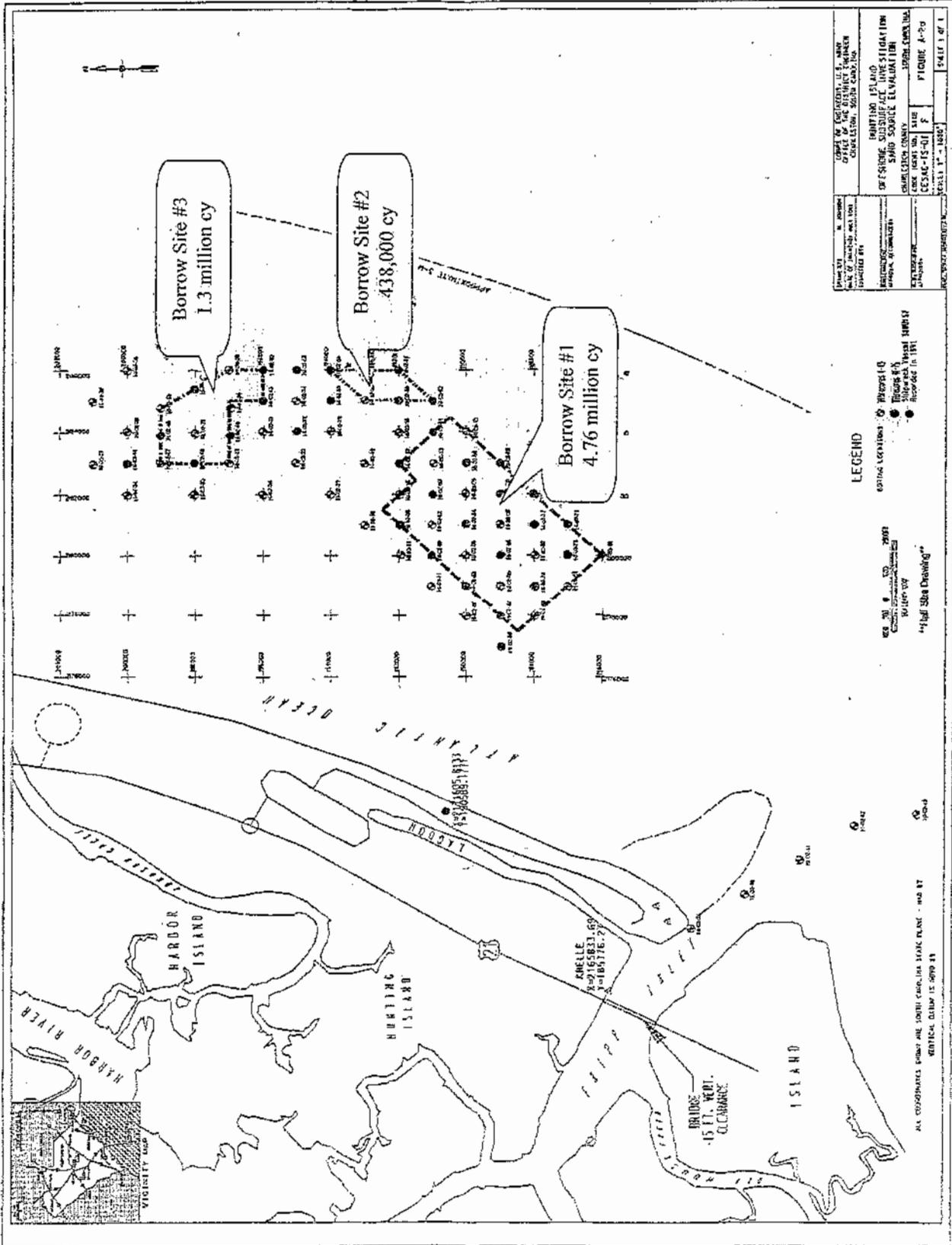


FIGURE 3

DRAFT

Appendix B

**DHEC Coordination Correspondence and Section 401 Water
Quality Certification**

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Appendix C

**DHEC-OCRM Coordination Correspondence and Coastal
Consistency Determination**

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Appendix D

Threatened and Endangered Species Coordination Documents

**BIOLOGICAL ASSESSMENT
OF THE PROPOSED HUNTING ISLAND
ECOSYSTEM RESTORATION AND PROTECTION PROJECT
BEAUFORT COUNTY, SOUTH CAROLINA**

AUGUST 2004

1.00 INTRODUCTION

Hunting Island is located on the South Carolina coast in Beaufort County, approximately 16 miles east of the City of Beaufort, 9 miles southwest of Edisto Beach, and approximately 45 miles northeast of Savannah, GA (see Figure 1). The 4-mile long island reaches from Fripp Inlet at the south end to Johnson Creek at the north end (see Figure 2). The Hunting Island ecosystem restoration and protection study is being conducted under authority of Section 206 of the Water Resources Development Act (WRDA) of 1996 (P.L. 104-303). An environmental assessment (EA) is being prepared to evaluate the overall environmental impacts of the proposed project. This document evaluates the impact of the proposed project on threatened and endangered species and will be incorporated in the EA.

The purpose of this project is to protect the maritime forest covering most of this island from erosion and storm events, with a secondary benefit of providing additional beach and dune area that will facilitate more sea turtle nesting, as well as providing habitat for the Wilson's plover and least tern. Development at the south end includes a few dozen vacation homes that are being lost to erosion one at a time. The rest of the island is lightly developed with camping and other recreational facilities. Both forest and facilities are being damaged/destroyed by beach erosion every year. The north end of the island seems to be partially protected by a terminal groin, while the south end appears to be stable. However, significant erosion problems exist throughout the balance of the island.

2.00 PROPOSED PROJECT

The study area for this project included the entire length of the island. For the environmental analysis, the study area was divided into nine impacted habitat zones: turtle habitat, maritime forest (undisturbed), maritime forest (campground), maritime forest (day use & parking), maritime forest (cabin area), maritime shrub/scrub, saltwater lagoon, salt/fresh water lagoon, and saltwater marsh (see Figure 3). The southern portion of the island contains the cabins, while the park infrastructure is woven throughout the central reach. The small amount of turtle nesting habitat that exists is located at the southern end and northern tip of the island. The maritime forest exists throughout 90% of the island and contains all of the park infrastructure. The saltwater lagoon is located behind the lower 40% of the island, and the freshwater lagoon covers only a few acres adjacent to the campground area in the northern portion of the island. The results of the study show that an ecosystem restoration project can be justified for almost the entire length of the island; however, limited project funds will keep it focused on the northern half (see Figure 4).



FIGURE 1: LOCATION OF HUNTING ISLAND

The proposed project consists of two components. One component is the Federal National Ecosystem Restoration (NER) plan. The NER plan will be cost shared with the sponsor (South Carolina Parks Recreation and Tourism – SCPRT) on a 65% Federal/35% non-Federal basis and includes nourishment of approximately 5,165 feet of beach beginning at the existing north terminal groin. Three 450-foot long groins spaced approximately 1,250 feet apart are included in the NER plan with a total of approximately 717,200 yd³ of sand being placed on the beach. The other component of the proposed project will be funded entirely by SCPRT and consists of additional nourishment of approximately 4,980 feet of beach. Three additional 450-foot long groins, spaced approximately 1,250 feet apart, are included in the SCPRT component of the project with approximately 744,700 yd³ of sand being placed on this portion of the beach. The overall project (referred to as the “locally preferred plan”) consists of these two components being combined into one effort and is summarized as follows:

The overall project consists of the nourishment of approximately 10,145 feet of beach beginning at the north terminal groin and construction of six 450-foot long groins spaced approximately 1,250 feet apart with the first groin being placed approximately

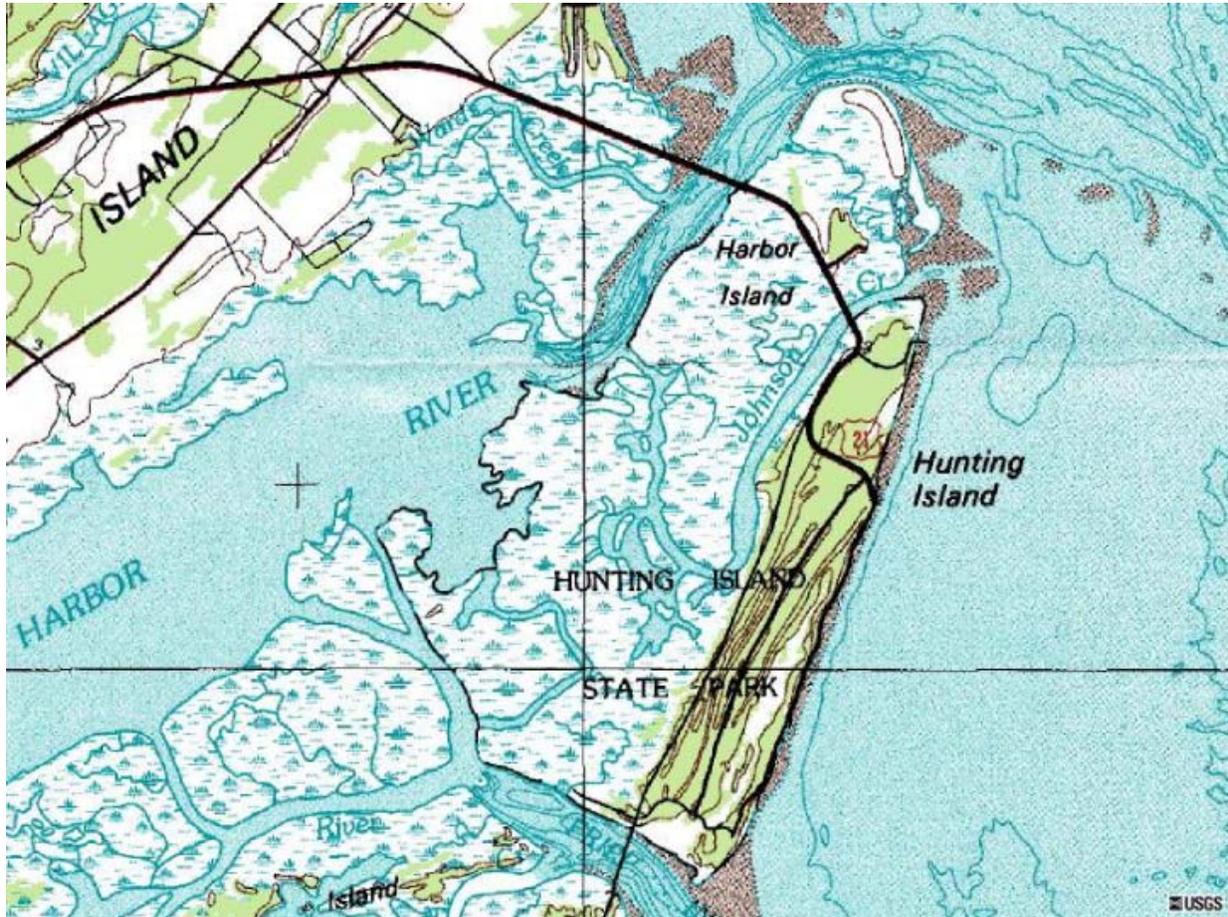


FIGURE 2: HUNTING ISLAND DETAIL MAP

1,250 feet south of the north terminal groin (see Figure 4). The beach nourishment profile consists of a berm at elevation 8 feet (NGVD 29) fronted by an “advance nourishment template” that will support a 9-year periodic renourishment cycle; however, periodic renourishment is not a feature of this project (see Figure 5). Any future renourishment will be pursued as a separate project by the non-Federal sponsor. The full nourishment profile shown in Figure 5 will begin at the existing north terminal groin, extend through the new groin field, and terminate approximately 1,725 feet south of the sixth groin. An approximate 620-foot long “end-taper” will transition the nourishment profile into the existing beach profile (see Figure 4) with a total of approximately 1,461,900 yd³ of sand being placed on the beach.

The sand will cover an average width of approximately 100 feet of existing dry beach (approximately 25 acres), an average width of approximately 270 feet of existing intertidal zone (approximately 60 acres), and an average width of approximately 80 feet of existing subtidal zone (approximately 20 acres).

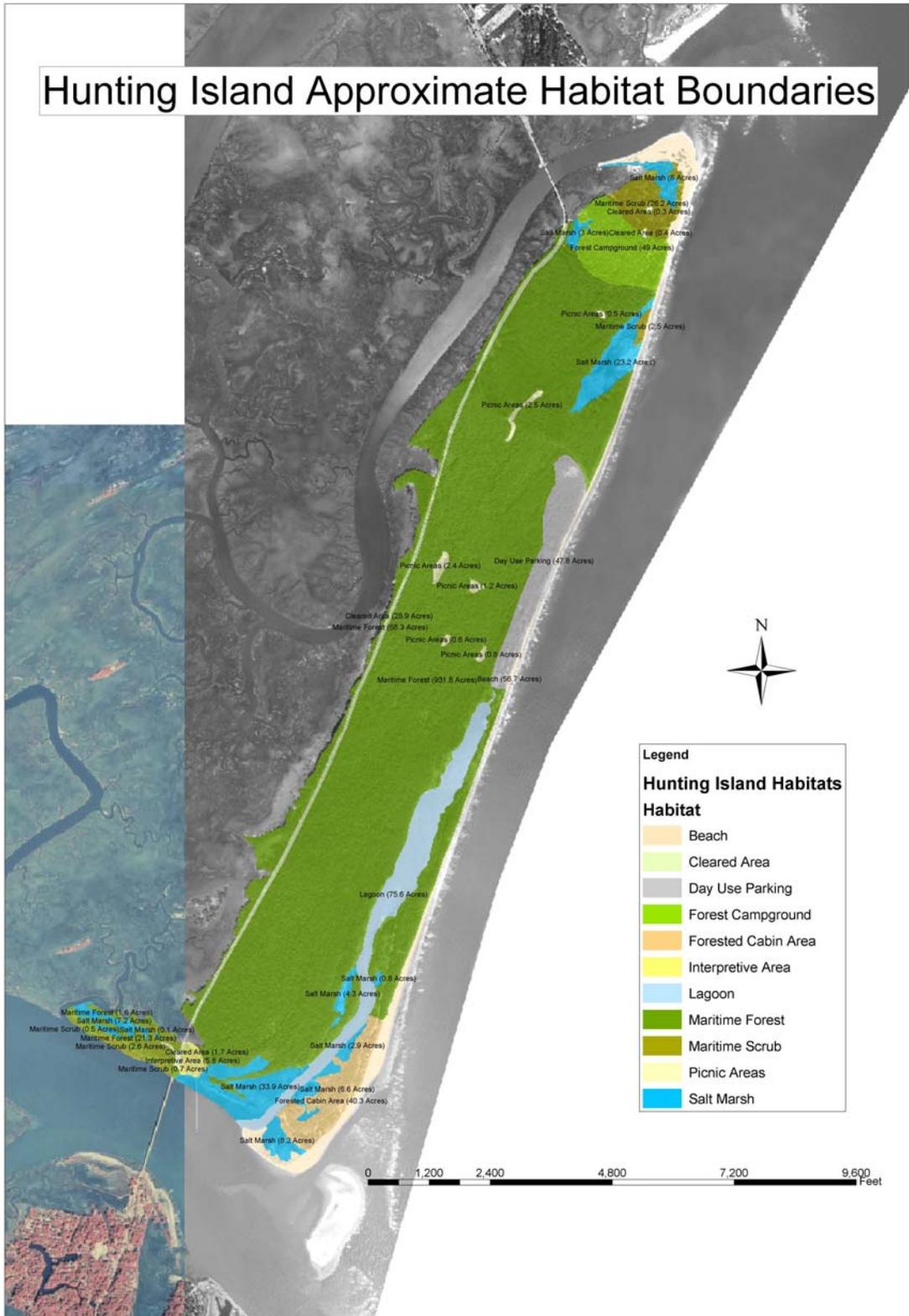


FIGURE 3: HUNTING ISLAND HABITAT ZONES

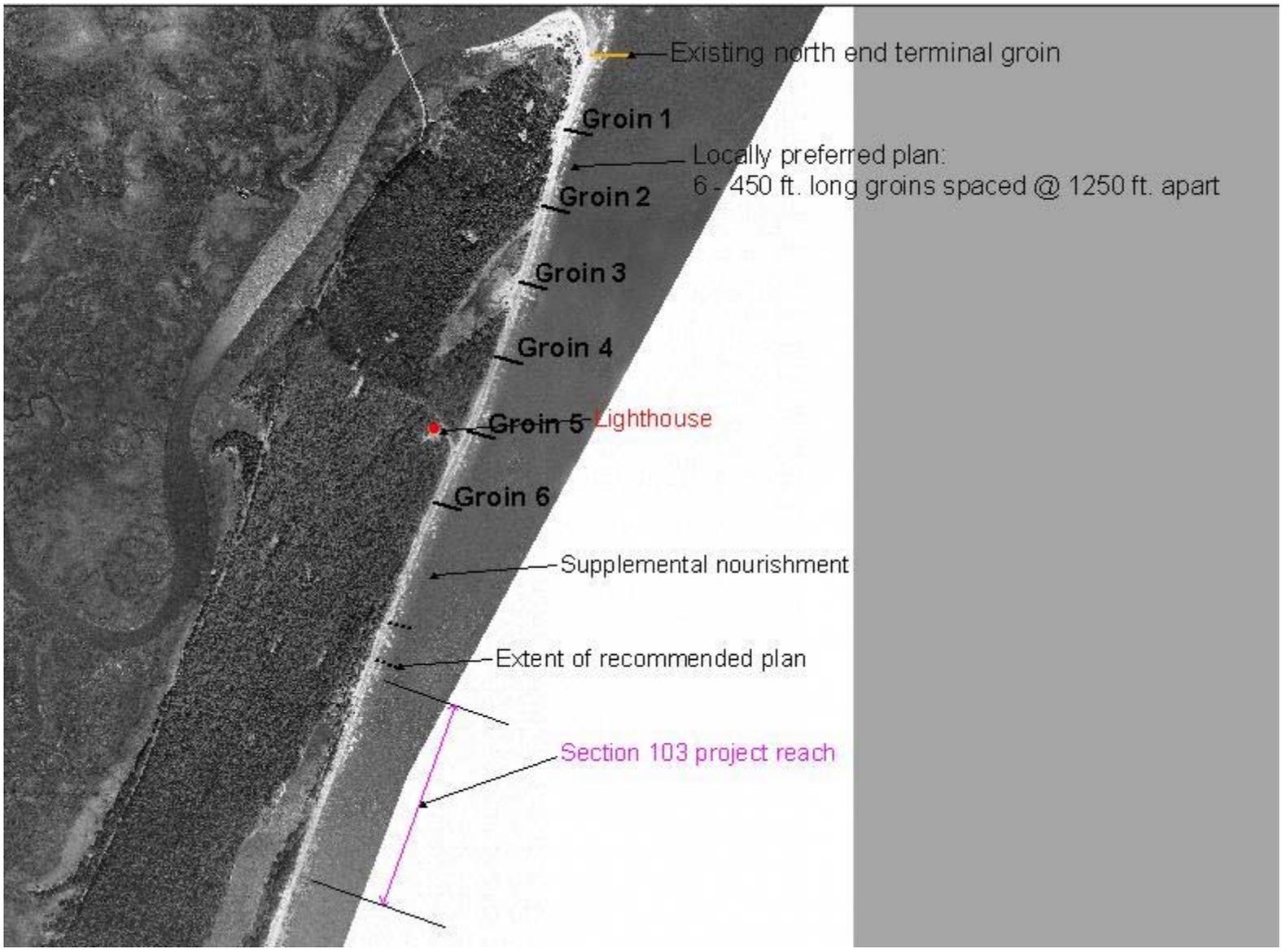


FIGURE 4: HUNTING ISLAND PROJECT LIMITS

Construction will be by means of either a hydraulic cutterhead dredge or a hopper dredge that will transport the sand through a pipeline. The pipeline will run adjacent to the groins and parallel with the beach. Beach compatible material (sand) from the offshore source will be pumped along the nearly 10,145 linear feet reach of the project and will be discharged as a slurry. 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. Equipment will be selected based on whatever proves to be the most advantageous economically, as well as what generates only minimal and acceptable temporary environmental impacts. It is anticipated construction will begin in late-2005 and will require approximately 6 to 8 months for completion. This construction window should minimize impacts to sea turtles, fish, shellfish, and infauna. This schedule could change due to contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

The borrow areas being used for beach compatible sand are designated in Figure 6. These areas total approximately 670 acres. The primary borrow area for this project is a large rectangular area covering approximately 490 acres to the SE off the coast of Hunting Island and is annotated as Area #1. It starts at roughly 6,000 feet offshore of the southern end of the island and is well within the 3-mile limit. The second area (approximately 40 acres) is less than a 1000 feet to the northeast of Area #1, and Area #3 (approximately 130 acres) is about 2,000 feet north of Area #2. None of the three areas are near any CBRA zones. The borrow areas have been surveyed by side-scan sonar, followed by the collection of numerous vibrocore samples in each of the potential borrow sites. This was done in order to avoid hard/live bottom areas during dredging, and to ensure that adequate quantities of beach compatible sand were available in the three areas. South Carolina Department of Natural Resources (SCDNR) also reviewed the reports and findings and helped clear these proposed borrow areas for use. The three borrow area acreages have been adjusted to match the amount of suitable sand depth. Larger areas had been evaluated but the above listed acreages are what remained after the Corps of Engineers and SCDNR review and evaluation process. The volume of sand in each borrow area (based on dredging to a depth of 6 feet) are as follows:

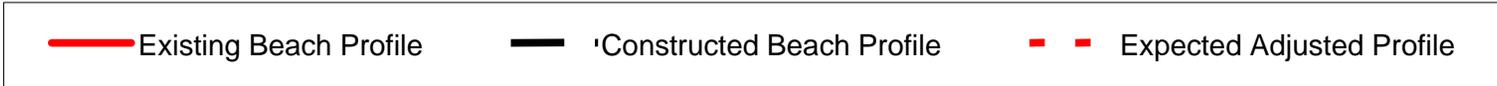
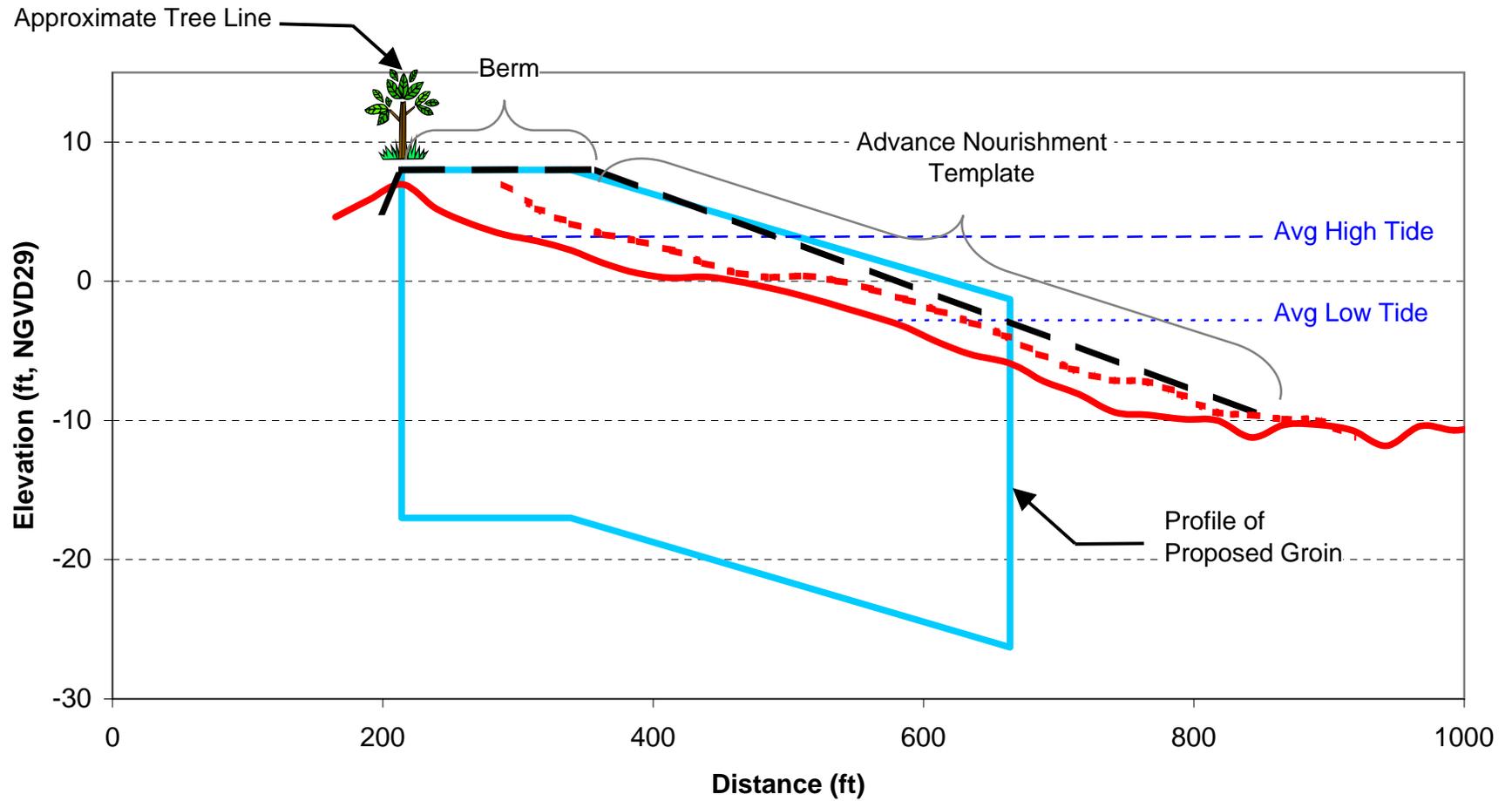
- Borrow Area #1: 4,760,000 cubic yards
- Borrow Area #2: 438,000 cubic yards
- Borrow Area #3: 1,300,000 cubic yards

Sand will be removed from the borrow areas to a depth of 6 to 8 feet. Because of the dynamic nature of the coastal area and the constant movement of sand, it is expected that the borrow areas will fill with sand of the same grain size after the dredging has been completed.

3.00 PRIOR CONSULTATIONS

No previous Section 7 formal or informal consultations are known to have occurred for this proposed Project.

Figure 5: Hunting Island Ecosystem Restoration Groin and Nourishment Cross Section



4.00 LIST OF SPECIES

4.01 U.S. Fish and Wildlife Service

Table 1 contains a list of species that have been listed by the U.S. Fish and Wildlife Service as occurring or possibly occurring in Beaufort County (from list dated May 01, 2004).

Common Name	Scientific Name	Status	Occurrence
West Indian manatee	<i>Trichechus manatus</i>	E	Known
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	Known
Wood stork	<i>Mycteria americana</i>	E	Known
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	Known
Piping plover	<i>Charadrius melodus</i>	T, CH	Known
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i> *	E	Known
Leatherback sea turtle	<i>Dermochelys coriacea</i> *	E	Known
Loggerhead sea turtle	<i>Caretta caretta</i>	T	Known
Green sea turtle	<i>Chelonia mydas</i> *	T	Known
Flatwoods salamander	<i>Ambystoma cingulatum</i>	T	Known
Shortnose sturgeon	<i>Acipenser brevirostrum</i> *	E	Known
Pondberry	<i>Lindera melissifolia</i>	E	Known
Canby's dropwort	<i>Oxypolis canbyi</i>	E	Possible
Chaff-seed	<i>Schwalbea americana</i>	E	Known
Southern Dusky Salamander	<i>Desmognathus auriculatus</i>	SC	Possible
Cupgrass	<i>Eriochloa michauxii</i>	SC	Known
Godfrey's privet	<i>Forestiera godfreyi</i>	SC	Known
Pondspice	<i>Litsea aestivalis</i>	SC	Known
Bachman's sparrow	<i>Aimophila aestivalis</i>	SC	Possible
Henslow's sparrow	<i>Ammodramus henslowii</i>	SC	Known
Red knot	<i>Calidris canutus</i>	SC	Possible
Swallow-tailed kite	<i>Elanoides forficatus forficatus</i>	SC	Known
American kestrel	<i>Falco sparverius</i>	SC	Possible
American oystercatcher	<i>Haematopus palliatus</i>	SC	Known
Loggerhead shrike	<i>Lanius ludovicianus</i>	SC	Possible
Swainson's warbler	<i>Limnothlypis swainsonii</i>	SC	Known
Painted bunting	<i>Passerina ciris ciris</i>	SC	Possible
Gull-billed tern	<i>Sterna nilotica</i>	SC	Known
Hilton Head white-tail deer	<i>Odocoileus virginianus hiltonensis</i>	SC	Known
Hunting Island white-tail deer	<i>Odocoileus virginianus venatoria</i>	SC	Known
Southeastern myotis	<i>Myotis austroriparius</i>	SC	Known
Southern hognose snake	<i>Heterodon simus</i>	SC	Known
E: Federally endangered T: Federally threatened CH: Critical Habitat SC: Federal Species of Concern. These species are rare or limited in distribution but are not currently legally protected under the Endangered Species Act. Species proposed for listing: None			

* Contact NOAA Fisheries for more information on this species

TABLE 1: USF&WS THREATENED AND ENDANGERED SPECIES IN BEAUFORT COUNTY

4.02 NOAA Fisheries

Table 2 contains a list of threatened and endangered species in South Carolina under the jurisdiction of NOAA Fisheries.

Listed Species	Scientific Name	Status	Date Listed
Marine Mammals			
Blue whale	<i>Balaenoptera musculus</i>	E	12/02/70
Finback whale	<i>Balaenoptera physalus</i>	E	12/02/70
Humpback whale	<i>Megaptera novaeangliae</i>	E	12/02/70
Right whale	<i>Eubaleana glacialis</i>	E	12/02/70
Sei whale	<i>Balaenoptera borealis</i>	E	12/02/70
Sperm whale	<i>Physeter macrocephalus</i>	E	12/02/70
Sea Turtles			
Green sea turtle	<i>Chelonia mydas</i>	T*	07/28/78
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E	06/02/70
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E	12/02/70
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E	06/02/70
Loggerhead sea turtle	<i>Caretta caretta</i>	T	07/28/78
Fish			
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	E	03/11/67
Candidate Species - Fish			
Dusky shark	<i>Carcharhinus obscurus</i>		
Sand tiger shark	<i>Odontaspis taurus</i>		
Night shark	<i>Carcharhinus signatus</i>		
Atlantic sturgeon	<i>Acipenser oxyrinchus oxyrinchus</i>		
Speckled hind	<i>Epinephelus drummondhayi</i>		
Warsaw grouper	<i>Epinephelus nigritus</i>		
Species proposed for listing: None			
Designated Critical Habitat: None in the area of this project			
Proposed Critical Habitat: None in the area of this project			

* Green turtles are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

** Candidate species are not protected under the Endangered Species Act, but concerns about their status indicate that they may warrant listing in the future. Federal agencies and the public are encouraged to consider these species during project planning so that future listings may be avoided.

TABLE 2: NOAA FISHERIES THREATENED AND ENDANGERED SPECIES IN SOUTH CAROLINA

5.00 GENERAL EFFECTS ON LISTED SPECIES/CRITICAL HABITAT

Since all aspects of the proposed work will occur either in the ocean or on the ocean beach, the project will not affect any listed species occurring in forested or freshwater habitats. Thus, species such as the bald eagle, red-cockaded woodpecker, wood stork, Canby's dropwort, Pondberry, and Chaff-seed will not be affected by the proposed action.

Species that could be present in the project area during the proposed action are the blue (NOAA Fisheries list), finback, humpback, right, sei, and sperm whales. Also, the hawksbill (NOAA Fisheries list), Kemp's ridley, leatherback, loggerhead, and green sea turtles could occur in the project area. However, loggerheads are the primary sea turtle nesters. The Florida manatee rarely visits the area but they do pass through when moving up the coast where they have been seen in various locations throughout South Carolina. They have been seen in the area at least 4 times since 1997. The piping plover is an occasional visitor and winters adjacent to the area. An area of critical habitat is located just to the north and across Johnson Creek; however, the most recent sighting was a group of 5 in March of 2000. There have been no official reported sightings of piping plover on Hunting Island since then, but park visitors claim to have seen them. There is no designated Piping plover critical habitat within the project area.

6.00 SPECIES ASSESSMENTS

6.01 Blue (NOAA Fisheries list), finback, humpback, right, sei, and sperm whales

The blue whale may be the largest mammal ever to inhabit the earth. It may have reached lengths of up to 100 feet - roughly the length of a basketball court. Blue whales have weighed up to 160 tons. They feed on small shrimp-like crustaceans. The whales consume up to eight tons of these animals a day during their feeding period. A blue whale produced the loudest sound ever recorded from an animal, and some scientists have speculated that they may be able to remain in touch with each other over hundreds of miles. The number of blue whales in the southern hemisphere was severely depleted by whaling. Due to commercial whaling the size of the population is less than ten percent of what it was originally.

The finback whale is the second largest whale, reaching lengths of up to 88 feet and weighs up to 76 tons. The finback whale because of its crescent-shaped dorsal fin, and obvious characteristic, is easily seen at sea. Depending on where they live, finback whales eat both fish and small pelagic crustaceans, and squids. It sometimes leaps clear of the water surface, yet it is also a deeper diver than some of the other baleen whales. The finback's range is in the Atlantic from the Arctic Circle to the Greater Antilles, including the Gulf of Mexico. In the Pacific Ocean the Finback ranges from the Bering Sea to Cape San Lucas, Baja California.

The humpback whale reaches a maximum length of about 50 feet long and a maximum weight of about 37.5 tons. They are mostly black, but the belly is sometimes white. Flippers and undersides of the flukes are nearly all white. They are migratory. They eat krill and schooling fish. In the Atlantic they migrate from Northern Iceland and Western Greenland south to the West Indies, including the Northern and Eastern Gulf of Mexico. In the Pacific Ocean they migrate from the Bering Sea to Southern Mexico. The humpback is one of the most popular whales for whale watching on both the east and west coasts. Scientists estimate that there are 10,000 humpbacks worldwide, only about 8% of its estimated initial population.

The sei whale is one of the largest whales. It can reach a length of 60 feet and a weight of 32 tons. They feed primarily on krill and other small crustaceans, but also feed at times on small fish. The sei whale is the fastest of the baleen whales and can reach speeds of more than 20

miles per hour. In the Atlantic Ocean the Sei whale ranges from the Arctic Circle to the Gulf of Mexico. In the Pacific Ocean the Sei whale may range from the Bering Sea to Southern Mexico. The Sei whale is endangered due to past commercial whaling.

Unlike the other great whales on the endangered species list, the sperm whale is a toothed whale. It is the largest of the toothed whales reaching a length of 60 feet in males and 40 feet in females. Sperm whales are noted for their dives that can last up to an hour and a half and go as deep as 2 miles under the surface. It is the most abundant of all the endangered whales, with an estimated population of two million. Sperm whales feed mainly on squid, including the giant squid. They range in the Atlantic Ocean from the Arctic Circle to the Gulf of Mexico. In the Pacific Ocean the sperm whale ranges from the Bering Sea to Southern Mexico. The sperm whale was almost hunted to extinction for its oil (spermaceti). This oil was used in the manufacture of ointments, cosmetics, and candles. The sperm whales usually inhabit the offshore waters.

The right whale is the most endangered species of whale off of the U.S. coasts. The right whale got its name because it was the "right" whale to hunt. It was slow moving and floated after being killed. Current estimates indicate that presently no more than a few hundred exist. Right whales can reach a length of 60 feet and a weight of 100 tons. Although the species has been internationally protected since 1937, it has failed to show any signs of recovery.

Right whales have been observed along the eastern coast of North America from the Florida Keys north to the Gulf of St. Lawrence in Canada. They are found in relatively large numbers around Massachusetts and near Georges Bank in the spring, and then they migrate to two areas in Canadian waters by mid-summer. Most cows that give birth in any given year travel in the winter to the coastal waters of Georgia and Florida to calve and raise their young for the first three months. The Bay of Fundy, between Maine and Nova Scotia, appears to serve as the primary summer and fall nursery hosting mothers and their first-year calves. The calf will stay with its mother through the first year and it is believed that weaning occurs sometime in the fall. Calves become sexually mature in about 8 years. Females are believed to calve about every three to four years. Sightings of right whales and their occurrence in the inshore waters of the State, although very rare, are generally assumed to represent individuals seen during this migration.

Right whales feed primarily on copepods and euphausiids. They swim very close to the shoreline, often noted only a few hundred meters offshore. Because of their habit of traveling near the coast, there is concern over impacts resulting from collisions with boats and ships. Some right whales have been observed to bear propeller scars on their backs resulting from collisions with boats (NMFS, 1984). Destruction or pollution of right whale habitat is not known to be a problem in the project area. There is no designation of critical habitat for whales in SC.

Effect Determination

Of these six species of whales being considered, only the right whale would normally be expected to occur within the project area during the construction period; therefore the other species of whales are not likely to be affected. The majority of right whale sightings occur from December through February. Since the proposed work is expected to occur during this time

period, the dredge will be required to have endangered species observers standing watch on the bridge of the dredge to look for whales during construction. The presence of a hydraulic cutterhead pipeline or hopper dredge in this area should pose no direct impacts to the right whale, however, when relocating, the dredge and any supporting vessels are required to alter course and stop if necessary to avoid approaching whales. If whales are spotted during the day within 10 miles of the dredging operation, then the dredge is required to reduce transit speed at night, should it need to relocate during that time period. Corps contract specifications expressly require avoidance of right whales. This project will rebuild the protective berm with a greater level of stability than with previous Federal projects, but without impacting existing near-shore habitat conditions and food supplies already available to the right whale. For these reasons, it has been determined that the project as proposed is **not likely to adversely affect the right whale**. (The 29 October 1997 “National Marine Fisheries Service, Regional Biological Opinion on Hopper Dredging along the South Atlantic Coast” has jurisdiction on right whale effects)

6.02 Manatee

West Indian manatees are massive fusiform-shaped animals with skin that is uniformly dark grey, wrinkled, sparsely haired, and rubber-like. Manatees possess paddle-like forelimbs, no hind limbs, and a spatulate, horizontally flattened tail. Females have two axillary mammae, one at the base of each forelimb. Their bones are massive and heavy with no marrow cavities in the ribs or long bones of the forearms (Odell 1982). Adults average about 11.5 feet in length and 2,200 pounds in weight, but may reach lengths of up to 15 feet (Gunter 1941) and weigh as much as 3,570 pounds (Rathburn *et al.* 1990). Newborns average 4 to 4½ feet in length and about 66 pounds (Odell 1981).

The West Indian manatee (*Trichechus manatus*) 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 (USFWS, 1996). 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 (USFWS, 1991). The manatee is an uncommon summer resident of the South Carolina coast with some visual reports in various locations along the coast with a few sightings in the Hunting Island area (information provided by Hunting Island State Park Interpreter Amanda Howard via emails on June 24 & July 03, 2003 and SCDNR employee John Coker via email on June 25, 2003). The most recent sightings in the Hunting Island area are as follows: in the vicinity of Russ Point Boat Ramp on August 07, 1997, in the Lagoon on October 16, 1998, Fripp Inlet on July 13, 1999, off the pier on June 18, 2002, off the northern end of Fripp Island on June 09, 2003, and swimming along the southern tip of the island into and out of the lagoon on the morning of July 03, 2003. There is no designation of critical habitat for the West Indian manatee in SC.

Effect Determination

The proposed work is currently scheduled to occur during the time of year when manatees are generally not visiting the area. If schedule slippage or weather changes result in work being performed when conditions are more favorable for the presence of manatees, then 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 either a pipeline dredge or a hopper dredge (dredge plants that are either essentially stationary or slow moving) and since manatees are uncommon in the vicinity of Hunting Island, 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 manatee.**

6.03 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 the Hawksbill sea turtle (*Eretmochelys imbricata*). These five species of sea turtles are protected by the Convention on International Trade in Endangered Species (CITES). They are also listed as endangered or vulnerable in the Red Data Book by the International Union for the Conservation of Nature (IUCN). The hawksbill, Kemp's ridley and leatherback were listed as endangered by the U. S. Endangered Species Act in 1973. The green turtle and the loggerhead were added to the list as threatened in 1978.

Sea turtles vary in size from an average of 75 pounds for the olive ridley (does not occur in the project area) to the giant leatherback, which may exceed 800 pounds. Modified for living in the open ocean, they have paddle-like front limbs for swimming. The thick neck and head cannot be drawn back into the body. Sea turtles also have special respiratory mechanisms and organs to excrete excess salt taken in with seawater when they feed.

The leatherback is very different from the other sea turtle species. Instead of plates (scutes) on the shell, the leatherback's carapace has seven hard longitudinal ridges along the length of the back. Its rubber-like covering is black with white spots and a pinkish-white underside. The average length of its shell is 5 feet. The green turtle is the second largest sea turtle and the loggerhead the third. Green turtles get their name from the color of their fat, not their shells, which are grayish in older animals. The smallest sea turtle that may be present in the area of the proposed project is the Kemp's ridley; it has a drab olive to grayish-black shell. Loggerheads have rich reddish-brown shells and yellow on their undersides. The loggerhead's large skull provides for the attachment of strong jaw muscles for crushing conchs and crabs. The hawksbill has a patterned shell of brown and yellow with scutes that overlap like shingles on a roof. Its long, narrow head and beak enable it to feed among coral reefs.

Sea turtles occupy different habitats, depending upon their species, sex and age (size). Hatchlings and smaller juvenile loggerheads appear to live in floating mats of Sargassum in the open ocean. This seaweed offers cover, protection from predators and a source of food. Larger

juveniles are generally seen in the same coastal habitat as the adults, especially during the summer.

Leatherbacks feed entirely on jellyfish, and they must often travel long distances to keep up with large concentrations of this food source drifting in the ocean currents. Green turtles are herbivorous and remain near pastures of turtle-preferred grasses. Often these pastures are not near their nesting beaches, so these turtles may migrate hundreds of miles to nest. Loggerheads usually leave the cold, coastal waters in the winter and are often seen along the edge of the Gulf Stream. Hawksbills live on coral reefs almost year-round, feeding on sponges, sea squirts and other bottom organisms. Although the Kemp's ridley nests only on Mexico's Gulf Coast, small juveniles of this species and the green turtle occur along the South Carolina coast during the summer.

Very little is known about male sea turtles since they almost never come ashore. Male loggerheads are seen in near-shore waters during the spring and early summer breeding season but apparently move back offshore once breeding is completed. Since the reproductive cycles of all sea turtles are similar, a generalized version encompasses all. Mating takes place offshore, and the turtles must only mate once to fertilize all eggs laid during the nesting season. When nesting, the female crawls onto the beach, usually at night, and digs a hole in the sand with her hind flippers. After laying about 100 (number of eggs vary among species) white, leathery eggs, she covers them and returns to the sea. A single female may nest several times a season, usually at 2-week intervals. The eggs incubate about 60 days, depending on the weather. Hatchlings dig out of the sand at night and make their way to the sea using light cues for guidance. Destruction of nests and hatchling mortality at sea are usually high. It appears sea turtles' high number of eggs per clutch and several nestings per season offset this high mortality rate. Nesting habits of the Kemp's ridley deviate from those of other sea turtles. The Kemp's ridley is the only species that nests during the day. Most sea turtles do not nest every year. They return on either a 2- or 3-year cycle to the same general area or beach. Of these five species, only the loggerhead is considered to be a regular nester in SC. However, in September 1996, a green sea turtle nested on Garden City Beach and another also nested on Garden City Beach in September 2002. Leatherback nests were recorded on Huntington Beach State Park in 2000, at Botany Bay in June 2003 and on Folly Beach in July 2003. There is no critical habitat designation for sea turtles in SC. For purposes of this assessment, the loggerhead is considered to be the only species likely to nest in the project area.

Loggerhead Sea Turtle. The loggerhead sea turtle has a worldwide distribution and is found in temperate and subtropical waters. Major nesting areas in North America occur along the Southeast Coast from North Carolina to Florida. Loggerhead sea turtles regularly nest along the southern coast of South Carolina from Georgetown south, usually from mid-May to August. Nesting is preferred on remote beaches-and away from human disturbance. The loggerhead is considered a turtle of shallow water with juveniles preferring bays and estuaries. An omnivore, crustaceans, molluscs, squid, jellyfish, fish, and plant materials are desirable foods. Stranding data reveals that up to 70% of all stranded sea turtles are loggerheads with the majority of strandings occurring from May to August. Therefore, it can be surmised that the potential presence of loggerheads in the project area would most-likely occur at this time. In Georgia, South Carolina and North Carolina the nesting season generally begins in mid-May and ends by

mid-August. Nesting activity is greatest, however, in June and July. Loggerheads are known to nest from one to seven times within a nesting season; the mean is approximately 4.1. The internesting interval varies around a mean of about 14 days. There is general agreement that females mate prior to the nesting season (and possibly only once) and then lay multiple clutches of fertile eggs throughout some portion of the nesting season. Mean clutch size varies from about 100 to 125 along the southeastern United States coast. Loggerheads are nocturnal nesters, but exceptions to the rule do occur infrequently. Multi-annual remigration intervals of two and three years are most common in loggerheads, but the number can vary from one to six years. The length of the incubation period is related to nest temperature. Sex determination in loggerhead hatchlings is temperature dependent and the species apparently lacks sex chromosomes. Loggerhead hatchlings engage in a "swimming frenzy" for about 20 hours after they enter the sea and that frenzy takes them about 22 to 28 kilometers offshore. At some point thereafter they become associated with Sargassum rafts and/or debris at current gyres. Upon reaching about 45 cm mean straight carapace length (SCL), they abandon the pelagic existence and migrate to near-shore and estuarine waters of the eastern United States, the Gulf of Mexico and the Bahamas and begin the subadult stage. As adults, loggerheads become migratory for the purpose of breeding. Reported tag recoveries suggest a "migratory path" from Georgia to Cape Hatteras, North Carolina with a single recovery of a Georgia tagged female on the Florida Gulf Coast (Tampa Bay). Little else is known of the scheduled travels of Georgia, South Carolina, and North Carolina nesters outside of the nesting season (NMFS, USFWS, 1991).

Affected sea turtle environment. The areas of affected environment for this proposed project are the three marine areas (an approximate 490 acre site, an approximate 40 acre site, and an approximate 130 acre site) proposed for borrow material dredging (see Figure 6) and the placement of approximately 1,461,900 cubic yards of sand along 10,145 feet of beach from the north terminal groin southward (see Figure 4). This 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. The approximate existing acreages of dry beach, intertidal beach, and subtidal beach that will be directly affected by the proposed project are as follows:

- Dry Beach (i.e., between high tide and the tree line) - approximately 25 acres affected
- Intertidal (i.e., between high tide and low tide) - approximately 60 acres affected
- Subtidal (below low tide) - approximately 20 acres affected

Upon completion of the project, the intertidal zone and the subtidal zone will be shifted seaward approximately 195 feet and 80 feet, respectively (see Figure 5). Upon completion the acreages of dry beach and intertidal beach will be as follows:

- Dry Beach - approximately 70 acres
- Intertidal - approximately 35 acres

Due to erosion, these acreages and the shifting of the intertidal and subtidal zones will change over time until being restored during periodic nourishments conducted by the non-Federal sponsor. The total existing area where sand will be placed encompasses approximately 105

acres; however, only the zone between the tree line and MHW may be considered suitable sea turtle nesting habitat. Currently, there is very little suitable sea turtle nesting habitat in the area of the project. Upon completion of the project, the total area of suitable nesting habitat will be approximately 70 acres.

Current range wide conditions for sea turtles. It is not possible, at present, to estimate the size of the loggerhead population in United States territorial waters if one includes subadults. There is, however, general agreement that enumeration of nesting females provides a useful index to population size and stability. It is estimated that 14,150 females nest per year in the southeastern United States. This estimate was based on aerial survey data from 1983 has been accepted as the best current approximation. Given a stochastically derived mean number of nests per female (4.1), this figure provides an estimate of approximately 58,000 nests deposited per year in the Southeast. Based on more extensive ground and aerial surveys throughout the Southeast in recent years (1987 to 1990), it is estimated that approximately 50,000-70,000 nests are deposited annually. These totals constitute about 35 to 40 percent of the loggerhead nesting known worldwide and clearly rank the southeastern United States aggregation as the second largest in the world, with the somewhat larger Oman assemblage being the only other truly large group remaining anywhere (NMFS, USFWS, 1991).

A recent review considered consequences of life tables and population models; mortality rates in the Southeast; population declines in South Carolina and Georgia; and estimates of annual mean clutch production per female. It was concluded that the stock of loggerheads represented by females that nest in the Southeast is continuing to decline (NMFS, USFWS, 1991).

Conditions for sea turtles in the project area. Hunting Island State Park personnel monitor the entire 4+ miles of beach that make up Hunting Island, and has statistics on false crawls and nests from 1990 to 2003 (emails from Hunting Island State Park Interpreter Amanda Howard on 11 July, 2003 & 23 October 2003). Hunting Island consists of a combination of offices and some park personnel that are present year-round, plus there is camping and home rentals available throughout the year. There is typically no good dune development in the island where turtles can nest successfully (except for the recent Section 103 project placed in front of Cabin Road, (see following photo), but the north end of the island has some remnant dunes that are being used to relocate nests that would be flooded and destroyed elsewhere. If possible, nests are left where they are laid to improve hatching success, but this can only be done at the most northern and most southern reaches of the island. Nest locations have been recorded since 1981 and since that time there have been anywhere from 23 to 157 nests per year. Since 1990, there have been anywhere from 35 to 130 nests per year (1990 to 2003) spread throughout 5 Zones. As of 2002 statistics are now being kept over 6 zones. False crawls have been recorded from 1981 to 2003, and there have been anywhere from 8 to 203 spread throughout the island. Table 3 provides a brief synopsis of sea turtle nesting at Hunting Island. All data represents the efforts of loggerhead sea turtles (*Caretta caretta*). During the fourteen-year period (1990-2003) a total of 967 nests were laid on the 4.1 miles of beach, averaging 68 nests per year. Total egg production data for the 1990-2002 time period (2003 egg data not available yet) included 51,212 eggs that were relocated and 4,678, which were left in-situ. Hatching success for the same period averaged 76% for the relocated eggs and 63% for the eggs left in-situ.



Courtesy of South Carolina DNR

Factors Impacting Nesting Success in the Area

In general, no other factor contributes to egg mortality more than nest predation prior to screening and locating the nest. A variety of natural and introduced predators such as raccoons, foxes, ghost crabs and ants prey on incubating eggs and hatchling sea turtles. Normally, it is expected that the raccoon (*Procyon lotor*) would be the principal predator, as it is throughout the coast, followed by fox and ghost crabs. Raccoons are known to patrol primary dune lines at night and dig up nests after they were buried in the dune. Raccoons may take up to 96 percent of all nests deposited on a beach if there is no intervention. Since the patrols by park personnel generally begin at first light a predated turtle nest may lay open to the elements for over 8 hours. These nests may be empty or only have a few eggs remaining after predation. Any remaining eggs can be cleaned and then relocated, however, these small nests normally exhibit very low hatching success. On Hunting Island, however, predation never reached the 96% figure and now that most nests are relocated to a hatchery area predation is minimal (email from Amanda Howard, 11 July 2003). In addition to the destruction of eggs, other predators may take considerable numbers of hatchlings just prior to or upon emergence from the sand (NMFS, USFWS, 1991).

Cumulative effects of actions in project area on sea turtles. Very little is known about sea turtle diseases or natural mortality rates. However, it is believed that declines in populations are a direct result of human actions. Erosion of nesting beaches can result in partial or total loss of suitable nesting habitat. Dynamic coastal processes, including sea level rise, influence erosion

Year	Entire Island	Area of Proposed Project	Zone 6	Zone 5	Zone 4	Zone 3	Zone 2	Zone 1
2003	67 Nests	18 Nests	6 Nests	13 Nests	30 Nests	1 Nest	5 Nests	12 Nests
2002	49 Nests	20 Nests	N/A	27 Nests	1 Nests	1 Nest	11 Nests	8 Nests
2001	43 Nests	20 Nests	N/A	15 Nests	8 Nests	1 Nest	11 Nests	8 Nests
2000	39 Nests	14 Nests	N/A	11 Nests	6 Nests	3 Nests	6 Nests	5 Nests
1999	56 Nests	36 Nests	N/A	11 Nests	1 Nest	0 Nests	11 Nests	25 Nests
1998	60 Nests	29 Nests	N/A	14 Nests	7 Nests	6 Nests	11 Nests	12 Nests
1997	36 Nests	32 Nests	N/A	3 Nests	1 Nest	15 Nests	10 Nests	7 Nests
1996	59 Nests	41 Nests	N/A	6 Nests	4 Nests	11 Nests	15 Nests	15 Nests
1995	88 Nests	63 Nests	N/A	13 Nests	10 Nests	33 Nests	18 Nests	12 Nests
1994	113 Nests	71 Nests	N/A	29 Nests	13 Nests	38 Nests	24 Nests	9 Nests
1993	52 Nests	30 Nests	N/A	12 Nests	10 Nests	12 Nests	16 Nests	2 Nests
1992	132 Nests	58 Nests	N/A	55 Nests	13 Nests	21 Nests	37 Nests	0 Nests
1991	80 Nests	19 Nests	N/A	30 Nests	18 Nests	8 Nests	9 Nests	2 Nests
1990	93 Nests	27 Nests	N/A	49 Nests	17 Nests	3 Nests	14 Nests	10 Nests
TOTALS	967 Nests	478 Nests	6 Nests	288 Nests	139 Nests	153 Nests	198 Nests	127 Nests

Source: Hunting Island State Park.

TABLE 3: KNOWN LOGGERHEAD SEA TURTLE NESTING ON HUNTING ISLAND FROM 1990 TO 2003

rates. Man's interference with these natural processes through coastal development and associated activities has resulted in accelerated erosion rates and interruption of natural shoreline migration. Where beachfront development occurs the site is often fortified to protect the property from erosion. Virtually all shoreline engineering is carried out to save structures, not dry sandy beaches, and ultimately, this results in environmental damage. One type of shoreline

engineering, collectively referred to as beach armoring, includes sea walls, rock revetments, riprap, sandbag installations, 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 and can prevent or hamper nesting females from accessing suitable nesting sites. Clutches deposited seaward of these structures may be inundated at high tide or washed out entirely by increased wave action near the base of these structures. As these structures fail and break apart they spread debris on the beach that may further impede access to suitable nesting sites (resulting in higher incidences of false crawls) and trap hatchlings and nesting turtles. Sandbags are particularly susceptible to rapid failure and result in extensive debris on nesting beaches. Rock revetments, riprap and sand bags can cause nesting turtles to abandon nesting attempts or to construct improperly, sized and shaped egg cavities when inadequate amounts of sand cover these structures. Approximately 21 percent (234 km) of Florida's, 10 percent (18 km) of Georgia's and 10 percent (30 km;) of South Carolina's beaches are armored (NMFS, USFWS, 1991).

Groins and jetties are designed to trap sand during transport in longshore currents or to keep sand from flowing into channels in the case of the latter. These structures prevent normal sand transport and accrete beaches on one side of the structure while starving neighboring beaches on the other side thereby resulting in severe beach erosion and corresponding degradation of suitable nesting habitat. Beach nourishment consists of pumping, trucking or scraping sand onto the beach to rebuild what has been lost to erosion. 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 (NMFS, USFWS, 1991).

Significant reductions in nesting success have been documented on severely compacted nourished beaches. Compaction levels that have been evaluated at ten renourished east coast Florida beaches concluded that 50 percent were hard enough to inhibit nest digging, 30 percent were questionable as to whether their hardness affected nest digging and 20 percent were probably not hard enough to affect nest digging. In general, beaches nourished from offshore borrow sites are harder than natural beaches, and, while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more. However, it is not known if these conclusions on Florida beaches are applicable to South Carolina beaches, since informal observations and sporadic cone penetrometer testing throughout the state has shown nesting occurring where sand compaction is over 500 pounds per square inch. In light of this limited amount of information, the Charleston District proposes to test sea turtle (loggerheads) nesting preferences by tilling only alternate sections of this reach of sand placement, as described in the following Effect Determination. Nourished beaches often result in severe escarpments along the mid-beach and can hamper or prevent access to nesting sites. 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 on the project beach at night may cause further disturbance to nesting females. Artificial lights along the project beach and in the nearshore area of the borrow site may deter nesting females and disorient or misorient emergent hatchlings from adjacent non-project beaches (NMFS, USFWS, 1991).

Beach nourishment projects require continual maintenance (subsequent nourishment) as beaches erode and hence their negative impacts to turtles are repeated on a regular basis. Beach nourishment projects conducted during the nesting season can result in the loss of some nests which may be inadvertently missed or misidentified as false crawls during daily patrols conducted to identify and relocate nests deposited on the project beach. Nourishment of highly eroded beaches (especially those with a complete absence of dry beach) can be beneficial to nesting turtles if conducted properly. Careful consideration and advance planning and coordination must be carried out to ensure timing, methodology and sand sources are compatible with nesting and hatching requirements (NMFS, USFWS, 1991).

Extensive research has demonstrated that the principal component of the sea finding behavior of emergent hatchlings is a visual response to light. Artificial beachfront lighting from buildings, streetlights, dune crossovers, vehicles and other types of beachfront lights has been documented in the disorientation (loss of bearings) and misorientation (incorrect orientation) of hatchling turtles. The results of disorientation or misorientation are often fatal. As hatchlings head toward lights or meander along the beach their exposure to predators and likelihood of desiccation is greatly increased. Misoriented hatchlings can become entrapped in vegetation or debris, and many hatchlings are found dead on nearby roadways and in parking lots after being struck by vehicles. Hatchlings that successfully find the water may be misoriented after entering the surf zone or while in nearshore waters. Intense artificial lighting can even draw hatchlings back out of the surf (NMFS, USFWS, 1991).

The problem of artificial beachfront lighting is not restricted to hatchlings. It has been indicated that adult loggerhead emergence patterns were correlated with variations in beachfront lighting in south Brevard County, Florida, and that nesting females avoided areas where beachfront lights were the most intense. It has also been noted that loggerheads aborted nesting attempts at a greater frequency in lighted areas. Problem lights may not be restricted to those placed directly on or in close proximity to nesting beaches. The background glow associated with intensive inland lighting, such as that emanating from nearby large metropolitan areas, may deter nesting females and disorient or misorient hatchlings navigating the nearshore waters. Cumulatively, along the heavily developed beaches of the southeastern United States, the negative effects of artificial lights are profound (NMFS, USFWS, 1991).

Residential and tourist use of developed (and developing) nesting beaches can 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. Night-time human activity can cause nesting females to abort nesting attempts at all stages of the behavioral process. It has been reported that disturbance can cause turtles to shift their nesting beaches, delay egg laying, and select poor nesting sites. Heavy utilization of nesting beaches by

humans (pedestrian traffic) 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. Campfires and the use of flashlights on nesting beaches misorient hatchlings and can deter nesting females (NMFS, USFWS, 1991).

Nest loss due to erosion or inundation and accretion of sand above incubating nests appear to be the principal abiotic factors that may negatively affect incubating egg clutches. While these factors are often widely perceived as contributing significantly to nest mortality or lowered hatching success, few quantitative studies have been conducted. Studies on a relatively undisturbed nesting beach indicated that excepting a late season severe storm event, erosion and inundation played a relatively minor role in destruction of incubating nests. Inundation of nests and accretion of sand above incubating nests as a result of the late season storm played a major role in destroying nests from which hatchlings had not yet emerged. Severe storm events (e.g., tropical storms and hurricanes) may result in significant nest loss, but these events are typically aperiodic rather than annual occurrences. In the southeastern United States, severe storm events are generally experienced after the peak of the hatching season and hence would not be expected to affect the majority of incubating nests. Erosion and inundation of nests are exacerbated through coastal development and shoreline engineering. These threats are discussed above under beach armoring (NMFS, USFWS, 1991).

The effects of dredging are evidenced through the degradation of habitat and incidental take of marine turtles. Channelization of inshore and nearshore habitat and the disposal of dredged material in the marine environment can destroy or disrupt resting or foraging grounds (including grass beds and coral reefs) and may affect nesting distribution through the alteration of physical features in the marine environment. Hopper dredges are responsible for incidental take and mortality of marine turtles during dredging operations. Other types of dredges (clamshell and pipeline) have not been implicated in incidental take (NMFS, USFWS, 1991). Incidental takes of sea turtles by hopper dredges comes under the jurisdiction of NOAA Fisheries and is covered by a separate Biological Opinion (NMFS, 1997).

Of all commercial and recreational fisheries conducted in the United States, shrimp trawling is the most damaging to the recovery of marine turtles. The estimated number of loggerheads killed annually by the offshore shrimping fleet in the southeastern United States Atlantic and Gulf of Mexico is 5,000 to 50,000. Incidental capture and drowning in shrimp trawls is believed to be the largest single source of mortality on juvenile through adult stage marine turtles in the southeastern United States. Most of these turtles are juveniles and subadults, the age and size classes most critical to the stability and recovery of marine turtle populations. Quantitative estimates of turtle take by shrimp trawlers in inshore waters have not been developed, but the level of trawling effort expended in inshore waters along with increasing documentation of the utilization of inshore habitat by loggerhead turtles suggest that capture and mortality may be significant. Trawlers targeting species other than shrimp tend to use larger nets than shrimp trawlers and probably also take sea turtles, although capture levels have not been developed. These fisheries include, but are not limited to bluefish, croaker, flounder, calico scallops, blue crab and whelk. Of these, the bluefish, croaker and flounder trawl fisheries likely pose the most serious threats. The harvest of Sargassum by trawlers can result in incidental capture of post hatchlings and habitat destruction (NMFS, USFWS, 1991).

Effect Determination

Loggerhead sea turtle nesting activities have been recorded within the project area on Hunting Island. The placement of sand and construction activities associated with the placement of that sand on this reach of beach could adversely affect any existing sea turtle nests and sea turtles attempting to nest. The extent of nesting on Hunting Island beach is somewhat irregular when compared with many other beaches along the coast; however, it does average approximately 14 nests per mile (despite the high erosion rate and resultant damage). Placement of the dredged material is currently scheduled to occur during the months of November through April; however, it is possible that the start of construction work will be delayed until nesting season or that completion of the project will be delayed and construction will extend into the nesting season. If any construction work occurs during sea turtle nesting season, then the following precautions will be taken to minimize the effects to sea turtles:

- 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 South Carolina DNR 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 Corps of Engineers will perform cone penetrometer compaction testing of the newly constructed sand berm. This compaction testing will be repeated for 3 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 3 years, starting at the most northern reach of the project, the sand placed on the beach will be tilled/untilled in alternate groin cells (i.e., every ~1,250 ft – see Figure 7). Sea turtle nesting data and false crawls will be monitored for this 3-year period and analyzed to determine if tilling (or lack of tilling) has an effect on nesting behavior.

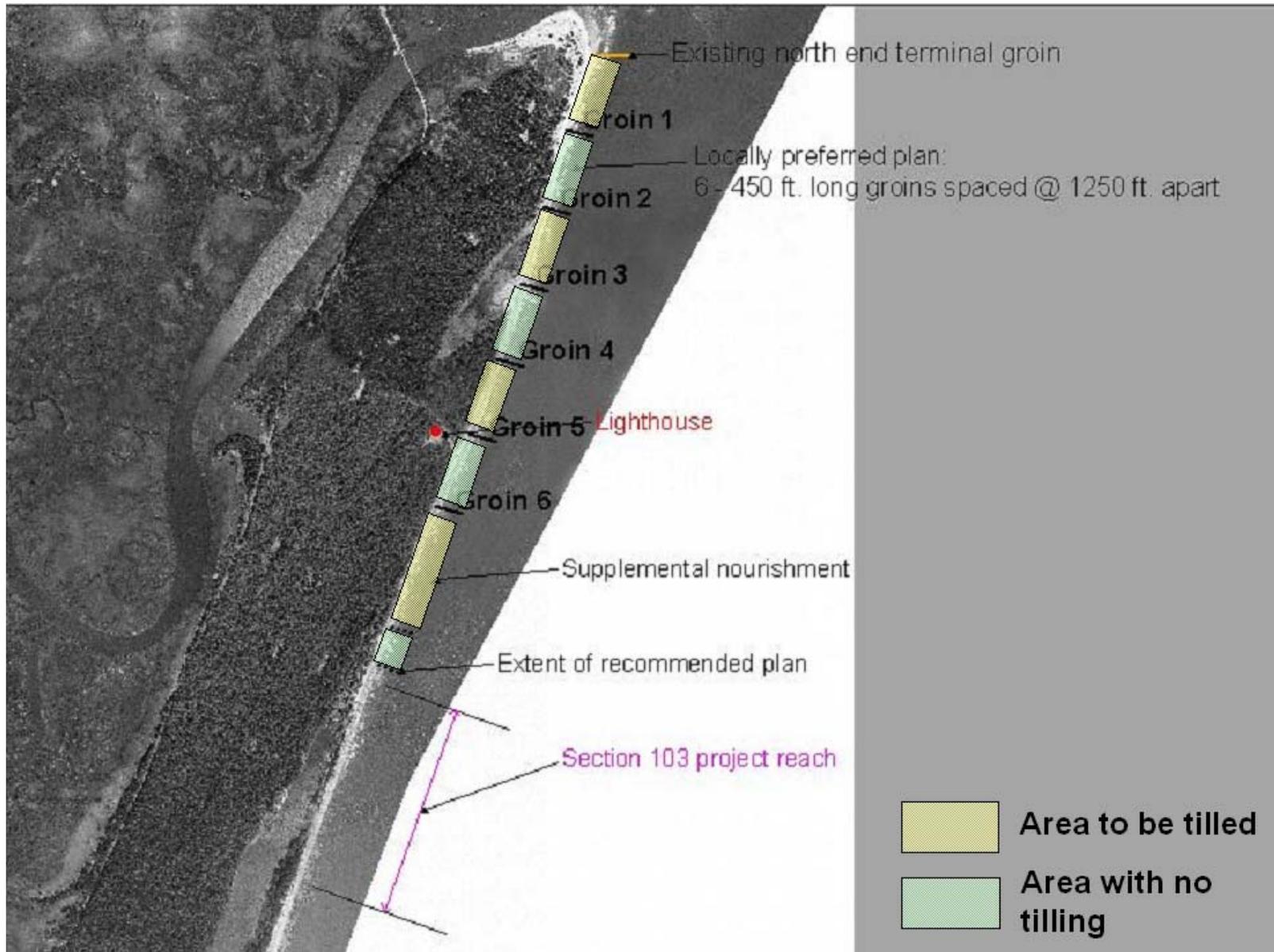


FIGURE 7: PROPOSED TILLING AT HUNTING ISLAND

This tilling protocol is being proposed because informal observations and sporadic cone penetrometer testing throughout the State of 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 renourished beaches.

Visual surveys for escarpments along the Project area will be made immediately after completion of the project and prior to May 1 for 3 subsequent years. Results of the surveys will be submitted to the USFWS prior to any action being taken. Since the Project should not occur during the sea turtle nesting season, escarpment leveling will not be performed until immediately prior to the nesting season. 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 affects to nesting sea turtles. Completion of the project will recreate lost habitat and protect existing turtle nesting habitat as well as the structures on the island. 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**.

6.03 Shortnose sturgeon

The Shortnose Sturgeon occurs in Atlantic seaboard rivers from southern New Brunswick to northeastern Florida. Department of Commerce studies have shown that the shortnose sturgeon exists in many of the large coastal river systems in South Carolina. Little is known about the shortnose sturgeon population level, life history or ecology. Their status is probably due to exploitation, damming of rivers and deterioration of water quality. Because there is no coastal river associated with this project, there is a lack of suitable freshwater spawning areas for the sturgeon in the immediate project area.

Effect Determination

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

6.04 Piping plover and proposed piping plover critical habitat

Piping plovers are small shorebirds approximately six inches long with sand-colored plumage on their backs and crown and white under parts. Breeding birds have a single black breast band, a black bar across the forehead, bright orange legs and bill, and a black tip on the bill. During the winter, the birds lose the black bands, the legs fade to pale yellow, and the bill becomes mostly black.

The piping plover breeds on the northern Great Plains, in the Great Lakes, and along the Atlantic coast (Newfoundland to North Carolina); and winters on the Atlantic and Gulf of Mexico coasts from North Carolina to Mexico, and in the Bahamas West Indies.

Piping plovers nest along the sandy beaches of the Atlantic Coast from Newfoundland to North Carolina, the gravelly shorelines of the Great Lakes, and on river sandbars and alkali wetlands throughout the Great Plains region. They prefer to nest in sparsely vegetated areas that are slightly raised in elevation (like a beach berm). Piping plover breeding territories generally include a feeding area, such as a dune pond or slough, or near the lakeshore or ocean edge. The piping plover winters along the coast, preferring areas with expansive sand or mudflats (feeding) in close proximity to a sandy beach (roosting). The primary threats to the piping plover are habitat modification and destruction, and human disturbance to nesting adults and flightless chicks. A lack of undisturbed habitat has been cited as a reason for the decline of other shorebirds such as the black skimmer and least tern (USFWS, 1996a).

Piping plovers are considered threatened species under the Endangered Species Act of 1973, as amended, when on their wintering grounds. Additionally, the U.S. Fish and Wildlife Service has designated critical habitat under the Endangered Species Act for the piping plover (*Charadrius melodus*) on breeding grounds in the Great lakes and Northern Great Plains Regions, and in the wintering grounds along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas. One of these designated areas of critical habitat (area SC-13) is located on the southern end of Harbor Island just to the north of Hunting Island (see Figure 8).

The piping plover is an occasional visitor along the South Carolina coast during the winter months and individuals are occasionally sighted in the project area. However, there are no large wintering concentrations in the project area. The species is not known to nest in the project area. Hunting Island is generally unsuitable for the species due to the heavy erosion along the ocean beach and heavy recreational use.

Effect Determination

Placement of the dredged material is currently scheduled to occur during the months of November through April. Direct loss of nests from the disposal of the dredged material should not occur, as the species is not known to nest in the project area. Piping plover foraging distribution on the beach during the winter months may be altered as beach food resources may be affected by placement of material along the project area. Such disruptions will be temporary and of minor significance. Any shorebird habitat area originally existing along the length of the

Hunting / Harbor Islands (Unit SC-13)



FIGURE 8: PIPING PLOVER CRITICAL HABITAT

island has suffered severe erosion. Dredged material will likely help restore the habitat lost to erosion in this area while the protective berm is being constructed. The placement of dredged material into the intertidal zone will provide additional foraging habitat for the wintering piping plover. For these reasons, it has been determined that the proposed project is **not likely to adversely affect the piping plover**. It has also been determined that the proposed project is **not likely to adversely modify critical habitat for wintering piping plovers**.

7.0 SUMMARY OF PROTECTIVE MEASURES

Manatee

Should a change in the schedule necessitate work 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 apply annually from 1 June to 30 September. 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 shall necessitate immediate shutdown of that equipment.

Right Whales

Since the construction is anticipated to be scheduled during the right whale migration period, personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing right whales. The Contractor may be held responsible for any whale 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 time when most right whale sightings occur is December, January, and February. The Contractor will be instructed to take necessary precautions to avoid any contact with whales. If whales are sighted within 1000 feet of the borrow area, all appropriate precautions shall be implemented to insure protection of the whale. In addition, the Contractor will stop, alter course, or maneuver as necessary to avoid operating moving equipment (including watercraft) any closer than this distance.

Sea Turtles

Should the schedule necessitate work during the sea turtle nesting time period, in order to minimize impacts to nesting sea turtles a beach monitoring and nest relocation program for sea turtles will be implemented. 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 Corps 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 this 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. In addition, all dredge pipes that are placed on the beach will be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes will be off the beach to the maximum extent possible. Temporary storage of pipes on the beach will be in such a manner so as to impact the least amount of nesting habitat and will likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline will be recommended as the method of storage).

During construction of this project, 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 offshore equipment 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. Shielded, low pressure sodium vapor lights will be highly recommended for lights on any offshore equipment that cannot be eliminated.

8.0 SUMMARY EFFECT DETERMINATION

This assessment has examined the potential impacts of the proposed project on the habitat and listed species of plants and animals that are, or have been, present in the project area. Both primary and secondary impacts to habitat have been considered. Critical habitat has not been designated for whales, manatees, sea turtles, or sturgeon in South Carolina; therefore, none would be affected. The USFWS designated critical habitat for the wintering piping plover is adjacent and to the north of the island, but not on the island. Based on this analysis, the following determinations have been made.

- It has been determined that the proposed project is not likely to adversely affect the blue (NOAA Fisheries list), finback, humpback, right, sei, or sperm whales.
- It has been determined that the proposed project is not likely to adversely affect the manatee.
- It has been determined that the proposed project is not likely to adversely affect Kemp's ridley, leatherback, green, or hawksbill sea turtles.
- It has been determined that the proposed project is not likely to adversely affect the shortnose sturgeon.
- 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 modify proposed critical habitat for the wintering piping plover.
- It has been determined that the proposed project may adversely affect the nesting loggerhead sea turtle.

9.0 List of Contacts Made

Extensive use was made of the research, communication, and coordination that was part of the March 2003 Biological Assessment prepared for the Pawleys Island Hurricane and Storm Damage Reduction project in Georgetown County, South Carolina. In addition to all the coordination that occurred with the development of that document, most of which equally applies to this project area, there is continuous contact with USFWS, SCDNR, SCDHEC, and NOAA Fisheries with regard to this coastal project and the development of the supporting Environmental Assessment and water quality work (all of which is utilized in this document).

Extensive verbal communication and coordination meetings have occurred and will continue to occur with USFWS, SCDNR, SCDHEC (OCRM), and NOAA Fisheries to adequately address environmental concerns until the ecosystem restoration and protection project is completed. The following list identifies some of the individuals contacted by the Corps for environmental coordination.

USFWS – Ms. Paula Sisson and Mr. Ed Eudaly
NOAA Fisheries - Mr. Prescott Brownell
SCDNR – Ms. Sally Murphy and Mr. John Coker
SCPRT – Ms Amanda Howard

LITERATURE CITED

Hopkins-Murphy, Sally R., Charlotte P. Hope, and Margaret E. Hoyle, 1999. A History of Research and Management of the Loggerhead Turtle (*Caretta caretta*) on the South Carolina Coast. Final Report to the U.S. Fish and Wildlife Service.

National Marine Fisheries Service, Office of Protected Species. 1997. Regional Biological Opinion for Hopper Dredging Along South Atlantic Coast. Silver Spring, Maryland.

Biological Assessment prepared on April 2001 for the Operations and Maintenance Dredging and Disposal work for the Murrells Inlet Project in Georgetown County, South Carolina. Extensive use was made of the research, communication, and coordination meetings that were part of this document.

Those references utilized for the development of the Murrells Inlet April 2001 BA.

Hopkins, J. Stephen, Richard D. Hamilton II, (SCDNR) and Stephen D. Roff (SCPRT) 1999. 1999 Research Plan: Development of Restoration Techniques for Seabeach Amaranth (*Amaranthus pumilus*) in South Carolina

National Marine Fisheries Service, 1984. Marine Fisheries Review, The Status of Endangered Whales. National Marine Fisheries Service, Scientific Publications Office, Seattle, Washington.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991. Recovery Plan for U.S. Population of Loggerhead Turtle. National Marine Fisheries Service, Washington, D.C.

(Corps) U.S. Army Engineer District, Charleston, South Carolina. 1976. Final Environmental Impact Statement. Murrells Inlet Navigation Project, Georgetown County, South Carolina.

- U.S. Fish and Wildlife Service. 1995. Florida Manatee Recovery Plan Second Revision. U.S. Fish and Wildlife Service, Atlanta, Georgia. 160 pp.
- U.S. Fish and Wildlife Service. 1996a. Piping Plover (*Charadrius melodus*), Atlantic Coast Population, Revised Recovery Plan. Hadley Massachusetts. 258 pp.
- U.S. Fish and Wildlife Service. 1996b. Recovery Plan for Seabeach Amaranth (*Amaranthus pumilus*). Rafinesque. Atlanta, Georgia

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Appendix E

U.S. Fish and Wildlife Service Coordination Correspondence

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Appendix F

SCIAA Coordination Correspondence

Chappell, Robert SAC

From: Chris Amer [AmerC@gwm.sc.edu]
Sent: Wednesday, April 23, 2003 11:09 AM
To: Robert.Chappell@usace.army.mil
Cc: Marcil@scdah.state.sc.us
Subject: Hunting Island 206



Chris Amer.vcf

Bob:

I have reviewed the information sent to me regarding the potential borrow areas in the vicinity of Hunting Island. There appear to be no records indicating the presence, or potential presence, of cultural resources in the impact areas noted. However, the possibility still remains that cultural resources exist in those areas, but that their presence is not recorded historically. Therefore, I would advise that, when the borrow areas are dredged, the operators be aware of the possibility that they may encounter cultural resources and remain vigilant.

SCIAA has recorded one shipwreck on the beach of Hunting Island. The Hunting Island Vessel (38BU157), was recorded by SCIAA in 1991. The wreck is located at approximately [REDACTED], almost directly in front of Seabreeze cabin. The remains of the wreck were buried at the time of the last renourishment and has remained buried ever since.

If you have any questions please feel free to contact me.

Christopher F. Amer
State Underwater Archaeologist
South Carolina Institute of Archaeology and Anthropology
1321 Pendleton Street
Columbia, SC 29208
(803)777-8170 (voice)
(803)734-0566 (voice)
(803)331-2672 (cell)
(803)254-1338 (fax)
amerc@sc.edu (e-mail)

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Appendix G

SHPO Coordination Correspondence

Chappell, Robert SAC

From: Marcil, Valerie [Marcil@scdah.state.sc.us]
Sent: Wednesday, April 23, 2003 12:45 PM
To: 'Chris Amer'; Robert.Chappell@usace.army.mil
Cc: Matthews, Marta
Subject: RE: Hunting Island 206

23 April, 2003

Bob,

Our office supports Chris Amer's recommendations concerning the Hunting Island 206 project. We have no additional information on recorded sites. Thank you for consulting with us.

Sincerely,

Valerie Marcil
Staff Archaeologist
SC Department of Archives and History
8301 Parklane Rd.
Columbia, SC 29223
(803)896-6173
(803)896-6167 (Fax)

> -----Original Message-----

> From: Chris Amer [SMTP:AmerC@gwm.sc.edu]
> Sent: Wednesday, April 23, 2003 11:09 AM
> To: Robert.Chappell@usace.army.mil
> Cc: Marcil, Valerie
> Subject: Hunting Island 206

> Bob:

> I have reviewed the information sent to me regarding the potential
> borrow areas in the vicinity of Hunting Island. There appear to be no
> records indicating the presence, or potential presence, of cultural
> resources in the impact areas noted. However, the possibility still
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> The Hunting Island Vessel (38BU157), was recorded by SCIAA in 1991. The
> wreck is located at approximately [REDACTED],
> [REDACTED], almost directly in front of Seabreeze cabin. The remains
> of the wreck were buried at the time of the last renourishment and has
> remained buried ever since.

> If you have any questions please feel free to contact me.

> Christopher F. Amer
> State Underwater Archaeologist
> South Carolina Institute of Archaeology and Anthropology
> 1321 Pendleton Street
> Columbia, SC 29208
> (803)777-8170 (voice)
> (803)734-0566 (voice)
> (803)331-2672 (cell)
> (803)254-1338 (fax)
> amerc@sc.edu (e-mail) << File: Chris Amer.vcf >>

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Appendix H

NOAA Fisheries Coordination Correspondence



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat Conservation Division
219 Fort Johnson Road
Charleston, South Carolina 29412-9110

February 29, 2002

RECEIVED
BY *JK* DATE *3/5/02*

Mr. Joseph A. Jones
Chief, Planning Branch
Charleston District, Corps of Engineers
69-A Hagood Avenue
Charleston, South Carolina 29403-5107

Dear Mr. Jones:

This responds to your February 4, 2002, request for comments on plans by the Charleston District to initiate a feasibility investigation for a Section 206 Aquatic Ecosystem Restoration Study for Hunting Island in Beaufort County, South Carolina. The stated purpose of the feasibility phase is to evaluate erosion along the four-mile-long shoreline reach of Hunting Island and develop a recommendation for protecting rare mature maritime forest and associated habitats. The recommendation would also consider needed restoration of nesting habitat for the Federally listed threatened loggerhead sea turtle.

As you may be aware, the South Carolina Department of Recreation and Tourism (SCDRT) has requested Department of the Army authorization to build groins and renourish beaches at Hunting Island. These activities are intended to accomplish the same purposes as the Section 206 Study your branch is undertaking. In connection with the SCDRT's application we have provided information concerning anticipated impacts on living marine resources, including Essential Fish Habitat (EFH).¹ In the interest of efficiency and making you aware of resource concerns and issues, I am enclosing copies of relevant comments we have provided to your Regulatory Branch concerning the SCDRT permit application. As you will see from our correspondence, we have encountered problems in obtaining information needed to ensure that work is performed in a manner which precludes long-term and significant adverse impacts to living marine resources, and that needed precautions would be taken to ensure that remedy of erosion problems at Hunting Island is not at the expense of adjacent lands.

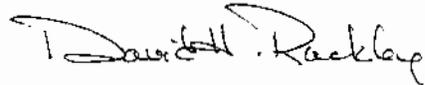
¹Identification of Essential Fish Habitat (EFH) and requirements concerning EFH coordination and management are contained in the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (P.L. 104-297). EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."



The NMFS would fully support an environmentally sound proposal to stabilize the shoreline at Hunting Island and protect the splendid maritime forests and estuarine wetlands located behind the island. We look forward to working with you and we are hopeful that if shoreline stabilization is warranted it can be undertaken before even more severe erosion is realized at Hunting Island.

Please contact me further assistance is needed.

Sincerely,

A handwritten signature in black ink that reads "David H. Rackley". The signature is written in a cursive style with a large, looping initial "D".

David H. Rackley
Chief, Charleston Area Office

Enclosures

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Appendix I

SCDNR Coordination Correspondence

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Appendix J

Other Pertinent Correspondence