

Appendix N

Biological Assessment

**BIOLOGICAL ASSESSMENT
MISSISSIPPI COASTAL IMPROVEMENTS PROGRAM (MsCIP)
BARRIER ISLAND RESTORATION
MISSISSIPPI SOUND
HANCOCK, HARRISON AND JACKSON COUNTIES, MISSISSIPPI AND MOBILE
COUNTY, ALABAMA**

**U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT**

NOVEMBER, 2012

Table of Contents

Introduction.....	4
Ship Island Restoration	5
Borrow Area Descriptions for Ship Island Restoration	12
Ship Island Borrow Area	12
DA-10 (SAND, SPOIL ISLAND) Borrow Area	13
Petit Bois Borrow Area	14
Potential Borrow Areas	16
Cat Island Restoration	18
Cat Island Borrow Area	19
Previous Coordination	22
Description of Listed Species under USFWS Jurisdiction	23
Species of Concern	25
Piping Plovers	25
Critical Habitat Boundaries for Ship Island Restoration	26
Critical Habitat for Borrow Areas.....	28
Piping Plover Critical Habitat	30
Sea Turtles	32
Loggerhead Sea Turtles	32
Green Sea Turtle	34
Kemp’s Ridley Turtle	36
Leatherback Sea Turtle	37
Hawksbill Sea Turtle.....	38
Description of Listed Species under NMFS Jurisdiction.....	39
Species of Concern	40
Sea Turtles	40
(see previous descriptions in USFWS section).....	40
Gulf Sturgeon.....	40
Gulf Sturgeon Critical Habitat	41
Effects of Proposed Action	46
Sea Turtles	46
Gulf Sturgeon.....	48
Gulf Sturgeon Critical Habitat	49
Piping Plover.....	54
Conservation Measures	56
Conclusions.....	57

Figures and Tables

Figure 1- Camille Cut & ESI Placement
Figure 2- Camille Cut Typ Section
Figure 3- East Ship Island Typ Sect.
Figure 4- Borrow Areas
Figure 5- Ship Island Borrow Area
Figure 6- Ship Island Cross Sect
Figure 7 – DA-10 Borrow Site
Figure 8 – Petit Bois Borrow
Figure 9- Ship Island Potential Borrow Area
Figure 10- Horn Island Potential Borrow
Figure 11 -Petit Bois Potential Borrow Area
Figure 12 – Cat Island Borrow Site
Figure 13 - Cat Island Cross Sect.
Figure 14 – Cat Island Fill Plan View
Figure 15 – Critical Habitat for Ship Island
Figure 16- Critical Habitat for Project Area
Figure 17 - Critical Habitat for DA-10
Figure 18-Number of Sturgeon per Total Detections
Figure 19-Densities of Eight Principal Prey for Sturgeon
Figure 20-Ship Island Placement Area
Table 1 - USFWS T&E species list
Table 2 - NMFS T&E species list
Table 3 - Critical Habitat Impact Summary

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AND MOBILE COUNTY, ALABAMA**

Introduction

The Final MsCIP Comprehensive Plan and Integrated Programmatic Environmental Impact Statement (EIS) dated June 2009 describes a Comprehensive Plan to support the long-term recovery of Hancock, Harrison, and Jackson Counties, Mississippi (MS) from the devastation caused by the hurricanes of 2005 and ways to increase of resiliency of the Mississippi coast for the future. The MsCIP Study was conducted under the authority of the Department of Defense Appropriation Act of 2006 (Public Law 109-148), dated December 30, 2005, and was completed in June 2009. The Report of the Chief of Engineers dated September 15, 2009 and the Record of Decision signed by the Assistant Secretary of the Army for Civil Works dated January 14, 2010 were submitted to Congress on January 15, 2010. The plan established improvements in the coastal areas of MS in the interest of hurricane and storm damage reduction, prevention of saltwater intrusion, preservation of fish and wildlife, prevention of erosion, and other related water resources purposes. The barrier island restoration plan discussed in this Biological Assessment (BA) is one component of the MsCIP Comprehensive Plan which addresses preservation of fish and wildlife and prevention of saltwater intrusion. In addition, the plan would provide for storm wave attenuation along a portion of the mainland.

The MsCIP Barrier Island Restoration Plan as identified in the MsCIP Comprehensive Plan and Integrated Programmatic EIS includes restoration of the barrier islands for preservation of fish and wildlife and sustaining water quality in the MS Sound. The Comprehensive Barrier Island Restoration consists of the placement of approximately 22 million cubic yards (mcy) of sand within the Ship Island portion of the National Park Service's Gulf Islands National Seashore, MS unit to close Camille Cut between East and West Ship Islands, and to ameliorate erosion of the southern shoreline of East Ship Island. In addition, the plan includes the restoration of the

eastern shoreface of Cat Island using an additional approximate 2 mcy of sand. A third related action to maximize the beneficial placement of sandy maintenance dredged material from the Pascagoula Federal navigation project includes the redefinition of Disposal Area (DA) 10 and the littoral zone disposal site.

Proposed Action

Ship Island Restoration

The MsCIP Comprehensive Plan identifies the restoration of the offshore barrier islands as a critical feature towards increasing the resiliency of the coast. The main focus of the barrier island restoration plan is focused towards Ship Island which is located approximately 16 miles southeast of Gulfport, MS. Ship Island was split into two pieces by Hurricane Camille in 1969, hence the name of the Cut. Since that time the cut shoaled and prior to Hurricane Georges in 1998 was identified as a shallow shoal. Hurricane Georges and subsequent storms, notably Hurricane Katrina widened and deepened the cut to the point that there is unlikely enough sediment in the system to heal the island naturally (Morton, R.A., 2008). In addition, erosion to the East Ship Island has worsened over time and now this area is a low barrier island.

The Ship Island restoration is composed of 2 parts: the rejoining of West and East Ship Islands through the closing of Camille Cut and the restoration of the southern shore of East Ship Island through the placement of approximately 22 million cubic yards of suitable sandy material. Approximately 16 mcy would be placed in Camille Cut and approximately 6 mcy would be placed along the southern shore of East Ship Island.

The constructed Camille Cut project area would be approximately 1,100 feet (ft) wide. The fill would tie into the existing West and East Ship Island's shoreline just below the frontal dune line at an elevation of approximately +7 ft extending below the mean high water line (MHWL) with a 1V:20H slope. The construction slope is primarily dependent on the grain size of the fill. Overtime, typically 6 months to a year the constructed slopes would naturally adjust due to waves and currents to milder slopes, which mimic the existing island nearshore slopes in the range of 1:50 to 1:100.

Sand placement along East Ship Island would consist of an approximate 1,200 ft wide restored shoreline. The equilibrium design widths average approximately 800-ft for Camille Cut and 1,000-ft for East Ship Island. The sand placement layout and typical section for Camille Cut and East Ship Island fill are shown in Figures 1-4. The combined Camille Cut and East Ship Island equilibrated fill will encompass approximately 1,500 acres of which approximately 800 acres will be above the MHWL, and 700 acres will lie below the MHWL. The newly restored areas will be planted with suitable beach and dune vegetation following construction.

Sand would be obtained from four separate borrow area sources within MS and Alabama (AL) including Ship Island borrow area in the Gulf of Mexico, DA-10 at the Pascagoula Federal Navigation Project, and 2 separate borrow areas south of the western end of Dauphin Island and Petit Bois Pass in the Gulf of Mexico (East and West Petit Bois borrow areas). The Ship Island borrow area is located approximately 2 miles south of Camille Cut; DA-10 is located between Horn Island and Petit Bois Island, just west of the Pascagoula Navigation Channel; and the Petit Bois borrow areas are located approximately 2 miles south of the western tip of Dauphin Island. The restoration of Ship Island will be phased into 5 separate contracts utilizing a variety of equipment including hopper, mechanical, and/or hydraulic pipeline dredges and dump scows. Four of those contracts will consist of sand movement and the other would involve planting of the restored areas. The Cat Island Restoration will be constructed under a separate contract.

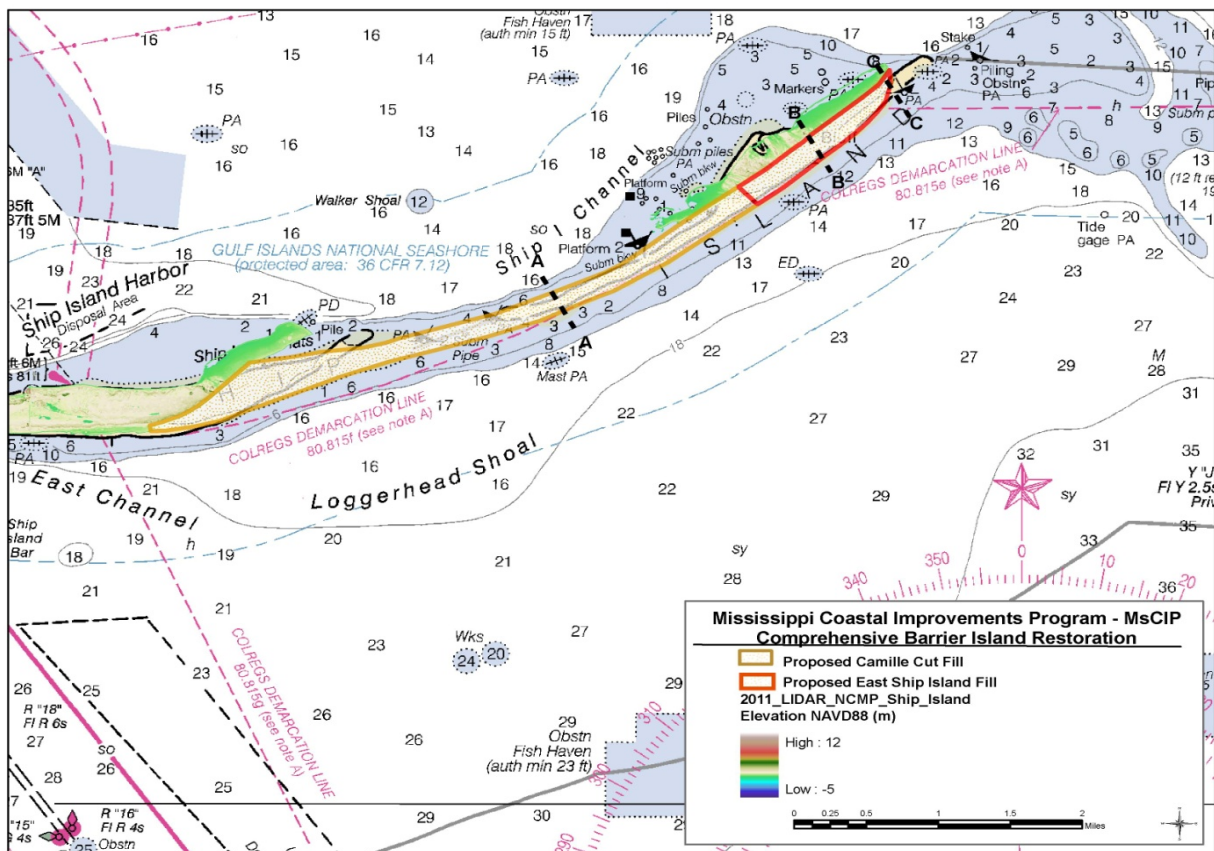


Figure 1. Camille Cut & East Ship Island Placement Layout

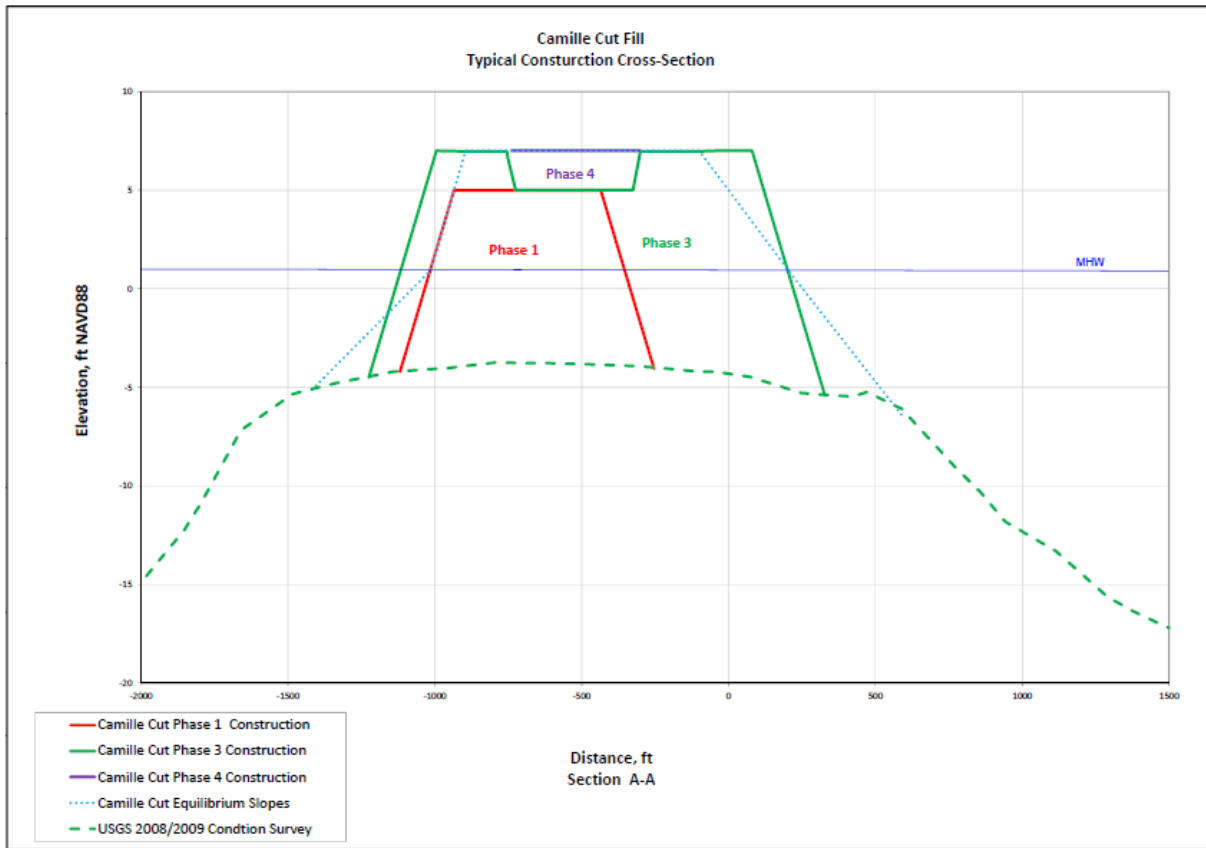


Figure 2. Camille Cut Typical Section

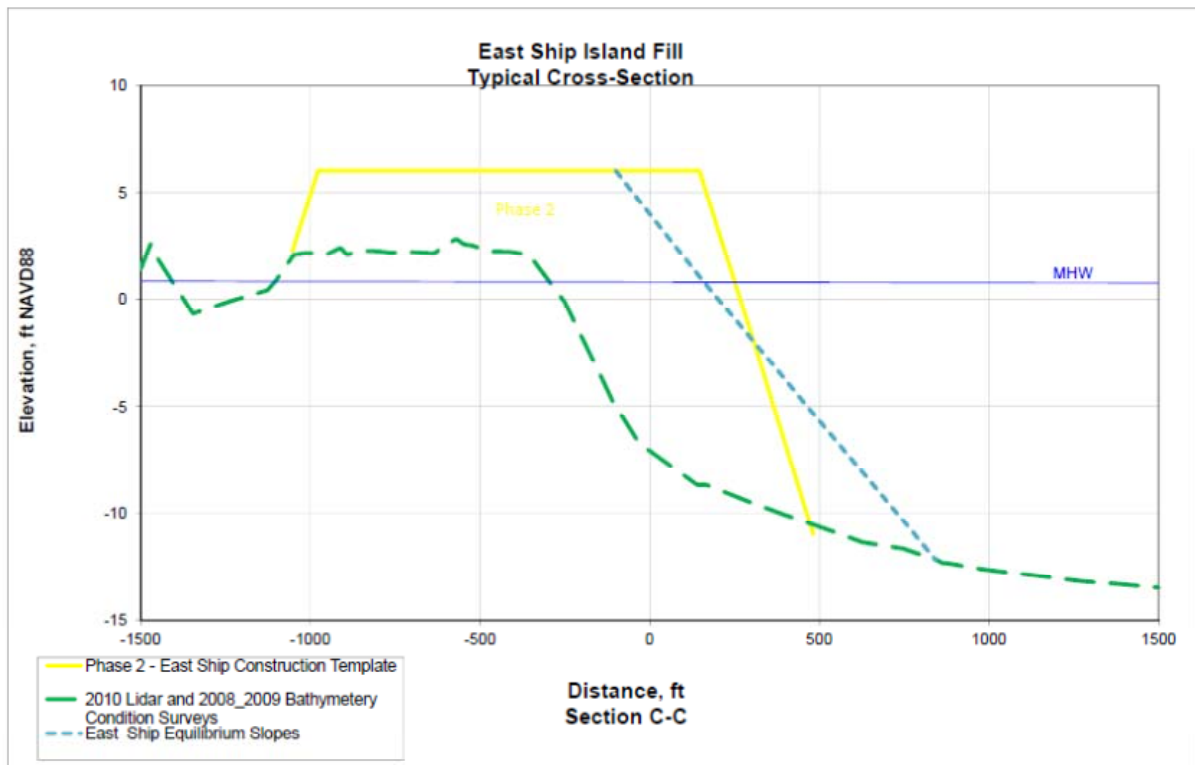


Figure 3. East Ship Island Typical Section



Figure 4. Sand Borrow Area Locations – Ship Island, DA-10 & Petit Bois

Construction Phases for Ship Island Restoration

As previously stated, the overall barrier island restoration project will likely be constructed in five contract phases. Work (i.e. sand placement) at Camille Cut and East Ship Island will be constructed in four (4) phases using a combination of hydraulic dredges, hopper dredges, bottom dump scows, hydraulic unloaders, and mechanical equipment, such as bulldozers and trackhoes. The total construction time to execute all four phases is approximately 3 years and the details of each phase are provided below. The fifth phase will be the planting of Camille Cut.

1. The first phase of the project consists of the construction of an initial berm across Camille Cut. The berm will have a crest width of approximately 500 ft and a top elevation of +5 ft NAVD88. The sand for Phase 1 (approximately 7 mcy) will be dredged from the Petit Bois East borrow area, hauled approximately 30 miles, and placed directly in Camille Cut. The work will take approximately one year to complete. Temporary obstructions including sheet pile walls and biodegradable geotubes or similar may be used during the construction of

Phase 1 to minimize sand losses by quickly cutting off the flow through the cut. These obstructions will either be removed or degrade overtime after the work is completed.

2. The second phase of the project consists of the restoration of the southern shoreline of East Ship Island. The restoration berm will have a constructed crest width of approximately 1,100 ft and a top elevation of +6 ft NAVD88. The sand for Phase 2 (approximately 6 mcy) will be dredged from DA-10 (Sand Island), hauled approximately 25 miles, and placed along the southern shoreline of East Ship Island. This phase of work is estimated to begin approximately six months after the commencement of Phase 1 and will take approximately 16 months to complete.
3. The third phase of work consists of the placement of the remaining sandy material from the Petit Bois East and West borrow areas in Camille Cut (approximately 8 mcy). The Camille Cut berm, after the completion of Phase 3, will be built to a crest width of approximately 1,000 ft with a top elevation of +7 ft NAVD88. There will be a portion of the berm (upper-center) that will be left void and will be filled in Phase 4. Work under Phase 3 will begin immediately upon completion of Phase 1 and is estimated to take approximately one year to complete.
4. The fourth phase of work will commence after completion of Phase 3 and consists of the placement of approximately 1 mcy of sandy material in the void left in the upper-center portion of the Camille Cut berm. The material for Phase 4 will be dredged from the Ship Island borrow area and the work is estimated to take approximately 3 months to complete. Due to its finer grain size, the material from the Ship Island borrow area will be used as a cap on the Camille Cut fill section to facilitate the establishment of beach vegetation.
5. The fifth and final phase of the project consists of the planting of the Camille Cut restoration berm with dune vegetation. This work will begin upon completion of Phase 4 and is estimated to take approximately one year to complete.

Borrow Area Descriptions for Ship Island Restoration

Ship Island Borrow Area

Ship Island borrow area is located approximately 2 miles south of Ship Island in an ambient water depth of approximately 30 ft. The characteristics of the sand consist of an average grain size of 0.21 millimeters (mm), with 9.0 percent fines, and a light gray color. The borrow area is approximately 600 ft wide (north-south direction) and 6,000 ft wide (east-west direction) covering a total area of approximately 96 acres with an average cut depth of approximately 8 ft. The cut elevation for dredging is approximately -36 ft NAVD88 (see Figure 5) and side slopes for cut areas are estimated in the design to be 1V:5H (see Figure 6). An estimated 1.2 mcy of sand is available within the proposed delineated borrow area limits.

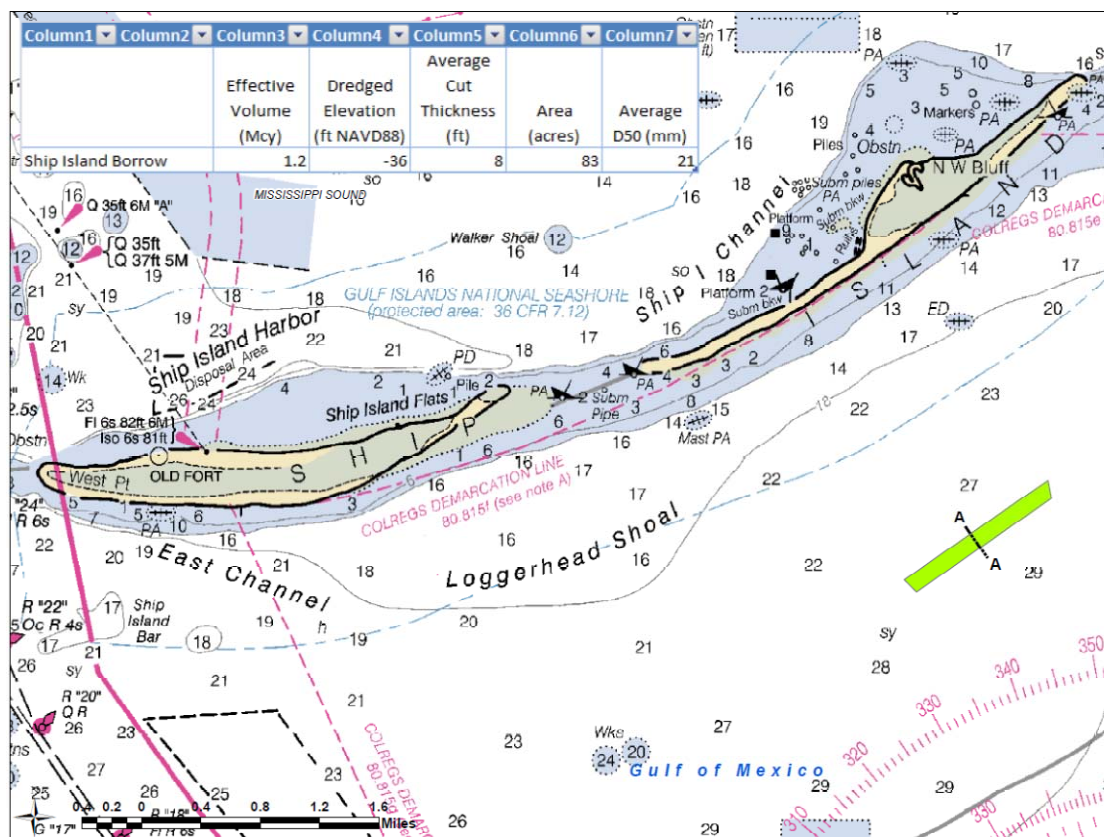


Figure 5. Ship Island Borrow Area

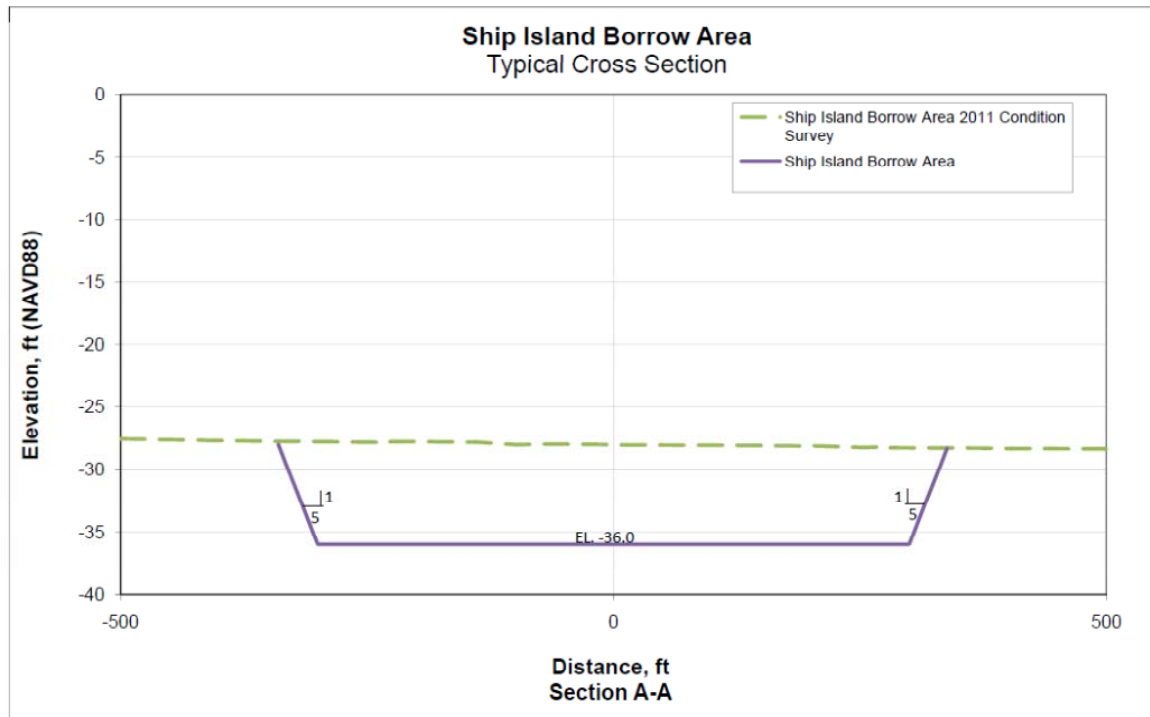


Figure 6. Ship Island Borrow Area Typical Cross Section

DA-10 (SAND ISLAND) Borrow Area

DA-10, also known by the locals as Sand Island, is an existing dredged material placement site for the Pascagoula Federal Navigation Channel. The site is located within the Horn Island Pass just west of the Pascagoula Harbor Navigation Channel. Elevations within the site range from approximately +18 to -10 ft NAVD 88. The approximate size of DA-10 is 357 acres, which includes the sand above and below the MHWL. The area above water is approximately 165 acres. The proposed excavation would remove material from above the -12 foot NAVD88 contour (see Figure 7). The area of the island that is proposed to be removed is approximately 105 acres. Approximately 60 acres of the island is estimated to remain above water after sand excavation and equilibrium. The DA-10 littoral area, which is shown in the Figure 7, will continue to be used for future placement of dredged material from maintenance of the Pascagoula Harbor Federal navigation channel. Sand placement in the littoral area feeds the sediment supply to the system. An estimated 5.1 mcy of sand is available within the proposed delineated borrow area limits. The material within the site is classified as poorly graded sand

with 2.7% fines and an average median grain size of 0.33 mm. The sand color is light gray to light brownish gray.

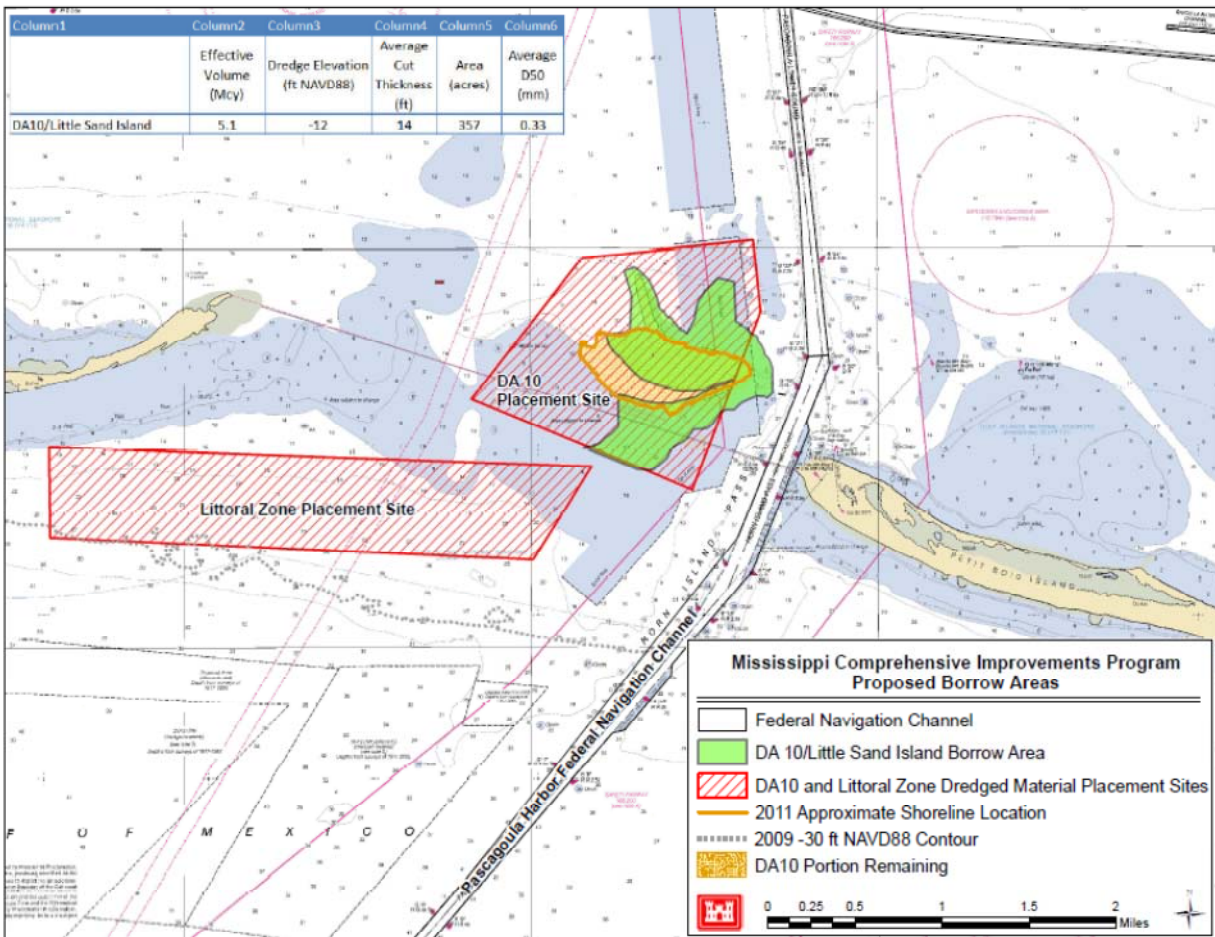


Figure 7. DA-10 Borrow Area

Petit Bois Borrow Area

The Petit Bois borrow area consists of two separate sites located approximately 2 miles south of the western end of Dauphin Island in average ambient water depths of approximately 31 ft (see Figure 9). The borrow area configuration consist of eastern and western segments known as Petit Bois borrow area east and Petit Bois borrow area west. Petit Bois borrow area west is approximately 587 acres in size, stretching roughly 0.5 mile wide (north-south direction) and approximately 2 miles long (east-west direction). The characteristics of the sand at Petit Bois

West consist of an average grain size of 0.32mm, with 4.1 percent fines, and a light gray to light brownish-gray color. A preliminary estimate of available material within the delineated area is approximately 4.3 mcy at cut depths of -5 to -7 ft deep (see Figure 9). The Petit Bois borrow area east is approximately 753 acres in size, stretching roughly 1 mile wide (north-south direction) and approximately 1.8 miles long (east-west direction). The characteristics of the sand at Petit Bois East consist of an average grain size of 0.33mm, with 6.6 percent fines, and a light gray to white color. A preliminary estimate of available material within the delineated borrow limits is approximately 11.7 mcy at cut depths of -7 to -14 ft deep (see Figure 9).

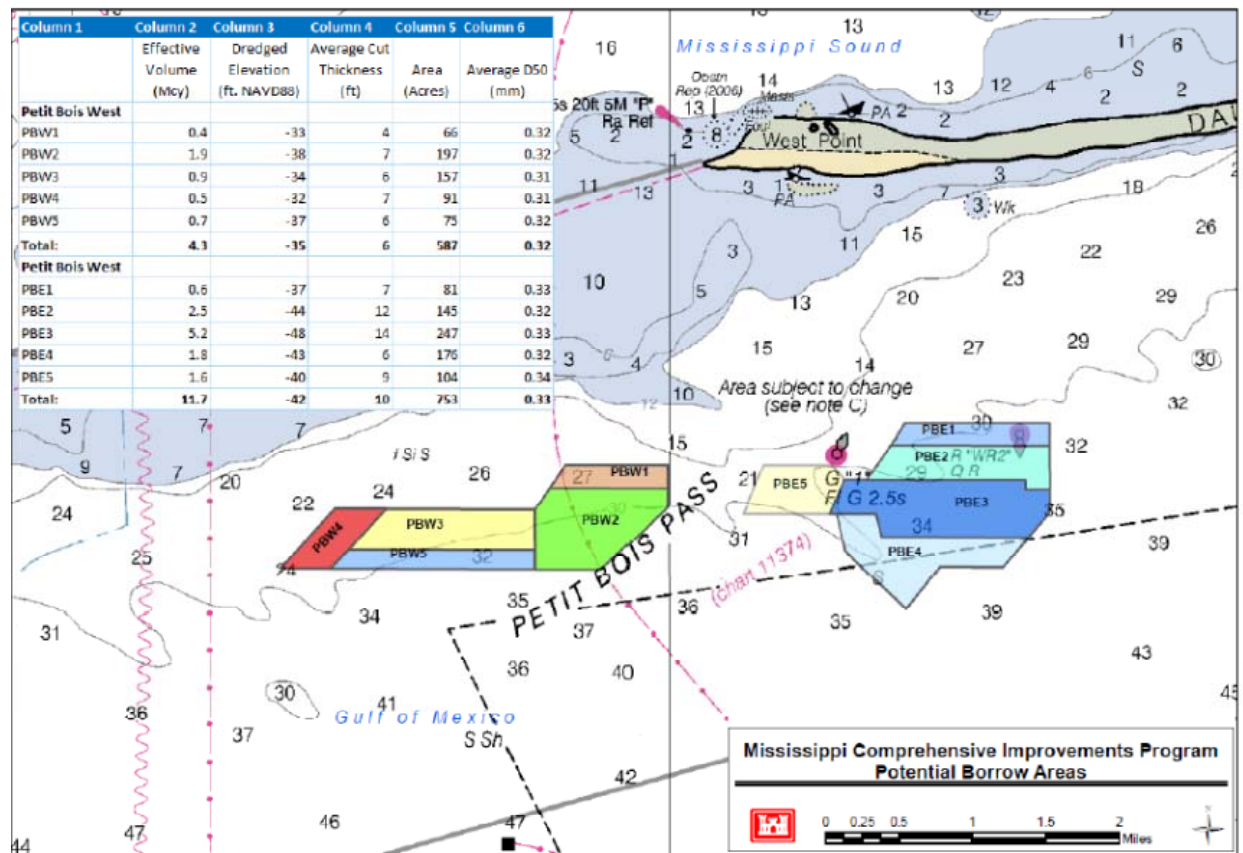


Figure 8. Petit Bois Borrow Area

Potential Borrow Areas

There are several areas (outside of designated critical habitat areas) currently being investigated further for sand compatibility, which may be incorporated into the design as additional borrow sources. These areas include Ship Island potential borrow area expansion (Figure 9), Horn Island Pass potential borrow area 1, 2 and 3 (Figure 10), Petit Bois Pass potential borrow areas 1 and 2, and Petit Bois Pass south areas 1 and 2 (Figure 11). The Ship Island potential borrow expansion area encompasses a total of approximately 688 acres including the Ship Island delineated borrow site. The Horn Island Pass potential borrow areas 1, 2 and 3 encompass a total of approximately 2,541 acres to the east and west of the Pascagoula Harbor Federal Navigation Project outer bar channel (see Figure 10). The Petit Bois Pass potential borrow area 1 encompasses a total of approximately 3,670 acres including the existing delineated West and East Petit Bois Borrow areas (see Figure 11). The Petit Bois Pass potential borrow area 2 encompasses a total of approximately 702 acres (see Figure 11).

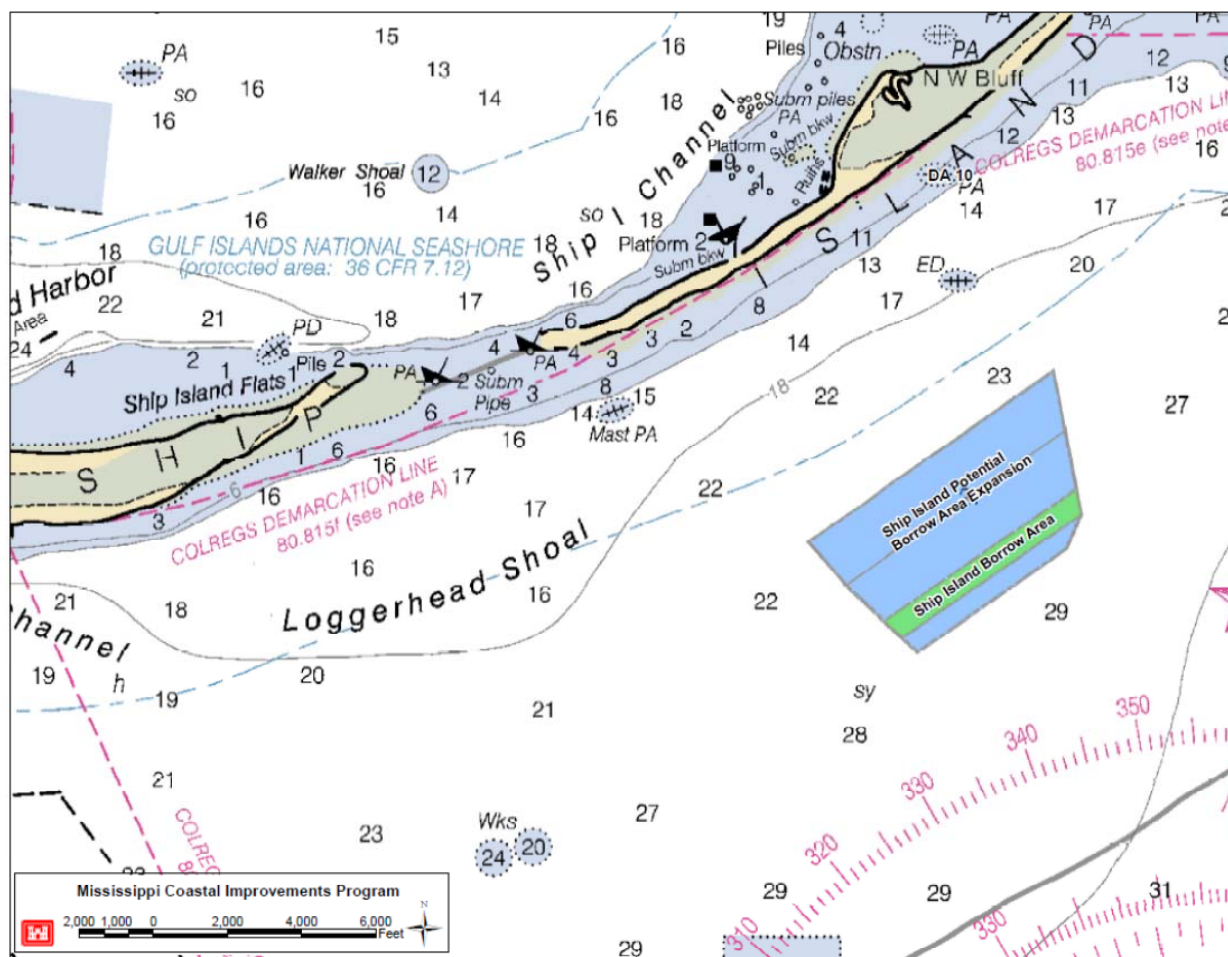


Figure 9. Ship Island Potential Borrow Expansion Areas

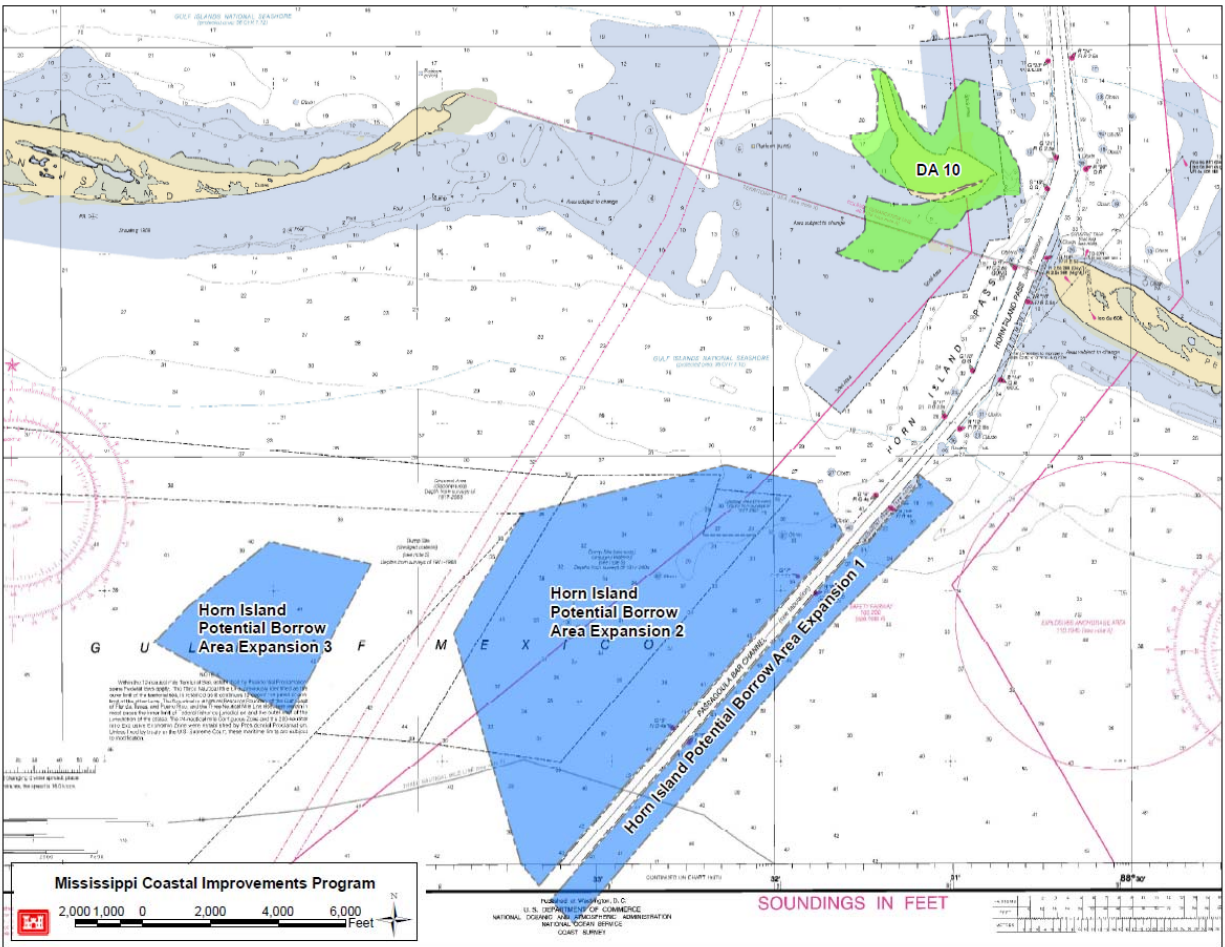


Figure 10. Horn Island Potential Borrow Area Expansion

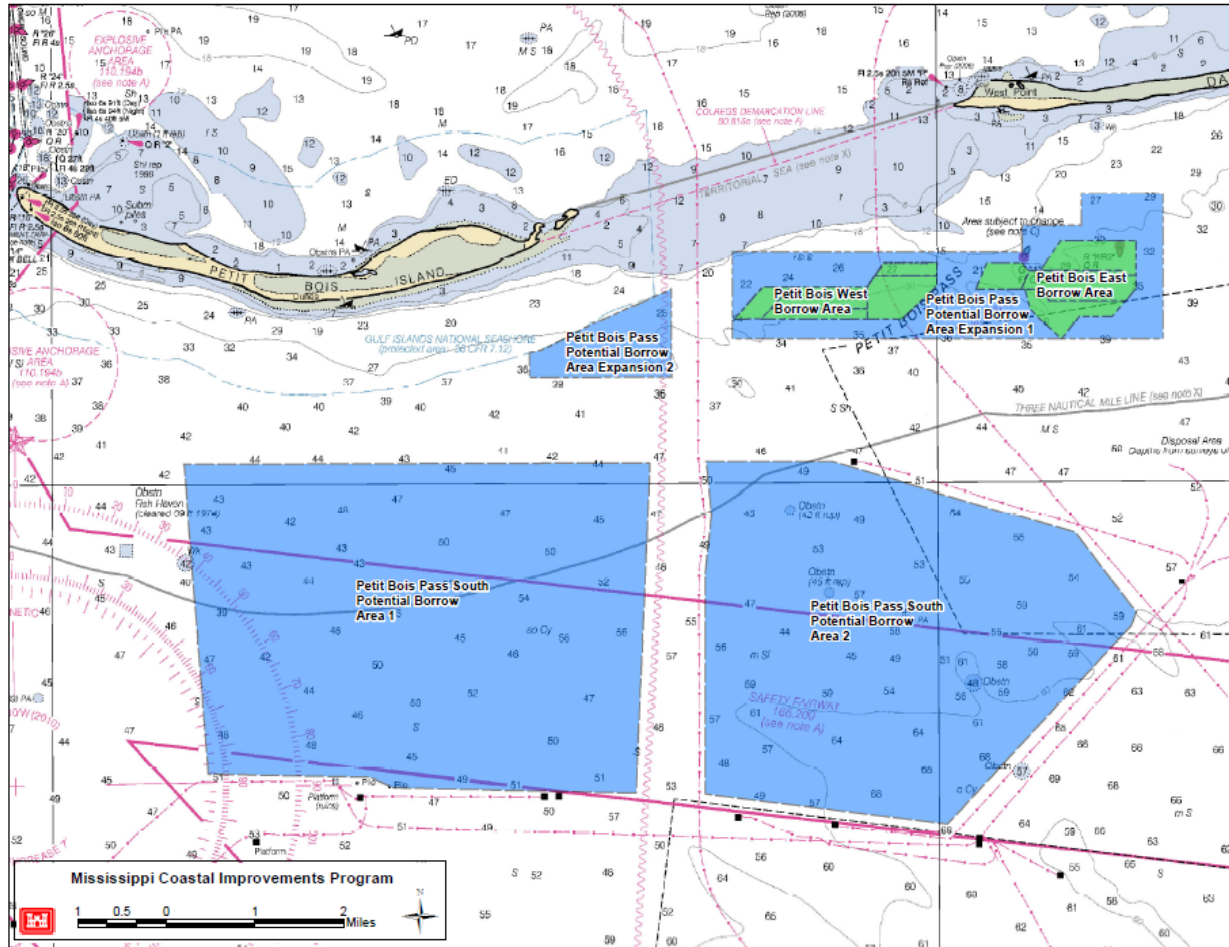


Figure 11. Petit Bois Potential Borrow Areas Ship Island

The two Petit Bois pass south potential borrow areas are approximately 6 miles south of Petit Bois island (Figure 11). Areas 1 and 2 are located mainly in Federal waters, and partially in State waters. The water depths for the two areas range from about 42-68 ft. Area 1 is approximately 11,500 acres and area 2 is approximately 9,500 acres.

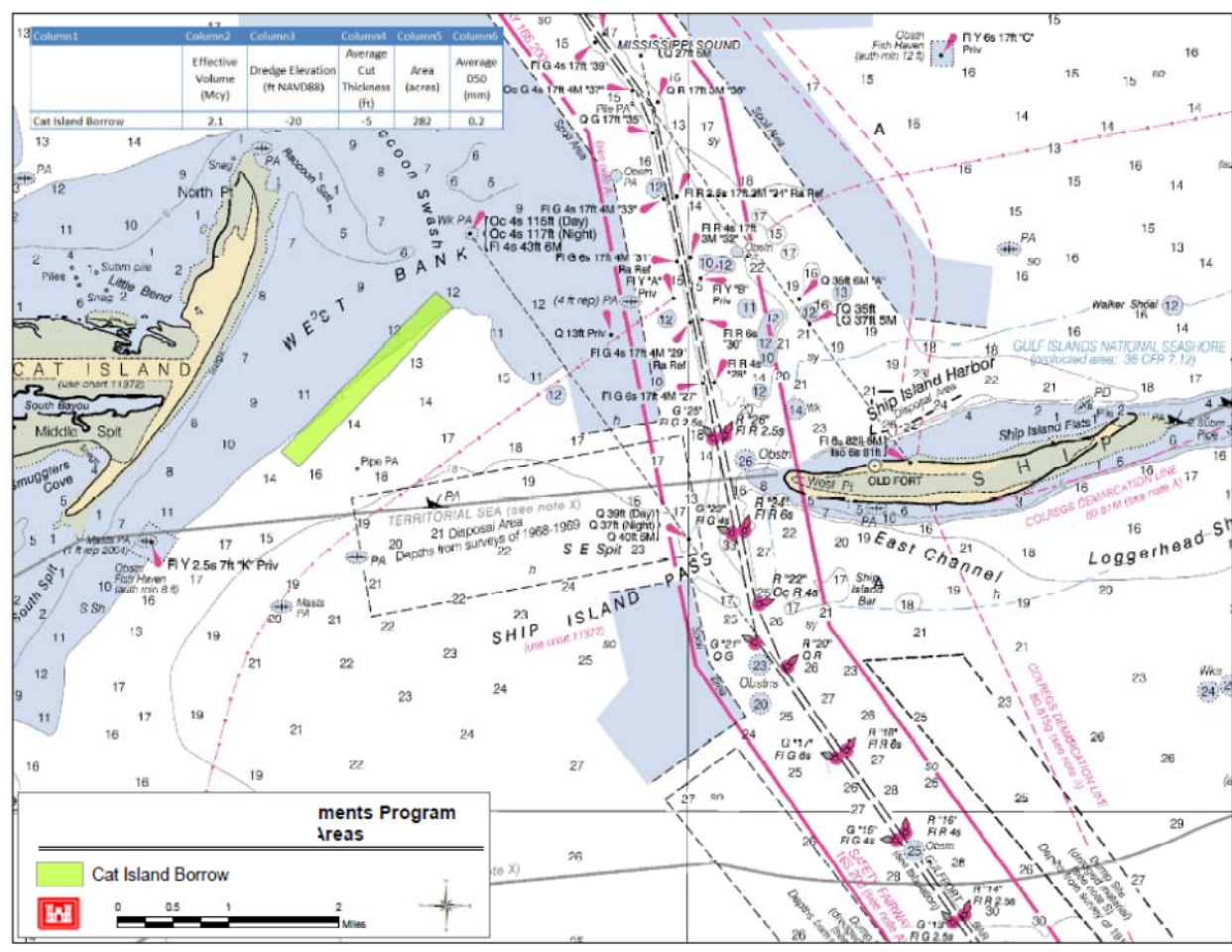
Cat Island Restoration

The Cat Island Restoration consists of the placement of an estimated 2 mcy of sand along the eastern shoreline. The construction template will consist of an average dune crest width of 40 ft at an elevation of approximately +7.5 ft NAVD88. The construction berm will have an average crest width of approximately 250 ft at an elevation of approximately +5 ft NAVD88 with a 1V:20H slope from the seaward side of the berm to the toe of the fill. The construction profile is

expected to adjust rapidly through the erosion of the upper profile, and mimic the natural nearshore profile once it reaches equilibrium. The equilibrium design berm width averages approximately 175 to 200 ft. The total equilibrated fill area encompasses approximately 305 acres. The work will likely be performed using a hydraulic dredge. The portion of Cat Island to be restored was acquired by BP following the Deepwater Horizon incident to allow for the ease of clean-up. The restoration will not begin until the property is under public ownership however the restoration should be considered as part of this assessment to assure that the full impacts and benefits of the comprehensive restoration are considered.

Cat Island Borrow Area

Sand for construction of the project will be dredged from an approximate 282-acre borrow area located approximately one mile east of the island in ambient water depths of approximately -12 to -14 ft NAVD88. The material within the borrow site is classified as poorly graded sand, with an average grain size of 0.21 mm, 5.5 percent fines, and a gray to olive-gray color. The Cat Island borrow and placement areas are shown in Figures 12-14 below.



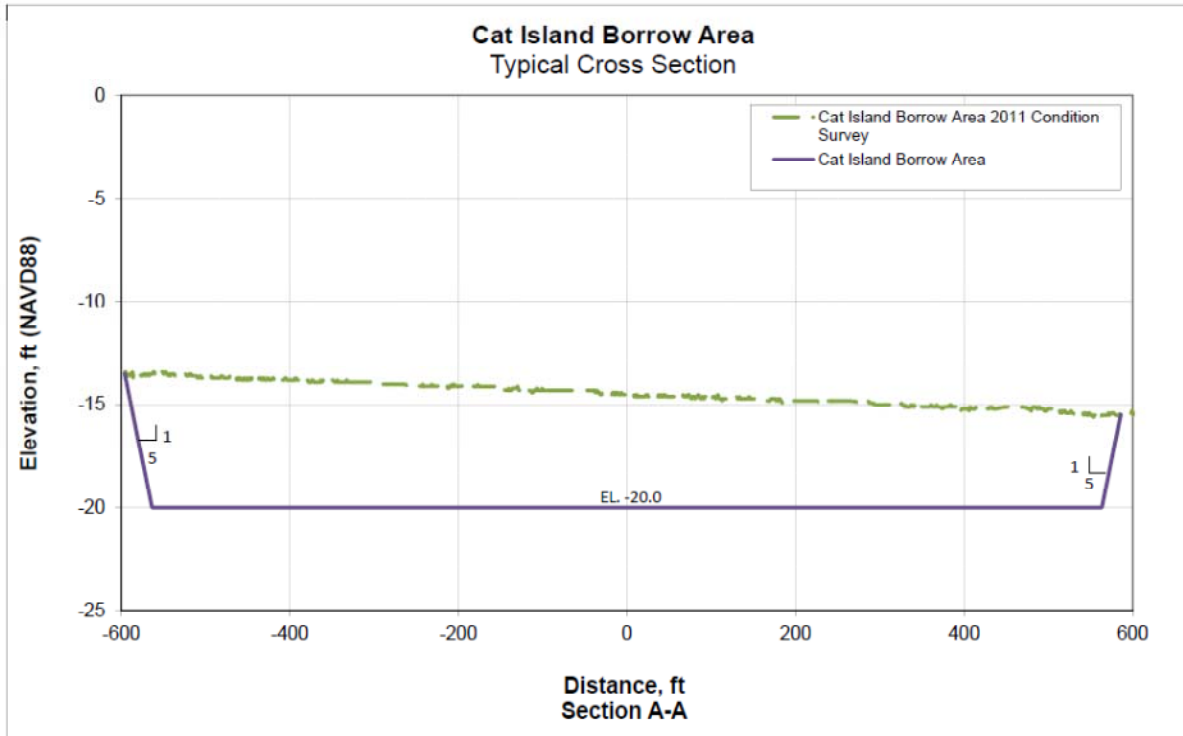


Figure 13. Cat Island Borrow Area Cross Section

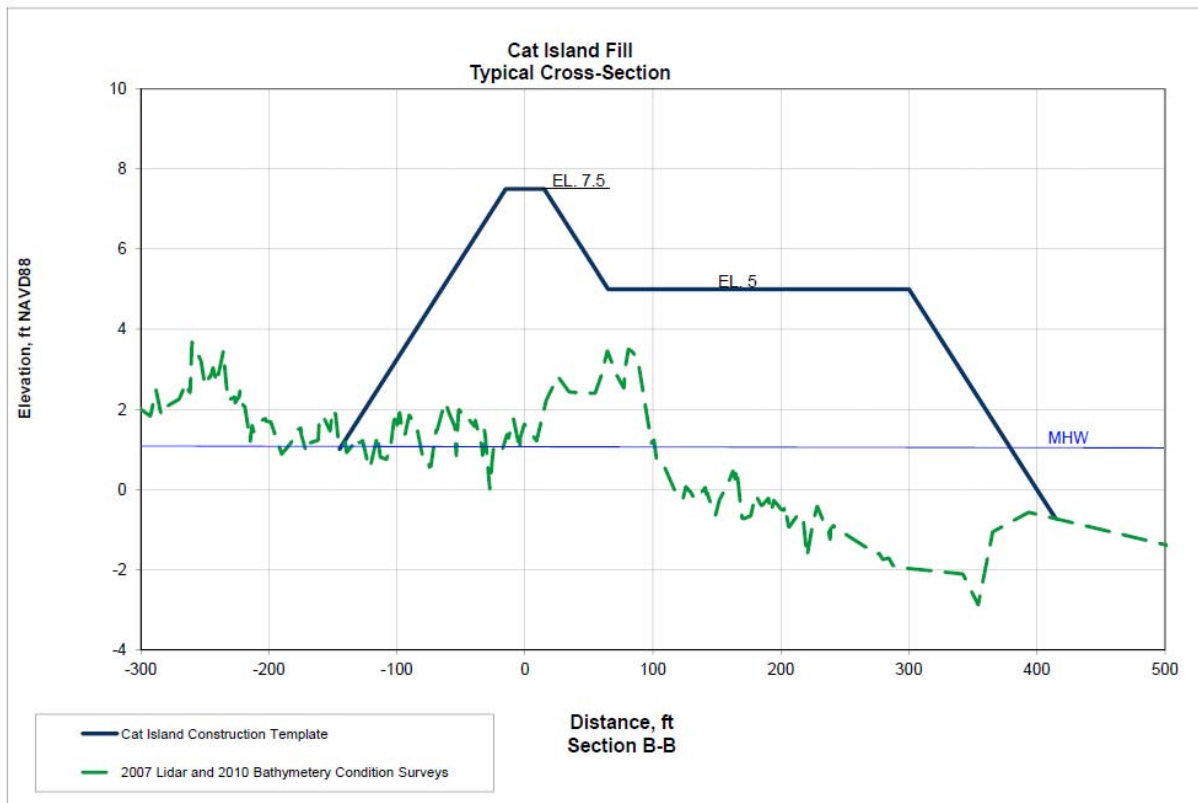


Figure 14. Cat Island Fill Typical Cross Section

Previous Coordination

The Corps, Mobile District has routinely coordinated with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), Protected Resource Division, St. Petersburg Field Office for its federally authorized navigation and restoration projects in Alabama and Mississippi. These coordinations pertain to restoration, improvements and continued operations and maintenance projects. The latest coordination was in 2011/2012 for the Regional BA for all operations and maintenance navigation projects in Mobile District. In 2010 and 2009, the Mobile District consulted with your agencies for the construction of Pascagoula and Gulfport Harbors to their authorized project dimensions. In addition, the Bayou Caddy marsh restoration and Bay St. Louis projects were also coordinated as part of the MsCIP interim projects. Additional coordination for the MsCIP Comprehensive EIS occurred with both USFWS and NMFS, Protected Resource Division in 2009.

Other coordination resulted in the Regional Biological Opinion (RBO) for Dredging of Gulf of Mexico Navigation Channels and Sand Mining Areas Using Hopper Dredges, which was prepared by COE Galveston, New Orleans, Mobile, and Jacksonville Districts (Consultation Number F/SER/2000/01287) and dated November 19, 2003 and subsequent revisions.

Description of Listed Species under USFWS Jurisdiction

The USFWS, Southeast Region, Jackson, MS office, lists the following species under their purview as either threatened or endangered for Hancock, Harrison and Jackson Counties, MS. In addition, the Mobile County for AL list is included (Table 1).

Table 1. USFWS T & E list Hancock, Harrison Jackson Counties, MS and Mobile, AL 2012			
Species	Scientific Name	Status	County
Louisiana black bear	<i>Ursus americanus luteolus</i>	T	Jackson, Hancock, Harrison
West Indian manatee	<i>Trichechus manatus</i>	E	Jackson, Hancock, Harrison, Mobile
Piping plover	<i>Charadrius melodus</i>	TCH	Jackson, Hancock, Harrison, Mobile
MS sandhill crane	<i>Grus canadensis pulla</i>	ECH	Jackson
AL red-bellied turtle	<i>Psuedemys alabamensis</i>	E	Jackson, Harrison, Mobile
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	Jackson, Harrison
Gopher tortoise	<i>Gopherus polyphemus</i>	T	Jackson, Hancock, Harrison
Gulf sturgeon	<i>Acipenser oxyrhynchus desotoi</i>	TCH	Jackson, Hancock, Harrison, Mobile
Yellow-blotched map turtle	<i>Graptemys flavimaculata</i>	T	Jackson
MS gopher frog	<i>Rana capito sevosa</i>	E	Jackson, Harrison
Louisiana quillwort	<i>Isoetes louisianensis</i>	E	Jackson, Hancock, Harrison
Green sea turtle	<i>Chelonia mydas</i>	T	Jackson, Hancock, Harrison, Mobile
Loggerhead sea turtle	<i>Caretta caretta</i>	E	Jackson, Hancock, Harrison
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E	Jackson, Hancock, Harrison, Mobile
Ringed map turtle	<i>Graptemys oculifera</i>	T	Hancock
Inflated heelsplitter	<i>Potamilus inflatus</i>	T	Hancock
Leatherback sea turtle	<i>Dermochelys comacea</i>	E	Jackson, Hancock, Harrison, Mobile
Wood Stock	<i>Mycteria americana</i>	E	Mobile

Eastern indigo snake	<i>Drymarchon coraisc</i>	T	Mobile
T- Threatened, E- Endangered, CH-Critical Habitat			

The federally protected species under the USFWS jurisdiction, such as the Louisiana (LA) black bear, MS sandhill crane, red-cockaded woodpecker, gopher tortoise, eastern indigo snake, LA quillwort, MS gopher frog, gopher tortoise, AL red-bellied turtle, wood stock, Inflated heelspitter, ringed mapped turtle, and the yellow-blotched map turtle, would not be adversely impacted by the proposed restoration project because these species are not typically found in the project areas due to the lack of suitable habitat. It has been noted that several AL red-bellied turtle hatchlings have been found on Horn Island (Necaise personal comm., 2012). These turtles were perhaps introduced to the island by humans. However, the habitats on the MS barrier islands and DA-10 are not suitable to sustain a viable, healthy population of these species.

Bald eagles, not listed above, are no longer federally threatened or endangered, but are still protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. Bald eagles have been known to utilize the MS barrier islands for nesting since their reintroduction to the Mississippi Gulf Coast in the mid 1990s. During the 2011-2012 nesting season, there were 4 documented nests, one nest each on Cat Island and East Ship Island with 2 fledglings and 2 nests on Horn Island with 3 fledglings. Historically, there has also been a nest on Petit Bois Island, however, in 2011, it was not active (Hopkins personal comm., 2012). However, the nests locations are found within the interior areas of the islands well outside of the project area. The restoration project activities will take place in the nearshore and along the primary dune line and will be far removed from where bald eagle nesting or perching may occur. Therefore, bald eagles or their nests are not likely to be affected by the project restoration activities.

Manatees may be occasionally found in the shallow waters of the project area during the warmer months of the year. Given their slow-moving and low visibility nature, it is possible that manatees could wander into close proximity of the placement operations. However, to minimize contact and potential injury to manatees in shallow water/placement areas, the Manatee Construction Conservation Measures as specified by the USFWS will be observed.

Species of Concern

Of particular concern in this BA are the species that may likely occur within the project vicinity which include: piping plover and its designated critical habitat under USFWS jurisdiction, and loggerhead, leatherback, Kemp's ridley, and green sea turtles and the Gulf sturgeon/designated critical habitat under NMFS jurisdiction in the water/marine systems and USFWS jurisdiction on land/riverine systems, respectively. Other shorebirds, such as the red knot, snowy plover, Wilson's plover, various species of terns, and black skimmer, protected under the Migratory Bird Act are also addressed below because of particular concerns. Furthermore, the USFWS is pursuing listing the red knot under Section 7 of the Endangered Species Act.

Piping Plovers

The piping plover is a small, pale-colored North American shorebird. The bird's light sand-colored plumage blends in with the sandy beaches and shorelines that are its primary habitat. It weighs 1-2 ounces (43-63 grams) and is 6-6 ½ inches (17-18 centimeters) long. During the breeding season, the legs are bright orange and the short stout bill is orange with a black tip. There are two single dark bands, one around the neck and one across the forehead between the eyes. Plumage and leg color help distinguish this bird from other plovers. The female's neck band is often incomplete and is usually thinner than the male's neck band. In winter, the bill turns black, the legs remain orange but pale, and the black plumage bands on the head and necks are lost. Chicks have speckled gray, buff, and brown down, black beaks, orange legs, and a white collar around the neck. Juveniles resemble wintering adults and obtain their adult plumage the spring after they fledge.

Historically, piping plovers bred across three geographic regions. These regions include: the United States and Canadian Northern Great Plains from Alberta to Manitoba and south to Nebraska; the Great Lakes beaches; and the Atlantic coastal beaches from Newfoundland to North Carolina. Currently, piping plovers live in an area similar to their historical range,

although the numbers of those breeding in the Great Lakes region have decreased significantly since the 1930s. The Great Lakes breeding population is now found mainly in Michigan, with one pair nesting in Wisconsin. Generally, piping plovers favor open sand, gravel, or cobble beaches for breeding. Breeding sites are generally found on islands, lake shores, coastal shorelines, and river margins.

Other Shorebirds

Red Knots

Red knots (*Calidris cantus*) a species of the sandpiper shorebird, have been observed wintering on the majority of the barrier islands, especially Cat island and Petit Bois in few numbers. Similar wintering habitat requirements to the piping plover exist for red knots.

Other various species of shorebirds such as snowy plover, Wilson's plover, various species of terns, black skimmer, and others have been documented to utilize the project area and mainland beaches for nesting and feeding. However, an assessment of native and migratory shorebirds within the project area, and any impacts to shorebirds are discussed in the MsCIP Supplemental EIS.

Critical Habitat Boundaries for Ship Island Restoration

Within the Ship Island restoration area, there are designated critical habitat for piping plovers and Gulf sturgeon. Of the 1,500 acres of the proposed placement area at Camille Cut and East Ship Island, approximately 820 acres of the 2002 USFWS designated piping plover critical habitat are located within the proposed project footprint; however, only approximately 139 acres of this currently lies above mean lower low water (MLLW) within the construction limits. For Gulf sturgeon, approximately 980 acres are located within the boundaries of 2003 NMFS designated Gulf sturgeon critical habitat; currently approximately 1,366 acres within the construction project limits lie below mean high water (MHW). Critical habitat boundaries of the piping plover and Gulf sturgeon are shown in Figures 15-17.

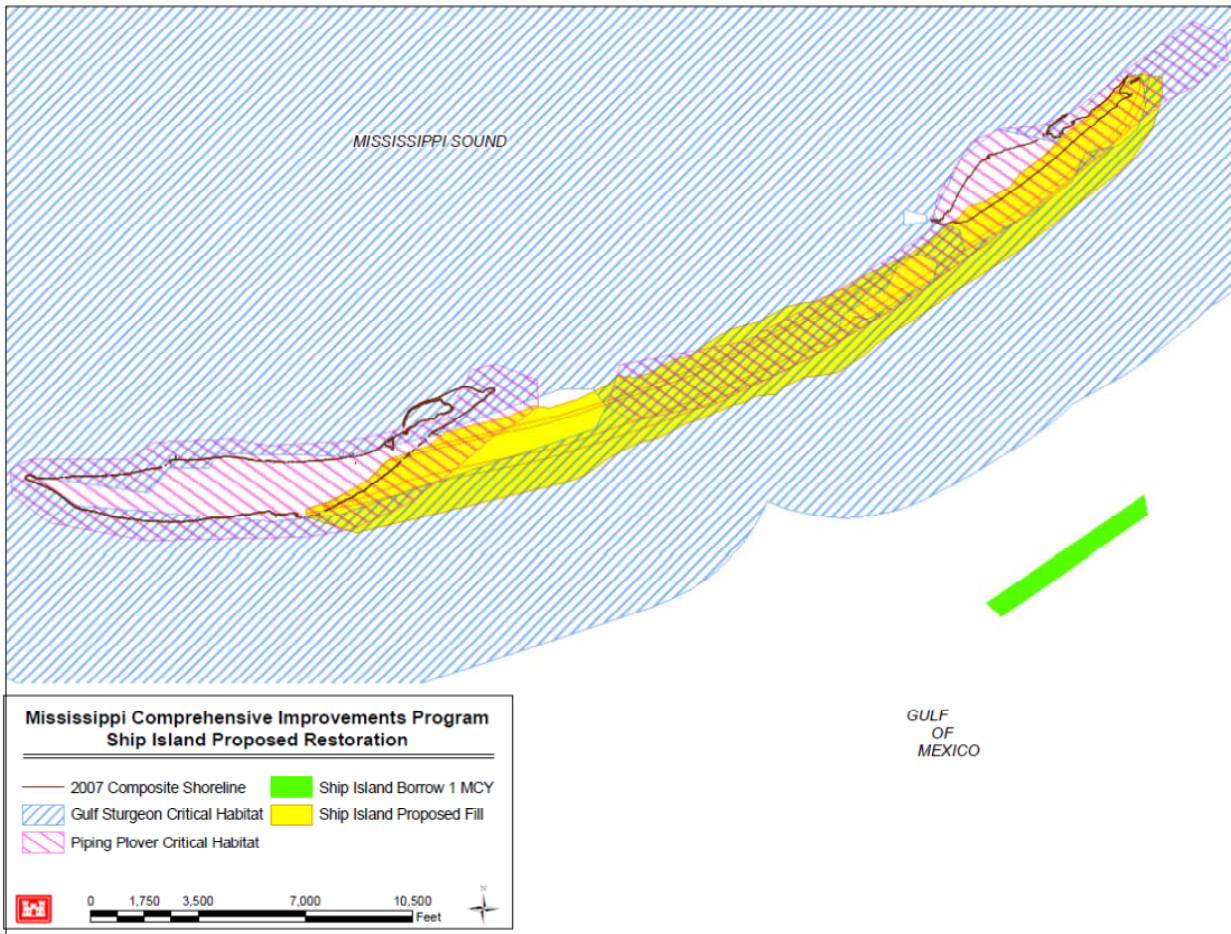


Figure 15. Critical Habitat boundaries for Ship Island Restoration Area

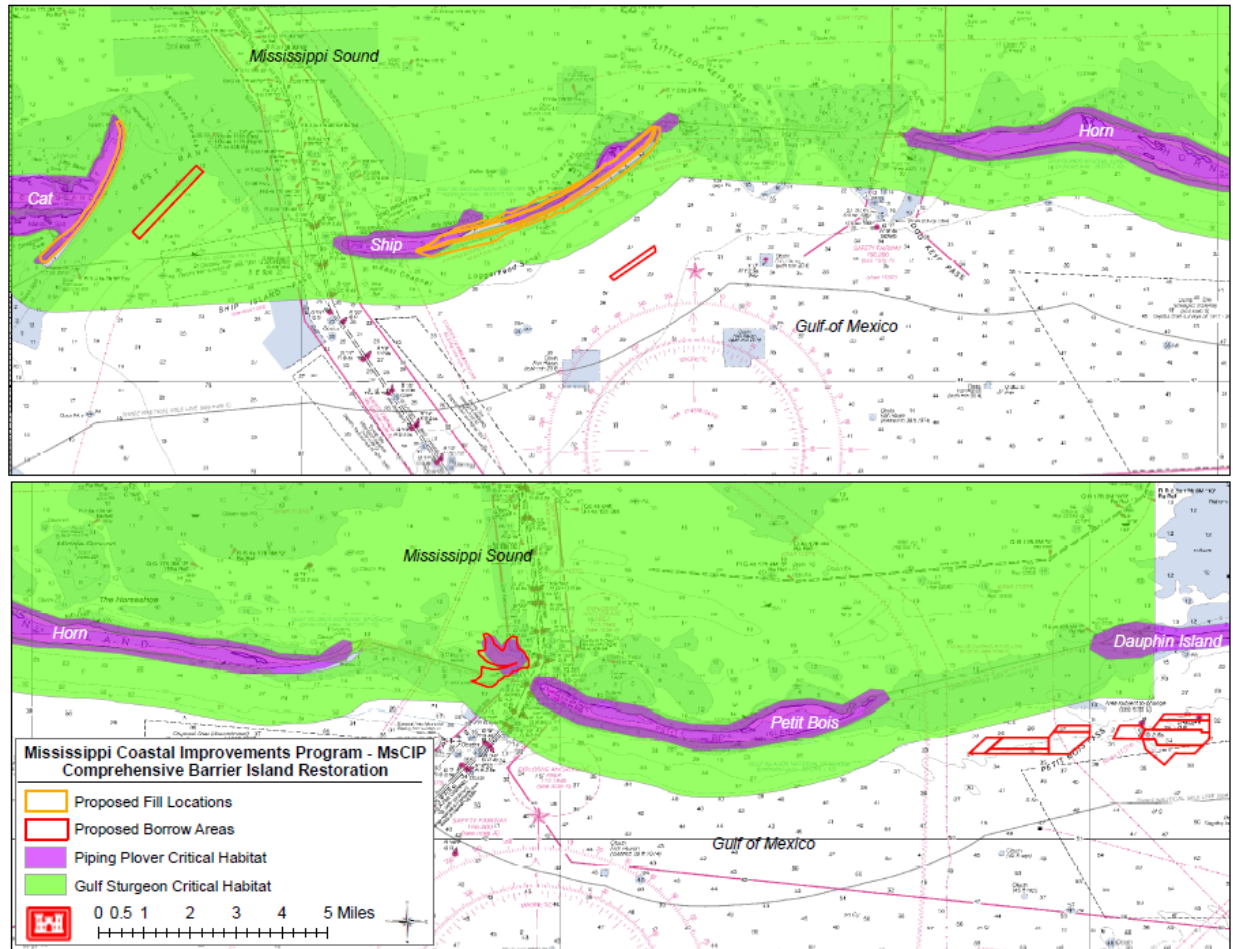


Figure 16. Critical Habitat Boundaries for Entire Project Area

Critical Habitat for Borrow Areas

The Ship Island borrow area is outside of critical habitat for designated piping plovers and Gulf sturgeon (Figure 16). The site at its closest location is approximately 4,000 ft seaward of designated Gulf sturgeon critical habitat.

Likewise, the Petit Bois borrow areas are submerged and outside of designated critical habitat areas for both Gulf Sturgeon and piping plover. The site at its closest location is approximately 1,000 ft seaward of designated Gulf sturgeon critical habitat.

Cat Island restoration area is located within critical habitat for Gulf sturgeon and Piping plover. The Cat Island borrow area is only located within gulf sturgeon critical habitat. The portion of restored area that is in the 2003 designated Gulf sturgeon critical habitat boundary is approximately 45 acres. In addition, the 305 acres of restored area is located within the 2002 designated Piping plover critical habitat; however, only approximately 99 acres within the constructed project limits currently lie above MLLW (Figure 16).

However, the DA-10 borrow area is located within piping plover and Gulf sturgeon critical habitat. It contains approximately 355 acres of designated Gulf sturgeon critical habitat; however, approximately 170 acres of this currently lie below MHW. In addition, approximately 240 acres of the 2002 designated piping plover critical habitat are located within the proposed project footprint; however, only approximately 112 acres of this currently lie above MLLW. Critical habitat boundaries of the Piping plover and Gulf Sturgeon are shown in Figures 16 and 17.

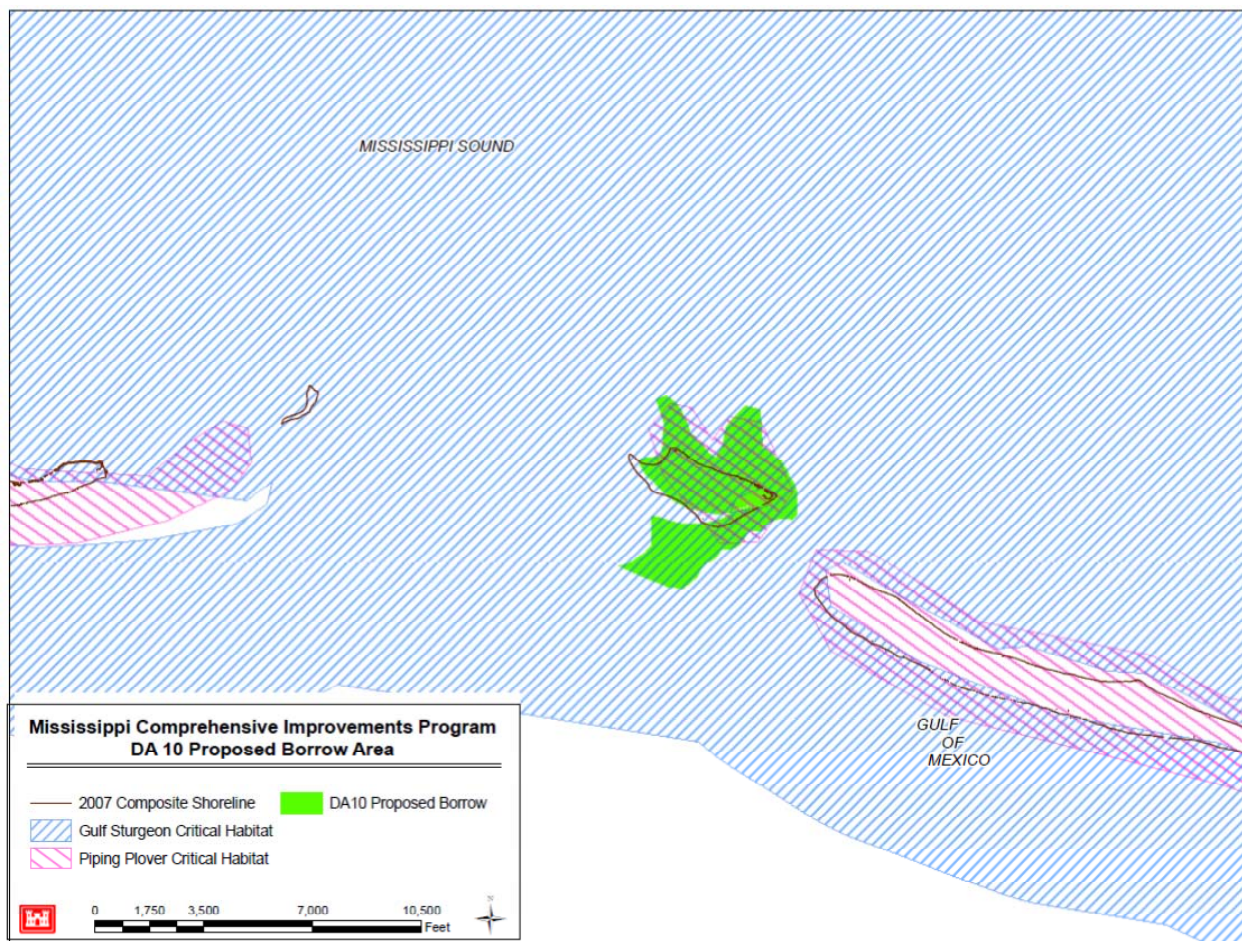


Figure 17. DA-10 (Sand/Spoil Island) Critical Habitat Boundaries

Piping Plover Critical Habitat

The project area is located within piping plover critical habitat, MS Unit 14. The final rule designating critical habitat for the wintering population of the piping plover was published in the Federal Register on July 10, 2001.

The primary constituent elements for the piping plover wintering habitat are those habitat components that are essential for the primary biological needs of foraging, sheltering, and roosting, and only those areas containing these primary constituent elements within the designated boundaries are considered critical habitat. The primary constituent elements are found in geologically dynamic coastal areas that support or have the potential to support such as intertidal beaches and flats and the sparsely vegetated back beach areas. Important components of intertidal flats include sand and or mud flats with no or sparse emergent vegetation. Critical habitat for MS-14 extends to the MLLW.

Piping plovers winter in coastal areas of the United States from North Carolina to Texas (TX). piping plovers begin arriving on the wintering grounds in July, with some late-nesting birds arriving in September. Behavioral observations of piping plovers on the wintering grounds suggest that they spend the majority of their time foraging (Nicholls and Baldassarre 1990; Drake 1999a, 1999b). Of the birds located on the United States wintering grounds, past censuses found that 89 percent were found on the Gulf Coast and eight percent were found on the Atlantic Coast. All piping plovers are considered threatened species under the Endangered Species Act when on their wintering grounds.

Breeding and wintering plovers feed on exposed wet sand in wash zones; intertidal ocean beach; wrack lines; washover passes; mud-, sand-, and algal flats; and shorelines of streams, ephemeral ponds, lagoons, and salt marshes by probing for invertebrates at or just below the surface. They use beaches adjacent to foraging areas for roosting and preening. Small sand dunes, debris, and

sparse vegetation within adjacent beaches provide shelter from wind and extreme temperatures (USFWS). Primary prey for piping plovers includes worms, various crustaceans, insects, and occasionally bivalve mollusks. Many of the coastal beaches traditionally used by piping plovers for nesting, feeding, and roosting have been lost to commercial, residential, and recreational developments. Also, developments near beaches provide food that attracts increased numbers of predators such as raccoons, skunks, and foxes. Water level manipulation along the major rivers may also lead to loss of breeding habitat. In order to recover the piping plover and remove it from the endangered species list, threats to reproductive success at breeding grounds must be addressed. Availability of quality foraging and roosting habitat in the regions where this species winters is necessary in order to insure that an adequate number of adults survive to migrate back to breeding sites and successfully nest.

Surveys for piping plovers on Mississippi barrier islands and mainland beaches indicate a mid-winter period when most of the birds are winter residents and a spring – fall migration when many more birds move through the islands staying for only a short time. During the migration, these areas serve as refueling spots on the long migratory journey. Within the project area, piping plovers are known to congregate primarily along the tidal flats and tips of West and East Ship Islands, and at Petit Bois, Horn, Cat Islands. A survey for the 2009 migratory period was conducted, in which approximately 24-34 piping plovers on Petit Bois, Horn and West and East Ship Islands (Zdravkovic, 2009) were counted. However, higher numbers of plovers were observed for Cat, West, and East Ship Islands during the 2010-11 migratory period (Necaise, person comm., 2012). Wintering period surveys have shown numbers in 20-45 count range for the MS barrier islands.

During the 2008-09 wintering period, piping plovers were surveyed from Boca Chica, Texas to Marco Island, FL (Maddock, 2010). Over a 9-day period, the MS mainland and barrier islands were observed. A maximum of 41 birds were observed on Cat Island, 24 on East Ship, 25 on West Ship, 29 on Horn, and 14 on Petit Bois. Moderate numbers of piping plovers were counted on the mainland beaches. Maddock observed higher frequencies of plovers use on areas that had large exposed flats, overwash areas, or newly created inlets.

In a 2011 wintering survey, the majority of birds were recorded at East Ship, Cat and Horn Islands; and of the three, Cat Island had the most, with 45 birds (Winstead, personal comm., 2012). In addition, a 2012 survey noted at least 38 piping plovers on Cat Island, 55 on East Ship Island, 15 on Petit Bois, 3 on West Ship Island, and 32 on Horn Island (Winstead, personal comm., 2012). Also, piping plovers are regularly observed on DA-10, although, their frequency of use has not been well-documented.

Sea Turtles

Loggerhead Sea Turtles

Biology

The loggerhead sea turtle is a medium to large turtle. Adults are reddish-brown in color and generally 31 to 45 inches in shell length with the record set at more than 48 inches. Loggerheads weigh between 170 and 350 pounds with the record set at greater than 500 pounds. Young loggerhead sea turtles are brown above and whitish, yellowish, or tan beneath, with three keels on their back and two on their underside.

Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Gulf of Mexico, Pacific, and Indian Oceans. This species may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, and the mouths of large rivers. Loggerhead sea turtles are considered turtles of shallow water. Juvenile loggerheads are thought to utilize bays and estuaries for feeding, while adults prefer waters less than 165 ft deep (Nelson 1986). Aerial surveys suggest that loggerheads (young and adults) in U.S. waters are distributed in the following proportions: 54% in the southeast U.S. Atlantic, 29% in the northeast U.S. Atlantic, 12% in the eastern Gulf of Mexico, and 5% in the western Gulf of Mexico. During aerial surveys of the Gulf of Mexico, the majority (97 percent) of loggerheads was seen off the east and west coasts of Florida (FL) (Fritts 1983). Most were observed around mid-day near the surface, possibly related to surface basking behavior (Nelson 1986). Although loggerheads were seen off the coast of AL, MS, and LA, they were 50 times more abundant in FL than in the western Gulf. The majority of the sightings were in the summer (Fritts et al.

1983). An individual tagged in Perdido Bay, AL was recaptured one year later only about a mile from the original capture site.

Loggerhead turtles are essentially carnivores, feeding primarily on sea urchins, sponges, squid, basket stars, crabs, horseshoe crabs, shrimp, and a variety of mollusks. Their strong beak-like jaws are adapted for crushing thick-shelled mollusks. Although loggerhead sea turtles are primarily bottom feeders, they also eat jellyfish and mangrove leaves obtained while swimming and resting near the sea surface. Presence of fish species, such as croaker in stomachs of stranded individuals may indicate feeding on the by-catch of shrimp trawling (Landry, 1986). Caldwell et al. (1955) suggest that the willingness of the loggerhead to consume any type of invertebrate food permits its range to be limited only by the presence of cold water.

As loggerheads mature, they travel and forage through nearshore waters until their breeding season, when they return to the nesting beach areas. The majority of mature loggerheads appear to nest on a two or three year cycle. Major nesting beaches for loggerheads include the Sultanate of Oman, southeastern United States, and eastern Australia. Within the U.S., this species nests from TX to Virginia, although the major nesting concentrations are found along the Atlantic coast of FL, Georgia, South Carolina, and North Carolina. About 80 percent of all loggerhead nesting in the southeastern U.S. occurs in six FL counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties).

Nesting in Project Area

Nesting in the northern Gulf outside of FL occurs primarily on the Chandeleur Islands in LA and to a lesser extent on adjacent Ship, Horn, and Petit Bois Islands in MS (Ogren 1977). Ogren (1977) reported a historical reproductive assemblage of sea turtles, which nested seasonally on remote barrier beaches of eastern LA, MS, and AL. These sea turtles have historically nested on MS's barrier islands (e.g., Ship, Horn, Petit Bois), situated about 19 km south of the mainland (Carr et al. 1982). The more recent occurrences of sea turtles nesting on the MS barrier islands have been documented by the NPS. From 1990- 2011, loggerhead sea turtle nesting and/ or false crawls have been documented at several barrier islands (Cat, West and East Ship, Horn, and Petit Bois). Among the barrier islands, most of the nesting occurred on Petit Bois and Horn Islands,

with few nesting documented on the other islands. There was one nest documented on East Ship Island (1992), two nests on Cat Island (1998), 16 nests on Horn Island (1998), and 12 nests on Petit Bois Island (1998). For the 2012 nesting season, there were several documented nests on East, and West Ship Island and Cat Island. A total of 4 nests were documented on West Ship, with 3 nests located on the southern shoreline and 1 nest on the northern shoreline (Hopkins personal comm., 2012). Likewise, a total of 3 nests were observed by Hopkins on the southern shoreline of East Ship Island. There were 3 confirmed nests and one potential nest on Cat Island (Necaise personal comm., 2012). In addition, four confirmed nests were reported on the MS mainland, including one on Deer Island (Coleman personal comm., 2012) and several on Petit Bois and Horn Islands.

Green Sea Turtle

Biology

The green sea turtle is mottled brown in color. The name is derived from the greenish fat of the body. The carapace is light or dark brown. It is sometimes shaded with olive, often with radiating mottled or wavy dark markings or large dark brown blotches. This species is considered medium to large in size for sea turtles with an average length of 36 to 48 inches. The record was set at about 60 inches in length. Its weight ranges from about 250 to 450 pounds with the record at more than 650 pounds. The upper surfaces of young green turtles are dark brown, while the undersides are white.

Although green sea turtles are found worldwide, this species is concentrated primarily between the 35° North and 35° South latitudes. Green sea turtles tend to occur in waters that remain warmer than 68° F; however, there is evidence that they may be buried under mud in a torpid state in waters to 50° F (Ehrhart 1977; Carr et al. 1979).

This species migrates often over long distances between feeding and nesting areas (Carr and Hirth 1962). During their first year of life, green sea turtles are thought to feed mainly on jellyfish and other invertebrates. Adult green sea turtles prefer an herbivorous diet frequenting shallow water flats for feeding (Fritts et al. 1983). Adult turtles feed primarily on seagrasses, such as *Thalassia testudinum*. This vegetation provides the turtles with a high fiber content and

low forage quality (Bjorndal 1981a). Caribbean green sea turtles are considered by Bjorndal (1981b) to be nutrient-limited, resulting in low growth rate, delayed sexual maturity, and low annual reproductive effort. This low reproductive effort makes recovery of the species slow once the adult population numbers have been severely reduced (Bjorndal 1981). In the Gulf of Mexico, principal foraging areas are located in the upper west coast of FL (Hirth 1971). Nocturnal resting sites may be a considerable distance from feeding areas, and distribution of the species is generally correlated with grassbed distribution, location of resting beaches, and possibly ocean currents (Hirth 1971).

Nesting

Major nesting areas for green sea turtles in the Atlantic include Surinam, Guyana, French Guyana, Costa Rica, the Leeward Islands, and Ascension Island in the mid-Atlantic. Historically in the U.S., green turtles have been known to nest in the FL Keys and Dry Tortugas. These turtles primarily nest on selected beaches along the coast of eastern FL, predominantly Brevard through Broward Counties. The turtles are not known to nest on the MS coast or barrier islands, but could be found feeding in the seagrass beds in nearshore waters. However, nesting has occurred in AL, and therefore it is possible in MS.

In the southeastern U.S., nesting season is roughly June through September. Nesting occurs nocturnally at 2, 3, or 4-year intervals. Only occasionally do females produce clutches in successive years. Estimates of age at sexual maturity range from 20 to 50 years (Balazs 1982; Frazer and Ehrhart 1985) and they may live over 100 years. Immediately after hatching, green turtles swim past the surf and other shoreline obstructions, primarily at depths of about 8 inches or less below the water surface, and are dispersed both by vigorous swimming and surface currents (Balzas 1980). The whereabouts of hatchlings to juvenile size is uncertain. Green turtles tracked in TX waters spent more time on the surface, with less submergence at night than during the day, and a very small percentage of the time was spent in the federally maintained navigation channels. The tracked turtles tended to utilize jetties, particularly outside of them, for foraging habitat (Renaud et. al. 1993).

Kemp's Ridley Turtle

Biology

The Kemp's ridley occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean with occasional individuals reaching European waters. Adults of this species are generally confined to the Gulf of Mexico, although some adults are sometimes found on the east coast of the U.S. Females return to their nesting beach about every other year with nesting occurring from April into July and usually limited to the western Gulf of Mexico. The mean clutch size for this species is about 100 eggs per nest and an average of 2.5 nests per female per season.

Immature turtles have been found along the eastern seaboard of the U.S. and in the Gulf of Mexico, including the MS Sound. In the Gulf, studies suggest that immature turtles stay in shallow, warm, nearshore waters in the northern Gulf until cooling waters force them offshore or south along the FL coast (Renaud 1995). Little is known of the movements of the post-hatching stage (pelagic stage) within the Gulf. Studies have indicated that this stage varies from 1 to 4 or more years and the immature stage lasts about 7 to 9 years (Schmid and Witzell 1997). The maturity age of this species is estimated to be 7 to 15 years.

Nesting

Kemp's ridley sea turtles are regularly seen in the MS Sound, and although no nesting has been documented, they could potentially nest on the MS barrier islands. Immature Kemp's ridleys have been incidentally captured by recreational fishermen at MS fishing piers. In 2012, almost 200 Kemp's ridleys were captured and rehabilitated (Coleman personal comm., 2012). Nests have been documented on Santa Rosa Island in the Florida District of the Gulf National Seashore Along the gulf coast. In addition, nesting is being reestablished in Texas through conservation programs; however, its primary nesting area is near Rancho Nuevo in Tamaulipas, Mexico (Rothschild, 2004).

Leatherback Sea Turtle

Biology

The leatherback sea turtles are the largest of all sea turtles. These turtles may reach a length of about 7 ft and weigh as much as 1,600 pounds. The carapace is smooth and gray, green, brown, and black. The plastron is yellowish white. Juveniles are black on top and white on the bottom.

This species is highly migratory and is the most pelagic of all sea turtles (NMFS and USFWS 1992). They are commonly found along continental shelf waters (Pritchard 1971; Hirth 1980; Fritts et al. 1983). Leatherback sea turtles' range extends from Cape Sable, Nova Scotia, south to Puerto Rico and the U.S. Virgin Islands. Leatherbacks are found in temperate waters while migrating to tropical waters to nest (Ross 1981). Distribution of this species has been linked to thermal preference and seasonal fluctuations in the Gulf Stream and other warm water features (Fritts et al. 1983). General decline of this species is attributed to exploitation of eggs (Ross 1981).

Leatherback sea turtles are omnivorous. They feed mainly on pelagic soft-bodied invertebrates, such as jellyfish and tunicates. Their diet may also include squid, fish, crustaceans, algae, and floating seaweed. Highest concentrations of these prey animals are often found in upwelling areas or where ocean currents converge.

Nesting

Nesting of leatherback sea turtles is nocturnal with only a small number of nests occurring in the Florida portion of the Gulf of Mexico from April to late July (Pritchard 1971; Fuller 1978; Fritts et al. 1983). There is very little nesting in the U. S except in the western Atlantic, where leatherback and hawksbill primarily nest at sites in the Caribbean, with isolated nesting on FL beaches (Gunter 1981, Rothschild, 2004). However, leatherback sea turtles have been occasionally seen feeding in the drift lines of jelly fish in the Mississippi Sound and the Gulf waters surrounding the Mississippi barrier islands (Hopkins, personal comm., 2012).

Leatherback sea turtles prefer open access beaches possibly to avoid damage to their soft plastron and flippers. Unfortunately, such open beaches with little shoreline protection are vulnerable to beach erosion triggered by seasonal changes in wind and wave direction. Thus, eggs may be lost when open beaches undergo severe and dramatic erosion. The Pacific coast of Mexico supports the world's largest known concentration of nesting leatherbacks.

Hawksbill Sea Turtle

Biology

The hawksbill sea turtle is the second smallest sea turtle and is somewhat larger than the Kemp's ridley. The hawksbill sea turtle is small to medium size with a very attractively colored shell of thick overlapping scales. The overlapping carapace scales are often streaked and marbled with amber, yellow, or brown. Hawksbill turtles have a distinct, hawks-like beak. The name of the turtle is derived from the tapered beak and narrow head.

Hawksbill sea turtles are highly migratory species. These turtles generally live most of their life in tropical waters, such as the warmer parts of the Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea (Carr 1952 and Witzell 1983). FL and TX are the only states where hawksbills are sighted with any regularity (NMFS and USFWS 1993). Juvenile hawksbills are normally found in waters less than 45 ft in depth. They are primarily found in areas around coral reefs, shoals, lagoons, lagoon channels and bays with marine vegetation that provides both protection and plant and animal food. Hawksbills can tolerate muddy bottoms with sparse vegetation unlike the green turtles. They are rarely seen in LA, AL, and MS waters.

Nesting

Hawksbills nest throughout their range, but most of the nesting occurs on restricted beaches, to which they return each time they nest. These turtles are some of the most solitary nesters of all the sea turtles. Depending on location, nesting may occur from April through November (Fuller et al. 1987). Hawksbills prefer to nest on clean beaches with greater oceanic exposure than those preferred by green sea turtles, although they are often found together on the same beach. The nesting sites are usually on beaches with a fine gravel texture. Hawksbills have been found in a variety of beach habitats ranging from pocket beaches only several yards wide formed between

rock crevices to a low-energy sand beach with woody vegetation near the waterline. These turtles tend to use nesting sites where vegetation is close to the water's edge.

Description of Listed Species under NMFS Jurisdiction

The NMFS, Protected Resource Division, St. Petersburg Field Office lists the following species under their purview as either threatened and/or endangered that may occur within the area (Table 2).:

Table 2. NMFS T&E list		
Species	Scientific Name	Status
green sea turtle	<i>Chelonia mydas</i>	T
hawksbill sea turtle	<i>Eretmochelys imbricate</i>	E
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E
leatherback sea turtle	<i>Dermochelys coriacea</i>	E
loggerhead sea turtle	<i>Caretta caretta</i>	T
Gulf sturgeon (fish)	<i>Acipenser oxyrinchus desotoi</i>	T/CH
Smalltooth sawfish	<i>Pristis pectinata</i>	E
blue whale	<i>Balaenoptera musculus</i>	E
finback whale	<i>Balaenoptera physalus</i>	E
humpback whale	<i>Megaptera novaeangliae</i>	E
sei whale	<i>Balaenoptera borealis</i>	E
sperm whale	<i>Physeter macrocephalus</i>	E

The federally protected species under the NMFS jurisdiction, such as the blue whale, finback whale, humpback whale, sei whale, and sperm whale, are not considered in this BA as these species are unlikely to be found in the project area due to the shallowness of the project placement area in MS Sound. However, if the potential offshore borrow areas are utilized, whales could be sighted in the deeper offshore waters. It is likely that these whales, if within the borrow areas, would avoid the operations activities due to noise. Smalltooth sawfish are rare in the action area and the chances of the proposed action affecting them are discountable (F/SER/2010/01062). This species is not likely to be adversely affected. Of particular concern in this BA are the species that may likely occur within the project vicinity which include: loggerhead, leatherback, Kemp's ridley, hawksbill, and green sea turtles, and the Gulf sturgeon.

The project area is located within Gulf sturgeon (*Acipenser oxyrinchus desotoi*) critical habitat Unit 8, which consists of areas within Lake Pontchartrain (east of causeway), Lake Catherine, Little Lake, the Rigolets, Lake Borgne, Pascagoula Bay, and MS Sound systems in LA and MS, and sections of the state waters within the Gulf of Mexico as shown on Figure 4.

Species of Concern

Sea Turtles

(see previous descriptions in USFWS section)

Gulf Sturgeon

The NMFS and USFWS listed the Gulf sturgeon as a threatened species on September 30, 1991. The Gulf sturgeon, also known as the Gulf of Mexico sturgeon, is a subspecies of the Atlantic sturgeon. It is a large fish with an extended snout, vertical mouth, and with the upper lobe of the tail longer than the lower. Adults are 180 to 240 cm (71-95 inches) in length, with adult females larger than adult males. The skin is scale less, brown dorsally and pale ventrally and imbedded with 5 rows of bony plates.

Adult fish are bottom feeders, eating primarily invertebrates, including brachiopods, insect larvae, mollusks, worms and crustaceans. Gulf sturgeon are anadromous, with reproduction occurring in freshwater. Most adult feeding takes place in the Gulf of Mexico and its estuaries. The fish return to breed in the river system in which they hatched. Spawning occurs in areas of deeper water with clean (rock and rubble) bottoms. The eggs are sticky and adhere in clumps to snags, outcroppings, or other clean surfaces. Sexual maturity is reached between the ages of 8 and 12 years for females and 7 and 10 years for males.

Historically, the Gulf sturgeon occurred from the MS River to Charlotte Harbor, FL. It still occurs, at least occasionally, throughout this range, but in greatly reduced numbers. The fish is essentially confined to the Gulf of Mexico. River systems where the Gulf sturgeon are known to be viable today include the MS, Pearl, Pascagoula, Escambia, Blackwater, Yellow, Choctawhatchee, Apalachicola, and Suwannee Rivers, and possibly others.

Gulf Sturgeon Critical Habitat

NMFS and USFWS jointly designated Gulf sturgeon critical habitat on April 18, 2003 (68 FR 13370, March 19, 2003). The term “critical habitat” is defined in section 3(5)(A) of the Endangered Species Act (ESA) as (i) the specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. “Conservation” is defined in section 3(3) of the ESA as the use of all methods and procedures that are necessary to bring any endangered or threatened species to the point at which listing under the ESA is no longer necessary. Critical habitat for the Gulf sturgeon within the project vicinity is identified as Unit 8 (approximately 881,280 acres), Lake Pontchartrain, (east of causeway), Lake Catherine, Little Lake, the Rigolets, Lake Borgne, Pascagoula Bay, and MS Sound systems in LA and MS, and sections of the state waters within the Gulf of Mexico. The primary constituent elements essential for the conservation of the Gulf sturgeon are those habitat components that support foraging, water quality, sediment quality, and safe unobstructed migratory pathways.

This unit provides juvenile, subadult and adult feeding, resting, and passage habitat for Gulf sturgeon from the Pascagoula and the Pearl River subpopulations (68 FR 13395). One or both of these subpopulations have been documented by tagging data, historic sightings, and incidental captures as using Pascagoula Bay, the Rigolets, the eastern half of Lake Pontchartrain, Little Lake, Lake St. Catherine, Lake Borgne, MS Sound, within 1 nautical mile of the nearshore GOM adjacent to the barrier islands and within the passes (Reynolds, 1993; Morrow et al., 1998; and Ross et al., 2001). Substrate in these areas ranged from sand to silt, all of which contain known Gulf sturgeon prey items (Menzel, 1971; Abele and Kim, 1986; and American Fisheries Society, 1989).

Incidental captures and recent studies confirm that both Pearl River and Pascagoula River adult Gulf sturgeon winter in the MS Sound, particularly around barrier islands and passes (Reynolds, 1993, and Ross et al., 2009). Gulf sturgeon exiting the Pascagoula River move both east and

west, with telemetry locations as far east as Dauphin Island and as far west as Cat Island and the entrance to Lake Pontchartrain, LA (Ross et al., 2009). Tagged Gulf sturgeon from the Pearl River subpopulation have been located between Cat Island, Ship Island, Horn Island, and east of Petit Bois Island to the AL state line (Rogillio et al., 2002). Habitat used by Gulf sturgeon in the vicinity of the barrier islands is 6.2 to 19.4 ft deep (average 13.8 ft), with clean sand substrata (Heise et al., 1999 and Ross et al., 2001).

An ongoing Mobile District Gulf sturgeon monitoring effort at Ship Island is being conducted by U.S. Army Engineer Research and Development Center (ERDC). The objective is to characterize the seasonal occurrences and movements of the sturgeon around Ship Island and within Camille Cut.

In late Spring 2011, a total of 21 receivers were placed around 3 areas (western tip of West Ship Island, Camille Cut, and eastern tip of East Ship Island) and monitored for Gulf sturgeon detections. No detections were documented during this period. The receivers were placed in the same locations in September 2011, and remained in place through June 2012. A total of 13,720 detections from approximately 14 Gulf sturgeons that originated from 5 rivers (Pearl, Pascagoula, Escambia, Blackwater, and Yellow) were found at all three sites (Figure 18). However, the largest number of detections was found along the eastern side of East Ship Island (Figure 18) (ERDC, 2012).

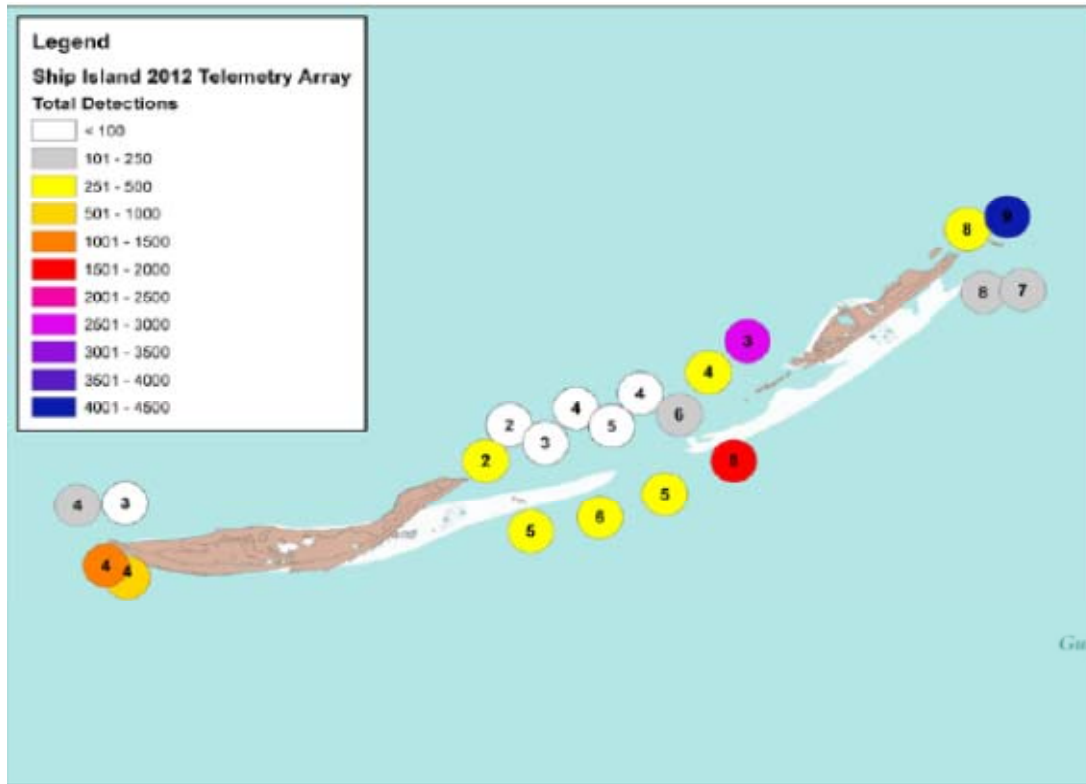


Figure 18. Number of sturgeon per total detections

Foraging: Unit 8 provides foraging habitat for the Gulf sturgeon. Generally, adults and subadults could be described as opportunistic benthivores typically feeding on benthic marine invertebrates including amphipods, lancelets, polychaetes, gastropods, shrimp, isopods, mollusks, and crustaceans. As Gulf sturgeon feed principally on benthic invertebrates, potential impacts to the foraging constituent element would be confined to possible impacts to the benthic community. Benthic samples taken within the MS barrier island passes, where Gulf sturgeon were located, were dominated by Florida lancelets, sand dollars, annelids, haustoriid amphipods, and mollusks, which are documented prey of large subadult and adult Gulf sturgeon (Ross et al. 2009).

Vittor and Associates, a contractor of the Mobile District, is conducting a similar ongoing study to identify benthic communities of the MS Sound and Gulf of Mexico, with a focus at MS barrier islands. For the study, there were three sampling periods, June and Sept 2010, and May 2011, and 636 samples collected, with taxa densities ranging from 257 to 10,206 individuals per square

meter. Results show that the benthic community within the project area provides suitable forage habitat for adult and subadult fish. A wide variety of benthic invertebrates were found in the placement and borrow sites, including polychaetes, chordates, nemerteans, gastropods, amphipods, and bivalves, but polychaete worms dominated majority of the sampling areas. However, taxa densities and richness was extremely variable between the sampling stations.

ERDC (2012) correlated the Gulf sturgeon locations with the abundance of eight principal prey benthic species and identified a direct relationship between the number and detections of Gulf sturgeon and the availability of primary prey, as shown in Figure 19, where the larger circles represent higher densities of those prey species. The sturgeons were found more frequently in the areas with the higher abundance of principal prey species. Further, Camille Cut and eastern side of Ship Island have relatively high overall abundances of these prey taxa compared to the west side of Ship Island (ERDC, 2012).

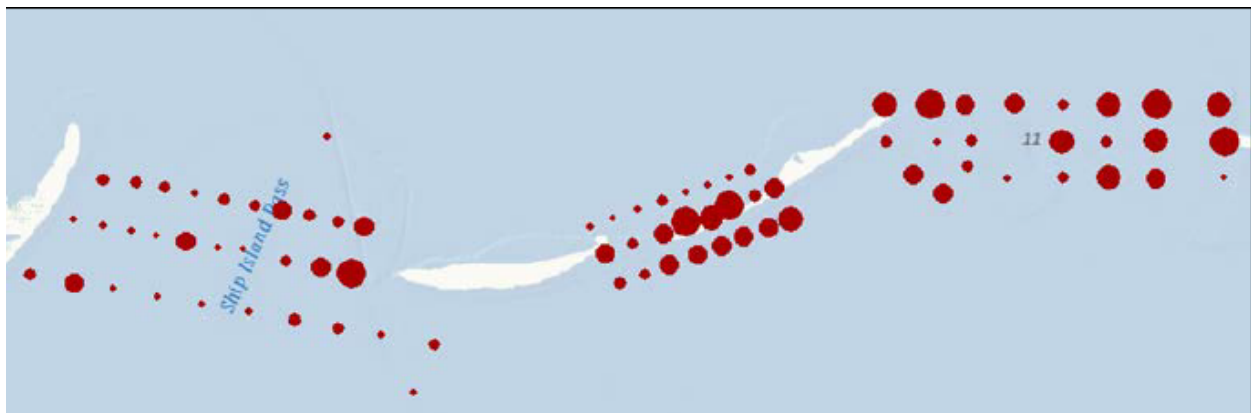


Figure 19. Densities of eight principal prey for sturgeon

Water Quality: The “water quality” constituent element is of concern to Gulf sturgeon critical habitat. Temperature, salinity, pH, hardness, turbidity, oxygen concentrations, and other chemical characteristics must be protected in order to preserved normal behavior, growth, and viability of all Gulf sturgeon life stages. If water quality is severely degraded, adverse impacts to Gulf sturgeon and its critical habitat may result. Water quality within the MS Sound is influenced by several factors, including the discharge of freshwater from rivers, seasonal climate changes, and variations in tide and currents. The primary driver of water quality is the rivers, including the Pascagoula River that feed into the Sound. Freshwater inputs provide nutrients and

sediments that serve to maintain productivity both in the Sound and in the extensive salt marsh habitats bordering the estuaries of the Sound. The salt marsh habitats act to regulate the discharge of nutrients to coastal waters and serve as a sink for pollutants. Suspended sediments enter the Sound from freshwater sources, but are hydraulically restricted due to the barrier islands. The barrier islands, combined with the Sound's shallow depth and mixing from wind, tides, and currents, promote re-suspension of sediments. These suspended sediments give MS Sound a characteristic brownish color (MDEQ, 2006).

Sediment Quality: The “sediment quality” constituent element is listed to ensure sediment suitable (i.e. texture and other chemical characteristics) for normal behavior, growth, and viability of all life stages. In addition, sediment quality is of a concern to support a viable benthic community in order to allow the Gulf sturgeon continual foraging of the area. The Mobile District has routinely conducted sediment analyses on its federally authorized navigation projects which include several within the MsCIP's barrier island restoration effort proximity. This material has been sampled using the protocols of the Inland and Ocean Testing manuals (EPA and USACE) and found to be suitable based on physical, chemical and biological parameters.

Migration Habitat: The “migration habitat” constituent element is concerned with ensuring safe unobstructed passage for the species. It is intended primarily for the more confined areas near the river mouths or the rivers themselves. Gulf sturgeon exiting the Pascagoula River move both east and west, with telemetry locations as far east as Dauphin Island and as far west as Cat Island and the entrance to Lake Pontchartrain, LA (Ross et al., 2001). Tagged Gulf sturgeon from the Pearl River subpopulation have been located between Cat Island, Ship Island, Horn Island, and east of Petit Bois Island to the AL state line (Rogillio et al., 2007, Ross et al. 2009). Gulf sturgeons occupy the coastal waters of MS beginning in October or November to March. They move offshore, primarily to the barrier island passes, to feed (Rogillio et al. 2007, Ross et. al 2009). Work by Rogillio et al (2009) and others indicate that Gulf sturgeon move along the nearshore area at depths of 10 m or less. A total of 71 tagged Gulf sturgeons were located in the MS Sound and adjoining barrier islands over a 5-yr study period (Ross et al., 2009). Winter telemetry locations of Gulf sturgeons from the Pascagoula and Pearl Rivers were primarily along

the barrier islands, and only four fish were found north of the barrier islands and south of the West Pascagoula River mouth (Ross et al. 2009). The spatial distribution of Gulf sturgeon within the marine environment was strongly nonrandom, but was highly structured, and likely caused by the distribution of preferred prey taxa (Ross et al. 2009). Of the fish located in the barrier island region, 93% were found in the passes between the islands, including the two small passes between Ship Island (Ross et al. 2009). The occurrence of Gulf sturgeon in the barrier island passes was consistent over the 5-yr period of study (Ross et al. 2009).

Similarly, preliminary data by ERDC (2012) indicates tagged sturgeons from five rivers, including the Pearl and Pascagoula Rivers, migrate from the rivers to the mainland shoreline, barrier islands and passes in search of food. There are five passes within the MS and AL barrier island chain, which include Ship Island Pass, Dog keys Pass, Little Dog keys Pass, Horn Island Pass, Petit Bois Pass. These passes provide adequate shallow, sandy areas where Gulf sturgeons have been documented to congregate and feed (Rogillio, et al. 2007; Ross, et al. 2009). As previously mentioned, the area east of East Ship Island (Little Dog Keys Pass) and the Camille Cut had the overall higher abundances of Gulf sturgeon compared to the area west of Ship Island (Ship Island Pass) (ERDC, 2012). Multiple detections of these fish within the barrier island passes, suggest these are feeding areas (this study; Rogillio et al. 2007; Ross et. al 2009, ERDC, 2012). Gulf sturgeon tagged in the Pascagoula and Pearl Rivers occupy the same marine feeding habitats (Ross et al. 2009).

Effects of Proposed Action

Sea Turtles

Effects Associated with Dredging Activities

The Proposed Action will utilize a combination of mechanical, hydraulic cutterhead and/or hopper dredges for borrow and placement activities. The existing Regional Biological Opinion on hopper dredging in the Gulf of Mexico waters have established that non-hopper type dredging methods have discountable effects on, or are not likely to adversely affect, currently listed sea turtles (I/SER/2006/02953; I/SER/2006/01096). Hydraulic or mechanical dredging is not known to take sea turtles. Sea turtles are highly mobile and will likely avoid the area due to

project activity and noise. Normal behavior patterns of sea turtles are not likely to be significantly disrupted by the project activities because of the short-term localized nature of the activities and the ability of sea turtles to avoid the immediate area. Sea turtles are not known to nest on the DA-10 borrow site, and there are no records of nesting.

A hopper dredge would likely be used to remove material from Petit Bois and Ship Island borrow areas. Hopper dredges are known to adversely impact federally-listed species (i.e. sea turtles and Gulf sturgeon) by entrainment in the suction dragheads. To reduce the possibility of protected species interactions, the Corps intends to have the dredge dragheads equipped with sea turtle deflector devices. In addition, 100% of the material dredged will pass through 4-inch screening boxes where it will be screened by a NMFS-approved observer for evidence of protected species interactions. There will be 100% observer coverage aboard the dredge (i.e. two observers) according to the RBO. The Corps will adhere to the terms and conditions of the RBO and will incorporate relocation trawling as described in the Reasonable and Prudent Measures of the RBO. These trawling relocation efforts are currently perceived as an effective method of protection for both sea turtles and Gulf sturgeon during hopper dredging projects where the species are likely to be present. As such, the Corps has no reason to anticipate that properly conducted trawling efforts as described in the Reasonable and Prudent Measures of the 2003 RBO would result in significant adverse impacts to the species. Considering the lack of potential effects by hydraulic dredges and the precautionary steps taken when utilizing a hopper dredge, we believe the proposed project will not jeopardize the continued existence of the species.

Effects Associated with Land-Based Construction Activities

To avoid and minimize potential impacts to nesting sea turtles, the Corps will conduct daily surveys during project construction for nest(s) and monitor the active construction areas for potential nesting activity throughout the nesting season (April 15 - November 30). A pre-construction survey would be done to document any existing nests as recommended in the Long-Term Monitoring Plan. If nests are discovered within the work area, nests would be relocated if possible, utilizing the USFWS, Jackson, MS field office guidelines for turtle nest relocations and the Long-Term Monitoring Plan developed as part of the MsCIP Barrier Island effort. However, although appropriate measures will be implemented to avoid impacts to nesting turtles, due to the

nature of the construction work at the point of closure, there could be unavoidable adverse impacts to a few nesting turtles within the project footprint, if nest relocations are not an option. The MS barrier islands are not known to have high occurrences of turtle nesting compared to the other Gulf shore areas of AL and FL. In 2012, there were between 3 to 4 loggerhead turtle nests documented on Cat, West and East Ship Islands, and there were several more on Petit Bois and Horn Islands. The potential adverse impacts to the species when compared to the overall benefits from restoring the island (i.e. restoring and sustaining nesting habitat) are far greater.

The restored Ship Island would add about 600 acres of beach habitat which the turtles will likely utilize for nesting. The newly restored beach would be suitable for nesting turtles since the compaction, gradation, and color of the borrowed sand would be similar to the existing beach. These types of restoration projects have been successful in providing suitable turtle nesting habitat in which the turtles use. Two examples, are the recent Deer Island Restoration Project and Harrison County Beach Restoration Project, both in Biloxi, MS, where there were turtle nests documented on the newly restored beach areas.

Gulf Sturgeon

The Project will likely utilize both a hydraulic cutterhead and hopper dredge for placement and dredging activities. The RBO on hopper dredging in the Gulf Of Mexico waters have established that non-hopper type dredging methods have discountable effects on, or are not likely to adversely affect, currently listed Gulf sturgeon (I/SER/2006/02953; I/SER/2006/01096). Hydraulic or mechanical dredging is not known to take Gulf sturgeons. Gulf sturgeons are highly mobile and will likely avoid the area due to project activity and noise. Normal behavior patterns of Gulf sturgeon are not likely to be significantly disrupted by the project placement and dredging activities because of the short-term localized nature of the activities and the ability of Gulf sturgeon to avoid the immediate area.

However, hopper dredges are known to adversely impact federally-listed species (i.e. sea turtles and Gulf sturgeon) by entrainment in the suction dragheads. The Corps will adhere to the RBO terms and conditions. Considering the lack of potential effects by hydraulic dredges and the

precautionary steps taken when utilizing a hopper dredge, we do not anticipate the proposed project will jeopardize the continued existence of the species.

Gulf Sturgeon Critical Habitat

Unit 8 of Gulf sturgeon critical habitat encompasses a total of approximately 881,424 acres. The placement activities would result in a loss of approximately 511 acres of Gulf sturgeon critical habitat within the Camille Cut and East Ship placement areas, and approximately 168 acres would be lost at Cat Island. However, there would be beneficial impacts from borrow activities at DA-10 that would result in the restoration of approximately 102 acres of Gulf sturgeon critical habitat to the system. For the entire project area, there would be an overall net loss of 573 acres (Table 3). Within Unit 8, of the total 881,424 acres, approximately 573 acres of designated critical habitat would be directly lost. The action area constitutes approximately 0.06 percent of the total area within Unit 8.

As previously mentioned, beneficial impacts to Gulf sturgeon critical habitat would result from the removal of sand at DA-10. It should be noted that the area would continue to be used for placement of dredged material from the Pascagoula Harbor Navigation Project to provide sediment to the down drift barrier islands.

Table 3. Critical Habitat Impact Summary					
Piping Plover Critical Habitat					
	Total Project Area (acres)	Area within 2002 Desingated PPCH Boundaries* (acres)	Existing (2010) Usable Piping Plover Habitat within the constructed project limits (acres above MLLW) ^{***1}	Usable Piping Plover Habitat within the constructed project limits after Equilibrium (acres above MLLW)	Habitat Change Gain or Loss (acres)
Restoration Areas					
<i>Camille Cut</i>	1500	820	139	738	599
<i>East Ship Island</i>					
<i>Cat Island</i>	305	305	99	261	162
Borrow Areas					
<i>Ship Island</i>	85	0	0		0
<i>DA 10</i>	360	240	112	10	-102
<i>Petit Bois East</i>	715	0	0		0
<i>Petit Bois West</i>	550	0	0		0
<i>Cat Island</i>	270	0	0		0
Total Area	3785	1365	350	1009	660
Gulf Sturgeon Critical Habitat					
	Total Project Area (acres)	Area within 2003 Desingated GSCH Boundaries** (acres)	Existing (2010) Usable Gulf Sturgeon Habitat within the construction project limits (acres below MHW) ^{***1}	Usable Gulf Sturgeon Habitat within the constructed project limits after Equilibrium (acres below MHW)	Habitat Change Gain or Loss (acres)
Restoration Areas					
<i>Camille Cut</i>	1500	980	1366	855	-511
<i>East Ship</i>					
<i>Cat Island</i>	305	45	212	44	-168
Borrow Areas					
<i>Ship Island</i>	85		0	0	0
<i>DA 10</i>	360	345	258	360	106
<i>Petit Bois East</i>	715		0	0	0
<i>Petit Bois West</i>	550		0	0	0
<i>Cat Island</i>	270	270	270	270	0
Total Area	3785	1640	2106	1529	-573
[*] Note acres are obtained from Geographic Information System (GIS) layers obtained from http://Criticalhabitat.fws.gov/crithab					
^{**} Note acres are obtained from GIS layers obtained from http://www.nmfs.noaa.gov/gis/data/critical.htm#se					
^{***} Using current MHW and MLLW line					
¹ shoreline based on 2010 Lidar data, except at Cat Island, which is from 2007					

Water Quality

Dredging within the borrow sites and subsequent placement at Camille Cut and Ship Island will create some degree of turbidity in excess of the natural condition. This turbidity is generated by the fines fraction of the sediments. However, the material to be dredged is predominantly sandy

in nature with low fines percentage therefore. Impacts from sediment disturbance during these operations are expected to be temporary, minimal, and similar to conditions seen during routine frontal storm events. It is expected during dredging, placement, and equilibrium of the project that suspended particles will settle out within a short time frame, with no measurable effects on water quality, especially in that this is predominantly sandy material.

During dredging and placement operations, turbidity levels would be monitored. Conservative preliminary modeling revealed that state water quality criteria could be exceeded by turbidity levels. This modeling effort assumed dredging in an area that had material with the greatest concentration of fines (~13%). It also assumed all of these fines would be retained in the material (i.e. no losses from that initial dredging event) and placed at the placement site with that same concentration of fines (~13%). However, during those operations, some percentage of the fines will be lost at the borrow area and another percentage would be lost at the placement area so exceedance of state water quality criteria could occur but likely only for a short period (i.e. hours to a few days). Temperature, salinity, and density profiles would be affected as a result of water column mixing during dredging and placement activities. Profiles would return to previous conditions following completion of the operations. Any impacts to profiles would be temporary and minor. No significant long term changes in temperature, salinity, Ph, hardness, oxygen content and other chemical characteristics are expected. The Corps does not expect measurable impacts to Gulf sturgeon critical habitat as a result of water quality impacts related to the proposed action.

Sediment Quality

The Corps does not expect measurable impacts to Gulf sturgeon critical habitat as a result of sediment impacts related to the proposed action.

The material from the borrow areas consists primarily of fine to coarse grained sand with less than 10% fines. The mean grain size at the borrow sites ranges from 0.22 to 0.33 mm and is within a similar range to the material at the placement sites which range between (0.29 to 0.33 mm). This material is consistent with that of the shorelines of the MS Barrier Islands. In addition, the Mobile District has routinely conducted sediment analyses of its federally

authorized navigation projects, which include several within the MsCIP's barrier island restoration effort proximity. This material has been sampled using the protocols of the Inland and Ocean Testing manuals (EPA and Corps) and found to be suitable based on physical, chemical and biological parameters. The percent fines within the project area are outside the areas of contamination.

In addition, as a result of the Deepwater Horizon Oil Spill, the Corps conducted statistically random sediment testing on all borrow and placement areas in June 2010. Grab samples were taken and tests for TPHs were conducted. Concentrations of TPH of the tested samples were below method/laboratory detection limits for over 98% of the samples. Random samples within the sampling grid were found to contain concentrations of TPH but there was no pattern to the presence. Based on conversations with U.S. Coast Guard (USCG) and the lead of the Operational Science Agency Team (OSAT3), the likelihood of the presence of oil in offshore borrow sites is low. However it has been reported that DA-10 has had repetitive tar ball issues. The Corps is coordinating any work activities at DA-10 and the barrier island restoration in general with the USCG and the OSAT3. Should the Corps discover the presence of any oil substance, including tar balls, we will notify the USCG and other appropriate agencies for appropriate action and clean-up activities.

The presence of tar balls on DA-10 is not expected to result in significant impacts to any resources using that area or the placement area. Tar balls are composed primarily of sand mixed with degraded oil product. These features are formed when the degraded oils become entrained within the surf zone and adhere to the sand particles. The repetitive movement within the surf zone causes the oil-sand particles to coalesce into various size and shape balls. The toxicity of these materials has been tested and due to the degraded nature of the oils is very low.

Prey Abundance

Past and current observances have recorded subpopulations found within the Pearl, Pascagoula, Yellow, Escambia, and Blackwater Rivers utilize the project area located within and around the barrier islands. The NMFS, in previous biological opinions that addressed impacts associated with maintenance activities within MS Sound, concluded the actual number of the species

utilizing the project area for foraging is likely few based on the small population sizes. Current monitoring results by ERDC has shown a total of at least 14 tagged Gulf sturgeons originating from 5 rivers utilizing the Camille Cut opening, and ends of Ship island for staging and foraging.

The non-motile benthic community within the footprint of dredging, pipeline corridors and placement areas would be lost as a result of project. Dredging impacts would be localized and affect the benthic community within the immediate footprint of the project. However, borrow sites and temporary pipeline corridors should recover and recolonize with similar benthic species within 1-year of completion of the project (Saloman, 1982). Long-term impacts to the benthic species are expected to occur from the placement activities; however, as quantified previously, the filled areas within the placement sites at Cat, Ship and Camille Cut are very small relative to the dimension of Unit 8.

With the closure of Camille Cut, it is anticipated that the Gulf sturgeons will redistribute and continue to feed within the adjacent passes, i.e. Little Dog Keys pass and Ship Island Pass, which are currently utilized by sturgeons for feeding (ERDC, 2010). Further east in the MS Sound are Dog keys Pass, Little Dog keys Pass, Horn Island Pass, Petit Bois Pass, which provide additional adequate areas where Gulf sturgeons have been documented to congregate and feed (Rogillio, et al. 2007; Ross, et al. 2009). The Corps anticipates the minor footprint reduction of benthic prey available within placement areas and the temporary reduction from dredging activities at the borrow sites is not expected to significantly affect the critical habitat's ability to support the Gulf sturgeon's conservation in the short or long term. Once Camille Cut is closed, Gulf sturgeons will still continue to feed around the shoreline perimeter of the restored Ship Island.

Migratory Pathways

Within Unit 8, subadult and adult Gulf sturgeon move from the rivers through estuarine and marine areas to feeding areas. Unit 8 is known to support migratory pathways for Gulf sturgeon sub-populations (Pascagoula and Pearl Rivers). It is believed that Gulf sturgeon swim through the action area during intermittent inter-riverine movements. The species is known to utilize Camille Cut inlets as well as the other 5 passes (Ship Island, Dog keys, Little Dog keys, Horn

Island, Petit Bois) for feeding and congregating (Rogillio, et al. 2007; Ross, et al. 2009, ERDC, 2012).

In addition, these adjacent passes provide access for Gulf sturgeons to connect to the Gulf of Mexico. However, the loss of Gulf sturgeon critical habitat as a result of the barrier island restoration activities represents a small area in relation to the entire MS Sound, approximately 573 acres of 881,424 acres (0.06 percent). Historically, the area which is now known as Camille Cut, was Ship Island, and there was no passage between West and East Ship Island prior to 1969, pre Hurricane Camille. Therefore, this area was not historically used by Gulf sturgeons. The area of Camille Cut is also very shallow, compared to the adjacent passes. The average depth is approximately 5 ft NAVD within the cut. With the closure of the cut, Gulf sturgeons will utilize adjacent areas for pathways to the Gulf of Mexico. It is not likely that the project action would alter critical habitat due to changes in migration since both Horn Island pass and Dog Keys pass to the east remain unaffected by the action. Also, as previously quantified, this area is very small relative to the dimension of Unit 8 (approximately 0.06%). Given this information, no adverse impacts to migratory pathways are anticipated.

Piping Plover

Dredging and placement activities are not expected to adversely impact wintering piping plovers. Shorebird monitoring will be conducted as identified in the Long-Term Monitoring Plan. If disturbed by noise or human presence, plovers will usually relocate. These species are opportunistic and will utilize the other suitable adjacent barrier islands for feeding, roosting, and sheltering. Also, the locations used for sediment discharge could serve as an attractant to some species of birds due to the increase in potential food supply. Overall implementation of this restoration project would benefit piping plovers by providing several hundred acres of wintering habitat.

Piping Plover Critical Habitat

The restoration at Camille Cut and East Ship Island will benefit piping plovers, by restoring approximately 660 acres of wintering piping plover critical habitat. When the Cat Island portion

is constructed, this would create an additional 261 acres of piping plover usable critical habitat. The majority of the tips of the islands were purposefully avoided in the design to minimize impacts to bird habitat (Figure 20). However, there will be some minor temporary impacts associated with closing the cut and tying into the islands. Impacts would likely cause the area to be unavailable for birds during construction, but once construction is completed, the birds will likely return.

The use of the DA-10 borrow site was purposely designed to avoid the lower elevation areas along the southern shoreline, which are used by birds. Of the 60 acres to remain, approximately 10 acres is considered usable by piping plovers, with elevations from 4 to 5 ft and tidal flats along the perimeter. Nearly the entire island is designated as critical habitat; however, the portion of the island that will be removed (102 acres in Table 3), consists of elevations ranging upwards of 20+ feet, and are not preferred by the birds.

In addition, the littoral zone area, (Figure 7) will continue to be used for future placement of dredged material from maintenance of the Pascagoula Harbor Federal navigation channel. This material will be placed south of the existing DA-10 disposal area, and elevations for sand placement would not exceed approximately 3 feet above water. These areas would be used by the birds. The primary objective of shifting the location of future disposal is not to create bird habitat, but to feed sand into the system. Therefore, the area would be subject to erosion from storms and waves, but may periodically provide bird habitat from the continued maintenance disposal events.

Overall a total of approximately 660 acres of critical habitat will be restored from restoration efforts of the entire project, not including the additional potential habitat from future disposal activities at DA-10.



Figure 20. Ship Island Placement Area

Conservation Measures

The following conservation measures and conditions are provided for the dredging work within borrow and beach placement areas.

While hopper dredging equipment is being used, all operations will abide by the terms and conditions of the Gulf of Mexico RBO, November 19, 2003 and subsequent amendments. While pipeline dredging equipment is being used, in an effort to minimize adverse affects, the following measures will be observed: a) disengage dredging pumps when the cutter heads are not in the substrate to reduce entrainment of animals in the dredging equipment and b) monitor the dredge discharge as appropriate for turtle or fish carcasses or parts to document the occurrence of mortality due to dredging operations. Should such evidence occur, dredging operations will be suspended and proper authorities notified immediately.

The placement areas at Ship and Cat Island would be surveyed for nests throughout the nesting season as per the MsCIP Long-Term Monitoring Plan prior to the commencement of and during work. If nests are located in the construction area, those nests would be relocated if possible, by an authorized individual.

During turtle nesting season, project lighting will be limited to the immediate area of active construction, and will be minimal necessary to comply with USCG and Occupational Safety and Health Administration (OSHA) requirements.

Best management practices would be used to minimize impacts to adjacent biological resources during placement operations. Best management practices to be used include, monitoring turbidity levels to ensure compliance with water quality permit, restoring any vegetation disturbed, and ensuring borrow material is compatible with the native beach sand.

Conclusions

Based upon the findings of this BA, the Corps has found that the proposed action “may affect” the following species under the purview of the NMFS:

Loggerhead Sea Turtle – Known to nest in project area. The operations associated with this project may affect, but is not likely to adversely affect and will not jeopardize the continued existence of the species. However, although appropriate measures will be implemented to avoid impacts to nesting turtles, due to the nature of the construction work, there could be unavoidable

adverse impacts to a few nesting turtles within the project footprint, if nest relocations are not an option. The potential adverse impacts to the species, are far greater outweighed by the benefits of the project. The project would create beneficial impacts by providing additional suitable nesting habitat for turtles.

Green Sea Turtle – Not known to nest in MS, but could possibly nest. The operations associated with this project may affect, but is not likely to adversely affect and will not jeopardize the continued existence of the species.

Leatherback Sea Turtle – May be seen in the area, but are not known to nest in the project area. The operations associated with this project may affect, but is not likely to adversely affect and will not jeopardize the continued existence of the species.

Kemp's Ridley Sea Turtle- Are seen in the project area and are known to nest in the area, particularly in Harrison County, Biloxi, MS. The operations associated with this project may affect, but is not likely to adversely affect and will not jeopardize the continued existence of the species.

Hawksbill Sea Turtle- Rarely seen in the project area and are not known to nest. The operations associated with this project may affect, but is not likely to adversely affect and will not jeopardize the continued existence of the species.

Gulf Sturgeon - May affect, but not likely to adversely affect and will not jeopardize the continued existence of the species.

Gulf Sturgeon Critical Habitat - The borrow and placement areas fall within Gulf sturgeon critical habitat; however, it has been determined that the activities associated with this project will not adversely modify designated Gulf sturgeon critical habitat.

Piping Plover- The borrow and placement activities associated with this project may affect, but is not likely to adversely affect and will not jeopardize the continued existence of the species.

Piping Plover Critical Habitat. - It has been determined that the disposal and placement activities associated with this project will not adversely modify designated Piping Plover critical habitat. The net benefit of the project would greatly outweigh the adverse impact.

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SEPTEMBER 13, 2013

**ADDENDUM TO BIOLOGICAL ASSESSMENT
FOR THE
MISSISSIPPI COASTAL IMPROVEMENTS PROGRAM (MsCIP)
BARRIER ISLAND RESTORATION
MISSISSIPPI SOUND
HANCOCK, HARRISON AND JACKSON COUNTIES, MISSISSIPPI AND MOBILE
COUNTY, ALABAMA**

DATED NOVEMBER 2012

Purpose: This addendum addresses the changes to the Tentatively Selected Plan which eliminates the plan to use sand material from DA-10 (Sand Island) as a borrow source. This change would result in modification of the description of construction process and would affect the quantities of critical habitat affected for gulf sturgeon and piping plover for the overall project. The revisions to the Biological Assessment are included below.

Construction Phases for Ship Island Restoration

The overall barrier island restoration project will likely be constructed in five contract phases. Work (i.e. sand placement) at Camille Cut and East Ship Island will be constructed in four (4) phases using a combination of hydraulic dredges, hopper dredges, bottom dump scows, hydraulic unloaders, and mechanical equipment, such as bulldozers and trackhoes. The total construction time to execute all four phases is approximately 3 years and the details of each phase are provided below. The fifth phase will be the planting of Camille Cut.

The restoration work at Camille Cut and East Ship Island would be conducted in five phases:

1. The first phase consists of the construction of an initial berm across Camille Cut. The berm would have a crest width of approximately 500 feet and a top elevation of +5 feet NAVD88. The sand for Phase 1 (approximately 7 mcy) would likely be dredged from the Petit Bois Pass - OCS and Horn Island Pass areas, hauled approximately 20 to 35 miles, and placed directly in Camille Cut. Work would take approximately 1 year to complete.
2. The second phase consists of restoring the southern shoreline of East Ship Island (Figures 3-17 and 3-18). The restoration berm would have a constructed crest width of approximately 1,200 feet and a top elevation of +6 feet NAVD88. Sand for Phase 2 (approximately 6 mcy) would be dredged from a combination of Horn Island Pass and Petit Bois Pass (Alabama, Mississippi, and OCS). The maximum amount of available sand from each borrow site consists of 1.2 mcy at Ship Island, 3.2 mcy at Horn Island Pass, 1.8 mcy at Petit Bois Pass MS, 16 mcy at Petit Bois Pass East and West, and 4.9 mcy at Petit Bois OCS. The sand would be hauled approximately 25-38 miles and placed along the southern shoreline of East Ship Island. This phase is estimated to begin approximately 6 months after the commencement of Phase 1 and would take approximately 16 months to complete.
3. Phase 3 consists of placing the remaining sand from the Horn Island and/or Petit Bois Pass (Alabama, Mississippi, and OCS) areas in Camille Cut (approximately 6 mcy). The Camille Cut berm, after completion of Phase 3, would be built to a crest width of approximately 1,100 feet with a top elevation of +7 feet NAVD88. A portion of the berm (upper-center) would be left void and would not be completely filled until Phase 4. Work under Phase 3 would begin immediately upon completion of Phase 1 and is estimated to take approximately 1 year to complete.
4. The fourth phase would commence after the completion of Phase 3 and consists of placing approximately 1 mcy of sand in the unfilled area of the upper-center portion of the Camille Cut berm. The sand for Phase 4 would be dredged from the Ship Island borrow area and the work is estimated to take approximately 3 months to complete. Due

to its finer grain size, the sand from the Ship Island borrow area would be used as a cap on the Camille Cut fill section to facilitate establishment of beach vegetation.

5. Phase 5 of the project consists of planting the Camille Cut restoration berm with native dune vegetation. This work would begin upon completion of Phase 4 and is estimated to take approximately 1 year to complete.

Piping Plover Critical Habitat

The restoration at Camille Cut and East Ship Island will benefit piping plovers, by restoring approximately 599 acres of wintering piping plover critical habitat. When the Cat Island portion is constructed, this would create an additional 162 acres of piping plover usable critical habitat. The majority of the tips of the islands were purposefully avoided in the design to minimize impacts to bird habitat. However, there will be some minor temporary impacts associated with closing the cut and tying into the islands. Impacts would likely cause the area to be unavailable for birds during construction, but once construction is completed, the birds will likely return.

In addition, the littoral zone area will continue to be used for future placement of dredged material from maintenance of the Pascagoula Harbor Federal navigation channel. This material will be placed southwest of the existing DA-10 disposal area, and elevations for sand placement would not exceed approximately 5 feet above water. These areas may be used by the birds. The primary objective of shifting the location of future disposal is not to create bird habitat, but to feed sand into the system. Therefore, the area would be subject to erosion from storms and waves, but may periodically provide bird habitat from the continued maintenance disposal events.

Overall a total of approximately 762 acres of critical habitat will be restored from restoration efforts of the entire project, not including the additional potential habitat from future disposal activities at DA-10 (Table 4).

Gulf Sturgeon Critical Habitat

Unit 8 of Gulf sturgeon critical habitat encompasses a total of approximately 881,424 acres. The placement activities would result in a loss of approximately 511 acres of Gulf sturgeon critical habitat within the Camille Cut and East Ship placement areas, and approximately 168 acres would be lost at Cat Island. For the entire project area, there would be an overall net loss of 679 acres (Table 4). Within Unit 8, of the total 881,424 acres, approximately 679 acres of designated critical habitat would be directly lost. The action area constitutes approximately 0.08 percent of the total area within Unit 8.

It should be noted that the area below DA-10 would be used for future placement of dredged material from the Pascagoula Harbor Navigation Project to provide sediment to the down drift barrier islands.

Table 4. Critical Habitat Impact Summary
Piping Plover Critical Habitat

	Total Project Area (acres)	Area within 2002 Desingated PPCH Boundaries* (acres)	Existing Usable Piping Plover Habitat within the constructed project limits (acres above MLLW)***	Usable Piping Plover Habitat within the constructed project limits after Equilibrium (acres above MLLW)	Habitat Change Gain or Loss (acres)
Restoration Areas					
<i>Camille Cut</i>	1500	820	139	738	599
<i>East Ship Island</i>					
<i>Cat Island</i>	305	305	99	261	162
Borrow Areas					
<i>Ship Island</i>	83	0	0		0
					0
<i>Petit Bois East</i>	715	0	0		0
<i>Petit Bois West</i>	550	0	0		0
<i>Cat Island</i>	270	0	0		0
Total Area	3423	1125	238	999	762

Gulf Sturgeon Critical Habitat

	Total Project Area (acres)	Area within 2003 Desingated GSCH Boundaries** (acres)	Existing Usable Gulf Sturgeon Habitat within the construction project limits (acres below MHW)***	Usable Gulf Sturgeon Habitat within the constructed project limits after Equilibrium (acres below MHW)	Habitat Change Gain or Loss (acres)
Restoration Areas					
<i>Camille Cut</i>	1500	980	1366	855	-511
<i>East Ship</i>					
<i>Cat Island</i>	305	45	212	44	-168
Borrow Areas					
<i>Ship Island</i>	83		0	0	0
<i>Petit Bois East</i>	715		0	0	0
<i>Petit Bois West</i>	550		0	0	0
<i>Cat Island</i>	282	282	282	282	0
Total Area	3435	1307	1860	1181	-679

*Note acres are obtained from Geographic Information System (GIS) layers obtained from <http://Criticalhabitat.fws.gov/crihab>

**Note acres are obtained from GIS layers obtained from <http://www.nmfs.noaa.gov/gis/data/critical.htm#se>

*** Using current MHW and MLLW line