

**Appendix M**  
**Wetland Statement of Findings**

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1            *Am Statement of Findings for Executive*  
2                            *Order 11990 (Wetland Protection)*

3                            **Mississippi Coastal Improvements**  
4    **Program (MsCIP)**  
5            **Comprehensive Barrier Island Restoration**  
6                            **Harrison, and Jackson Counties, MS**

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11            Recommended: \_\_\_\_\_  
12            Daniel R. Brown, Superintendent, Gulf Islands National Seashore            Date

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16            Certified for Technical Adequacy and Service-wide Consistency:  
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18            \_\_\_\_\_  
19            Chief, Water Resources Division            Date

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24            Approved: \_\_\_\_\_  
25            Director, Southeast Region            Date

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## Introduction

The U.S. Army Corps of Engineers (USACE), Mobile District, proposes to restore the Mississippi barrier islands in the Gulf of Mexico through the placement of sand within the National Park Service (NPS) Gulf Islands National Seashore (GUIS), Mississippi units. This action is proposed to help address the consequences of Hurricane Katrina, other hurricanes in the Gulf of Mexico, and past navigational dredging activities that have altered sediment transport along the islands and contributed to substantial erosion and island land loss. The Tentatively Selected Plan is part of the Mississippi Coastal Improvements Program (MsCIP) Comprehensive Plan (USACE, 2009), which was developed to support the long-term recovery of Hancock, Harrison, and Jackson Counties, Mississippi from the devastation caused by these hurricanes, as well as to help lessen the impacts of future storms.

The USACE, Mobile District, has prepared a Supplemental Environmental Impact Statement (SEIS) in cooperation with several other federal, state, and local agencies to evaluate potential environmental impacts associated with the comprehensive restoration of the Mississippi barrier islands. The MsCIP SEIS is tiered from the MsCIP Comprehensive Plan and Integrated Programmatic Environmental Impact Statement prepared in June 2009 (USACE, 2009).

This Wetland Statement of Findings (SOF) and the SEIS provide sufficient information for assessing the potential wetland impacts of the Tentatively Selected Plan within GUIS to meet NPS requirements under Director's Order (DO) #77-1 (Wetland Protection). Executive Order (EO) 11990 (No Net Loss of Wetlands) requires the NPS, and other federal agencies, to evaluate the likely impacts of actions in wetlands. Director's Order #77-1 establishes NPS procedures for implementing EO 11990, as set forth in Procedural Manual #77-1: Wetlands Protection (NPS, 2012a). This Wetland SOF documents compliance with the NPS wetland protection procedures.

We consider the Corps phrase "Tentatively Selected Plan" equivalent to what DO #77-1 refers to as the "Preferred Alternative". The NPS DO #77-1 states that we should complete the WSOF on the "preferred alternative". Therefore, we are not using the phrase "proposed action," but will keep the wording of the phrase "Tentatively Selected Plan" to be consistent with the SEIS use of the phrase and remain consistent with our DO #77-1.

## Tentatively Selected Plan

The Tentatively Selected Plan for comprehensive barrier island restoration includes the following key construction elements (Section 3.1.1 of MsCIP SEIS):

- Restoration of Ship Island including Sand Placement in Camille Cut and Replenishment of East Ship Island. Borrow Site Option 4 would use a total of approximately 19 mcy of sand dredged from five borrow areas for Camille Cut closure and restoration of East Ship Island. Borrow sites estimated quantities include: Ship Island (1.2 mcy), Petit Bois Pass – Alabama (8.5 mcy), Petit Bois Pass – Mississippi (1.7 mcy), Petit Bois Pass – OCS (4.1 mcy), and Horn Island Pass (3.2 mcy).
- Beach-front and Dune Placement of Sand Along Eastern Shoreface of Cat Island
- Management of Future Dredged Material Placement from Pascagoula Federal Navigation Project.

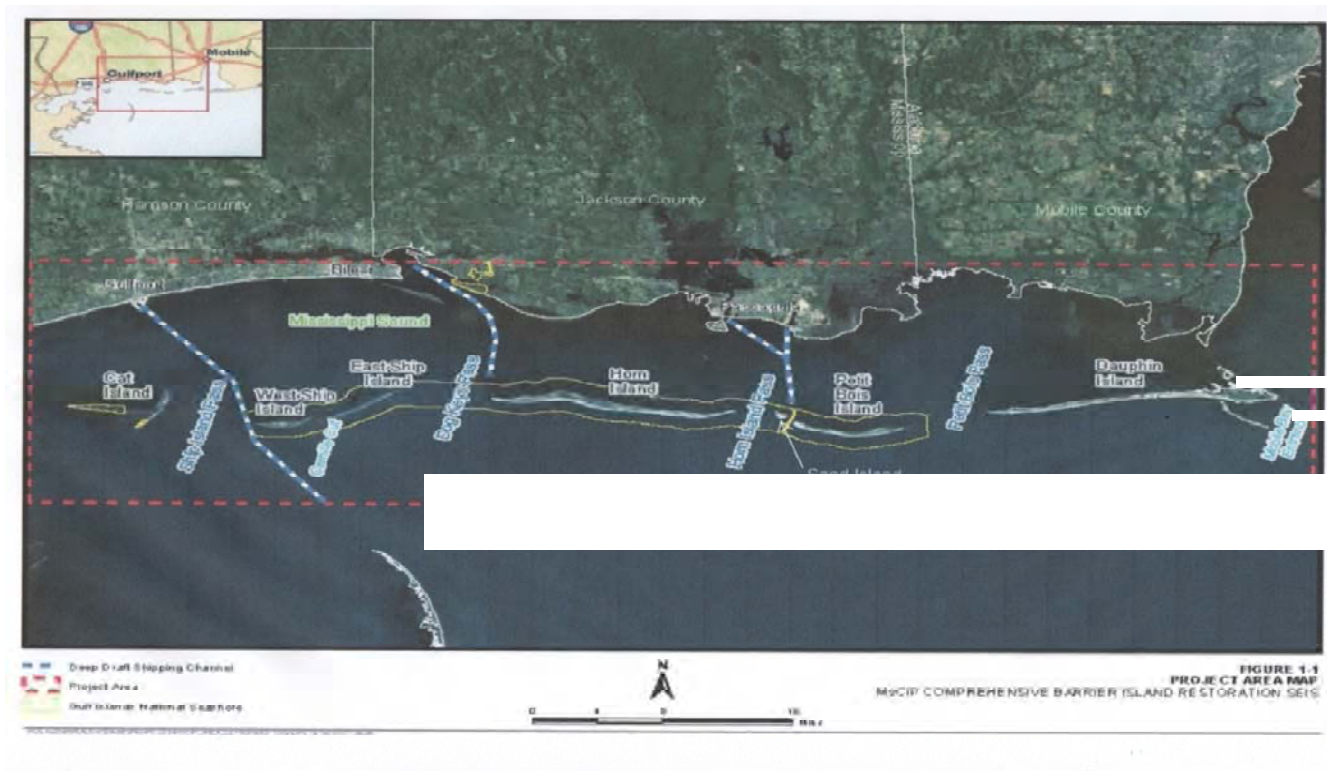


Figure 1-1 Project Area Map

## **Restoration of Ship Island including Sand Placement in Camille Cut and Replenishment of East Ship Island**

The tentatively selected plan proposes restoration of Ship Island including the closure of Camille Cut and restoration of the southern shoreline of the current East Ship Island located within the congressionally authorized boundaries of GUIIS. A summary of the detailed design is provided in the SEIS in Section 3.2.2.4. The restoration of Ship Island would be accomplished in 5 phases over an approximately 2.5-year period as described in Section 3.2.3.3 of the MsCIP Barrier Island Restoration SEIS.

### **Direct Sand Placement in Camille Cut**

In order to restore East Ship Island and West Ship Island to a single elongated barrier island, the approximately 3.5-mile-long Camille Cut would be filled with approximately 13.5 mcy of sand (Fig. 1.2). Sand used to fill Camille Cut would come from a combination of borrow sites described below. The newly formed island segment would be constructed as a low-level dune system connecting West Ship Island and East Ship Island. The constructed Camille Cut template would be approximately 1,100 feet wide. The fill would tie into the existing island shoreline just below the frontal dune line at an elevation of approximately +7 feet North American Vertical Datum of 1988 (NAVD88) with a 1V:12H (vertical : horizontal) slope to the MHWL and an approximate 1V:20H slope below the MHWL. The fill at its western and eastern ends would tie into the existing berm along the eastern end of West Ship Island and transition into the East Ship Island placement. Sand from potential borrow sites would likely be dredged with a hopper dredge, hauled and then pumped directly onto the site. The direct placement of sand to fill Camille Cut would be a one-time event.

Depending on funding, as sand placement in Camille Cut progresses, the newly created island segment would be planted with native dune vegetation, including sea oats and/or other grasses and forbs, to restore stable dune habitat. The planting would include dune grasses in groupings along all shorelines within the newly created beach.

### **Replenishment of East Ship Island**

The restoration of East Ship Island consists of the placement of approximately 5.5 mcy of sand along the southern shoreline. In addition to restoring the southern shoreline, placement of sand in this area would add material to the littoral system of Ship Island which would support the overall replenishment of the system as identified in the sediment budget analysis and sediment transport modeling. The construction template for the restored southern shoreline consists of an average berm crest width of approximately 1,200 feet at an elevation of +6 feet NAVD88 with a 1V:12H to 1V:20H slope from the seaward edge of the berm to the toe of the fill (intersection with the existing bottom).

Sand used to restore East Ship Island would come from a combination of borrow sites described below. Sand from potential borrow sites would likely be dredged with a hopper dredge or cutter head dredge, transported to the placement vicinity, and then pumped directly onto the site. Placement of the material would be concurrent with the fill of Camille Cut.

The combined Camille Cut and East Ship Island equilibrated fill template would encompass approximately 1,500 acres, of which approximately 800 acres would be above the MHWL. The placement of sand would be a one-time event.



## **Beach-front and Dune Placement of Sand Along Eastern Shoreface of Cat Island**

The tentatively selected plan proposes dune and beach restoration on Cat Island, including revegetation, through the direct placement of approximately 2 mcy of sand on the eastern beach fronting Cat Island. The recommended design was largely based on restoring the eastern shoreface of Cat Island to 1998 conditions. The construction template would include an average dune crest width of 40 feet at an elevation of approximately +7.5 feet NAVD88. The construction berm would have an average constructed crest width of approximately 250 feet at an elevation of roughly +5 feet NAVD88 with a 1V:12H to 1V:20H slope from the seaward side of the berm to the toe of the fill. Direct placement of sand on the eastern beach would restore the island habitats, thereby enhancing the island's ability to absorb energy from westward-propagating waves. The construction profile is expected to begin to adjust rapidly through the erosion of the upper profile and mimic the natural nearshore profile once it reaches equilibrium, typically within a year timeframe. The equilibrium design berm width averages approximately 175 to 200 feet. The total equilibrated fill area encompasses approximately 305 acres. Sand used in the restoration of Cat Island would come from an approximately 282-acre sand deposit in an area about 2 miles long and 0.2-mile wide centered about 1.25 miles off the eastern shoreline of Cat Island. The borrow site would be located east of the placement area and outside of the GUIIS boundaries. Geophysical survey data indicate that extensive sand deposits are available in this area (SEIS Appendix A). The borrow site would be dredged to a depth of approximately 3 to 5 feet to minimize disruption of habitat and to minimize the effects of wave refraction over the site after excavation.

The majority of placement of sand on Cat Island is located outside the congressionally authorized boundaries of GUIIS.

## **Management of Littoral Placement of Future Dredged Material from Pascagoula Federal Navigation Channel**

The tentatively selected plan proposes reorientation of the existing Disposal Area 10 (DA-10) and the Littoral Zone Placement Site (LZA) for placement of suitable sandy material dredged from the Horn Island Pass portion of the Pascagoula Federal Navigation Channel located within the boundary of the Gulf Islands National Seashore. The intent of the reorientation is to ensure that placement of maintenance dredged material within the littoral zone best replicates natural sediment pathways in the system and minimizes potential adverse impacts to the surrounding area, while not increasing costs for operation and maintenance of the Pascagoula Federal Navigation Channel. The new configuration of the disposal areas would still include DA-10, but placement of material is recommended further to the south and west of Sand Island along the shallow shoals exposed to the open Gulf waves. The areas between the extreme high water and the extreme low water of spring tides are considered marine intertidal wetlands under the Cowardin et al. 1979 classification system and are protected by Executive Order 11990 and NPS Director's Order 77-1: Wetland Protection. As currently defined, the USACE intends to dispose of future dredge material in open water beyond the marine intertidal wetlands. It is important to note that the area below the extreme low water of spring tides is not considered a wetland area under the Cowardin et al. 1979 classification system. If any future placements have the potential to affect marine intertidal wetlands as defined under the Cowardin et al. 1979 classification system, a revised NPS Wetlands Statement of Findings will also be required. Placement of dredged material within DA 10 and LZA, both above and below the mean high water line, will be conducted within NPS jurisdictional areas in accordance with 16 USC § 459h-5. NPS and the USACE will continue their significant positive collaboration for future activities within and adjacent to NPS jurisdictional areas.

## **Borrow Site Options for Ship Island Restoration**



Four combinations of borrow material were developed for use in the closure of Camille Cut and restoration of East Ship Island. These options utilize identical placement locations, design and engineering methods, and construction methods and phasing, but different combinations and portions of borrow area sites.

Borrow Site Option 4 would use a total of approximately 19 mcy of sand dredged from five borrow areas for Camille Cut closure and restoration of East Ship Island. Borrow sites and estimated quantities include: Ship Island (1.2 mcy), Petit Bois Pass – Alabama (8.5 mcy), Petit Bois Pass – Mississippi (1.7 mcy), Petit Bois Pass – OCS (4.1 mcy), and Horn Island Pass (3.2 mcy).

Borrow Site Option 4 was selected as the tentatively selected borrow site option. Borrow Site Options 1-3 are described in 3.4.2.1.1-3.4.2.1.1.4 of the SEIS. All four of these options are carried forward with detailed analysis in the SEIS.

## Description of Alternatives Considered and Analysis Process

The range of alternatives considered for site-specific implementation of Comprehensive Barrier Island Restoration are the No-Action Alternative, the Tentatively Selected Plan and alternatives considered for further consideration. Table 1-1 lists the range of alternatives considered and analyzed. These alternatives are described in Section 3.2 of the MScIP SEIS, including the borrow area, sand placement, and construction alternatives that were evaluated.

TABLE 1-1  
Range of Alternatives Considered for Comprehensive Barrier Island Restoration

Borrow Area Alternatives	Placement Area Alternatives
St. Bernard Shoals (PEIS)	Petit Bois Island Littoral Zone
Gulfport Channel	Ship Island Littoral Zone
Mississippi Sound	
Pascagoula DA 10	Camille Cut (PEIS)
Cat Island	East Ship Island Shoreline
Ship Island Pass	Cat Island Littoral Zone (PEIS)
Ship Island	Cat Island Eastern Beach
Dog Keys Pass	
Horn Island (multiple sites)	
Petit Bois Pass (multiple sites)	
Lower Tombigbee River Upland Sites	
Engineering and Design Alternatives	Construction Mixing Alternatives
Initial Camille Cut Placement Analysis (desktop analysis)	Offshore mixing of sand to be pumped directly into Camille Cut
Camille Cut 1,000-ft wide equilibrated berm placement with finer-grain sand (D50 from 0.2 to -.03 mm) and a nearshore feeder berm at East Ship Island	Onsite mixing of sand using dredges to achieve mixing during placement into Camille Cut
Camille Cut 700-ft wide equilibrated berm with more coarse sand (D50 = 0.32 mm), and 1,000-ft wide equilibrated berm for East Ship Island	Fine-grain core sand placement with coarse-grain sand cover.
	Capping of fine-grain sand by pumping separately directly into Camille Cut

## Borrow Area Alternatives

As detailed in Section 3.2.1 of the MsCIP SEIS, 10 offshore areas and 2 upland sites from an inland river source were identified as potential borrow material locations. This screening process incorporates beach sand compatibility requirements as well as other physical, location, and environmental attributes and criteria to meet the Purpose and Need of the project while reducing adverse environmental impacts. Ideally, sand used for beach construction or re-nourishment would have the same physical characteristics (gradation, grain shape, and color) as the sand currently on the islands. The results of this analysis of borrow sites indicated:

### Borrow Area Options Eliminated From Further Consideration

- St. Bernard Shoals was eliminated because of sand grain size, sand color, and location, which is farther than the other potential borrow areas from the proposed placement areas.
- The Gulfport Channel area was eliminated because it lacked suitable material (limited amounts of sand).
- Mississippi Sound was eliminated because it lacked desired sand grain size.
- Ship Island Pass was eliminated because it lacked desired grain size and it had smaller sand deposits.
- Dog Keys Pass was eliminated because the sand would have to be removed from within an active littoral zone.
- The Lower Tombigbee River Upland sites were eliminated because of incompatible color and the long haul distances necessary to obtain the material.

## Alternative Borrow Locations Carried Forward

Six borrow sites (St. Bernard Shoals, Gulfport Channel, Mississippi Sound, Ship Island Pass, Dog Keys Pass, and Lower Tombigbee River Upland disposal sites) were evaluated as not feasible, and five borrow locations (Cat Island, Ship Island, DA-10, Petit Bois Pass – multiple sites and Horn Island Pass) are alternative borrow locations carried forward and evaluated in the SEIS. See SEIS 3.2.1.2 for more information.

**Ship Island** – The Ship Island borrow site is located outside of the congressionally authorized boundary of GUI.

Geophysical surveys and borings identified an initial deposit of approximately 22 mcy in the area south of Ship Island, with an average cut thickness of 8 feet. Within the Ship Island borrow site, three potential borrow areas were identified (SHP1, SHP2, and SHP3). SHP1 is located 1.5 miles south of Camille Cut and East Ship Island at a depth of approximately -28 feet NAVD88. The proximity of this sand deposit to Camille Cut and East Ship Island makes this borrow area highly favorable for the placement of sand at East and West Ship Islands. However, the sand is finer than desired (D50 of 0.21 mm), which would limit its potential use. The predominant sand color is light gray. Further investigations identified two sub-areas of SHP1 (Figure 3-5): SHP2 and SHP3. SHP2 is approximately 634 acres in size and contains 8.7 mcy of suitable sand. SHP3 is approximately 83 acres in size and contains approximately 1.2 mcy of sand. SHP3 is located entirely outside of designated critical habitat for Gulf sturgeon. Because of the shallow (<30 feet), nearshore location of the potential borrow sites in this area, hydrodynamic modeling studies were conducted to determine whether utilization of this material would cause adverse wave focusing or negatively impact the transport system. The borrow area design was configured to prevent significant adverse impacts to the transport system. Details of these studies are contained in Appendix C of the SEIS. The modeling evaluation indicated that using a subset of the entire 22 mcy of sand available would not negatively impact the long-term overall morphological development of Ship Island. Based on the proximity of the site, potential sand volume and grain size, and limited potential for impact on critical habitat, SHP3 is considered the most feasible of the Ship Island borrow areas. Ship Island Borrow Site has been identified as a borrow source with an available borrow volume of approximately 1.2 mcy under Borrow Site Option 4 of the Tentatively Selected Plan.

**Horn Island Pass** - The Horn Island borrow site is located outside of the congressionally authorized boundary of GUIIS.

The Horn Island Pass borrow site is located immediately west of the Pascagoula Harbor entrance channel. The sediment mounds present at this location were formed by past disposal of dredged material from the Pascagoula Bar Channel section of Horn Island Pass. The ambient water depths range from 27 to 40 feet. Estimated combined available volume from the three sites is approximately 3.2 mcy, and the D50 is 0.28 mm. The Horn Island Pass borrow areas combined are approximately 587 acres with cut elevations of -34 to -42 feet NAVD88 and cut thicknesses ranging between 4 and 11 feet. Three obstructions are marked on National Oceanic and Atmospheric Administration (NOAA) charts in the vicinity of the borrow sites. The sites were buffered with 200 feet in addition to the specified buffer, as indicated on the latest NOAA map. In addition, two known pipelines are located to the east. A 1,000-foot buffer was maintained around the known pipelines. Excavation would consist of removing existing disposal mounds to surrounding depths; therefore, any potential wave focusing would likely be minimal.

The Horn Island Pass borrow site has been identified as a borrow source with an available borrow volume of approximately 3.2 mcy under Borrow Site Option 4 of the Tentatively Selected Plan.

**Petit Bois Pass – Alabama** – The Petit Bois Pass-Alabama borrow site is outside of the congressionally authorized boundary of GUIIS.

The initial Petit Bois Pass Alabama location extends from Petit Bois Island in Mississippi, east to Dauphin Island in Alabama. The geophysical surveys indicated that large deposits of sand are present in the area south of the main pass extending 3 miles offshore. Based on the results of borings, approximately 16 mcy of sand were found in two separate zones: a western zone (PBP-AL West 1) and an eastern zone (PBP-AL East 1). PBP-AL West 1 is approximately 587 acres in size and contains approximately 4.3 mcy of sand (Figure 3-20 10). PBP-AL East 1 is approximately 753 acres in size and contains approximately 11.7 mcy of sand (Figure 3-10). Both PBP-AL West 1 and PBP-AL East 1 contain high-quality sand, with a larger compatible grain size (D50 = 0.32 mm) and color ranging from light gray to white; however, PBP-AL West 1 contains a higher percentage of shell fragments. The extent of this sand appears to be continuous with a shallow bar to the north that is within the littoral zone of one of the barrier islands, but its characteristics suggest it may be of fluvial origin associated with a relict river channel. This borrow area is located outside (southeast) of Gulf sturgeon critical habitat. This area is located in water with an average depth of approximately -31 feet NAVD88 and is approximately 2 to 2.5 miles to the southwest of Dauphin Island. Because of the shallow (<30 feet) nearshore location of this area, hydrodynamic modeling studies were conducted to determine whether disruption of the deposits would cause adverse wave focusing or negatively impact the transport system. The borrow area design was configured to prevent significant adverse impacts to the transport system. Details of these studies are contained in Appendices C and D. Given the extensive shoal system to the north, the majority of wave focusing would be broken up by a shoal. Based on results from hydrodynamic and morphological modeling of potential impacts to adjacent pipelines, PBP-AL East 2 and PBP-AL West 2 were identified as more feasible (Figure 3-10). The boundary for PBP-AL West 2 was established to maintain a minimum 1,000-foot buffer around known pipelines. To offset the smaller volume of sand available from PBP-AL West 2, compared to PBP-AL West 1, additional geotechnical investigations were performed in 2012 along the margins of the borrow areas. Therefore, the boundary of PBP-AL East 2 is larger than that of PBP-AL East 1, to include suitable material located further away from the pipelines. The estimated combined available volume of PBP-AL East 2 and PBP-AL West 2 is approximately 16 mcy, and the combined area is 1,265 acres. Cut elevations vary between -32 to -48 feet NAVD88 and 1 cut thicknesses range between 3 and 18 feet. The Petit Bois Pass Alabama borrow site has been identified as a borrow source with an available borrow quantity of approximately 8.5 mcy under Borrow Site Option 4 of the Tentatively Selected Plan.

**Petit Bois Pass – Mississippi** – The Petit Bois Pass-Mississippi borrow site is located outside of the congressionally authorized boundary of GUIIS.

The PBP-MS borrow site is located approximately 1 mile southeast of the eastern tip of Petit Bois. Sand in this location has a favorable grain size ( $D_{50}=0.31$  mm). The ambient water depths range from -25 to -32 feet. Available volume is approximately 2.0 mcy. The site consists of approximately 175 acres with cut elevations of -33 to -48 feet NAVD88 and cut thicknesses ranging between 4 and 16 feet. The site is bounded to the north and west by the NPS limits and to the east by a submerged cable and a pipeline. The cable and pipeline are located approximately 500 feet and 2,500 feet, respectively, from the eastern limits of the proposed borrow area. The Petit Bois Pass Mississippi borrow site has been identified as a borrow source of approximately 1.7 mcy under Borrow Site Option 4 of the Tentatively Selected Plan.

**Petit Bois Pass -- OCS** - The Petit Bois Pass-OCS borrow site is located outside of the congressionally authorized boundary of GUIs.

Petit Bois Pass Potential Borrow Expansion Areas 3 and 4 are located approximately 2 miles south of Petit Bois Island and 4.5 miles south of Dauphin Island, respectively. The Petit Bois Pass Potential Area Expansions 3 and 4 are located in areas of the Outer Continental Shelf outside the State Territorial Sea (more than 3 miles offshore) (OCS) waters in approximately -45 to -55 ft. NAVD88. Investigation of these two sites is being coordinated with the Bureau of Ocean Energy Management (BOEM) to ensure compliance with OCS regulations. These sites have the potential to contain up to 4.9 mcy deposits of suitable sands.

The Petit Bois Pass OCS location is located approximately 3.5 miles offshore near the safety fairway. Sand in this location is an acceptable size ( $D_{50}=0.28$  to  $0.33$  mm), and the ambient water depths range from -45 to -60 feet. Estimated combined available volume is approximately 4.9 mcy. The site consists of approximately 810 acres with cut elevations of -50 to -68 feet NAVD88 and cut thicknesses ranging between 4 and 18 feet. An obstruction is marked on the latest NOAA chart in the vicinity of the borrow site. The specified buffer, as indicated on the latest chart, is located off the shoal to the east approximately 150 feet from the borrow area. The Petit Bois Pass OCS borrow site has been identified as a borrow source of approximately 4.1 mcy under Borrow Site Option 4 of the Tentatively Selected Plan.

**Cat Island** – The Cat Island borrow site is located outside of the congressionally authorized boundary of GUIs.

Potential borrow sites were investigated to the east of Cat Island. Geophysical surveys indicated the availability of extensive sand deposits in this area that could provide approximately 2.1 mcy of sand for placement at Cat Island. Average grain size in the borrow area ( $D_{50}$  of 0.20 mm) is smaller than in the native beach but deemed suitable for the placement site, and material is predominantly light gray in color. The borrow area is approximately 282 acres in size and material is an average of 5 feet thick. Water depth over the area ranges from -12 to -14 feet North American Vertical Datum of 1988 (NAVD88). Although this area is located within designated critical habitat (Unit 8) for the federally threatened Gulf sturgeon, and has a smaller grain size than desired, it is in close proximity to the placement area on Cat Island and the volume necessary for restoration would be small relative to the widespread availability of sand in this area. East and West Ship Islands and the shoal system to the south help to shelter this area from stronger, more energetic waves coming from the south and southeast, but there is the potential for some moderate focusing of waves out of the north and northeast along Cat Island. Because of the shallow (<30 feet) nearshore location of the potential borrow areas, hydrodynamic modeling studies were conducted to determine whether disruption of the deposits would cause adverse wave focusing or negatively impact the transport system. Additional evaluations of the impact to Gulf sturgeon critical habitat were also conducted. The borrow area design is configured to prevent significant adverse impacts to the transport system and the use of this site would not impact or adversely modify critical habitat or threaten the continued existence of the protected species. The Cat Island borrow site has been identified as a borrow source of approximately 4.1 mcy under the Tentatively Selected Plan.

## DA-10- Sand Island -

The DA-10 potential borrow site is located within the congressionally authorized boundaries of GUIS and is an existing dredged material disposal location currently used for material dredged from the Pascagoula Harbor Federal Navigation Project between Horn Point and Petit Bois Islands. DA-10 is located on the west side of the channel. Although DA-10 is located within the active littoral zone, the material has historically been placed such that transport is not conducive to feeding the natural island sand transport system. The existing specified disposal area is 940 acres in size, including the 183-acre island locally known as Sand Island. Sand Island is an existing NPS property, which includes recreational area for NPS visitors, 26.69-acres of ponded emergent freshwater wetlands, 18.79 acres of marine intertidal wetlands, piping plover critical habitat, shorebird habitat, and marine turtle nesting habitat. Current elevations at the site range from 18 feet to -10 feet NAVD88. Geotechnical surveys have identified approximately 5.1 mcy of suitable quality sand, with favorable grain size ( $D_{50} = 0.33$  mm) to remove from this location. DA-10 is within the area designated as critical habitats for the Gulf sturgeon and the piping plover but is currently an active dredged material disposal site.

Two proposed borrow designs within DA-10 were identified as part of Borrow Options 1-3. Borrow Options 1 and 2 propose to remove approximately 5.1 mcy of sand to a depth of approximately -12 feet NAVD88. These options would remove an approximately 8 acre ponded wetland and would result in the loss small ponded emergent fresh water wetlands on Sand Island. Loss of these wetlands would need to be compensated for within the Gulf Island National Seashore island chain. The southern portion of Sand Island is proposed to be left in place to minimize potential changes to waves on the lee side of the island and to continue to provide for shorebird habitat. DA-10 design under Borrow Option 1 and 2 is approximately 357 acres in size, of which approximately 105 acres are Sand Island and are above MLLW and 252 acres are below MLLW.

Borrow Option 3 proposes to remove approximately 3.7 mcy of material to a depth of approximately -12 feet NAVD88. This option was developed to avoid removal of an 8-acre ponded wetland, but would result in the loss of 11 acres of small ponded emergent fresh water wetlands. Loss of these wetlands would need to be compensated for within the Gulf Island National Seashore island chain. Use of Borrow Option 3 would involve using approximately 58 acres of the eastern portion of Sand Island above MLLW while seeking to keep approximately 125 acres of the western segment above MLLW in place. This area includes the lower berm elevation (+5 ft NAVD88) along the southern shoreline for bird habitat and the higher vegetated elevations upwards of + 18 ft NAVD88 associated with an existing ponded wetland. Borrow Option 3 is approximately 304 acres in size, of which approximately 58 acres are Sand Island and above MLLW and 246 acres are below MLLW.

The DA-10 borrow site is NOT a borrow source under Borrow Site Option 4 of the Tentatively Selected Plan.

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## Sand Placement Alternatives

Section 3.2.2 of the MsCIP SEIS describes the alternative placement locations considered. These include littoral zone placements that were part of the original design concepts but have since been revised based on the results of sediment budget and transport analyses (Byrnes et.al, 2012, Appendix B and Appendix C of the SEIS) to include more direct placements of sand on the barrier islands for restoration of the sediment budget.

Section 3.2.2.4 of the MsCIP SEIS describes the engineering and design options investigated for placement of fill in Camille Cut and along the beach at East Ship Island and the eastern shore face of Cat Island. This analysis includes placement configurations, sand sources, and placement phasing.

Also see Figure 1-2

## No-Action Alternative

The MsCIP SEIS (USACE, 2014), from which this Wetland SOF is tiered, describes a future without-project condition that would occur in the project area without comprehensive restoration of the Mississippi barrier islands and evaluates the environmental effects of the No-Action Alternative.

The No-Action Alternative as described in Section 3.4.1 of the SEIS would involve continuing erosion of the barrier islands, and continuing degradation and loss of estuarine habitats and productive fisheries (USACE, 2009). The No-Action Alternative assumes that net land loss and morphological changes would continue along the barrier islands into the future as a result of storms, rising sea level, and reduced sand supply from dredging and other human activities.

No-Action Alternative in Section 3.4.1 of the SEIS also suggests that the loss of marine intertidal wetland and other habitats would continue. Barrier islands, wetlands, and beaches along eroding margins of the islands could transition to open-water habitat or experience other physical changes as a result of erosion that may otherwise be attenuated by restoring the degraded islands to enlarged barrier islands. Historical analysis of barrier island change provided by Morton et al. (2004) and recent analysis by Byrnes et al. (2012) indicate that East Ship Island would continue to narrow and lose land area under this alternative. Sand transport from East Ship Island would be depleted in a matter of decades, as storm and normal transport processes reduce the island to a shoal. Dog Keys Pass would become wider as East Ship Island evolves to a shoal, and natural sediment bypassing to West Ship Island would be greatly diminished.

The structural integrity and efficacy of the barrier islands as a first line of defense would continue to diminish, reducing the resilience of the coast against damage from future storms. See Section 3.4.1 of the MsCIP SEIS for additional details on the No-Action Alternative.

## Other Alternatives Not Carried Forward

Alternative borrow material locations were not carried forward and a brief explanation is provided above in the discussion of alternatives for St. Bernard Shoals, Gulfport Channel, Mississippi Sound, Ship Island Pass, Dog Keys Pass, Horn Island Pass, and Lower Tombigbee River.

Alternative placement locations not carried forward include the littoral zone of East and West Ship Island because sediment transport modeling determined that better replenishment of Ship Island would occur from placement of sand on and immediately adjacent to East Ship Island (Tentatively Selected Plan). The littoral zone sites at Petit Bois Island and Cat Island were not carried forward because investigations and modeling of the site following initial selection identified sufficient material in the littoral zone of the island to support the island recreation/maintenance process (Byrnes et.al, 2012, Appendix B of the SEIS).

## Site Description

The site of the Tentatively Selected Plan includes barrier islands and offshore borrow sites that lie within Gulf Islands National Seashore. The barrier islands are located in Mississippi Sound, a shallow coastal lagoon averaging about 8 to 10 miles wide and extending along the coast between Mobile Bay, Alabama and Lake Borgne, Louisiana (see Figure 1-1). The barrier islands are located approximately 6 to 12 miles offshore. The project area also includes the northern Gulf of Mexico to a distance about 5 miles seaward of the barrier islands, including offshore borrow material locations.

Generally, the barrier islands feature broad, sandy beaches with extensive intertidal wetland habitats to the north, some wetland habitats interspersed among upland dunes in the interior portions of the islands, and intertidal wetland habitats along the shores on the southern-Gulf side. The barrier islands and surrounding waters contain important natural, cultural, and recreational resources.

## Borrow Sites

The sand used in these restoration areas for the Tentatively Selected Plan of Borrow Site Option 4 would use a total of approximately 19 mcy of sand dredged from five borrow areas for Camille Cut closure and restoration of East Ship Island. Borrow sites and estimated quantities include: Ship Island (1.2 mcy), Petit Bois Pass – Alabama (8.5 mcy), Petit Bois Pass – Mississippi (1.7 mcy), Petit Bois Pass – OCS (4.1 mcy), and Horn Island Pass (3.2 mcy). Sand used in the restoration of Cat Island would come from an approximately 282-acre sand deposit in an area about 2 miles long and 0.2-mile wide centered about 1.25 miles off the eastern shoreline of Cat Island. None of these borrow sites are within the jurisdictional boundary of Gulf Island National Seashore.

All of the offshore sand borrow sites are areas deemed to be geologically conducive to the presence of large sand deposits, are unvegetated with minimal habitat designations, and are not close to active littoral transport. Potential offshore borrow material sites for the proposed work were also evaluated on the compatibility with the placement areas in terms of grain size, shape, color, and other physical characteristics (See Section 3.2.1 of the SEIS).

## Wetlands

The Tentatively Selected Plan includes impacts to marine and estuarine intertidal wetlands on or around the project barrier islands that will either be dredged or filled. The NPS Director's Order #77-1 Wetland Protection requires the NPS to identify and delineate wetlands according to the definition and classification system according to the U.S. Fish and Wildlife Service's (USFWS) definition in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979). Wetlands are defined as lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water and must have one or more of the following three attributes:

1. At least periodically, the land supports predominantly hydrophytes (wetland vegetation).
2. The substrate is predominantly undrained hydric soil.
3. The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The NPS uses the USFWS wetland definition (in addition to the USACE wetland delineation procedure when there are vegetated wetlands present). The U.S. Fish and Wildlife Service's definition includes marine and estuarine intertidal habitats and aquatic habitat areas that, though lacking vegetation and/or soils due to natural, physical, or chemical factors such as wave action or high salinity, are still saturated or shallow inundated environments that support aquatic life. This broader definition encompasses the intertidal wetland resources affected by the project. These marine habitats are exposed to the waves and currents of the open ocean and the water regimes are determined primarily by the ebb and flow of oceanic tides (Cowardin et al., 1979).

## Marine and Estuarine Intertidal Wetland Delineation and Mapping

The marine and estuarine intertidal wetlands that will be impacted by the project are shown in maps below (Figures 1-5 through 1-10). The marine intertidal wetlands were delineated as occurring between the mean lower low water and the mean higher high water contour. These lines were established using the National Oceanic and Atmospheric Administration (NOAA) Vertical Datum Transformation Tool (VDatum) program. These maps were subsequently reviewed and approved by the NPS as representative of the extent of wetland resources. Marine intertidal wetlands were delineated and mapped in the project footprint areas of East and West Ship Islands by NPS staff. Approximately 21.75 acres of existing intertidal wetlands were identified on the affected barrier islands (East and West Ship). Information about intertidal wetland impacts is summarized in Table 1-2.

On the west end of East Ship Island, a small 1.3 acre estuarine intertidal wetland was mapped within the project footprint. This ponded area appears to be persistent and is utilized by several species of small fish and crabs, as well as extensive observed use by several species of shore birds. The pond is not vegetated, though a significant algal population is present. However, the pond is tidally influenced. Salinities were recorded at 25 ppt indicating a strong Gulf influence.

Because the seaward slope of the beach construction profile would be steeper than the native slope, the construction profile would be expected to adjust over a 6-month to 2-year period through the erosion of the upper profile with deposition near the toe of the fill until its shape, termed “equilibrium profile,” mimics the natural near shore profile. During the restoration, immediately after placement of the sand berms, the marine intertidal wetland areas created by the process would equal 37.41 acres, with the seaward slope of the construction profile steeper than the native slope. Once the more natural equilibrium profile has been achieved would equal 93.39 acres.

A total of 24.27 acres of marine intertidal wetland and 1.3 acres of estuarine intertidal wetlands for a total of 25.57 acres will be filled in the tentatively selected plan including East and West Ship Islands and Cat Island. After the deposited sand surfaces settle out or equilibrate, the total area of created marine intertidal wetland will equal 93.39 acres. The project will produce a total net gain of 67.82 acres of marine intertidal wetland.

TABLE 1-2  
Project Area Marine Intertidal Wetlands (shown in Acres)

	Existing Marine and Estuarine Intertidal Wetland Areas to be Filled	Marine Intertidal Wetland Areas Initially Created	Marine Intertidal Wetland Areas at Equilibrium	Net Gain or Loss of Marine Intertidal Wetlands
Cat Island	2.52	0.28	0.39	-2.13
East and West Ship Island	21.75	37.13	93	71.25
Estuarine Pond A ESI	1.3	0	0	-1.3
<b>Total Wetlands</b>	<b>25.57</b>	<b>37.41</b>	<b>93.39</b>	<b>67.82</b>



**Legend**  
**Wetland Areas**  
**Color**

- Existing Wetland Areas
- Wetland Areas created by construction of berm
- Wetland Areas after berm has reached Equilibrium

- Notes:
1. All wetland areas were calculated by defining the MHW and MHHW contour lines.
  2. NOAA's VDatum program was used to establish MHW and MHHW elevations for Cat Island. The zone model utilized was Louisiana / Mississippi - Eastern Louisiana to Mississippi Sound, version02.
  3. The existing Wetland contours on the South end of the Island had a large amount of small isolated contours. In these areas a shape was drawn around the bulk of these contours and 30% of the overall area was used to account for the voids.
  4. Existing Wetlands Areas = 2.52 Acres  
Wetlands Areas created by construction of berm = 0.28 Acres  
Wetlands Areas after berm reaches Equilibrium = 0.39 Acres

Figure 1-2

**CAT ISLAND WETLAND MAP**

DATE: JAN. 12, 2012

Figure 1-3. Existing marine intertidal wetlands in the project area of Cat Island.





## Wetlands - West and East Ship

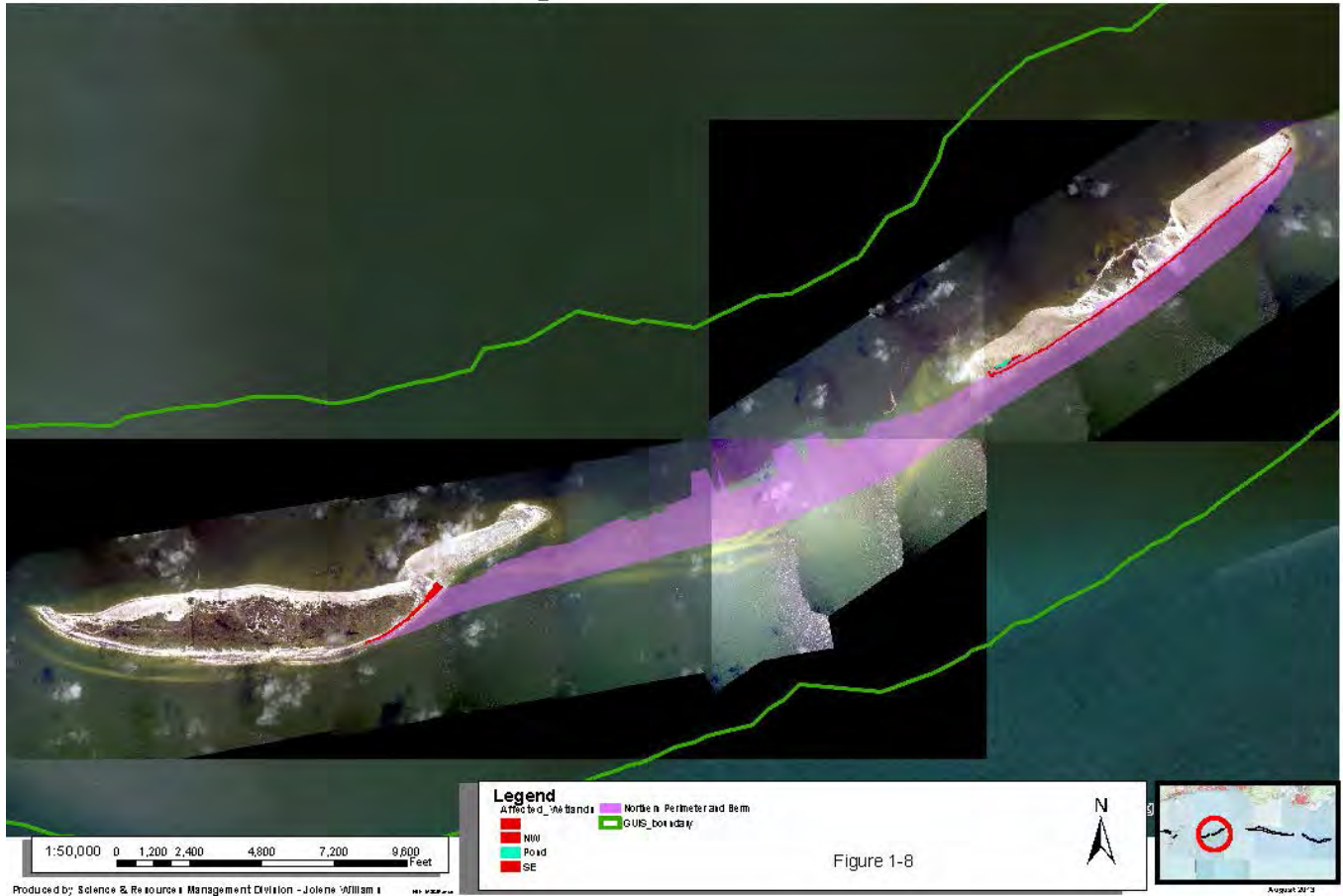


Figure 1-4. Wetlands of West and East Ship Islands.

## **Intertidal Wetland Resources at Placement Locations**

### ***Cat Island***

Figure 1-3 shows the location of the intertidal wetlands on the NPS owned portion of Cat Island under existing conditions, post-construction, and at equilibrium. The NPS boundary begins at the Mean High Water mark. Therefore marine intertidal wetlands do not fall under the jurisdiction of the NPS on Cat Island.

### ***East and West Ship Island and Camille Cut***

Ship Island has been separated into east and west segments since 1969, with the center portion of the island breached during previous hurricanes. While most of the island has reformed prior to Hurricane Katrina, the center portion (Camille Cut) has remained submerged and never gained enough sand to form dunes and establish vegetation. The intertidal wetland system on the east side of West Ship Island and the west and southern sides of East Ship Island comprises 21.75 acres of marine intertidal unconsolidated shoreline (beach; Cowardin et al., 1979). Closure of Camille Cut between East Ship Island and West Ship Island would result in a beneficial impact from the creation of approximately 800 acres of new island habitat, including a net increase of 71.25 acres of marine intertidal shoreline wetlands. This change would cause a long-term alteration of the habitat for biological resources. Figure 1-5 shows the location of the wetlands on Ship Island under existing conditions, post-construction, and at equilibrium. Figures 1-6 – Figure 1-9 show wetlands (August 2013) of East and West Ship Islands that will be affected by the construction template.

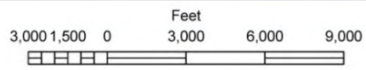


**Legend**

- █ Existing Wetlands Area
- █ Wetland Areas created by construction of berm
- █ Wetland Area after berm has reached Equilibrium

**Notes:**

1. All wetland areas were calculated by defining the MLLW and MHHW contour lines.
2. NOAA's VDatum program was used to establish MLLW and MHHW elevations for Ship Island. The zone model utilized was Louisiana / Mississippi - Eastern Louisiana to Mississippi Sound, version02.
3. Existing Wetlands Areas = 21.75 Acres  
 Wetlands Areas created by construction of berm = 37.13 Acres  
 Wetlands Areas after berm reaches Equilibrium = 93.0 Acres



**SHIP ISLAND WETLAND MAP**

DATE: JAN. 12, 2012

Figure 1-5. Sand placement for West Ship Island, Camille Cut and East Ship Island.

DRAFT



## Wetlands - West Ship

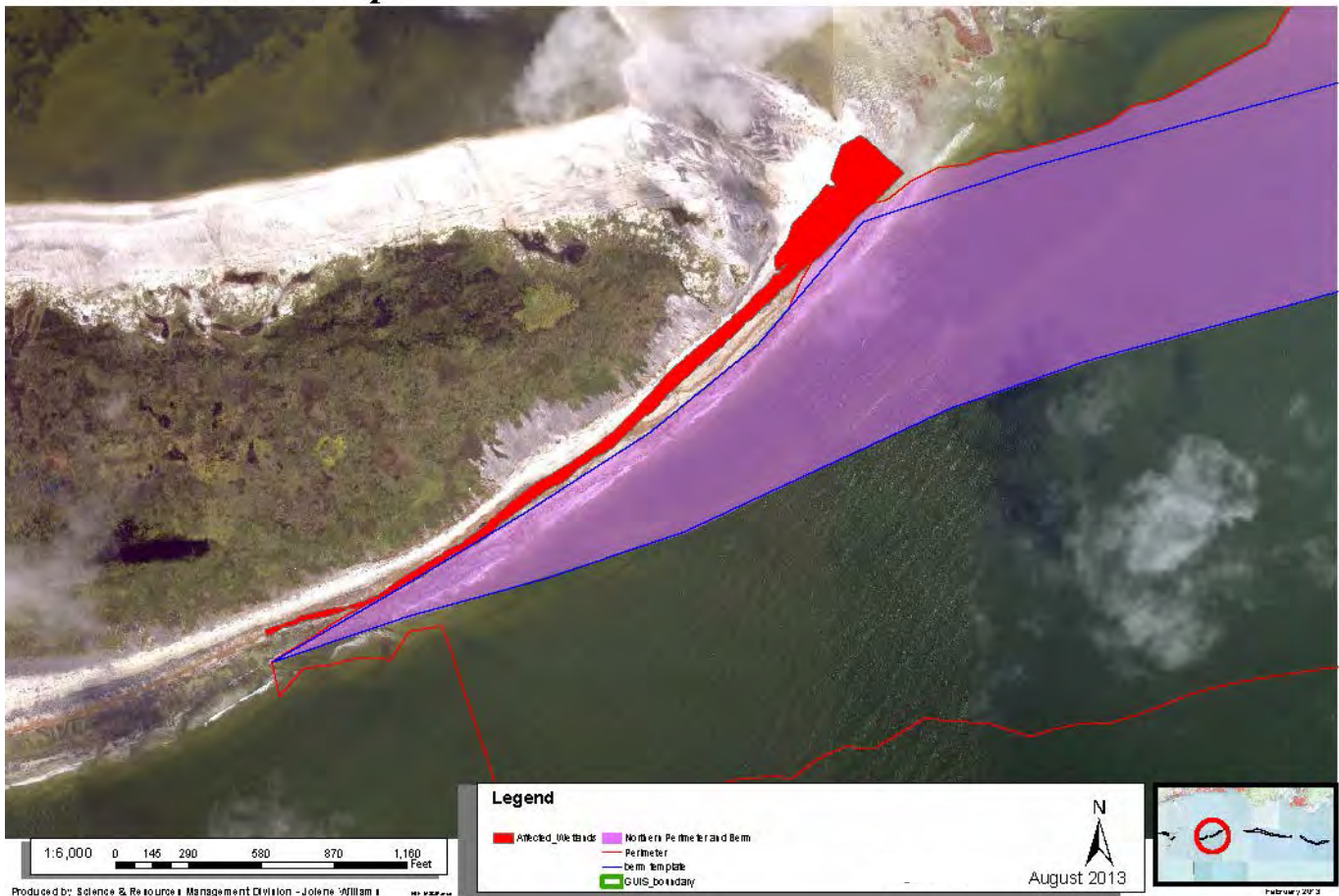


Figure 1-6. Sand placement on West Ship Island.



## Wetlands - East Ship

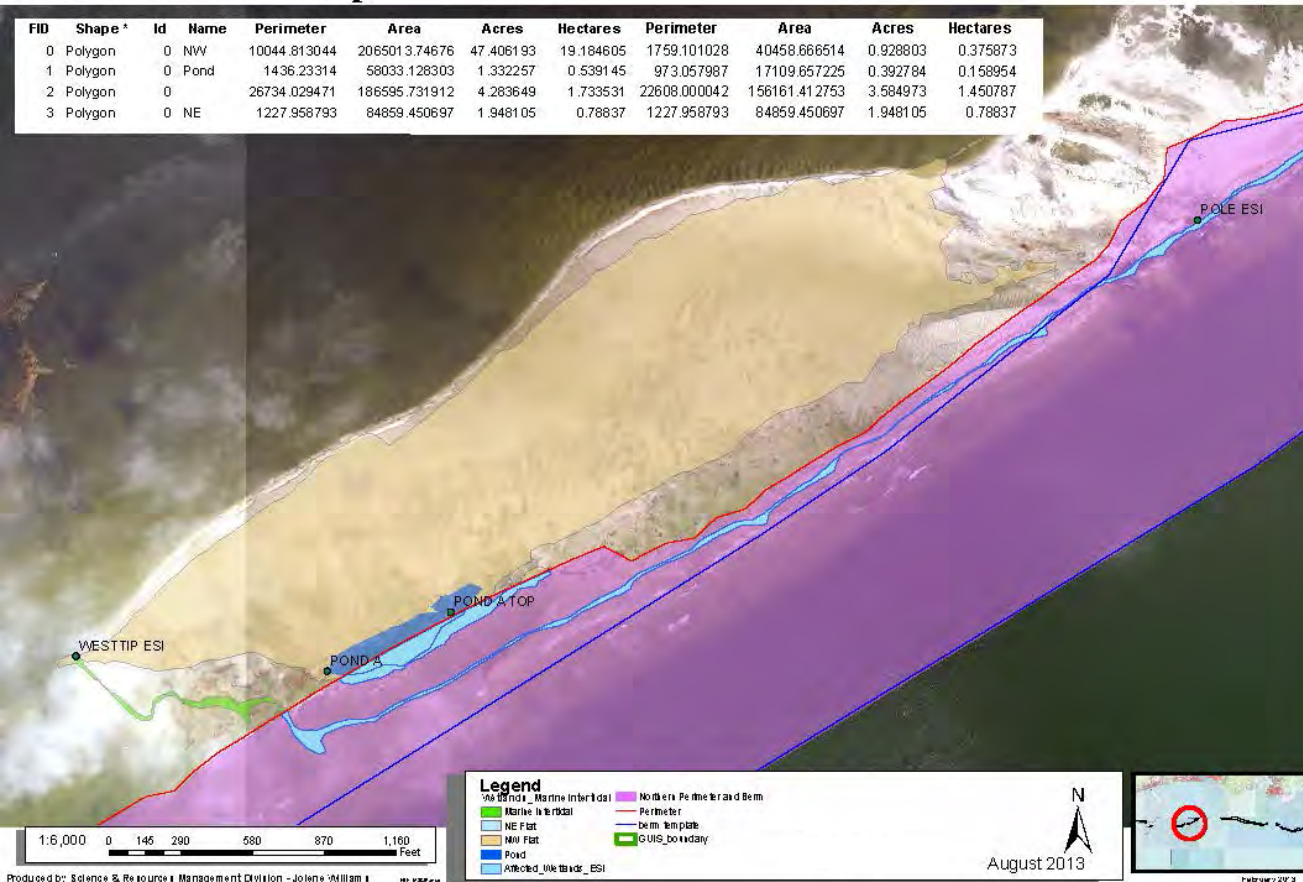


Figure 1-7. Sand placement on the west end of East Ship Island including the 1.3 acre estuarine Pond A.



# Wetlands - East Ship

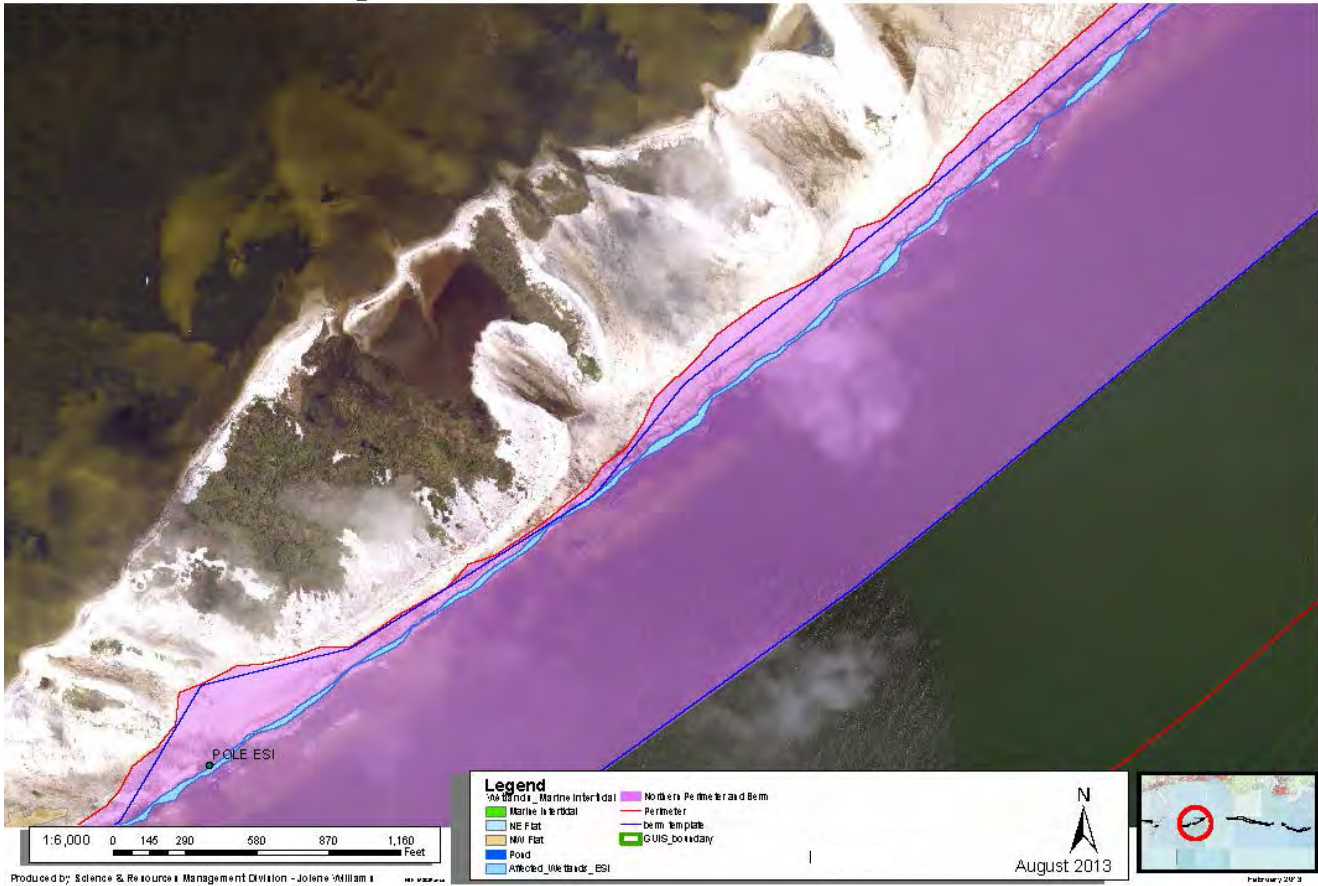


Figure 1-8. Sand placement on the central reach of East Ship Island.



# Wetlands - East Ship



Figure 1-9. Sand placement east end of East Ship Island.

## Wetland Functions

Potential impacts on the coastal wetland functional values within the project area have been evaluated based on biotic functions, and hydrologic functions.

### Biotic Functions

Section 4.5 of the MsCIP SEIS, Biological Resources, contains details on the biological resources present within the project area. The wetlands on the proposed placement sites are unvegetated and classified as marine intertidal unconsolidated shore wetlands and an estuarine intertidal pond wetland. Biotic functions in the wetlands consist primarily of habitat and forage for shorebirds, fish, mammals, and invertebrates, as summarized below. More information is contained in the SEIS and in the Biological Assessment (BA)

### Marine and Coastal Birds

**Setting:** The Mississippi Sound barrier islands represent the primary marine and coastal bird habitat in the project area. More than 280 species of birds have been identified within the island boundaries and many use shoreline wetlands for resting, nesting, and feeding (NPS, 2010).

The barrier islands serve as important breeding habitat and contain rookeries for several species (MDMR, 2010). Some of the solitary nesting bird species known to regularly breed on the barrier islands include the American egret (*Ardea alba*), snowy egret (*Egretta thula*), black nighthawk (*Chordeiles minor*), yellow nighthawk, great blue heron (*Ardea herodias*), willet (*Tringa semipalmata*), American oystercatcher (*Haematopus palliatus*), snowy plover (*Charadrius nivosus*), and Wilson's plover (*Charadrius wilsonia*) (GUIS, 2012). In addition, the white ibis (*Eudocimus albus*) is known to breed on Cat Island and the Louisiana heron (*Egretta tricolor*) on Petit Bois Island (GUIS, 2012).

Colonial nesting species known to regularly breed on the barrier islands include the gull-billed tern (*Gelochelidon nilotica*), least tern (*Sterna antillarum*), sandwich tern (*Thalasseus sandvicensis*), royal tern (*Thalasseus maximus*), and black skimmer (*Rynchops niger*) (GUIS, 2012). Shorebirds use shoreline wetlands for resting, feeding, and nesting (NPS, 2010).

Two species of raptor, the osprey (*Pandion haliaetus*) and bald eagle (*Haliaeetus leucocephalus*), are known to breed on the barrier islands.

Breeding seasons for most of these species typically occur between April and June, with young birds remaining through August or September. For example, breeding seasons are typically March 1 to July 30 for ospreys; April 1 to September 30 for colonial nesting shorebirds; and March 1 to August 30 for solitary nesting shorebirds. Eagles, however, breed over winter, typically from September 1 to April 30.

The barrier islands also serve as habitat for the federally protected piping plover (*Charadrius melodus*). See Protected Species subsection in the SEIS for additional details.

Colonial nesting species observed on the islands include least terns, black skimmers, royal terns, sandwich terns, black terns (*Chlidonias niger*), common terns (*Sterna hirundo*), and gull-billed terns. (Hopkins, 2011; GUIS, 2012). In 2010 the nesting colony consisted of 409 pairs of least terns, 103 pairs of black skimmers, and 11 pairs of gull-billed terns (Section 4.5.9). Solitary nesting shorebirds observed include the American egret, snowy egret, black nighthawk, yellow nighthawk, willet, American oystercatcher, snowy plover, Wilson's plover, and great blue heron (GUIS, 2012). In 2010, two pairs of snowy plovers, one pair of willets, one pair of American oystercatchers, and one pair of Wilson's plovers were observed nesting (NPS, 2011). The reddish egret has also been observed on Sand Island during the fall migration (Zdravkovic, 2010). The red knot (*Calidris canutus*) has also been observed on the wintering grounds of East Ship Island, Cat Island, and Petit Bois Island (Personal communication with Paul Necaie, USFWS, 2012).

**Impacts:** The impacts within marine and estuarine intertidal wetlands by the Tentatively Selected Plan: could disrupt resident birds and breeding migrants (e.g., black skimmers, gulls, pelicans, terns, ospreys, and herons) during construction activities. Typical state and federal buffer zones of 300 feet exist for nesting shorebirds. Additionally,



placement would occur directly on Ship Island and Cat Island, which would help to restore degraded upland habitat and maintain such habitat at these locations. Significant short-term impacts to nesting, foraging, and roosting behavior could occur in the vicinity of placement activities. However, long-term beneficial impacts to birds (such as enhanced near shore foraging habitat) would result from the improved island stability. Closure of Camille Cut between East Ship Island and West Ship Island would result in a long-term beneficial impact to birds from the creation of approximately 800 acres of new island habitat, including an increase of 71.25 acres of marine intertidal unconsolidated shoreline wetlands. Sand placement on Cat Island would result in a long-term beneficial impact to birds from the creation of approximately 305 acres of new island habitat, but would result in a loss of 2.13 acres of marine intertidal unconsolidated shoreline wetlands.

The recently de-listed eastern brown pelican occurs along the Mississippi coast and forages in Mississippi Sound and other near shore waters. While this species would likely avoid areas where dredging or placement activities are ongoing, there is ample habitat in the region to support the species. Any displacement would be temporary and would end after work is complete. Any effects would likely be negligible (Section 5.4.9 SEIS).

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. However, the bald eagle nests locations identified during recent surveys (on Cat Island, East Ship Island, and Horn Island) are found within the interior areas of the islands well outside of the project area. The restoration project activities will take place in the near shore 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 (See SEIS, Appendix F).

### ***Invertebrates***

**Setting:** The sediment and sand bottom in Mississippi Sound near the barrier islands provides habitat for multiple species of infaunal and epifaunal invertebrates. Due to the frequent disturbances in the area (e.g., sediment disposal, storm action, and maritime activity), invertebrate species tend to be either tolerant of disruption or capable of rapidly recolonizing disturbed areas.

Fiddler crabs (*Uca* sp.) are small semi-terrestrial crabs that inhabit tidal marshes and the adjacent sand and mud flats. They are recognized by the square shape of their bodies and by the male fiddler's oversized claw. Fiddlers dig cylindrical burrows where they take shelter from predators, hot sun, winter cold, and high tides. *Ocypode quadrata*, ghost crabs are larger than fiddler crabs and very light in color. Ghost crabs prefer open sandy beaches rather than tidal marshes.

**Impacts:** The impacts within marine and estuarine intertidal wetlands by the Preferred Alternative (Tentatively Selected Plan): Impacts could occur from placement activities. Infaunal species will get buried and epifaunal invertebrates would be displaced. Studies on recolonization of the benthic substrates indicate varying rates of recolonization depending upon the nature of the substrate (Chessa et al., 2007; Newell et al., 2004; and Bemvenuti et al., 2005). Recovery of 86 percent of species diversity can occur within 20 days and full recovery within 80 days (Newell et al., 2004). However, recovery of biomass can take more than 18 months. There is little evidence of indirect impacts on the community structure outside of the immediate dredging boundaries (Newell et al., 2004). In another study, the benthic communities in the intertidal zone were found to be largely re-established 7 months following sediment dredging (Chessa et al., 2007).

The benthic community of the intertidal wetlands would experience direct impacts from placement of sand. In intertidal placement areas, recovery of the community could range from a few months to several years (Bolam and Rees, 2003; USACE, 1999). USACE disposal sites in the northeastern United States have been monitored since 1977 as part of the Disposal Area Monitoring System program and disposal mounds have exhibited rapid recovery of species diversity and density within 3 to 6 months following placement of sand (USACE, 1978; USACE, 1983; USACE, 1993). However, the composition of the benthic community shifted initially to more opportunistic species, with the benthic communities at disposal mounds typically being similar to those in undisturbed areas within 2 to 5 years (USACE, 1993). Bolam and Rees (2003) found that the marine benthos experienced a decrease in the number of species, densities, and biomass, followed by a rapid recovery. Therefore, although a change in the health of

populations, community structure and composition, trophic structure, or system function may occur, these impacts are temporary and typically the recovery time ranges from a few months to 1-2 years.

Placement of dredged sand would result in a direct loss of the intertidal non-motile mollusk community. Motile mollusks would likely leave the project area during these activities and return after operations cease. However, bivalves (through larval recruitment) would recolonize the area. Benthic bivalve assemblages have been shown to be similar to pre-dredging assemblages within 9 months (Bolam and Rees, 2003). There would likely be some direct losses of semi-sessile mollusks during littoral placement; however, any loss would represent a very limited portion of the population, which would ultimately repopulate the new substrata.

Amphipods are infauna and live in the bottom sediments. These species would likely experience some mortality from removal and placement of sand. As reported by Bolam and Rees (2003), the total abundance and community structure decreased at borrow and placement sites. However, recovery for both the borrow and placement sites was well underway within 3 months.

### ***Emergent Wetland Vegetation***

**Setting:** Within the project footprint marine intertidal wetlands, there are no emergent wetland plants.

### ***Submerged Aquatic Vegetation***

**Setting:** Within the project area's marine intertidal wetlands, there are no submerged aquatic vegetation (SAV).

### ***Fish***

**Setting:** Christmas and Waller (1973) reported 138 species of finfish taken in trawl surveys from Mississippi Sound. The most abundant species was the bay anchovy, comprising over 70 percent of the reported catch. The fish community in the vicinity of the Mississippi barrier islands includes a wide array of species from both near shore and offshore taxa. Ninety-eight percent of the fishes collected in Mississippi Sound also were present in offshore trawl samples (Christmas and Waller, 1973). The majority of the fish species that occur are estuarine-dependent for part of their life cycle. Typically, these species spawn in the Gulf of Mexico and the larvae (ichthyoplankton) are carried inshore to estuaries where they mature (U.S. Environmental Protection Agency [USEPA], 1991). These small, immature forms are susceptible to flow regime changes around the barrier islands (Horn and Petit Bois Islands) where the surrounding grassbeds provide nursery grounds. The greatest abundance of larvae occurs in the spring and summer. These larger SAV beds around Horn and Petit Bois Islands would not be affected by the Tentatively Selected Plan (Section 4.5.5 SEIS).

**Impacts:** The Tentatively Selected Plan would result in a short-term impact to shallow foraging areas and nursery areas during construction. It would also result in long-term beneficial impacts to fish habitat by enhancing shallow foraging areas, nursery areas, and SAV areas around the barrier islands in Mississippi Sound following implementation.

### ***Marine Mammals***

**Setting:** Twenty-nine marine mammal species (Section 4.5.8, Table 4-9), including the West Indian manatee, have been or are known to occur in the Gulf of Mexico. The more common marine mammals found in along near shore areas and the Mississippi Sound Barrier Islands include Atlantic bottlenose dolphin (*Tursiops truncatus*), Atlantic spotted dolphin (*Stenella frontalis*), and spinner dolphin (*Stenella longirostris*) (Section 4.5.8 SEIS).

**Impacts:** Within the project area's marine intertidal wetlands, it is unlikely that localized sand removal and placement operations would affect migration, feeding, or reproduction of marine mammals. Species would likely avoid the borrow and placement sites during construction and move to other areas within the Sound. The project area includes no known mating or breeding habitat. No impacts to reproduction would be expected. Long-term beneficial impacts could occur from the enhancement of foraging habitat in the littoral zones around the barrier islands (USACE, 2014).

## Protected Species

**Setting:** Section 4.5.11 in the MsCIP SEIS identifies 21 species either listed under the Endangered Species Act (ESA) or as candidate species for listing under the ESA that may occur within the Mississippi coastal counties, within Mississippi Sound, or on the Mississippi barrier islands. However, only seven of these species occur in Mississippi Sound or on the barrier islands: Gulf sturgeon (*Acipenser oxyrinchus desotoi*), smalltooth sawfish (*Pristis pectinata*), green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), loggerhead sea turtle (*Caretta caretta*), leatherback sea turtle (*Dermochelys coriacea*), hawksbill sea turtle (*Eretmochelys imbricate*), piping plover (*Charadrius melodus*), and West Indian manatee (*Trichechus manatus*). Of these species, all the sea turtles and the piping plover have the potential to occur in the shoreline wetlands. In addition, the eastern brown pelican (*Pelicanus occidentalis carolinensis*), which was delisted in 2009, also may occur in shoreline wetlands.

Critical habitat has been designated for the Gulf sturgeon (USFWS and NOAA Fisheries Service, 2003). Designated critical habitat Unit 8 includes the project area and encompasses Mississippi Sound and other open water areas connected to the Sound. Proposed project areas within the critical habitat include all placement locations and the Cat Island borrow area.

The piping plover winters along the Gulf Coast utilizing the Gulf Islands National Seashore island chain. Critical habitat has been designated for the piping plover. The project area is located within the Mississippi piping plover critical habitat and includes all proposed placement locations. Wintering plovers begin arriving on wintering grounds in early July and continue arriving into September. Although some individuals can be found on the wintering grounds throughout the year, most plovers depart in spring and sightings are rare in June and early July (USFWS, 2010a). Piping plover have been observed wintering on Cat Island, East Ship Island, West Ship Island, Horn Island, Petit Bois Island, and on portions of Sand Island as described in the Biological Assessment (SEIS, Appendix G).

No critical habitat has been designated within the project area for the smalltooth sawfish, green sea turtle, Kemp's ridley sea turtle, loggerhead sea turtle, or West Indian manatee. Critical nesting habitat for loggerhead sea turtles is proposed for nearby Horn and Petit Bois Islands. See Section 4.5.11 of the SEIS for more detail.

The eastern brown pelican was formerly listed under the ESA, but was delisted in 2009 (USFWS, 2010b). The eastern brown pelican occurs along the Mississippi coast, where it forages over the open water of Mississippi Sound and also nests on small islands (USACE, 2009; USFWS, 1979).

**Impacts:** Within the project area's marine and estuarine intertidal wetlands, piping plover and nesting sea turtles may be affected. During construction, the marine intertidal wetland (beach) will be buried resulting in no access for crossing of nesting turtles nor be available for foraging piping plovers. There will be no beach available for turtles and plovers within the project footprint until after construction when the habitat has had time to reestablish the flora and faunal species. Approximately 1,500 acres of habitat, including 139 acres of designated piping plover critical habitat and 511 acres of Gulf sturgeon critical habitat, would be filled during restoration activities at East Ship Island and West Ship Island (though this activity creates 71.25 acres of shoreline wetlands as shown in Table 1-2). The proposed design for closure of Camille Cut (Figure 1-4) was developed to avoid, to the extent practicable, the tips of East and West Ship islands that are more heavily utilized by piping plover. Long-term, there would be an increase in potential foraging areas for the piping plover, as the land mass of barrier islands and the amount of tidally exposed land increases and becomes colonized by prey items. There would be a long-term benefit to the piping plover and no long-term adverse effects would be expected.

The impacts to 511 acres of Gulf sturgeon critical habitat would be permanent with the loss of benthic invertebrate populations within Camille Cut. Because this area is small relative to the size of Unit 8, this change, approximately 0.08%, would be unlikely to alter the overall critical habitat as a result of reduction of prey items.

Sand placement on Cat Island would result in a long-term beneficial impact to birds from the creation of approximately 305 acres of new island habitat, but would result in a loss of 2.13 acres of marine intertidal unconsolidated shoreline wetlands. Sand placement on East Ship, West Ship, and Camille Cut would result in a

long-term beneficial impact to birds from the creation of 365 acres of new island habitat, but would result in the loss of 21.75 acres of marine and estuarine intertidal wetlands. These new land areas would not be suitable to meet the needs of the piping plover until the areas become established with full biological communities. However, these short-term adverse effects would be more than offset by the long-term benefit to the critical habitat resulting from the new land areas and associated marine intertidal habitat.

Within the project area's marine intertidal wetlands, the West Indian manatee will not be present.

Within the project area's marine intertidal wetlands, access by nesting sea turtles to sea turtle nesting habitat could be affected during construction. In 2012, several loggerhead turtle nests were documented on Cat, West and East Ship Islands and several additional nests were observed on Horn and Petit Bois. Long-term benefits to potential sea turtle nesting would result from the net increase of 800 acres of new barrier island habitat at Ship Island. No significant long term impacts to turtle nesting habitat are anticipated from the sand placement activities.

The overall potential impacts to threatened and endangered species from the Tentatively Proposed Plan, as summarized in the BA (Appendix I), are the following:

- Sea turtles (loggerhead, green, Kemp's ridley, and hawksbill) – not likely to be affected due to 1) adherence to mitigations during construction (see the Gulf of Mexico Regional Biological Opinion), 2) general unlikely that the species will occur in the area during construction, and 3) an increase in potential nesting habitat in the project area once construction is completed.
- Piping plover – may be affected but not likely to adversely affected. There would be a net increase of (762) acres of foraging habitat for the wintering birds.

### Hydrologic Functions

**Setting:** Section 4.3 (Physical Environment) of the MsCIP SEIS contains a discussion of the physical environment. The environment and hydrologic functions in and around the wetland areas are summarized below. The hydrology of the marine intertidal wetlands will be disrupted when sand is placed, however will be reestablished along the newly created marine intertidal wetland to the south of both East and West Ship Islands.

### Cultural Values

West Ship Island has known archaeological sites, all on the north shore and not located within the construction template. There are 4 documented archaeological sites on East Ship Island. Two sites are on the north shore: French Warehouse and Ship Island Cemetery, that are not located within the construction template, and two are on the south shore which are within the construction template: Quarantine Station, and Sherds on the Beach. The Quarantine Station used to be on land on the north shore of the island, but with the movement of the island, now is in the water off the south shore, and within the construction template, and the visible portions of the archaeological site are now within the marine intertidal wetland. Sherds on the beach, a recently discovered archaeological site in 2010, have human remains in context with Native American ceramic pieces or sherds. When first delineated, the entire site was on land, but with the movement of the island, now portions of the delineated site is partially in the water off the south shore, and has portions within the marine intertidal wetland. The SEIS will analyze the impacts of the proposed action on these cultural resources.

### Recreation

The Mississippi islands within the national seashore provide more than 60 miles of sandy shoreline on the Gulf of Mexico and Mississippi Sound sides. These offshore barrier islands constitute virtually all of the naturally maintained sandy shoreline on the Mississippi Coast. In addition to beach recreation potential, these barrier islands offer unique natural history interpretive opportunities. West Ship Island is the most heavily visited island within the Mississippi District of the national seashore. A tour boat takes visitors to West Ship Island from Gulfport, Mississippi, from March through October.

East Ship Island is open year-round to private boaters. The island is not accessible by automobile. Visitors to the Seashore's barrier islands can enjoy primitive island camping and other activities that include beach combing, bird watching, swimming, snorkeling, and fishing.

West Ship Island serves almost the entire demand in the Mississippi District for high-density beach use and swimming because it is the only island served by tour boat. West Ship Island has a boardwalk that extends from the boat dock on the north side of the island to the south side of the island where there is a designated swim beach.

Gulf Islands National Seashore provides visitors with a variety of fishing opportunities. About two-thirds of the national seashore consists of marine water. In addition, there are 60 miles of beaches that have easy access for fly and surf fishing. Fly fishing generally occurs on the north side and surf fishing on the Gulf side of the barrier islands. Areas off both ends of West Ship Island and the pier are also popular fishing spots, as is the east end of East Ship Island.

### **Research/Scientific Values**

Twenty-two (22) current research permits have East Ship Island as an approved location for research activities. One example is Long-term Investigations of Barrier Island Vegetation, Habitats, and Geomorphology in Response to Climate Change and Sea Level Rise in the Gulf of Mexico by the University of Southern Mississippi. Another example is Vegetation comparative analysis of observed geomorphologic changes along the Mississippi Sound due to extreme weather events by Louisiana State University. Researchers may be affected short term by the presence of construction activities.

### **Economic Values**

Jackson and Harrison counties are the primary areas whose population has a direct influence on the Mississippi District of Gulf Islands National Seashore. Mississippi's coastal recreation and tourism industry is a major portion of the entire state's recreation and tourism industry. Coastal tourism accounts for about one-third of the total state tourism expenditures.

Recent surveys show that Mississippi anglers annually spend more than \$50 million on food and beverages, more than \$9 million on lodging, more than \$19 million on bait and ice, more than \$15 million on boat fuel, and more than \$57 million on fishing tackle. About 10% of the \$236 million spent annually by Mississippi anglers is spent in the three coastal counties.

Gulf Islands National Seashore is an economic generator that helps anchor the economy of the gateway communities while contributing to the regional economy. In 2003 there were 4.94 million recreation visits to the national seashore. It is estimated that 60% of those recreation visits were local residents on day trips; 30% were visitors on day trips from outside the local area; 5% were visitors on overnight trips staying in lodges, motels, hotels or bed-and-breakfasts in the area; and 5% were camping. On average, visitors spent \$69 per party per day in the local area. Total visitor spending was \$57.20 million dollars in 2003. Although a small part of the regional economy, there are many small businesses that rely on the national seashore as one of the major attractions for visitors to come to their communities. Overtime, businesses have evolved and adjusted to the patterns and needs of these visitors.

## **Justification for Use of Wetlands/Wetland Mitigation**

The range of alternatives considered for site-specific implementation of comprehensive Mississippi barrier island restoration included borrow material locations, placement locations, and alternative construction methods. The Tentatively Selected Plan requires dredging and placement of sand to achieve comprehensive restoration of the system with the least amount of impact to wetlands.

# Wetland Avoidance, Minimization, and Compensatory Mitigation Plan

Construction is proposed to last a minimum of 2.5 years, with no breaks. Mitigations offered included 1) Turtle nesting surveys, marking and potential relocation activities must be conducted during daily active construction, within the nesting and hatching season April 15 – November 30; and 2) Shorebird nesting surveys, and marking activities must be conducted daily during active construction, with a temporary, 300-foot buffer zone created around any nesting or courtship behavior, or around areas where piping plovers occur or winter migrants congregate in significant numbers, during Migration season from August to end of April; and Breeding season from April to end of September. There will be no consideration given to identifying and avoiding impacts to fish spawning or shorebird foraging in the intertidal wetland zones to be impacted.

## Compensatory Mitigation Plan

The Tentatively Selected Plan would permanently impact 25.57 acres of marine and estuarine intertidal wetlands. However, 93.39 acres of marine intertidal wetland will be created and therefore the project would achieve the “no net loss of wetlands” goal by providing a net gain of 67.82 acres of marine intertidal wetlands. Table 1-2 provides a summary of impacts and net benefits for NPS marine intertidal wetlands. See Figure 1-2 and Figure 1-3 for the boundaries of the impacted marine intertidal wetlands and the location of the newly created marine intertidal wetland areas. Based on this analysis, the total net gain of 67.82 acres of marine intertidal wetland habitat would result in a net benefit to the marine intertidal wetlands systems in GUIIS and therefore would not require additional compensatory mitigation for the impacts to marine intertidal wetlands (see Table 1-2).

## Monitoring Plan

In collaboration with NPS, the USACE and USGS will establish plans for monitoring various components of the overall project. These plans will be established prior to construction and would be fully implemented after the construction is complete. The monitoring and adaptive management team, which the NPS sits on, is regularly meeting to develop a comprehensive program for the barrier island restoration efforts. Members of the team are experts in monitoring.

## Compliance

### National Park Service Regulations

This Wetland Statement of Findings document is required in order to comply with the National Park Service’s Director’s Order #77-1: Wetland Protection. Compliance with other agency regulations will be completed (if appropriate for this project) separately from this document. Separate compliance with other appropriate federal laws and regulations is required as per the NPS’s Director’s Order #77-1: Wetland Protection and Procedural Manual.

## Conclusion

The Tentatively Selected Plan would impact 25.57 acres of marine and estuarine intertidal shoreline wetlands with deposited sand and, at the same time, relocate the marine and estuarine intertidal hydrologic conditions to other locations and result in an increase in the amount of marine intertidal wetland habitat. There would be impacts on intertidal and estuarine wetland resources, including water quality, benthic invertebrates, fish, mollusks, crustaceans, and marine mammals. The project would result in the creation of 93.39 acres of marine intertidal shoreline wetlands. Although impacts to the intertidal zone’s health of flora and fauna populations, community

structure and composition, trophic structure, or system function would occur, these impacts are temporary and typically the recovery time ranges from a few months to 1-2 years. The net gain of 67.82 acres of new marine intertidal wetland habitat would compensate for the loss of 25.57 acres.

DRAFT

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