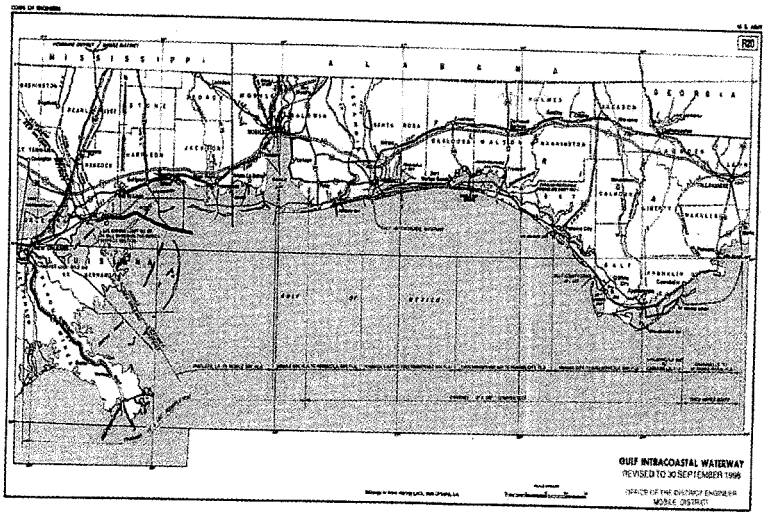
FINDING OF NO SIGNIFICANT IMPACT, ENVIRONMENTAL ASSESSMENT AND SECTION 404(b)(1) EVALUATION FOR THE MAINTENANCE DREDGING AND DISPOSAL OF DREDGED MATERIAL MISSISSIPPI AND LOUISIANA PORTIONS OF THE GULF INTRACOASTAL WATERWAY FEDERALLY AUTHORIZED NAVIGATION PROJECT

HANCOCK, HARRISON AND JACKSON COUNTIES, MISSISSIPPI AND COASTAL LOUISIANA



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October 2010

FINDING OF NO SIGNIFICANT IMPACT

MAINTENANCE DREDGING AND DISPOSAL OF DREDGED MATERIAL MISSISSIPPI AND LOUISIANA PORTIONS OF THE GULF INTRACOASTAL WATERWAY FEDERALLY AUTHORIZED NAVIGATION PROJECT

HANCOCK, HARRISON AND JACKSON COUNTIES, MISSISSIPPI AND COASTAL LOUISIANA

A. DESCRIPTION OF THE PROPOSED ACTION

The proposed action would involve maintenance dredging and disposal operations for the Gulf Intracoastal Waterway (GIWW) in the State of Mississippi and Louisiana (**Figure 1 of EA**). Approximately 300,000 cubic yards (cys) of clay, silt and sand are proposed for removal by hydraulic cutterhead dredge along various sections of the channel on an infrequent basis over the next five years. The material would be placed in previously certified open water disposal sites: 66, 65A, 65B and 65C (**Figures 2-6 of EA**).

The existing project provides for a waterway 12 feet deep and 125 feet wide at mean low water (MLW) from Apalachee Bay, FL., to Mobile Bay, AL., and 12 feet deep and 150 feet wide from Mobile Bay, AL., to the Rigolets, LA. (Lake Borgne Light No. 29), and for a tributary channel (the Gulf County Canal), 12 feet deep, 125 feet wide, and about 6 miles long connecting the waterway at White City, Florida with St. Joseph Bay. The waterway between the 12 foot contours in Apalachee Bay and Lake Borgne Light No. 29 at the Rigolets is 379 miles long. Plane of reference is MLW.

The proposed dredging action would be performed with a tolerance of up to two (2) feet of advance maintenance and 2 feet of paid allowable over-depth dredging. Maintenance dredging of soft-dredged material with a hydraulic cutterhead dredge may disturb the bottom sediments several feet deeper than the target depth due to the inaccuracies of the dredging process. An additional 3 feet of sediment below the 2-foot paid allowable dredging cut may be disturbed in the dredging process with minor amounts of material being removed.

Maintenance dredging and disposal would be performed on an as needed basis. The frequency of channel dredging at any one site and the associated time between the use of any given disposal area ranges on average once every 3 to 25 years.

B. ALTERNATIVE TO THE PROPOSED ACTION

Two alternatives were considered for this project. These alternatives are:

1. No Action / No Maintenance of the GIWW.
2. Continued Operation and Maintenance of the GIWW.

NEPA defines a "no action" as the continuation of existing conditions in the affected environment without the implementation, or in the absence of the proposed action. Inclusion of the "no action" alternative is prescribed by the Council on Environmental Quality (CEQ) regulations as the benchmark against which Federal actions are to be evaluated.

The implementation of the "no action" alternative would result in discontinuing project maintenance dredging to its authorized depths of -12 feet MLW plus 2 feet of advanced maintenance and 2 feet of paid allowable over depth. This alternative would result in a waterway that would eventually fill with sediments and become unsafe and non-navigable for commercial and recreational boats. Shoaling would develop at various times and places. This would forego the benefits of the waterway by eliminating a major link connecting the Gulf Coastal ports with the rest of the United States. Millions of tons of commodities, a large percentage of which are petroleum products or their derivatives, annually would likely have to be shipped via other means at a higher cost. Project abandonment would place an economic stress on the industrial and commercial investments already dependent on the project. Therefore, the "no action" alternative was deemed unacceptable and not considered further.

The proposed project and preferred alternative is the continued operation and maintenance of the GIWW within the States of Mississippi and Louisiana. No modifications are being proposed. Alternatives to the proposed action were evaluated in existing environmental documents. As previous operation and maintenance activities of the project have proven to be effective, evaluation of additional alternatives was deemed not warranted at this time.

C. POTENTIAL ENVIRONMENTAL IMPACTS

The environmental impacts associated with the proposed action are fully described in the Environmental Assessment (EA). The EA identifies the environmental characteristics that may possibly be affected by the proposed action, and determines the significance of the impact to each of the characteristics. The EA concludes that the proposed continued operations and maintenance of the federally authorized Mississippi and Louisiana GIWW Navigation Project would not have a significant adverse impact on the existing environment.

D. COORDINATION

The proposed operations and maintenance (O&M) dredging and placement activities of the Mississippi and Louisiana GIWW Federal Navigation Project were coordinated through Public Notices FP08-IW01-14 and FP08-IW02-14 both dated January 28, 2008. The notice was provided to interested public and local, state, and Federal agencies. The Mississippi Department of Marine Resources (MDMR) issued coastal zone consistency (CZC) on March 10, 2008 for continued O&M of the channel. The Mississippi Department of Environmental Quality (MDEQ) issued water quality certification (WQC) on March 24, 2008 for continued O&M of the channel. The

Louisiana Department of Environmental Quality (LDEQ) issued WQC on December 9, 2009. These certifications do not have an expiration date as long as the scope of the project does not change. The Louisiana Department of Natural Resources issued CZC on January 27, 2010. There is a five year concurrence with this project for CZC. Additional details of coordination are provided in the attached Statement of Findings and EA. Coordination in reference to the Deepwater Horizon Oil Spill was also conducted between the state resource agencies that issued CZC and WQC.

E. FINDING OF NO SIGNIFICANT IMPACT (FONSI)

A careful review of the EA shows that the proposed O&M dredging and subsequent placement of material would not have a significant adverse impact on the natural and human environment. The requirements of the National Environmental Policy Act and the Council on Environmental Quality regulations have been satisfied and the preparation of an Environmental Impact Statement is not necessary.

DATE 8 NOV 10

Steven J. Roemhildt
Colonel, Corps of Engineers
District Commander

ENVIRONMENTAL ASSESSMENT

MAINTENANCE DREDGING AND DISPOSAL OF DREDGED MATERIAL MISSISSIPPI AND LOUISIANA PORTIONS OF THE GULF INTRACOASTAL WATERWAY FEDERALLY AUTHORIZED NAVIGATION PROJECT

HANCOCK, HARRISON AND JACKSON COUNTIES, MISSISSIPPI AND COASTAL LOUISIANA

Table of Contents

List of Figures

List of Tables

List of Enclosures

EA-Enclosure 1 – Corps letter dated April 19, 2007 notifying National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), Protected Resource Division (PRD) that in accordance with Section 7 of the Endangered Species Act (ESA) the Biological Assessment (BA) indicates continued operations and maintenance (O&M) of the GIWW is not likely to adversely affect threatened and endangered species or permanently destroy or adversely modify critical habitat.

EA-Enclosure 2 – Corps letters dated April 19, 2007 requesting Section 7 concurrence with U.S. Fish and Wildlife Service (USFWS) to Mississippi and Louisiana state field offices for the GIWW.

EA-Enclosure 3 – USFWS Louisiana Field Office letter dated May 18, 2007 stating they concur that the GIWW project is not likely to adversely affect most of the federally listed species or their critical habitats in Louisiana.

EA-Enclosure 4 – NMFS, PRD letter dated May 21, 2007 requesting additional information (RAI) in reference to GIWW to comply with Section 7 of ESA.

EA-Enclosure 5 – USFWS Mississippi Field Office letter dated May 30, 2007 stating that the GIWW in Mississippi lies within the Gulf Sturgeon Critical Habitat Unit #8 and that NMFS retains primary responsibility for the sturgeon in all marine units.

EA-Enclosure 6 – Corps letter dated July 11, 2007 responding to the NMFS, PRD RAI.

EA-Enclosure 7 – NMFS, PRD letter dated October 23, 2007 stating consultation responsibilities under Section 7 of the ESA are concluded.

EA-Enclosure 8 – Public Notice FP08-IW01-14 dated January 28, 2008 for the Mississippi portion of the GIWW.

EA-Enclosure 9 – Public Notice FP08-IW02-14 dated January 28, 2008 for the Louisiana portion of the GIWW.

EA-Enclosure 10 – Corps letters dated March 6, 2008 requesting to initiate formal EFH consultation with NMFS, Habitat Conservation Division (HCD) for Mississippi and Louisiana.

EA-Enclosure 11 – Mississippi Department of Marine Resources (MDMR) letter dated March 10, 2008 granting Coastal Zone Consistency (CZC) for the Mississippi portion of the GIWW.

EA-Enclosure 12 – Mississippi Department of Archives and History letter dated March 14, 2008 stating no objection to the proposed project.

EA-Enclosure 13 – NMFS, HCD letter dated March 24, 2008 stating the proposed project will not result in significant long term impacts to Louisiana EFH.

EA-Enclosure 14 – Mississippi Department of Environmental Quality (DEQ) letter dated March 24, 2008 granting State 401 Water Quality Certification (WQC) for the Mississippi portion of the GIWW.

EA-Enclosure 15 – NMFS, HCD letter dated March 31, 2008 stating the large quantity of fine-grained sediment being placed, unconfined, in the Mississippi Sound would result in adverse impacts to EFH and other estuarine resources.

EA-Enclosure 16 – Corps letters dated June 17, 2008 responding to the EFH HCD letter recommending that expanded EFH consultation be initiated and that a comprehensive EFH assessment must be prepared.

EA-Enclosure 17 – Corps e-mail dated April 2, 2009 stating the Corps, Mobile District has completed their consultation requirements, addressed NMFS HCDs initial request of an expanded assessment and considers this consultation complete.

EA-Enclosure 18 – E-mail dated November 1, 2009 from Louisiana Department of Environmental Quality (LDEQ) with notice on how to restart the WQC process.

EA-Enclosure 19 – Proof of Publication dated November 6, 2009 for the Louisiana portion of the GIWW published in *The Advocate*.

EA-Enclosure 20 – Corps letter dated November 13, 2009 to the Louisiana State Historic Preservation Officer (SHPO) requesting concurrence with the Corps finding of no historic properties affected.

EA-Enclosure 21 – LDEQ letter dated November 15, 2009 stating the requirements to obtain WQC.

EA-Enclosure 22 – Corps letter dated November 16, 2009 requesting CZC from the Louisiana Department of Natural Resources (LDNR).

EA-Enclosure 23 – Proof of Publication dated November 23, 2009 for the Louisiana portion of the GIWW published in *The Times Picayune*.

EA-Enclosure 24 – Corps letter dated December 9, 2009 requesting WQC from LDEQ.

EA-Enclosure 25 – Stamped letter dated December 15, 2009 stating that the Louisiana SHPO determined there are no known historic properties affected by the proposed project.

EA-Enclosure 26 – Letter dated December 28, 2009 granting WQC from LDEQ.

EA-Enclosure 27 – Letter dated January 27, 2010 granting CZC from LDNR.

EA-Enclosure 28 – Corps Memorandums for Record 1 and 2 referencing BP oil spill coordination with the resource agencies granting CZC and WQC.

EA-Enclosure 29 – Section 404 (b)(1) Evaluation Report for the MS/LA GIWW.

ACRONYMS AND ABBREVIATIONS

BA	Biological Assessment
BO	Biological Opinion
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Corps	United States Army Corps of Engineers
cys	Cubic Yards
CZC	Coastal Zone Consistency
EA	Environmental Assessment
EFH	Essential Fish Habitat
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act
FONSI	Findings of No Significant Impact
GMFMC	Gulf of Mexico Fishery Management Council
GIWW	Gulf Intracoastal Waterway
HCD	Habitat Conservation Division
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
NAAQS	National Ambient Air Quality Standards
MDEQ	Mississippi Department of Environmental Quality
MDMR	Mississippi Department of Marine Resources
MLW	Mean Low Water
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLAA	Not Likely to Adversely Affect
NLAM	Not Likely to Adversely Modify
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PRD	Protected Resource Division
Register	National Register of Historic Places
SAV	Submerged Aquatic Vegetation
SHPO	State Historic Preservation Officer
TSS	Total suspended solids
USFWS	United States Fish and Wildlife Service
WQC	Water Quality Certification

ENVIRONMENTAL ASSESSMENT

MAINTENANCE DREDGING AND DISPOSAL OF DREDGED MATERIAL MISSISSIPPI AND LOUISIANA PORTIONS OF THE GULF INTRACOASTAL WATERWAY FEDERALLY AUTHORIZED NAVIGATION PROJECT

HANCOCK, HARRISON AND JACKSON COUNTIES, MISSISSIPPI AND COASTAL LOUISIANA

1.0 INTRODUCTION

1.1 Location. The Gulf Intracoastal Waterway (GIWW) within Mississippi and Louisiana extends from the Alabama-Mississippi state line through Mississippi Sound to Lake Borgne Light No. 29 at the Rigolets in Louisiana (**Figure 1**).

1.2 Description of the Entire Authorized Project. The GIWW is a Federal shallow-draft navigation project that extends approximately 1,115 miles along the Gulf of Mexico coast from northern Florida to the southern tip of Texas. The waterway connects southern ports with the midwest, the east, and the Great Lakes region. The U.S. Army Corps of Engineers (Corps), Mobile District has jurisdiction over that portion of the GIWW from Rigolets, Louisiana to Apalachee Bay, Florida, a total of approximately 380 miles (**Figure 1**). The existing project, under auspices of the Corps, Mobile District, provides for a waterway 12 feet deep, 125 feet wide at Mean Low Water (MLW) from Apalachee Bay, Florida to Mobile Bay, Alabama and a channel 12 feet deep, 150 feet wide from Mobile Bay, Alabama to the Rigolets, Louisiana (Lake Borgne Light No. 29).

1.3 Description of the Proposed Action. The proposed action would involve maintenance dredging and disposal operations for the GIWW in the State of Mississippi and Louisiana. Approximately 300,000 cubic yards (cys) of clay, silt and sand are proposed for removal by hydraulic cutterhead dredge along various sections of the channel on an infrequent basis over the next five years. The material would be placed in previously certified open water disposal sites: 66, 65A, 65B and 65C (**Figures 2-6**). A summary of each disposal site is located in Table 6 at the end of this report located on page 34.

The existing project provides for a waterway 12 feet deep and 125 feet wide at MLW from Apalachee Bay, FL., to Mobile Bay, AL., and 12 feet deep and 150 feet wide from Mobile Bay, AL., to the Rigolets, LA. (Lake Borgne Light No. 29), and for a tributary channel (the Gulf County Canal), 12 feet deep, 125 feet wide, and about 6 miles long connecting the waterway at White City, Florida with St. Joseph Bay. The waterway between the 12 foot contours in Apalachee Bay and Lake Borgne Light No. 29 at the Rigolets is 379 miles long. Plane of reference is MLW.

The proposed dredging action would be performed with a tolerance of up to two (2) feet of advance maintenance and 2 feet of paid allowable over-depth dredging. Maintenance dredging of soft-dredged material with a hydraulic cutterhead dredge may disturb the bottom sediments several feet deeper than the target depth due to the inaccuracies of the dredging process. An additional 3 feet of sediment below the 2-foot paid allowable dredging cut may be disturbed in the dredging process with minor amounts of material being removed.

Maintenance dredging and disposal would be performed on an as needed basis. The frequency of channel dredging at any one site and the associated time between the use of any given disposal area ranges on average once every 3 to 25 years.

In emergency conditions a barge mounted dragline or snagboat may be used to remove rapidly formed or unexpected shoals or other hazards to navigation. This material would be placed to the side of the channel to allow for immediate passage of vessels until a hydraulic cutterhead dredge could be dispatched to restore project dimensions. Emergency disposal needs are infrequent and usually the result of storm incidents or barge groundings. Past experiences have shown that only a few areas would likely require such emergency action, but such actions may be required at any location along the waterway. In the event of an emergency, all necessary Federal and State agencies would be notified before commencement of work.

1.4 Purpose and Need for the Proposed Action. The purpose and need for the proposed action is to provide barge tows and other small craft that are not well suited for use in the Gulf of Mexico a secure and safe means of navigating the great inland rivers of the country. The GIWW has historically been a vital means for transporting heavy freight and continues to be one today.

Table 1 below shows the waterborne commerce for various reaches of this statement portion of the GIWW from 2003 to 2007.

Table 1: Waterborne Commerce
Gulf Intracoastal Waterway Pensacola, FL to New Orleans, LA
Traffic (thousand short tons)

Year	Pensacola Bay, FL to Mobile Bay, AL	Mobile Bay, AL to New Orleans, LA
2003	8,511	20,875
2004	8,289	21,808
2005	7,553	18,597
2006	7,873	18,885
2007	7,187	21,244
TOTAL	33,013	101,409
5 Year Average	7,883	20,281

Source: Waterborne Commerce of the United States: 2003-2007

Without the proposed action, the vessels utilizing the GIWW would be subjected to adverse navigational conditions caused by shoaling along various reaches of the project. This action would in turn eliminate a vital and economical link in a waterway that connects the Gulf coastal ports with the rest of the United States.

1.5 Authority. The existing project was authorized by the 1966 Rivers and Harbors Act (House Document 481, 89th Congress, 2nd Session) as amended and prior acts.

1.6 Environmental History. Pursuant to the National Environmental Policy Act (NEPA), this environmental assessment (EA) was prepared to update the resource description and to evaluate the potential impacts associated with the continued operation and maintenance of the GIWW - Federal Navigation Project within the State of Mississippi and Louisiana. Related environmental documents include the following:

Corps, 2008. Operations and Maintenance of the Federal Navigation Projects within the Mississippi Sound Louisiana, Mississippi and Alabama, June 16, 2008.

Corps, 2007. Federally Authorized GIWW Project – Operation and Maintenance Louisiana, Mississippi, Alabama and Florida Biological Assessment (BA).

Corps, 1994. Statement of Findings for GIWW Project, Mississippi Portion, Hancock, Harrison and Jackson Counties, Mississippi, Maintenance Dredging and Placement Activities.

Corps, 1983. Environmental Assessment for Modifications to the Maintenance Plan as Presented in the Final Environmental Statement for Maintenance Dredging of the GIWW from Pearl River, Louisiana-Mississippi to Apalachee Bay, Florida December 1983. FONSI signed February 7, 1984.

Corps, 1976. Environmental Impact Statement for Maintenance Dredging of the GIWW from Pearl River, Louisiana-Mississippi to Apalachee Bay, Florida. Statement of Findings signed December 1, 1976.

These documents are hereby incorporated by reference.

The Rigolets section of the GIWW was last dredged in September-October 1966 according to dredging history records. The channel was dredged from -12 feet to a depth of -15.0 feet. Approximately 430,000 gross cubic yards (288,000 net) of silty-sandy material was removed by hydraulic pipeline dredge from the channel section. The material was placed in an open-water site adjacent to the channel in the State of Louisiana. There is no evidence on file that suggests water quality certification and coastal zone consistency for this portion of the GIWW or the open-water placement area were ever acquired.

2.0 ALTERNATIVES. NEPA defines a "no action" as the continuation of existing conditions in the affected environment without the implementation, or in the absence of the proposed action.

Inclusion of the "no action" alternative is prescribed by the Council on Environmental Quality (CEQ) regulations as the benchmark against which Federal actions are to be evaluated.

The implementation of the "no action" alternative would result in discontinuing project maintenance dredging to its authorized depths of -12 feet MLLW plus 2 feet of advanced maintenance and 2 feet of paid allowable over depth. This alternative would result in a waterway that would eventually fill with sediments and become unsafe and nonnavigable for commercial and recreational boats. Shoaling would develop at various times and places. This would forego the benefits of the waterway by eliminating a major link connecting the Gulf Coastal ports with the rest of the United States. Millions of tons of commodities, a large percentage of which are petroleum products or their derivatives, annually would likely have to be shipped via other means at a higher cost. Project abandonment would place an economic stress on the industrial and commercial investments already dependent on the project. Therefore, the "no action" alternative was deemed unacceptable and not considered further.

The proposed project is the continued operation and maintenance of the GIWW within the State of Mississippi and Louisiana. No modifications are being proposed. Alternatives to the proposed action were evaluated in existing environmental documents. As previous operation and maintenance activities of the project have proven to be effective, evaluation of additional alternatives was deemed not warranted at this time.

3.0 AFFECTED ENVIRONMENT

3.1 Fish and Wildlife Resources

Oyster Reefs. Oyster reefs of commercial importance are subtidal and form aggregates that cover thousands of acres throughout the Mississippi Sound. The oysters inhabit shallow estuarine waters during all life stages. The Mississippi Department of Marine Resources (MDMR) manages 17 natural oyster reefs. The areal extent of oyster reefs in Mississippi is estimated at approximately 10,000 to 12,000 acres, of which approximately 7,400 acres are located in western Mississippi Sound. Approximately 97 percent of the commercially harvested oysters in Mississippi come from the reefs in western Mississippi Sound, primarily from Pas Marianne, Telegraph, and Pass Christian reefs (MDMR 2009). Lake Borgne is particularly important as the site for some of Louisiana's prime oyster grounds. Oyster reefs are particularly productive biological areas. The animals and plants, which are associated with the oyster reef community, are varied and numerous and include algae, sponges, hydroids, polychaetes, other mollusks, barnacles, bryozoans, tunicates, and a number of species of fish. Note: Many of the oyster reefs located in Mississippi and Louisiana were destroyed or severely damaged by Hurricane Katrina and Rita in 2005. Both States are currently investing a significant amount of resources to rebuild them.

Submerged Aquatic Vegetation. Mississippi Sound encompasses an area of 4,792 km^2 and contains 12,140 ha of submerged aquatic vegetation (SAV) (USEPA 1999). Seagrass represents the primary component of SAV. Approximately 810 ha of seagrass beds have been identified along coastal Mississippi (MDFWP, 2005). Seven species of seagrass can be found in the Gulf of Mexico. Mississippi coastal waters contain three submergent bed types: barrier island seagrass, widgeon grass, and American wildcelery beds. Widgeon grass beds occur in shallow,

moderate turbidity waters that are low in salinity. These beds occur in bays along bayous, and in mudflats and barrier island ponds. Size and distribution of widgeon grass beds have varied over time due to damage from hurricanes (MDFWP, 2005). SAVs serve as a vital nursery area for fish and shellfish, such as shrimp and crabs and as food for a variety of waterfowl.

Wetlands. Tidal marshes are located along the bay shorelines and the shoreline of the Mississippi Sound and Louisiana coast line. These marshes are typically bordered along the waters edge by a strip of salt marsh grass, *Spartina alterniflora*, with scattered stands of *S. cynosuroides, S. patens, Distichilis spicata,* and *Phragmites communis*. The majority of the marsh inside of this strip is composed of *Juncus roemerianus* (Swingle, 1971). Tidal marsh is most extensive in the Pascagoula and Pearl River area. They are also found in narrow fringes along bays, isolated bayous and along marsh islands in the sound. Wetlands and tidal marshes are rich in wildlife resources and provide nesting grounds and important stopovers for waterfowl and migratory birds, as well as spawning areas and valuable habitats for commercial and recreational fish.

Sediments. The sediments along the GIWW consist of sand to clays with various mixtures of sand, silt, and clay located throughout the channel. Sediments found along this portion of the GIWW in the Mississippi Sound are primarily composed of a mix of estuarine silty clay. Sediments are an important material affecting the physical, chemical and biological conditions for the environment. The natural sand and mud bottoms of the Mississippi Sound support a benthic infaunal population that contributes directly to the complex estuarine food web and provides important forage, spawning, and nursery areas for a variety of commercially and recreationally important fish and invertebrate species.

3.2 Terrestrial Wildlife. Animals inhabiting the open-waters within terrestrial habitats in the vicinity of the project include reptiles (alligators, turtles and snakes), small mammals (muskrat, nutria, and bats) and birds (Gulls, terns, sandpipers, plovers, stilts, skimmers, oystercatchers herons, egrets and ibises).

3.3 Benthos, Motile Invertebrates, and Fishes. The benthic community in the Mississippi Sound was classified by Vittor and Associates in a study of the Mississippi Sound and selected sites in the Gulf of Mexico (Vittor, 1982). A total of 437 taxa were collected at densities ranging from 1,097 to 35,537 individuals per square meter from the Mississippi Sound. Generally, densities increase from fall through the spring months since most of the dominant species exhibit a late winter to early spring peak in production. These species, though sometimes low to moderate in abundance, occur in a wide range of environmental conditions. They are usually the most successful at early colonization and thus tend to strongly dominate the sediment subsequent to disturbances such as dredging activities. These species include polychaetes *Mediomastus spp., Paraprionospio pinnata, Myriochele oculata,* polychaete worm *Owenia fusiformi, Lumbrineris app.,Sigambra tentaculata,* the *Linopherus-Paraphinome* complex, and *Magelona cf. phyllisae*. The *phoronid, Phoronis ap.* and the *cumacean Oxyurostylis* also fit this category. *M. oculata* and *O. fusiformis* are predominate species in the Mississippi Sound. The numerically dominant species collected during the study were polychaete worm *M. californiensis* and *P. pinnata.*

The Mississippi Department of Environmental Quality (MDEQ) conducted yearly benthic invertebrate surveys in Mississippi Sound from 2000 through 2004. The results of these surveys identified 260 species (8,071 individuals) from 18 major classes (12 phyla) of marine benthic invertebrates taken in the areas close to the GIWW (MDEQ, 2006).

The fish community present in the vicinity of the GIWW navigation project represents a wide array of species from both near-shore and off-shore taxa. The majority of the fish species present are estuarine-dependent for part of their lifecycle. Typically, these species spawn in the Gulf of Mexico and the larvae are carried inshore to estuaries to mature (Corps, 1989). These small, immature forms (ichthyoplankton) are susceptible to flow regimes changes around the barrier islands where the surrounding grassbeds provide nursery grounds.

The major fisheries of the area include Gulf menhaden (*Brevoortia patronus*), striped mullet (*Mugil cephalus*), and Atlantic croaker (*Micropogonial undulates*) (Corps 1989). All of these species are commercially important and the estuaries within the vicinity of the project site play a key role in their lifecycle and survival. Christmas and Waller (1973) reported 138 species of finfish taken from Mississippi Sound. The most abundant species was the bay anchovy (*Anchoa mitchilli*) which serve an important forage fish for many other fish species. The GIWW does not provide the only habitat necessary to maintain the existing population levels of the bay anchovy. Other areas in the Gulf of Mexico also provide the required habitat needed to maintain successful bay anchovy populations.

The most commercially important shellfish found in the area include the brown and white shrimp, blue crab, and American oyster (Swingle, 1971 and Swingle and Bland, 1974). Marine shrimp is by far the most popular seafood in the United States. There are many species of shrimp found in the Gulf of Mexico; however, only those of the family *Penaeidae* are large enough to be considered seafood. Brown shrimp (*Penaeus aztecus*), white shrimp (*P. setiferus*) and pink shrimp (*P. duorarum*) make up the bulk of Mississippi shrimp landings.

The life cycles of brown, white and pink shrimp are similar. They spend part of their life in estuaries, bays and the Gulf of Mexico. Spawning occurs in the Gulf of Mexico. One female shrimp releases 100,000 to 1,000,000 eggs that hatch within 24 hours. The postlarvae shrimp develop through several larval stages as they are carried shoreward by winds and currents. Postlarvae drift or migrate to nursery areas within shallow bays, tidal creeks, and marshes where food and protection necessary for growth and survival are available. There they acquire color and become bottom dwellers. If conditions are favorable in nursery areas, the young shrimp grow rapidly and soon move to the deeper water of the bays. When shrimp reach juvenile and subadult stages (3-5 inches long) they usually migrate from the bays to the Gulf of Mexico where they mature and complete their life cycles. Most shrimp will spend the rest of their life in the Gulf.

3.4 Essential Fish Habitat. Congress defines Essential Fish Habitat (EFH) as "those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity." The designation and conservation of EFH seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities. The Gulf of Mexico Fishery Management Council (GMFMC) and National Marine Fisheries Service (NMFS) have identified EFHs for the Gulf of Mexico in

its Fishery Management Plan Amendments. These habitats include estuarine areas, such as estuarine emergent wetlands, seagrass beds, algal flats, and mud, sand, shell, and rock substrates. In addition, marine areas, such as the water column, vegetated and non-vegetated bottoms, artificial and coral reefs, geologic features and continental shelf features have also been identified. The habitat within the vicinity of the project consists of estuarine waters; shell, sand, silt and clay substrates; estuarine emergent wetlands; seagrass beds; oyster reefs and artificial fishing reefs. Within the project area EFH has been designated for managed species of red drum, reef fish, coastal migratory pelagics, shrimp, stone crab, and highly migratory species.

The following describes the preferred habitat, life history stages, and relative abundance of each EFH managed species likely to occur within the project area based on information provided by GMFMC (1998, 2004 and 2005) and Fishbase (2007).

Red Drum: Red drum occupy a variety of habitats, ranging from depths of 130 feet offshore to very shallow estuarine waters. Spawning occurs in the Gulf near the mouths of bays and inlets in the fall and winter months. Eggs hatch mainly in the Gulf, and larvae are transported into the estuary where they mature before moving back to the Gulf to spawn. Adult red drum use estuaries but tend to spend most of their time offshore as they age. They are found over a variety of substrates, including sand, mud, and oyster reefs, and can tolerate a wide range of salinities (GMFMC, 1998). Juvenile red drum are most abundant around marshes, preferring quiet, shallow, protected waters with muddy or grassy bottoms (Simmons and Breuer, 1962). Sub-adult and adult red drum prefer shallow bay bottoms and oyster reef substrates (Miles, 1950). Within coastal Mississippi, adult and juvenile red drums are common year-round.

Estuaries are also important to the prey species of red drum. This is essential to larvae, juvenile, and early adult red drum since they spend all of their time in the estuary. Larval red drum feed mainly on shrimp, mysids, and amphipods, while juveniles feed on more fish and crabs (Peters and McMichael, 1988). Adult red drum feed mainly on shrimp, blue crab, striped mullet, and pinfish.

Brown Shrimp: Brown shrimp eggs are demersal and occur offshore. The larvae occur offshore and begin to migrate to estuaries as postlarvae. Postlarvae migrate through passes on flood tides at night mainly from February to April with a minor peak in the fall. In estuaries, brown shrimp postlarvae and juveniles are associated with shallow vegetated habitats but also are found in over silty sand and non-vegetated mud bottoms. The density of late postlarvae and juveniles is highest in marsh edge habitat and submerged vegetation, followed by tidal creeks, inner marsh, shallow open water and oyster reefs; in unvegetated areas, muddy substrates seem to be preferred. Juveniles and sub-adults of brown shrimp occur from secondary estuarine channels out to the continental shelf but prefer shallow estuarine areas, particularly the soft, muddy areas associated with plant-water interfaces. Sub-adults migrate from estuaries at night on ebb tide of the new and full moons. Adult brown shrimp occur in neritic Gulf waters (i.e., marine waters extending from mean low tide to the edge of the continental shelf) and are associated with silt, muddy sand, and sandy substrates (GMFMC, 1998). Brown shrimp are common to highly abundant throughout coastal Mississippi and Louisiana year-round.

Larval shrimp feed on phytoplankton and zooplankton. Postlarvae feed on phytoplankton,

epiphytes, and detritus. Juveniles and adults prey on amphipods, polychaetes, and chironomid larvae in addition to algae and detritus (Pattillo et al., 1997).
White Shrimp: White shrimp are offshore and estuarine dwellers and are pelagic or demersal, depending on life stage. Their eggs are demersal and larval stages planktonic, both occurring in nearshore marine waters. Postlarvae migrate through passes mainly from May to November with peaks in June and September. Migration is in the upper 7 feet of the water column at night and at middepths during the day. Postlarval white shrimp become benthic once they reach the estuary, where they seek shallow water with muddy-sand bottoms high in organic detritus or rich marsh where they develop into juveniles. Postlarvae and juveniles inhabit mostly mud or peat bottoms with large quantities of decaying organic matter or vegetative cover. Densities are usually highest in marsh edges and SAVs, followed by marsh ponds and channels, inner marsh, and oyster reefs. White shrimp juveniles prefer salinities of less than 10 parts per thousand and can be found in tidal rivers and tributaries. As juveniles mature, they move to coastal areas where they mature and spawn. Adult white shrimp move from estuaries to coastal areas, where they are demersal and inhabit soft mud or silt bottoms (GMFMC, 1998). White shrimp are common to abundant throughout coastal Mississippi and Louisiana year-round.

Larval shrimp feed on phytoplankton and zooplankton. Postlarvae feed on phytoplankton, epiphytes, and detritus. Juveniles and adults prey on amphipods, polychaetes, and chironomid larvae but also on algae and detritus (Pattillo et al., 1997).

Gray snapper: Gray snapper are demersal mid-water dwellers inhabiting marine, estuarine, and riverine habitats. Gray snapper prefer SAV beds, mangroves, and coral reefs over rocky, sandy and muddy bottoms. Spawning occurs offshore from June to August around artificial structures and shoals. Eggs are pelagic and larvae are planktonic, both occurring in offshore shelf waters and near coral reefs. Postlarvae migrate into the estuaries and are most abundant over shoalgrass and manatee grass beds. Juveniles seem to prefer turtlegrass beds, SAV meadows, marl bottoms, and mangrove roots within estuaries, bayous, channels, SAV beds, marshes, mangrove swamps, ponds and freshwater creeks (GMFMC, 1998). Juvenile gray snapper are common in coastal Mississippi August to January.

This species is classified as an opportunistic carnivore at all life stages (Pattillo et al., 1997). In the estuary, juvenile gray snapper feed on shrimp, larval fish, amphipods, and copepods. At offshore reefs, adults feed primarily on fish and secondarily on crustaceans; larger gray snapper will eat proportionately more fish (GMFMC, 1998).

Spanish mackerel: Spanish mackerel are pelagic, occurring at depths to 250 feet throughout the coastal zone of the Gulf of Mexico. Adults are usually found along coastal areas, extending out to the edge of the continental shelf; however, they also display seasonal migrations and will inhabit high salinity estuarine areas at times. The occurrence of adults in Gulf estuaries is infrequent and rare. Spawning occurs in offshore waters during May through October. Nursery areas are in estuaries and coastal waters year-round. Larvae are most often found offshore from depths of 30 to 275 feet. Juveniles are found offshore, in the surf area, and sometimes in estuarine habitats. Juveniles prefer marine salinities and are not considered estuarine-dependent. The substrate preference of juveniles is clean sand; the preferences of other life stages are

unknown (GMFMC, 1998). Juvenile Spanish Mackerel are common in the Mississippi Sound February to October.
Estuaries are important habitats for most of the major prey species of Spanish mackerel. They feed throughout the water column on a variety of fishes, especially herrings. Squid, shrimp, and other crustaceans are also eaten. Most of their prey species are estuarine-dependent, spending all or a portion of their lifecycle in estuarine habitat.

Sharks species: The Mississippi Sound and adjacent waters have been identified as important nursery areas for nine sharks, primarily Atlantic sharpnose, blacktip, finetooth, and bull sharks. Less prevalent species are the spinner, blacknose, sandbar, bonnethead, and scalloped hammerhead.

Typically sharks migrate inshore in the early spring around March and April, remain inshore during the summer months and then migrate offshore during the late fall around October. Most shark species in the Mississippi waters give birth during late spring and early summer, with young sharks spending just a few months of their life's in shallow coastal waters.

Most shark species are abundant around barrier islands, with adult sharks commonly located south of the barrier islands (Carlson *et al*, 2003).

The four most common inshore shark species feed primarily on fish including: menhaden, spot, croaker, speckled trout, and hardhead catfish. In addition, researchers have found crabs in the stomachs of bonnethead shark and stingrays and smaller sharks in the stomachs of blacktip and bull sharks.

Atlantic Sharpnose shark. Common in bays and estuaries often entering rivers. Also found in offshore waters at depths of about 1,500 feet, generally less than 329 feet. Feeds mainly on small bony fishes, including wrasses, but also marine snails, squid and shrimp.

Blacktip shark. An inshore and offshore shark found on or adjacent to continental and insular shelves. Often off river mouths and estuaries, muddy bays, mangrove swamps, lagoons, and coral reef drop-offs. Bottom associated or pelagic. Young are common along beaches. Blacktip sharks have been captured in high turbidity areas and over bottom types dominated by mud/silt/clay (Carlson et.al, 2003). Active hunter in mid-water. Feeds mainly on pelagic and benthic fishes, also small sharks and rays, cephalopods and crustaceans.

Finetooth shark. Commonly found close inshore. Finetooth sharks have been captured in high turbidity areas and over bottom types dominated by mud/silt/clay (Carlson *et al.*, 2003). Forms large schools. Feeds on small bony fishes and cephalopods.

Bull shark. Bull sharks are coastal and freshwater sharks inhabiting shallow waters especially in bays, estuaries, rivers, and lakes. Readily penetrates far up rivers and hypersaline bays. Capable of covering great distances (up to 180 kilometers in 24 hours), moving between fresh and brackish water at random. Adults are often found near estuaries and freshwater inflows to the sea. Young enter rivers and may be found hundreds of kilometers from the sea. Bull sharks feed on bony fishes, other sharks, rays, mantis shrimps, crabs, squid, sea snails, sea urchins,

mammalian carrion, sea turtles, and occasionally garbage.

The species managed by the Gulf of Mexico Fishery Management Council are listed in **Table 2.**

Table 2: Fishery Management Plans and Managed Species for the Gulf of Mexico (NMFS 2010).

Shrimp Fishery Management Plan
- brown shrimp - *Farfantepenaeus aztecus*
- pink shrimp - *F. duorarum*
- royal red shrimp - *Pleoticus robustus*
- white shrimp - *Litopenaeus setiferus*

Red Drum Fishery Management Plan
- red drum - *Sciaenops ocellatus*

Reef Fish Fishery Management Plan
- almaco jack – *Seriola rivoliana*
- anchor tilefish - *Caulolatilus intermedius*
- banded rudderfish – *S. zonata*
- blackfin snapper - *Lutjanus buccanella*
- blackline tilefish - *Caulolatilus cyanops*
- black grouper- *Mycteroperca bonaci*
- blueline tilefish – *C. microps*
- cubera snapper – *L. cyanopterus*
- dog snapper – *L. jocu*
- dwarf sand perch - *Diplectrum bivittatum*
- gag grouper - *M. microlepis*
- goldface tilefish – *C. chrysops*
- goliath grouper - *Epinephelus itajara*
- gray snapper – *L. griseus*
- gray triggerfish - *Balistes capriscus*
- greater amberjack – *S. dumerili*
- hogfish - *Lachnolaimus maximus*
- lane snapper - *Lutjanus synagris*
- lesser amberjack - *S. fasciata*
- mahogany snapper – *L. mahogoni*
- marbled grouper – *E. inermis*
- misty grouper – *E. mystacinus*
- mutton snapper – *L. analis*
- Nassau grouper – *E. striatus*
- queen snapper - *Etelis oculatus*
- red hind - *Epinephelus guttatus*
- red grouper – *E. morio*
- red snapper - *L. campechanus*
- sand perch - *Diplectrum formosum*
- scamp grouper - *M. phenax*
- schoolmaster – *L. apodus*
- silk snapper – *L. vivanus*
- snowy grouper – *E. niveatus*
- speckled hind - *E. drummondhayi*
- tilefish - *Lopholatilus chamaeleonticeps*
- vermilion snapper - *Rhomboplites aurorubens*
- Warsaw grouper – *E. nigritus*
- wenchman - *Pristipomoides aquilonaris*
- yellowedge grouper *E .lavolimbatus*
- yellowfin grouper – *M. venenosa*
- yellowmouth grouper – *M. interstitialis*
- yellowtail snapper - *Ocyurus chrysurus*

Stone Crab Fishery Management Plan FL
- stone crab - *Menippe mercenaria*
- gulf stone crab – *M. adina*

Spiny Lobster Fishery Management Plan
- spiny lobster - *Panulirus argus*
- slipper lobster - *Scyllarides nodife*

Coral and Coral Reef Fishery Management Plan
- varied coral species and coral reef communities comprised of several hundred species

Coastal Migratory Pelagic Fishery Management Plan
- cobia - *Rachycentron canadum*
- king mackerel – *Scomberomorus cavalla*
- Spanish mackerel - *S. maculatus*

Species in the Fishery but Not in the Mgt Unit
- cero – *Scomberomorus regalis*
- little tuny – *Euthynnus alletteratus*
- dolphin – *Coryphaena hippurus*
- bluefish – *Pomatomus saltatrix (Gulf of Mexico only)*

Table 3: Species Managed Species in the Gulf of Mexico under Federally Implemented Fishery Management Plans (NMFS 2010).

Tuna
albacore – *Thunnus alalunga*
Atlantic bigeye – *T. obesus*
Atlantic bluefin – *T. thynnus*
Atlantic yellowfin – *T. albacares*
skipjack –*Katsuwomus pelamis*

Swordfish
swordfish – *Xiphias gladius*

Billfish
blue marlin – *Makaira nigricans*
sailfish – *Istiophorus platypterus*
white marlin – *T. albidus*
longbill spearfish – *Tetrapturus pfluegeri*

Large Coastal Sharks
basking shark – *Cetorhinus maximus*
great hammerhead – *Sphyrna mokarran*
scalloped hammerhead – *S. lewini*
smooth hammerhead – *S. zygaena*
white shark – *Carcharodon carcharias*
nurse shark – *Ginglymostoma cirratum*
bignose shark – *Carcharhinus altimus*
blacktip shark – *C. limbatus*
bull shark – *C. leucas*
Caribbean reef shark – C. perezi
dusky shark – *C. obscurus*
Galapagos shark – *C. galapagensis*
lemon shark – *Negaprion brevirostris*
narrowtooth shark – *C. brachyurus*
night shark – *C. signatus*
sandbar shark – *C. plumbeus*
silky shark – *C. falciformis*
spinner shark – *C. brevipinna*
tiger shark – *Galeocerdo cuvieri*
tiger shark – *Galeocerdo cuvieri*
bigeye sand tiger – *Odontaspis noronhai*
sand tiger shark – *O. taurus*
whale shark – *Rhinocodon typus*

Small Coastal Sharks
Atlantic angle shark – *Suatina dumerili*
bonnethead shark – *Sphyrna tiburo*
Atlantic sharpnose – *R. terraenovae*
blacknose shark – *C. acrontus*
Caribbean sharpnose shark – *R. porosus*
finerooth shark – *C. isodon*
smalltail shark – *C. porosus*

Pelagic Sharks
bigeye sixgill shark – *Hexanchus vitulus*
sevengill shark – *Heptranchias perlo*
sixgill shark – *H. griseus*
longfin mako shark – *Isurus paucus*
porbeagle shark – *Lamna nasus*
shortfin mako shark – *I oxyrinchus*
blue shark – *Prionace glauca*
oceanic whitetip shark – *C. longimanu*
bigeye thresher shark – *Alopias superciliosus*
common thresher shark – *A. vulpinus*

3.5 Threatened and Endangered Species. Several species of threatened and endangered marine mammals, turtles, fish and birds occur in the Gulf of Mexico off the coast of Mississippi and Louisiana. The National Oceanic and Atmospheric Administration (NOAA) lists the following species in **Table 4** as either threatened and/or endangered that may potentially occur within the project area:

Table 4: Threatened and Endangered Species (NOAA 2010)

LISTED SPECIES	SCIENTIFIC NAME	STATUS	DATE LISTED
Marine Mammals			
Blue Whale	*Balaenoptera musculus*	Endangered	12/2/1970
Finback Whale	*Balaenoptera physalus*	Endangered	12/2/1970
Humpback Whale	*Megaaptera novaengliae*	Endangered	12/2/1970
Sei Whale	*Balaenoptera borealis*	Endangered	12/2/1970
Sperm Whale	*Physeter macrocephalus*	Endangered	12/2/1970
North Atlantic Right Whale	*Eubalaena glacialis*	Endangered	12/2/1970
West Indian Manatee	*Trichechus manatus*	Endangered	3/11/1967
Turtles			
Green Sea Turtle	*Chelonia mydas*	Threatened	7/28/1978
Hawksbill Sea Turtle	*Eretmochelys imbricata*	Endangered	6/2/1970
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Endangered	12/2/1970
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered	6/2/1970
Loggerhead Sea Turtle	*Caretta caretta*	Threatened	7/28/1978
Fish			
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	Threatened	9/30/1991

The U.S. Fish and Wildlife Service (USFWS) lists the following species in **Table 5** as either threatened and/or endangered that may occur within Coastal Louisiana, Hancock, Harrison and Jackson County, Mississippi.

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Table 5: Federally Listed Threatened and Endangered Species in Hancock, Harrison and Jackson County, MS and Coastal Louisiana (USFWS 2010)
T – Louisiana black bear (*Ursus a. luteolus*)
E – West Indian manatee (*Trichechus manatus*)
T – Inflated heelsplitter (*Potamilus inflatus*)
* – Bald Eagle (*Haliaeetus leucocephalus*)
T – Piping plover (*Charadrius melodus*)
T – Gopher tortoise (*Gopherus polyphemus*)
T – Loggerhead sea turtle (*Caretta caretta*)

E – Kemp's ridley sea turtle (*Lepidochelys* kempi)
T – Green sea turtle (*Chelonia mydas*)
TCH – Gulf sturgeon (*Acipenser oxyrinchus desotoi*)
E – Louisiana quillwort (*Isoetes louisianensis*)
C – Black pine snake (*Pituophis melanoleucus ssp. Lodingi*)
E – Red-cockaded woodpecker (*Picoides borealis*)
E – Mississippi gopher frog (*Rana capito sevosa*)
E – Alabama red bellied turtle (*Psuedemys alabamensis*)
T – Eastern indigo snake (*Pituophis melanoleuscus*)
T – Yellow-blotched map turtle (*Graptemys flavimaculata*)
Key to codes on list: * – Bald Eagle is now delisted but their nest trees are protected by federal law. E – Endangered C – Candidate Species T – Threatened TCH – Listed with Critical Habitat

Detailed species accounts and status are contained in the Corps, Mobile District's Federally Authorized GIWW Navigation Project – Operation and Maintenance Louisiana, Mississippi, Alabama and Florida Biological Assessment (BA) dated March 22, 2007.

3.6 Water Quality. Water quality within Mississippi 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 that feed into the Sound. Freshwater inputs from 172,160 acres of watersheds 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 Mississippi Sound a characteristic brownish color (MDEQ, 2006b).

Dynamic features such as the Loop Current, eddies, and river plumes create variations in temperature, salinity, and water density. Temperature and Salinity strongly influence chemical, biological, and ecological patterns and processes. Differences in water density affect vertical ocean currents and may also concentrate buoyant material such as detritus and plankton. Greatest stratification in the water column occurs in summer. There is a general trend for increasing salinity with depth. This results from the combination of denser water from outside the Sound moving along the channel toward shore and less dense freshwater overrunning at the surface (Thompson, 1999).

3.7 Hazardous Material. The Corps is obligated under Engineer Regulation 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste contamination in the vicinity of the proposed action. Statewide, both the

Mississippi and Louisiana Departments of Environmental Quality oversee the assessment and remediation of both abandoned and responsible party sites where hazardous and toxic substances have been released to the environment. No known hazardous materials are present within the project area or immediate vicinity.

3.8 Air Quality. Existing air quality in coastal Mississippi and Louisiana counties were assessed in terms of types of sources contributing to emissions that are regulated by National Ambient Air Quality Standards (NAAQS). NAAQS have been developed for oxides of nitrogen, hydrocarbons, particulate matter, carbon monoxide, sulfur dioxide, lead,volatile organic compounds and other hazardous air pollutants. Sources of air pollution in the project area are mainly from non point sources such as boat motors and vehicular traffic emissions. No major sources of air pollution were found within the vicinity of the project area. The coastal counties in the vicinity of the project are all in attainment for all NAAQS (Environmental Protection Agency, 2008).

3.9 Aesthetics. The coastal region of Mississippi and Louisiana in the vicinity of the project is aesthetically pleasing. The surrounding lands include national, state and county parks, in addition to several urbanized coastal areas.

3.10 Noise. Noise levels in the area are typical of recreational, boating, and fishing activities. Noise levels fluctuate with the highest levels usually occurring during the spring and summer months due to increased recreational activities. Marine shipping activities also produce underwater shipping noise, typically low—frequency sound in the range of 20-500 hertz. Shipping to the ports of Louisiana and Mississippi includes approximately 8,000 to 9,000 foreign cargo vessel trips per year, and shipping traffic throughout the GIWW exceeds 700,000 vessels per year. Low-frequency sound travels farther underwater that high-frequency sound, so underwater shipping noise from traffic in the GIWW extends beyond the immediate vicinity of the channel (CH2MHILL, 2007).

3.11 Cultural Resources. Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended and implementing regulations 36 CFR Part 800 requires consultation with other agencies to avoid or minimize adverse effect on historical, architectural, archaeological, and cultural resource. In order to ensure compliance, the National Register of Historic Places (Register) has been consulted and no properties listed on, being nominated to or that have been determined eligible for the Register are located in the vicinity of the proposed work. Since the area has been previously dredged, the potential for submerged cultural resources is low. The GIWW was authorized by Congress and completed more than 50 years ago. The existing channel and disposal areas were constructed and operated prior to the enactment of the NHPA. In 1979, the Corps, Mobile District, analyzed and considered the effect that continued use and maintenance of the waterway may have on historic properties as per regulations within 36 Code of Federal Regulation (CFR) 800, in order to ensure compliance with NHPA. This analysis was conducted as part of the aforementioned EIS from 1976. No cultural resources were found within the dredged material disposal areas or channel areas. No sites listed on the Register were located within the project area.

4.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

4.1 Fish and Wildlife Resources.

Oyster Reefs. No significant adverse impacts to oyster reefs from the continued operation and maintenance of the GIWW in Mississippi or Louisiana were identified in this evaluation. The closest oyster reefs are located more than 2,000 feet from any open water placement activities associated with this project with most occurring more than 3,000 feet from discharge (**Figures 2-5**).

Submerged Aquatic Vegetation. No significant impacts to the SAVs were identified in this evaluation. The closest known SAVs are located over a mile from open water placement activities associated with this project and no SAVs are located within the expected 400-foot turbidity mixing zone of channel dredging.

Wetlands. No impacts to wetlands are expected from the continued operation and maintenance of the GIWW in Mississippi or Louisiana. There are no upland dredged material management areas on this portion of the GIWW and the project is too far away from shore to impact any coastal marshlands.

Sediments. The sediment quality and texture of the channel dredged material are expected to be homogenous to that existing in the dredged material management areas, due to their close proximity to the channel and the fact that these areas have historically received dredged material from the adjacent reaches of the GIWW. Placement of a large quantity of fine-grained sediment in Mississippi Sound will temporarily have an adverse impact to EFH and other estuarine resources. However, over a ten-year period it is not expected to have any long-term adverse impacts.

In addition, the Section 404(b)(1) Evaluation Report concluded that the proposed maintenance and dredging action will not jeopardize or adversely impact any oyster reefs, SAVs, wetlands or other critical habitat (**Enclosure 28**).

4.2 Terrestrial Wildlife. As a result of this evaluation, no adverse impacts to the terrestrial wildlife located in the vicinity of project were identified. The proposed work would create disturbance to species utilizing the terrestrial habitats within on-shore equipment staging areas. This would mainly involve short-term disturbance from equipment, vehicles and personnel movements for the duration of work. However, these species are mobile and would generally avoid the area during use.

4.3 Benthos, Motile Invertebrates, and Fishes. There would be temporary disruption of the aquatic community caused by the maintenance dredging and open water placement. Non-motile benthic fauna within the area would be destroyed by dredging and open water placement operations, but should repopulate upon project completion. Some of the motile benthic and pelagic fauna, such as crabs, shrimp, and fishes are able to avoid the disturbed area and should return shortly after the activity is completed. Larval and juvenile stages of these forms may not be able to avoid the activity due to limited mobility.

The materials that will be dredged from the project area are homogenous with those that will remain in the channel and, therefore, no alteration of habitat composition is occurring. If sediment type is not changed as a result of project activities, recolonization can be expected with the similar species returning to the disturbed areas (Stickney, 1984). The area will remain a shallow-water (defined as depths shallower than 46 feet) neritic zone that can support sub-littoral benthic biota. Because similar habitat, in terms of both sediment composition and depth, will be present pre- and post-dredging, it is concluded that the benthic biota in the channel will have the ability to recover and re-colonize.

Rates of benthic community recovery observed after dredged material placement ranged from a few months to several years. The relatively species-poor benthic assemblages associated with low salinity estuarine sediments can recover in periods of time ranging from a few months to approximately one year (Leathem et al., 1973; McCauley et al., 1976 and 1977; Van Dolah et al. 1979 and 1984; Clarke and MillerWay, 1992), while the more diverse communities of high salinity estuarine sediments may require a year or longer (e.g. Jones, 1986; Ray and Clarke, 1999).

Open water placement activities would utilize thin layer disposal methods (< 12 inches) where practicable and feasible to minimize impacts by allowing populations of small, shallow-burrowing infauna with characteristically high reproductive rates and wide dispersal capabilities to recover quickly. Deposition of relatively thin layers of dredged material (<10 centimeter, 4 inches) can minimize impacts by allowing many populations of small, shallow-burrowing infauna with characteristically high reproductive rates and wide dispersal capabilities to recover quickly. Deposits greater than 20-30 cm (8-12 in) generally eliminate all but the largest and most vigorous burrowers (Maurer et al., 1978). The sediment quality and texture of the channel dredged material are expected to be homogenous to that existing in the disposal areas, due to their close proximity to the channel and the fact that these areas have historically received dredged material from the adjacent reaches of the GIWW. Placement of material similar to the ambient sediments (e.g., sand on sand or mud on mud) has been shown to produce less severe, long-term impacts (Maurer et al. 1978, 1986).

Temporary loss of benthic invertebrate populations would occur within the project footprint of the channel and open water disposal areas. These areas combined comprise less than 0.2% of estuarine water bottom of the state within the Mississippi Sound. It should also be noted that dredging and disposal along the entire channel length in Mississippi and Louisiana would not occur within the same dredging cycle (year). Given this and the fact that the average dredging cycle of any one location is 3 years or greater; sufficient time for an area to recover is expected.

Several studies of turbidity from total suspended solids (TSS) associated with dredging operations have concluded that dredging had no substantial effects on nekton (Ritchie, 1970; Stickney, 1972; Wright, 1978); however, other studies have shown that elevated TSS levels and prolonged exposure can suffocate and reduce growth rates of adult and juvenile nekton and reduce viability of eggs (Moore, 1977; Stern and Stickle, 1978). Detrimental effects are generally recognized at TSS concentrations greater than 500 milligrams per liter (mg/L) and for durations of continuous exposure ranging from several hours to a few days. Turbidities exceeding 500 mg/L have been observed around maintenance dredging and placement operations (EH&A,

1978), and such turbidities may affect some aquatic organisms near the active dredges. In a study in Corpus Christi Bay, Schubal et al. (1978) reported TSS values greater than 300 mg/L but only in a relatively small area near the bottom. They also found that TSS from maintenance dredging in Corpus Christi Bay is not greater than that from shrimping and affects the bay for much shorter time periods. In a study of the Laguna Madre, Sheridan (1999) found elevations in turbidity only over the subtidal placement material fluid mud pile. In this study they found that even 16.5 feet from the edge of the placed material, turbidity was not statistically greater than that 1 kilometer or more away. May (1973) found that TSS was reduced by 92 percent within 100 feet of the discharge point, by 98 percent at 200 feet, and that concentrations above 100 mg/L were seldom found beyond 400 feet from the point of placement. Elevated turbidities during construction and maintenance dredging may affect some aquatic organisms near the dredging activity; however, turbidities in open-water habitats can be expected to return to near ambient conditions within a few hours after dredging ceases or moves out of a given area. Schidler (1984) reports similar TSS levels from dredging and storm events. Overall, motile organisms are mobile enough to avoid highly turbid areas (Hirsch et al., 1978). Under most conditions, fish and other motile organisms are only exposed to localized suspended-sediment plumes for short durations (minutes to hours) (Clarke and Wilber, 2000).

Due to the phased nature of the channel maintenance, the small area (percentage wise) of ecosystem that will be affected at a given point in time and the use of thin layer open water disposal methods where practicable and feasible, no significant long-term impacts to the benthos, motile invertebrates, and fishes are expected to occur as a result of the proposed action.

4.4 EFH. Dredging to maintain the GIWW would temporarily adversely affect the EFH in the vicinity of the proposed action. However, there is ample habitat available in the vicinity to accommodate these temporarily displaced animals and any impacts would be minor. EFH for adult and juvenile brown and white shrimp; red drum; as well as adult gray snapper, Spanish mackerel and several species of shark occurs within the vicinity of the project. No estuarine emergent wetlands, oyster reefs, or SAVs would be adversely affected by the proposed action. No mitigation would be required for the temporary disruptions to the EFH, as the fish would move out of the area during dredging activities and would be able to return to the channel area after activities cease. Dredging could cause minor, localized disruptions to seasonal shrimp distributions in the vicinity of the dredge. The loss of organisms would be negligible and could be mitigated by timing dredging operations to avoid peak migration periods. Based on the size of the Mississippi Sound, only a small fraction of this total area would likely be affected during any single routine maintenance dredging event. Initial placement operations would cover benthic organisms with dredged material. However, as detailed in Section 4.3 of this assessment, no significant long-term impact to this resource is expected as result of this action.

Notwithstanding the potential harm to some individual organisms, no significant impacts to managed species of finfish or shellfish populations are anticipated from the maintenance dredging and placement operations. The public notice and the effects determination of the EA were forwarded to the NMFS Habitat Conservation Division (HCD) for review and comment **(Enclosures 8, 9 and 10)**. NMFS HCD sent a letter dated March 31, 2008 to the Corps, Mobile District stating that "the large quantity of fine-grained sediment being placed, unconfined, in Mississippi Sound would result in adverse impacts to EFH and other estuarine resources.....

species diversity of non-motile benthic species may never fully recover to pre-project levels" (**Enclosure 15**). The Corps, Mobile District believes that due to the phased nature of the channel maintenance and the small area (percentage wise) of ecosystem that would be affected at a given point in time no significant long-term EFH impacts are expected to occur.

4.5 Threatened and Endangered Species. Through consultation with the NMFS, Protected Resource Division (PRD) and the United States Fish and Wildlife Service (USFWS) the Corps, Mobile District has determined that the following threatened and endangered species: Gulf sturgeon; West Indian manatee; and the loggerhead, green and Kemp's ridley sea turtles may be affected by the continued operation and maintenance of the GIWW within the States of Mississippi and Louisiana. The Corps, Mobile District assessed the potential impacts of the proposed action on threatened and endangered species and known designated critical habitat areas within the action area in a BA dated March 22, 2007. Based on this assessment the Corps, Mobile District determined that no federally-protected species or designated critical habitat were likely to be adversely affected as a result of the proposed project. A letter requesting concurrence with the District's Not Likely to Adversely Affect (NLAA) and Not Likely to Adversely Modify (NLAM) determination was sent to the NMFS PRD and USFWS on April 19, 2007 (**Enclosures 1 & 2**). The USFWS Louisiana Field Office (LFO) concurred, by letter dated May 18, 2007 that the proposed project would NLAA most of the federally listed species or their critical habitat. However, the LFO recommended two additional West Indian manatee standard conditions to further reduce potential impacts: 1) request that the Corps require vessels to operate at "no wake/idle" speeds within 100 yards of the active work zone if a manatee is sighted within 100 yards of the active work zone; 2) request that the Corps notify the LFO and Louisiana Department of Wildlife and Fisheries, Natural Heritage Program (**Enclosure 3**). The Corps, Mobile District believes that if the Standard Manatee Construction Conditions are implemented during dredging operations, potential impacts to West Indian Manatee would be minimized. The USFWS Mississippi Field Office responded by letter dated May 30, 2007 to the BA expressing concern for the Gulf sturgeon in Mississippi. They stated that the decline of the Gulf sturgeon is primarily due to limited access to migration routes and historic spawning areas, habitat modification, and water quality degradation. The GIWW lies within the Critical Habitat of the Gulf Sturgeon identified as Unit 8. Although the Service is concerned regarding potential impacts to the sturgeon and its designated Critical Habitat, the NMFS retains primary responsibility for the sturgeon in all marine units (**Enclosure 5**). NMFS PRD concurred with the Corps, Mobile District's determination on a NLAA threatened and endangered species and NLAM designated critical habitat determination, under their purview by letter dated October 23, 2007 (**Enclosure 6**).

To reduce the likelihood of take the Corps, Mobile District has agreed to incorporate the following conditions during operations and maintenance dredging of the GIWW with Mississippi and Louisiana:

- Dredging will be conducted utilizing hydraulic or mechanical methods reducing the potential for entrainment of Gulf sturgeon and sea turtles associated with hopper dredges.

- During active hydraulic dredging operations the cutterhead will be located within the substrate.

- Thin layer disposal will be utilized when practicable and feasible.
- If threatened or endangered species are observed during dredging operations, the operation will be temporarily stopped until the species has left the area.
- Standard Manatee Construction Conditions will be followed during operations.
- If manatees are encountered at the project site in Louisiana, the USFWS Louisiana Field Office (337/291-3100) and the Louisiana Department of Wildlife and Fisheries (225/765-2800) will be notified.

4.6 Water Quality. The dredging and disposal operations are expected to create some degree of construction-related turbidity in excess of the natural condition in the proximity of the channel and placement site. Impacts from sediment disturbance during these operations are expected to be temporary, minimal and similar to conditions experienced during past routine operation and maintenance of the GIWW. Suspended particles are expected to settle out within a short time frame (hours), with no long-term measurable effects on water quality. No measurable changes in temperature, salinity, PH, hardness, oxygen content or other chemical characteristics are expected. The Corps, Mobile District requested water quality certification from both MDEQ and Louisiana Department of Environmental Quality (LDEQ). MDEQ issued water quality certification (WQC) on March 24, 2008 (**Enclosure 14**). LDEQ issued WQC on December 28, 2009 (**Enclosure 26**).

In addition, MDEQ granted a 750-foot mixing zone for maintenance dredging operations with an outside turbidity limit of 50 NTUs (**Enclosure 14**). During construction, turbidity levels would be monitored at the dredge and the open water placement sites, to ensure compliance with Best Management Practices (BMPs).

4.7 Hazardous Materials. No hazardous materials are known to exist in the project area. The contractor would be responsible for proper storage and disposal of any hazardous material, such as oils and fuels used during the dredging and disposal operation.

4.8 Air Quality. The proposed action would have no significant long-term affect on air quality. Air quality in the immediate vicinity of the construction equipment would be slightly affected for a short period of time by the fuel combustion and resulting engine exhausts. The exhaust emissions are considered insignificant in light of prevailing breezes and when compared to the existing exhaust fumes from other vessels using the project area. The proposed action would not affect the attainment status of the project area or region.

4.9 Aesthetics. Only temporary degradation to the aesthetic environment would occur as a result of the proposed action. Impacts would primarily occur as a result of the physical presence of heavy equipment. Some minor increases in turbidity may be noted in the immediate vicinity during dredging operations, but these increases would be minor and short term in nature.

4.10 Noise. Noise impacts from project equipment are expected to increase in the vicinity during maintenance dredging work. These impacts would be short term and restricted to the immediate vicinity of the activity and only for a few days. Sensitive noise receptors (a residential area and school) are located several miles from the proposed action. Mechanical dredging produces between 58 and 70dB for a person located 50 feet from the operation. Hopper dredging ships produce an average of 82 dB. Underwater noise levels range from 160 to 180 dB. The noise is not at levels known to cause any injury, temporary or permanent, to marine life, and would not remain in any single location for longer that a few days (CH2MHILL, 2007).

Past maintenance dredging operations along the GIWW and other areas have occurred at depths and durations similar to those of the proposed action. Marine species in the vicinity of the channel and elsewhere in the Sound have coexisted with ongoing maintenance dredging operations. Therefore, any noise impacts from the proposed action would be temporary and minor. No long-term increase in noise would occur in or around the project area.

4.11 Cultural Resources. In compliance with the NHPA, coordination with both the Mississippi and Louisiana State Historic Preservation Officer (SHPO) was conducted. No cultural resources are known to occur in the open water disposal or channel areas. No sites listed on the Register are located within the project area.

The GIWW was authorized by Congress and completed more than 50 years ago. The existing channel and disposal areas were constructed and operated prior to the enactment of the NHPA, which was signed in to law in 1966. In 1979, the Corps, Mobile District, analyzed and considered the effect that continued use and maintenance of the waterway may have on historic properties as per regulations within 36 Code of Federal Regulation (CFR) 800, in order to ensure compliance with NHPA. This analysis was conducted as part of the aforementioned EIS from 1976. No cultural resources were found within the upland disposal, open-water disposal or channel areas. No sites listed on the Register were located within the project area. As the lead Federal agency the Corps, Mobile District, determined that the continued operation and maintenance activities would have no effect on historic properties.

The present project includes no new action as defined by the NHPA. The Corps, Mobile District has determined that maintenance dredging operations within existing channels and utilizing existing disposal areas has no potential to cause effects to historic properties as per 32CFR 800.3(a)(1). The Mississippi SHPO concurred with the Corps, Mobile District's findings via lettered dated March 14, 2008 (**Enclosure 12**). The Louisiana SHPO concurred with the Corps, Mobile District's findings via letter date stamped December 15, 2009 (**Enclosure 25**).

5.0 CUMULATIVE EFFECTS SUMMARY. Cumulative effects are those impacts on the environment that result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or nonfederal) or person undertakes such other actions. This section analyzes the proposed action as well as any connected, cumulative, and similar existing and potential actions occurring in the area and surrounding the site.

The Corps is required by Congress to maintain the federally authorized GIWW to a depth of -12 feet MLLW plus 2 feet of advanced maintenance and 2 feet of allowable paid over depth to provide for safe navigation by commercial and recreational vessels. The location of a disposal area at or near this site is essential for future dredging events to meet this Congressional mandate. Future development of the surrounding area (on shore) would likely proceed under the "no action" or the "preferred action" plan as development in the immediate area is not specific to the proposed action but connected with existing local attractions and urbanization of the area. Those future plans could be considered through a separate NEPA process at that time. Therefore, dredging of the GIWW is expected to have no significant direct cumulative impacts to biological resources, water chemistry, or oceanographic resources.

6.0 OTHER CONSIDERATIONS

6.1 Coastal Zone Management Act of 1972. The Corps, Mobile District determined that the proposed action is consistent with both the Mississippi and Louisiana Coastal Management Programs to the maximum extent practicable. Mississippi Department of Marine Resources (MDMR) issued Coastal Zone Consistency (CZC) on March 10, 2008 and is referenced in **Enclosure 11**. Louisiana Department of Natural Resources (LDNR) issued CZC on January 27, 2010 and is referenced in **Enclosure 27**.

6.2 Clean Water Act of 1972. No work would occur until each State issued water quality certification for the proposed action. All State water quality standards have been met for this project. Section 401 water quality certification was requested from both MDEQ and LDEQ. MDEQ issued WQC on March 24, 2008 and is referenced in **Enclosure 14**. LDEQ issued WQC on December 28, 2009 and is referenced in **Enclosure 26**. A Section 404(b)(1) evaluation is also included in this report as **Enclosure 28**.

6.3 Rivers and Harbors Act of 1899. The proposed work would not obstruct navigable waters of the United States.

6.4 Marine Mammal Protection Act of 1972, as amended. Incorporation of the safe guards used to protect threatened or endangered species during project implementation will also protect any marine mammals in the area; therefore, the project is in compliance with this Act.

6.5 Fish and Wildlife Coordination Act of 1958, as amended. This project was coordinated with the FWS, and is in full compliance with the act.

6.6 E.O. 11988, Protection of Children. The proposed action complies with Executive Order (EO) 13045, "Protection of Children from Environmental Health Risks and Safety Risks", and does not represent disproportionally high and adverse environmental health or safety risks to children in the United States. The proposed site is not used disproportionally by children.

6.7 E.O. 11990, Environmental Justice. EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (February 11, 1994) requires that Federal agencies conduct their programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that such programs, policies, and activities do not have

the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under such programs, policies, and activities because of their race, color, or national origin.

The proposed project is not designed to create a benefit for any group or individual. No changes in demographics, housing, or public services would occur as a result of the proposed project. The dredging of GIWW does not create disproportionately high or adverse human health risks or environmental impacts on minority or low income populations of the surrounding community. Review and evaluation of the proposed project have not disclosed the existence of identifiable minority or low income communities that would be adversely impacted by the proposed project.

6.8 Deepwater Horizon Oil Spill Impacts. On April 20, 2010, while working on an exploratory well approximately 50 miles offshore of Louisiana, the floating semi-submersible mobile offshore drilling unit Deepwater Horizon experienced an explosion and fire. The rig subsequently sank and oil and natural gas began leaking into the Gulf of Mexico. The total amount of oil and natural gas that has escaped into the Gulf of Mexico is unknown, but is currently believed to be between 35,000 and 65,000 barrels per day for an approximate total of 4.9 million barrels. On September 19, the relief well process was successfully completed and the federal government declared the well "effectively dead". The spill has caused extensive damage to marine and wildlife habitats as well as the Gulf's fishing and tourism industries.

This spill has created uncertainty on whether future dredging operations will meet environmental compliance criteria and requirements for ocean disposal. The long term impacts of the oil spill on coastal Mississippi and Louisiana are uncertain at this time. This spill could potentially adversely impact USACE water resources projects and studies within the coastal area. Potential impacts could include factors such as changes to existing or baseline conditions, as well as changes to future-without and future with project conditions. The USACE will continue to monitor and closely coordinate with other Federal and state resource agencies and local sponsors in determining how to best address any potential problems associated with the oil spill that may adversely impact USACE water resources development projects/studies. This could include revisions to proposed actions as well as the generation of supplemental environmental analysis and documentation for specific projects/studies as warranted by changing conditions.

7.0 COORDINATION. The general public was notified of the proposed action via Public Notice on January 28, 2008 for both the Mississippi portion of the GIWW and the Louisiana portion. The public notices were mailed to Federal and state agencies and the interested public and included a 30-day review period. All comments on the action were considered prior to a decision on the action. Legal notices were published in the *The Advocate* and *The Times-Picayune* during the month of November 2009 to meet the State of Louisiana requirements **(Enclosures 19 and 23)**.

8.0 CONCLUSION. The proposed action would have no significant environmental impacts on the existing environment. No mitigation actions are required for the proposed project. The implementation of the proposed action would not have a significant adverse impact on the quality of the environment and an Environmental Impact Statement is not required.

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10.0 LIST OF AGENCIES CONSULTED.

Mississippi Department of Marine Resources
Mississippi Department of Environmental Quality
Mississippi State Historic Preservation Officer
Mississippi Department of Wildlife, Fisheries and Parks

Louisiana Department of Natural Resources
Louisiana Department of Environmental Quality
Louisiana State Historic Preservation Officer
Louisiana Department of Wildlife and Fisheries

National Marine Fisheries Service
National Register of Historic Places
U.S. Army Corps of Engineers, Mobile District
U.S. Environmental Protection Agency, Region IV
U.S. Fish and Wildlife Service, Jackson, Mississippi Field Office
U.S. Fish and Wildlife Service, Baton Rouge, Louisiana

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SECTION 404(B)(1) EVALUATION REPORT

MAINTENANCE DREDGING AND DISPOSAL OF DREDGED MATERIAL MISSISSIPPI AND LOUISIANA PORTIONS OF THE GULF INTRACOASTAL WATERWAY FEDERALLY AUTHORIZED NAVIGATION PROJECT

HANCOCK, HARRISON AND JACKSON COUNTIES, MISSISSIPPI AND COASTAL LOUISIANA

I. PROJECT DESCRIPTION.

A. Location. The Gulf Intracoastal Waterway (GIWW) within Mississippi and Louisiana extends from the Alabama-Mississippi state line through Mississippi Sound to Lake Borgne Light No. 29 at the Rigolets in Louisiana (**Figure 1 of EA**).

B. General Description of the Proposed Action. The proposed action would involve maintenance dredging and disposal operations for the GIWW in the State of Mississippi and Louisiana. Approximately 300,000 cubic yards (cys) of clay, silt and sand are proposed for removal by hydraulic cutterhead dredge along various sections of the channel on an infrequent basis over the next five years. The material would be placed in previously certified open water disposal sites: 66, 65A, 65B and 65C (**Figures 2-6 of EA**).

The existing project provides for a waterway 12 feet deep and 125 feet wide at mean low water (MLW) from Apalachee Bay, FL., to Mobile Bay, AL., and 12 feet deep and 150 feet wide from Mobile Bay, AL., to the Rigolets, LA. (Lake Borgne Light No. 29), and for a tributary channel (the Gulf County Canal), 12 feet deep, 125 feet wide, and about 6 miles long connecting the waterway at White City, Florida with St. Joseph Bay. The waterway between the 12 foot contours in Apalachee Bay and Lake Borgne Light No. 29 at the Rigolets is 379 miles long. Plane of reference is MLW.

The proposed dredging action would be performed with a tolerance of up to two (2) feet of advance maintenance and 2 feet of paid allowable over-depth dredging. Maintenance dredging of soft-dredged material with a hydraulic cutterhead dredge may disturb the bottom sediments several feet deeper than the target depth due to the inaccuracies of the dredging process. An additional 3 feet of sediment below the 2-foot paid allowable dredging cut may be disturbed in the dredging process with minor amounts of material being removed.

Maintenance dredging and disposal would be performed on an as needed basis. The frequency of channel dredging at any one site and the associated time between the use of any given disposal area ranges on average once every 3 to 25 years.

In emergency conditions, a barge mounted dragline or snagboat may be used to remove

rapidly formed or unexpected shoals or other hazards to navigation. This material would be placed to the side of the channel to allow for immediate passage of vessels until a hydraulic cutterhead dredge could be dispatched to restore project dimensions. Emergency disposal needs are infrequent and usually the result of storm incidents or barge groundings. Past experiences have shown that only a few areas would likely require such emergency action, but such actions may be required at any location along the waterway. In the event of an emergency, all necessary Federal and State agencies would be notified before commencement of work.

C. Authority and Purpose. The existing project was authorized by the 1966 Rivers and Harbors Act (House Document 481, 89th Congress, 2nd Session) as amended and prior acts. The purpose is to provide barge tows and other small craft that are not well suited for use in the Gulf of Mexico a secure and safe means of navigating the great inland rivers of the country. The GIWW has historically been a vital means for transporting heavy freight and continues to be one today.

D. General Description of Dredged or Fill Material. The sediments that would be dredged and placed in previously authorized open water and confined upland disposal areas consists of sand to clays with various mixtures of sand, silt, and clay located throughout the channel.

(1) **General Characteristics of Material.** Bottom sediments along the navigation channel consist of sandy silts and clays.

(2) **Quantity of Material.** Approximately 300,000 cubic yards of material will be dredged from the GIWW navigation project over the next five years.

(3) **Source of Material.** The material is being dredged from the GIWW Federal navigation project would be attained by the maintenance dredging activities associated with the coastal Alabama and Louisiana portions of the GIWW. The dredging cycle is dependent upon where shoaling occurs.

E. Description of the Proposed Discharge Site.

(1) **Location.** The designated open-water placement areas are located in Mississippi and Louisiana oriented south of the GIWW channel **(Figures 2-6 of EA)**.

(2) **Size.** The open-water disposal sites range in size from 176 to 1962 acres **(Table 6 of EA)**.

(3) **Type of Site.** The disposal sites are previously authorized open-water placement areas in the Mississippi Sound that consist of bottoms colonized by similar material as to what is being proposed for removal.

(4) **Type of Habitat.** The open-water area is estuarine habitat that has historically

been used for disposal of dredged material. No submerged aquatic vegetation or oyster reefs are present at these sites.

(5) **Timing and Duration of Discharge.** Timing and duration of the proposed action are dependent upon where shoaling occurs in the navigation project. The frequency of channel dredging at any one site and the associated time between the use of any given disposal area ranges on average once every 3 to 25 years. Maintenance dredging cycles typically require several months to complete.

F. Description of Disposal Method. The disposal method used will be a thin-layer placement in the previously authorized open-water sites where feasible. The contractor will use a hydraulic pipeline dredge and the dredged material would be pumped via pipeline to the open-water disposal areas. The dredged material will be placed in a thin-layer not to exceed 12 inches where practical and feasible.

II. Factual Determinations.

A. Physical Substrate Determinations.

(1) **Substrate Elevation and Slope.** The preferred alternative would have no adverse impacts on the existing substrate elevation and slope within the project vicinity. The project would result in the removal of substrate as needed to a depth of 12 feet MLLW with two feet of advanced maintenance and two feet of allowable overdepth within the project area. Thin layer technique for the placement of dredged material in open-water sites would be utilized where feasible. Dredged material would not significantly exceed present depths at these sites. Significant mounding is not expected to occur in the open-water sites, as the larger material will flow into deeper areas and seek slopes reflective of existing bottom conditions. Bottom topography within this site is relatively flat.

(2) **Sediment Type.** Dredged material proposed for disposal consists of sands, silts and clays.

(3) **Dredged/Fill Material Movement.** Material disposed of at the open-water site would be positioned in such a way to retain movement of sediment mostly within the disposal area. However, after placement some materials may move under storm events outside the designated area.

(4) **Physical Effects on Benthos.** Disruption of the benthic community is expected to be temporary and minimal. Non-motile benthic fauna within the open-water disposal site may be destroyed by the proposed operations, but should repopulate within several months after completion. Some of the motile benthic and pelagic fauna, such as crabs, shrimp, and fishes, are able to avoid the disturbed area and should return shortly after the activity is completed. Larval and juvenile stages of these forms may not be able to avoid the activity due to limited mobility. The overall impact to these organisms is

expected to be minimal.

(5) **Other effects.** No other effects are anticipated.

(6) **Actions Taken to Minimize Impacts.** The thin-layer dredged material disposal is a minimization technique that will be used to lessen impacts caused by the disposal. No other actions to minimize impacts to the physical substrate are deemed appropriate for this project.

B. Water Column Determinations.

(1) **Water**

(a) **Salinity.** Salinity would not be impacted as a result of the dredging and disposal operations.

(b) **Water Chemistry (pH, etc.).** No effect.

(c) **Clarity.** Minor increases in turbidity may be experienced in the immediate vicinity of the project area during dredging and disposal operations. However, these increases will be temporary and would return to pre-project conditions shortly after completion.

(d) **Color.** No effect.

(e) **Odor.** No effect.

(f) **Taste.** No effect.

(g) **Dissolved Gas Levels.** Temporary decreases in dissolved oxygen will likely result from the operations, but this will only be of a short duration. No significant effect to the water column is anticipated.

(h) **Nutrients.** Slight increases in nutrient concentrations may occur from dredging and disposal operations; however, these concentrations would rapidly disperse. These described increases would have no significant effect to the water column.

(i) **Eutrophication.** No effect.

(2) **Current Patterns and Circulation.**

(a) **Current Patterns and Flow.** Placement of dredged material into the open water disposal site would have no effect on current patterns and flow in the vicinity of the project area.

(b) **Velocity**. No significant effects.

(c) **Stratification**. No effect.

(d) **Hydrologic effects**. No effect.

(3) **Normal Water Level Fluctuations**. No significant effects.

(4) **Salinity Gradient**. The salinities in the project vicinity are highly variable due to the inflow of freshwater from surrounding rivers and the tidal influence from the Gulf of Mexico. No effect.

C. **Suspended Particulate/Turbidity Determination**:

(1) **Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Placement Site**. No significant effect.

(2) **Effects on Chemical and Physical Properties of the Water Column**. No effect.

(a) **Light Penetration**. Light penetration through the water column at the open-water disposal site may be temporarily affected but is anticipated to return to previous conditions upon completion of operation and maintenance activities.

(b) **Dissolved Oxygen**. No significant effects.

(c) **Toxic Metals and Organics**. No effect.

(d) **Pathogens**. No effect.

(e) **Esthetics**. No effect.

(3) **Effects on Biota**. No effect.

(a) **Primary Production Photosynthesis**. No significant effects.

(b) **Suspension/Filter Feeders**. No significant effects.

(c) **Sight Feeders**. Shorebirds tend to be attracted to disposal sites and placement activities due to the presence of food items in the dredged material. The impact of dredging and disposal operations at the open-water site on sight feeders is expected to be a beneficial, short-term impact.

(4) **Actions Taken to Minimize Impacts (Subpart H)**. No further actions are deemed appropriate.

D. Contaminant Determinations. The materials proposed for placement are naturally occurring materials from the Mississippi Sound. The proposed dredged materials are far removed from potential sources of contamination and have minute probability as a carrier of contaminates. There is no reason to believe that the materials are unsuitable for placement. Therefore, the materials are excluded from testing under Section 404(b)(1)(d).

E. Aquatic Ecosystem and Organism Determinations.

(1) **Effects on Plankton**. No significant effects.

(2) **Effects on Benthos**. Temporary disruption of the aquatic community is anticipated at the open-water site. Non-motile benthic fauna within the area may be destroyed by the proposed dredging operations, but should repopulate within several months after completion. Due to the dredging cycle occurring once every 3 to 25 years, repopulation of non-motile benthic fauna should not be adversely impacted. Some of the motile benthic and pelagic fauna, such as crabs, shrimp, and fishes, are able to avoid the disturbed area and should return shortly after the activity is completed. Larval and juvenile stages of these forms may not be able to avoid the activity due to limited mobility. The overall impact to these organisms is expected to be minimal.

(3) **Effects on Nekton**. No significant effects.

(4) **Effects on Aquatic Food Web**. No significant effects.

(5) **Effects on Special Aquatic Sites**. No effect.

(a) **Sanctuaries and Refuges**. Not applicable.

(b) **Wetlands**. No effect.

(c) **Mud Flats**. Not applicable.

(d) **Vegetated Shallows**. No significant impacts to the submerged aquatic vegetation (SAV) were identified in this evaluation. The closest known SAVs are located over a mile from open-water placement and no SAVs are located within the expected 400-foot turbidity mixing one of channel dredging.

(e) **Coral Reefs**. Not applicable.

(f) **Riffle and Pool Complexes**. Not applicable.

(6) **Effects on Threatened and Endangered Species**. The Corps, Mobile District coordinated with the U.S. Fish and Wildlife Service and the National Oceanic

and Atmospheric Administration Fisheries under Section 7 of the Endangered Species Act and the Marine Mammals Protection Act. Concurrence was received from both agencies.

(7) **Effects on Other Wildlife.** No significant effects.

(8) **Actions to Minimize Impacts.** No other actions to minimize impacts on the aquatic ecosystem are deemed appropriate.

F. Proposed Disposal Site Determinations:

(1) **Mixing Zone Determination.** The State of Mississippi specified a mixing zone not to exceed ambient turbidity by more than 50 nephelometric turbidity units at the outer limits of 750-foot for turbidity compliance. The State of Louisiana did not specify a mixing zone. Material placed at the open-water area is anticipated to quickly settle out of the water column. Pre- and post-monitoring of water quality suggests turbidity and total suspended solids are temporarily affected by disposal operations. However, the magnitude of the increases with disposal operations is consistent with those caused by frontal storms. Disposal of material at the open-water sites is not anticipated to exceed the proposed turbidity compliance issued. Thus, no mixing violations are expected.

(a) **Depth of water at the disposal site.** The designated open-water disposal site adjacent to the channel ranges from approximately 7 to 15 feet in depth.

(b) **Current velocity, direction, and variability at the disposal site.** Astronomical tides, winds, and freshwater discharge dominate the circulation patterns within Mississippi Sound. Data collected within the Gulf of Mexico between November 1980 and September 1981 indicate that the progression of the tide through Horn Island Pass segments the Gulf into eastern and western areas dominating circulation within this portion of the Gulf. The eastern area is between Horn Island Pass, Mississippi, and the main pass entering Mobile Bay, Alabama. The western area is between Horn Island Pass and the Chandeleur Islands. As tide propagates from the Gulf into Mississippi Sound, a clockwise movement of water occurs in the eastern area while a counterclockwise movement occurs in the west.

(c) **Degree of turbulence.** No effect.

(d) **Stratification attributable to causes such as obstructions, salinity or density profiles at the disposal site.** No effect.

(e) **Discharge vessel speed and direction, if appropriate.** No effect.

(f) **Rate of discharge.** Rate of discharge will vary according to the particular type of dredge disposing of the material.

(g). **Ambient concentrations of constituents of interest.** Not applicable.

(h). **Dredged material characteristics, particularly concentrations of constituents, amount of material, type of material (sand, silt, clay, etc.) and settling velocities.** Approximately 300,000 cubic yards of material will be dredged from the federally authorized project by a hydraulic dredge. Dredged material along the navigation channel consists of sands, silts and clays. Settling of particles is anticipated due to the dredged material size.

(i). **Number of discharge actions per unit of time.** The number of discharge actions per unit of time will vary depending upon particular disposal activity.

(2) **Determination of Compliance with Applicable Water Quality Standards.** The proposed activity has been determined to be in compliance with all applicable water quality standards.

(3) **Potential Effects on Human Use Characteristics.**

(a) **Municipal and Private Water Supply.** No applicable.

(b) **Recreational and Commercial Fisheries.** No effect.

(c) **Water Related Recreation.** No effect.

(d) **Esthetics.** No significant effects.

(e) **Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.** Not applicable.

G. Determination of Cumulative Effects on the Aquatic Ecosystem. The proposed action is not expected to have significant cumulative adverse impacts.

H. Determination of Secondary Effects of the Aquatic Ecosystem. The proposed action is not expected to have any significant secondary adverse effects on the aquatic ecosystem.

III. Finding of Compliance With the Restrictions on Discharge.

A. No significant adaptations of the Section 404(b)(1) guidelines were made relative to this evaluation.

B. The proposed discharge represents the least environmentally damaging practicable alternative.

C. The planned placement of dredged materials would not violate any applicable State

Water Quality standards; nor will it violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

D. Use of the proposed disposal sites will not jeopardize the continued existence of any federally listed endangered or threatened species or their critical habitat.

E. The proposed placement of material will not contribute to significant degradation of waters of the United States. Nor will it result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing; life stages of organisms dependent upon the aquatic ecosystem; ecosystem diversity, productivity and stability; or recreational, aesthetic or economic values.

F. Appropriate and practicable steps will be taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

DATE 8 Nov 10

Steven J. Roemhildt
Colonel, Corps of Engineers
District Commander