DRAFT
ENVIRONMENTAL ASSESSMENT
AND
SECTION 404(b)(1) EVALUATION REPORT

MAINTENANCE DREDGING WITH IN-CHANNEL PLACEMENT

ESCATAWPA RIVER
PASCAGOULA HARBOR FEDERAL NAVIGATION PROJECT

JACKSON COUNTY, MISSISSIPPI

A FEDERALLY AUTHORIZED NAVIGATION PROJECT

Prepared by
U.S. Army Corps of Engineers, Mobile District
Planning and Environmental Division
Environmental Resources Branch
Coastal Environment Team

October 2019

DRAFT ENVIRONMENTAL ASSESSMENT

MAINTENANCE DREDGING WITH IN-CHANNEL PLACEMENT

ESCATAWPA RIVER PASCAGOULA HARBOR FEDERAL NAVIGATION PROJECT JACKSON COUNTY, MISSISSIPPI

A FEDERALLY AUTHORIZED NAVIGATION PROJECT

Table of Contents

Appendix

LIST OF ENCLOSURE(S)

ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effect
BA	Biological Assessment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CZC	Coastal Zone Consistency
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ER	Engineering Regulation

F	Fahrenheit
FEIS	Final Environmental Impact Statement
FSEIS	Final Supplemental Environmental Impact Statement
FONSI	Finding of No Significant Impact
MDEQ	Mississippi Department of Environmental Quality
MDMR	Mississippi Department of Marine Resources
MLLW	Mean Lower Low Water
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ODMDS	Ocean Dredged Material Disposal Site
O&M	Operations and Maintenance
SAV	Submerged Aquatic Vegetation
SHPO	State Historic Preservation Officer
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WQC	Water Quality Certification

DRAFT ENVIRONMENTAL ASSESSMENT
MAINTENANCE DREDGING WITH
IN-CHANNEL PLACEMENT

ESCATAWPA RIVER
PASCAGOULA HARBOR FEDERAL NAVIGATION PROJECT
JACKSON COUNTY, MISSISSIPPI

A FEDERALLY AUTHORIZED NAVIGATION PROJECT

1.0 Introduction

The United States Army Corps of Engineers (USACE), Mobile District is responsible for the operations and maintenance (O&M) of the federally-authorized Pascagoula Harbor Navigation Channel Project, which includes removal of dredged material from the channel and placement of dredged material in approved placement areas (open-water, littoral, ocean, semi-confined, upland, etc.). See **Figure(s) 1 and 2** in the Appendix. This Environmental Assessment (EA) has evaluated impacts that could potentially result from the proposed maintenance dredging with in-channel placement of material for the federally-authorized Pascagoula Harbor Navigation Channel Project, Escatawpa River portion, in Moss Point, Mississippi.

1.1 Project Location

The federally-authorized Pascagoula Harbor Navigation Project is located 40 miles west of Mobile, Alabama and 100 miles east of New Orleans, Louisiana. The Port of Pascagoula is a deep draft commercial harbor in Jackson County, Mississippi. The Pascagoula River Basin covers an area of approximately 9,600 square miles in southeastern Mississippi. The Pascagoula River is formed by the confluence of the Chickasawhay and the Leaf Rivers. From this confluence, the river flows southward for approximately 80 miles before emptying into the Gulf of Mexico. The Escatawpa River, located mostly in Alabama, flows into the Pascagoula River near the Gulf Coast. The proposed action is located on the Escatawpa River, between the Highway 63 and Highway 613 bridges, in Moss Point, Mississippi (see **Figure 3** in the Appendix).

1.2 Authority

The existing project was authorized by the Water Resources Development Act (WRDA) of 1986 (Public Law (P.L.) 99-662). Construction of the initial Federal project commenced in 1962 and was completed in 1965 (USACE, 1985a). Improvements to the Pascagoula Harbor Navigation Channel were evaluated in the Pascagoula Harbor, Mississippi, Feasibility Report (USACE, 1985a). USACE completed a Final Environmental Impact Statement (FEIS) in 1985 and improvements to the Pascagoula Harbor Navigation Channel were authorized by WRDA of 1986. Subsequent to this authorization, an Environmental Impact Statement (EIS) for the designation of an Ocean Dredged Material Disposal Site (ODMDS) located offshore of Pascagoula was completed in 1991. A Final Supplemental Environmental Impact Statement (FSEIS) was prepared in August 2010 to

evaluate the potential for widening and deepening channels to their fully federally authorized project dimensions (USACE, 1985a; USACE, 1985b; USACE, 2010). The ROD for these improvements was signed in 2011 and all construction improvements, except for deepening the impoundment basin, were completed by 2016.

1.3 Authorized and Constructed Project.

The authorized and constructed Pascagoula Harbor, Mississippi navigation project includes the following channels (except for the impoundment basin improvements):

a. An entrance channel 44 feet deep and 550 feet wide from the Gulf of Mexico to Horn Island Pass, including a 2,200-foot long by 200-foot wide sediment trap situated on the east side of the channel, a channel 44 feet deep and 600 feet wide through Horn Island Pass, including a 4,700-foot long sediment trap situated on the east side of the channel 44 feet deep and 175 feet wide.

b. A channel 42 feet deep and 350 feet wide in Mississippi Sound and the Pascagoula River to the railroad bridge at Pascagoula, including a turning basin 2,000 feet long and 950 feet wide (including the channel area) on the west side of the river below the railroad bridge;

c. A channel 42 feet deep and 350 feet wide from the ship channel in Mississippi Sound to the 1,150-foot turning basin at the mouth of Bayou Casotte, then 350 feet wide for about one mile to the northern turning basin, 900 feet wide and 1,750 feet long;

d. A channel 22 feet deep and 150 feet wide up Pascagoula River from the railroad bridge to the mouth of Escatawpa River (Dog River), thence up the Escatawpa River to the Highway 613 Bridge;

e. A channel 12 feet deep and 125 feet wide from the Highway 613 Bridge, via Robertson and Bounds Lakes to mile 6.0 on the Escatawpa River; and

f. A channel 12 feet deep by 80 feet wide extending from deep water in the Pascagoula River to a turning basin in Krebs Lake a distance of about 1,500 feet, then along the south bank of the lake a channel 10 feet deep and 60 feet wide, terminating at a second turning basin, a distance of 2,700 feet from the first turning basin.

In order to maintain the Pascagoula Harbor Federal Navigation Project, maintenance dredging is performed on an as-needed basis. Approximately 2,000,000 cubic yards of material is removed from various channel segments (predominantly segments a, b, and c above) with average dredging cycles occurring every 18 to 36 months. Depending on shoaling rates, not all portions require maintenance dredging every dredging cycle. Therefore, both the location and quantity of materials to be dredged are dependent upon

where shoaling occurs. The Escatawpa River portion of the Pascagoula Harbor Project is not normally maintained, as it is a naturally deep river channel. Thus, USACE maintains the authority to dredge the channel to authorized depths, but until recently there has not been a need. Typically, a hopper dredge is used to maintain the outer portion of the Entrance Channel with material placement in the Pascagoula ODMDS, while a cutterhead dredge is typically used to maintain the remainder of the project utilizing open-water, littoral, semi-confined and/or upland disposal sites. Due to specific project needs, funding requirements or equipment availability, a combination of hydraulic or mechanical dredging equipment may be utilized to maintain the Pascagoula Harbor Federal Navigation Project.

2.0 The National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. §4321 et seq), excuses or excludes Federal agencies from the preparation of any formal environmental analysis with respect to actions that result in minor or no environmental effects, which are known as "categorical exclusions." An intermediate level of analysis, an EA, is prepared for an action that is not clearly categorically excluded, but does not clearly require an Environmental Impact Statement (EIS) [40 CFR §1501.3 (a) and (b)]. Based on the EA, Federal agencies either prepare an EIS, if one appears warranted, or issue a "Finding of No Significant Impact" (FONSI), which satisfies the NEPA requirement. This EA has been prepared according to USACE Engineer Regulation (ER) 200-2, Procedures for Implementing NEPA, and the Council of Environmental Quality (CEQ) Regulations (40 CFR § 1508.27) for Implementing the Procedural Provisions of NEPA (40 CFR § 1500-1508).

2.1 Purpose and Need

The Escatawpa River portion of the Pascagoula Harbor Project is not normally maintained, as it is a naturally deep river channel. However, concerns were raised from local industry that a bend in the Escatawpa River channel had become too shallow to navigate safely. Hydrographic surveys conducted by USACE over the years and most recently in the spring of 2019 (see Figure 4 in the Appendix) confirmed that a small portion of the channel was no longer navigable and therefore, maintenance dredging would be needed to bring the channel to authorized depths. Also, the only approved placement area(s) for this section of channel are upland sites located further down the river towards the Pascagoula River. Due to the significant distance to the nearest site(s) and subsequent increased project costs, the in-channel placement method was more cost efficient than placing at an upland site.

2.2 Alternatives

2.2.1 No Action Alternative

The No Action Alternative would be to continue to not maintain the Escatawpa River portion of the Pascagoula Harbor Federal Navigation Channel project. However, this would render portions of the channel non-navigable and would have negative effects on commercial and recreational boats in the area.

2.2.2 Proposed Action Alternative

The Proposed Action includes maintenance dredging of the federally-authorized channel (Escatawpa River portion), as part of the Pascagoula Harbor Navigation Project (see **Figure 3** in the Appendix). An additional -2 feet of advanced maintenance plus -2 feet of overdepth dredging will also be necessary. Maintenance dredging of soft-dredged material with a hopper, mechanical, and/or a hydraulic cutterhead dredge tends to 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 the material being removed. The amount of dredged material to be removed for this dredging event is estimated to be approximately 20,000 cubic yards. This action could be accomplished by a mechanical, hopper and/or hydraulic dredge. The area proposed for dredging ranges from -6 feet to -11 feet Mean Lower Low Water (MLLW). The authorized depth is -12 feet MLLW (plus -2 feet of advanced maintenance, plus -2 feet of overdepth dredging and plus -3 feet for sediment disturbance).

The dredged material is to be placed via thin-layer placement in deeper parts of the existing channel. The portion of the channel proposed for in-channel placement is approximately 20 acres in size, depth ranges from -20 to -39 feet MLLW and is less than 1 mile from the dredging area (see **Figure 3** in the Appendix for location).

3.0 ENVIRONMENTAL SETTING

3.1.1 Physical Environment

The 9,600 square mile Pascagoula River Basin of southeast Mississippi is the last major river system in the lower 48 states to be unaltered by dams, channelization, levees or similar impacts. The Pascagoula River Basin has two major tributaries. The 159-mile Chickasawhay River begins at the town of Enterprise, just south of Meridian. To the west, the 185-mile Leaf River heads up near Raleigh, just south of Interstate 20. The pale, silty Chickasawhay River meets the dark, clear Leaf River just north of Merrill in southeastern Mississippi to form the main Pascagoula, which meanders 81 miles south to the Gulf Coast at the cities of Pascagoula and Gautier. Other sizable tributaries include the Chunky River, Buckatunna Creek, Okatoma Creek, the Bowie (also spelled Bouie) River, Tallahala Creek, Bogue Homa Creek, Black Creek, Red Creek, and the Escatawpa River. The Escatawpa River is a 129-mile-long tributary which eventually merges with the Pascagoula River near Moss Point, Mississippi and from there they both discharge into the Gulf of Mexico. The Escatawpa River flows through two southeastern Mississippi Counties: George and Jackson and two southwestern Alabama Counties: Washington and Mobile.

3.1.2 Land Use

The Escatawpa watershed is approximately 1,031 square miles. The majority of land use consists of 75% forest, while the remaining consists of 20% Agricultural, 2% wetland, and developed areas. The urban areas include Pascagoula and Moss Point with some small suburban communities.

3.1.3 Climate

The area is characterized by a humid, warm-temperate, sub-tropical climate, and is partially isolated from the Atlantic Ocean. Jackson County average annual air temperatures range between 40 (winter low) and 90 (summer high) degrees Fahrenheit (F). The normal annual rainfall is 67 inches, distributed relatively evenly throughout the year. The northern Gulf of Mexico area is subject to hurricanes between June and October, occurring most frequently in September. In 1969, Hurricane Camille devastated the entire Mississippi coast, and in 2005, Hurricane(s) Katrina and Rita devastated coastal areas from Galveston, Texas through the entire Mississippi coast.

4.0 AFFECTED ENVIRONMENT

This Section characterizes the affected environment and provides descriptions of existing conditions for environmental resources in the overall project area and vicinity, which includes Pascagoula Harbor. Additional information about the affected environment can be found in the following documents: FEIS Pascagoula Harbor, Mississippi (Maintenance Dredging) (USACE 1975), Feasibility Report : Mississippi Sound and Adjacent Areas – Dredged Material Disposal Study (USACE 1984), FEIS Pascagoula Harbor, Mississippi Navigation Improvements (USACE 1985), Environmental Assessment for Federally Authorized Pascagoula River Navigation Project Continued Operations and Maintenance (USACE 2002), and FSEIS Pascagoula Harbor, Mississippi Navigation Improvements (USACE 2010).

4.1.0 Soils and Sediment Quality

The Pascagoula and Escatawpa River(s) receive sediment from the surrounding drainage area. Sediment grain size analyses conducted in July 2019 indicated the proposed dredged material is 99.6% sand (Geotechnical Engineering Testing, 2019). Sediment samples were obtained from the proposed dredging area (see **Figure 3** for sampling location) to the fullest extent of dredging depth (-12'+2'+2'+3' MLLW). See **Figure 4** in the Appendix for the grain size analysis and **Figure 5** for sampling and general vicinity photos. In general, Escatawpa River and Pascagoula River sediment(s) consists primarily of sand with particle sizes larger than silt, and the material is found in areas of high currents.

4.1.1 Coastal Flora

Coastal Mississippi consists of several habitats including beaches, sand dunes, coastal maritime forests, emergent wetlands, submerged aquatic vegetation (SAV), rivers, tidal creeks, tidal flats, scrub/shrub wetlands, bottomland hardwood wetlands, and open-water benthic habitats. These areas are home to an immensely diverse, resilient, and environmentally significant group of species, including some threatened and endangered fauna. Ecological habitats within the project site include riverine water bottoms populated with diverse benthic communities. Directly flanking this portion of the Escatawpa River channel is the Escatawpa River Marsh Preserve (managed by the Mississippi Department of Marine Resources (MSDMR) Coastal Preserves Program), which consists of 2,826 acres following the edge of the estuarine marsh. A tidally-restricted sawgrass (*Cladium spp.*) -dominated marsh exists to the east of the railroad crossing. Sawgrass dominates

the marsh areas upstream of this site and some portions of marsh downstream. This oligohaline area contains a mixture of brackish (e.g. needle rush (*Juncus roemerianus*) and freshwater plant species (e.g. *Typha*). Sawgrass dominates the marsh areas upstream of this site (i.e. east, northeast) and some portions of marsh downstream. A considerable portion of what was likely a mixture of sawgrass marsh and cypress swamp has been replaced by open-water and scattered patches of marsh dominated by needle rush (*Juncus roemerianus*). Downstream, the cypress swamp intermixes with sawgrass-dominated marsh habitat. The Escatawpa River Swamp is composed of a mixture of cypress, sawgrass (*Cladium*) marsh, and water-lily pond habitat. The cypress swamp grades gradually into the sawgrass, with scattered cypress trees in the marsh. The marsh is dominated almost entirely of sawgrass (*Cladium jamaicense*). The water-lily pond is dominated by water lily (*Nymphaea odorata*), with floating organic mats scattered about, each having bladderworts, spike rushes, grasses and sedges, and other aquatic plants occur around the pond's edges.

The Escatawpa River feeds directly into the Pascagoula River Marsh Preserve (also managed by the MSDMR), which consists of 11,150 acres of brackish marsh, dominated by needle rush (*Juncus roemerianus*), olneyi bulrush (*Scirpus olneyi*), and spike-rush (*Eleocharis cellulosa*). Scattered with high saltmeadow cordgrass (*Spartina patens*) bands occurring adjacent to the uplands and on the high spots along with groundsel bush (*Baccharis angustifolia*). Smooth cordgrass (*Spartina alterniflora*) occurs as narrow, disjunct bands along the lake and creeks. The oligohaline stretch of the West Pascagoula River contains a variety of marsh types and includes a high diversity of freshwater and brackish water species of plants. Common reed (*Phragmites australis*) occurs on channel levees and eelgrass (*Vallisneria americana*) has been seen here in the past, occurring in the small creeks and marsh ponds.

4.1.1.1 Forest

The wooded areas surrounding and along the Escatawpa River are comprised of approximately 75% forest. It consists of southern mixed hardwood and pine forest, bottomland hardwoods, bald cypress/black gum swamp.

4.1.1.2 Wetlands

The proposed dredging and placement areas are open-water unconsolidated water bottoms. No wetlands are within these areas. The wetlands outside of the affected project area have been described by the MSDMR as estuarine subtidal, muddy sand embayment, riverine estuary (sand and muddy types), cypress swamp, black gum swamp and pitcher plant bog. Estuarine wetlands are a dynamic ecosystem having a connection to the open sea (or gulf) through which sea water enters with the rhythm of the tides. The sea water entering the estuary is diluted by the fresh water flowing from rivers and streams. Eleuterius (1998) noted that a large portion of the marsh cover in the area has been impacted or lost, possibly due to chemical pollution. The nearby commercial industries on the river have also impacted and continue to impact this area. This area represents a portion of the lower Escatawpa River that has been impacted by a combination of

apparent salt-water intrusion associated with channel deepening and marsh impoundment caused by a rail crossing across the river and associated marshes (MSDMR 1998).

4.1.1.3 Submerged Aquatic Vegetation

Submerged Aquatic Vegetation (SAV) beds might be present just outside of the affected project area, along the shallower areas closer to the river bank. Typically *Ruppia* spp., also known as the widgeon weeds, ditch grasses or widgeon grass, has been observed in the area in depths of 1-3' MLLW (Jared Harris, MSDMR personal communication), however no records of official SAV surveys have been located in the project vicinity. The dredging area and placement area within the existing channel is expected to be too deep to support SAVs (9' – 27' MLLW).

4.1.2 Coastal Fauna.

Jackson County supports an array of reptiles, amphibians, birds and mammals. Reptiles and amphibians found in the area include snakes, turtles, lizards, toads, frogs, salamanders and alligators. They include species such as: raccoon (*Procyon lotor*), river otter (*Lontra canadensis*), grey fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitis mephitis*), mink (*Neovison vison*), white-tailed deer (*Odocoileus virgininus*), bottlenose dolphin (*Tursiops truncatus*), beaver (*Castor canadensis*), possum (*Didelphis virginiana*), and nine-banded armadillo (*Dasypus novemcinctus*). Bottlenose dolphins use the Pascagoula Harbor and the Pascagoula River as breeding and nursery areas.

4.1.2.1 Benthos, Motile Invertebrates and Fishes

Benthic communities are largely composed of macro-invertebrates, such as annelids, mollusks, and crustaceans. These organisms inhabit the bottom substrates of estuaries and play a vital role in maintaining sediment and water quality. They also are an important food source for bottom-feeding fish, invertebrates, and birds. Communities of benthic organisms are important indicators of environmental stress because they are particularly sensitive to pollutant exposure (Holland *et al*., 1987). This sensitivity arises from the close relationship between benthic organisms and sediments, which can accumulate environmental contaminants over time, and the fact that these organisms are relatively immobile, which means they receive prolonged exposure to contaminants in their immediate habitat (Sanders *et al*., 1980; Nixon *et al*., 1986).

Macro-Benthic sampling of the Pascagoula River in 2013 by Peterson *et al*, to evaluate differential estuarine habitat use patterns in Gulf sturgeon population areas revealed a representative benthic taxa assemblage of: nemerteans, 19 polychaetes, 2 oligochaetes, 2 gastropods, 2 bi-valves, 1 cumacean, 1 isopod, 3 amphipods, 1 chironomid, and 1 phoronid worm. Some species included: *Mediomastis ambiseta*, *Streblospio gynobranchiata*, *Paraais litoralis*, tubificid worms, *Leitoscolopis fragilis*, *Edotea triloba*, *Cyclaspis varians. Acetocina cana liculata, nemerteans, Paraprionospio pinnata, Aricidea philbinae, Rictaxis punctostriatus, and Phoronis* worms. It is assumed that the Escatawpa River

would have similar benthic taxa assemblages due to vicinity and similarity of estuarine habitat conditions.

Marine shrimp are 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 post-larvae shrimp develop through several larval stages as they are carried shoreward by winds and currents. Post-larvae 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. Shrimpers actively fish around the Mississippi barrier islands.

Several factors influence the distribution of freshwater fish in Mississippi. Watershed or drainage boundaries play a primary role in affecting fish distribution, and climate and water chemistry are of secondary importance. Minnow and perch families account for approximately 50 percent of the freshwater fish known to occur in the region. Fish species expected to occur in the Escatawpa River include southern brook lamprey (*Ichthyomyzon gagei*), gar (*Atractosteus spatula*), American eel (*Anguilla rostrata*), shad (*Alosa sapidissima*), minnows (many spp.), chubs (*Squalius cephalus*), numerous varieties of shiner, madtom (*Noturus* spp.), sunfish (*Lepomis* spp.) and various darters (generally *Percina* spp.). The spotted gar (*Lepisosteus oculatus*), longnose gar (*Lepisosteus osseus*) and sunfish, such as the rock bass (*Ambloplites rupestris*), flier (*Centrarchus macropterus*), warmouth (*Lepomis gulosus*), bluegill (*Lepomis macrochirus*) and spotted (*Micropterus punctulatus*) and largemouth bass (*Micropterus salmoides*) are the predominant sportfish of the Escatawpa River. Threatened and endangered fish species such as the Gulf sturgeon (*Acipenser oxyrhynchus desotoi*) may use the Pascagoula River or Escatawpa River (Peterson, 2019 personal communication).

4.2 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. The habitat within the vicinity of the project consists of open-water estuarine environment with a sandy bottom and subject to low wave action and currents.

Estuarine environments provide habitat for various species of invertebrates and vertebrates. Epibenthic crustaceans and infaunal polychaetes dominate the diets of higher trophic levels, such as flounder, catfish, croaker, porgy, and drum. The fish species composition of the estuarine area(s) along the northern Gulf of Mexico is of a high diversity due to the variety of environmental conditions, which exist within the area. Estuarine areas also serve as nurseries for the economically important shrimp, crab and sport fisheries in Mississippi. The major fisheries found along the Mississippi Gulf coast are: Spanish mackerel (*Scomberomerus maculatus*), king mackerel (*Scomberomerus cavalla*), cobia (*Rachycentron canadum*), bluefish (*Pomatomus saltatrix*), pompano (*Trachinotus carolinus*), little tunny (*Euthynnus alletteratus*), spotted sea trout (*Cynoscion nebulosus*), red drum (*Sciaenops ocellatus*), and several shark species. The species managed by GMFMC for project area in the Escatawpa River are listed in **Table 1** below.

Table 1: Fishery Management Plans and Managed Species for the Escatawpa River (NMFS 2019)

Reef Fish Fishery Management Plan
- Queen snapper – *Etelis oculatus*
- Mutton snapper – *Lutjanus analis*
- Schoolmaster – *L. apodus*
- Blackfin snapper – *L. buccanella*
- Red snapper – *L. campechanus*
- Cubera snapper – *L. cyanopterus*
- Gray (mangrove) snapper – *L. cyanopterus*
- Dog snapper – *L. jocu*
- Mahogany snapper – *L. mahogoni*
- Lane snapper – *L. synagris*
- Silk snapper – *L. vivanus*
- Yellowtail snapper – *Ocyurus crysyrys*
- Wenchman – *Pristipomoides aquilonaris*
- Vermillion snapper – *Rhomboplites aurorubens*
- Speckled hind – *Epinephelus drummondhayi*
- Goliath grouper – *E. itajara*
- Red grouper – *E. morio*
- Rock hind – *E. adscensionis*
- Speckled hind – *E. drummondhayi*
- Yellowedge grouper – *E. flavolimbatus*
- Red hind – *E. guttatus*
- Misty grouper – *E. mystacinus*
- Warsaw grouper – *E. nigritus*
- Snowy grouper – *E. niveatus*
- Nassau grouper – *E. striatus*
- Marbled grouper – *E. inermis*
- Black grouper – *Mycteroperca bonaci*
- Yellowmouth grouper – *M. interstitialis*
- Gag – *M. microlepis*
- Scamp – *M. phenax*
- Yellowfin grouper – *M. venenosa*
- Dwarf sand perch – *Diplectrum bivittatum*
- Sand perch – *D. formosum*

Reef Fish Fishery Management Plan (continued)
- Greater amberjack – *S. dumerili*
- Lesser amberjack – *S. fasciata*
- Almaco jack – *S. rivoliana*
- Banded rudderfish – *S. zonata*
- Gray triggerfish – *Balistes capriscus*
- Hogfish – *Lachnolaimus maximus*

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

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

Shrimp Fishery Management Plan
- brown shrimp – Penaeus aztecus
- pink shrimp – P. duorarum
- royal red shrimp - Pleoticus robustus
- white shrimp – P. setiferus

Goldface tilefish – *Caulolatilus chrysops*
Blackline tilefish – *C. cyanops*
Anchor tilefish – *C. intermedius*
Blueline tilefish – *C. microps*
Tilefish – *Lopholatilus chamaeleonticeps*

No Habitat Areas of Particular Concern (HAPC) nor EFH Areas Protected from Fishing (EFHA) were identified in the affected project area.

4.2 Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) lists the following species as either threatened and/or endangered that may occur within Jackson County, Mississippi: Eastern black rail (*Laterallus jamaicensis spp. jamaicensis*), Wood stork (*Mycteria americana*), Mississippi sandhill crane (*Grus canadensis pulla*), Piping plover (*Charadrius melodus*), Red knot (*Calidris canutus rufa*), Red-cockaded woodpecker (*Picoides borealis*), Alabama red-bellied turtle (*Psuedemys alabamensis*), gopher tortoise (*Gopherus polyphemus*), yellow-blotched map turtle (*Graptemys flavimaculata*), Black pine snake (*Pituophis melanoleucus lodingi*), Dusky gopher frog (*Rana sevosa*), Gulf sturgeon (*Acipenser oxyrhynchus desotoi*), Pearl darter (*Percina aurora*), Louisiana quillwort (*Isoetes louisianensis*), West Indian manatee (*Trichechus manatus*), green sea turtle (*Chelonia mydas*), loggerhead sea turtle (*Caretta caretta*), hawksbill sea turtle (*Eretmochelys imbricata*), leatherback sea turtle (*Dermochelys coriacea*) and Kemp's ridley sea turtle (*Lepidochelys kempii*).

Federally protected species, such as the Eastern black rail, Wood stork, Mississippi sandhill crane, Piping plover, Red knot, Red-cockaded woodpecker, Dusky gopher frog, gopher tortoise, Black pine snake, Louisiana quillwort, and the sea turtles, would not be adversely impacted by the proposed O&M project because these species are not typically found in riverine open-water nor are typically found in the Escatawpa River. However, the Alabama red-bellied turtle, yellow-blotched map turtle, Gulf sturgeon, pearl darter and West Indian manatee could potentially occupy the area.

4.2.1 Alabama red-bellied turtle

The Alabama red-bellied turtle is a relatively large freshwater turtle with a carapace length of up to 13 inches. The plastron is orange to red in color; the carapace is olive green, brown, or black, accompanied by distinct vertical markings in yellow, orange or red. The Alabama red-bellied turtle is distinguished from other similar species by the stripes of color on its head, and also the shape of the upper jaw (USFWS 1989). This turtle primarily feeds on aquatic plants and is most common in sluggish bays and bayous in brackish marshes adjacent to the main channels of large coastal rivers. In Mississippi, Alabama red-bellied turtles have been known to be in the lower reaches of the Old Ft. Bayou, Escatawpa, and Pascagoula Rivers in Jackson County, and Tchoutacabouffa and Biloxi Rivers in Harrison County. This species is abundant in quiet backwater areas with dense submerged vegetation, in water generally 3.3 to 6.6 feet deep (McCoy and Vogt, 1985).

This species uses dense beds of aquatic vegetation for basking and is known to nest in sandy areas along natural riverbank levees.

This turtle was listed as endangered by USFWS on June 16, 1987; and it is threatened due to its low reproductive success and taking of adult turtles. Although adult turtles spend most of their time feeding and basking in SAV, they must return to land to lay eggs. Disturbance of nests and destruction of eggs have been identified as major threats to the population. Local residents have collected eggs and live turtles for food. Recreational use of natural sand beaches have also disturbed nests and dredged material areas, such as Gravine Island in Alabama (USFWS 1989). Feral pigs, crows, and fire ants also raid nests to eat turtle eggs. Some collection of these turtles for the pet trade still persists, as does trawling to collect turtles for food. Some turtles are harvested accidentally by commercial fishermen in nets, traps, and trawls. Recovery efforts include learning more about the life history of the species; protecting nests in recreational areas; preventing destruction of aquatic vegetation used for basking, cover, and food; preventing taking of eggs and adult turtles through law enforcement; and educating the public about turtle conservation.

4.2.2 Yellow-blotched map turtle

The yellow-blotched map turtle is a small turtle getting its name from the distinctive yellow blotches on its carapace. The turtle has a greenish-black body covered with yellow stripes. The plastron is yellow to tan in color. Adult male turtles have been observed with carapace length between 3.5 to 4.8 inches, while the normally larger female turtles have been observed with carapace length of 4.1 to 8.5 inches (USFWS 1993). Several prominent spine-like projections extend from the top of the carapace. Yellow-blotched map turtles are endemic to the Pascagoula River system. They live in the main channels of rivers and large creeks; they have also been observed in oxbow lakes (USFWS 1993). These turtles have been observed in the Pascagoula and Escatawpa Rivers in Jackson County. Yellow-blotched map turtles avoid small streams where the surface of the water is shaded by bank vegetation. Aquatic insects and snails are thought to make up a large part of the turtles' diet. Turtles often bask on snags and logs fallen in the water. Nesting occurs during the summer months on sandbar beaches.

Yellow-blotched map turtle populations in the upper Pascagoula watershed have been in decline since the early 1990s. Navigation improvement projects to remove logs and snags from the Pascagoula River have taken away structures needed by the turtles for basking (USFWS 1993). Snag removal has also adversely impacted populations of the turtles' invertebrate prey that use snags as habitat. Gravel mining activities in the watershed have increased sedimentation and further impacted aquatic invertebrate populations. Four reservoirs and ongoing channel modification projects in the Pascagoula River system have altered or eliminated sandbars that turtles use for nesting. These small, colorful turtles are illegally collected for the pet trade, and basking turtles are used for target practice by some individuals (USFWS 1993). Some turtles have been observed to drown in illegal catfish traps.

Water pollution is a serious problem in some Pascagoula River tributaries. Permitted industrial and municipal effluents degrade water quality (USFWS 1993). Brine discharge

from oil fields and a dioxin spill in the Pascagoula River have also impacted river water quality. Sedimentation and water pollution are threats to aquatic invertebrates, a main food source for the turtles. Food availability is thought to be a limiting factor for turtle populations. Reproduction might be impaired by lack of nesting habitat, exclusion of the turtles from suitable nesting beaches by excessive human presence, or effects of chemical pollutants on turtle reproductive biology. Direct and indirect adverse impacts to yellow-blotched map turtles would be expected from point and non-point source discharges of toxic chemicals, brine, sewage, and sediment to the Pascagoula River system (USFWS 1993).

4.2.3 Gulf sturgeon

Gulf sturgeon is a subspecies of the Atlantic sturgeon. In early spring, subadult and adult fish migrate into rivers from the Gulf of Mexico and continue until early May. In late September or October, subadult and adult sturgeon begin downstream migrations. Adult fish spend eight to nine months each year in rivers and three to four of the coolest months in estuarine or Gulf waters. Gulf sturgeon are bottom-feeders which apparently only feed during their stay in marine waters; food items are rarely found in the stomachs of specimens sampled from rivers. Mississippi Sound along with other adjacent areas have been designated as 'critical habitat' for the Gulf sturgeon (Unit 8 of USFWS and NMFS's final rule). Unit 8 area provides juveniles, subadult and adult feeding, resting, and passage habitat for the Gulf sturgeon from Pascagoula River and the Pearl River subpopulations. Gulf sturgeons have been documented by tagging data in the Pascagoula River estuary in 2010-2013 (Peterson *et al*, 2016). Substrates in these areas range from sand to silt, all of which contain known Gulf sturgeon prey items.

In Unit 2, Gulf sturgeon use the West and East distributaries of the Pascagoula River during spring and fall migrations (Ross *et al.*, 2001). Summer resting areas have been consistently documented on the Pascagoula River (Ross *et al.*, 2001). The Pascagoula River Harbor is on the East Pascagoula River distributary, a small portion of this overall unit, but used for migration and/or summer resting areas and probable feeding use by juveniles. The proposed action area on the Escatawpa River is outside of Gulf Sturgeon Critical Habitat, however gulf sturgeon have been located in the Escatawpa River (Michael Andres and Mark Peterson, University of Southern Mississippi, personal communication).

4.2.3 Pearl darter

The pearl darter is a small fish in the perch family that usually grows to just over 2 inches in length. It has a blunt nose, horizontal mouth, large eyes placed high on the head, and a black spot on the caudal fin. Pearl darters have been collected in rivers and large creeks with moderate current and sand and gravel substrates. It is not found in deep, sluggish pools, lacustrine environments, or headwater creeks with insufficient flow. Chironomids and small crustaceans probably make up a large part of pearl darter diet (USFWS 2001). The Pearl darter is endemic to 88 miles of the Pascagoula River and its tributaries within Jackson County, in slow flowing waters along the downstream edge of sandbar point bars over a substratum of sand with scattered patches of detritus.

Otherwise little is known about the life history and ecology of the pearl darter. The Pascagoula River drainage system remains the sole refuge for the species, rendering its continued existence vulnerable to disturbance.

Never considered abundant, the pearl darter was once found in both the Pearl and Pascagoula River systems. It has not been collected in the Pearl River system since 1973. The pearl darter is thought to be restricted to 88 river miles of the Pascagoula River watershed (USFWS 2001). The pearl darter has the potential to occur in the Pascagoula River and its tributaries in Jackson County. Threats include sedimentation from forestry and development in the watershed, permitted industrial and municipal discharges of toxic chemicals and sewage, sand and gravel mining, and proposed impoundments for reservoirs. Sand and gravel mining activities are ongoing in the Pascagoula River system. In-stream mining not only removes substrates preferred by the pearl darter, it also delivers sediment to aquatic habitats downstream. Holes in river channels left by sand and gravel mining activities function similar to lake habitats, which pearl darters avoid (Natureserve 2001).

4.2.3 West Indian manatee

The West Indian manatee migrates along the Gulf coast from Florida to Louisiana as a seasonal transient. Manatees undertake large seasonal migrations with distribution controlled by temperature. In the summer and fall, manatees seek shallow grass beds with ready access to deep channels as preferred feeding areas in coastal and riverine habitats including secluded canals, creeks, embayments, and lagoons, particularly near the mouths of coastal rivers and sloughs. Artificial sources of fresh water are also attractive to manatees. Manatees are herbivores and forage on SAV, especially undersea grasses. These grasses typically grow at 3-6 feet in depth. However, manatees have been noted in water as shallow as 1.5 feet and in deeper waters during coastal and other migrations to SAV areas. Areas with SAV are particularly important to manatee conservation.

In the winter, manatees from the Gulf Coast typically return to Florida, congregating en masse around on warm water springs and effluent discharges such as those below power plants. Increasing numbers of manatees are found in Mississippi and Alabama waters in the summer. Manatees are occasionally sighted in the Escatawpa River by locals. A major threat to the manatee, accounting for over one third of all death of adults, is watercraft strikes. Water control structures and navigation aides also are significant causes of deaths, as are red tides and incidents of freezing. Some manatees are also believed to die as a result of poor nutritional status when the underwater vegetation they feed on is killed by salinity changes or pollution.

4.3 Water Quality.

Stream conditions in the Pascagoula River Basin are mostly natural, as in un-dammed and un-channelized. Some streams are considered “black-water streams” because they are stained by tannic acid leached from vegetation. The Escatawpa River near Moss Point is a stratified estuarine river with historic water quality impairment. Industries surrounding the area contribute municipal and industrial discharges to surface waters.

Within the estuary are several discharges including the largest and most significant, the Jackson County Port Authority release which includes the industrial wastewater from the International Paper Company. In addition, agricultural and forestry activities, mining and waste management also contribute to the degraded water quality in the area. Principal causes of water quality problems in the Pascagoula River Basin are excessive concentrations of metals, pathogens, and low dissolved oxygen from non-point source pollution. The three main pollutants identified in the Pascagoula River Basin are nutrients, siltation and pesticides. Since January 1996, the Mississippi Department of Environmental Quality (MDEQ) has investigated multiple fish kills in the Pascagoula River Basin. Of these, the causes were low dissolved oxygen, pesticides or suspected pesticides, elevated ammonia levels and otherwise unknown origin(s). Most of the fish kills attributed to low dissolved oxygen were due to natural occurrences in back water areas.

Dioxin below bleach kraft pulp facilities has been a concern in Mississippi since the initial results of EPA's National Bioaccumulation Study (NBS) were received in 1989 (*Bioaccumulation of Selected Pollutants in Fish- a National Study*) (USEPA 1989). The NBS was a one-time screening investigation to determine the prevalence of selected bio-accumulative pollutants in fish and to identify correlations with sources of these pollutants. The study began in 1986 as an outgrowth of the USEPA's National Dioxin Study, a nationwide investigation of 2,3,7,8 tetrachlorodibenzo-p-dioxin (2,3,7,8 TCDD) contamination of soil, water, sediment, air and fish. Some of the highest concentrations of 2,3,7,8 TCDD in the National Dioxin Study were detected in fish. MDEQ undertook an aggressive fish tissue monitoring program and had issued a series of advisories on the Leaf, Pascagoula, and Escatawpa Rivers. In August 1990, a consumption advisory for all species of fish and shellfish and a commercial shellfish fishing ban were issued for the lower 12 miles of the Escatawpa River near Moss Point due to elevated levels of dioxin. The paper companies responded to the situation by modifying their processes to prevent the formation of the unwanted byproduct in their effluent. Once these changes were made, MDEQ documented a corresponding steady decline in dioxin in the fish tissue, and the advisories were rescinded as the fish tissue concentrations declined. The last of these advisories were removed from the Escatawpa River in July 1996. A similar advisory was issued for the lower Escatawpa River in 1990, and intensive fish tissue monitoring began on the Escatawpa River in 1991. This monitoring documented a similar decline in dioxin, and in July 1996, all fish consumption advisories were lifted from the lower Escatawpa River. Fish tissue was collected in 1996, 1997 and 1998. A "limit consumption" advisory due to mercury remains in effect. This portion of the Escatawpa River is not currently listed on MDEQ's Section 303(d) List of Impaired Water Bodies.

In September 1997, an intensive survey was conducted on the Escatawpa River by EPA with assistance from MDEQ Office of Pollution Control (OPC) Water Quality Assessment Branch, OPC Field Services Division - South Regional Office and OPC laboratory, and MDEQ Office of Land and Water Resources. The primary objective of this survey was to collect a calibration data set for the development of a water quality model for the Escatawpa River. A total of 14 stations were established in the study area which included the Escatawpa River, Pascagoula River, West Pascagoula River and a station in the

Mississippi Sound. Monitoring activities during the nine day study period included tide-phased water quality sampling for 5-Day Biochemical Oxygen Demand (BOD5), ultimate BOD, nitrogen series, and total and ortho-phosphorus and in-situ profiling of Dissolved Oxygen (DO), salinity and temperature. Other study components included effluent monitoring, continuous DO monitoring with Hydrolab multi-parameter data-loggers, production and respiration measurements, sediment oxygen demand, diffusion/re-aeration measurements, a dye dilution study as well as hydrological and meteorological monitoring. A second intensive survey was conducted in spring of 1999. The purpose of this study was to collect an additional set of data for model calibration/verification.

In 2005, EPA's Region 4 Science and Ecosystem Support Division (SESD), in cooperation with the Mississippi Department of Environmental Quality (MDEQ), conducted a water quality study in the rivers and bays along the Mississippi coast following Hurricanes Katrina and Rita. The study area encompassed major bay systems on the Mississippi coast including Bangs Lake, Bayou Casotte, the Pascagoula and West Pascagoula River systems (including the Escatawpa River), the Back Bay of Biloxi, St. Louis Bay, and the Pearl River. Findings from the study showed few detectable priority pollutant compounds in the studied bays and rivers. In general, the compounds present in surface waters were low in concentration compared to EPA's National Ambient Water Quality Criteria (NAWQC) for priority toxic pollutants. The compounds present in the sediment were generally lower than the levels which would be expected to have adverse effects, based on values published by NOAA. Only two surface water stations had dissolved oxygen concentrations below the minimum water quality criteria adopted by the state of Mississippi. Bacteriological densities at the study locations were less than EPA's promulgated enterococci criteria for coastal waters. Overall, the data collected by EPA shows that few water quality criteria were exceeded during the study. An exception was high algal growth results in the Back Bay of Biloxi and Bayou Casotte. Dioxin results for the five sediment samples collected were all well below the EPA screening value for residential soils (EPA, 2005).

4.4 Air Quality.

Existing air quality in Jackson County was 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 marine vessel traffic emissions. No major sources of air pollution were found within the vicinity of the project area. Furthermore, Jackson County is in attainment for all NAAQS. Existing air quality conditions near the project study area reflect the ongoing industrial and commercial operations in the immediate vicinity, as well as surrounding traffic and residential outputs.

4.5 Aesthetics and Recreation.

Surface waters in coastal and riverine Mississippi primarily support recreation activities, commercial fishing and shellfish, wildlife and fish, and industrial use. Fishing, boating

and bird-watching are popular with recreationists in the Escatawpa River. Areas for camping, nature trails and parks are also recreational uses for the watershed vicinity.

4.6 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.

4.7 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended and implementing regulations 36 CFR Part 800 requires the USACE, Mobile District to consider the effects of its undertakings upon historic properties (which includes but is not limited to historical, architectural, archaeological, and cultural resources). This also includes the requirement to consult with other agencies such as the State Historic Preservation Officer (SHPO) and the appropriate Tribal Nations to avoid or minimize or mitigate adverse effects upon those resources. No known historic properties are present within the Area of Potential Effect (APE). The Mississippi SHPO and Federally Recognized Tribes with an interest in the area are being consulted regarding USACE's effects determination.

5.0 EFFECTED ENVIRONMENT.

Performing an evaluation of environmental impacts for proposed Federal actions is a requirement of Federal law (40 C.F.R. §§ 1500-1508). An impact analysis must be compared to a significance threshold to determine whether a potential consequence of an alternative is considered a significant impact. If the impact is significant, it may be mitigable (i.e., measures are available to reduce the level of impact, so it is no longer significant) or unmitigable. "Significance" under NEPA is determined using two variables: context and intensity. Factors to consider when determining significance include: impacts that may be both beneficial and adverse, degree to which action affects public health and safety, unique characteristics of the geographic area, degree to which effects may be highly controversial, highly uncertain effects or unique or unknown risks, degree to which action may establish precedent for future actions with significant impacts, etc.

5.1 Soils and Sediment Quality

The significance criteria for sediments in the vicinity of the proposed project area would be a change in sediment characteristics that becomes permanent; a change in grain size and consistency; a long-term decline in water quality as a result of sediment/water interactions; or a decline in sediment quality that causes permanent impacts to biological resources.

5.1.1 Soils and Sediment Quality – No Action

No impacts are expected to soils and sediment quality with the No Action Alternative. The sediment in the dredging and placement area would remain undisturbed with continued non-maintenance.

5.1.2 Soils and Sediment Quality – Proposed Action

Grain size analysis determined the dredged material to be 99.6% sand (Geotechnical Engineering Testing, 2019), therefore the proposed action is unlikely to result in degradation of the discharge site and further testing is not needed. Section 230.60(a) of the Inland Testing Manual states "The reason to believe that no testing is required is based on the type of material to be dredged and/or its potential to be contaminated. Dredged material is most likely to be free of contaminants if the material is composed primarily of sand, gravel or other inert material and is found in areas of high current or wave energy." Due to the sandy nature of the dredged material, it is not anticipated that the dredged material would be contaminated and thus unsuitable for placement.

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

5.2 Coastal Flora

The significance criterion for Coastal Flora would be the permanent loss or gain of habitat suitable for wetland vegetation.

5.2.1 Forest – No Action

No changes are expected to the surrounding forested areas of Jackson County with continued non-maintenance of the navigation channel.

5.2.2 Forest – Proposed Action

No forest(s) exist within the proposed dredging and in-channel placement areas, therefore no impacts are anticipated to forest(s) with the Proposed Action.

5.2.3 Wetlands – No Action

The surrounding emergent tidal marsh along the banks of the Escatawpa River is not expected to be impacted from continued non-maintenance of the navigation channel.

5.2.4 Wetlands– Proposed Action

Emergent tidal marsh wetlands are located adjacent, but not directly in, the proposed dredging and in-channel placement areas. No impacts to wetlands are anticipated.

5.2.5 SAV– No Action

Potential SAV beds in shallower areas of the Escatawpa River are not expected to be impacted from continued non-maintenance of the navigation channel.

5.2.6 SAV – Proposed Action

The significance criterion for SAV would be the permanent loss or gain of habitat suitable for SAV. Potential habitat for SAVs does not exist within the proposed dredging and placement areas associated with this project and no SAVs are located within the expected 400-foot turbidity mixing zone of channel dredging. No impacts to SAVs were identified in this evaluation.

5.3 Coastal Fauna

The significance criteria for marine mammal communities in the vicinity of the project area would be loss of a species; a permanent habitat change that would make the area unsuitable to meet life history requirements; or a disruption that would cause permanent interference with the movement of native resident or migratory marine mammals.

5.3.1 Coastal Fauna – No Action

No impacts are expected to Coastal Fauna with the No Action Alternative. The Coastal Fauna in the affected area would remain undisturbed with continued non-maintenance.

5.3.2 Coastal Fauna – Proposed Action

Marine mammals, such as bottlenose dolphins and West Indian manatees, could potentially utilize the project area with rare, isolated sightings. Dredging operations could result in harassment, as defined by the Marine Mammal Protection Act, of marine mammal species if the mammals are in close proximity to an operating dredge. However, this would be a temporary condition and the marine mammals could avoid the vessel disturbance. Water depth and bottom type also affect the propagation of sound energy. Analysis of sound propagation in shallow waters indicates lower frequencies at which there is no sound propagation. However higher frequency noise has the potential to propagate and may cause temporary avoidance near the dredging operations. These levels are not known to cause any injury, temporary or permanent, to marine life, and would not remain in any single location for longer than a few days. These conditions would eliminate propagation for a substantial portion of the noise generated by dredging operations associated with the proposed action. Considering the limits on propagation of underwater noise for shallow water depths and soft bottom conditions within the project area, the tendency of marine species to avoid anthropogenic noise, and previous exposure to placement activities, any noise impacts from the proposed action are expected to be minor and would be less than significant. Standard Manatee Conditions would be utilized if required by the U.S. Fish and Wildlife Service, or if manatees are spotted in the area.

Marine and coastal birds such as diving and plunging birds are common in the area and could utilize the site of the proposed action for foraging. Foraging birds could be displaced during dredging and placement activities. Foraging habitat is readily available in the other parts of the river and it is expected that plunging and diving birds would shift to other areas if temporarily displaced. The noise and activity of dredging and placement operations could deter birds from using areas in the immediate vicinity of equipment during active periods but could also offer an additional food source. Increased turbidity associated with dredging operations could temporarily decrease foraging success of diving and plunging birds that feed in riverine areas, however, these birds are not dependent upon the dredge and placement sites for survival. Following dredging, birds would be expected to resume normal use of the area. . Any impacts would be expected to be localized, temporary, and minor.

5.3.3 Benthos, Motile Invertebrates and Fishes – No Action

No impacts are anticipated to benthos, motile invertebrates, or fishes with continued non-maintenance of the navigation channel.

5.3.4 Benthos, Motile Invertebrates and Fishes – Proposed Action

The project area does contain various invertebrate species typically found in association with estuarine benthic systems. Also, various motile pelagic marine species (i.e. various marine fish, shrimp and crabs species in juvenile form) are present within the project area. There would be temporary disruption of the aquatic community. Non-motile benthic fauna within the project area will be lost due to the proposed operations, but should repopulate within several months upon completion of dredging. 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 temporary and insignificant.

The project area does not provide specific habitat that could not be found in other areas of the Pascagoula River Basin, Mississippi Sound or the Gulf of Mexico. There is no significant resource at this site that is essential for the continued survival of any particular species. With the small area (percentage wise) of ecosystem that will be affected at a given point in time and the use open-water disposal methods being employed, no significant long-term impacts to the benthos, motile invertebrates, and fishes are expected to occur as a result of the proposed action. Therefore, it was determined that no long-term adverse impacts to the aquatic community would result from the proposed maintenance dredging and in-channel placement at the Escatawpa River portion of the Pascagoula Harbor Federal Navigation Channel.

5.4 Essential Fish Habitat

5.4.1 Essential Fish Habitat – No Action

No impacts are anticipated to EFH with continued non-maintenance of the navigation channel.

5.4.2 Essential Fish Habitat – Proposed Action

The USACE, Mobile District will take extensive steps to reduce and avoid potential impacts to EFH as well as other significant area resources. No estuarine emergent wetlands, oyster reefs, or SAVs would be adversely affected by the proposed action. Most of the motile benthic and estuarine fauna, such as crab, shrimp, and fish, should be able to avoid the disturbed area and should return shortly after the activity is completed. No long-term direct impacts to managed species of finfish or shellfish populations are anticipated. However, it is reasonable to anticipate some non-motile and motile invertebrate species will be physically affected through disposal operations. These species are expected to recover rapidly soon after the disposal operations are complete. No significant long-term impacts to this resource are expected as result of this action.

Increased water column turbidity during dredging and placement would be temporary and localized. The spatial extent of elevated turbidity is expected to be within 400 feet of the operation, with turbidity levels returning to ambient conditions within a few hours after completion of the dredging activities. Due to the nature of dredging and placement activities and the small area (percentage wise) of ecosystem that would be affected at a given point in time, no significant long-term impacts are expected to occur. The USACE, Mobile District will initiate EFH consultation with the NMFS, Habitat Conservation Division (HCD) through a public notice.

5.5 Threatened and Endangered Species

Significant impacts to threatened and endangered species would be the loss of or long term reduction in the size of a population; a habitat modification that causes a permanent disruption to breeding, foraging or other life history requirement; permanent interference with the movement of resident or migratory protected species; and loss of any area designated a critical habitat.

5.4.1 Alabama red-bellied turtle – No Action

No impacts are anticipated to the Alabama red-bellied turtle with continued non-maintenance of the navigation channel.

5.4.2 Alabama red-bellied turtle – Proposed Action

The Alabama red-bellied turtle is highly mobile and would likely avoid the area due to the project area's activity and noise. Normal behavior patterns of turtles are not likely to be significantly disrupted by the project activities because of the short-term localized nature of the activities and the ability of the turtles to avoid the immediate area. Furthermore, the Proposed Action would not adversely impact existing aquatic vegetation or the adjacent river banks that may be utilized by the species. Under Section 7 of the Endangered Species Act, the USACE, Mobile District is requesting concurrence from the USFWS with our determination that the proposed action *may affect but is unlikely to adversely affect* the Alabama red-bellied turtle.

5.4.3 Yellow-blotched map turtle – No Action

No impacts are anticipated to the Yellow-blotched map turtle with continued non-maintenance of the navigation channel.

5.4.4 Yellow-blotched map turtle – Proposed Action

The Yellow-blotched map turtle is highly mobile and would likely avoid the area due to the project area's activity and noise. Normal behavior patterns of turtles are not likely to be significantly disrupted by the project activities because of the short-term localized nature of the activities and the ability of the turtles to avoid the immediate area. Furthermore, the Proposed Action would not adversely impact existing aquatic vegetation or the adjacent river banks that may be utilized by the species. Under Section 7 of the Endangered Species Act, the USACE, Mobile District is requesting concurrence from the

USFWS with our determination that the proposed action *may affect but is unlikely to adversely affect* the Yellow-blotched map turtle.

5.4.5 Gulf sturgeon – No Action

No impacts are anticipated to Gulf sturgeon with continued non-maintenance of the navigation channel.

5.5.6 Gulf sturgeon – Proposed Action

The Gulf sturgeon could potentially utilize the area, most likely transiting from one area to another. The adjacent Pascagoula River is a known migratory route of Gulf sturgeon(s). If a cutterhead pipeline dredge is used, Gulf sturgeons in the area during operations are highly mobile and would likely avoid the area due to the project area's activity and noise. Normal behavior patterns of sturgeon are not likely to be significantly disrupted by the project activities because of the short-term localized nature of the activities and the ability of the sturgeon to avoid the immediate area. Following the completion of dredging and placement activities, any displaced sturgeon would be expected to resume normal use of the area. Activities associated with the removal of O&M materials by hopper dredges have previously been analyzed in the November 2003 Gulf Regional Biological Opinion (GRBO) titled "Dredging of Gulf of Mexico Navigation Channels and Sand Mining ("Borrow") Areas Using Hopper Dredges by Corps of Engineers (COE) Galveston, New Orleans, Mobile, and Jacksonville Districts" as amended and modified on June 24, 2005, and January 9, 2007. The USACE, Mobile District will implement terms and conditions for Gulf sturgeon identified in NMFS-Protected Resource Division's (PRD) GRBO if a hydraulic hopper dredge is utilized.

Under Section 7 of the Endangered Species Act, the USACE, Mobile District is requesting concurrence from the USFWS with our determination that the proposed action *may affect but is unlikely to adversely affect* the Gulf sturgeon. Impacts are anticipated to be less than significant.

5.4.7 Pearl darter – No Action

No impacts are anticipated to the pearl darter with continued non-maintenance of the navigation channel.

5.4.8 Pearl darter – Proposed Action

It is assumed that the pearl darter would likely avoid the area during project activities due to increased noise and turbidity, and would return after completion. These disturbances would be short-term and localized to a small area within the navigation channel. Under Section 7 of the Endangered Species Act, the USACE, Mobile District is requesting concurrence from the USFWS with our determination that the proposed action *may affect but is unlikely to adversely affect* the pearl darter. Impacts are anticipated to be less than significant.

5.4.9 West Indian manatee – No Action

No impacts are anticipated to the West Indian manatee with continued non-maintenance of the navigation channel.

5.4.10 West Indian manatee – Proposed Action

West Indian manatees are occasional visitors to the Pascagoula and Escatawpa River(s), with incidental sightings over the past 10 years. Active dredging and placement may cause these animals to alter their route during dredging activities, but would not prevent their passage across the project study area once activities cease. Any impacts to these species would be limited to annoyance and alteration of swimming patterns to avoid the active dredging areas. Following the completion of dredging activities, any displaced animals would be expected to resume normal use of the area. Any such impacts would be less than significant. Standard Manatee Conditions would be utilized if manatees are spotted in the area.

5.5 Water Quality

The significance criteria for water quality in the vicinity of the project area would be a permanent change in water quality from organic and inorganic chemicals; or a long-term change in water quality that results in the loss of a commercially viable or protected species, loss of foraging habitat for coastal birds, or loss of important habitats. Placement of dredged material in United States waters is allowed provided there is avoidance of "unacceptable effects," compliance with applicable water quality standards after considering dispersion and dilution, toxic effluent standards, and marine sanctuary requirements, and no jeopardy to endangered species (Section 404 Federal Water Pollution Control Act [Pub. L. 92-500]). Therefore, violation of any of these standards is considered an adverse impact to water quality.

5.5.1 Water Quality – No Action

No impacts are anticipated to water quality with continued non-maintenance of the navigation channel.

5.5.2 Water Quality – Proposed Action

The dredging and placement 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, and this would be minimal given the sandy nature of the material. Future shoaling is also anticipated to be minimal, given there hasn't been a need to dredge the channel until now. Suspended particles are expected to settle out within a short time, 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. Temporary decreases in dissolved oxygen could likely result from the operations depending on timing of discharge. If decreases occur, they will be of a short duration. No significant effect to the water column is anticipated. Placement of dredged material into deeper portions of the existing channel would have no effect on

current patterns and flow in the vicinity of the project area. Thus, the USACE, Mobile District does not anticipate any adverse impacts as a result of this action. The entire Pascagoula Harbor Federal Navigation Channel project has a current water quality certification from the MDEQ for O&M dredging of the navigation channel and placement of dredged material in approved placement areas, and modification is being requested to add in-channel placement of dredged material. The USACE, Mobile District would adhere to MDEQ's water quality standards.

5.6 Air Quality

The significance criterion for air quality would be the air quality standards are not violated by the implementation of the proposed action or that air quality would not be degraded from present conditions in the vicinity of the project area. The evaluation of impacts to air quality associated with the alternatives was based on the identification of air contaminants and estimated emission rates. The air contaminants considered are those covered by the NAAQS and monitored by Jackson County including carbon monoxide, ozone, nitrogen oxide, particulate matter with diameters less than 10 microns, particulate matter less than 2.5 microns in diameter, and sulfur oxides.

5.6.1 Air Quality – No Action

No impacts are anticipated to air quality with continued non-maintenance of the navigation channel. The NAAQS attainment status for Jackson County would not be affected.

5.6.2 Air Quality – Proposed Action

The proposed action would have no significant long-term effect on air quality. The project area is currently in attainment with NAAQS, and the proposed action is not expected to affect the attainment status of the project area or region. Air quality would be temporarily and insignificantly affected due to emissions resulting from dredge operations and other necessary equipment.

5.7 Aesthetics and Recreation

5.7.1 Aesthetics and Recreation – No Action

No impacts are anticipated to aesthetics and recreation with continued non-maintenance of the navigation channel. The channel is navigable for recreational boats and non-maintenance would not hinder their use of the waterway.

5.7.2 Aesthetics and Recreation – Proposed Action

Placement of dredged material would likely decrease the aesthetic qualities of the project area for a short period of time during and shortly after placement. The placement areas equilibrate and rapidly return to normal upon exposure to the river currents and wave climate. The proposed maintenance dredging with in-channel placement is not anticipated to have any significant impacts to recreation or aesthetics. Commercial and recreational vessels and dredges have concurrently utilized the same area in the past without incident.

5.8 Noise

The significance criteria for the noise impacts in the vicinity of the project area would be a permanent elevation of above-surface noise levels compared to existing ambient conditions or temporary creation of a high noise level (>85 dB) in the vicinity of sensitive receptors. Disrupting nesting behavior in marine birds would be a significance criterion for surface noise, while behavior of marine mammals is a consideration for underwater noise.

5.8.1 Noise- No Action

No impacts are anticipated from noise with continued non-maintenance of the navigation channel. Surface noise and underwater noise would continue under ambient conditions.

5.8.2 Noise- Proposed Action

Noise impacts from project equipment are expected to increase in the vicinity during maintenance dredging work as a result of engine noise from the dredge, and noise emitted from other job related equipment. While there is little that can be done to reduce noise during the operation, these impacts would be short term and restricted to the immediate vicinity of the activity. No long-term increase in noise would occur in or around the project area. Noise is not expected to be a significant impact.

5.9 Cultural Resources

5.9.1 Cultural Resources – No Action

No impacts are anticipated to cultural resources with continued non-maintenance of the navigation channel.

5.9.2 Cultural Resources – Proposed Action

The Federal Navigation channel was assessed for likelihood of historic properties by *Mistovich, Clinton,* and *Agranat* in 1990, which identified no moderate or high potential areas within the APE. No known historic properties are present in the APE and previous studies have identified the APE has having low probability for the presence of historic properties. USACE sent a No Effects determination to the Mississippi SHPO and SHPO replied that a survey would be required. USACE then evaluated hydrographic surveys over the past 25 years and determined that the material had shoaled in the area over the past 20 years. USACE determined that based on the nature of the undertaking and hydrographic surveys, the undertaking coordinated by this document would have No Effects to historic properties. The Mississippi SHPO and appropriate Tribal Nations are being consulted regarding USACE's effects determination based on the evaluation of the hydrographic surveys.

6.0 CUMULATIVE EFFECTS SUMMARY

Federal regulations implementing the NEPA (40 CFR Sections 1500-1508) require that the cumulative impacts of a Proposed Action be assessed. NEPA defines cumulative effects as an "impact on the environment which results from the incremental impacts of

the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-federal) or person undertakes such other actions." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. 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 temporal and spatial extent of this analysis includes similar past, present and future actions.

This action would consist of maintenance dredging with in-channel placement for a portion of the Escatawpa River. Maintenance materials dredged from the Escatawpa River portion of the Pascagoula Harbor Federal Navigation Project authorized project are approved only for upland placement. With the proposed action, water quality in the immediate vicinity of the placement area would be temporarily impaired for a short period of time due to an increase in turbidity. The dredging and placement would be monitored so that operations would not cause an increase in turbidity greater than 50 Nephelometric Turbidity Units (NTUs) above background levels outside a 400-ft mixing zone, as per water quality conditions issued by MDEQ. Adverse effects on biota from changes in water quality would be temporary and localized. Impacts to commercial and recreational fishing from implementation of the proposed action are expected to be minor and temporary with no long-term adverse effects anticipated. Commercial fishing boats regularly transit the area, traveling between the Omega Protein facility located directly upstream from the dredging area and the Gulf of Mexico. While the proposed placement of dredged materials may be a temporary inconvenience to commercial and recreational fishermen, it is not expected to have any long-term adverse effects on fishing activities or fishery resources in the area. The proposed action would comply with environmental statutes and commitments and would not result in significant long-term adverse effects on biological resources, protected species, marine mammals, or birds. No records have been found for any previous dredging actions at this portion of the Escatawpa River in the past.

Foreseeable similar future projects that impact the river bottom could have a minor effect on sedimentation, shoaling or siltation rates due to possible changes in hydrology. Implementation of the proposed action is not expected to have a significant incremental cumulative impact on soils or sediments. Incremental impacts from other known and foreseeable future actions such as future dredging and placement events at the Escatawpa River also are expected to have minor, temporary impacts on water quality and fishery resources. Incremental effects from implementation of the proposed action would result in insignificant cumulative impact on fishery resources.

The proposed maintenance dredging with in-channel placement of material is expected to have no significant direct cumulative impacts to biological resources, water chemistry, or oceanographic resources. Effects from the proposed action, when considered with other past, present, and reasonably foreseeable future actions are not expected to result in significant cumulative adverse impacts on biological resources.

7.0 OTHER CONSIDERATIONS

7.1 Coastal Zone Management Act of 1972

The entire Pascagoula Harbor Federal Navigation Project received a Coastal Zone Consistency (CZC) from the Mississippi Department of Marine Resources (MDMR) on March 2, 2017 and the proposed action will adhere to the conditions of the CZC to the maximum extent practicable. However, in-channel placement is not included in the CZC. The USACE, Mobile District has determined that the proposed action is consistent with the Mississippi Coastal Management Program to the maximum extent practicable, and will coordinate with the MDMR to obtain a Consistency Determination.

7.2 Clean Water Act of 1972

A Section 401 water quality certification (WQC) was received from the MDEQ for the entire Pascagoula Harbor Federal Navigation Channel Project on February 22, 2017. However, in-channel placement is not included in the WQC. The USACE, Mobile District will coordinate with the MDEQ for the dredging and placement action to obtain a WQC. A Section 404(b)(1) evaluation report has been prepared and is included in the **APPENDIX** of this EA. All State water quality standards will be met.

7.3 Rivers and Harbors Act of 1899

The proposed work would not obstruct navigable waters of the United States.

7.4 Marine Mammal Protection Act of 1972, as amended

Incorporation of the safe guards such as Standard Manatee Conditions will be used to protect manatee species during project implementation; therefore, the project is in compliance with this Act.

7.5 Endangered Species Act of 1973, as amended

This project is being coordinated with the USFWS, and is in full compliance with the Act.

7.6 Executive Order 11988, Protection of Children

The proposed action complies with Executive Order 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 action is located in open-water and uninhabited; thus, no changes in demographics, housing, or public services would occur as a result of the proposed project. With respect to the protection of children, the likelihood of disproportionate risk to children is not significant. The dredging and placement activities do not involve activities that would pose any disproportionate environmental health risk or safety risk to children.

7.7 Executive Order 11990, Environmental Justice

The proposed action complies with Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”, and does not represent disproportionally high and adverse human health or environmental effects on minority populations and low-income populations in the United States.

The proposed action is not designed to create a benefit for any group or individual. The dredging and placement activities do not create disproportionately high or adverse human health or environmental impacts on minority or low-income populations of the surrounding community. Review and evaluation of this action has not disclosed the existence of identifiable minority or low-income communities that would be adversely impacted by the proposed project.

8.0 COORDINATION

The general public will be notified of the proposed action via 30-day public notice. The public notice, draft EA and Section 404(b)(1) Evaluation Report will be made available to Federal and state agencies and the interested public. Any comments received during the comment period will be incorporated into the final EA and Section 404(b)(1) Evaluation Report.

9.0 CONCLUSION

The proposed maintenance dredging with in-channel placement at the Escatawpa River portion of the Pascagoula Harbor Federal Navigation Project would have no significant environmental impacts on the existing environment. Furthermore, future maintenance of the channel with in-channel placement e 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 EIS is not required.

In accordance with the requirements of NEPA, this EA has been prepared to consider impacts associated with the Proposed Action and alternatives. Based on the conclusion presented in the EA, it has been determined that the implementation of the Proposed Action would not result in long-term adverse impacts and that no significant cumulative impacts would occur. A FONSI will be prepared.

10.0 REFERENCES

Andres, M. and Peterson, M. (2019, August). University of South Mississippi. Personal communication.

Christmas, J.Y. and R.S. Waller. 1973. Cooperative Gulf of Mexico Estuarine Inventory and Study. 434 p. Gulf Coast Research Laboratory, Ocean Springs, MS.

Clarke, D. G. and T. Miller-Way. 1992. An environmental assessment of the effects of open water disposal of maintenance dredged material on benthic resources in Mobile Bay, Alabama.

Clarke D.G., and D.H. Wilber. 2000. Assessment of potential impacts of dredging operations due to sediment resuspension. DOER Technical Notes Collection. ERDCTN DOER E9 US Army Engineer Research and Development Center, Vicksburg Mississippi

Eleuterius, L.N. 1998. Mississippi Coastal Plant Habitats in Marine Resources and History of the Mississippi Gulf Coast. Volume II, pp 141-165. Mississippi Department of Marine Resources, Jackson, MS

Espey, Huston & Associates (EH&A). 1978. The biological effects of turbidity. Prepared for Board of Trustees, Galveston Wharves and Northville Industries Corporation. EH&A Document No. 78187.

Geotechnical Engineering Testing, 2019. Sediment sampling in the Escatawpa River.

Harris, J. (2019, August). Mississippi Department of Marine Resources. Personal communication.

Hirsch N.D., L.H. DiSalvo and R. Peddicord. 1978. Effects of dredging and disposal on aquatic organisms. US Army Corps of Engineers Waterways Experiment Station. Tech Rep DS 78 5

Holland, A.F., A. Shaughnessy, and M.H. Heigel. 1987. Long-term variation in mesohaline Chesapeake Bay benthos: Spatial and temporal patterns. Estuaries 10:227-245.

Jones, A. 1986. The effects of dredging and spoil disposal on macrobenthos, Hawkesbury Esturary, New South Wales. Marine Pollution Bulletin 17: 17-20.

Leathem, W., P. Kinner, D. Maurer, R. Briggs and W. Treasure. 1973. Effect of spoil disposal on benthic invertebrates. Marine Pollution Bulletin 4: 122-125.

Mississippi Department of Marine Resources (MSDMR). 1998. Marine Resources and History of the Mississippi Gulf Coast, Mississippi's Coastal Environment. Volume H Mississippi Department of Marine Resources. Biloxi, MS

Moore, P.G. 1977. Inorganic particulate suspensions in the sea and their effects on marine animals. Ann. Rev. Oceanogr. Mar. Biol. 15:225—363.

Nixon, S.W., C.D. Hunt, and B.L. Nowicki. 1986. The retention of nutrients (C, N, P), heavy metals (Mn, Cd, Pb, Cu), and petroleum hydrocarbons by Narragansett Bay. In: Lasserre, P., and J.M. Martin, eds. Biogeochemical processes at the land-sea boundary. New York, NY: Elsevier. pp.99-122.

Pattillo, M.E., T.E. Czapl, D.M. Nelson and M.E. Monaco. 1997. Distribution and Abundance of Fishes and Invertebrates in Gulf of Mexico Estuaries. Volume II: Species

Life History Summaries. ELMR Report No. 11. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD 377 pp.

Peterson, M., P. Grammer, J.M. Havrylkoff, W.T. Slack. 2013. Macro-Benthic Prey and Physical Habitat Characteristics in a Western Gulf Sturgeon Population: Differential Estuarine Habitat Use Patterns. Endangered Species Research. Vol. 22: 159-174. DOI: 10.3354/esr00546

Peterson, Mark, Jeanne-Marie Havrylfoff, Paul. Grammer, Paul Mickle, William Slack, 2016. Consistent SpatioTemporal Estuarine Habitat Use during Emigration or Immigration of a Western Population of Gulf Sturgeon. American Fisheries Society 145:27-43, 2016

Sanders, H.L., J.F. Grassle, G.R. Hampson, L.S. Morse, S. Gerner-Price, and C.C. Jones. 1980. Anatomy of an oil spill: Long-term effects from the grounding of the barge Florida off West Falmouth, Massachusetts. J. Mar. Res. 38:265-380.

Schubel, J.R., H.H. Carter, R.E. Wilson, W.M. Wise, M.G. Heaton and MG Gross. 1978. Field Investigations of the Nature Degree and Extent of Turbidity Generated by Open Water Pipeline Disposal Operations. US Army Engineer Waterways Experiment Station Technical Report D 78 30

Sheridan, P. 1999. Temporal and spatial effects of open water dredged material disposal on habitat utilization of fishery and forage organisms in Laguna Madre, Texas. Final Report to the Laguna Madre Interagency Coordination Team. National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Shideler, G. L..1984. Suspended sediment responses in a wind-dominated estuary of the Texas Gulf Coast, J. Sediment. Res., 54(3), 731–745, doi:10.1306/212F84E5-2B24-11D7-8648000102C1865D.

Stickney, R. R. 1984. Estuarine Ecology of the Southeastern United States and Gulf of Mexico. Texas A&M University Press, College Station.

Thompson, M. J. 1999. USGS in cooperation with MMS. Ecology of Live Bottom Habitats of the Northeastern Gulf of Mexico: A Community Profile.

Turner, R.E. 1997. Wetland loss in the northern Gulf of Mexico: Multiple working hypothesis. Estuaries 20:1-13.

U.S. Army Corps of Engineers (USACE). 1975. A Study of the Effects of Maintenance Dredging on Selected Ecological Parameters in the Gulfport Ship Channel, prepared by Water and Air Research, Inc.

USACE. 1985a. Feasibility Report Pascagoula Harbor, Mississippi Improvement of the Federal Deep-Draft Channel. Volume I: Main Report and Environmental Impact Statement. Mobile District.

USACE. 1985b. Improvement of the Federal Deep-Draft Navigation Channel. Volume I: Main Report and Environmental Impact Statement.

U.S. Environmental Protection Agency (USEPA). 1989. Bioaccumulation of Selected Pollutants in fish - A National Study. Volume D study report and appendices A and B. Draft report. Washington, DC: Office of Water Regulations and Standards. December 1989.

USEPA and Mississippi Department of Environmental Quality (MDEQ). 2005. Water Quality Study of Bays in Coastal Mississippi Water Quality Report. Project #05-0926. 28 October 2005.

Wright, T.D. 1978. Aquatic dredged material disposal impacts. U.S. Army Eng. Water Experiment Station Environmental Laboratory, Vicksburg, Miss. Technical Report DS-78-1.

Figure 1: Pascagoula Harbor Federal Navigation Channel Project – Harbor Portion

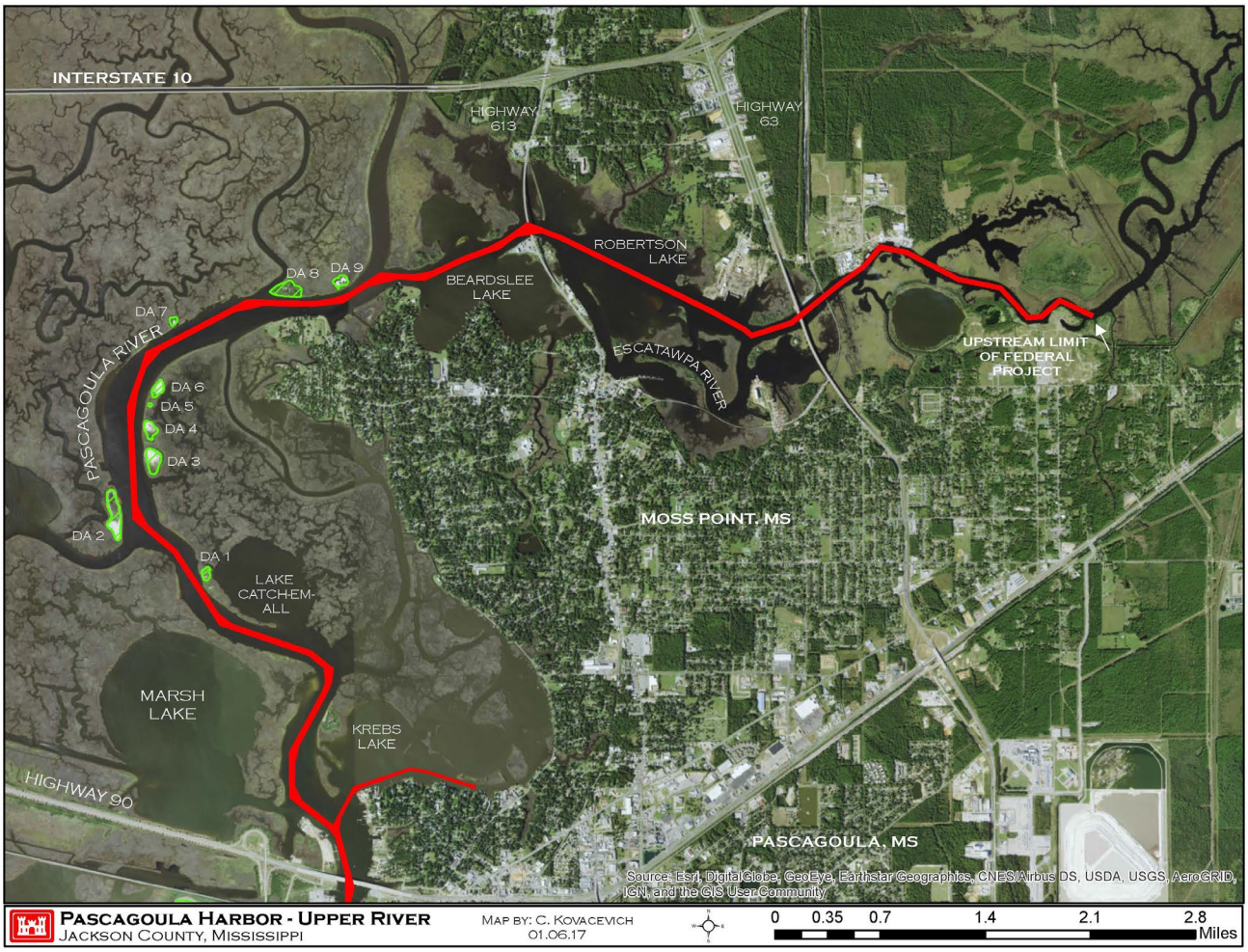

Figure 2: Pascagoula Harbor Federal Navigation Channel Project – River Portion

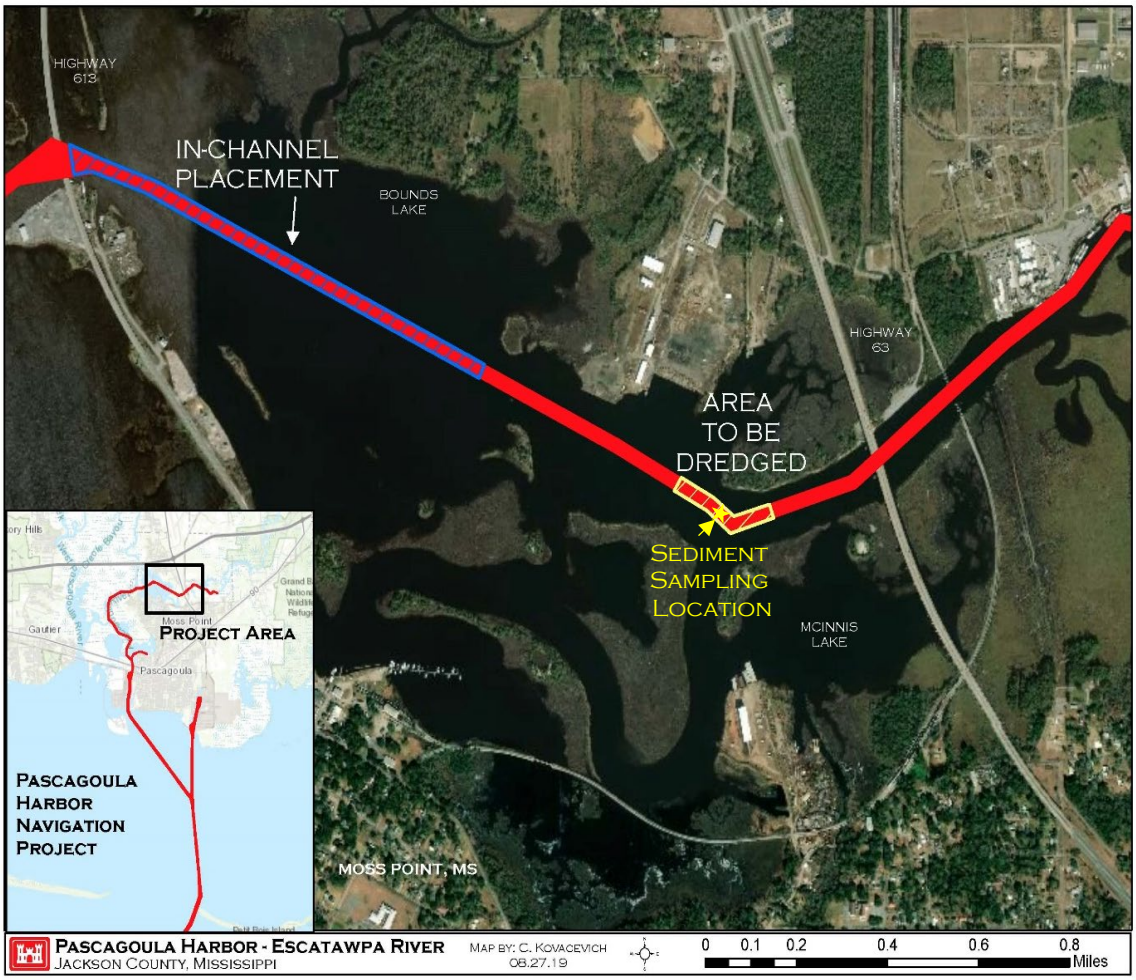

Figure 3. Pascagoula Harbor Federal Navigation Channel Project and proposed maintenance dredging with in-channel placement in the Escatawpa River

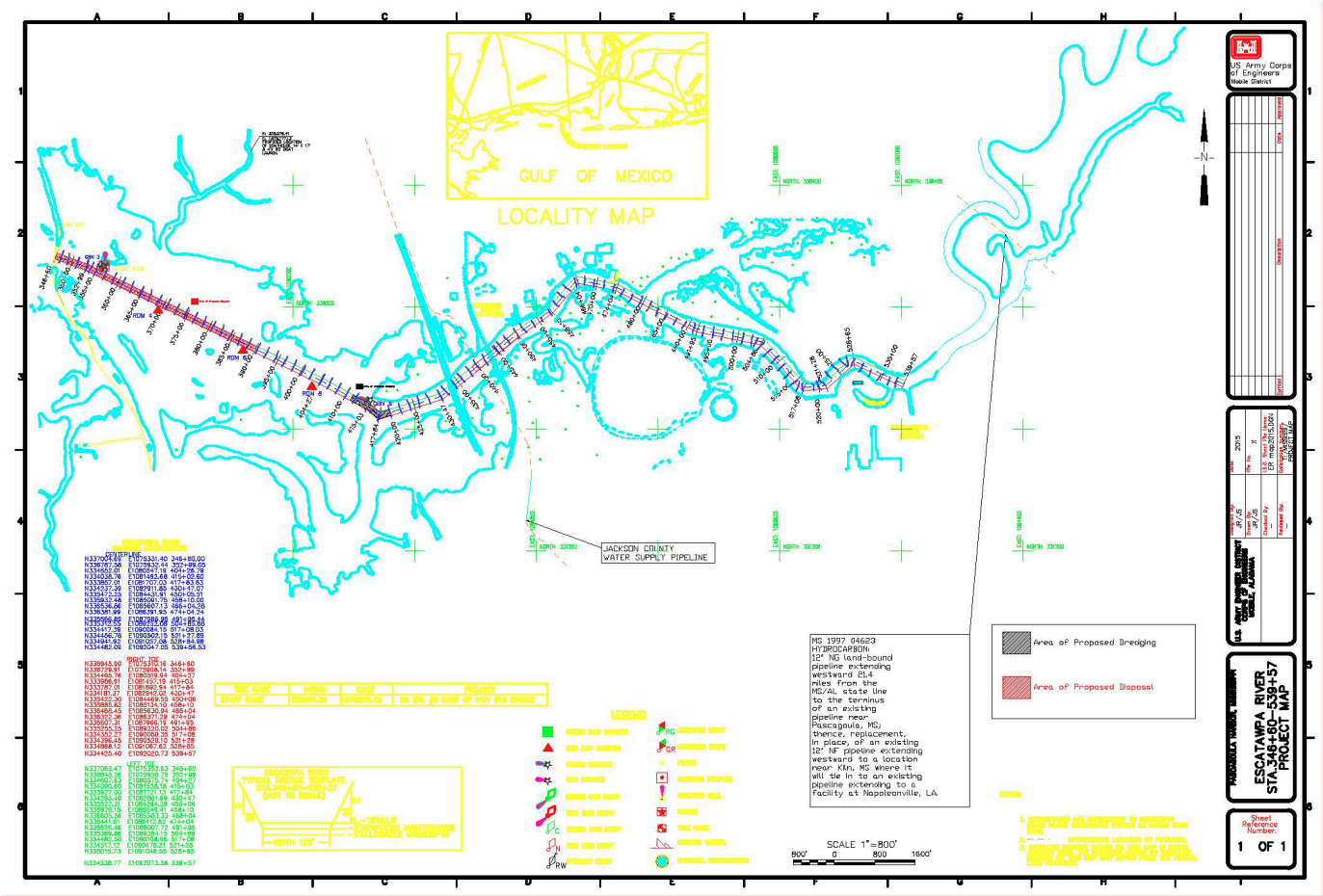

Figure 4: Hydrographic surveys of the project area in the Escatawpa River (USACE 2019)

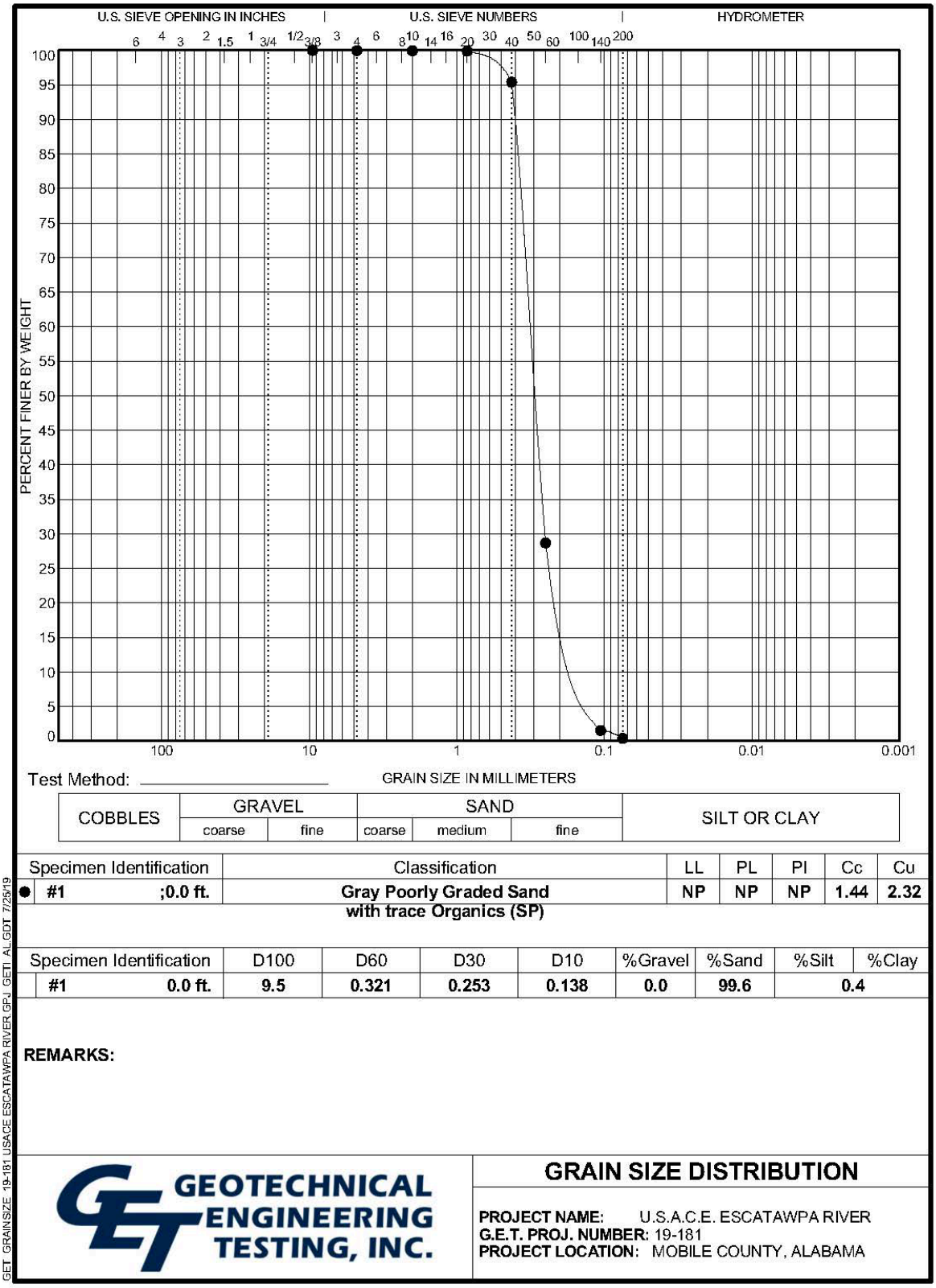

Figure 5. Grain size analysis

Figure 6: General vicinity and sediment sampling photos

Figure 6 (continued): General vicinity and sediment sampling photos

APPENDIX

SECTION 404 (b)(1) EVALUATION REPORT

MAINTENANCE DREDGING WITH IN-CHANNEL PLACEMENT

ESCATAWPA RIVER PASCAGOULA HARBOR FEDERAL NAVIGATION PROJECT JACKSON COUNTY, MISSISSIPPI

A FEDERALLY AUTHORIZED NAVIGATION PROJECT

I. **PROJECT DESCRIPTION**:

A. **Location:** The proposed maintenance dredging with in-channel placement of the Escatawpa River portion at the Pascagoula Harbor Federal Navigation Project is located in Moss Point, Jackson County, Mississippi. See **Figure(s) 1 & 2** in the Appendix of the Environmental Assessment (EA).

B. **General Description:** The authorized Pascagoula Harbor, Mississippi navigation project includes the following channels:

a. An entrance channel 44 feet deep and 550 feet wide from the Gulf of Mexico to Horn Island Pass, including a 2,200-foot long by 200-foot wide sediment trap situated on the east side of the channel, a channel 44 feet deep and 600 feet wide through Horn Island Pass, including a 4,700-foot long sediment trap situated on the east side of the channel 44 feet deep and 175 feet wide.

b. A channel 42 feet deep and 350 feet wide in Mississippi Sound and the Pascagoula River to the railroad bridge at Pascagoula, including a turning basin 2,000 feet long and 950 feet wide (including the channel area) on the west side of the river below the railroad bridge;

c. A channel 42 feet deep and 350 feet wide from the ship channel in Mississippi Sound to the 1,150-foot turning basin at the mouth of Bayou Casotte, then 350 feet wide for about one mile to the northern turning basin, 900 feet wide and 1,750 feet long;

d. A channel 22 feet deep and 150 feet wide up Pascagoula River from the railroad bridge to the mouth of Escatawpa River (Dog River), thence up the Escatawpa River to the Highway 613 Bridge;

e. A channel 12 feet deep and 125 feet wide from the Highway 613 Bridge, via Robertson and Bounds Lakes to mile 6.0 on the Escatawpa River; and

f. A channel 12 feet deep by 80 feet wide extending from deep water in the Pascagoula River to a turning basin in Krebs Lake a distance of about 1,500 feet, then along the south bank of the lake a channel 10 feet deep and 60 feet wide, terminating at a second turning basin, a distance of 2,700 feet from the first turning basin.

In order to maintain the Pascagoula Harbor Federal Navigation Project, maintenance dredging is performed on an as-needed basis. Approximately 2,000,000 cubic yards of material is removed from various channel segments (predominantly segments a, b, & c above) with average dredging cycles occurring every 18 to 36 months. Depending on shoaling rates, not all portions require maintenance dredging every dredging cycle. Therefore, both the location and quantity of materials to be dredged are dependent upon where shoaling occurs. The Escatawpa River portion of the Pascagoula Harbor Project is not normally maintained, as it is a naturally deep river channel. No dredging history records have been found for the section of channel included in this evaluation. Typically, a hopper dredge is used to maintain the outer portion of the Entrance Channel with material placement in the Pascagoula ODMDS, while a cutterhead dredge is typically used to maintain the remainder of the project utilizing open-water, littoral, semi-confined and/or upland disposal sites. Due to specific project needs, funding requirements or equipment availability, a combination of hydraulic or mechanical dredging equipment may be utilized to maintain the Pascagoula Harbor Federal Navigation Project.

Proposed Action

The Proposed Action involves maintenance dredging of the federally-authorized channel (Escatawpa River portion) with in-channel placement of the dredged material, as part of the Pascagoula Harbor Navigation Project (see **Figure 1** in the Appendix). An additional -2 feet of advanced maintenance plus -2 feet of overdepth dredging will also be necessary. Maintenance dredging of soft-dredged material with a hopper, mechanical, and/or a hydraulic cutterhead dredge tends to 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 the material being removed. The amount of dredged material to be removed for this dredging event is estimated to be approximately 20,000 cubic yards. This action could be accomplished by a mechanical, hopper and/or hydraulic cutterhead dredge.

C. **Authority and Purpose:** The existing project was authorized by the Water Resources Development Act (WRDA) of 1986 (Public Law (P.L.) 99-662). Construction of the initial Federal project commenced in 1962 and was completed in 1965 (USACE, 1985a). Improvements to the Pascagoula Harbor Navigation Channel were evaluated in the Pascagoula Harbor, Mississippi, Feasibility Report (USACE, 1985a). The USACE completed a Final Environmental Impact Statement (FEIS) in 1985 and improvements to the Pascagoula Harbor Navigation Channel were authorized by WRDA of 1986. Subsequent to this authorization, an Environmental Impact Statement (EIS) for the designation of an Ocean Dredged Material Disposal Site (ODMDS) located offshore of

Pascagoula was completed in 1991. A Final Supplemental Environmental Impact Statement (FSEIS) was prepared in August 2010 to evaluate the potential for widening and deepening channels to their fully federally authorized project dimensions (USACE, 1985a; USACE, 1985b; USACE, 2010). The ROD for these improvements was signed in 2011 and all construction improvements, except for deepening the impoundment basin, were completed by 2016.

Until shoaling occurred recently in a small section of the Escatawpa River channel, there has never been a need to dredge the channel as it is a naturally deep riverine channel. However, concerns were raised from local industry that a bend in the channel had become too shallow to navigate safely. Hydrographic surveys conducted by USACE over the years and most recently in the spring of 2019 (see **Figure 4** in the Appendix) concurred that a small portion of the channel was no longer navigable and therefore, maintenance dredging would be needed to bring the channel to authorized depths.

Also, if maintenance dredging of the Escatawpa River channel did occur, the only approved placement area(s) for this section of channel are upland sites adjacent to the channel, further down the river towards the Pascagoula River. Due to the significant distance to the nearest site(s) and subsequent increased project costs, this alternative was eliminated from further consideration, and a more cost-efficient means of dredged material placement would need to be determined.

D. General Description of Dredged or Fill Material:

(1) **General Characteristics of Material:** The material to be dredged and placed in deeper portions of the channel is O&M material from the Escatawpa River portion of the Pascagoula Harbor Federal Navigation channel. The material proposed for dredging is 99.6% sandy material.

(2) **Quantity and Source of Material:** Approximately 20,000 cubic yards of material is anticipated for this dredging event from the Escatawpa River channel.

E. Description of the Proposed Discharge Site:

(1) **Location:** The portion of the channel proposed for in-channel placement is less than 1 mile from the dredging area and depth ranges from -20 to -39 feet MLLW.

(2) **Size:** The deeper portion(s) of the channel proposed for placement are approximately 20 acres in size.

(3) **Type of Site:** The placement sites consist of open-water areas in the Escatawpa River, specifically within the authorized channel dimension(s) of 12 feet in depth and 125 feet wide.

(4) **Type of Habitat:** The type of habitat is open-water, unconsolidated sandy bottom. No submerged aquatic vegetation or oyster reefs are present at this site.

(5) **Timing and Duration of Discharge:** The dredging placement activities for this project can occur any time of the year.

F. **Description of the Disposal Method:** Placement will be accomplished by using hopper dredges, hopper dredges with pump out capabilities, mechanical dredges (clamshell, etc.) or hydraulic pipeline dredges.

II. **Factual Determinations (Section 230.11)**:

A. **Physical Substrate Determinations:**

(1) **Sediment Type:** The dredged material is 99.6% sandy material (Geotechnical Engineering Testing (under contract to USACE), 2019).

(2) **Dredged/Fill Material Movement**. The predominant sediment transport pattern in this riverine area is assumed to be downstream towards the Pascagoula River.

(3) **Physical Effects on Benthos**. It is certain that some benthic organisms would be destroyed by the proposed action; however, due to the constant movement of material by currents, benthic organism diversity and abundance would appear to be low. Research conducted by the U.S. Army Corps of Engineers, Engineering, Research and Development Center (ERDC) under the Dredged Material Research Program suggests that the benthic community is adapted to a wide range of naturally occurring environmental changes and that no significant or long-term changes in community structure or function are expected.

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

(5) **Actions Taken to Minimize Impacts (Subpart H)**. No actions that would further reduce impacts due to the placement of the dredged material are deemed necessary.

B. **Water Column Determinations:**

(1) **Salinity**. There would be no significant change in salinity gradients or patterns. This is a riverine/estuarine environment. Average salinity ranges from 13 to 18 ppt.

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

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

(4) **Color**. No effect.

(5) **Odor**. No effect.

(6) **Taste**. No effect.

(7) **Dissolved Gas Levels**. Temporary decreases in dissolved oxygen could likely result from the operations depending on timing of discharge. If decreases occur, they will be of a short duration. No significant effect to the water column is anticipated.

(8) **Nutrients**. Slight increases in nutrient concentrations may occur; however, these would rapidly return to normal. These described increases would have no significant effect to the water column.

(9) **Eutrophication**. No effect.

C. **Water Circulation, Fluctuation, and Salinity Gradient Determinations:**

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

(a) **Current Patterns and Flow**. Placement of dredged material into deeper portions of the existing channel would have no effect on current patterns and flow in the vicinity of the project area.

(b) **Velocity**. No effect.

(2) **Stratification**. No effect.

(3) **Hydrologic Regime**. No effect.

(4) **Normal Water Level Fluctuations**. No effect.

(5) **Salinity Gradient**. No effect on the salinity gradient is anticipated.

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

(1) **Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Placement Site:** Suspended particulate and turbidity levels are expected to undergo minor increases during dredging and placement activities, however, suspended sediment of this type will quickly fall out of the water column and return to normal conditions. The river currents may carry the suspended sediments southward towards the Pascagoula River and the Gulf of Mexico. No significant effects would occur as a result of these increases. Turbidity during disposal is not expected to violate State water quality certification conditions.

(2) **Effects on Chemical and Physical Properties of the Water Column:**

(a) **Light Penetration**. Increased turbidity levels in the project area as a

result of the placement of dredged material would reduce the penetration of light into the water column only slightly and would be a minor short-term impact.

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

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

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

(e) **Aesthetics**. Placement of dredged material would likely decrease the esthetic qualities of the project area for a short period of time during and shortly after placement. The placement areas equilibrate and rapidly return to normal upon exposure to the wave climate.

(3) **Effects on Biota:**

(a) **Primary Production Photosynthesis**. No significant effects greater than those experienced under current project conditions are anticipated.

(b) **Suspension/Filter Feeders**. Some local increases in suspended particulates may be encountered during the dredging and disposal actions, but these increases would not cause significant impacts to these organisms unless they are directly covered with sediment. If directly covered with dredged material, it is expected that some organisms will be destroyed. Rapid recruitment of these organisms will promote a rapid recovery to normal populations. Overall, the impact to these organisms is expected to be minor and insignificant.

(c) **Sight Feeders**. Sight feeders would avoid impacted areas and return when conditions are suitable. However, it is difficult to relate the presence or absence of sight feeders in an area to the placement of dredged material. Sight feeders, particularly fishes, may vary in abundance as a result of temperature changes, salinity changes, seasonal changes, dissolved oxygen level changes, as well as other variables. No significant impacts are expected to occur on sight feeders.

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

D. **Contaminant Determinations**. Due to the similarity between dredging and placement area and sandy nature of the dredged material, it is not anticipated that the dredged material would be contaminated and thus unsuitable for placement.

E. **Aquatic Ecosystem and Organism Determinations:**

(1) **Effects on Plankton**. No significant effects greater than those experienced under current project conditions are anticipated.

(2) **Effects on Benthos**. Benthic organisms would be destroyed by the dredging and placement material, but no long-term effects are expected on the benthic community as a result of the proposed action.

(3) **Effects on Nekton**. No significant effects greater than those experienced under current project conditions are anticipated.

(4) **Effects on Aquatic Food Web**. No significant effects greater than those experienced under current project conditions are anticipated.

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

(a) **Sanctuaries and Refuges**. No effect.

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

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

(d) **Vegetated Shallows**. Not applicable.

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

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

(6) **Effects on Threatened and Endangered Species**. Pursuant to Section 7 of the Endangered Species Act, operations & maintenance (O&M) dredging and placement of material action(s) at Pascagoula Harbor was previously coordinated with the U.S. Fish and Wildlife Service (USFWS). During past certification efforts for O&M actions, concurrences of *may affect but not likely to adversely affect* the species of concern were received. The project area is outside of Gulf Sturgeon Critical Habitat. This proposed action is being coordinated with the USFWS.

(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.

G. **Proposed Disposal Site Determinations:**

(1) **Mixing Zone Determination**. The Mississippi Department of Environmental Quality (MDEQ) would specify a mixing zone limit not to exceed 50 Nephelometric Turbidity Units (NTUs) for turbidity compliance. The USACE, Mobile District, will adhere to that turbidity requirement.

(a) **Depth of water at the disposal site**. Depths of water at the disposal

site vary from 20 feet to 39 feet.

(b) **Current velocity, direction, and variability at the disposal site**. Similar to dredging site.

(c) **Degree of turbulence**. Not significant.

(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.** The proposed action would involve placement of dredged material consisting of dredged material (99.6% sand) from the Pascagoula Federal Navigation channel(s) (Escatawpa River portion). Given the sandy nature of the material, rapid settling of the dredged material is anticipated.

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

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

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

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

(b) **Recreational and Commercial Fisheries**. Recreational and commercial fishing vessels transiting the area would be temporarily impacted primarily as a result of the physical presence of heavy equipment during operation activities.

(c) **Water Related Recreation**. No significant effects.

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

(e) **Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves**. None in the project area.

(f) **Other Effects**. No effect.

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

I. **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 dredging and placement of 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 (CWA).

D. The proposed maintenance dredging with in-channel placement will not jeopardize the continued existence of any federally-listed endangered or threatened species or their critical habitat provided the specified conditions in this document are implemented during maintenance dredging and disposal operations.

E. The proposed placement of fill 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 discharge on the aquatic ecosystem.

Date: _____

_____
Sebastien P. Joly
Colonel, U.S. Army
District Commander