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

SAND ISLAND BENEFICIAL USE AREA EXPANSION
MOBILE COUNTY
MOBILE, ALABAMA

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ENVIRONMENTAL ASSESSMENT

SAND ISLAND BENEFICIAL USE AREA EXPANSION
MOBILE HARBOR NAVIGATION PROJECT

MOBILE COUNTY, ALABAMA

A FEDERALLY AUTHORIZED NAVIGATION PROJECT

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ACRONYMS AND ABBREVIATIONS

ADEM	Alabama Department of Environmental Management
BA	Biological Assessment
BO	Biological Opinion
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CZC	Coastal Zone Consistency
DA	Disposal Area
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
ER	Engineering Regulation
ESA	Endangered Species Act
FONSI	Findings of No Significant Impact
GMFMC	Gulf of Mexico Fishery Management Council
GIWW	Gulf Intracoastal Waterway
ITS	Incidental Take Statement

Mg/l	Milligrams per liter
MHTB	Mobile Harbor Turning Basin
MLW	Mean Low Water
MLLW	Mean Lower Low Water
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLAA	Not Likely to Adversely Affect
NLAM	Not Likely to Adversely Modify
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ODMS	Ocean Dredged Material Disposal Site
O&M	Operations and Maintenance
RBO	Regional Biological Opinion
Register	National Register of Historic Places
SAV	Submerged Aquatic Vegetation
SIBUA	Sand Island Beneficial Use Area
SHPO	State Historic Preservation Officer
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WRDA	Water Resources Development Act
WQC	Water Quality Certification

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1.0 INTRODUCTION.

The U.S. Army Corps of Engineers (USACE), Mobile District is responsible for the operations & maintenance (O&M) of the federally-authorized Mobile Harbor Federal navigation project, which includes removal of dredged material from the channel and placement of dredged material in approved placement areas (open-water, upland, ocean, beneficial use area, etc.). See **Figure 1** in the Appendix. This Environmental Assessment (EA) evaluates impacts that would potentially result from the proposed further expansion of the existing Sand Island Beneficial Use Area (SIBUA) by approximately 3,305 acres for the continued placement of Mobile Harbor Federal Navigation Channel O&M material. The site will be expanded to the northwest, following the shoal and pathway of sediment transport towards Dauphin Island. See **Figure 2** of the Appendix. This action would provide the return of sediment into the local littoral system and increasing placement capacity in the SIBUA consistent with established regional sediment management principles and goals.

Material dredged as part of the routine maintenance of the Bar Channel (primarily sandy sediments) is placed in the SIBUA. The SIBUA, located west of the channel on the ebb tidal shoal, was evaluated to determine whether capacity exists to accommodate projected increases in maintenance dredged material. An additional level of analysis to evaluate transport rates leaving SIBUA as well as capacity available within depth constraints of dredging equipment was performed in an effort to balance safe and efficient dredged material placement practices, while ensuring sandy material dredged from the Bar Channel is maintained within the littoral system. An estimate using USACE 2018 surveys shows the site capacity in the existing SIBUA boundaries is inadequate using current placement practices.

1.1 LOCATION.

The Mobile Harbor is located in Alabama in the southwestern part of the state in Mobile and Baldwin Counties, at the junction of the Mobile River with the head of Mobile Bay (see **Figure 1** in the Appendix). The Port of Mobile is about 28 nautical miles north of the Bay entrance from the Gulf of Mexico and 170 nautical miles east of New Orleans, Louisiana. Mobile Bay is an estuarine system approximately seven miles wide at the northern end and 30 miles wide at the southernmost end. It stretches approximately 30 miles long from the Mobile Delta to the Dauphin Island-Mobile Point entrance. It is situated at the mouth of the Mobile River basin, which drains approximately 44,000 square miles in Alabama, Mississippi, and Georgia. The bay is almost uniformly shallow with an average depth of about 9.5 feet. The Port of Mobile is on the western side of the

Mobile River at the head of the bay. Three federally-authorized navigation channels cross the bay, the Mobile Ship Channel from north to south, the Gulf Intracoastal Waterway from east to west, and the Theodore Industrial Park from northwest to southeast. The southern-most portion of authorized navigation channel known as the Mobile Bar Channel extends approximately seven (7) miles from the Gulf of Mexico into Mobile Bay, and is typically maintained by a hopper dredge with the sandy material placed in the authorized SIBUA as shown in **Figure 1** in the Appendix. The SIBUA is located three miles offshore from the primary Mobile Bay entrance channel, bordered on the west by Dauphin Island, on the east by Mobile Point, Alabama, adjacent to the Sand Island Lighthouse and west of the Bar Channel as it approaches to the Mobile Harbor Ship Channel.

1.2 Authorized and Existing Project.

The navigation channel dredging in Mobile Bay and Mobile River began in 1826 with enactment of the River and Harbor Act of 1826. Over subsequent years, the Federal project at Mobile River and Mobile Bay was expanded to include adjoining channels within the bay. Section 104 of the River and Harbor Act of 1954 (House Document 74, 83rd Congress, First Session, as amended, and previous acts) authorized a 40-foot channel. Improvements to the existing Federal project were authorized in the Water Resources Development Act of 1986 (PL 99 – 662, Ninety-ninth Congress, Second Session), which was approved 17 November 1986, and amended by Section 302 of the Water Resources Development Act of 1996.

The federally-authorized Mobile Harbor, Alabama navigation project consists of the following:

a. A 57-foot deep by 700 feet wide channel from the Gulf of Mexico for approximately eight (8) miles to Mobile Bay;

b. A 55-foot deep by 550 feet wide channel from the mouth of the Mobile Bay for a distance of approximately 29 miles to near the mouth of Mobile River, including a passing lane two (2) miles long and 625 feet wide at mid-bay;

c. A 55-foot deep by 750 feet by 4,000 feet wide anchorage area just south of McDuffie Island;

d. A 55-foot deep by 1,500 feet by 1,500 feet wide turning basin opposite McDuffie Island;

e. A 40-foot deep channel with the width varying from 700 feet, near the Mobile River mouth, to 500 feet, near the Cochrane Bridge (U.S. Highway 98), a distance of approximately four (4) miles;

f. A 40-foot deep by 800 feet to1,000 feet by 2,500 feet wide turning basin opposite the Alabama State docks between river miles 1.0 to 1.5;

g. A 40-foot by 1,000 feet by 1,600 feet wide turning basin just south of the Cochrane Bridge.

Approval for advanced maintenance for the Federal Mobile Harbor navigation project was received from South Atlantic Division in the mid-1990s as per the Navigation Regulations ER1130-2-530, 29 November 1996. As such, the navigation channels have associated advanced maintenance to accomplish dredging in an efficient, cost-effective, and environmentally responsible manner. In addition to the federally-authorized channel dimensions providing for navigation, two (2) sediment basins in the lower Mobile River and three (3) sediment basins in the bay channel have been previously authorized and approved. These sediment basins are to provide improved channel maintenance efficiency. Each of the basins are several thousand feet long and have depths ranging from four (4) feet to 10 feet lower than the existing navigation channel bottom. The basins decrease frequency of dredging to provide a more cost effective and reliable channel. In addition to sediment basins, an advanced widening feature is authorized for the bar channel.

Dredged material may be removed from the channels by dragline/clamshell, hydraulic pipeline and/or hopper dredge, and all material would be placed in previously-approved upland disposal areas (DAs), open water disposal areas, the SIBUA or the Mobile Harbor Ocean Dredge Material Disposal Site (ODMDS). See the following table for placement designations by channel section.

Mobile Harbor Channel Segment	Approved Placement Areas
River Channel	Upland DAs, Mobile Harbor ODMDS
Bay Channel	Mobile Harbor ODMDS, Open-water DAs
Bar/Entrance Channel	SIBUA, Mobile Harbor ODMDS

2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 History of SIBUA Modifications

In September 2004, a modification of the SIBUA was issued to expand the disposal site to include the area around the Sand Island Lighthouse, which is a valuable cultural resource listed on the National Register of Historic Places. Placement of sandy material around the light house's rubble foundation is beneficial in that it provides protection to the historic structure. In order to continue the beneficial use practices, in December 2008, the USACE expanded the SIBUA extending a 4,500-foot wide southern boundary approximately 2,000 to the south. This expanded area provided for continued placement of sandy material from the Mobile Bar Channel in a manner that returns this material to the local littoral system.

2.2 The National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969, as amended, 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 Code of Federal Regulations (CFR) §1501.3 (a) and (b)]. Based on the EA, Federal agencies either prepares an EIS, if one appears warranted, or issues a "Finding of No Significant Impact" (FONSI), which satisfies the NEPA requirement. This EA is prepared according to the 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).

In accordance with the requirements of the NEPA impacts associated with the Proposed Action, an EA has been prepared and is available upon request. Based on the conclusion presented in the EA, it is determined that the implementation of the proposed action would not result in long-term adverse impacts and that no significant cumulative impacts would occur. The EA is available at http://www.sam.usace.army.mil/Missions/Planning-Environmental/Environmental-Assessments/. The EA will be updated should comments be provided that necessitate inclusion. Upon finalization of the EA, a Finding of No Significant Impacts (FONSI) will be prepared.

2.3 Alternatives

2.3.1 No Action Alternative

The No Action Alternative would consist of the continued use of the existing site as currently authorized and not expanding the SIBUA. This Alternative was considered and determined to not be a viable alternative for the proposed action. It is believed that greater negative economic and environmental impacts will result from continual maintenance dredging and placement activities as is currently permitted. Placement of material in the existing SIBUA allows for some feeding of the active littoral system, but expanding the SIBUA will allow for greatly increased acceleration of returning material to the littoral system.

2.3.2 Proposed Action Alternative

Under the Proposed Action, the USACE, Mobile District is proposing to further expand the existing SIBUA by approximately 3,305 acres (to the west towards Dauphin Island) for the continued placement of Mobile Harbor Federal Navigation Channel O&M material as shown in **Figure 2**. This action would provide for the return of sediment into the littoral system as well as increasing placement capacity in the SIBUA, consistent with established regional sediment management implementation principles and goals. The characteristics of the sediment being dredged and placed ranges from fine to medium-grained quartz sand from the Mobile Harbor channel(s).

3.0 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 Mobile Harbor.

3.1 Physical Environment

Coastal Alabama extends approximately 56 miles from 87°30' longitude at Perdido Pass to 88°25' longitude at Petit Bois Pass. Approximately 47 miles of sandy shoreline along the open Gulf encompasses the southern portions of Mobile and Baldwin Counties. Mobile Bay is an estuary which serves as a transition zone where the freshwater from the rivers mixes with the tidally-influenced salt water of the Gulf of Mexico. It has been recognized as a nationally significant estuary of the United States since 1995, with the designation as one of 28 National Estuary Programs established by the U.S. Environmental Protection Agency (USEPA). The Mobile Bay estuary is a bell-shaped, submerged river valley system approximately 31 miles from the mouth of the Bay extending northward to the Mobile River, and 23 miles wide from the Mississippi Sound across through Bon Secour Bay. It receives water and sediment from the Mobile-Tensaw River system, the nation's fourth largest river system relative to discharge and sixth largest in term of total drainage area, and it has an average width of 13 miles. Mobile Bay is about 413 square miles in area and 31 miles long with a maximum width of 24 miles. It is considered the sixth largest watershed in the United States and the fourth largest in terms of stream-flow. Water from three-fourths of Alabama and areas of Georgia, Tennessee and Mississippi flow into Mobile Bay. The Mobile and Tensaw Rivers flow into the northern end of the Bay with smaller rivers such as Dog River, Deer River, and Fowl River enter on the western side of the Bay.

Dauphin Island is part of the east Louisiana-Mississippi-Alabama Shelf, a triangular-shaped region that includes parts of offshore Louisiana, Mississippi, Alabama and northwest Florida (Parker, 1990). The shelf extends from the Mississippi River delta eastward to the De Soto Canyon and from the southern shorelines of the Mississippi-Alabama-northeast Florida barrier islands. Dauphin Island is the easternmost island in the Mississippi-Alabama barrier chain that separates Mississippi Sound from the Gulf of Mexico. The island is approximately 15 miles long and varies from 1.6 miles to 0.25 miles wide. Little Dauphin Island is a spit extending from the eastern tip of Dauphin Island into Mississippi Sound. Tidal inlets, produced by high energy storm events (hurricanes and tropical storms) have subdivided the spit into a series of islands (Nummedal *et al*. 1980). Nautical charts show that these inlets have closed, reopened, and changed location over the past two centuries (Hardin *et al.* 1976; Hummell, 1990).

3.2 Climate

The climate in the project area is subtropical, characterized by warm summers and short, mild winters. The average daily temperature ranges in the summer and winter are 81–91 and 42–63 degrees Fahrenheit, respectively. The average annual rainfall is about 66 inches, and is well distributed throughout the year. Precipitation records indicate July as the wettest month, while October is the driest. Tropical storms occur in the Gulf in summer

through fall. Hurricane season extends from June 1 to November 30. The season averages 10 named storms, 6 of which become hurricanes. These storms are most likely to occur in the Mobile Bay area from late August to early October. The Mobile area receives an average annual rainfall of 65 inches, among the highest for metropolitan areas in the continental U.S. This rainfall can be accentuated by hurricanes, tropical storms, and El Niño events.

3.3 Topography and Bathymetry.

Dauphin Island is the westernmost beach environment in coastal Alabama. The island is approximately 15 miles long and extends from Main Pass at the Mobile Bay entrance to Petit Bois Pass, a 4-mile-wide tidal inlet separating western Dauphin Island, Alabama and eastern Petit Bois Island, Mississippi. The western two-thirds of Dauphin Island is a low-relief, washover barrier that is subject to overwash by Gulf of Mexico waters during tropical storms and hurricanes (Nummedal *et al*. 1980; Byrnes *et al*. 1991; Hummell, 1996; Morton, 2007). Maximum relief along this portion of the island is about 7 ft relative to mean water level (MWL), except for dune features that may reach 10 ft MWL in elevation. Island width varies between about 800 and 2,600 ft. Currently, the main channel at Petit Bois Pass is located adjacent to Dauphin Island and extends to about 23 ft below MWL (McBride *et al.* 1991). The eastern end of Dauphin Island has an average elevation near the beach of about 10 ft MWL; however, an extensive interior dune system that reaches an elevation of approximately 45 ft MWL exists north of beach deposits on top of existing Pleistocene coastal deposits (Otvos, 1979; Otvos and Giardino, 2004). Seaward of the beach along eastern Dauphin Island, an ephemeral, subaerial sand deposit called Pelican Island is associated with the Mobile Pass ebb-tidal delta. This feature is prominent in its impact on shoreline response along eastern Dauphin Island (Byrnes *et al*. 1991). The island has continuously changed its shape, size, and location throughout the historical record in response to storms and normal wave and current processes (Hummell, 1996).

3.4 Sediments

The sediment of Mobile Bay consists of sand to clays with various mixtures of sand, silt, and clay covering most of the bay bottom. The Mobile Bay sediments are approximately 50 percent sand and 50 percent clay. The northern portion of the bay is comprised of deltaic sands, silty sand, silts and clayey silts carried in by the Mobile River. Sediments of the lower bay are primarily estuarine silty clay and clay. The western shoreline exhibits sands which grade to clayey sand, sandy clays, and clays towards the deeper parts of the bay. Oyster reefs and shell occur in isolated locations in the southern part of Mobile and Bon Secour Bays. The upper portion of Mobile Harbor is predominantly silt and clay with higher concentrations of sand in the mouth of the Mobile River. The northernmost part of the harbor and Mobile River mouth, which reflects the conditions within the turning basin area is sandier due to the larger grain sizes initially deposited into the estuary by the mouth of the river while the finer silts and clays were deposited in the deeper portions of the harbor area. The SIBUA is part of the ebb tidal shoal associated with the mouth of Mobile Bay. This sediment is characterized as predominantly fine to medium quartz sand.

3.5 Benthos, Motile Invertebrates, and Fishes.

The balance between freshwater inflow and saltwater tidal exchanges is an important driver establishing salinity-zone habitats in estuaries (Van Diggelen and Montagna 2016) and salinity strongly influences benthic macroinvertebrate distributions (Telesh and Khlebovich 2010). Changes to this freshwater/saltwater relationship are associated with wetland loss on the northern Gulf of Mexico via altered riverine input of freshwater and sediment (Day *et al.* 2000) and salt water intrusion via canal and channel dredging (Turner 1997). Other factors affect habitat quality and the salinity balance within an estuary, including severe storms, sediment changes, and development. Alterations to inputs of freshwater (e.g., droughts, floods, flood control levees) or saltwater (e.g., channel deepening), can affect biotic communities that are adapted to particular salinity zones by changing their taxonomic composition and distributions. Important estuarine biota includes benthic invertebrates, which are relatively stationary, living within bottom sediments. Their abundances and distributions, therefore, can serve as an indicator of environmental conditions in an area. Salinity, however, is not the only factor affecting the distributions of benthic invertebrates, which also respond to sediment composition, competition, and predator-prey relationships (Little *et al.* 2017). Commercially and recreationally important estuarine fish feed on benthic invertebrates in estuarine and contributing freshwater habitats.

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

A more recent evaluation conducted by the USACE Engineering, Research and Development Center (ERDC) characterized baseline benthic infaunal communities in estuarine, transitional, and freshwater habitats in the Mobile Bay watershed (Berkowitz *et al*., 2018). Sampling was conducted in October 2016 and May of 2017 with a total 240 benthic samples collected over 40 stations within habitat zones of freshwater, brackish, and estuarine. Benthic macrofauna in Mobile Bay are dominated by polychaetes and macrofaunal abundances are relatively low in this area compared to other Gulf of Mexico estuaries (Berkowitz *et al*., 2018). In the Estuarine Zone, the following Class and Families were found to be the highest in abundance: Bivalvia (Mactridae), Crustacea (Idoteidae), Nemertea (Nermertea), Oligochaeta (Tubificidea) and Polychaeta (Capitellidae).

A number of studies evaluating the fish and invertebrates of Alabama estuaries have been conducted. These studies looked at species abundance and diversity in coastal waters. The nearshore and marsh species are comprised largely of fish in the families *Poeciliidae*, *Cyprinodontidae*, and *Atherinidae* which serve as the prey for the Southern flounder *Paralichthys lethostigma* and seatrout *Cynoscion spp.,* both important sport and commercial species. Common migratory fish in the study area are Atlantic croaker *Micropogonias undulatus*, spot *Leiostomus xanthurus*, and sand seatrout *Cynoscion arenarius*. Important forage fish within the area are the pelagic species; Bay anchovy *Anchoa mitchilli*, striped anchovy *Anchoa hepsetus*, and Gulf menhaden *Brevoortia patronus*. The most commercially important shellfish found in the area include the brown and white shrimp, blue crab, and American oyster (Swingle, 1971 and Swingle and Bland, 1974).

Most marine species considered to be of significant economic importance utilize open water areas of the Gulf of Mexico for spawning purposes rather than the confines of semi-enclosed estuaries. However, almost all of these species, except for anadromous forms, migrate seaward seasonally for spawning, then larvae and early juveniles return to the estuaries, which serve as nursery grounds. Estuaries provide larvae and juveniles with protective habitat, an influx of freshwater, a continuous mixing zone, and an abundance of food supply. This phenomenon considered in this report is documented in scores of publications, but especially Christmas and Waller (1973), Loyacano and Smith (1979), and Benson (1982).

A more recent study was conducted by Berkowitz *et al*., 2018 during September 2016 to evaluate recruitment and growth and in May 2017 to evaluate the spawning period and young-of-year survival of freshwater species. Berkowitz *et al*., 2018 conducted sampling in the freshwater, transition and upper bay zones of Mobile Bay for a total of 11 sites. A total of 2,097,836 individuals representing 162 species were recorded and used in the analysis. Salinity tolerances for each fish guild community in Mobile Bay study areas were identified according to the Gulf Coastal Research Laboratory publication by Christmas (1973) following the recommendations by Elliott *et al* (2007). Guilds included: freshwater only, freshwater entering estuary, resident estuary, marine entering estuary, and marine only. The Marine guild consisted of predominantly Red snapper *Lutjanus campechanus* (91%), along with Rough scad *Trachurus lathami,* Round herring *Spratelloides gracilis*, Smoothhead scorpionfish *Scorpaena calcarata*, Spotted batfish *Ogcocephalus cubifrons*, Blackedge cusk-eel *Lepophidium brevibarbe*, Broad flounder *Paralichthys squamilentus*, Dusky flounder *Syacium papillosum* and Mexican searobin *Prionotus paralatus.*

Shipp (1983) documented this utilization activity by numerous species, such as the bay anchovy (*Anchoa mitchilli*), the speckled trout or spotted sea trout (*Cynoscion nebulosus*), and the red fish or red drum (*Sciaenops ocellatus*) in the immediate vicinity of the SIBUA. Pattillo *et al* (1997) summarized the life history and environmental tolerances for three species of shrimp in this region. The bay anchovy spawns throughout estuaries and nearshore Gulf of Mexico waters. Large numbers of these fish inhabit the lower estuaries and near-shore waters during warm months. The SIBUA expansion site does provide suitable spawning habitat for the bay anchovy but no data exists to indicate this particular

site is more suitable than another. The SIBUA does not provide the only habitat necessary to maintain the existing population levels of the bay anchovy. Other areas in the Gulf of Mexico also provide the required habitat needed to maintain successful bay anchovy populations.

Spotted sea trout and red fish are species of concern to coastal states due to their game fish importance. The red drum is an important recreational species throughout its range. Juveniles generally live in estuaries and move to near-shore oceanic waters, such as the SIBUA, as they reach maturity (Pearson 1929). Adults range widely over the near-shore continental shelf waters throughout the year but apparently move to coastal waters to spawn (Overstreet 1983). Spawning is generally thought to take place in coastal waters near inlets (Jannke 1971, Holt *et al*. 1985) although Lyczkowski-Shultz *et al.* (1988) found eggs and larvae out to 20 miles from shore in the eastern Gulf of Mexico. It is believed that water temperature and salinity levels are more important to the spawning of the spotted sea trout than a specific location because newly hatched spotted sea trout will not survive low salinity and low temperature conditions. Optimum spawning conditions for spotted sea trout exist when salinity is 20 to 34 parts per thousand (ppt) and temperatures reach 70 to 90° Fahrenheit (F). Spawning takes place at night in coastal bays, sounds, and lagoons, near passes, and around barrier islands from March through November. Females may lay up to 10 million eggs. The eggs hatch within 20 hours and are transported to estuaries by winds and currents. Juveniles spend two to four years in shallow grassy areas and then tend to move into the near-shore passes and along beaches.

The SIBUA could possibly serve as a spawning site for these species since both are known to spawn in lower estuaries, in near-shore areas, and around barrier islands (Perret *et al*. 1980; Benson, 1982). In a literature review, Wade (1979) noted that earliest observations of this century data implied intra-estuarine spawning, while the more recent data, relying more heavily on empirical observations of the presence and transport of eggs and larvae, indicated that most spawning is really salinity dependent, and in fact more activity is concentrated just off the barrier islands than previously thought. Studies indicated large numbers of eggs and larvae of several species of the drum family, including both the spotted sea trout and red drum, are present around SIBUA. The passes into the Mobile Bay estuary are the lanes of transport for these larvae leading into the Bay. These passes are located near the vicinity of the SIBUA. Thus, strong evidence support that all near-shore areas are important spawning areas for these species, and the SIBUA is not unique in their importance. Spawning location for the red drum is more definitive. Christmas and Waller (1973) report spawning of red drum outside of the Mississippi barrier islands, near to passes, and indicate no mature females have ever been taken in estuarine waters along their area of study.

Marine shrimp is by far the most popular seafood in the United States. There are many species of shrimp found in the Gulf of Mexico; however, only those of the family *Penaeidae* are large enough to be considered seafood. Brown shrimp (*Penaeus aztecus*), white shrimp (*P. setiferus*) and pink shrimp (*P. duorarum*) make up the bulk of Alabama 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. Several shrimpers actively fish in the vicinity of the SIBUA site for shrimp. However, shrimp is also actively fished outside of the boundaries of the site.

3.6 Coastal Flora

Coastal Alabama consists of several habitats including beaches, sand dunes, coastal maritime forests, emergent wetlands, submerged aquatic vegetation, rivers, tidal creeks, tidal flats, scrub/shrub wetlands, forested 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 estuarine subtidal and intertidal water bottoms populated with diverse benthic communities.

3.6.1 Wetlands

Mobile Bay supports one of the largest intact wetland ecosystems in the U.S., including over 250,000 acres in the Mobile-Tensaw River Delta. Tidal marshes are located along the bay shorelines and the shoreline of the Mississippi Sound. These marshes are typically bordered along the waters edge by a strip of salt marsh grass, *Spartina alterniflora*, with scattered stands of *S. cynosuroides, S. patens, Distichilis spicata,* and *Phragmites communis*. The majority of the marsh inside of this strip is composed of *Juncus roemerianus* (Swingle, 1971). Within the vicinity of the project there are also a few isolated wetlands, some being densely vegetated with slash pine (*Pinus elliotti)*, a thick understory of swamp titi (*Cyrilla racemiflora)*, and other shrubs.

Berkowitz *et al.* (2018) mapped a total of 41 wetland communities for the Mobile Bay ecosystem. The study area utilized to evaluate wetlands focused on the central and southern portions of the Mobile Bay and the Five River Delta region. As a result of the observed salinity gradient increasing from north to south, wetlands in the northern portion of the bay are characterized by bottomland hardwood forests containing *Taxodium distichum*, *Nyssa aquatica*, *N. biflora*, Acer sp., Carya sp., Fraxinus sp., Quercus sp., and Ulmus sp. Herbaceous species within this zone include: *Typha domingensis*, *T. latifolia*, *Sagittaria lancifolia, Schoenoplectus americanus,* and *Alternanthera philoxeroide*s. Additionally a number of aquatic bed species (e.g., *Nuphar* sp., *Nelumbo lutea*) can be found adjacent to open water reaches in many wetland areas. Wetlands within the southern portion of the Delta form a transition zone of estuarine adapted, moderate salinity tolerant species

dominated by a mixture of shrubs including: *Baccharis glomeruliflora*, *B. halimifolia*, *Ilex sp*., *Morella cerifera*, *Persesa palustris*, and *Sabal minor*. The lower portions of the bay include an array of moderate to high salt tolerant herbaceous species including *Spartina cynosuroides*, *Panicum virgatum, Cladium jamaicense*, and *Juncus roemerianus (*Berkowitz, *et al. (2018)*.

The project area consists of Estuarine and Marine Deepwater wetlands, which consists of open ocean overlying the continental shelf and its associated high-energy coastline. Marine habitats are exposed to the waves and currents of the open ocean and the water regimes are determined primarily by the ebb and flow of oceanic tides. Salinities exceed 30 parts per thousand (ppt), with little or no dilution except outside the mouths of estuaries. Shallow coastal indentations or bays without appreciable freshwater inflow, with the substrate in these habitats is flooded and exposed by tides; includes the associated splash zone.

3.6.2 Submerged Aquatic Vegetation

Coastal seagrass beds represent one of the most productive ecosystems on the planet (Berkowitz *et al*., 2018). Submerged Aquatic Vegetation (SAV) communities in Mobile Bay serve as thriving habitats that provide shelter for fish and invertebrates, nursery habitat for commercially and recreationally important finfish and shellfish species, a food source for over-wintering waterfowl, and prevention against erosion through sediment stabilization (MBNEP, 2008). The Mobile Bay National Estuary Program funded a survey of SAV in coastal Alabama beginning in summer and fall 2002. This work included ground-truthed photo-interpreted aerial imagery of SAVs. Vittor identified species composition of the SAV beds using surveys that were conducted in 2002, 2009, and the summer (July/August) and fall (October) of 2015 (Vittor and Associates, Inc. 2004, 2010, 2016). In the Marine areas the 2002 SAV survey found shoal grass (*Halodule wrightii)* comprised most of the acreage, particularly in Mississippi Sound (819.4 acres) and southern Perdido Bay (299.6 acres, including Florida waters). In addition, relatively small patches of SAV occurred along the northern shoreline of the western end of Dauphin Island, and in Baldwin County in Little Lagoon, Bay la Launch, Arnica Bay, and Palmetto Creek. In Mobile Bay, the species with both the most coverage and the most temporal variation in coverage were Eurasian Watermilfoil (*Myriophyllum spicatum)*, Water Celery (*Vallisneria neotropicalis)*, Southern Naiad (*Najas guadalupensis*), Water stargrass (*Heteranthera dubia)*, and Coons Tail (*Ceratophyllum demersum)*.

Several areas of the Delta that had supported large SAV beds in 2002 were devoid of submerged vegetation in 2008 and 2009, in particular the northernmost part of the survey area. The dynamics of SAV occurrence in the Delta are poorly known, and reasons for the decline of SAV in these areas are not clear. The species composition and distribution of SAV in northern Mississippi Sound is also different compared to the 2002 baseline survey. SAV mapped in the Sound in 2002 was entirely shoal grass. During the 2008 and 2009 survey, widgeon grass, shoal grass, and mixed beds of widgeon grass and shoal grass occurred in the Grand Bay, Isle aux Herbes, and Kreole quadrangles. SAV composition has changed through time in the northern Sound, likely due to exposure to wave-generated turbulence and scour, and freshwater outflow from the Mobile Bay

watershed. SAV in this portion of the survey area likely remains in some degree of flux due to highly variable physical environmental conditions, unlike the relatively sheltered locations containing SAV in southeastern Baldwin County. Widgeon grass beds that occurred in Mobile Bay and in portions of northern Mississippi Sound in 2008 did not re-emerge in 2009. The early spring of 2009 was characterized by persistent strong southerly winds, and elevated turbidity was present for much of the first half of the year in open waters of Mobile Bay and Mississippi Sound, potentially limiting vegetative growth of widgeon grass in those areas.

3.7 Coastal Fauna.

Birds in the vicinity of the project may include: Gulls, pelicans, terns, sandpipers, plovers, stilts, skimmers, oystercatchers, herons, egrets and ibises. Twenty-nine marine mammal species, including the West Indian manatee, have been or are known to occur in the Gulf of Mexico. Of the species sited along the upper continental shelf, three marine mammal species are commonly found along nearshore areas. They include Atlantic bottlenose dolphin (*Tursiops truncates*), Atlantic spotted dolphin (*Stenella frontalis*), and spinner dolphin (*Stenella longirostris*). In recent years, the West Indian manatee has become a more common transient, frequently migrating from Florida along the coast as far as Louisiana in warmer weather. However, this species typically remains close to the coast and would not be expected near the barrier islands. Other marine mammal species, such as whales, are inhabitants of the deeper waters (greater than 200 feet) off the continental shelf. They would be unlikely to be encountered in the coastal waters off of Mobile Bay but these animals could appear as transients through the area. No sightings of these species have been recorded near the project area.

3.8 Oyster Reefs.

Oyster reefs of commercial importance are subtidal and form aggregates that cover thousands of acres (1896 hectares of mapped oyster reef) of bay bottom throughout coastal Alabama. The primary oyster reefs of Alabama are located in the southwestern portion of Mobile Bay (Cedar Point, Sand Reef Buoy, Dauphin Island Bay, Kings Bayou, and Peavy Island Reef). Oyster reefs are also located to the east in Bon Secour Bay and to the west in Portersville Bay. There are additional small, scattered patches of oysters especially along the western shore of Mobile Bay in addition to the riparian beds located in Heron Bay and the Mississippi Sound (May 1971; Tatum *et al*. 1996). According to the Alabama Marine Resources Division, the oyster harvest in Mobile and Bon Secour Bay(s) and the Alabama portion of Mississippi Sound for the period of 2013 through 2016 was reported at just over 274,000 pounds of shucked oysters, which translates to an approximate dock-side value of over $2.1 million.

3.9 Essential Fish Habitat.

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

Mexico in its Fishery Management Plan Amendments. These habitats include estuarine areas, such as estuarine emergent wetlands, seagrass beds, algal flats, and mud, sand, shell, and rock substrates. In addition, marine areas, such as the water column, vegetated and non-vegetated bottoms, artificial and coral reefs, geologic features and continental shelf features have also been identified. The habitat within the vicinity of the project consists of open-water marine environment with a sandy bottom and subject to high wave action and currents.

Open-water and estuarine marshes 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 and offshore area along the northern Gulf of Mexico is of a high diversity due to the variety of environmental conditions, which exist within the area. The major fisheries landed along the Mississippi and Alabama 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. In addition, numerous species of less interest may be taken, including ladyfish (*Elops saurus*), crevalle jack (*Caranx hippos*), blue runner (*Caranx crysos*), and black drum (*Pogonias cromis*). Trawlers work the area primarily for brown and white shrimp (*Peneus aztecus* and *P. setiferous*), but occasional trawlers seeking finfish species, including menhaden (*Brevoortia patronus*) and croaker (*Micropogonias undulatus*), as well as other industrial species may trawl this bottom (GMFMC-1998, 2004 and 2005).

The Mississippi Sound and adjacent waters have been identified as important nursery areas for nine sharks, primarily Atlantic sharpnose, blacktip, finetooth, and bull sharks. Less prevalent species are the spinner, blacknose, sandbar, bonnethead, and scalloped hammerhead. Typically sharks migrate inshore in the early spring around March and April, remain inshore during the summer months and then migrate offshore during the late fall around October. Most shark species in the Mississippi waters give birth during late spring and early summer, with young sharks spending just a few months of their life's in shallow coastal waters. Most shark species are abundant around barrier islands, with adult sharks commonly located south of the barrier islands (Carlson *et al*, 2003). The species managed by the Gulf of Mexico Fishery Management Council are listed in **Table 1** below.

Table 1: Fishery Management Plans and Managed Species for the Gulf of Mexico (NMFS 2015).

Shrimp Fishery Management Plan
brown shrimp – *Farfantepenaeu aztecus*
pink shrimp - *F. duorarum*
royal red shrimp - *Pleoticus robustus*
white shrimp - *Litopenaeus setiferus*
Reef Fish Fishery Management Plan
almaco jack – *Seriola rivoliana*
anchor tilefish - *Caulolatilus ntermedius*
banded rudderfish – *S. zonata*

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

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

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

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

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

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

Within the project area, EFH has been designated for managed species of Gulf of Mexico dolphin, wahoo, red drum, blue marlin, sharks (11 species), coastal migratory pelagics (3 species), reef fish (43 species), stone crab (2 species) and shrimp (4 species). No habitat areas of particular concern were identified for this area.

3.10 Threatened and Endangered Species

The USFWS lists the following species as either threatened and/or endangered that may occur within the project area for Baldwin and Mobile Counties: dusky gopher frog (*Lithobates sevosus*), Mississippi sandhill crane (*Grus canadensis pulla*), saltmarsh topminnow (*Fundulus jenkinsi*), tan riffleshell mussel (*Epioblasma florentina walkeri)*, wood stork (*Mycteria Americana*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), Alabama heelsplitter (*Potamilus inflatus*), Atlantic sturgeon (Gulf subspecies) (*Acipenser oxyrhynchus desotoi*), loggerhead sea turtle (*Caretta caretta*), Eastern indigo snake (*Drymarchon couperi*), black pine snake (*Pituophis melanoleucus*), gopher tortoise (*Gopherus polyphemus*), southern clubshell (*Pleurobema decisum*),

Alabama sturgeon (*Scaphirhynchus suttkusi*), West Indian manatee (*Trichechus manatus*), hawksbill sea turtle (*Eretmochelys imbricata*), leatherback sea turtle (*Dermochelys coriacea*), Kemp's ridley sea turtle (*Lepidochelys kempii*), American chaffseed (*Schwalbea americana*), Maui remya (*Remya mauiensis*), Alabama beach mouse (*Peromyscus polionotus ammobates*), Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*), and the Alabama red-bellied turtle (*Pseudemys alabamensis*).

The NMFS-Protected Resource Division (PRD) lists the following species as either threatened and/or endangered in the State of Alabama: fin (*Balaenoptera physalus*), sei (*Balaenoptera borealis*), and sperm (*Physeter macrocephalus*) whales, green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles, Gulf sturgeon, oceanic whitetip shark (*Carcharhinus longimanus*), and giant manta ray (*Manta birostris*). Critical habitats are designated for loggerhead sea turtles and piping plovers in the counties but outside the project footprint. Portions of the expansion area near Dauphin Island contain Critical Habitat for Piping Plover, though at this time, those areas are currently submerged (previously emergent). Critical habitat for the Piping plover extends to the MLLW line. Bald eagles are no longer federally listed as threatened or endangered but are still protected under the Bald and Golden Eagle Protection Act. The Alabama red-bellied turtle is known to inhabit the River Channel and the upper channel reaches. Past maintenance dredging of the navigation channels and disposal operations in existing disposal areas have not been identified as actions that would be threatening to this species.

The species of particular concern for the project area include the gulf sturgeon, West Indian manatee, and sea turtles. 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 Alabama waters in the summer. They are known to utilize the Mobile Ship Channel extensively as they migrate throughout Mobile Bay and into the adjacent rivers. 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.

The loggerhead sea turtle is currently listed as endangered by USFWS and threatened by NOAA Fisheries. Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Gulf of Mexico, Pacific, and Indian Oceans. This species may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, and the mouths of large rivers. Nesting in the northern Gulf outside of Florida occurs primarily on the Chandeleur Islands in Louisiana and to a lesser extent on adjacent Ship, Horn, and Petit Bois Islands in Mississippi (Ogren, 1977). Ogren (1977) reported a historical reproductive assemblage of sea turtles, which nested seasonally on remote barrier beaches of eastern Louisiana, Mississippi, and Alabama. These sea turtles have historically nested on Alabama's beaches and barrier islands. There currently is designated nearshore reproductive (NOAA Fisheries) and nesting critical habitat (USFWS) for the loggerhead sea turtle in the project area. The USFWS has identified coastal beach habitat that is important for the recovery of the northwest Atlantic population of the loggerhead sea turtle. The agency has identified portions of islands and mainland coastal beaches in six states, including Alabama, as critical habitat. The areas in Alabama include Little Lagoon Pass, Gulf State Park, and Perdido Pass.

The Kemp's ridley sea turtle is listed as endangered under the ESA (USFWS, 2018). The Kemp's ridley occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean, with occasional individuals reaching European waters. Immature turtles have been found along the eastern seaboard of the U.S. and in the Gulf of Mexico. In the Gulf, studies suggest that immature turtles stay in shallow, warm, nearshore waters in the northern Gulf until cooling waters force them offshore or south along the Florida coast (Renaud, 1995). Little is known of the movements of the post-hatching stage (pelagic stage) within the Gulf. Studies have indicated that this stage varies from 1–4 or more years and the immature stage lasts about 7–9 years (Schmid and Witzell, 1997). The maturity age of this species is estimated to be 7–15 years.

Kemp's ridley sea turtles are regularly seen in Alabama coastal waters and could potentially nest on the Alabama coastal beaches. Immature Kemp's ridley turtles have been incidentally captured by recreational fishermen at Mississippi fishing piers. In 2012, almost 200 Kemp's ridley turtles were captured and rehabilitated. Nests have been documented on Santa Rosa Island in the Florida District of the Gulf Island National Seashore (GUIS) along the Gulf coast. In addition, nesting is being reestablished in Texas through conservation programs; however, its primary nesting area is near Rancho Nuevo in Tamaulipas, Mexico (Rothschild, 2004).

The breeding populations of the green sea turtle off Florida and off the Pacific coast of Mexico are listed as endangered. All other breeding populations are listed as threatened (USFWS, 2018). Although green sea turtles are found worldwide, this species is concentrated primarily between the 3º North and 35º South latitudes. Green sea turtles tend to occur in waters that remain warmer than 68ºF; however, there is evidence that they may be buried under mud in a torpid state in waters to 50ºF (Ehrhart, 1977; Carr et al., 1979). In the southeastern U.S., nesting season is approximately June through September. Nesting occurs nocturnally at 2-, 3-, or 4-year intervals. Nesting has been known to occur in Alabama.

Only occasionally do females produce clutches in successive years. Estimates of age at sexual maturity range from 20–50 years (Balazs, 1982; Frazer and Ehrhart, 1985), and they may live over 100 years. Immediately after hatching, green turtles swim past the surf and other shoreline obstructions, primarily at depths of about 8 inches or less below the water surface, and are dispersed both by vigorous swimming and surface currents (Balazs, 1982). The whereabouts of hatchlings to juvenile size is uncertain. Green turtles tracked in Texas waters spent more time on the surface, with less submergence at night than during the day, and a very small percentage of the time was spent in the federally maintained navigation channels. The tracked turtles tended to utilize jetties, particularly outside of them, for foraging habitat (Renaud and Carpenter, 1994).

The hawksbill sea turtle is the second smallest sea turtle and is somewhat larger than the Kemp's ridley. The hawksbill sea turtle is small to medium size, with a very elaborately colored shell of thick overlapping scales. The overlapping carapace scales are often streaked and marbled with amber, yellow, or brown. Hawksbill turtles have a distinct, hawks-like beak. The name of the turtle is derived from the tapered beak and narrow head. Hawksbill sea turtles are a highly migratory species. These turtles generally live most of their life in tropical waters, such as the warmer parts of the Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea. Florida and Texas are the only states where hawksbills are sighted with any regularity (NMFS and USFWS, 1993). Juvenile hawksbills are normally found in waters less than 45 feet in depth. They are primarily found in areas around coral reefs, shoals, lagoons, lagoon channels, and bays with marine vegetation that provides both protection and plant and animal food. Unlike the green turtles, hawksbills can tolerate muddy bottoms with sparse vegetation. They are rarely seen in Louisiana, Alabama, and Mississippi waters.

Hawksbills nest throughout their range, but most of the nesting occurs on restricted beaches, to which they return each time they nest. These turtles are some of the most solitary nesters of all the sea turtles. Depending on location, nesting may occur from April through November. Hawksbills prefer to nest on clean beaches with greater oceanic exposure than those preferred by green sea turtles, although they are often found together on the same beach. The nesting sites are usually on beaches with a fine gravel texture. Hawksbills have been found in a variety of beach habitats ranging from pocket beaches only several yards wide formed between rock crevices to a low-energy sand beach with woody vegetation near the waterline. These turtles tend to use nesting sites where vegetation is close to the water’s edge.

The leatherback sea turtles are the largest of all sea turtles. These turtles may reach a length of about 7 feet and weigh as much as 1,600 pounds. The carapace is smooth and gray, green, brown, and black. The plastron is yellowish white. Juveniles are black on top and white on the bottom. This species is highly migratory and is the most pelagic of all sea turtles (NMFS and USFWS, 1992). They are commonly found along continental shelf waters. Leatherback sea turtles’ range extends from Cape Sable, Nova Scotia, south to Puerto Rico and the U.S. Virgin Islands. Leatherbacks are found in temperate waters while migrating to tropical waters to nest (Ross, 1981). The distribution of this species has been linked to thermal preference and seasonal fluctuations in the Gulf

Stream and other warm water features (Fritts et al., 1983). The general decline of this species is attributed to exploitation of eggs (Ross, 1981).

Leatherback sea turtles are omnivorous. They feed mainly on pelagic soft-bodied invertebrates, such as jellyfish and tunicates. Their diet may also include squid, fish, crustaceans, algae, and floating seaweed. Highest concentrations of these prey animals are often found in upwelling areas or where ocean currents converge. Nesting of leatherback sea turtles is nocturnal, with only a small number of nests occurring in the Florida portion of the Gulf of Mexico from April to late July. There is very little nesting in the U.S. except in the western Atlantic, where leatherback and hawksbill primarily nest at sites in the Caribbean, with isolated nesting on Florida beaches (Gunter, 1981; Rothschild, 2004). However, leatherback sea turtles have been occasionally seen feeding in the drift lines of jellyfish in the Mississippi Sound and the Gulf waters surrounding the northern Gulf of Mexico barrier islands.

Leatherback sea turtles prefer open access beaches, possibly to avoid damage to their soft plastron and flippers. Unfortunately, such open beaches with little shoreline protection are vulnerable to beach erosion triggered by seasonal changes in wind and wave direction. Thus, eggs may be lost when open beaches undergo severe and dramatic erosion. The Pacific coast of Mexico supports the world's largest known concentration of nesting leatherbacks. Adult leatherbacks have been documented by strandings and are regular visitors to the Alabama coast as they follow eruptions of jellyfish in the Gulf of Mexico. The possibility of a leatherback nest in Alabama exists each season due to the proximity of a confirmed nest in nearby Gulf Islands National Seashore, Florida, in 2000 (USFWS, 2008).

The Gulf sturgeon is a subspecies of the Atlantic sturgeon. Subadult and adult Gulf Sturgeon spend six to nine months each year in rivers and three to six of the coolest months (September-March) in estuaries and/or the adjacent Gulf of Mexico. Adults migrate up the river and other streams during the period of March through September to spawn. Juvenile Gulf Sturgeon use the bay primarily from September through June, although they may be found in the bay or adjacent estuaries during any month of the year. The proposed project area may be used by Gulf sturgeon for foraging during their migration periods. NMFS and USFWS (2003) jointly designated Gulf Sturgeon Critical Habitat on April 18, 2003 (68 Federal Register [Fed. Reg.] 13370, March 19, 2003). The primary constituent elements essential for the conservation of the Gulf sturgeon are those habitat components that support foraging, water quality, sediment quality, and safe unobstructed migratory pathways. However, Mobile Bay and the project waters are not within designated Gulf Sturgeon critical habitat.

3.11 Water Quality.

Water quality within Mobile Bay, Mississippi Sound, and adjacent Gulf of Mexico is influenced by several factors, including the discharge of freshwater from rivers, seasonal climate changes, and variations in tide and currents. The primary driver of water quality is the rivers that feed into the Bay and Sound. Freshwater inputs from the local watersheds provide nutrients and sediments that serve to maintain productivity both in

the Sound and in the extensive salt marsh habitats bordering estuaries of the Sound. The salt marsh habitats act to regulate the discharge of nutrients to coastal waters and serve as a sink for pollutants. Suspended sediments enter the Bay and Sound from fresh water sources, but are hydraulically restricted due to barrier islands and near shore areas. In addition, dynamic features such as the Loop Current, eddies, and river plumes create variations in temperature, salinity, and water density. Temperature and salinity strongly influence chemical, biological, and ecological patterns and processes. Differences in water density affect vertical ocean currents and may also concentrate buoyant materials such as detritus, and plankton. Greatest stratification in the water occurs in summer (Thompson *et al*., 1999)

The Alabama Department of Environmental Management (ADEM) has classified the coastal water in the project area as suitable for recreation, propagation of fish and wildlife and shellfish harvesting. Sufficient dissolved oxygen concentrations, water clarity, and typical salinity ranges with little to no stratification in the water column occur within this site. Water quality within the project area is influenced mainly by non-point source pollution. According to the 2008 Section 303(d) list prepared by the ADEM, the main causes of water quality degradation within the area are pathogens, introduced into the system by urban runoff and storm sewers.

3.12 Air Quality.

Existing air quality in coastal Mobile and Baldwin counties 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 vehicular traffic emissions. No major sources of air pollution were found within the vicinity of the project area. Mobile and Baldwin counties are in attainment for all NAAQS (USEPA, 2009).

3.13 Aesthetics and Recreation.

Coastal-based tourism and recreation account for a significant portion of Alabama's tourism and recreations industry. Opportunities for recreation include arts and entertainment, boating, golfing, sightseeing, picnicking, swimming, bird watching, and fishing. Alabama's Gulf Coast, located between Mississippi and the Florida Panhandle, includes just two counties: Mobile and Baldwin. These counties border Mobile Bay, the Mississippi Sound and the Gulf of Mexico, which provide ample opportunity for boating, swimming, fishing and relaxing on coast beaches. For land lovers, Mobile and Baldwin also offer plenty to do away from the water, including cultural, historic, educational and family-friendly attractions. Visitors can enjoy outdoor activities such as fishing and swimming in waters of the Gulf of Mexico in the beach towns of Gulf Shores, Orange Beach and Fort Morgan, and Dauphin Island as well as several historic places.

Alabama has a rich history and diversity of freshwater, inshore, and saltwater sport fishing opportunities within its extensive rivers systems, farm ponds and the inshore and offshore waters of the Gulf of Mexico. According the Alabama Department of Conservation and

Natural Resources, the State contains 47 reservoirs larger than 500 acres that cover 551,220 acres, 23 Alabama State Public Fishing Lakes, and 77,000 miles of perennial rivers, streams and the Mobile Delta as well as over 60 miles of shoreline along the Gulf Coast that provide fresh and saltwater fishing opportunity. Alabama supports 11 million angler fishing days with expenditures of three-quarters of a billion dollars. There is excellent access to the inshore waters of Mobile Bay and offshore waters of the Gulf of Mexico from Mobile and Perdido Bay. Inshore and estuarial fishing opportunities are extensive in both upper and lower Mobile Bay, but extend from Grand Bay in the Mississippi Sound on the West to the western shores of Perdido Bay near Orange Beach, Alabama. Numerous local, regional and national fishing tournaments take place throughout the State every year. Some of the fish species caught near Dauphin Island through surf or charter fishing include: Amberjack, Atlantic Croaker, Bluefish, Catfish, Cobia, Crevalle Jack, Dolphinfish, Drum, Flounder, Groupers, Kingfish, Ladyfish, Mackerel, Pompano, Redfish, Seatrout, Sharks, Sheepshead, Snappers, Tarpon, Tripletail, Tuna, and Wahoo.

3.14 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.

3.15 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended and implementing regulations 36 Code of Federal Regulation (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) and to consult with other agencies such as the State Historic Preservation Officer and also consult with the appropriate Tribal Nations to avoid or minimize or mitigate adverse effects upon those resources. A literature review was conducted to characterize and assess the potential effects of the proposed project. The data search revealed that a high potential for submerged prehistoric and historic archaeological resources, particularly shipwrecks, in the project area. As such, a formal maritime Phase I cultural resources survey has been conducted. The survey identified anomalies, and project activities associated with dredging and placement of material will avoid those anomalies. Consultation and coordination will be conducted with the Alabama State Historic Preservation Officer and the appropriate Tribal Nations regarding the results of the survey and the effects of the project on historic properties.

4.0 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.

4.1 Physical Environment.

The physical environment in the vicinity of the proposed action area would not be altered in any significant way. The proposed action would not alter Mobile Bay's designation as a nationally significant estuary of the United States, and would not alter water flows nor land usage. Pelican Island has risen and fallen beneath the waves periodically over the past two centuries, and the proposed action of placement of material to continually feed the littoral system would not significantly alter that action.

4.2 Climate

The significance criterion for climate would be a permanent disruption in the climate and weather patterns in Mobile Bay and/or the project area near Dauphin Island. Generally, the activities associated with the proposed action would not result in overall regional climate, meteorological or oceanographic impacts. No activities associated with any of the alternatives could result in impacts on regional processes and would not change the climate or weather patterns in the project area. As a result there would be no impacts to winds, rainfall, temperature, astronomic tides, or the Gulf of Mexico circulation patterns.

4.3 Topography and Bathymetry

The significance criterion for bathymetry would be a permanent change in depth that affects currents, tides, and or natural water movement in Mobile Bay. The proposed action would not have long-term effects to bathymetry in Mobile Bay near the proposed SIBUA expansion. Maintenance dredging associated with this action would continue to remove deposition in the existing channel and not alter bathymetry significantly as the channel would remain at its current width and depths. Approximately 3,305 acres of shallow estuarine bottoms would be permanently changed as a result of the proposed action. However, this change would not result in bathymetric effects outside of the area of physical disturbance and based on the relative small size as compared to the remaining area in Mobile Bay, the permanent alternation would be minor. Impacts would be less than significant.

4.5 Sediments

The significance criteria for sediments in the vicinity of the proposed expanded SIBUA would be a change in sediment characteristics that results in a permanent change in sediment characteristics; a change in grain size and consistency; a temporary decline in water quality as a result of sediment/water interactions; or a decline in sediment quality that causes permanent impacts to biological resources. Dredging and disposal operations could potentially result in the temporary increases of suspended sediments,

the loss of benthic organisms, increases in nutrients, and bathymetry changes in the ocean bottom. The increase in turbidity could reduce light penetration through the water column, thereby reducing photosynthesis, surface water temperatures, and esthetics. These conditions could potentially alter visual predator-prey relations in the immediate project vicinity. In addition, sediment adheres to fish gills, resulting in respiratory stresses, and natural movement of eggs and larvae could be potentially altered as a result of the sediment adherence. However, the salinity of water associated with the proposed project area is high enough to promote rapid settling of finer particles. Ninety-eight percent of discharged sediments from hydraulic dredging have been observed to settle out within 200 feet of discharge points during similar operations in the project vicinity (USACE 1978). All of these described impacts are temporary and are anticipated to return to previous conditions shortly after disposal operations. In addition, the Section 404(b)(1) Evaluation Report (**APPENDIX A**) concluded that the proposed maintenance and dredging action will not jeopardize or adversely impact any oyster reefs, SAVs, wetlands or other critical habitat. The sediment quality and texture of the material dredged from the Federal Navigation channel is expected to be homogenous to that existing in the proposed SIBUA Expansion area. This is due to their close proximity to each other.

4.6 Benthos, Motile Invertebrates and Fishes

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

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

Open-water placement activities will result in the mounding of the sandy dredged material after it is released from the hopper dredge in a relatively thick layer. Deposits greater than 20-30 cm (8-12 in) generally eliminate all but the largest and most vigorous burrowers (Maurer *et al*., 1978). The sediment quality and texture of the channel dredged material are expected to be homogenous to that existing in the dredging and disposal areas, due to their close proximity to each other. Placement of material similar to the ambient sediments (e.g., sand on sand or mud on mud) has been shown to produce less sever, long-term impacts (Maurer *et al.* 1978, 1986). Temporary loss of benthic invertebrate populations would occur within the project footprint of the dredging and open water disposal areas.

Several studies of turbidity from total suspended solids (TSS) associated with dredging operations have concluded that dredging had no substantial effects on nekton (Ritchie, 1970; Stickney, 1972; Wright, 1978); however, other studies have shown that elevated TSS levels and prolonged exposure can suffocate and reduce growth rates of adult and juvenile nekton and reduce viability of eggs (Moore, 1977). Detrimental effects are generally recognized at TSS concentrations greater than 500 milligrams per liter (mg/L) and for durations of continuous exposure ranging from several hours to a few days. Turbidities exceeding 500 mg/L have been observed around maintenance dredging and placement operations (EH&A, 1978), and such turbidities may affect some aquatic organisms near the active dredges. In a study in Corpus Christi Bay, Schubal *et al.* (1978) reported TSS values greater than 300 mg/L, but only in a relatively small area near the bottom. They also found that TSS from maintenance dredging in Corpus Christi Bay is not greater than that from shrimping and affects the bay for much shorter time periods. In a study of the Laguna Madre, Sheridan (1999) found elevations in turbidity only over the subtidal placement material fluid mud pile. In this study they found that even 16.5 feet from the edge of the placed material, turbidity was not statistically greater than that 1 kilometer or more away. May (1973) found that TSS was reduced by 92 percent within 100 feet of the discharge point, by 98 percent at 200 feet, and that concentrations above 100 mg/L were seldom found beyond 400 feet from the point of placement. Elevated turbidities during construction and maintenance dredging may affect some aquatic organisms near the dredging activity; however, turbidities in open-water habitats can be expected to return to near ambient conditions within a few hours after dredging ceases or moves out of a given area. Shideler (1984) reports similar TSS levels from dredging and storm events. Overall, motile organisms are mobile enough to avoid highly turbid areas (Hirsch *et al.*, 1978). Under most conditions, fish and other motile organisms are only exposed to localized suspended-sediment plumes for short durations (minutes to hours) (Clarke and Wilber, 2000).

The project area does not provide important habitat that could not be found in other areas of 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 adverse impacts to the aquatic community would result from the dredging of material from the SIBUA and subsequent placement at the Sand Island site.

4.7 Coastal Flora.

The significance criterion for Coastal Flora would be the permanent loss or gain of habitat suitable for wetland vegetation. Vegetation communities that occur in the proposed project area are almost exclusively estuarine and marine deepwater and wetland habitats. Currently the proposed action area does not contain emergent tidal marsh vegetation, though it may have in the past before Pelican Island was submerged.

4.7.1 Wetlands

Emergent wetlands are not located in the vicinity of the project and will not be impacted.

4.7.2 Submerged Aquatic Vegetation

The significance criterion for SAV would be the permanent loss or gain of habitat suitable for SAV. No significant impacts to the SAVs were identified in this evaluation. The closest known SAVs are located several miles from open water dredging and placement activities associated with this project and no SAVs are located within the expected 400-foot turbidity mixing zone of channel dredging.

4.8 Coastal Fauna

The significance criteria for marine mammal communities in the vicinity of the project area would be a localized 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. Marine mammals, such as bottlenose dolphins and West Indian manatees, co-exist with current O&M operations. As defined by the Marine Mammal Protection Act, dredging operations could result in harassment of marine mammal species if the mammals are in close proximity to an operating dredge. However, this would be a temporary condition and the mammals can swim around the noise and 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.

Marine and coastal birds are common in the area and could utilize the site of the proposed action for foraging and adjacent islands for nesting, roosting, or stopovers during migration. Foraging birds could be displaced during dredging and placement activities. 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 deepwater areas, however, these birds are not dependent upon the dredge and placement sites for survival. Foraging habitat is readily available in the northern Gulf and Mobile Bay and it is expected that plunging and diving birds would shift to other areas if temporarily displaced. Following dredging, birds would be expected to resume normal use of the area. Any impacts would be expected to be localized, temporary, and minor.

4.9 Oyster Reefs

No significant adverse impacts to oyster reefs from the continued operation and placement of maintenance material in the expanded SIBUA were identified in this evaluation. Dredging to remove regular maintenance of dredged material would temporarily disrupt shellfish distribution and localized commercial and recreational harvesting in the immediate vicinity of dredging and placement activities. Use of the dredging and placement area would be expected to resume after work is complete. The closest oyster reefs are located several miles from the open water dredging and placement activities associated with this project. No significant impacts to commercial and recreational oyster reefs would result from the implementation of the proposed action.

4.10 Essential Fish Habitat

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 pelagic 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. As detailed in section 3.10 of this assessment, no significant long-term impacts to this resource is expected as result of this action.

Increased water column turbidity during dredging 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.

4.11 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 native resident or migratory protected species; and loss of any area designated a critical habitat.

West Indian manatees are known to exist throughout the entire project area as they move during warmer periods of the year. Manatees are frequently reported in Dog River, a river emptying into Mobile Bay. A group of manatees were most recently sighted in Dog River in June 2018. Although unlikely given the project location occurs mostly in the Bay and Bar Channels, a West Indian manatee could be possibly encountered during the project construction. Given this possibility, the USACE has historically agreed to implement

"Standard Manatee Construction Conditions" during maintenance dredging and disposal operations in Alabama. The USACE recommends these conditions be implemented during the improvement activities and associated future maintenance so no adverse impact to West Indian manatees are anticipated.

Sea turtles and Gulf sturgeon may also be affected by dredging and disposal operations if they were to be struck by the dredge as it transits the site or by the movement of hydraulic pipelines; however, due to their mobility, the chance of this occurring is discountable. Activities associated with the removal of materials from the Mobile Bar Channel by hopper dredges have already been analyzed in the November 2003 Regional Biological Opinion (RBO) 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 sea turtles and Gulf sturgeon identified in NMFS-PRD’s *Gulf Regional Biological Opinion.* These protective measures will be utilized if a hydraulic hopper dredge is utilized. The project area is outside of designated Gulf sturgeon critical habitat and placement of material will not breach the water surface. Thus, based upon this previous coordination, NMFS-PRD concluded these activities will not likely jeopardize the continued existence of these species

The USACE, Mobile District has determined that no federally-protected species or designated critical habitat were likely to be adversely affected as a result of the proposed project. Letters requesting concurrence with the District’s ‘Not Likely to Adversely Affect’ (NLAA) determination are being prepared for transmittal to the NMFS and USFWS.

4.12 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 temporary 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 sediments in U.S. 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.

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, minimal and similar to conditions experienced during past routine operation and maintenance of the channel. The dredged material from the channel and placement at the SIBUA will consist primarily of fine to medium-grained sands. This type of material has historically resulted in insignificant release potential for dissolved constituents that may potentially enter the water column. 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. SIBUA has been historically used for the placement of sandy dredged material since 1997. Thus, the Mobile District does not anticipate any adverse impacts as a result of this action. In addition, a water quality certification will be requested from ADEM.

4.13 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 Mobile 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.

The proposed action would have no significant long-term effect on air quality. The project area is currently in attainment with National Ambient Air Quality Standards, 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.

4.14 Aesthetics and Recreation

The SIBUA is currently used by the USACE, Mobile District for the maintenance operations of the bar channel. Continued use of the SIBUA and expanded area is not anticipated to have any adverse impacts to recreation or aesthetics. The SIBUA may be intensely trawled during offshore migrations in summer and early fall for fish and shrimp. Commercial and recreational vessels and dredges have concurrently utilized the same area in the past without incident.

4.15 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. 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.

4.16 Cultural Resources

A preliminary cultural resources evaluation revealed a high potential for submerged prehistoric and historic archaeological resources in the project area. As such, a formal maritime Phase I cultural resources survey has been conducted. The survey identified anomalies, and project activities associated with dredging and placement of material will avoid those anomalies. Consultation and coordination will be conducted with the Alabama State Historic Preservation Officer and the appropriate Tribal Nations regarding the results of the survey and the effects of the project on historic properties.

5.0 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 nonfederal) 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.

Mobile Bay is an estuarine transition zone where freshwaters from the rivers mix with saltwater from the Gulf of Mexico. Water quality changes are dynamic in tidally-influenced estuarine areas and biological resources are adapted to accommodating short-term, periodic changes in water quality such as turbidity, salinity and nutrient loading. 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 controlled and monitored so that none of these operations would cause an increase in turbidity greater than 50 NTUs above background levels outside a 400-ft mixing zone. Adverse effects on biota from changes in water quality would be temporary and localized.

Water quality and habitat loss from past actions have been or are being considered for mitigation by the passage of Federal and state environmental statutes, regulatory controls and mitigation measures to protect these resources. 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. Relevant proposed future actions would result in minor loss of wetlands, SAV and shallow bottom habitat, but would be subject to the same regulatory controls as the proposed action. Further, it is unlikely that future actions would occur at the same time as the proposed action, thereby exacerbating temporary adverse effects. Due to lack of suitable habitat and their location in coastal freshwater or nearshore coastal estuarine environments, species other than those discussed above would not occur in the project area area. 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.

Current and foreseeable future projects that impact the Bay bottom could have a minor effect on sedimentation, shoaling or siltation rates due to possible changes in hydrology. Historical dredging records have not shown increased shoaling rates resulting from ship channel maintenance or improvements. Significant mounding of Bay bottom resulted from the placement of new work material from channel deepening in the 1960's. However, recent sediment transport modeling to evaluate possible effects on sediment transport in the Bay and nearshore coastal areas showed that minimum bed level changes are expected in the Bay and on the ebb-tidal shoal. Shoaling rates are expected to increase between 5 to 15 percent. Impacts to sediment from implementation of the proposed action are expected to be minor and temporary with no long-term adverse effects anticipated. Net sediment movement within the Bay suggests that open-Bay and/or beneficial use placement of sediment is most similar to natural long-term depositional processes. Testing has shown that sediment from the navigation channel met the Limiting Permissible Concentration (LPC) for water quality, toxicity, and bioaccumulation, and is suitable for open-water or beneficial use placement. Implementation of the proposed action is not expected to have a significant incremental cumulative impact on soils or sediments.

Impacts to commercial and recreational fishing and shellfish harvesting from implementation of the proposed action are expected to be minor and temporary with no long-term adverse effects anticipated. While the proposed placement of dredged materials may be a temporary inconvenience to commercial and recreational fishermen during construction, it is not expected to have any long-term adverse effects on fishing activities or fishery resources in the area. Beneficial use of dredged material may improve habitat important for sustaining fishery resources. Incremental impacts from other known and foreseeable future projects such as the I-10 project, APM Terminal expansion, and proposed National Fish and Wildlife Foundation (NFWF) restorations 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 USACE is required by Congress to maintain the federally-authorized Mobile Harbor navigation channel to provide safe navigation for commercial and recreational vessels. Future development of the surrounding area would likely proceed under the "no action" or the "preferred action" plan as development in the immediate area of Mobile Bay is not specific to the proposed action but connected with existing local attractions and urbanization of the area. Thus, the expansion of the SIBUA is expected to have no significant direct cumulative impacts to biological resources, water chemistry, or oceanographic resources.

6.0 OTHER CONSIDERATIONS

6.1 Coastal Zone Management Act of 1972

The USACE, Mobile District determined that the proposed action is consistent with the Alabama Coastal Management Program to the maximum extent practicable. A Coastal Zone Consistency determination will be requested from the State of Alabama.

6.2 Clean Water Act of 1972

No work would occur until the State has issued water quality certification for the proposed action. It is expected that all State water quality standards will be met. Section 401 water quality certification will be requested from the ADEM for the proposed action. A Section 404(b)(1) evaluation report has been prepared and is included in the **APPENDIX** of this EA.

6.3 Rivers and Harbors Act of 1899

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

6.4 Marine Mammal Protection Act of 1972, as amended

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

6.5 Fish and Wildlife Coordination Act of 1958, as amended

This project is being coordinated with the USFWS, and will be in full compliance with the act.

6.6 E.O. 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. Re-designating the disposal site does not involve activities that would pose any disproportionate environmental health risk or safety risk to children.

6.7 E.O. 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 expansion and disposal 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.

7.0 COORDINATION.

The general public will be notified of the proposed action via 30-day public notice. The public notice will be made available to Federal and state agencies and the interested public. All comments on the action will be considered prior to a decision on the action. A legal notice will be published in the Mobile Register.

8.0 CONCLUSION.

The proposed expansion of the existing SIBUA would have no significant environmental impacts on the existing environment. No mitigation actions are required for the proposed project. The implementation of the proposed action would not have a significant adverse impact on the quality of the environment and an environmental impact statement is not required.

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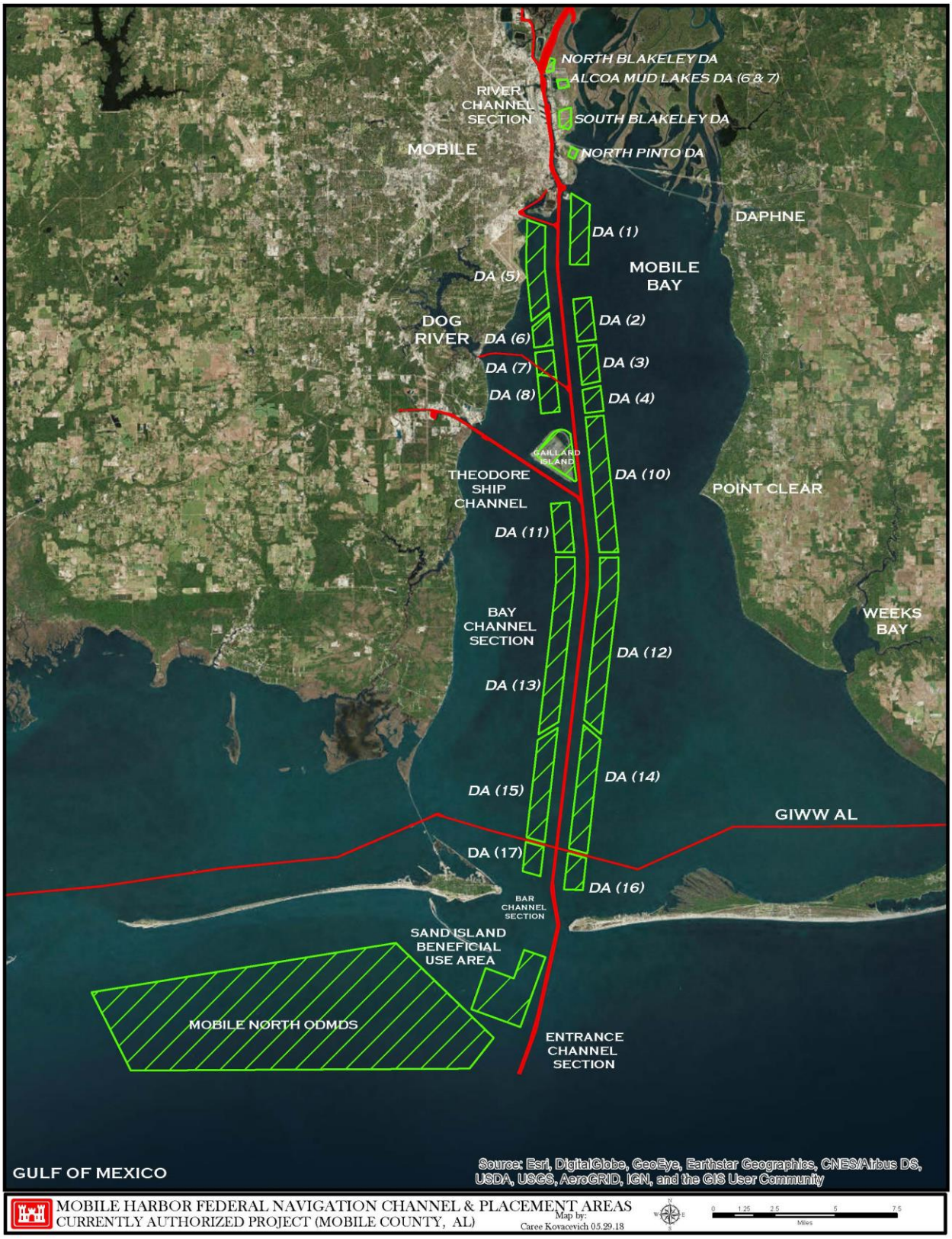

Figure 1. Mobile Harbor Federally Authorized Navigation Project

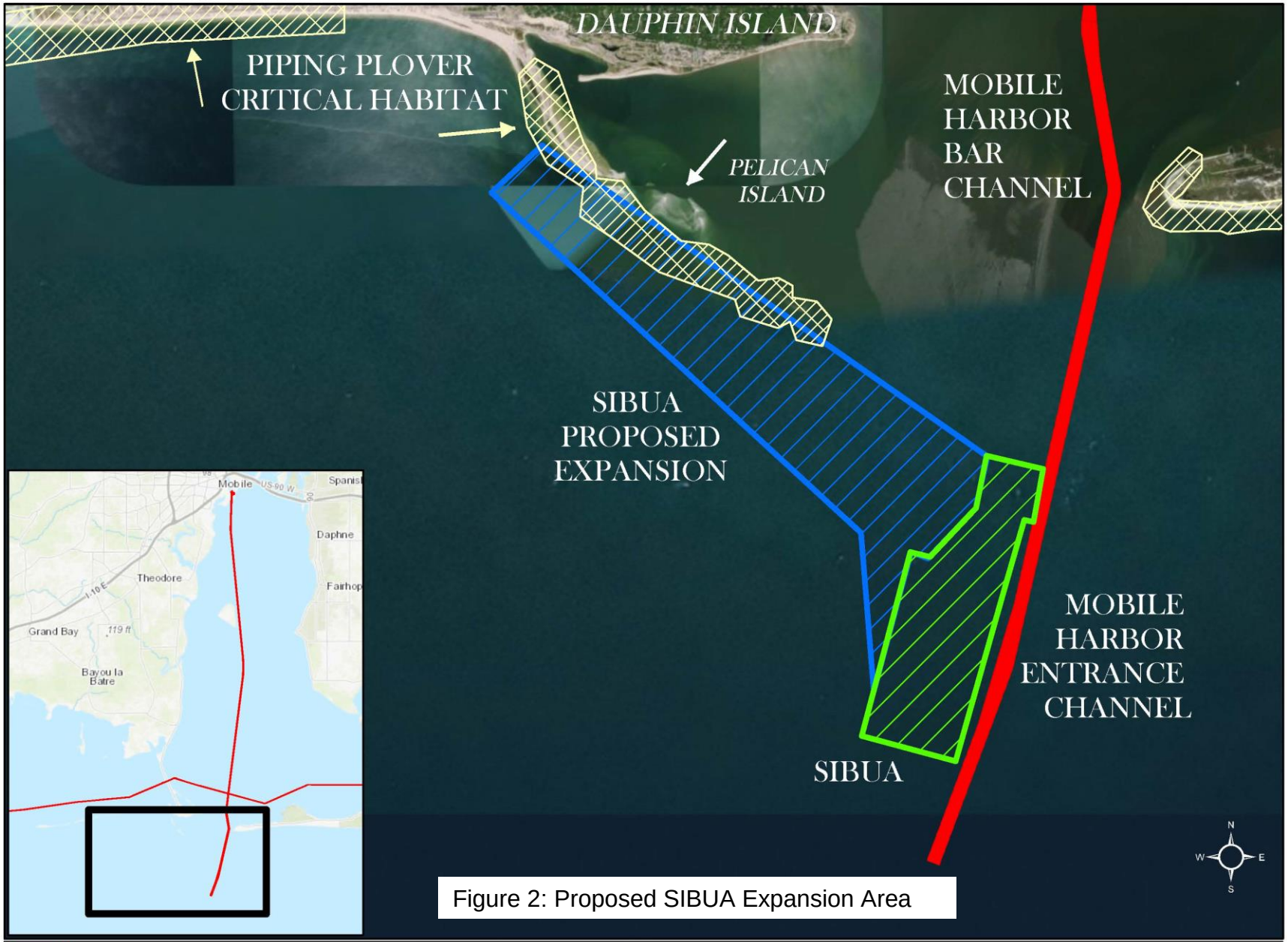

Figure 2: Proposed SIBUA Expansion Area

MOBILE HARBOR FEDERAL NAVIGATION CHANNEL PROJECT
SAND ISLAND BENEFICIAL USE AREA PROPOSED EXPANSION

MAP BY:
CAREE
KOVACEVICH

0 0.5 1 2 3 4 Miles

APPENDIX

SECTION 404 (b)(1) EVALUATION REPORT

SAND ISLAND BENEFICIAL USE AREA EXPANSION
MOBILE HARBOR NAVIGATION PROJECT

MOBILE COUNTY, ALABAMA

A FEDERALLY AUTHORIZED NAVIGATION PROJECT

I. **PROJECT DESCRIPTION**:

A. **Location:** The proposed expansion area of the Sand Island Beneficial Use Area (SIBUA) is located southeast of Dauphin Island along the west side of the Mobile Bar/Entrance Channel and adjacent to the Sand Island Lighthouse in the Gulf of Mexico, Mobile County, Alabama. (**Figures 1 and 2** in the Appendix**)** of the Environmental Assessment [EA]).

B. **General Description:** The USACE, Mobile District is responsible for the O&M of the federally-authorized Mobile Harbor Federal navigation project. Three federally-authorized navigation channels cross the bay, the Mobile Ship Channel from north to south, the Gulf Intracoastal Waterway from east to west, and the Theodore Industrial Park from northwest to southeast. The southern-most portion of authorized navigation channel, known as the Mobile Bar Channel, extends approximately seven (7) miles from the Gulf of Mexico into Mobile Bay is typically maintained by a hopper dredge with the sandy material placed in the authorized SIBUA as shown in **Figure 1**.

The SIBUA, located west of the channel on the ebb tidal shoal, was evaluated to determine whether capacity exists to accommodate projected increases in maintenance dredged material. An additional level of analysis to evaluate transport rates leaving SIBUA as well as capacity available within depth constraints of dredging equipment were performed in an effort to balance safe and efficient dredged material placement practices, while ensuring sandy material dredged from the Bar Channel is maintained within the littoral system. An estimate using USACE 2018 surveys shows the site capacity in the existing SIBUA boundaries is inadequate using current placement practices.

Under the Proposed Action, the USACE, Mobile District is proposing to further expand the existing SIBUA by approximately 3,305 acres (to the west towards Dauphin Island) for the continued placement of Mobile Harbor Federal Navigation Channel O&M material as shown in **Figure 2**. This action would provide for the return of sediment into the littoral system as well as increasing placement capacity in the SIBUA, consistent with established regional sediment management implementation principles and goals. The

characteristics of the sediment being dredged and placed ranges from fine to medium-grained quartz sand from the Mobile Harbor channel(s).

C. **Authority and Purpose:** The navigation channel dredging in Mobile Bay and Mobile River began in 1826 with enactment of the River and Harbor Act of 1826. During the period 1826 to 1857, a channel 10 feet deep was dredged through the shoals in Mobile Bay up to the city of Mobile. Subsequently, further modifications to the channel were authorized and the original Federal project was enlarged by the addition of the Arlington, Garrows Bend, and Hollingers Island channels within the bay, and a channel into Chickasaw Creek from the Mobile River. Section 104 of the River and Harbor Act of 1954 authorized a 40-foot depth channel with a 400-foot width in Mobile Bay to the mouth of the Mobile River and a 40-foot depth in the Mobile River to the Cochran Bridge with the width varying from 400 to 775 feet. The Senate Public Works Committee on 16 July 1970 and the House Public Works Committee on 15 December 1970, under the provisions of Section 201 of the 1965 Flood Control Act, authorized a 40- foot by 400-foot channel, branching from the main ship channel and extending through a land cut to the Theodore Industrial Park. The Theodore Ship Channel was reauthorized in the Water Resources Development Act of 1976.

Further improvements to the existing federal project were initially authorized in the 1985 Energy and Water Resources Appropriation Act (PL 99-88, Ninety-ninth Congress, First Session). The improvements were reauthorized in Section 201 of the Water Resources Development Act of 1986 (PL 99 – 662, Ninety-ninth Congress, Second Session), which was approved 17 November 1986, and subsequently amended by Section 302 of the Water Resources Development Act of 1996. The report referenced by this authorization recommended the following improvements to the Federal project: deepening and widening the gulf entrance channel to 57 by 700 feet; deepening and widening the main ship channel to 55 by 550 feet in Mobile Bay, except for the upper 3.6 miles which require a width of 650 feet; deepening the Mobile River channel to 55 feet to a point about 1 mile below the Interstate 10 highway tunnels; and, constructing turning and anchorage basins near the upper end of the main ship channel.

The proposed dredging operations and placement activities are required to continually provide for safe navigation and maintain the Mobile Bay channels to the federally authorized dimensions. The action is a result of normal rates of shoaling and a need exists to maintain full commercial shipping capacity for the Port of Mobile.

D. **General Description of Dredged or Fill Material:**

(1) **General Characteristics of Material:** The material to be dredged and placed in the proposed expanded SIBUA site will be maintenance dredged material from predominantly the Mobile Harbor Bar/Entrance channel(s), and/or occasionally from the remaining Mobile Harbor Federal Navigation channel(s) (River, Bay, etc.). The dredged material will be sandy sediments and composed predominantly of medium and fine-grained quartz sand.

(2)) **Quantity and Source of Material:** Approximately 525,000 cubic yards of material is dredged each year from the Mobile Harbor Bar/Entrance channel(s). Material dredged from other areas in Mobile Harbor would be in lesser, variable amounts.

E. **Description of the Proposed Discharge Site:**

(1) **Location:** The proposed expansion area of the SIBUA is located southeast of Dauphin Island in the Gulf of Mexico, Mobile County, Alabama. The SIBUA expansion area is presented in **Figure 2** of the EA.

(2) **Size:** The footprint of the proposed SIBUA expansion is approximately 3,305 acres in size and can be seen in **Figure 2** in the Appendix.

(3) **Type of Site:** The proposed SIBUA expansion is a previously authorized open-water beneficial use area.

(4) **Type of Habitat:** The proposed SIBUA expansion is characterized by predominantly fine to medium quartz sand that is white to tan in color. It is part of the ebb tide shoal associated with the mouth of Mobile Bay. It is a very dynamic environment that changes drastically as a function of climate and wave conditions. The direction of littoral transport is from east to west. The constantly shifting sediments do not allow aquatic vegetation to become rooted or attached to the unconsolidated sandy substrate. 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) **Substrate Elevation and Slope:** The intent of the SIBUA is to keep sandy materials in the littoral system. The materials placed will be redistributed by local currents and waves to a more natural configuration consistent with the ebb tidal shoal.

(2) **Sediment Type:** All material dredged from the Bar/Entrance channel(s) and placed on the proposed SIBUA expansion is fine to medium quality quartz sand consistent with the near shore areas along the northern Gulf of Mexico.

(3) **Dredged/Fill Material Movement**. The dredged material placed would be subject to movement in the littoral system. This movement would occur on a continuous basis depending upon wave action, climate and the frequency of storm events. The

predominant sediment transport pattern in this area is from east to west. The intent of this action is to return the material to the littoral system and migrate west, thus, providing benefits to the local environment.

(4) **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.

Bottom organisms include polychaete worms, crabs, shrimp, mollusks, and enchinoderms. Non-motile species are directly covered by the dredged material, engulfed by mud flow or covered by heavy siltation within 1,200 feet of the dredge discharge. Responses of benthic infauna to large scale disturbance by dredge material placement were studied in areas around Corpus Christi, Texas. The study looked at biological responses to dredged material disturbance that were linked to both pre-disturbance conditions and differences between disturbed and neighboring undisturbed areas. Results for this study area indicated that benthic communities are poised to respond relatively quickly to disturbances given their historical exposure to impacts and resultant colonization by opportunistic species. The impacts of the dredged material placement were evident for less than a year. The response of benthic communities to disposal of dredged material was assessed at three (3) sites in Mississippi Sound in 2006. The findings indicated that adults re-colonized the newly deposited sediments either through vertical migration or later immigration from adjacent areas within a period of three (3) to 10 months. A related study conducted in Mississippi Sound associated with the Gulfport Federal navigation project indicated benthic recovery rates to predisposal conditions occurred within 12 months.

A major factor influencing benthic recovery rates is the prior disturbance history of a particular area. Studies indicate that benthic recovery occurs more rapidly in relatively shallow areas, such as Mobile Bay, where the resident benthic communities are already adapted to dynamic conditions and shifting sediments. Being that Mobile Bay is a depositional shallow water body with dynamic sediment processes, it would be expected that benthic recovery would be consistent with that shown by previous studies.

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

(6) **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.

(2) **Water Chemistry (pH, etc.)**. Sampling results of recent studies (2008, 2010, and 2014) of the elutriate analyses indicate little, to no discernable changes, on water chemistry for the proposed action.

(3) **Clarity**. Minor increases in turbidity may be experienced in the immediate vicinity of the project during 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 the expanded beneficial use site 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. 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) **Esthetics**. 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 disposal 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**.

Sampling results of recent chemical analysis studies (2008, 2010, and 2014) indicated that a few metals and PAHs, pesticides, and insecticides were detected in Mobile Harbor sediments, but did not exceed critical thresholds (PEL levels). Also, based on post oil-spill testing results from 2010, PAH and TPH testing of surface sediments collected in the Mobile Lower Ship Channel, Mobile Bar Channel, EPA-designated reference site, and Mobile ODMDS in November and December 2010, there are no discernable changes in the sediment quality that are attributable to the *Deepwater Horizon* Oil Spill.

F. **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 below the waterline in the project areas, 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**. Through consultation with the National Marine Fisheries Service (NMFS) Protected Resource Division (PRD)

and the U.S. Fish and Wildlife Service (USFWS) the USACE, Mobile District has determined that the following threatened and endangered species: Gulf sturgeon; West Indian manatee; and the loggerhead and Kemp's ridley sea turtles may be affected by the project action. Letters are being prepared to NMFS and USFWS requesting concurrence with the District's Not Likely to Adversely Affect (NLAA) any listed endangered and/or threatened species or their associated critical habitat.

(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 Alabama Department of Environmental Management (ADEM) specified a mixing zone for turbidity compliance of up to 400 feet from the activity and an increase of 50 NTUs above background turbidity levels. The USACE, Mobile District, will adhere to that turbidity requirement.

(a) **Depth of water at the disposal site**. Depths of water at the site vary from 15 to 27 feet. However there is a highly dynamic sand shoal in the northern portion of the project site that may be as shallow as 5 feet at times.

(b) **Current velocity, direction, and variability at the disposal site**. Not significant.

(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 open-water placement of dredged material consisting of marine sand from the Mobile Harbor Federal Navigation channel(s). Sand from these areas that would be placed in the SIBUA is predominantly white to light brown and consists of fine to medium quartz sand. Rapid settling of the sandy 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 in compliance with all applicable water quality standards. Water Quality Certification and Coastal Zone Consistency will be requested from ADEM for this project.

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

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

(b) **Recreational and Commercial Fisheries**. Recreational and commercial fishing 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**. Placement of the material will be in the vicinity of Sand Island Lighthouse which is a valuable cultural resource listed on the National Register of Historic Places. There should be no impact to this structure.

(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). A permit is being requested from ADEM for Section 410 Water Quality Certification and Coastal Zone Consistency.

D. The SIBUA expansion action 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