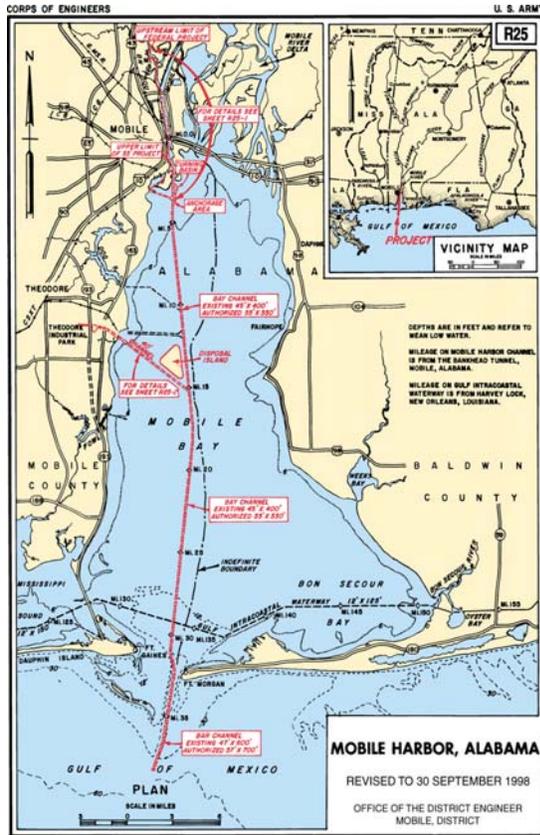


**DRAFT  
ENVIRONMENTAL ASSESSMENT  
AND  
SECTION 404(b)(1) EVALUATION**

**MODIFICATION TO MOBILE HARBOR OPERATIONS AND MAINTENANCE  
ADDITION OF OPEN BAY THIN-LAYER DISPOSAL OPTION  
MOBILE COUNTY, ALABAMA**

**A FEDERALLY AUTHORIZED PROJECT**



Prepared by

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



May 2014

**DRAFT  
 ENVIRONMENTAL ASSESSMENT  
 FEDERAL MOBILE HARBOR OPERATIONS & MAINTENANCE  
 ADDITION OF OPEN BAY THIN-LAYER DISPOSAL OPTION  
 MOBILE COUNTY, ALABAMA**

**TABLE OF CONTENTS**

**1.0 INTRODUCTION..... 4**  
     1.1 Purpose and Need for the Proposed Action ..... 5

**2.0 AUTHORIZED PROJECT AND EXISTING PROJECT ..... 6**

**3.0 NATIONAL ENVIRONMENTAL POLICY ACT CONSIDERATION ..... 6**

**4.0 DESCRIPTION OF THE PROPOSED PROJECT ..... 6**  
     4.1 Open Bay Thin-layer Disposal Actions ..... 7  
     4.2 Strategic Sediment Placement Plan ..... 8

**5.0 ALTERNATIVES TO THE PROPOSED PROJECT ..... 9**  
     5.1 No Action Alternative..... 9  
     5.2 Proposed Action – Thin-layer Placement Activities..... 10

**6.0 AFFECTED ENVIRONMENT ..... 10**  
     6.1 Soils..... 10  
     6.2 Biological Resources ..... 10  
     6.3 Essential Fish Habitat (EFH) ..... 10  
     6.4 Cultural Resources ..... 10  
     6.5 Water Quality..... 10  
     6.6 Threatened and Endangered Species ..... 11

**7.0 ENVIRONMENTAL IMPACTS..... 10**  
     7.1 Soils..... 11  
     7.2 Biological Resources ..... 11  
     7.3 Essential Fish Habitat Assessment..... 12  
     7.4 Cultural Resources ..... 12  
     7.5 Water Quality..... 13  
     7.6 Threatened and Endangered Species ..... 13

**8.0 CUMULATIVE EFFECTS..... 13**

**9.0 OTHER CONSIDERATIONS..... 13**

**10.0 COORDINATION ..... 13**

**11.0 CONCLUSION** ..... 13

**12.0 LIST OF PREPARERS** ..... 14

**13.0 LIST OF AGENCIES, INTERESTED GROUPS & PUBLIC CONSULTED** ..... 14

**14.0 REFERENCES**..... 14

**APPENDIX A – Section 404(b)(1) Evaluation Report** ..... A-1

**List of Figures**

**Figure 1** – Vicinity Map of Mobile Harbor Project Area

**Figure 2** – Locations of the pre-established open water disposal areas in Mobile Bay.

**Figure 3** – Example of the Strategic Sediment Placement Plan utilizing pre-established open bay placement areas

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## 1.0 INTRODUCTION

The proposed dredging operations and placement activities are required to continually provide for safe navigation and maintain the Mobile Harbor 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 (see **Figure 1**).

This Environmental Assessment (EA) was prepared in accordance with Engineer Regulation (ER) 200-2-2, *Procedures for Implementing the National Environmental Policy Act (NEPA)* and the Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations (CFR) Pts. 1500-1508).

The objective of the EA is to determine the magnitude of the environmental impacts of modifying sediment management practices to add open bay disposal as a permanent option associated with maintenance of the Mobile Bay navigation channel. Impacts associated with the Mobile Harbor project were addressed during the project recertification in the *Final Environmental Assessment for Mobile Harbor Operations and Maintenance, Mobile County, Alabama* dated April 2012 (2012 Mobile Harbor EA) and will not be repeated here as to eliminate repetitive discussions of the same issues previously addressed. Only those impacts relating to the proposed project modification will be considered in this EA.

The U.S. Army Corps of Engineers (Corps), Mobile District is proposing to implement modifications to the maintenance dredging and placement activities associated with the Mobile Harbor navigation project. The proposed modification will include a long term open bay thin-layer disposal activity as defined in Joint Public Notice and Permit FP11-MH01-06 in addition to the emergency storm-related action. Implementing this option will provide an environmentally acceptable alternative for

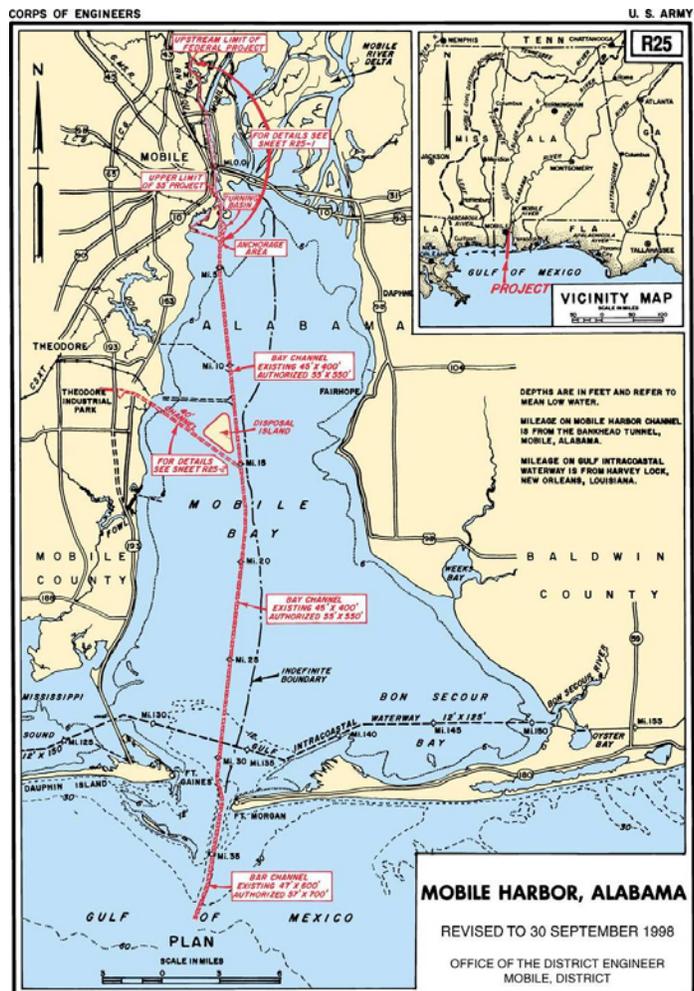


Figure 1. Vicinity Map of Mobile Harbor Project Area

managing maintenance dredged material within the Mobile Bay navigation channel that allows sufficient time for environmental recovery and permits the bottom conditions to return to that of the adjacent bottom as the sediment becomes remobilized into the Bay's natural sediment transport system.

If such impacts are relatively minor, a Finding of No Significant Impact (FONSI) will be issued and the Corps, Mobile District may proceed with the action. If the environmental impacts are significant according to CEQ's criteria (40 CFR Pt. 1508.27), an Environmental Impact Statement (EIS) or a supplement to the existing 1980 Final EIS would be prepared before a decision is reached to implement the proposed action.

**1.1 Purpose and Need for the Proposed Action.** The Corps, Mobile District has the responsibility for maintenance of the federally authorized navigation project for Mobile Harbor, Alabama which is highly utilized for commercial shipping. An overall project description is provided in the 2012 Mobile Harbor EA. The main Mobile Bay channel consists of a 45-foot by 400-foot channel from the mouth of the Bay extending 29 miles northward to the mouth of Mobile River. This stretch of channel is typically dredged using hopper dredging equipment with disposal of the material in the approved Mobile-North Ocean Dredged Material Disposal Site (ODMDS). Approximately 4 million cubic yards of material is removed from the channel annually and transported as much as 40 miles to the ODMDS at an annual cost of about \$12 million. Historically, maintenance dredging of this segment of Bay channel utilized cutterhead dredges with open bay disposal sites adjacent to the navigation channel. The open water disposal practice was no longer considered viable by the WRDA of 1986 which specified that dredged material from the Mobile Bay channel project shall be disposed of in the Gulf of Mexico. Therefore, in order to maintain the federally authorized Mobile Harbor navigation project the Corps, Mobile District is restricted to using hopper dredging equipment and disposal of the material in the ODMDS.

With competition for dredging funds expected to increase in the near future, difficult choices will have to be made on how and where to prioritize available dredging funds, especially for specific navigation reaches within the Mobile Harbor navigation project. A restriction that confines the use to hopper dredges limits the Corps, Mobile District's access to a smaller percentage of the available dredging fleet which results in scheduling and cost constraints. Hopper dredging in Mobile Bay typically doesn't clear the channel template as well as a cutterhead dredge; thereby increasing the dredge cycle frequency. Hopper dredging in Mobile Bay is also restricted to no overflow, which drastically reduces the volume hauled per load. The cost of hauling the material to the ODMDS site, especially for the upper reaches of the Bay channel is for the most part inefficient given the average U.S. fleet hopper volume. Having the ability to utilize both hopper and cutterhead dredging equipment would provide options and flexibility on maintenance scheduling and cost.

In addition to the operational constraints, hauling material from the Bay channel to the ODMDS permanently removes sediment from the natural system. It is now perceived that the removal of sediment from the Bay's natural sediment system may not be an environmentally sound method of disposing of the dredged sediment and may have long term negative effects. Reestablishing the option for open bay disposal may contribute to the much needed conservation efforts for the protection of marshes, sea grasses, oyster reefs, and other ecological resources. By reducing the amount of sediment placed in the ODMDS, more of the bay sediment will subsequently be retained in the natural sediment transport system.

## 2.0. AUTHORIZED AND EXISTING PROJECT

A detailed description of the authorization for the Mobile Harbor Federal navigation project is included in the 2012 Mobile Harbor EA. The WRDA of 1996 provides the authority to consider alternatives to disposal of dredged material for the Mobile Harbor Federal navigation project that includes other environmentally acceptable alternatives including beneficial uses and environmental restoration.

## 3.0 NATIONAL ENVIRONMENTAL POLICY ACT CONSIDERATION

NEPA and Title 40 of the CFR, Parts 1500-1508 (40 CFR 1500-1508) require Federal agencies to consider the potential environmental consequences of proposed actions and alternatives. Executive Order (EO) 11514, Protection and Enhancement of Environmental Quality (amended by EO 11991), provides policy directing the Federal government to take leadership in protecting and enhancing the environment.

In accordance with the requirements of NEPA, impacts associated with navigation improvements for the Mobile Harbor navigation project were addressed in an EIS dated October 1980. In addition, a supplemental EIS dated December 13, 1985, was prepared to address impacts associated with the offshore placement (Gulf Disposal Area) of dredged material from construction of navigation improvements and channel maintenance activities, and for the designation of an offshore placement site(s). The Record of Decision implementing the harbor improvements was signed January 8, 1987. The EIS, Supplemental EIS and EAs were coordinated with all applicable Federal, state and local agencies and the interested public. Impacts from the construction of the new Mobile Harbor Turning Basin were addressed in the Final EA (published May 2007), as well as a Public Notice (PN# FP06-MH13-10 published December 2006). A final EA was prepared to address impacts associated with the placement activities in the *Sand Island Beneficial Use Area* (SIBUA), dated March 2007, and a Finding of No Significant Impact (FONSI) signed on March 1997. An EA and FONSI were prepared during the recertification of the Mobile Harbor Operations and Maintenance dated April 2012.

## 4.0 DESCRIPTION OF THE PROPOSED ACTION

The Mobile District proposes to implement modifications to the maintenance dredging and placement activities associated with the Mobile Harbor navigation project. The proposed modification will change the open bay thin-layer disposal activity defined in Joint Public Notice and Permit FP11-MH01-06 as being an emergency storm-related action to also include a long term open bay thin-layer disposal option. Providing this option will add an environmentally acceptable alternative for managing maintenance dredged material within the Mobile Bay navigation channel that allows sufficient time for benthic recovery and permits the bottom elevations to return to that of the adjacent bottom as the placed sediment is remobilized into the Bay's natural sediment transport system.

**4.1 Open Bay Thin-layer Disposal Actions.** Since the late 1980's maintenance practices for the Mobile Bay Federal navigation channel required that all maintenance dredged material be taken to open water and disposed in Mobile North ODMS as per the WRDA 1986. Since that time questions have

been raised whether removing all the dredged material from the Bay's sediment transport system is environmentally sound. WRDA 1996 provides the authority to consider alternatives to disposal of dredged material for the Mobile Harbor Federal navigation project that includes other environmentally acceptable alternatives including beneficial uses and environmental restoration.

As part of the 2012 recertification of the Mobile Harbor Federal navigation project, the use of open bay disposal areas was authorized in the event where storm-related emergency dredging activities are required and considered critical to provide safe navigation for returning the channels to their pre-storm dimensions and restoring full shipping capacity. Open bay placement utilizes pre-established historical disposal areas that have been implemented during emergency procedures resulting from Hurricane Georges in 1998 and Hurricane Katrina in 2005 as described in Joint Public Notice Number FP05-MH12-10 dated 21 September 2005. These historic disposal areas are illustrated in **Figure 2**.

An Interagency Working Group (IWG) has been established to evaluate and provide guidance pertaining to alternative sediment management practices in Mobile Bay. The IWG consists of the following local, State and Federal agencies:

- Alabama State Port Authority
- U.S. Army Corps of Engineers, Mobile District
- U.S. Army, Engineer Research and Development Center
- Alabama Department of Environmental Management
- Alabama Department of Conservation and Natural Resources, State Lands Division
- Alabama Department of Conservation and Natural Resources, Marine Resources Division
- Geological Survey of Alabama
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service, Habitat Conservation Division
- Mobile Bay National Estuarine Preserve
- Dauphin Island Sea Lab
- The Nature Conservancy
- Mobile County Environmental Department
- Federal Aviation Authority

In 2012, the dimensions of the Mobile Bay navigation channel were compromised and a critical need arose to return the channel to full operational dimensions which could not effectively be accomplished by hopper dredges. The IWG concurred with the Corps, Mobile District's determination that invoking the emergency option was a reasonable action under the circumstances and that it presented a valuable opportunity to monitor and model the open bay placement sites to answer questions as to how the material behaves once it has been placed. In September of 2012, the Corps, Mobile District utilized a large pipeline dredge to clear the upper Bay channel. This action resulted in the placement of about 9 million cubic yards of maintenance dredged sediment within the historically established open water sites (**Figure 2**). The placement utilized thin-layer techniques such that the thickness would be no greater than 12 inches. The Corps subsequently implemented a monitoring and modeling program to demonstrate and predict the behavior and fate of the placed sediment.

The results of these studies were to be used to determine future open water placement strategies. Based on the results of the monitoring and modeling effort, the IWG recommended that a long term option for conducting within bay thin-layer disposal should be pursued.

#### 4.2 Strategic Sediment Placement Plan.

To implement the proposed open bay thin-layer disposal option, sediment removed from Mobile Bay navigation channel will be placed using a spill barge outfitted with a continuous GPS tracking system and a diffuser or baffle plate. The spill barge utilizes a system of winches, which constantly move the barge in a sweeping pattern to prevent material from exceeding the thin-layer tolerance. Placement of material in the open-water sites will occur at least 2,500 feet from the edge of the channel as shown in **Figure 3**.

A strategic placement plan provides an approach that optimizes the use of adjacent thin-layer open water sites, takes advantage of additional beneficial use opportunities, and continues the use of the ODMDS. This balanced approach allows for more efficient use of both pipeline cutterhead dredges and hopper dredges, which greatly enhances the use of the native bay sediments and improves navigation channel reliability.

The strategic sediment placement plan presented herein is based on using historic shoaling rates/reaches aligned with available adjacent open water sites and evaluated by measuring water depth and pipeline distances from the shoal to the placement site. Typically, each 2 mile reach of channel has 3 open water placement areas within a reasonable pumping distance that are adequately sized based on the historic shoaling rates for the associated channel reach. In the case where shoaling rates are consistent with historical rates, a pipeline cutterhead dredge could be used every 12-24 months, which would result in a thin-layer placement in each of the three placement sites approximately once every 4 to 6 years. During the approximate 12-24 months between pipeline cutterhead dredging events, it is likely that a hopper dredge would be required to remove corner shoaling and place the material in the ODMDS. **Figure 3** presents an example of the thin-layer placement strategy utilizing the pre-established historical disposal areas. Abnormal shoaling rates and unforeseen events can shift the alternating placement strategy. However, tracking of each placement event will provide optimal management of the placement sites. As



**Figure 2.** Locations of the pre-established open water disposal areas in Mobile Bay



**Figure 3.** Example of the Strategic Sediment Placement Plan utilizing pre-established open bay placement areas

open bay thin-layer disposal option is being recommended for implementation, as it would add an environmentally acceptable alternative for managing maintenance dredged material within the Mobile Bay navigation channel that allows sufficient time for benthic recovery, permits the bottom elevations to

discussed previously, using such a strategy provides an environmentally acceptable alternative for managing maintenance dredged material within the Bay channel that will allow sufficient time for benthic recovery and permit the bottom elevations to return to that of the adjacent bottom as the placed sediment becomes remobilized into the Bay's natural sediment transport system.

## 5.0. ALTERNATIVES TO THE PROPOSED PROJECT

**5.1. No Action.** The No Action 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 the continued practice of removing all dredged material, except for emergency actions, from the Mobile Bay channel which is no longer considered an environmentally sound sediment management approach. By continuing to transport the material from the navigation channel results in restrictions that confines the use to hopper dredges and limits the Corps, Mobile District's access to a smaller percentage of the available dredging fleet resulting in scheduling and cost constraints.

**5.2. Proposed Action.** The selected alternative of adding the

return to that of the adjacent bottom, remobilizes the sediment within the Bay's natural sediment transport system, and provides the ability to utilize both hopper and cutterhead dredging equipment. Disposing of the dredged material from the Mobile Bay navigation channel in this manner makes available options and flexibilities on project maintenance scheduling and cost. This alternative has been reviewed and supported by the IWG which recommended that a long term option for conducting within bay thin-layer disposal be pursued.

## **6.0. AFFECTED ENVIRONMENT**

A detailed discussion of the overall affected environment pertaining to the Mobile Harbor Federal navigation project is contained in the 2012 Mobile Harbor EA. Only the affected environmental components that are considered relevant to the proposed action are being addressed here.

**6.1 Soils.** The upper portion of Mobile Harbor is predominantly silt and clay with higher concentrations of sand in the mouth of the Mobile River. In 2010 the chemical and physical properties of the maintenance material were evaluated to determine the suitability of the material for ocean placement in the ODMDS. The Mobile Bay sediments are considered free of contaminants and approved for placement at the Mobile-North ODMDS. Additional information regarding the Mobile Bay sediment characteristics can be found in the 2012 Mobile Harbor EA.

**6.2 Biological Resources.** Ecological habitats within the proposed project sites include subtidal estuarine water bottoms populated with diverse benthic communities. Benthic communities vary depending on the substrate bottom types present in the area. The subtidal bottoms in and adjacent to the thin-layer disposal areas consist primarily of soft mud sediments (Christmas, 1973). There are no submerged aquatic beds in the vicinity of the placement areas. Generally, the submerged aquatic grasses are restricted to the northern shores of the barrier islands south of the mainland shoreline. Additional information regarding the biological resources for the entire Mobile Harbor navigation project is included in the 2012 Mobile Harbor EA.

**6.3 Essential Fish Habitat (EFH).** A detailed discussion of EFH as defined in the Magnuson-Stevens Fishery Conservation and Management Act is included in the 2012 Mobile Harbor EA.

**6.4 Cultural Resources.** A detailed discussion concerning the potential effects of the Mobile Harbor navigation project on historic properties in accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended) and its implementing regulations at 36 CFR 800 is included in the 2012 Mobile Harbor EA. The proposed open bay thin-layer disposal areas are within the footprint of the included in previous coordinations.

**6.5 Water Quality.** The State of Alabama's water quality standards would not be significantly affected and water clarity would return to ambient conditions shortly after sediment placement at the open bay disposal sites. As required by the Clean Water Act, a Section 404 (b)(1) evaluation report for the removal of sediment from the previously-approved areas and placement of material in the open bay thin-layer disposal sites has been prepared and is included in Appendix A.

**6.6 Threatened and/or Endangered Species.** A detailed discussion of all threatened and endangered species that occur within the overall Mobile Harbor project is included in the 2012 Mobile Harbor EA. Of particular concern in the proposed open bay disposal areas are sea turtles, Florida manatee, and the Gulf sturgeon. Sea turtles are known to be present within the Mobile Bay and actively nest on adjacent Gulf of Mexico beaches. However, they are not known to actively use the upper reaches of the Bay or Mobile River. A more detailed discussion of these species is included in the 2012 Mobile Harbor EA.

## 7.0 ENVIRONMENTAL IMPACTS

The impacts resulting from the dredging and disposal activities would be short-term and localized, including temporary benthic impacts in the shallow water areas around dredging and thin-layer disposal operations, increased turbidity, suspension of bottom sediments, and minor aesthetic degradation. All reasonable efforts would be made to avoid, minimize, and restore affected natural resources to the extent practicable. It is anticipated implementation of this project would result in improved navigation.

**7.1 Soils.** The open-bay thin-layer disposal operations will result in the temporary increases of suspended sediments, the loss of benthic organisms, increases in nutrients, and bathymetry changes in the open bay disposal sites. The increase in turbidity will 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, the proposed open-bay thin-layer disposal activities will not jeopardize or adversely impact any oyster reefs, Submerged Aquatic Vegetation (SAVs), wetlands or other critical habitat.

Monitoring and modeling of the thin-layer disposal areas was conducted by the U.S. Army Engineer Research and Development Center (ERDC) to demonstrate and forecast the behavior of the dredged material once it has been placed in the thin-layer sites. The modeling effort has shown that approximately 35% of the sediment that erodes from the designated thin-layer disposal areas is transported and deposited in the navigation channel. The remaining material becomes re-suspended and is widely dispersed throughout the bay by wind-, river-, and tide-driven currents over a period of approximately 2 years (ERDC 2014). Sediment removed from the navigation channel and placed in the thin-layer disposal areas exhibits finer grain size characteristics and due to its cohesive properties is less erodible than the native bay bottom sediments by approximately 45% (ERDC 2014). The results of the monitoring and modeling efforts also indicate that that material placed in this method is not transported along the bottom as a large sediment mass, rather it is remobilized into the water column by waves and currents and returned into the Bay's natural sediment transport system.

In addition to the monitoring and modeling efforts, a comprehensive sediment budget that was prepared for the Mobile Bay National Estuary Program by Applied Coastal Engineering and Research, Inc. (Byrnes et al. 2012). The purpose of the study was to document the long term regional sediment dynamics in Mobile Bay. The study compiled historical channel dredging and placement quantities in order to document sediment movement throughout the Bay due to engineering activities such as dredging to construct and maintain the navigation project for a period from 1870 to 2010. A large component of the study was the compilation and comparison of historical shoreline and bathymetry data for the Bay.

Sediment transported within the watershed is the primary source of sediment for delta growth in the northern reaches of the Bay. Given the general bay characteristics and considering the low velocity discharge from the river, relatively low wave and current conditions results in significant quantities of fine-grained sediment deposited in the Bay.

Historic channel dredging records indicate that maintenance dredging in the Mobile Bay ship channel has been consistent since about 1913, regardless of channel depth, width, and changes in dredged material placement. Dredging volumes have been determined to be approximately 4.15 million cubic yards (mcy) per year (yr). The amount of sediment entering the Bay from adjacent watersheds is about 2.87 mcy/yr or 64% of annual maintenance dredging, indicating that sediment dredging quantities exceeds natural sediment inputs by 1.6 mcy/yr. This suggests that that about 36% of maintenance dredging material placed in the Bay gets transported back to the channel which is consistent with that shown by the modeling.

Net sediment movement within the Bay suggests that open bay disposal of sediment is most similar to natural long-term depositional processes. Design of dredged material placement techniques that focus on thin-layer disposal farther from the margins of the channels would be beneficial to channel dredging operations.

**7.2 Biological Resources.** Impacts relating to the entire Mobile Harbor navigation project are discussed in detail in the 2012 Mobile Harbor EA. Of particular concern regarding thin-layer disposal methods are the effects on the benthic environment. The benthic organisms that occur in the bay bottom sediments may be destroyed or severely impacted by the physical placement of sediment. However, it is believed that affected areas are small and would rapidly recover within a couple of months back to pre-project conditions. Several studies have been conducted pertaining to the affects of benthic communities in response to thin-layer disposal activities (Wilbur et al. 2008, Wilbur et al. 2007, USACE 1999, Wilbur and Clarke 1998, and USACE 1994). Responses of benthic infauna to large scale disturbance by dredged material placement were studied at areas in Corpus Christi Bay, 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 one year. The response of benthic communities to thin-layer disposal of dredged material was assessed at three sites in Mississippi Sound in 2006. The findings indicated that adults re-colonized the newly deposited sediments either through vertical migration or lateral immigration from adjacent areas within a period of 3 to 10 months. A related study conducted in Mississippi Sound associated with the Gulfport Federal project indicated benthic recovery rates to predisposal conditions occurred within 12 months.

A major parameter influencing benthic recovery rates is the prior disturbance history of a particular area. Studies indicate that benthic recovery occurs more rapidly in 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 waterbody with dynamic sediment processes, it would be expected that benthic recovery would be consistent with that shown by previous studies.

**7.3 Essential Fish Habitat (EFH) Assessment.** The Corps, Mobile District takes 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 dredging and disposal operations. As discussed in the section above, previous studies conducted on the effects of thin-layer disposal indicate that benthic recovery rates to predisposal conditions occurred within approximately 12 months, especially for shallow water dynamic environments such as exists in Mobile Bay.

Thin-layer disposal actions conducted in a strategic manner would allow sufficient time for benthic recovery and permits the bottom elevations to return to that of the adjacent bottom. The placed sediment would be remobilized into the Bay's natural sediment transport system. Impacts to EFH would be temporal in nature associated with the maintenance dredging and thin-layer placement activities in Mobile Bay. The proposed activities would not significantly affect coastal habitat identified as EFH in the project area. Based on the extent of this habitat in the general vicinity of the project and the temporal nature of the impact, the overall impact to fisheries resources is considered negligible and that no long-term adverse impacts are anticipated. The Corps, Mobile District has requested concurrence from the National Marine Fisheries Service, Habitat Conservation Division for the proposed actions concerning EFH.

**7.4 Cultural Resources.** The proposed open bay thin-layer disposal areas were included in the 2012 Mobile Harbor EA. Since changing the thin-layer disposal activities from a storm-related action to a permanent option with no change in the project area, the Section 106 determination remains the same in that that the proposed project has no potential to cause effects to historic properties as per 36 CFR 800.3(a)(1) and therefore will have no significant impact to cultural resources. By regulation, no further consultation or coordination is required under Section 106.

**7.5 Water Quality.** The dredging and thin-layer disposal operations are expected to create some degree of construction-related turbidity in excess of the natural condition in the proximity of the channel and placement site(s). 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. Minor increases in turbidity within the vicinity of operations will occur. A more detailed discussion of the water quality impacts are included in the 2012 Mobile Harbor EA.

**7.6 Threatened and Endangered Species.** The Corps, Mobile District has determined that the proposed permanent open-bay thin-layer disposal option will not impose any impacts to threatened and endangered species any greater than was addressed in the 2012 Mobile Harbor EA. However, informal coordinations with the U.S. Fish and Wildlife Service and National Marine Fisheries Service will be conducted to confirm this determination in accordance with Section 7 of the Endangered Species Act.

## **8.0 CUMULATIVE EFFECTS SUMMARY**

The cumulative impacts associated with the proposed action would be consistent with those addressed in the 2012 Mobile Harbor EA.

## **9.0 OTHER CONSIDERATIONS**

The open bay thin-layer disposal was considered in the 2012 recertification of the Mobile Harbor Federal Project as an emergency action. Other considerations for the proposed action are consistent with the considerations addressed in the 2012 Mobile Harbor EA.

**10.0 COORDINATION.** The general public has been notified of the proposed action via public notice. The public notice has been electronically sent to Federal and state agencies and the interested public for a 15-day review period. 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.

**11.0 CONCLUSION.** The proposed maintenance dredging and placement activities 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.

Findings of this EA and Section 404 (b)(1) Evaluation determined no significant impacts would occur as a result of this Mobile Harbor Operations & Maintenance Project. The purpose of this EA is to determine if the proposed action has the potential for creating significant impacts to the environment and would thereby warrant a more detailed study on possible impacts, mitigation, and alternative courses of action.

## **12.0. LIST OF PREPARERS**

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## **13.0. LIST OF AGENCIES AND OTHERS CONTACTED REGARDING THE ACTION.**

U.S. Department of the Interior, Fish and Wildlife Service  
National Oceanic and Atmospheric Administration, National Marine Fisheries Service  
Gulf of Mexico Fishery Management Council  
Alabama Department of Environmental Management  
Alabama State Historic Preservation Officer

**14.0. REFERENCES.**

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## Appendix A

### DRAFT

#### Section 404(b)(1) Evaluation Report for the Modification to Mobile Harbor Operations & Maintenance Project Addition of Open Bay Thin-layer Disposal Option

#### **I. DESCRIPTION OF THE AUTHORIZED AND EXISTING FEDERAL PROJECT**

The authorized Mobile Harbor, Alabama navigation project includes the following:

- a. A 57' x 700' channel from the Gulf of Mexico for approximately eight (8) miles to Mobile Bay;
- b. A 55' x 550' 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' wide at mid-bay;
- c. A 55' x 750' x 4,000' anchorage area just south of McDuffie Island;
- d. A 55' x 1500' x 1,500' turning basin opposite McDuffie Island;
- e. A 40' deep channel with the width varying from 700', near the Mobile River mouth, to 500', near the Cochrane Bridge (U.S. Highway 98), a distance of approximately four (4) miles;
- f. A 40' x 800' – 1000' x 2,500' turning basin opposite the Alabama State docks between river miles 1.0 to 1.5;
- g. A 40' x 1,000' x 1,600' turning basin just south of the Cochrane Bridge.

The authorized dimensions of all segments of the Mobile Harbor project have not been constructed. A summary of both the authorized and the existing maintained dimensions are listed in Table 1. The maintained dimensions of the bay channel are 45' by 400' and the outer bar channel is 47' by 600'. Each of these areas is maintained to a depth that is 10' less than the authorized depth. Several additional features of the authorized project have not been constructed at this time. The anchorage areas that would be located south of the mouth of the Mobile River have not been constructed, and the bay channel and the bar channel, have not been widened. The new turning basin opposite McDuffie Island, between Pinto Island and Little Sand Island was constructed in 2010.

**Table 1. Authorized and Existing Dimensions for Mobile Harbor**

Channel	Authorized Dimensions	Existing Dimensions
<i>Outer Bar Channel (a.)</i>	57' x 700'	47' x 600'
<i>Bay Channel (b.)</i>	55' x 550'	45' x 400'
<i>Anchorage Area (c.)</i>	55' x 750' x 4,000'	<i>Not Constructed</i>
<i>Turning Basin (d.)</i>	55' x 1,500' x 1,500'	45' x 755' x 1,320'
<i>River Channel (e.)</i>	40' x 500'-700'	<i>As Authorized</i>
<i>Turning Basin (f.)</i>	40' x 800' – 1,000' x 2,500'	<i>As Authorized</i>
<i>Turning Basin (g.)</i>	40' x 1,000' x 1,600'	<i>As Authorized</i>

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 Engineering 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 sediment basins in the Mobile River and three sediment basins in the bay channel, have been previously authorized and approved. These sediment basins are to provide improved channel maintenance efficiency. Each of these basins are several thousand feet long and have depths ranging from four feet to ten 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.

## **II. DESCRIPTION OF THE PROPOSED ACTION:**

Mobile Harbor, Alabama, is located in the southwestern part of the state, at the junction of the Mobile River with the head of Mobile Bay. The port is about 28 nautical miles north of the Bay entrance from the Gulf of Mexico and 170 nautical miles east of New Orleans, Louisiana. 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, 83<sup>rd</sup> Congress, First Session, as amended, and previous acts) authorized a 40-foot channel. Improvements to the existing Federal project were authorized in 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 proposed action is the continued operations and maintenance of the Mobile Harbor navigation project. However, previously-approved, but recently constructed, components are being included in this authorization, for the first time, such as: the Mobile Harbor Turning Basin, the use of open water disposal sites for emergency disposal, and the entrance to Theodore Ship Channel where it intersects with Mobile Bay channel.

The Mobile Harbor project is divided into three (3) general areas: the river channel section, the bay channel section and the bar channel section. The maintenance activities include the placement of dredged material originating from the project into previously-approved disposal areas. The complete description of the proposed action is presented below, and the project features are illustrated in Figure 1 (see Public Notice and EA).

**River Channel Section** - The proposed action in this portion of the project involves the continued maintenance dredging and placement of material from the mouth of the Mobile River to the Cochrane Bridge, a distance of about four (4) miles (see Figure 2 in the Public Notice and EA). The River channel is dredged to a total depth of 40 feet plus two (2) feet of advanced maintenance and two (2) feet of allowable overdepth dredging. The river channel section upper sediment basin would be maintained to its authorized and approved dimensions with eight (8) feet of advanced maintenance and an additional two (2) feet for allowable overdepth. The river channel section lower sediment basin would be maintained to its authorized and approved dimensions with four (4) feet of advanced maintenance and an additional two (2) feet for allowable overdepth.

Approximately 1.2 million cubic yards of dredged material would be removed from the main channel on an annual basis. This includes sediment collected in the sediment basins that would be periodically removed as necessary to restore their original dimensions and their sediment-trapping ability. 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 (i.e., North Blakeley, ALCOA Mud Lakes, South Blakeley and North Pinto; see Figure 2) located in the upper harbor area or the Mobile-North Ocean Dredged Material Disposal Site (ODMDS). Dredging and material placement activities could occur at any time during the year, and in response to unforeseen shoaling.

**Bay Channel Section** – The proposed action within the bay channel section consists of the maintenance dredging of the main channel in Mobile Bay, from near the mouth of the bay to the mouth of the Mobile River, a distance of approximately 29 miles, and the tangent channels, *i.e.*, Theodore channel intersection.

The Bay channel is dredged to a total depth of 45 feet plus two (2) feet of advanced maintenance and two (2) feet of allowable overdepth dredging. The upper and lower bay sediment basins would be maintained to their authorized and approved dimensions with five (5) feet of advanced maintenance and an additional two (2) feet for allowable overdepth. This action will also include the entrance to Theodore Ship Channel where it intersects with Mobile Bay channel for a distance of approximately 4,300 feet to its authorized and approved dimensions with six (6) feet of advanced maintenance and an additional two (2) feet for allowable overdepth (see Figure 3). The Mobile Harbor upper bay turning basin would be maintained to its authorized and approved dimensions with four (4) feet of advanced maintenance and an additional two (2) feet for allowable overdepth.

The main navigation channel in the bay typically requires the annual removal of about 4.3 million cubic yards of material to maintain the channel dimensions. The maintenance of the navigation channels and sediment basins may be accomplished by a dragline/clamshell, hopper and/or hydraulic pipeline dredge. The primary disposal area for the bay channel is the previously-approved Mobile-North ODMDS. Dredging and material placement activities could occur at any time during the year, and in response to unforeseen shoaling.

**Bar Channel Section** – The proposed action includes the maintenance dredging of the channel from the Gulf of Mexico to Mobile Bay, a distance of approximately eight (8) miles (see Figure 5). The bar channel is dredged to a total depth of 47 feet plus two (2) feet of advanced maintenance and two (2) feet of allowable over depth dredging.

Approximately 300,000 cubic yards of material would be removed from the channel each year (average annual). The material is typically removed by a hopper or hydraulic cutterhead dredge, and placed in the Sand Island Beneficial Use Area (SIBUA) as described by Public Notice FP08-MH14-05. The primary disposal area for the bar channel is the SIBUA; however, the Mobile-North ODMDS may be utilized if it is not feasible or in the SIBUA is not available at the time of disposal.

**Advanced Maintenance** - It is a U.S. Army Corps of Engineers (Corps) policy that dredging will be accomplished in an efficient, cost-effective, and environmentally responsible manner to improve and maintain the Nation's waterways to make them suitable for navigation and other purposes consistent with Federal laws and regulations. In a guidance memorandum dated 17 January 2006, Congress specifically authorizes Federal navigation channels with a specific depth and width (and length). The authorized depth and width are generally based on maximizing net transportation savings considering the characteristics of vessels using the channel. In addition to authorized dimensions, channel reliability is considered and may result in the incorporation of advance maintenance depths into construction of the channel where such advance maintenance is justified to ensure channel reliability and least overall cost. There are inherent excavation inaccuracies in the dredging process. Excavation accuracy relates to closeness of the dredge's completed work to the design (project and/or overdepth) grade as determined by an after-dredge hydrographic survey.

Dredge excavation accuracies vary as a function of type of dredging equipment used (mechanical or hydraulic) and interaction with site-specific physical conditions (tides, currents, waves), type and thickness of sediment or rock being dredged, and channel design (water depth, side slopes, etc.). Because of these variables and the resulting excavating inaccuracies associated with the dredging activity, Corps engineering design, cost estimating, and construction contracting documents recognize that dredging below the congressionally- authorized project dimensions will occur and is necessary to ensure required depth and width as well as cost-effective operability. To balance project construction requirements against the need to limit dredging and disposal to the minimum required to achieve the designed dimensions, a paid allowable overdepth (including side slopes) is incorporated

into the project dredging prism. Material removed from this allowable overdepth is paid for under the terms of the dredging contract. Material removed beyond the limits of allowable overdepth is not paid for.

Hydraulic pipelines, mechanical, and hopper dredges differ on the disturb sediment profile depths beyond the advanced maintenance and overdepth dredging. Up to an additional three (3) feet of sediment could be disturbed in the dredging process resulting in minor amounts of material being removed.

**Disposal Area Maintenance** – Included in the overall maintenance of the Mobile Harbor project are activities necessary to maintain the longevity of the upland dredge material placement areas. At times, material from upland sites, *i.e.*, Blakeley Island, may be transported to Gaillard Island for dike raising/construction or other purposes. Upland disposal area restoration and material placement activities could occur at any time during the year. Material to be placed in Gaillard Island would only occur in accordance with the *Migratory Bird Treaty Act* and any associated regulatory agency agreements.

**Emergency Disposal Actions** - In the event where storm-related emergency dredging activities are required and considered critical to provide safe navigation for returning the channels to their pre-storm dimensions and restoring full shipping capacity, the Corps, Mobile District is proposing the use of the open bay disposal areas (and Gaillard Island disposal area). This action, using pre-established historical disposal areas, was implemented during emergency procedures resulting from Hurricane Katrina and described in Public Notice No. FP05-MH12-10 dated 21 September 2005. This emergency option is necessary when there is insufficient hopper dredge capability to meet these increased needs. Under these circumstances pipeline dredging equipment will be used for the bay channel utilizing thin-layer open-water disposal on adjacent bay-bottoms (east and west side). Pipeline dredging operations will extend from the northern limit of the bay channel south to the mouth of Mobile Bay. These areas range in depth from about 6 to 10 feet. Placement of materials within these sites will utilize thin-layer disposal techniques and will be placed as thinly as possible not to exceed 12 inches in thickness. These areas were historically utilized, prior to 1990, for the maintenance of the bay channel (see Figure 7 in the Public Notice and EA.) The use of the open water sites would be coordinated with the applicable agencies as needed prior to usage. This disposal action is being replaced by the permanent open bay thin-layer disposal option described below.

**Permanent Open Bay Thin-layer Disposal Option** – In addition to the emergency action described above a permanent open bay thin-layer disposal option exists as described in the EA. Providing this option adds an environmentally acceptable alternative for managing maintenance dredged material within the Mobile Bay navigation channel that allows sufficient time for benthic recovery and permits the bottom elevations to return to that of the adjacent bottom as the placed sediment is remobilized within the Bay's natural sediment transport system.

A strategic thin-layer placement plan has been developed for associated with this disposal option based on using historic shoaling rates/reaches aligned with available adjacent open bay sites and evaluated by measuring water depth and pipeline distances from the shoals to the placement site. Typically, each 2 mile reach of channel has 3 open bay placement areas within a reasonable pumping distance that are adequately sized based on the historic shoaling rates for the associated channel reach. In the case where shoaling rates are consistent with historical rates, a pipeline cutterhead dredge could be used every 12-24 months, which would result in a thin-layer placement in each of the three placement sites approximately once every 4 to 6 years. During the approximate 12-24 months between pipeline cutterhead dredging events, it is likely that a hopper dredge would be required to remove corner shoaling and place the material within the ODMDS. The EA discusses an example of the thin-layer placement strategy utilizing the pre-established historical disposal areas. Abnormal shoaling rates and unforeseen events can shift the alternating placement strategy. However, tracking of each placement event will provide optimal management of the placement sites.

Sediment removed from Mobile Bay navigation channel will be placed using a spill barge outfitted with a continuous GPS tracking system and a diffuser or baffle plate. The spill barge utilizes a system of winches, which constantly move the barge in a sweeping pattern to prevent material from exceeding the thin-layer tolerance. Placement of material in the open bay sites will occur at least 2,500 feet from the edge of the channel.

**a. 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 (WRDA) of 1986 (PL 99 – 662, Ninety-ninth Congress, Second Session), which was approved 17 November 1986, and subsequently amended by Section 302 of the WRDA of 1996 which provides the authority to consider alternatives to disposal of dredged material for the Mobile Harbor Federal Navigation Project that includes other environmentally acceptable alternatives including beneficial uses and environmental restoration. 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.

**b. General Description of the Dredged or Fill Material.** A geotechnical investigation was conducted to determine the physical characteristics of the material contained in the proposed project area. A summary of the findings are discussed below. The sediment proposed for excavation was also sampled and tested for possible contaminants. A summary of this investigation is also summarized below.

(1) Geotechnical Investigation. In general, the maintenance sediments from both Mobile River and Mobile Bay were found to be predominantly silt + clay, ranging from 46.9 to 97.7 percent silt + clay. The grain size of sediments from the Mobile bar channel were variable with two locations composed of more than 90 percent sand and two locations composed of roughly 50 % sand and 50 % silt+clay.

(2) Sediment Contaminant Analyses. The sampling results of recent studies (March 2010) of the sediment chemical analyses indicate that within the upper 10-foot layer, a few metals (arsenic, copper, and nickel) and pesticides were present at detectable levels but did not exceed critical thresholds. Each of the tested metals was detected in at least one of the sediments from Mobile River and Mobile Bay. However, none of the detected metal concentrations exceeded the PEL (Probable Effects Level) values.

The physical and chemical characteristics of sediment samples from the Mobile Harbor lower ship channel, Mobile bar channel, Mobile reference site, and Mobile ODMDS were sampled in late 2010 to assess whether or not sediments were impacted by the *Deepwater Horizon* Oil Spill. Concentrations of detected analytes in sediment samples from the Mobile Harbor project were compared to sediment quality guidelines (SQGs) for marine sediments, where applicable, to assess the sediment quality.

Results from the post-oil spill sampling effort were compared to results from a previous investigation conducted in a March 2010 EA and to the site-designation report for the Mobile ODMDS conducted in October 2009 to determine if there were any discernible changes to the sediment quality in the Mobile Harbor ship channels and Mobile ODMDS that could potentially be attributed to the *Deepwater Horizon* oil spill.

When compared to the PAH concentrations from March 2010, the results from the November/December 2010 study indicate that there was no discernible change in the PAH concentrations in the Mobile Harbor lower ship channel in the last year. Similarly, the total PAH concentrations (ND= $\frac{1}{2}$ RL) detected at the Mobile ODMDS (121, 295, and 535 ug/kg) were slightly higher than concentrations detected in this study, and still well below the TEL value. Likewise, individual PAH concentrations and total PAH (ND= $\frac{1}{2}$ MDL) concentrations at the reference site do not indicate a change in sediment quality, between March and December 2010. Although the PAH concentrations at the Mobile bar channel and ODMDS cannot be compared to data from March 2010 (not sampled), based on their location relative to the Gulf of Mexico, low PAH concentrations in November/December 2010, and the comparative data from the Mobile Harbor lower ship channel and reference site, results indicate that observed concentrations are most likely similar to background concentrations in the area. Based on results of PAH and TPH testing of surface sediments collected in the Mobile lower ship channel, Mobile bar channel, USEPA-designated reference site, and Mobile ODMDS in November and December 2010, there are no discernible changes in the sediment quality that are attributable to the *Deepwater Horizon* Oil Spill.

### **c. General Description of the Discharge Sites.**

(1) Location. Mobile Harbor, Mobile, Alabama. Maps illustrating the location of the existing channels and disposal areas are presented in the Public Notice and the EA.

(2) Type of Habitat. Previously-approved upland disposal areas (i.e., North Blakeley, ALCOA Mud Lakes, South Blakeley and North Pinto) located in the upper harbor area and the Gaillard Island disposal area are existing upland and confined disposal sites that are approved to accept materials that contain sand and fine-grained sediments. The Mobile North ODMDS is a previously approved ocean disposal site and is approved to accept material from this project. The designated open water disposal sites will impact approximately 3,750 acres of bay bottoms predominantly composed of mud flats. These areas were historically utilized, prior to 1990, for the maintenance of the bay channel. The material will be moved in a strategic fashion so that the areas used are in the more expansive portions of the bay and provide sufficient time for benthic recovery. 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. This zone is a very dynamic environment that changes drastically as a function of currents and wave conditions. The direction of the littoral transport in this location is from east to west. Due to the dynamic nature of this environment, the benthic community generally consists of opportunistic invertebrates. The constantly shifting sediments do not allow aquatic vegetation to become rooted or attached to the unconsolidated sandy substrate.

(4) Timing and Duration of Discharge. Discharge could occur at any time in the year at any disposal location. This proposed action is merely a recertification of an authorized action.

**d. Disposal Method.** Placement of materials in the approved upland disposal sites (North Blakeley, ALCOA Mud Lakes, South Blakeley and North Pinto) will be accomplished by hydraulic dredge with a pipeline or hopper. Also, placement of materials in the Gaillard Island sites will be accomplished by hydraulic pipeline. It is

expected that some support equipment such as bull dozers, marsh buggies, etc. may be necessary to redistribute the sediment within these sites. Sediment placed in the SIBUA and ODMDS will likely be accomplished using a hopper dredge or scowl. For the open water disposal sites, the use of pipeline dredging equipment is proposed for the bay channel utilizing thin layer open-water disposal on adjacent bay-bottoms. Pipeline dredging operations associated with the open disposal will extend from the northern limit of the bay channel south to the mouth of Mobile Bay.

### **III. FACTUAL DETERMINATIONS.**

#### **a. Physical Substrate Determinations.**

(1) Substrate elevation and slope. The substrate placed in the approved upland disposal sites, as well as the ODMDS, will be confined within the disposal areas. The elevation of the approved upland disposal sites ranges from 21.0 feet to 46 feet. 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.

Studies of open water disposal in Mobile Bay by Nichols, 1978, show that the disposal initially raised the bed approximately 30 cm and increased the average bed slope from 1:3000 to 1:2000. After disposal the mud consolidates, bulk density increases and slopes decrease. Between disposal operations the disposal area bathymetry returns to broad swells and troughs with maximum relief of two (2) feet representing topography modified by waves and tidal currents. Very little long-term mounding has resulted from the disposal of maintenance material in the bay. Significant mounding has occurred in the Upper Mobile Bay as a result of disposal of new work material from channel deepening in the 1960's. Continued disposal of maintenance material in the upper bay has not added to that mounding when utilizing the thin-layer methods.

(2) Sediment type. Approximately 5.5 million cubic yards of dredged material would be removed from the river, bay and bar channel(s) on an annual basis. Additionally, sediment collected in the sediment basins would be periodically removed as necessary to restore their original dimensions and their sediment-trapping ability. In general, the maintenance sediments from both Mobile River and Mobile Bay were found to be predominantly silt + clay, ranging from 46.9 to 97.7 percent silt + clay. The grain size of sediments from the Mobile Bar Channel were variable with two locations composed of more than 90 percent sand and two locations composed of roughly 50 % sand and 50 % silt+clay.

(3) Dredged/fill material movement. The dredged material placed in the approved upland disposal area sites will be confined. 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. The salinity of water associated with Mobile-North ODMDS is high enough to promote rapid settling of finer particles. Current velocities range from about 8 inches per second (in/s) to 16 in/s at the Mobile-North ODMDS. The directions of the currents measured during tide conditions moved towards the east while flood tide conditions moved to the north-northwest.

Monitoring and modeling of the thin-layer disposal areas was conducted by the U.S. Army Engineer Research and Development Center (ERDC) to demonstrate and forecast the behavior of the dredged material once it has been placed in the thin-layer sites. The modeling effort has shown that approximately 35% of the sediment that erodes from the designated thin-layer disposal areas is transported and deposited in the navigation channel. The remaining material becomes re-suspended and is widely dispersed throughout the bay by wind-, river-, and tide-driven currents over a period of approximately 2 years. Sediment removed from the navigation channel and placed in the thin-layer disposal areas exhibits finer grain size characteristics and due to its cohesive properties is less erodible than the native bay bottom sediments by approximately 45% . The results of the monitoring and modeling efforts also indicate that that material placed in this method is not transported along the bottom as a

large sediment mass, rather it is remobilized into the water column by waves and currents and returned into the Bay's natural sediment transport system.

(4) Physical effects on benthos. Within the open-water disposal sites, SIBUA and the ODMDS 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 ERDC under the Dredged Material Research Program (DMRP) 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 echinoderms. 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. Several studies have been conducted pertaining to the affects of benthic communities in response to thin-layer disposal activities. Responses of benthic infauna to large scale disturbance by dredged material placement were studied at areas in Corpus Christi Bay, 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 one year. The response of benthic communities to thin-layer disposal of dredged material was assessed at three sites in Mississippi Sound in 2006. The findings indicated that adults re-colonized the newly deposited sediments either through vertical migration or lateral immigration from adjacent areas within a period of 3 to 10 months. A related study conducted in Mississippi Sound associated with the Gulfport Federal project indicated benthic recovery rates to predisposal conditions occurred within 12 months.

A major parameter influencing benthic recovery rates is the prior disturbance history of a particular area. Studies indicate that benthic recovery occurs more rapidly in 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 waterbody 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 significant effects due to movement of the physical substrate are noted.

(6) Actions taken to minimize impacts. No actions, which would further reduce impacts due to the placement of the dredged material are deemed necessary.

## **b. Water Circulation/Fluctuation, and Salinity Determination.**

### (1) Water

(a) Salinity. No significant effects.

(b) Water chemistry. The sampling results of recent studies (2010) of the elutriate analyses indicate little to no effects on water chemistry for the proposed action.

(c) Clarity. Water clarity may locally be decreased slightly during the proposed placement of dredged material, but this would not be significant.

(d) Color. No effects.

(e) Odor. No effects.

- (f) Taste. No effects.
- (g) Dissolved gases. No effects.
- (h) Nutrients. No effects.
- (i) Eutrophication. No effects.

(2) Current Patterns and Circulation

(a) Current patterns and flow. Changes in water circulation and flow due to placement of sand in the SIBUA, open water and ODMDS are not expected to occur. Natural currents and flow will occur during tidal, wave, and storm activities.

- (b) Velocity. No significant effects.
- (c) Stratification. No effects.
- (d) Hydrologic effects. No significant effects.

(3) Normal Water Level Fluctuations. No effects.

(4) Salinity Gradients. No significant effects.

(5) Actions That Will Be Taken To Minimize Impacts. No other actions that would minimize impacts on water circulation/fluctuation and salinity are deemed necessary.

**c. Suspended Particulate/Turbidity Determinations.**

(1) Expected changes in suspended particulate and turbidity levels in the vicinity of the disposal site. The modeling effort described in the EA shows that the sediment placed in the thin-layer sites becomes re-suspended and is widely dispersed throughout the bay by wind-, river-, and tide-driven currents over a period of approximately 2 years. Sediment removed from the navigation channel and placed in the thin-layer disposal areas exhibits finer grain size characteristics and due to its cohesive properties is less erodible than the native bay bottom sediments. The results of the modeling also indicates that material placed in this method is not transported along the bottom as a large sediment mass, rather it is remobilized into the water column by waves and currents and returned into the natural sediment transport system. The suspended particulate and turbidity levels are expected to undergo minor increases during dredging and placement activities, however, suspended sediment of this type will quickly return to normal conditions. No significant effects would occur as a result of these increases.

(2) Effects on the 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 effects.
- (c) Toxic metals and organics. No significant effects.

(d) Pathogens. No effects.

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

(f) Others as appropriate. None appropriate.

(3) Effects on biota.

(a) Primary production, photosynthesis. No significant effects.

(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. No further actions are deemed appropriate.

**d. Contaminant Determination. No significant effects.** The sampling results of recent studies (March 2010) of the sediment chemical analyses indicate that within the upper 10-foot layer, a few metals (arsenic, copper, and nickel) and pesticides were present at detectable levels but did not exceed critical thresholds. Also, based on results of PAH and TPH testing of surface sediments collected in the Mobile lower ship channel, Mobile bar channel, USEPA-designated reference site, and Mobile ODMDS in November and December 2010, there are no discernible changes in the sediment quality that are attributable to the Deepwater Horizon Oil Spill.

**e. Aquatic Ecosystem and Organism Determinations.**

(1) Effects on plankton. No effects.

(2) Effects on benthos. Benthic organisms would be destroyed by the deposition of dredged material below the waterline in the placement area, but no significant effects are expected on the benthic community as a result of the maintenance activities.

(3) Effects on nekton. No effects.

(4) Effects on aquatic food web. No effects.

(5) Effects on special aquatic sites.

(a) Sanctuaries and refuges. Not applicable

(b) Wetlands. Not applicable

- (c) Mud flats. Not applicable.
- (d) Vegetated shallows. Not applicable.
- (e) Coral reefs. Not applicable.
- (f) Riffle and pool complexes. Not applicable.

(6) Threatened and endangered species. The project area is host to wildlife on the state and Federal protected species list. Of particular concern in the proposed project vicinity are sea turtles, Florida manatee, and the Gulf sturgeon. Sea turtles are known to be present within the Mobile Bay and actively nest on adjacent Gulf of Mexico beaches. However, they are not known to actively use the upper reaches of the Bay or Mobile River.

The Corps, Mobile District has determined that five (5) species of sea turtles (loggerhead, green, hawksbill, Kemp's ridley, and leatherback), and Gulf sturgeon protected by the Endangered Species Act (ESA) can be found in or near the project area and may be affected by the project. These species will likely avoid the immediate project vicinity during dredging or placement due to noise from vessels and machinery; however these effects will be insignificant. 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 hopper dredges and hydraulic pipelines; however, due to their mobility, the chance of this occurring is discountable. This project is not located within designated critical habitat for any of the listed species.

Activities associated with the removal of materials from the Mobile bar channel by hopper dredge 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 7, 2009. Potential impacts on the five species of listed sea turtles and Gulf sturgeon from hopper dredging activities were assessed in the 2003 RBO. In the opinion, NMFS concluded that sea turtles and Gulf sturgeon can be adversely affected by hopper dredges and included in Incidental Take Statement (ITS), pursuant to Section 7 of Endangered Species Act. The ITS in the 2003 RBO contains reasonable and prudent measures with implementing terms and conditions to help minimize impacts of take; therefore any sea turtle or Gulf sturgeon take resulting from future maintenance dredging in Mobile Bay will be assessed against the Annual ITS in the RBO.

The Florida manatee is a subspecies of the West Indian Manatee. Between October and April, Florida manatees concentrate in areas of warmer water. During summer months, the species may migrate as far west as the Louisiana coast on the Gulf of Mexico and may occasionally be found along the Alabama coast. Manatees inhabit both salt and fresh water of sufficient depth (about 5 feet to usually less than 18 feet). Florida manatees may be encountered in canals, rivers, estuarine habitats, saltwater bays, and on occasion have been observed as much as 3.7 miles off the Florida Gulf coast. These manatees will consume any aquatic vegetation available to them including sometimes grazing on the shoreline vegetation. Although rare, manatee sightings have been documented in Mobile Bay and/or its tributaries for the past several years, during the period May through December. In the unlikely event that a manatee was located in the vicinity of the nearshore project site, "Standard Manatee Construction Conditions" would be implemented.

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. Gulf sturgeon less than two years old typically resides in lower reaches of riverine habitats and estuaries throughout the year. In general, subadult and adult Gulf Sturgeon begin to migrate into rivers from the Gulf of Mexico as river temperatures increase to about 16 to 23° C (60.8 to 75.0° F). They

continue to immigrate through early May, but most arrive when temperatures reach 21° C. Most Gulf sturgeon returns to estuaries or the Gulf of Mexico by mid-November to early December. 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. However, Mobile Bay is not within designated Gulf sturgeon critical habitat.

The remaining non-marine listed species for Mobile County may possibly occur in the upland portions of the project area, but it is unlikely. Such as: the Red-Cockaded Woodpecker (*Picoides borealis*), which has specific habitat requirements, including preference for fire-maintained mature pine stands, preferably Longleaf pine (*Pinus palustris*). These pines must also suffer from a fungus called ‘red heart rot’, which attacks the center of the trunk, causing the inner wood, the heartwood, to become soft. The upland disposal areas do not contain this specific habitat. This is also true for the Alabama Red Bellied Turtle (*Psuedemys alabamensis*), Piping plover (*Charadrius melodus*), Gopher tortoise (*Gopherus polyphemus*), Least Tern (*Sterna antillarum*), Bald eagle (*Haliaeetus leucocephalus*), Louisiana quillwort (*Isoetes louisianensis*), Black pine snake (*Pituophis melanoleucus lodingi*), Flatwoods salamander (*Ambystoma cingulatum*), and the Eastern indigo snake (*Drymarchon corais couperi*). Their presence is possible but not likely due to their specific habitat requirements, which the project area does not contain.

The Corps, Mobile District, does not anticipate sperm, blue, fin, humpback, or sei whales would be adversely affected by the varying dredging methods (i.e. hydraulic, hopper, and/or mechanical) described by the proposed action along the entire proposed action area. The possibility of collision with the dredge is remote since these are deepwater species and the likelihood for collision would be enhanced by the highly mobile nature of these species. Given their likely absence, feeding habits, and very low likelihood of interaction, the Corps, Mobile District, does not anticipate the proposed actions identified in this EA will affect these species. As such, sperm, blue, fin, humpback, and sei whales are not considered further in this assessment.

The piping plover and least tern occur along the Gulf coast and also may occur on Sand Island or other nearby land forms. Since this project is located over water and away from any land forms, it is highly unlikely that these birds would be disrupted by the continued maintenance dredging and placement activities will have no impact on them. Due to high bird nesting use, material to be placed in Gaillard Island would only occur in accordance with the *Migratory Bird Treaty Act* and any associated regulatory agency agreements

The Corps, Mobile District has determined that the proposed action may affect but is not likely to adversely affect the species discussed above.

(7) Other wildlife. No significant effects.

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

#### **f. Proposed Disposal Site Determination.**

(1) Mixing zone determinations. The Alabama Department of Environmental Management (ADEM) delineates mixing zones on a case-by-case basis. Any requirements placed on the project would be followed to the maximum extent practicable.

(2) Determination of compliance with applicable water quality standards. Preliminary finding show that action would be in compliance to the maximum extent practicable, with all applicable water quality standards.

(3) Potential effects on human use characteristics.

- (a) Municipal and private water supply. No effects.
- (b) Recreational and commercial fisheries. No effects.
- (c) Water-related recreation. No effects.
- (d) Esthetics. No significant effects.

(e) Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves. Not applicable.

**g. Determination of Cumulative Effects on the Aquatic Ecosystem.** No significant cumulative effects on the aquatic ecosystem would occur as a result of the proposed action.

**h. Determination of Secondary Effects on the Aquatic Ecosystem.** No significant effects.

### **III. FINDING OF COMPLIANCE.**

**a. Adaptation of Section 404(b)(1) Guidelines.** No significant adaptations to the guidelines were made relative to this evaluation.

**b. Alternatives.** The proposed action discussed in this EA and Section 404(b)(1) only encompasses the recertification of an ongoing maintenance project. Therefore, only 'Action' and 'No Action' alternatives have been evaluated in this assessment. It is believed that greater negative economic and environmental impacts will result from not re-issuing certification of continual maintenance dredging and disposal activities. Other Alternatives for dredging and disposal were evaluated in the 1980 EIS for Mobile Harbor Channel Improvements.

**c. Compliance with State Water quality Standards.** A Clean Water Act (CWA), Section 401 Water Quality Certification is required for the proposed action. Certification will be coordinated with ADEM for the proposed action.

**d. Compliance with Applicable Toxic Effluent Standard or Prohibition under Section 307 of the Clean Water Act.** The action is consistent with the Alabama Coastal Program to the maximum extent practicable. Recertification of the existing project will be coordinated through and approved by the State of Alabama.

**e. Compliance with Endangered Species Act.** The proposed activity is not expected to harm federally-protected species. No critical habitats of any federally-protected species exist within the project area. Regarding potential impacts to federally-protected species, coordination with the appropriate Federal agencies will be initiated through a Public Notice and completed. Sufficient safeguards exist to protect federally-protected species which may enter into the project area.

**f. Compliance with Specific Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act.** The proposed activity would not result in any significant adverse effects on human health or welfare, including municipal or private water supplies, recreation and commercial fishing, plankton, fish, shellfish, and wildlife. The life stages of aquatic life and other wildlife would not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, esthetic, and economic values would not occur. No wetlands would be impacted by the proposed action.

**g. Evaluation of Extent of Degradation of the Waters of the United States.** The proposed fill plan is

specified as complying with the requirements of these guidelines.

**h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem.** The proposed fill plan is specified as complying with the requirements of these guidelines.

**i. On the Basis of the Guidelines, the proposed Disposal Site for the Discharge of Dredged Material.** Specified as complying with the requirements of these guidelines.

**DATE:** \_\_\_\_\_

\_\_\_\_\_  
**Jon J. Chytka**  
**Colonel, Corps of Engineers**  
**District Commander**

