# DRAFT
# ENVIRONMENTAL IMPACT STATEMENT

# DESIGNATION OF THE ATCHAFALAYA RIVER BAR CHANNEL OCEAN DREDGED MATERIAL DISPOSAL SITE PURSUANT TO SECTION 102(c) OF THE MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT OF 1972

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## Acronyms and Abbreviations

°C degrees Celsius

°F degrees Fahrenheit

µg/kg micrograms per kilogram

ARBC Atchafalaya River Bar Channel

BEA Bureau of Economic Analysis

BOD biochemical oxygen demand

BU Beneficial Use

CEQ Council on Environmental Quality

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

CFR *Code of Federal Regulations*

cm centimeter

COD chemical oxygen demand

CWA Clean Water Act of 1977

CZMA Coastal Zone Management Act

CZMP Coastal Zone Management Plan

DMRP Dredged Material Research Program

EFH Essential Fish Habitat

EIS Environmental Impact Statement

ER Engineering Regulation

ERDC Engineering Research and Development Center

ERL Effect Range – Low

ERLN Environmental Response Laboratory Network

ETS Environmental Tracing Systems Limited

FMP Gulf of Mexico Fishery Management Plan

FONSI Finding of No Significant Impacts

FR *Federal Register*

ft feet/foot

FWPCA Federal Water Pollution Control Act

GIWW Gulf Intracoastal Waterway

HTRW hazardous, toxic, or radioactive waste

km kilometer

$km^2$ square kilometers

Louisiana Department of Environmental Quality LDEQ

Louisiana Department of Natural Resources LDNR

m meter

mcy million cubic yards

mg/kg milligrams per kilogram

mg/L milligrams per liter

MLG Mean Low Gulf

MPRSA Marine Protection, Research, and Sanctuaries Act of 1972

MVN New Orleans District (USACE)

NEPA National Environmental Policy Act

NMFS National Marine Fisheries Service

NOAA National Oceanic and Atmospheric Administration

O&M Operations and Maintenance

ODMDS Ocean Dredged Material Disposal Site

ODR Ocean Dumping Regulations

PAH polynuclear aromatic hydrocarbons

PCB polychlorinated biphenyls

ppt parts per thousand

RIA Regional Implementation Agreement

sec second

SMMP Site Management and Monitoring Plan

TKN total kjeldahl nitrogen

TOC total organic carbons

TPH total petroleum hydrocarbons

TSS total suspended solids

USACE U.S. Army Corps of Engineers

USCG U.S. Coast Guard

USDOE U.S. Department of Energy

EPA U.S. Environmental Protection Agency

USFWS U.S. Fish and Wildlife Service

WQC Water Quality Criteria

WQS Water Quality Standards

ZSF zone of siting feasibility

## Executive Summary

# INTRODUCTION

The Atchafalaya River and the Atchafalaya River Bar Channel (ARBC) (Figure 1-1) provide vessel access to Morgan City, the Gulf Intracoastal Waterway (GIWW), and Bayous Chene, Boeuf, and Black from the Gulf of Mexico. Vessels using the ARBC consist of oilfield supply boats, offshore tugs, fishing boats, and bargetows.

The Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana (Figure 1-1), project was authorized by the Rivers and Harbors Act of 1968 (Public Law 90-483). Historically, the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, navigation channel has been dredged to 7.3 meters (m) (24 feet [ft]) Mean Low Gulf (MLG) which includes 6 m or 20 ft for the authorized channel dimension plus 0.6 m (2 ft) advanced maintenance and 0.6 m (2 ft) of allowable overdepth. Material removed from the ARBC suitable for beneficial use (i.e., between ARBC Stations 475+00 and 650+00) has been placed in one of two adjacent Bird Island disposal sites (Figure 1-2), pursuant to Section 404 of the Clean Water Act (CWA) of 1977. Material that could not be used beneficially (i.e., between ARBC Stations 650+00 and 1340+00) has been placed (prior to 2002) at the existing Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA) Section 102(c) Ocean Dredged Material Disposal Site (ODMDS) on the east side of the channel (Figure 1-2). This ODMDS is referred to as ODMDS-East. Since 2002, however, material not suitable for beneficial use has been placed at a temporary (i.e., 5-year) ODMDS on the west side of the channel under the authority of MPRSA Section 103(b) (the ODMDS-West) (Figure 1-2). In 2007, the U.S. Army Corps of Engineers, New Orleans District (MVN) requested, and received, from the U.S. Environmental Protection Agency, Region 6 (EPA), a 5-year extension for the continued use of the MPRSA Section 103(b) ODMDS-West. The approval for the ODMDS-West use expired in August 2012; therefore, the site can no longer accommodate shoal material dredged from the ARBC unless it is re-designated as a MPRSA Section 102(c) site by EPA.

The ARBC is located in an area of heavy sedimentation. The bed load fraction of the sediment carried by the Atchafalaya River is deposited mainly in Atchafalaya Bay, resulting in delta accretion and progradation. Currently, the presence of fluid mud, or "fluff", in the ARBC has made it very difficult to maintain the authorized 6-m (20-ft) channel through the ARBC. The fluff returns to the channel within weeks after maintenance dredging is complete and interferes with the passage of vessels. Although the MVN has committed to more frequent maintenance dredging in the ARBC to alleviate the fluff problems, recent annual Operations and Maintenance (O&M) budgets for this project have not allowed for more than a single bar channel maintenance dredging contract each year.

The average amount of material dredged from the ARBC for placement in the ODMDS-East and Bird Island-East between 1992 and 2002 was approximately 12.8 million cubic yards (mcy) per fiscal year, of which, approximately 10.9 mcy per fiscal year was placed in the ODMDS-East (Table 1-1). The average amount of material dredged from the ARBC for placement in the ODMDS-West and Bird Island-West (since 2002) is about 12.6 mcy per fiscal year, of which, approximately 10.8 mcy per fiscal year is placed in the ODMDS-West (Table 1-1).

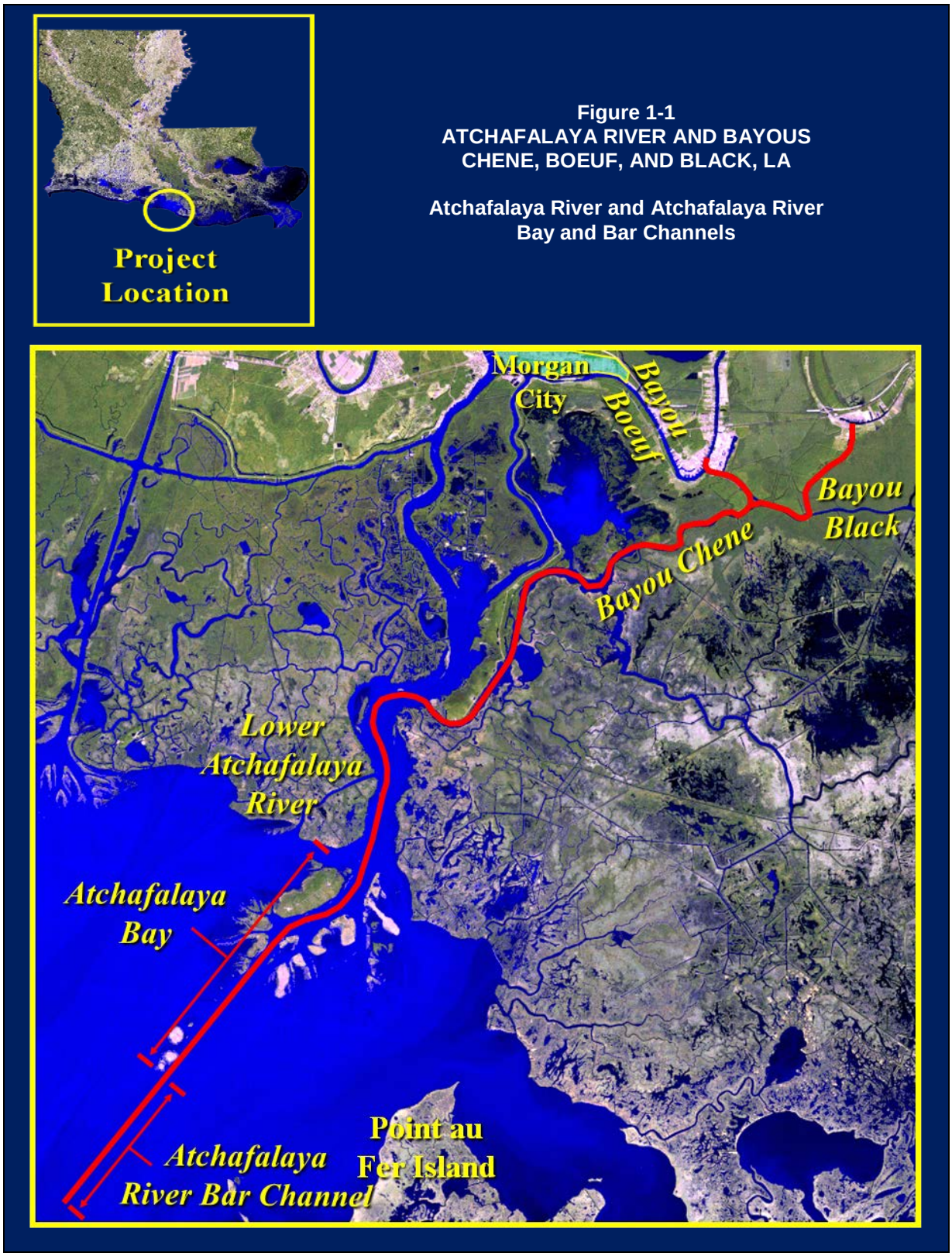


**Figure 1-1.** Atchafalaya River and Atchafalaya River Bar Channel (ARBC) in the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana project.

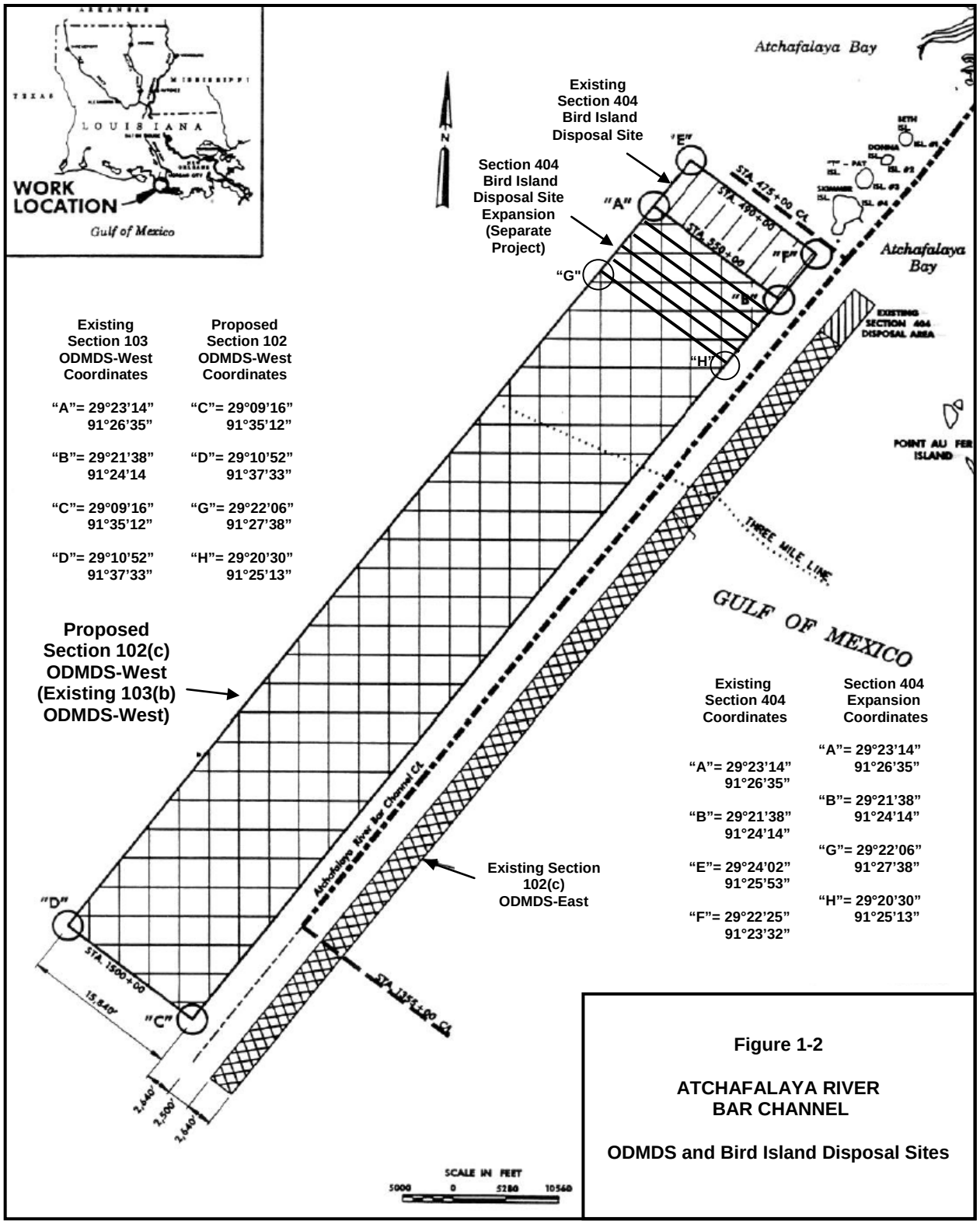


**Figure 1-2.** Proposed Section 102(c) ODMDS-West, located on the west side of the ARBC. Also shown are the Section 404 Bird Island disposal sites and the Section 102(c) ODMDS-East. The proposed Section 102(c) ODMDS-West will be "shorter" than the existing Section 103(b) ODMDS-West to accommodate the recent southwesterly expansion of the Section 404 Bird Island disposal site.

**Table 1-1**. Disposal history of the ODMDS-East, ODMDS-West, Bird Island-East, and Bird Island-West for material dredged from the ARBC from fiscal years 1992 to 2011.

| Fiscal Year Cycle | ODMDS-East | ODMDS-West | Bird Island-East | Bird Island-West | Total CY |
|---|---|---|---|---|---|
| 1992 | 9,630,972 | 0 | 1,000,000 | 0 | 10,630,972 |
| 1993 | 17,990,013 | 0 | 855,644 | 0 | 18,845,657 |
| 1994 | 10,594,042 | 0 | 658,670 | 0 | 11,252,712 |
| 1995 | 9,311,000 | 0 | 0 | 0 | 9,311,000 |
| 1996 | 11,589,416 | 0 | 3,019,163 | 0 | 14,608,579 |
| 1997 | 6,968,673 | 0 | 3,523,632 | 0 | 10,492,305 |
| 1998 | 10,942,132 | 0 | 2,208,674 | 0 | 13,150,806 |
| 1999 | 10,847,337 | 0 | 2,998,674 | 0 | 13,846,011 |
| 2000 | 10,749,971 | 0 | 2,237,039 | 0 | 12,987,010 |
| 2001 | 10,824,858 | 0 | 1,530,624 | 0 | 12,355,482 |
| 2002 | 9,168,753 | 6,797,817 | 1,176,384 | 2,584,433 | 20,664,827 |
| 2003 | 0 | 9,125,381 | 0 | 0 | 9,125,381 |
| 2004 | 0 | 14,820,423 | 0 | 1,918,795 | 16,739,218 |
| 2005 | 0 | 12,917,556 | 0 | 2,170,384 | 15,638,178 |
| 2006 | 0 | 8,168,569 | 0 | 1,360,348 | 9,528,917 |
| 2007 | 0 | 14,837,877 | 0 | 1,187,346 | 16,025,223 |
| 2008 | 0 | 9,545,797 | 0 | 1,791,290 | 11,337,087 |
| 2009 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 11,246,103 | 0 | 2,200,425 | 13,446,528 |
| 2011 | 0 | 9,922,298 | 0 | 1,256,759 | 11,179,057 |
| Total CY | 71,091,140 | 97,381,821 | 19,208,504 | 14,469,780 | 251,164,950 |
| **Average CY** | **10,874,288** | **10,820,202** | **1,920,850** | **1,808,722** | 13,219,207 |

Concern has been expressed that maintenance-dredged material placed on the east side of the ARBC (particularly in the ODMDS-East) is rapidly transported back into the navigation channel by prevailing littoral currents. It is worth noting that the ODMDS-East is currently the only ODMDS located on the east side of a navigation channel along the Texas-Louisiana coast, which is dominated by the Louisiana-Texas Coastal Current which flows westward (downcoast) along the Louisiana coast in fall, winter, and spring. Following the MPRSA Section 103(b) designation of the ODMDS-West in 2002, the U.S. Army Corps of Engineers, Engineering Research and Development Center, performed monitoring studies to determine whether placing maintenance-dredged material on the west side of the channel was more effective at reducing shoaling in the channel, and thus, reducing the dredging frequency and costs. These studies found that while placing material on the west side of the ARBC did not eliminate shoaling, it did reduce runback of material into the channel and thus the shoaling rate, when compared to placing material on the east side of the channel (Teeter et al. 2003). These findings were corroborated in the report, "Sediment Disposal from the Atchafalaya Bar Channel, Atchafalaya Bay, St. Mary Parish, Louisiana," prepared for MVN in 2007 (PBS&J 2007).

The need for the proposed action (the permanent, MPRSA 102(c) designation of the ODMDS-West) is to reduce the amount and rate of shoal material runback into the ARBC (i.e., reduce the shoaling rate), and thus, decrease the overall annual maintenance dredging effort needed for the ARBC while providing vessels with a longer period of safe navigation access prior to a maintenance dredging event. The purpose is to provide an environmentally acceptable location for the placement of maintenance-dredged material from the ARBC.

There are currently the following authorized disposal areas in Atchafalaya Bay (Figures 1-2):

- *CWA Section 404 Disposal Site named Bird Island-East* – located east of the ARBC on the left descending bank and used annually for beneficial use prior to 2002.
- *CWA Section 404 Disposal Site named Bird Island-West* – located west of the ARBC on the right descending bank and used annually for beneficial use since 2002.
- *MPRSA Section 102(c) designated ODMDS named ODMDS-East* – located east of the ARBC on the left descending bank and used annually for placement prior to 2002.
- *MPRSA Section 103(b) designated ODMDS named ODMDS-West* – located west of the ARBC on the right descending bank, used annually for placement since 2002 (expired as of August 2012).

The existing ODMDS-West is located in Atchafalaya Bay, approximately 19 miles (30.6 kilometers [km]) from the mainland coast and the mouth of the Atchafalaya River (Figure 1-1). The ODMDS-West is rectangular, approximately 3 miles (4.8 km [2.6 nautical miles]) wide by 18 miles (29 km [15.6 nautical miles]) long, and parallel (on the west side or right-descending bank) to the Atchafalaya River bar channel (ARBC) located within the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana project (Figures 1-1 and 1-2). The site encompasses approximately 35,000 acres (140 $km^2$ [54 square miles]) of open water and ranges in depth from 6 to 23 ft (1.8 to 7 m) MLG.

The proposed Section 102(c) ODMDS-West retains the same width (3 miles) as the existing Section 103(b) ODMDS-West, but differs slightly at its upper end, resulting in an area only 16 miles (26 km [14 nautical miles]) long (Figure 1-2). The resulting reduced area of the proposed Section 102(c) ODMDS-West, then, is approximately 31,000 acres (129 $km^2$ [48 square miles]). The reduced area of the proposed Section 102(c) ODMDS-West would accommodate the planned southwesterly expansion of an adjacent Bird Island disposal site that is currently used by USACE for beneficial use of maintenance-dredged material removed from the ARBC, pursuant to Section 404 of the Clean Water Act (CWA) of 1977, and that was recently cleared for expansion by USACE in a separate project (Figure 1-2). The continued progradation and accretion of the Atchafalaya Delta and related increases in the sediment bed load fraction (i.e., accelerated sedimentation) in nearshore portions of Atchafalaya Bay and the ARBC have allowed for additional beneficial use of maintenance-dredged material where practicable, and thus, the opportunity to expand the Section 404 Bird Island site in a southwesterly direction and into the footprint of the Section 103(b) ODMDS-West.

Coordinates of the four corners of the proposed Section 102(c) ODMDS-West are as follows:

Northwest Corner - 29°22′06″ N, 91°27′38″ W
Northeast Corner - 29°20′30″ N, 91°25′13″ W
Southeast Corner - 29°09′16″ N, 91°35′12″ W
Southwest Corner - 29°10′52″ N, 91°37′33″ W

## ALTERNATIVES

Multiple site alternatives have been evaluated for placement of maintenance-dredged material: the No-Action Alternative, non-ocean (beneficial use—marsh creation and beach nourishment) placement alternative sites (BU), a nearshore alternative site, a mid-shelf alternative site, a deepwater alternative site, and the proposed ODMDS-West (Figure 1-3). The No-Action Alternative provides for the placement of maintenance dredged material at the MPRSA Section 103(b) designated ODMDS-West located parallel and to the west of the navigation channel until July 31, 2012. Maintenance dredged material from the ARBC could also be placed into the MPRSA Section102(c) designated ODMDS-East located on the east side of the channel. In the absence of EPA action to permanently designate the ODMDS-West, the existing maintenance operations would continue to place maintenance dredged material into the current MPRSA Section 103(b) designated ODMDS-West until its designation expires on July 31, 2012, after which time maintenance dredged material would be placed in the MPRSA Section 102(c) designated ODMDS-East. As a result of disposal at ODMDS-East, sediment would enter the ARBC at a higher rate due to the net northwest transport of sediments.

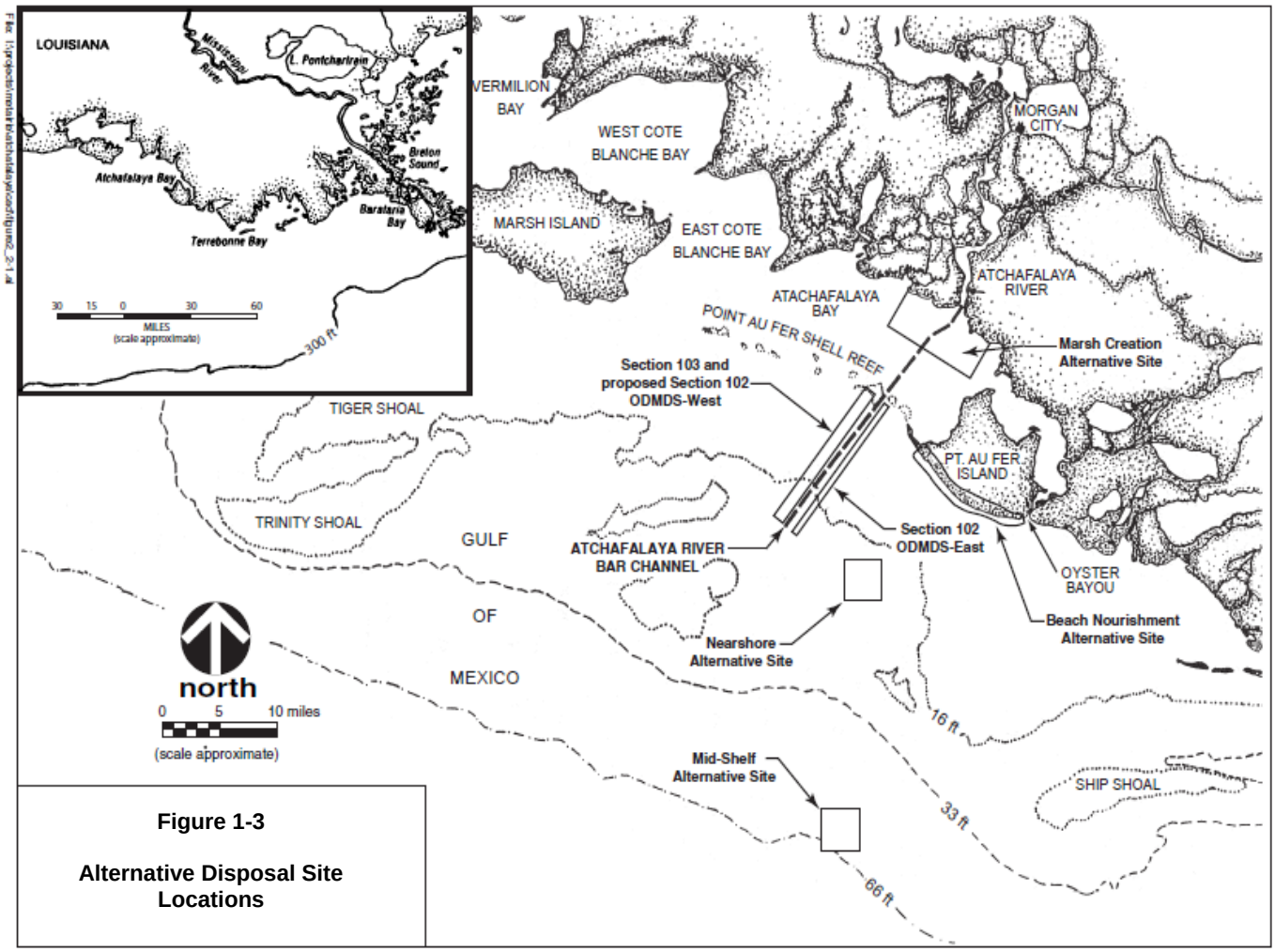


**Figure 1-3.** Alternative disposal site locations for the ARBC. The proposed deepwater alternative site is not shown.

## Alternatives Screening

A screening process was used to identify reasonable action alternatives. In accordance with the Louisiana Coastal Resources Program (LCRP) Guideline 4.2, and Section 307 of the CZMA, BU options for placement of the maintenance-dredged material were considered in addition to placement of material into an ODMDS. Each of these BU options was considered in regards to feasibility, cost, and longevity. Potential ODMDS sites were evaluated through a three-phase screening process. The BU options considered were beach nourishment, marsh creation, single point unconfined island creation, and single point confined island creation.

The shoreline from Oyster Bayou to North Point of Point au Fer Island and the wash over area in the vicinity of Point au Fer have been identified as possible locations for beach nourishment. However, the maintenance material dredged from Station 650+00 and 1340+00 is a loose fluid mud (fluff) that is not considered suitable for beach nourishment. Due to these material constraints, as well as the cost constraints and safety issues associated with the distance to the beach nourishment area, this BU alternative was removed from further consideration.

Marsh creation was considered in the vicinity of the prograding Atchafalaya Delta. However, the distance to the placement area, the nature of the material and the system into which it would be placed, and the cost associated with the proposed effort make this BU alternative unfeasible.

Unconfined open-water placement using single point discharge approximately every 2 miles along the entire length of the ARBC to create/establish islands for use by colonial nesting birds was also considered. However, the maintenance material removed from the majority of the channel consists of fluff, which is not suitable for creation of islands. Therefore, this BU alternative was removed from further consideration.

Several options for confined placement to create/establish islands in the area of the existing ODMDS-East or proposed ODMDS-West were also considered. Confinement of the material would eventually allow some of the material to settle out. However, an accurate estimate of how much material and the time required for eventual mounding to occur is unknown. Additionally, in the high-energy environment of the Gulf, it is possible that containment dikes could breach. Because of the uncertainty associated with the feasibility of this alternative, as well as the potential for increased operational costs, this BU alternative was also eliminated from further consideration.

Following elimination of potential BU alternatives, a three-phase screening process was initiated. Phase I of the process initiated review of ocean placement alternatives to identify those most appropriate for additional evaluation. This phase included definition of a zone of siting feasibility (ZSF), characterization of expected material and site sizing, and establishment of buffer zones for critical areas and resources. Phase II of the screening process addresses more site specific issues based on consideration of the 11 specific factors prescribed in 40 CFR Part 228.6. Phase II is the final determination of the environmental suitability of each candidate site in accordance with the five general criteria for site selection (40 CFR Part 228.5).

## *Phase I Screening*

Three types of ocean placement, nearshore, mid-shelf, and deepwater, were considered in Phase I of the screening process. Two nearshore sites were considered. The first was a new site, referred to as "Nearshore Alternative Site 1" and the existing ODMDS-West (Figure 1-3). One mid-shelf and one deepwater site were also considered (Figure 1-3). To avoid conflict with these and other permitted uses in the area, it was determined that an alternative nearshore ODMDS could be located approximately 9.2 miles south and 2.3 miles east of the center of the ODMDS-East. If similar placement techniques to those used at ODMDS-East are applied at the Nearshore Alternative Site 1, the environmental effects of the maintenance dredged material would probably be quite similar to those at the ODMDS-East. Surveillance and monitoring conditions for the Nearshore Alternative Site 1 would also be similar to those at the ODMDS-East. Therefore, selection of the alternative nearshore site would subject a new area of the ocean to the effects of maintenance dredged material placement while offering little environmental advantage over the proposed site. The nearshore alternative site ODMDS-West is located to the west of the ARBC and approximately parallel to the existing ODMDS-East. This site is similar to the existing ODMDS-East in both physical and biological characteristics and similar impacts would be expected to those experienced at the ODMDS-East when placement occurred at that site. Thus, the impacts at this site would be the same as the current impacts at the ODMDS-West under the MPRSA Section 103(b) authority.

The mid-shelf area off the coastal Louisiana is a biologically productive area with oil and gas lease tracts and pipelines located throughout the region. Depths in the area of the alternate mid-shelf site are approximately 60 ft and the site would be approximately 32 miles from shore. The mid-shelf area is less dynamic than the nearshore area near the ODMDS-East and West and is subjected to a slower rate of erosion and transport. For these reasons, the maintenance dredged material that sloughs outside the immediate placement footprint could be thicker than that deposited at the ODMDS-East or West. Additionally, the material would be transported by barge or hopper dredge to the placement site and the material, composed mostly of silt and clay, would undergo a certain amount of compaction and dewatering en route to the site and could be cohesive enough to settle to the bottom in discrete masses, creating a mound on top of the natural sediment at the site. Because of the increased distance, cost and time to transport the material and to monitor onsite conditions would be increased.

The deepwater region is the area seaward of the edge of the continental shelf at approximately the 360-ft contour, 84 miles from the ARBC. Dredged material placed at a deepwater site should be dispersed over a much larger area than at a mid-shelf or nearshore site because of the breakup of the descending plume and once sediments reach the bottom, they tend to remain in place and are subject to slow erosion and transport. The increased travel distance to a deepwater site would increase the costs and surveillance and monitoring would be possible, but difficult and costly.

## *Zone of Siting Feasibility*

The constraints on a site relative to the ZSF are those related more to its feasibility from a utilitarian as opposed to a regulatory perspective, although there is some overlap. Primary

among the geographical and physical constraints are those which would restrict the safe and economical use of the site, such as distance from the dredging area, dangerous structures or currents, interference with or from other vessels, political boundaries, and logistic constraints on monitoring and surveillance. Cost and safety issues involved in the transportation of dredged material were the limiting factors in determining the ZSF boundaries. Especially, a mid-shelf site and a site beyond the continental shelf would not be feasible because of dredging costs, safety, and limits on monitoring and surveillance.

Based primarily on the efficiency of the dredging operation in terms of time, cost, and safety and the general uniformity of the area near the ARBC, the ZSF for the proposed ODMDS is an area approximately 29 km (18 miles) long and 8 km (5 miles) wide adjacent to both sides of the ARBC (Figure 1-4). The ZSF thus encompasses an area of roughly 233 $km^2$ (90 square miles).

### *Characterization of Material and Site Sizing*

Only material dredged from the navigation channel to maintain the authorized channel depth would be placed at the proposed ODMDS-West. The maintenance-dredged material is generally comprised of silt with some sand and clay (7-12 percent sand, 81-88 percent silt, and 6-7 percent clay) (PBS&J 2008). Although metals, ammonia, and organic carbons were detected in sediment samples collected from the ARBC and reference sites for the 1996, 2002, and 2008 contaminant assessments, there is nothing in the chemical analyses, suspended particulate phase bioassays, solid phase bioassays, or bioaccumulation studies for those assessments that would indicate a concern (Espey, Huston & Associates, Inc. 1997; PBS&J 2002 and 2008). Based on the guidance provided by the Regional Implementation Agreement (RIA) among the EPA and the USACE, Galveston and New Orleans Districts (EPA/USACE 2003), the conclusion of this testing is that no significant adverse impacts are anticipated with the ocean placement of these sediments, and that the Limiting Permissible Concentration (40 CFR 227.29(a)) for the water column and solid phase, including bioaccumulation, are met.

Elutriate and water samples were also collected from locations in the ARBC, and from the reference area located southeast of the channel in 1996, 2002, and 2008. Antimony, arsenic, cadmium, copper, nickel, selenium, and zinc were detected in elutriates from the ARBC sample locations and from the reference area (Espey, Huston & Associates, Inc. 1997; PBS&J 2002 and 2008). None of the metals concentrations in the water samples was at or above the acute or chronic Water Quality Standards or Water Quality Criteria.

Surface sediments in the ODMDS-West are predominately silt and clay (IEC 1983; Dettman and Tracey 1990; Flemer et al. 1994; Trulli 1996; PBS&J 2002 and 2008). The size of the proposed ODMDS-West was determined based upon the need to maximize the discharge distance away from the ARBC to minimize the run back into the channel and to allow for adjacent pumping of the dredged material from within the reaches of the ARBC. As a result, the dimensions of the proposed ODMDS-West were determined to be 29 km (18.0 miles) long (length of the ARBC) and 5 km (3.0 miles) wide (typically the pumping distance at which a hydraulic pipeline cutterhead suction dredge may no longer be cost effective without a booster pump, depending on the size of the dredge), which are within the ZSF boundaries described above. The site lends itself to surveillance of individual dredged material placement operations and monitoring.

Additionally, the orientation of the proposed ODMDS-West broadside to the prevailing currents in the area increases the chance that placed material will disperse away from the ARBC.

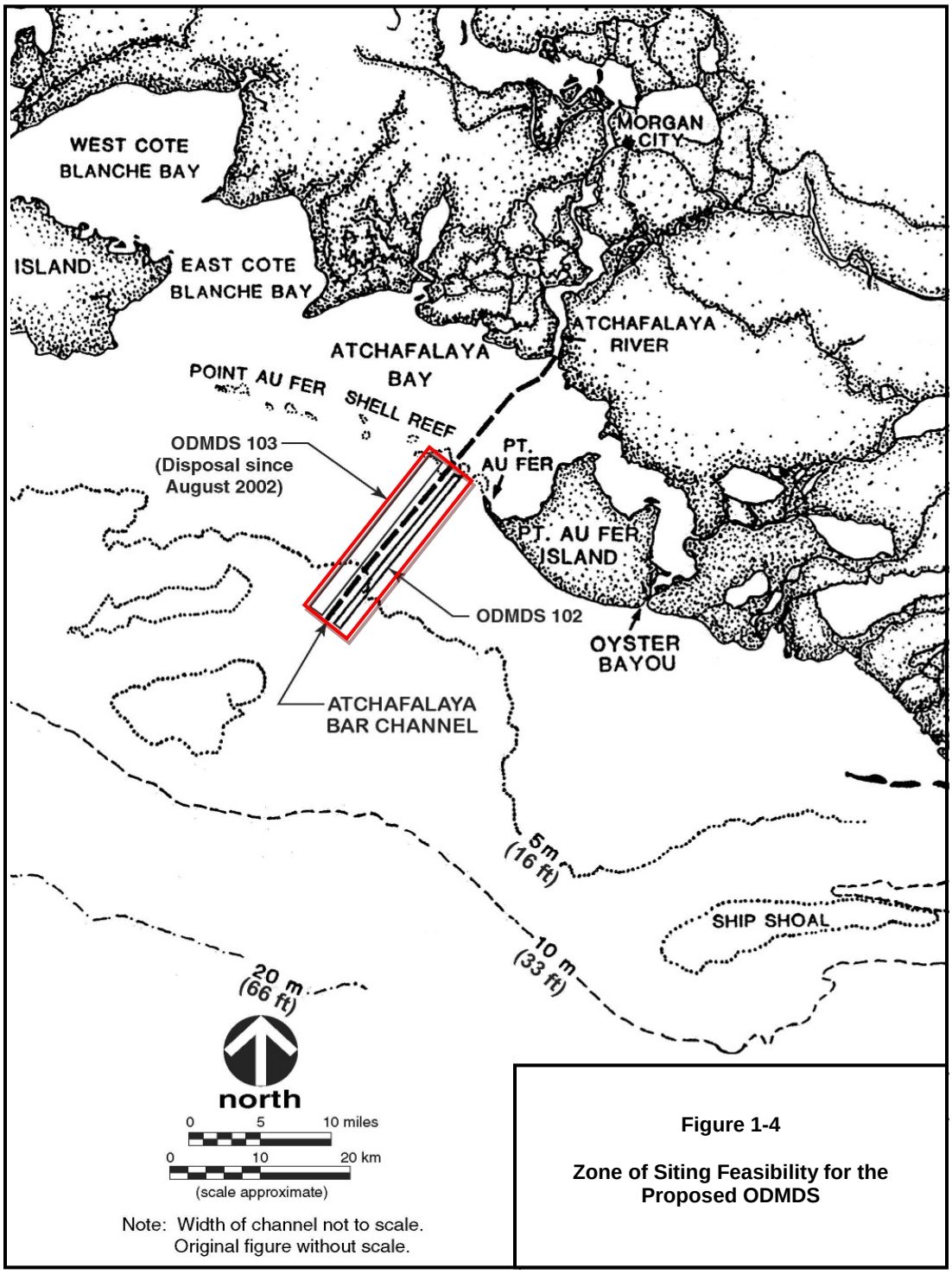


**Figure 1-4.** Zone of Siting Feasibility (ZSF) in relation to the ODMDSs and the ARBC. Note the ZSF, outlined in red, encompasses an area on both sides of the ARBC.

### *Establishment of Buffer Zones*

Pre and post-maintenance dredging bathymetric surveys conducted annually by MVN show no accumulation of material in either the existing ODMDS-East or ODMDS-West (Creef, MVN-OD, personal communication, 2012). These data indicate material dispersion at the placement sites. No marine sanctuaries occur within 46 km of the ARBC. The nearest point of land is North Point au Fer Island and it is approximately 3.7 km (2 miles) from the existing and proposed ODMDS. There are no beaches in the area of the proposed ODMDS-West. The candidate ODMDSs are located outside of the Navigation Channel and open-water approaches to the ARBC, therefore interference with navigation is not expected. Based on this, there are no buffer zones established.

## ***Evaluation of Eleven Specific Criteria – Phase II Screening***

*Criterion 1 - Geographical position, depth of water, bottom topography, and distance from coast.*

The ODMDS-West and ODMDS-East are located in the nearshore area of the plain. Except for being located adjacent to the dredged channel, the area occupied by the ODMDSs is typical in depth and bottom topography to the continental shelf in the vicinity of the Atchafalaya River Delta.

*Criterion 2 - Location in relation to breeding, spawning, nursery, feeding or passage areas of living resources in adult or juvenile phases.*

The proposed ODMDS-West is located in a region dominated by species that are estuarine-dependent (Darnell et al., 1983; Phillips and James, 1988; Day et al., 1989). Commercially important species likely found in the area include white shrimp, brown shrimp, Gulf menhaden, and sand sea trout. Commercially important shellfish and fish that inhabit the nearby bay environment include oyster, blue crab, black drum, white shrimp, and brown shrimp. The stress and possible mortality of individual organisms encountering adverse conditions during dredging and placement operations in the ODMDS-West would be negligible compared to the passage of the far greater majority of individuals crossing into or out of the estuary and at other locations. Additionally, any impact would also occur at any other ODMDS location near the ARBC.

Placement of material at the proposed ODMDS-West would have negligible effects on endangered and threatened species. Dredging operations might affect sea turtles through incidental take. If hopper dredges are used, there is a possibility of impact to sea turtles, as there would be no matter where the ODMDS is located. Hydraulic cutterhead pipeline dredging operations have not been identified as a source of sea turtle mortality. Hopper dredging will be conducted in accordance with all reasonable and prudent measures and implementing terms and conditions provided to MVN by the National Marine Fisheries Service (NMFS) in its 2007 Biological Opinion (NMFS 2007), and any subsequent Biological Opinion, to avoid sea turtle mortality.

*Criterion 3 - Location in relation to beaches or other amenity areas.*

There are no recreational parks or beaches near the proposed ODMDS-West. It may be possible to observe the placement plume from boats in the vicinity during the active period of maintenance-dredged material placement within the site. The plume is expected to dissipate quickly after completion of the placement operations. Except for the minor effects of these limited observations, there should be no effects to the aesthetics of the area.

*Criterion 4 - Types and quantities of wastes proposed to be disposed of and proposed methods of release, including methods of packaging the waste, if any.*

The material dredged from the ARBC is generally comprised of silt with some sand and clay (7-12 percent sand, 81-88 percent silt, and 6-7 percent clay) (PBS&J 2008). Based on dredging records since 2002, the volume of maintenance-dredged material removed from the ARBC for placement in the ODMDS-West is approximately 10.8 mcy per fiscal year dredging cycle. Material is removed from the ARBC using a hydraulic cutterhead pipeline dredge and released within the ODMDS-West as uncohesive slurry. Any material disposed of at the site would be required to comply with the criteria of the Ocean Dumping Regulations (40 CFR Parts 220 to 229). None of the material will be packaged in any way.

*Criterion 5 - Feasibility of surveillance and monitoring.*

The proposed ODMDS-West is in relatively shallow water and is close to shore, which facilitates surveillance and monitoring of the site. A site management plan incorporating monitoring requirements has been developed jointly by EPA and MVN for the proposed ODMDS-West and is included in Appendix A of this Draft Environmental Impact Statement.

*Criterion 6 - Dispersal, horizontal transport, and vertical mixing characteristics of the area, including prevailing current velocity, if any.*

Current patterns in the vicinity of the proposed ODMDS-West are highly complex. Although tides, Loop current intrusions, and river flow may affect the local currents, these currents are influenced predominately by winds (Phillips and James 1988). Thus, the direction and velocity of the currents vary throughout the year. Net water flow in the winter is to the northwest; however, rapid flow reversals to the southeast occur periodically in concert with wind direction (Crout and Hamiter 1981; Phillips and James 1988; Walker and Hammack 2000). The near shore current patterns are somewhat more complex in summer. Net flow in summer can be either to the east or west (Crout and Hamiter 1981; Phillips and James 1988; Walker and Hammack 2000). Spinoff eddies from the Loop current occasionally enter the region, producing flows to the southeast near the ARBC (Weissberg et al. 1980a, 1980b). Current speeds generally range from 10 to 30 centimeters per second in the vicinity of the ODMDS-West. Stagnant periods with little or no current motion, lasting as long as 6 days, have been recorded in April, May, and July (Weissberg et al. 1980a, 1980b).

In the absence of strong currents, the bulk of the maintenance-dredged material settles on the bottom of the particular area of a site being used at that time. A portion of the plume (fines) will

be transported in the direction of the current over a wider area of the disposal site and, to some extent, outside the disposal site. This material will eventually settle over a wide area.

The maintenance-dredged material is proportionally very small compared to the sediment load delivered by the discharge of the Atchafalaya River to the area. During disposal operations, a temporary mound of maintenance-dredged material may be initially formed within the ODMDS-West. However, flow of the non-cohesive slurry and re-suspension of the maintenance-dredged material results in the disappearance of the mound through dispersal and horizontal transport. Based on analysis performed by Teeter et al. (2003), placement in ODMDS-West reduced runback to the channel; within approximately 10 weeks, the difference was made up through lateral inflow. The annual potential lateral source is estimated at approximately 30 mcy, which is a reasonable rate, given the parameters identified during the study.

*Criterion 7 - Existence and effects of current and previous discharges and dumping in the area (including cumulative effects).*

The area proposed for selection (the ODMDS-West) has been used for the disposal of maintenance-dredged material since 2002. Historical data collected from MVN bathymetric surveys conducted prior to and after disposal operations indicate there is no persistent mounding and the maintenance-dredged material is relatively quickly dispersed (Creef, MVN-OD, personal communication, 2012). No measurable effects from previous disposals have been noticed.

*Criterion 8 - Interference with shipping, fishing, recreation, mineral extraction, desalination, fish and shellfish culture, areas of special scientific importance and other legitimate uses of the ocean.*

The proposed ODMDS-West is outside the navigation channel and therefore does not interfere with shipping. Smaller recreational and commercial fishing vessels will pass over the ODMDS-West. All dredging and placement operations are closely coordinated with the U.S. Coast Guard (USCG) with issuance of a Notice to Mariners to dredging operators and the shipping interests to avoid interference with traffic. Recreational fishing and boating takes place throughout the area of the ODMDS-West, specifically at Ship Shoal, Trinity and Tiger Shoals, and smaller fishing shoals and Point au Fer Reef. There may be some short-term interference with recreational activities at the ODMDS-West, particularly during disposal operations. This interference would be short-term and restricted to the relatively small area of the ODMDS-West being used for dredged material placement at any particular time.

There are numerous active oil and gas platform located in the west and south end the ODMDS-West and other platforms are located adjacent to the east, south, and west of the site. Additionally, several large natural gas pipelines cross the ODMDS-West. Because of the dispersive nature of the site, past experience with dredged material placement has not indicated interference with oil and gas exploration or production.

No desalination or artificial finfish or shellfish culture facilities are located within the site. Fish and shellfish that naturally occur within the site may be affected by placement of dredge material at the site, particularly bottom-dwelling organisms that may be trapped and smothered. There

are no Public Oyster Areas within the ODMDS-West, and the nearest oyster leases are approximately 4 miles east of the ARBC and ODMDSs, near Point au Fer (LDNR 2012). Effects of placement operations on oyster lease areas near Point au Fer would be minimal and consistent with natural conditions.

Two areas designated as wildlife management areas or wildlife refuges and that are used for recreational use are located in the project area. The 140,000-acre Atchafalaya Delta Wildlife Management Area (WMA), managed by the Louisiana Department of Wildlife and Fisheries, (LDWF) encompasses the developing delta in Atchafalaya Bay. The Atchafalaya Delta WMA is located immediately adjacent to the upper end of the existing Section 103(b) ODMDS-West. The Shell Keys National Wildlife Refuge and Russell Sage - Marsh Island State Wildlife Refuge is located approximately 29 miles (47 km) west of the ODMDS-West. The transport of suspended materials from the ODMDS-West would mainly be parallel to the coastline, and concentrations of suspended materials produced during dredging operations are expected to be within background levels within a few miles or so of the ODMDS-West (May 1973). Suspended materials originating from the ODMDS-West may drift into adjacent portions of the Atchafalaya Delta WMA; however, the effects of these suspended materials would likely be indiscernible from ambient conditions in these areas. There have been no significant impacts to these areas from use of the interim-designated ODMDS-West, and no impacts are expected from its continued use.

Various universities and state and Federal agencies have studied the biological, geomorphological, and hydrological development of the Atchafalaya Delta. Placement of dredged material into the ODMDS-West is not expected to interfere with any such studies.

*Criterion 9 - Existing water quality and ecology of the site as determined by available data or by trend assessment or baseline surveys.*

The water quality and ecology of the ODMDS-West generally reflect that of the nearshore region off the Louisiana coast affected by discharges from the Atchafalaya River. The variations in water quality depend on the amount and mixing of freshwater runoff that is highly variable (Phillips and James 1988). Data collected during the IEC (1983) surveys and the EPA-Environmental Response Laboratory Network (Dettmann and Tracey 1990) survey are generally comparable to historic data (Phillips and James 1988). Similarly, water quality and sediment contaminant data from the 2008, 2002, and 1996 contaminant assessments all indicated no water quality impacts related to the placement of dredged material.

The nearshore macrofaunal assemblages near the ODMDS-West are typical of estuarine areas, with communities dominated by polychaete worms, small molluscs, and macrocrustaceans (Parker et al. 1980; Weissberg et al. 1980a, 1980b). Central Louisiana Gulf coastal waters are inhabited by numerous species of finfish and shellfish that can be characterized as estuary-related or demersal shelf inhabitants. Recreational fishing is popular in the vicinity of the ODMDS-West including fishing, crabbing, and shrimping.

*Criterion 10 - Potentiality for the development or recruitment of nuisance species in the disposal site.*

Past placement of maintenance-dredged material at the existing ODMDS-East and ODMDS-West has not resulted in the development or recruitment of nuisance species. Therefore, placement of maintenance-dredged material at the proposed ODMDS-West is not expected to result in development or recruitment of nuisance species.

*Criterion 11 - Existence of or in close proximity to the site of significant natural or cultural features of historical importance.*

The USACE Submerged Cultural Resource Database contains historical accounts that indicate historical use of the Atchafalaya Basin. In 1996, a remote sensing survey was on the ODMDS-East. This study found that while several anomaly clusters existed, which may represent shipwrecks, the geomorphologic and bathymetric data indicates that between 5 and 6 m (17 and 21 ft) of sedimentation had occurred in the area between 1839 and 1996. Thus, it was concluded that the placement of maintenance-dredged materials in the proposed ODMDS-West would not add appreciably to the impact already induced by progradation of the Atchafalaya Delta during the last century. The results of the 1996 remote sensing study can be applied to the present study given its proximity to the previously designated ODMDS-East.

## *Evaluation of Five General Criteria — Phase III Screening*

*Criterion 1*

The dumping of materials into the ocean will be permitted only at sites or in areas selected to minimize the interference of disposal activities with other activities in the marine environment, particularly avoiding areas of existing fisheries or shellfisheries, and regions of heavy commercial or recreational navigation. The ODMDS-West is located adjacent to and parallel to the ARBC, which reduces the distance that the maintenance-dredged material must be transported, minimizing interference with other activities in the marine environment. There have been no impacts to existing oyster leases located northeast of the ODMDS area near Point au Fer from the use of the existing ODMDS-East, or ODMDS-West (which has been used since 2002), and no impact is expected to occur in the future as a result of using the proposed ODMDS-West.

*Criterion 2*

Locations and boundaries of disposal sites will be so chosen that temporary perturbations in water quality or other environmental conditions during initial mixing caused by disposal operations anywhere within the site can be expected to be reduced to normal ambient seawater levels or to undetectable contaminant concentrations or effects before reaching any beach, shoreline, marine sanctuary, or known geographically limited fishery or shellfishery. Placement of maintenance-dredged material will produce a turbidity plume. This plume will disperse to the point where it would be indistinguishable from the turbidity naturally occurring in the area. There are no marine sanctuaries in the immediate vicinity of the proposed ODMDS-West (USFWS 1981). The transport of suspended materials from the ODMDS would mainly be

parallel to the coastline, and concentrations of suspended materials produced during dredging operations are expected to be within background levels within a few miles or so of the ODMDS-West (May 1973). There are no Public Oyster Areas within the ODMDS-East or ODMDS-West, and the nearest oyster leases are approximately 4 miles east of the ARBC and ODMDSs, near Point au Fer (LDNR 2012). The potential impact on oyster beds in nearby Atchafalaya Bay is expected to be minimal.

*Criterion 3*

If, at any time during or after disposal site evaluation studies, it is determined that existing disposal sites presently approved on an interim basis for ocean dumping do not meet the criteria for site selection set forth in 228.5–228.6, the use of such sites will be terminated as soon as suitable alternative disposal sites can be designated. This criterion does not apply to the proposed ODMDS-West since it is not an existing site approved on an interim basis. However, studies to date indicate that the proposed ODMDS-West meets the requirements of the MPRSA.

*Criterion 4*

The sizes of ocean disposal sites will be limited in order to localize for identification and control any immediate adverse impacts and to permit the implementation of effective monitoring and surveillance programs to prevent adverse long-range impacts. The size, configuration, and location of any disposal site will be determined as a part of the disposal site evaluation or designation study. The size of the ODMDS-West has been identified to cover an area as small as possible to reasonably meet the criteria stated at 40 CFR 228.6(a) for the ARBC project and for efficient placement of material dredged from the ARBC. The size and location of the proposed ODMDS-West also minimizes the return of dredged material from the ODMDS to the channel. The site lends itself to surveillance of individual dredged material placement operations and long-term monitoring. The configuration of the ODMDS-West limits its overall area to a dimension of 26.0 km by 4.8 km (16.0 miles long by 3.0 miles) wide.

*Criterion 5*

The EPA will, wherever feasible, designate ocean dumping sites beyond the edge of the continental shelf and other such sites that have been historically used. In this area of the Gulf of Mexico, an ODMDS beyond the continental shelf would be at least 135 km (84 miles) from the area to be dredged. A dredged material placement site beyond the continental shelf would not be feasible due to, among other things, increased safety risks, increased cost of dredged material transportation, and increased costs for site characterization, monitoring, and surveillance studies.

## *Preferred Alternative*

Based on the studies and analysis, the preferred alternative is the MPRSA Section 102(c) designation of the ODMDS-West for continued placement of maintenance-dredged material. The majority of the proposed ODMDS-West has been used for the placement of maintenance-dredged material since 2002. Continued use of the site would subject the area within the site boundaries to the same environmental effects that have existed since 2002. The proposed ODMDS-West site is located in a dynamic environment characterized by high variability in

physical factors. Correspondingly, the organisms that occur there are adapted to natural stresses and are able to recover more rapidly than those organisms adapted to more stable conditions.

No adverse environmental effects due to maintenance-dredged material placement were detected outside the ODMDS-East boundaries during the IEC (1983) surveys; nor were they indicated by the evaluation. Adverse environmental effects outside the boundaries of the proposed ODMDS-West were not detected during prior use of this site and therefore are not expected to result from continued use of the site.

# 1.0 INTRODUCTION

Construction and maintenance of the 54-mile-long Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, navigation channel was authorized by the Rivers and Harbors Act of 1968, House Document 155, 90th Congress, 1st Session. Its authorized dimensions are a depth of 20 ft relative to Mean Low Gulf by 400-ft bottom width. The primary purpose of the channel is to provide vessel access to Morgan City, Louisiana, from the Gulf of Mexico.

Material in the ARBC is removed with a hydraulic cutterhead dredge and the slurry is discharged through a floating pipeline into a dispersive site. Dredging records indicate that between 1957 and 1973 dredged material was placed into open water on either side of the navigation channel (EPA 1998). Between 1974 and 2002 dredged material was placed into an ODMDS parallel to and east of the bar channel (the ODMDS-East). In 2002, the USACE, under the authority of Section 103(b) of MPRSA, began placing dredged material in a temporary ODMDS on the west side of the ARBC, hereafter referred to as the ODMDS-West (Figure 2). Following this designation, USACE, Engineering Research and Development Center (ERDC) performed monitoring studies to determine whether placing maintenance-dredged material on the west side of the channel was more effective at reducing shoaling in the channel and thus reducing the dredging frequency and costs. This study, "Final Report, Factors Affecting Fluff and Fluid Mud Accumulation in the Atchafalaya Bar Channel," by Teeter et al. (2003), found that while placing material on the west side of the channel did not eliminate shoaling, it did reduce runback of material into the channel and thus the shoaling rate—by as much as 10 weeks—when compared to placing material on the east side of the channel. These findings were corroborated in the report, "Sediment Disposal from the Atchafalaya Bar Channel, Atchafalaya Bay, St. Mary Parish, Louisiana," prepared for MVN in 2007 (PBS&J 2007). Final recommendations in the Teeter et al. study were to place the material in the westernmost portion of the ODMDS-West, since net sediment drift was to the northwest and this would reduce runback, the shoaling rate, and the required dredging frequency (Teeter et al. 2003).

This document has been prepared to identify an ODMDS for permanent designation pursuant to Section 102(c) of the MPRSA of 1972 for maintenance-dredged material removed from the ARBC following the findings of Teeter et al. It has also been prepared to meet the requirements of an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality's (CEQ) regulations (40 *Code of Federal Regulations* [CFR] 1500–1508), as reflected in the USACE Engineering Regulation, ER 200-2-2; the MPRSA (86 Stat. 1052), as amended; the EPA Ocean Dumping Regulations (ODR), 40 CFR 220 to 229; and other applicable Federal environmental legislation and regulations.

The following sections include a discussion of the purpose and need for the proposed action, the authorities for the proposed action, alternatives to the proposed action, significant resources affected by the proposed action, and the potential impacts of the proposed action and alternatives. In addition, selection of an alternative will be based on evaluation of the environmental consequences of site selection and use in accordance with the 5 general (40 CFR 228.5) and 11 specific criteria (40 CFR 228.6(a)), as required by the MPRSA.

## 1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION

Historically, the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, Navigation Channel has been dredged to 7.3 meters (m) (24 ft) MLG (6.1 m [20 ft] with 10.6 m [2 ft] advanced maintenance and 2 ft of allowable overdepth). Material removed from the ARBC that was suitable for beneficial use (BU) has been placed in one of two Bird Islands located adjacent to the ARBC. Material that could not be used beneficially has been placed (i.e., prior to 2002) at the existing MPRSA Section 102 (c) ODMDS on the east side of the channel. This ODMDS is referred to as ODMDS-East. Since 2002, however, material not suitable for BU has been placed at a temporary ODMDS on the west side of the channel under the authority of MPRSA Section 103(b) (the ODMDS-West).

The ARBC is located in an area of heavy sedimentation. The Atchafalaya River is a distributary of the Mississippi River and carries approximately 30 percent of the Mississippi River's water and sediment load (Wells et al. 1981; USACE 2004). The bed load fraction of the sediment is deposited mainly in Atchafalaya Bay, resulting in active delta accretion and progradation (USGS 2011). It is estimated that 7 percent of the total sediment load of the Atchafalaya River is deposited onto the shelf every year (Draut et al. 2005). Sediments that accumulate in the Gulf portion of the ARBC result from a combination of littoral transport and inputs from the Atchafalaya River. Currently, the presence of fluid mud or "fluff" (terms used interchangeably herein) in the ARBC has made it very difficult to maintain the authorized 6.1-m (20-ft) MLG channel through the ARBC. The fluff returns to the channel within weeks after maintenance dredging is complete and interferes with the passage of certain types of vessels. The USACE, New Orleans District (MVN) has committed to more frequent maintenance dredging in the ARBC to alleviate the fluff problems.

The ODMDS-East received final designation in 2000, under 65 FR 31492 (May 18, 2000). Historical use of the ODMDS-East between 1992 and 2002 is shown in Table 1-1. Historically, the ODMDS-East has received dredged material from the ARBC via a cutterhead hydraulic pipeline dredge, discharging directly into the site. The average amount of material placed in the ODMDS-East between 1992 and 2002 was approximately 10.9 mcy per fiscal year.

The ODMDS-West has been used for disposal of dredged materials since 2002 under the authority of MPRSA Section 103 (b). The ODMDS-West has received dredged material from the ARBC via a cutterhead hydraulic pipeline dredge, discharging directly into the western half of the site. The average amount of shoal material placed in the ODMDS-West (since 2002) is about 10.8 mcy per fiscal year which is placed at an average frequency of once every 7.4 months. This frequency and volume is expected to continue into the future. Dredged volumes placed in the ODMDS-West since 2002 are shown in Table 1-1.

The EPA, Region 6 and MVN are proposing selection and permanent designation under MPRSA Section 102(c) of the ODMDS-West in response to concerns that maintenance-dredged material placed on the east side of the channel, and in particular into the existing ODMDS-East, is rapidly transported back into the navigation channel by prevailing littoral currents. The ODMDS-East is currently the only ODMDS on the east side of a navigation channel along the Texas-Louisiana

coast, which is dominated by the Louisiana-Texas Coastal Current which flows mainly westward (downcoast) along the Louisiana coast in fall, winter, and spring.

The need for the proposed action (the permanent, MPRSA Section 102(c) designation of the ODMDS-West) is to reduce the amount and rate of shoal material runback into the ARBC (i.e., reduce the shoaling rate), and thus, decrease the overall annual maintenance dredging effort needed for the ARBC while providing vessels with a longer period of safe navigation access between maintenance dredging events.

## 1.2 DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the permanent designation under Section 102(c) of the MPRSA for the ODMDS-West to receive maintenance-dredged material from the ARBC when ocean disposal is the preferred disposal alternative. The existing ODMDS (i.e., the ODMDS-West) is located in Atchafalaya Bay, approximately 19 miles (30.6 km) from the mainland coast and the mouth of the Atchafalaya River (Figure 1-1). The ODMDS-West is rectangular, approximately 3 miles (4.8 km [2.6 nautical miles]) wide by 18 miles (29 km [15.6 nautical miles]) long, and parallel (on the west side or right-descending bank) to the Atchafalaya River bar channel (ARBC) located within the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana project (Figures 1-1 and 1-2). The site encompasses approximately 35,000 acres (140 $km^2$ [54 square miles]) of open water and ranges in depth from 6 to 23 ft (1.8 to 7 m) MLG. Since 2002, an average of 10.8 mcy of shoal material not suitable for beneficial use has been removed annually (i.e., each fiscal year) from the ARBC and placed at the ODMDS-West at an average frequency of once every 7.4 months under the authority of Section 103(b) of MPRSA.

The proposed Section 102(c) ODMDS-West retains the same width (3 miles) as the existing Section 103(b) ODMDS-West, but differs slightly at its upper end, resulting in an area only 16 miles (26 km [14 nautical miles]) long (Figure 1-2). The resulting reduced area of the proposed Section 102(c) ODMDS-West, then, is approximately 31,000 acres (129 $km^2$ [48 square miles]). The reduced area of the proposed Section 102(c) ODMDS-West would accommodate the planned southwesterly expansion of an adjacent Bird Island disposal site (the Bird Island-West) that is currently used by USACE for beneficial use of maintenance-dredged material removed from the ARBC, pursuant to Section 404 of the Clean Water Act (CWA) of 1977, and that was recently cleared for expansion by USACE in a separate project (Figure 1-2). The continued progradation and accretion of the very dynamic Atchafalaya Delta and related increases in the sediment bed load fraction (i.e., accelerated sedimentation) in nearshore portions of Atchafalaya Bay and the ARBC have allowed for additional beneficial use of maintenance-dredged material where practicable, and thus, the opportunity to expand the Section 404 Bird Island site in a southwesterly direction and into the footprint of the Section 103(b) ODMDS-West. The permanent Section 102(c) designation of the ODMDS-West would not prohibit future consideration of beneficial use alternatives as the physical characteristics of the ARBC change. MVN will continue to explore the possibility of using greater amounts of shoal material from the ARBC beneficially, if and when the bed load composition in the channel becomes more conducive (higher percentage of sand) to marsh and/or island creation as active progradation of the Atchafalaya Delta continues. It is anticipated that additional modifications (e.g., further shortening of the site footprint) to the proposed ODMDS-West may be deemed appropriate to

accommodate future expansion of the Bird Island-West site and/or other beneficial use efforts as greater quantities of suitable (courser-grained) material become available in the area. Any modifications to the ODMDS-West (or ODMDS-East) site in the future would require the preparation of the appropriate environmental compliance and supporting documentation.

Coordinates of the four corners of the proposed Section 102(c) ODMDS-West are as follows: Northwest Corner - 29°22′06″ N, 91°27′38″ W; Northeast Corner - 29°20′30″ N, 91°25′13″ W; Southeast Corner - 29°09′16″ N, 91°35′12″ W; Southwest Corner - 29°10′52″ N, 91°37′33″ W.

Maintenance dredging of the ARBC is required on an approximately annual basis and only maintenance-dredged material from the ARBC navigation channel would be placed into the proposed ODMDS-West. Maintenance-dredged material would be removed using hydraulic cutterhead pipeline dredges and/or hopper dredges. Cutterhead dredges would discharge dredged material into the proposed ODMDS-West as non-cohesive slurry through a floating pipeline. Hopper dredges would excavate material from the navigation channel and transport and place the maintenance-dredged material at the proposed ODMDS-West. The maintenance-dredged material is generally comprised of mainly silt and clay with some sand. Maintenance dredged material would be discharged into the proposed ODMDS-West in a manner that would ensure that direct impacts of the placement would be within the limits of the ODMDS. Approximately 10.8 mcy of future maintenance-dredged material would be placed annually (i.e., each fiscal year) at an average frequency of once every 7.4 months, into the proposed ODMDS-West during maintenance cycles. The proposed ODMDS-West is situated in a high-energy erosional zone and can generally accept large volumes of dredged material with little apparent net change to the bottom. The dredged material discharged into this site will disperse relatively quickly because of the high percentage of fine grain components and because of the location of the site in a high energy, nearshore area where waves, currents, winds, and tides constantly mix and redistribute sediments, and thus, the dredged material, over a wide area. The site is situated within the inlet zone and is adjacent to the channel, providing easy access for dredged material placement operations and reduced costs.

With its permanent, Section 102(c) designation the ODMDS-West would remain the primary disposal options for maintenance-dredged material removed from the ARBC. However, the ODMDS-East would retain its Section 102(c) designation and would remain a secondary disposal option for future dredging efforts in the ARBC on those occasions when disposal to the east side of the channel may be warranted.

It is the responsibility of the EPA and the USACE under MPRSA to manage and monitor each of the ODMDSs designated by the EPA pursuant to Section 102 of MPRSA. Section 102(c)(3) of MPRSA requires development of a Site Management and Monitoring Plan (SMMP) for each ODMDS and review and revision of the SMMP not less frequently than every 10 years. A Draft SMMP for the proposed Section 102(c) ODMDS-West and the existing Section 102(c) ODMDS-East has been developed jointly by EPA and MVN and is included in Appendix A of this Draft EIS. This SMMP is intended to provide management strategies for disposal in the ODMDS-West and ODMDS-East sites as they are utilized for ARBC improvement and maintenance dredging projects. Upon finalization of this SMMP, the SMMP provisions shall be requirements for all dredged material disposal activities at the site.

## 1.3 PRIOR REPORTS AND PROJECTS

The impacts of the initial work in the ARBC were described in the Final EIS titled, "Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana," filed with the Council on Environmental Quality on January 15, 1974. A Supplemental Final EIS on the channel was filed with the EPA on February 4, 1977.

The EPA prepared a Draft EIS (DEIS) on the final designation of the ARBC ODMDS (ODMDS-East), in November 1983. In December 1989, the EPA determined that a Supplemental EIS was necessary to correct information deficiencies and to include more recent data. The EPA prepared a Supplemental DEIS, "Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site Designation," in December 1990, and a Supplemental Final EIS in November 1998.

An Environmental Assessment for the expansion of the ODMDS-East titled, "EA #256: Proposed Expansion and Selection of the Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site," was prepared by MVN and the resulting Finding of No Significant Impacts (FONSI) was signed on February 4, 1997.

An Environmental Assessment for the temporary designation of ODMDS-West titled, "EA #348: Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, Construction of Advanced Maintenance Test Sections and Additional Disposal Areas in Atchafalaya River Bar Channel," was prepared by MVN with a FONSI signed in July 2002. This action designated the ODMDS-West for use under MPRSA Section 103(b). In 2007 this designation was extended for an additional five years to 2012.

The following presents a brief review of additional studies and reports prepared to address fluff-related concerns in the ARBC:

A Draft Final Report for Region 6 Contaminated Sediment Study Phase III, September 1996 was prepared by EPA. The EPA conducted a three-phase study to identify and characterize the contaminants found in or near ODMDSs found within EPA Region 6. The study included a literature search, survey in June/July 1995, and survey in June/July 1996. The Atchafalaya River was included in the 1996 survey.

The Final Report, "Marine Remote Sensing Survey of the Atchafalaya Ocean Dredged Material Disposal Site, Louisiana" was completed in October 1998 by USACE (USACE 1998). This report summarizes the results of a Phase 1 remote sensing submerged cultural resource investigation. The survey found that most anomalies identified resulted from oil and gas industry debris. The report indicated that no further archeological investigations appeared to be warranted.

As a component of the 2002 EA (EA #348), the USACE ERDC presented study findings in a report titled, "Final Report, Factors Affecting Fluff and Fluid Mud Accumulation in the Atchafalaya Bar Channel." The study was performed to investigate the movement of sediment in the ARBC. The study was performed by Teeter et al. (2003) and was released in August 2003.

In an effort to further understand sediment conditions in Atchafalaya Bay, a study was performed by Evans Hamilton Inc. and Environmental Tracing Systems Limited (ETS) on behalf of MVN. The report of this study, titled, "Final Report, Silt Sediment Transport Study to Investigate Fate and Efficiency of Dredging and Characterization of Lateral Dredge Disposal Sites; Tracer Report, Atchafalaya River Bayous Chene, Boeuf, and Black, Atchafalaya Bar Channel, St. Mary Parish, Louisiana," was released in September 2006 (ETS 2006).

In addition to the above reports, numerous scientific reports have been produced regarding the Atchafalaya River, and particularly the ARBC. A report prepared by MVN titled "Evaluation Report, Managing Sediments in the Atchafalaya Bar Channel, Atchafalaya Bay, St. Mary Parish, Louisiana" was completed in June 2007.

## 1.4 AUTHORITY FOR THE PROPOSED ACTION

The authority for designation of ODMDSs is the MPRSA of 1972 (86 Stat. 1052), as amended (33 USCA 1401 et seq.). Title I of the MPRSA, which is the act's primary regulatory section, authorizes the Administrator of the EPA to establish permit programs for ocean disposal of non-dredged materials (Section 102) and the Secretary of the Army acting through the USACE to establish permit programs for ocean disposal of dredged materials (Section 103). Title I also requires the EPA to establish criteria, based on the factors listed in Section 102(a), for the review and evaluation of permits under the EPA and USACE permit programs. Section 102(c) of Title I authorizes the EPA, considering criteria established pursuant to Section 102(a), to designate recommended ocean disposal sites or times for disposal of non-dredged and dredged materials. Section 103(b) of Title I of the MPRSA, as amended by Section 501 of the Water Resources Development Act of 1992 (PL 102-580, October 31, 1992), authorizes the Secretary of the Army, with the concurrence of the Administrator of the EPA, to select an alternative ODMDS. The criteria and factors established in Section 102(a) relating to site selection are used in selecting the alternative site. Placement of maintenance-dredged material at the alternative site under authority of MPRSA Section 103(b) is limited to a period of five years unless the EPA subsequently assigns a permanent designation to the site. An ODMDS selected pursuant to Section 103(b) may continue for an additional five years if no other feasible placement site has been designated by the EPA; the continued use of the alternative site is necessary to maintain navigation and facilitate interstate or international commerce; and the EPA determines that the continued use of the site does not pose an unacceptable risk to human health, aquatic resources, or the environment.

The Federal Water Pollution Control Act (FWPCA), passed in 1972, and later amended by the Clean Water Act of 1977 (CWA), and MPRSA passed in 1972, specifically addressed waste disposal in aquatic and marine environments. The FWPCA and the Water Quality Improvement Act of 1970 set up specific water-quality criteria to be used as guidelines in controlling discharges into marine and aquatic environments. These water-quality criteria applied to placement of dredged material only in cases where fixed pipelines were used to transport and discharge dredged material into the environment at discrete points. MPRSA specifically regulates the transport and ultimate disposal of waste materials in the ocean. Under Title I of

MPRSA, the primary regulatory vehicle of the Act, a permit program for the disposal of dredged and non-dredged materials was established that mandates determination of impacts and provides for enforcement of permit conditions.

The August 1975 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (Convention) is the principal international agreement governing ocean disposal. The Convention specifies that contracting nations will regulate disposal in the marine environment within their jurisdiction, disallowing all disposal without permits. The nature and quantities of all waste material and the circumstances of disposal must be periodically reported to the International Maritime Organization (formerly the Inter-Governmental Maritime Consultative Organization), which administers the Convention.

In October 1973, the EPA issued the final Ocean Dumping Regulations and Criteria (the Regulations or Ocean Dumping Regulations or ODR), which were revised in January 1977 (40 CFR Parts 220 to 229). These regulations established procedures and criteria for review of ocean disposal permit applications (Part 227); assessment of impacts of ocean disposal and alternative disposal methods; enforcement of permits; and designation and management of ocean disposal sites (Part 228). They also established procedures by which the EPA is authorized to designate ODMDSs, times for ocean disposal of acceptable materials under Section 102(c) of the MPRSA, and the criteria for site designation, including general and specific criteria for site selection.

## 1.5 U.S. ARMY CORPS OF ENGINEERS

The Atchafalaya River and the ARBC provide ship access to Morgan City, the Gulf Intracoastal Waterway (GIWW), and Bayous Chene, Boeuf, and Black from the Gulf of Mexico. Vessels using the ARBC consist of oilfield supply boats, offshore tugs, fishing boats, and barges. Construction and maintenance of the 54-mile-long Atchafalaya River Navigation Channel was authorized by the Rivers and Harbors Act of 1968, House Document 155, 90th Congress, 1st Session. Its authorized dimensions are a depth of 20 ft relative to MLG by 400-ft bottom width. As the Atchafalaya River is a major thoroughfare and a U.S. Congressionally authorized navigable waterway, the USACE is responsible for operations and maintenance of the channel. For the MVN to maintain the ARBC to its currently authorized depth, material is periodically removed from the channel. The MVN is requesting that EPA permanently designate the ODMDS-West for continued placement of maintenance-dredged material from the ARBC under MPRSA Section 102(c).

## 1.6 U.S. ENVIRONMENTAL PROTECTION AGENCY

The EPA is authorized by Congress to regulate ocean disposal and associated site designation, monitoring, and management, as stated specifically in 40 CFR 228.4(e) (1). Site designation by EPA does not authorize any dredging project nor does it permit placement of any dredged material. Sites are designated in areas where a need for ocean disposal has been indicated, based on past dredging demands and/or projected demands associated with new or expanded projects. However, site designation does not in and of itself preclude the consideration of other placement options, including BU options or the No-Action Alternative. Once designated as an approved ocean disposal site, the appropriateness of ocean disposal is determined on a case-by-case basis in accordance with the ocean disposal criteria.

## 1.7 COASTAL ZONE MANAGEMENT ACT

The Coastal Zone Management Act (CZMA) of 1972, as amended (16 USC 1451 et seq.), states in Section 307 (1) (A) "Each Federal agency with activity within or outside the coastal zone that affects land or water use or natural resources of the coastal zone shall be carried out in a manner that is consistent to the maximum extent practicable with the enforceable policies of approved State management programs." Louisiana has developed a Coastal Zone Management Plan (CZMP), which has been approved by the National Oceanic and Atmospheric Administration (NOAA), the designee of the Secretary of Commerce for the CZMP approval. This DEIS addresses consistency with this CZMP by assessing impacts to critical coastal zone habitats and resources, as presented in the Consistency Determination prepared by EPA and submitted to the Louisiana Department of Natural Resources (LDNR), Office of Coastal Management (OCM) on February 27, 2012.

# 2.0 ALTERNATIVES

Multiple site alternatives have been evaluated for placement of maintenance-dredged material: the No-Action Alternative, non-ocean placement alternative sites (BU), a nearshore alternative site, a mid-shelf alternative site, a deepwater alternative site, and the proposed ODMDS-West. The site selection process and evaluation of site alternatives described in this section are also summarized and presented in Table 2.0-1.

There are currently the following authorized disposal areas in Atchafalaya Bay (see Figures 1-1 and 1-2):

- **CWA Section 404 Disposal Site named Bird Island-East** – located east of the ARBC on the left descending bank and used annually for BU prior to 2002.

- **CWA Section 404 Disposal Site named Bird Island West** – located west of the ARBC on the right descending bank and used annually for BU since 2002.

- **MPRSA Section 102(c) designated ODMDS named ODMDS-East** – located east of the ARBC on the left descending bank and used annually for placement prior to 2002.

- **MPRSA Section 103(b) designated ODMDS named ODMDS-West** – located west of the ARBC on the right descending bank, used annually for placement since 2002 (expired as of August 2012).

Several concurrent approaches were taken in the collection of data relative to the proposed project and surrounding area. A computerized literature search for pertinent information was conducted. Forms of materials referenced include monographs, journals and other serials, conference and symposium proceedings, theses and dissertations, technical reports, government-sponsored research reports, and informational materials from resource agencies.

Data available from work contracted by the USACE to private corporations and universities, and from USACE EISs and monitoring data from the existing ODMDS-East and ODMDS-West projects were obtained. The data provided by the USACE also offer (1) information on the characteristics and quantity of the material previously dredged and deposited at the historically used sites, and (2) expected characteristics of future maintenance-dredged material. This information aided in determining the compatibility of future maintenance-dredged material with that already at the existing site and the expected amounts of maintenance-dredged material. USACE personnel also provided information pertinent to physical and geographical constraints.

**Table 2.0-1.** Summary of the screening process and evaluation outcome for the original array of ODMDS alternatives.

| ALTERNATIVES | | | |
|---|---|---|---|
| **SCREENING PROCESS** | **Beneficial Use (BU)**<br>Marsh Creation<br>Beach Nourishment<br>Island Creation-confined<br>Island Creation-unconfined | **Ocean Placement**<br>Nearshore (Alt 1; ODMDS-West)<br>Mid-shelf<br>Deepwater | **No-Action/ ODMDS-East*** |
| **Preliminary Screening**<br>*Outcome*<br>**Eliminate** | All BU | | |
| **Retain** | | All Ocean Placement | ODMDS-East |
| **Phase I Screening (ZSF)**<br>*Outcome*<br>**Eliminate** | | Nearshore-Alt 1, Mid-shelf, Deepwater | |
| **Retain** | | Nearshore-ODMDS-West | ODMDS-East |
| **Phase I Screening (continued)**<br>*Outcome*<br>**Eliminate** | | | |
| **Retain** | | ODMDS-West** | ODMDS-East |
| **Phase II Screening (11 Criteria)**<br>*Outcome*<br>**Eliminate** | | | |
| **Retain** | | ODMDS-West | ODMDS-East |
| **Phase II Screening (5 Criteria)**<br>*Outcome*<br>**Eliminate** | | | |
| **Retain** | | ODMDS-West | ODMDS-East |
| **FINAL ALTERNATIVES FOR IMPACT ANALYSIS** | | **ODMDS-West (Preferred Alternative)** | **ODMDS-East** |

* The No-Action Alternative and ODMDS-East Alternative are the same.
**This site differs slightly in footprint size from the previously screened Nearshore-ODMDS-West (the Section 103(b) ODMDS-West).

Monitoring studies have been conducted at and near both the existing ODMDS-East and at the MPRSA Section 103 ODMDS-West. The results of these studies, conducted by the USACE and USACE contractors, along with other studies, provided the necessary site-specific data used to characterize the water and sediments in the zone of siting feasibility (ZSF) and the physical characteristics and contaminant concentrations of future maintenance material.

In addition to the information discussed above, navigation charts, Bureau of Ocean Energy Management, Regulation and Enforcement charts, EISs, and other documents, were identified and collected. The collected data were compiled, arranged according to the pertinent topics and examined. At that time, any data gaps were noted. None were sufficient to disallow completion of the selection process; i.e., sufficient information was available to apply the exclusion process and the five general and eleven specific criteria.

## 2.1 NO-ACTION ALTERNATIVE

The No-Action Alternative allows for the placement of maintenance-dredged material at the MPRSA Section 103(b) designated ODMDS-West located parallel and to the west of the navigation channel until July 31, 2012. Maintenance-dredged material from the ARBC could also be placed into the MPRSA Section 102(c) designated ODMDS-East located on the east side of the channel.

ODMDS-East, as designated by 65 CFR 314.92 on May 18, 2000, is bounded by the following coordinates:

**N**orthwest Corner - 29°20′59.92″ N, 91°23′33.23″ W
Northeast Corner - 29°20′43.94″ N, 91°23′09.73″ W
Southeast Corner - 29°08′15.46″ N, 91°34′51.02″ W
Southwest Corner - 29°07′59.43″ N, 91°34′27.51″ W

ODMDS-East is approximately 29.8 km (18.5 miles) long and 0.8 km (0.5 mile) wide, and is located east of, and parallel to the ARBC. The center of the ODMDS-East is approximately 16 miles from the mouth of the Atchafalaya River. North Point of Point au Fer Island is about 3.2 km (2 miles) east of the northern end of the site. The average water depth at the site is approximately 4.9 m (16 ft) MLG.

In the absence of EPA action to permanently designate the ODMDS-West, the existing maintenance operations can place maintenance-dredged material into the current MPRSA Section 103(b) designated ODMDS-West until its designation expires on July 31, 2012, after which time maintenance-dredged material must be placed in the MPRSA Section 102(c) designated ODMDS-East. As a result of disposal at ODMDS-East, MVN predicts that sediment would likely enter the ARBC at a higher rate due to the net northwest transport of sediments, likely requiring an increased dredging frequency for the ARBC.

## 2.2 SITE ALTERNATIVES

The following sections outline the screening process through which reasonable action alternatives were identified and evaluated (Table 2.0-1). In accordance with the Louisiana Coastal Resources Program (LCRP) Guideline 4.2, and Section 307 of the CZMA, BU options for placement of the maintenance-dredged material were considered in addition to placement of material into an ODMDS. Each of these BU options was considered in regards to feasibility, cost, and longevity. Potential ODMDS sites were evaluated through a three-phase screening process.

### 2.2.1 Beneficial Use

Compliance with the LCRP Guideline 4.2, and Section 307 of the CZMA requires that "Spoil shall be used beneficially *to the maximum extent practicable* to improve productivity or create new habitat, reduce or compensate for environmental damage done by dredging activities, or prevent environmental damage" [emphasis added]. Under provisions of the LCRP, for each dredging operation, a Consistency Determination is made wherein consideration is given to the BU of maintenance-dredged material to the maximum extent practicable.

On November 8, 2007, Congress reaffirmed the long-standing Federal position that the costs associated with dredging for construction, operation, or maintenance of an authorized Federal water resources project are limited to the most cost-effective means, consistent with economic, engineering, and environmental criteria, Water Resources Development Act of 2007, P.L. 101-114, 121 Stat. 1041 (WRDA of 2007) Section 2037(c)(A). Any costs associated with the beneficial use of dredged material above this Federal Standard is to be cost-shared with a nonfederal sponsor after entering into a Project Cooperation Agreement, pursuant to Section 2037(c)(B) of the WRDA of 2007. Section 2038 of the WRDA of 2007 is an affirmation of the Congressional limitations on the Federal government's financial responsibility relative to the beneficial use of dredged material as contained in Section 204 of the WRDA of 1992, 33 USC 2326.

MVN has historically used dredged material from the upper Atchafalaya Bay Channel (about Station 4355+59 to Station 350+00) and the Atchafalaya Bar Channel (about Station 350+00 to Station 475+00) beneficially for bird island creation on both sides of the channel. In 1991, the MVN incorporated the northern end of the ODMDS-East into an area designated under CWA Section 404 for the placement of suitable maintenance-dredged material from the ARBC originating between Station 475+00 and Station 675+00, to create islands for colonial nesting birds. This beneficial use-placement area is approximately 1.6 $km^2$ (402 acres) in size. In 2002, the MVN created an additional beneficial use-placement area, approximately 8.9 $km^2$ (2,195 acres), for island creation. This site, Bird Island-West (Figure 2.2-1), was also designated under CWA Section 404, accommodating material dredged from about Station 475+00 to Station 650+00 of the upper ARBC. To compensate for compaction and subsidence during the marsh/island creation process, maintenance-dredged material is mounded to a maximum height of 1.8 m (+6 ft) MLG. Placement at Bird Island-East has led to dense vegetation inhabited by mostly mottled ducks. Bird Island-West is mostly inhabited by terns, gulls, and skimmers.

The Bird Island-West disposal site was recently cleared for expansion by MVN in a separate project, Proposed Expansion of Bird Island Placement Site (Public Notice mailed July 13, 2011). The continued progradation and accretion of the Atchafalaya Delta and related increases in the sediment bed load fraction (i.e., accelerated sedimentation) in nearshore portions of Atchafalaya Bay and the ARBC have allowed for additional beneficial use of maintenance-dredged material where practicable, and thus, the opportunity to expand the Section 404 Bird Island-West site in a southwesterly direction and into the footprint of the Section 103(b) ODMDS-West. The recently authorized Bird Island-West expansion site is composed of approximately 3,274 acres of presently shallow open water, and would accommodate approximately 1,000,000 cubic yards of dredged material from the upper reaches of the ARBC during each maintenance event.

The ARBC Federal Standard, or base plan for disposal, is placement of shoal material in the adjacent Section 103(b) ODMDS-West. As discussed above, the extreme upper end of the ODMDS-West area has been designated for creation of colonial seabird nesting sites due to the presence of suitable, sandy material in the adjacent bar channel dredging reach. However, beneficial use of ARBC shoal material removed from about Station 650+00 out into the Gulf of Mexico is not practicable, as historical data indicate that approximately 80 percent of the material from this bar dredging reach is composed of "fluff" (a dense sediment-laden fluid), which is so fluid when hydraulically pumped that it is not suitable for creating substantial wetlands or land features such as bird islands, nor is it appropriate for beach nourishment. The use of fluid mud for beneficial use-placement applications, then, is not based on sound engineering practices. Furthermore, the cost of pumping the sandier material from the lower portion of the ARBC to a non-ODMDS beneficial use area exceeds the Federal Standard and is not economically justified.

MVN has demonstrated a commitment to using dredged material from the upper Atchafalaya River Bar and Bay channels beneficially where practicable—the numerous bird islands and associated fringe marsh habitat that have been created provide foraging, breeding, nesting, and nursery areas, as well as refugia for a multitude of estuarine-dependent and commercially important fish and shellfish, migratory waterfowl, wildlife, and several species of wading, diving, and shore birds, and help to offset the substantial wetlands loss currently taking place in Louisiana. Irrespective of a permanently designated Section 102(c) ODMDS-West, MVN will continue to explore the possibility of using greater amounts of shoal material from the ARBC beneficially, if and when the bed load composition in the channel becomes more suitable (i.e., courser-grained) for marsh and/or island creation as active progradation of the Atchafalaya Delta continues. It is anticipated that additional modifications (e.g., further reduction of the site footprint) to the proposed ODMDS-West may be deemed appropriate to accommodate future expansion of the Bird Island-West and/or other beneficial use efforts as greater quantities of suitable material become available in the area. Any modifications to the proposed ODMDS-West (or ODMDS-East) site in the future would require the preparation of the appropriate accompanying environmental compliance and supporting **d**ocumentation.

**Figure 2.2-1.** Bird Island-West BU disposal area with fringe marsh.

### 2.2.1.1 Beach Nourishment

The shoreline from Oyster Bayou to North Point of Point au Fer Island and the wash over area in the vicinity of Point au Fer have been identified as possible locations for beach nourishment (Figure 1-3). Most of the maintenance-dredged material removed between Station 650+00 and Station 1340+00 is a loose fluid mud (fluff). This material is considered unsuitable for beach nourishment. When hydraulically pumped, it flows as a fluid and does not have the high sand component that is typically used for beach nourishment projects. Even though the maintenance-dredged material pumped onto the shoreline would not provide a sandy beach, the shoreline and adjacent marshes would be nourished, to some extent, by the fines contained in the fluff. As the fluff is pumped onto the shoreline, the fines would eventually settle and provide a thin layer of fine material over the shoreline and adjacent marshes. The degree to which this type of placement would benefit the shoreline and adjacent marshes is also limited due to the high wave and current energy environment characteristic of the Gulf coastal shores.

The shoreline from North Point of Point au Fer Island to Oyster Bay is approximately two and twenty miles, respectively, from the upper and lower ends of the proposed ODMDS-East. The estimated incremental costs, compared to placement of material in the ODMDS-East, for transportation of maintenance-dredged material annually removed from the ARBC for the purpose of beach nourishment at this site would be approximately $48.4 million including 20 percent contingencies (Table 2.2-1).

Recognizing the above cost and material constraints, the distance from the ARBC to the shoreline creates additional technological and safety limitations. Rough weather and seas make the use of a long pipeline or hopper dredges impractical. Because of the shallow water depths

near the shoreline, hopper dredges with suitable capacity for the ARBC maintenance dredging would require a pipeline for final transportation of material to the beaches. Also, hopper dredges capable of making beach landings do not have the capacity required to transport the large volume of material to be dredged from the ARBC. Moreover, studies on wave-sediment interaction in Atchafalaya Bay have found that fluid mud is correlated with wave dissipation (Sheremet et al. 2005), suggesting that this type of sediment may serve a role in dampening wave energy during storm events when left on the bay bottom (as opposed to placement on the Point au Fer beach). For these reasons, this alternative is not considered feasible, as it is not economically justified nor is it based on sound engineering practices, and has been eliminated from further consideration (Table 2.0-1).

### 2.2.1.2 Marsh Creation

Maintenance dredged material removed from the ARBC may also be used for marsh creation in the vicinity of the prograding Atchafalaya Delta (Figure 2.2-1). Pumping the maintenance-dredged material from the ARBC to the proposed marsh creation site in Atchafalaya Bay would require the use of at least two boosters. Additionally, the nature of the material dredged from the ARBC makes it less suitable for marsh creation—use of fluid mud to create wetlands is not based on sound engineering practices.

**Table 2.2-1**
Comparison of Incremental Costs Relative to the No-Action Alternative

| Alternative | One-Way Transport Distance (mi) | Incremental Transport Cost (million $) | Incremental Construction Cost (million $) | Total Incremental Cost (million $) |
|---|---|---|---|---|
| **Non Ocean Disposal – Beneficial Use** | | | | |
| Beach Nourishment | 9.1 | $48.4 | $0 | $48.4 |
| Marsh Creation | 14.9 | $66.7 | $0 | $66.7 |
| Island Creation – Uncontained Single Point Discharge | 2 | $26.0 | $0 | $26.0 |
| Island Creation – Contained Single Point Discharge | 2 | $26.0 | $115.6 to $127.0 | $141.6 to $153.0 |
| **Ocean Placement** | | | | |
| ODMDS-West | 1.1 | $0 | $0 | $0 |
| Nearshore Alternative Site 1 | 9.5 | $49.7 | $0 | $49.7 |
| Mid-shelf Alternative | 29.7 | $113.0 | $0 | $113.0 |
| Deepwater Alternative | 74 | $253 | $0 | $253 |

The additional transportation distances from the ARBC to this potential marsh creation area would be from 16 to 47 km (10 to 29 miles). The estimated incremental annual costs, compared to placement in ODMDS-East, for pumping maintenance-dredged material from the ARBC to unconfined marsh creation sites in Atchafalaya Bay, a distance in excess of 16 km (10 miles) would be approximately $66.7 million, including 20 percent contingencies (see Table 2.2-1).

Because of the long pumping distance and associated costs, combined with characteristics of the material that make it unsuitable for use in marsh creation, this alternative is not considered feasible and has been eliminated from further consideration (Table 2.0-1). However, as stated earlier, MVN will continue to explore the possibility of using greater amounts of shoal material from the ARBC beneficially, if and when the bed load composition in the channel becomes more

conducive (i.e., higher percentage of sand) to marsh and/or island creation as active progradation of the Atchafalaya Delta continues.

### 2.2.1.3 Island Creation – Single Point Unconfined Discharge

Unconfined open-water placement using single point discharge approximately every 2 miles along the entire length of the ARBC (total length along the proposed ODMDS-West is about 29 km [18 miles]) was also considered. The objective of such placement would be the creation/ establishment of islands for use by colonial nesting birds.

The estimated incremental annual costs, compared to placement of material in ODMDS-East, for pumping maintenance-dredged material annually from the ARBC to unconfined single point discharge points located approximately every 3.2 km (2 miles) along the length of the ARBC (approximately 19 miles) would be approximately $26.0 million including 20 percent contingencies (see Table 2.2-1).

As previously described, the maintenance-dredged material removed from the ARBC between Station 475+00 and Station 650+00 has been deposited in the CWA Section 404 site for bird islands. However, most of the maintenance-dredged material removed from the ARBC (between Station 650+00 and Station 1340+00) is a loosely consolidated fluid mud that is not suitable for creation of islands. For this reason, this alternative is not considered feasible and has been eliminated from further consideration (Table 2.0-1). However, as stated earlier, MVN will continue to explore the possibility of using greater amounts of shoal material from the ARBC beneficially, if and when the bed load composition in the channel becomes more conducive (i.e., higher percentage of sand) to marsh and/or island creation as active progradation of the Atchafalaya Delta continues.

### 2.2.1.4 Island Creation – Single Point Confined Discharge

Because of the poor physical characteristics of the maintenance-dredged material removed from the ARBC, discharge into confined placement sites located within either the existing ODMDS-East or proposed ODMDS-West was also considered. Each of the confined placement sites would be approximately 3.2 km (2 miles) long by 0.8 km (½ mile) wide. Maintenance dredged material removed from the northernmost half of the ARBC would be placed in a confined placement site with center located at approximately 6.4 km (4 miles) from the head of the ODMDS. Maintenance dredged material removed from the southernmost half of the ARBC would be placed into a confined placement site located approximately 19 km (12 miles) from the northernmost head of the ODMDS. Specific options considered include the following:

- Confined placement using native material for dikes — a short-term option considering the amount of material needed and the time needed for compaction and dewatering.
- Confined placement using sediment fences — a means of holding sediment, with appropriate materials (e.g., Christmas trees), long enough for dewatering and settlement.

- Confined placement using shell dikes — less expensive than rock but the cost savings may be offset if a larger amount of material were required. Long-term dike survival would likely require maintenance.
- Confined placement using rock dikes — costly, however, considering several dredging cycles, the total costs may be more reasonable. Also, mobilization cost could be reduced by constructing a large rock enclosure and creating internal cells from native sediments for each dredge cycle.
- Confined placement using anchored geotextile tubes — has not been tested, but geotextile tubes have been used to hold sediment in shallow water situations.
- Confined placement using plastic sheet piling — has installation advantages over rock, and the cost of the material is more reasonable. An additional advantage of sheet piling is its potential capability to provide additional confinement for additional placement of material after the sediment has compacted.

The estimated incremental costs, compared to placement at ODMDS-East, for construction of the above confined placement sites (approximately 3.2 by 0.8 km [2 miles by ½ mile], each) is approximately $115.6 to $127.0 million, including a 20 percent contingency, depending on the type of confined placement, as described above. The estimated incremental annual cost, compared to placement of material in ODMDS-East, for pumping maintenance-dredged material from the ARBC into two confined placement sites located adjacent to the ARBC is approximately $26.0 million including a 20 percent contingency (see Table 2.2-1).

Confinement of the material would eventually allow some of the material to settle out. However, an accurate estimate of how much material and the time required for eventual mounding to occur is unknown. In the high-energy environment of the Gulf, it is possible that containment dikes could breach and/or maintenance would add to the overall operational costs.

Because of the uncertainty associated with the feasibility of this alternative, as well as the potential for increased operational costs, this alternative has been eliminated from further consideration (Table 2.0-1).

### 2.2.2 Screening Process for Ocean Placement Sites

The procedure classically used to determine which potential site is the preferable site for ocean placement is basically a series of eliminations carried out in sequential order (Pequegnat 1984). The order used in the evaluation process is as follows:

**Phase I**

This phase of the screening process is presented in Section 2.3. Because none of the BU sites were identified for further evaluation, the analysis focuses on ocean placement alternatives. This first screening phase was used to identify the most appropriate alternatives(s) for additional evaluation.

1. **Definition of ZSF**. This is an initial screening procedure used to limit the geographic area of consideration and define the ZSF. Reasonable haul distance is a determining factor, as well a cost of monitoring and surveillance, and constraints imposed by political boundaries.

2. **Characterization of expected material and site sizing**. The type, quantity and behavior of expected maintenance material is identified. This is compared to general sediment characteristics in the ZSF to delineate zones of incompatibility. The requisite size of the proposed ODMDS is determined based upon review and analysis of historic pre and post-placement bathymetric surveys that provided sufficient detail to determine the size of the site. In addition, determination of the size of the site also considered the potential for runback of newly placed material from the placement site back to the dredged channel.

3. **Establish buffer zones for critical areas and resources**. Numerical models may also be used to define appropriate buffer zones around critical areas and resources. In this document, critical areas and resources will be discussed in three general categories — biologically sensitive areas, beaches and recreational areas, and navigation channels.

**Phase II**

In this phase, more site-specific issues are resolved based on consideration of the eleven specific factors prescribed in 40 CFR Part 228.6. These criteria are addressed in Section 2.4 based on the evaluation of alternatives, presented in Section 4.

**Phase III – Final Evaluation and Site Selection**

Based upon the evaluations conducted in Phases I and II, final determination of the environmental suitability of each candidate site will be made in accordance with the five general criteria for site selection (40 CFR Part 228.5). These criteria are addressed in Section 2.5 based on the evaluation of alternative impacts presented in Section 4.

## 2.3 DEVELOPMENT OF ALTERNATIVE SITES USING THE SCREENING TECHNIQUE – PHASE I

As noted in Section 2.2.2, a three-phase screening process was used to identify practical and reasonable alternative sites for the placement of maintenance-dredged material from the ARBC (Table 2.0-1). Three types of ocean placement, nearshore, mid-shelf, and deepwater, were considered. The following sections describe the alternatives that were considered and the steps taken through the first phase of the screening process.

### 2.3.1 Ocean Placement Alternative Sites

Three types of ocean placement were considered: nearshore, mid-shelf, and deepwater. Two nearshore sites were considered. The first was a new site, referred to as "Nearshore Alternative Site 1," and the existing ODMDS-West. One mid-shelf and one deepwater site were also

considered. Additional detail regarding each alternative ocean placement site is provided in the following sections.

### 2.3.1.1 Nearshore Alternative Site 1

The Nearshore Alternative Site 1 is located to the east side of the ARBC, Gulfward of the existing ODMDS-East. Productive fishing banks, oil, and gas development facilities are located throughout the nearshore areas. To avoid conflict with these and other permitted uses in the area, it was determined that an alternative nearshore ODMDS could be located approximately 14.8 km (9.2 miles) south and 3.7 km (2.3 miles) east of the center of the ODMDS-East (centered at 28°08′30″ N and 91°25′30″ W). Location of the Nearshore Alternative Site 1 is shown in Figure 1-3.

The Nearshore Alternative Site 1 would be deeper (6 m [19.7 ft] MLG) than the ODMDS-East (2.0 to 6.6 m [6.6 to 21.6 ft] MLG). This variance in depth would not be great enough to substantially change the physical stresses on the bottom sediment at the two locations. According to the information presented in Darnell et al. (1983) and Phillips and James (1988), the bottom sediments and biological characteristics of the two locations are practically identical. Thus, if similar placement techniques are applied at the Nearshore Alternative Site 1, the environmental effects of the maintenance-dredged material would probably be quite similar to those at the ODMDS-East. If hopper dredges or barges are used to transport the material to the new site, temporary mounding at the site would be expected, but wave action and storm events in the shallow area would rapidly spread the material to a uniform level. Surveillance and monitoring conditions for the Nearshore Alternative Site 1 would also be similar to those at the ODMDS-East.

The estimated incremental cost, compared to placement at ODMDS-East, for transportation of maintenance-dredged material annually removed from the ARBC to Nearshore Alternative Site 1 is $49.7 million including 20 percent contingencies. Selection of an alternative nearshore site would subject a new area of the ocean to the effects of maintenance-dredged material placement while offering little environmental advantage over the proposed ODMDS-West site.

### 2.3.1.2 Nearshore Alternative Site – ODMDS-West

The nearshore alternative site ODMDS-West is located to the west of the ARBC and approximately parallel to the existing ODMDS-East. To avoid conflict with oil and gas facilities and infrastructure, productive fishing banks, and other permitted uses in the area, an alternative nearshore site could be located approximately 30.5 km (19 miles) off the coast, and adjacent to the channel. The location of the nearshore alternative site, ODMDS-West, is shown in Figure 1-3.

This site is similar to the existing ODMDS-East in both physical and biological characteristics. Similar impacts would be expected to those experienced at the ODMDS-East when placement occurred at that site. The impacts at this site would be the same as the current impacts at the ODMDS-West under the MPRSA Section 103(b) authority.

Based on historic (1996 - 2010) maintenance dredging data, the average volume of material that was placed in the ODMDS-East is greater than the average volume of material placed in the ODMDS-West. Table 1-1 indicates that the amount of maintenance material placed in each site on an annual basis indicates that an average of 438,152 cy more material was placed into ODMDS-East compared to ODMDS-West each fiscal year. Assuming the historical dredge volumes are not influenced by an unidentified factor, such as budget constraints for maintenance dredging, the data indicate that maintenance-dredging volumes were higher when material was placed in the ODMDS-East. This indicates that assuming the per unit cost is constant, placement of material in the ODMDS-West would have a lower incremental cost compared to placement of the material in the ODMDS-East, despite the fact that there would be no difference in the distance for placement.

MVN analysis of pre and post-maintenance dredging surveys conducted annually at the ODMDS-West since 2002 reflected the fluid nature of maintenance-dredged material and the low probability it would form permanent mounds. The depth of sediment accumulation in three of the placement reaches in the ODMDS-West was evaluated before and after the year of greatest dredged material placement for each area.

The amount of dredged material added to ODMDS-West had the potential to make the water 3 inches (7.6 centimeters [cm]) shallower. Surveys indicated the ODMDS was actually about 4 inches (10.2 cm) shallower at the end of the dredge placement period for 2004. Although the depth of water was shallower than expected by 2.5 cm (1 inch) following placement, there was not significant mounding in the ODMDS-West during the period of greatest dredged material placement to this reach.

The amount of dredged material added to two reaches within ODMDS-West had the potential to make these two areas 17.8 and 20.3 cm (7 and 8 inches) shallower. However, annual MVN surveys of these reaches pre and post-dredged material placement indicated these areas were actually slightly deeper at the end than at the beginning of the dredged placement cycle. These data suggest that long-term measurable mounding of dredged material in these placement reaches is not anticipated.

#### 2.3.1.3 Mid-Shelf Alternative Site

The mid-shelf area off the coastal Louisiana is a biologically productive area with oil and gas lease tracts and pipelines located throughout the region. The selection of an alternative mid-shelf site was based principally on avoidance of the oil and gas lease tracts and pipelines. It was determined that an alternative site in the shape of a square with center coordinates of approximately 28°49′00″ N and 91°27′30″ W would avoid oil and gas facilities. Location of the mid-shelf alternative site is shown in Figure 1-3.

Depths in the area of the alternate mid-shelf site are approximately 18 m (60 ft). The site would be approximately 51 km (32 miles) from shore, somewhat closer and due west of Ship Shoal. The mid-shelf area in the vicinity of the proposed alternative site is characterized by a gentle slope with no prominent bottom features. Sediments range from silty clay to silty sand (Weissberg et al. 1980a).

The mid-shelf area, being of greater depth, is less dynamic than the nearshore area near the ODMDS-East and West. Maintenance dredged material placed in this area would be subjected to a slower rate of erosion and transport. As a result, the layers of mixed site sediments and maintenance-dredged material that sloughs outside the immediate placement footprint could be thicker than those deposited at the ODMDS-East or West.

The physical effects on bottom organisms at the mid-shelf site would be different from those occurring at the existing ODMDSs-East or West. Because the mid-shelf site would necessitate the use of barges to transport the maintenance-dredged material, the material would undergo a certain amount of compaction and dewatering en route to the site. Since the material dredged from the channel is mostly silt and clay, when the material is finally placed at the site, it could be cohesive enough to settle to the bottom in discrete masses. This combined with reduced wind-driven currents and storm effects at the 18-m (60-ft) depth would create a mound on top of the natural sediment at the site. Some organisms would be covered and smothered during placement operations. Others will be able to work their way up through the material and recolonize the new sediment surface or other areas. Some plankton would be trapped or lost in the descending plume. Nekton should be able to avoid the plume entirely. The three-dimensional aspects of a mound of deposited material on an otherwise very flat sediment area might conceivably create new habitat for benthic organisms. This alternative site can occasionally be affected by the Gulf of Mexico hypoxic zone (water with a dissolved oxygen (DO) concentration less-than-or-equal-to 2.0 milligrams per liter [mg/L]), and therefore planktonic, benthic, and nektonic organisms may be more susceptible to the additional stresses associated with maintenance-dredged material placement.

The estimated incremental cost, compared to placement of material at ODMDS-East, for transportation of maintenance-dredged material annually removed from the ARBC to be deposited at the mid-shelf alternative site is $113.0 million including 20 percent contingencies. Impacts of the mid-shelf alternative site include the increased costs of maintenance-dredged material placement and onsite monitoring efforts. Use of a cutterhead pipeline dredge would no longer be feasible due to the transport distance and hopper dredges or barges would be required. Surveillance and monitoring methods would be similar to those necessary at the interim site, but costs would be higher due to the increased travel and sampling time. The greater distance and water depths might also require the use of large vessels and special equipment.

#### 2.3.1.4 Deepwater Alternative Site

The deepwater region is the area seaward of the edge of the continental shelf. The edge of the continental shelf off this part of Louisiana is at the approximately 110-m (360-ft)-depth contour (USACE 1996). Although this area is beyond the white and brown shrimp grounds, it contains the royal red shrimp grounds and major fish-harvest areas. Fishing banks, oil, gas pipelines and structures are also located in the area. A deepwater placement site could be located beyond the continental shelf directly south of the existing ODMDS-East, approximately 135 km (84 miles) from the ARBC. No specific site within the area was selected for site-specific evaluation.

Due to a breakup of the descending plume, the maintenance-dredged material placed at a deepwater site should be dispersed over a much larger area than at a mid-shelf site or a nearshore site. Once the sediments reach bottom they may tend to remain in place, subject to slow erosion and transport. However, neither of the foregoing assumptions can be confirmed without specific information on the near surface and bottom currents at the specific site. The physical effects of placement on bottom organisms, phytoplankton, zooplankton, and nekton should be similar to those at the existing ODMDS-East or the mid-shelf alternative site but lesser in magnitude. Some bottom organisms, phytoplankton, and zooplankton could be trapped and perish. Nekton would be affected to the extent of having to avoid the descending plume. This placement area occasionally is affected by the Gulf of Mexico hypoxic zone. Planktonic, benthic, and nektonic organisms may be more susceptible to the additional stresses associated with maintenance-dredged material placement if disposal is carried out during hypoxic conditions in the overlying water column.

The increased travel distance would increase the costs, and the large number of oil and gas platforms in the area could increase the safety hazards of placement operations. Operating in open-ocean waters for long periods of time and navigation through dense oil and gas fields and their associated traffic increase the possibility of emergencies such as rough waters or storms and collisions without vessels, which could necessitate placement of the maintenance-dredged material prior to reaching the proposed ODMDS. Surveillance and monitoring would be possible, but difficult and costly. Surveillance could be carried out through reports, ship riders, shipboard "black boxes," and over flights. Monitoring would require special equipment because of the need to operate in open-ocean and deepwater. The estimated incremental cost, compared to placement in ODMDS-East, for transportation of maintenance-dredged material annually removed from the ARBC to be deposited at the deepwater alternative site is $253.0 million including 20 percent contingencies. This annual maintenance dredged material placement cost is increased by the need to use hopper dredges and/or barges, as well as the additional costs associated with the long turnaround time between loading and unloading of the barges.

### 2.3.2 Zone of Siting Feasibility

The constraints on a site relative to the ZSF are those related more to its feasibility from a utilitarian as opposed to a regulatory perspective, although there is some overlap. Primary among the geographical and physical constraints are those which would restrict the safe and economical use of the site, such as distance from the dredging area, dangerous structures or currents, interference with or from other vessels, political boundaries, and logistic constraints on monitoring and surveillance.

#### 2.3.2.1 Limits Due to Cost of Transport

The efficiency of the dredging operation, for the purposes of this report, depends only on the placement site location since all other factors will be relatively constant, no matter where the placement site is located. This efficiency can be broken down into several factors: (1) safety to personnel and dredges, (2) cost of dredging per cubic yard, (3) the time required for the dredge to complete the dredging operation and be ready to move to another area, and (4) down-time due to equipment failure. All of these factors are adversely affected by increasing the distance of the

placement site from the ARBC. The last three of these factors can be directly correlated to the distance from dredging area to placement site, while the first is more complicated and site-specific. Certainly, however, the safety of personnel and dredges is related to some measure of the exposure time to potential hazards (i.e., weather, other vessels/structures, etc.) and increasing exposure time in the offshore area would have an overall adverse impact on safety considerations. Selecting a mid-shelf alternative site, or a nearshore alternative site Gulfward of the existing ODMDS-East would result in increases to maintenance dredging costs and monitoring costs.

The EPA (1986) states that ODMDSs should be located in an area that is within an economically and operationally feasible distance from the dredging site. Pequegnat et al. (1990) also cite operational and transportation costs as a limit on the location of an ODMDS. Therefore, since no significant reasons for moving the placement site further offshore, i.e., to a nearshore site Gulfward of the existing ODMDS-East, mid-shelf site, or to one beyond the edge of the continental shelf, have been demonstrated, and since economic and safety reasons discourage consideration of alternatives with greater transport distances, based on limits due to cost of transport, the areas parallel to and west and east of the ARBC are the most feasible ODMDS locations.

#### 2.3.2.2 Limits Due to Feasibility of Monitoring and Surveillance

The geographical constraints on the feasibility of a site for monitoring and surveillance are three: (1) size, (2) configuration, and (3) location. Based on historical practice, size and configuration are not pertinent to the ZSF analysis. The restrictions on location are (1) that the site be near enough to shore to allow safe and efficient monitoring by reasonably available vessels, and (2) that the site be located in water shallow enough to allow efficient benthic sampling by reasonably available vessels and equipment, since benthic impacts are of primary concern. The first restriction is eliminated by the fact that any distance feasible for hopper dredge use will also be feasible for reasonably available monitoring and surveillance vessels. The efficiency of getting good replication benthic sampling due to anchoring difficulties for vessels reasonably available puts a water depth limitation on the site of a maximum of approximately 30 m (100 ft) (Pequegnat et al. 1981). Also, any increase in water depth increases the benthic sampling time due to increased winch time in dropping and retrieving the grab sampler. However, along the shelf near the ARBC, depth limitations are not as restrictive as are the cost factors, although a mid-shelf site would be in approximately 18 m (60 ft) of water. A site well beyond the ZSF boundaries would place restrictions on monitoring and surveillance that would reduce the feasibility of such a site.

#### 2.3.2.3 Limits Due to Political Boundaries

The Atchafalaya Bay is located in both St. Mary and Terrebonne parishes. The ARBC, however, is located in St. Mary Parish. The Louisiana State Seaward Boundaries, measured from the mean lower low water (MLLW) line, and which separate State from Federal waters, determines the jurisdiction over activities that occur in those waters; for instance, the seaward limit of each State's Coastal Zone and the extent of waters from which states receive all revenues from oil and gas exploration. However, these particular political boundaries do not limit the ZSF boundaries.

There are no Military Warning Areas within roughly 40 km (25 miles) of the ARBC (www.gomr.mms.gov/homepg/regulate/environ/MWA_boundries.pdf).

#### 2.3.2.4 Conclusion

Pequegnat (1984) recommends additional criteria for selecting a site and develops criteria to identify generally suitable sites. For example, a minimum water depth of 18 m (60 ft) is recommended to assure that the material would remain in the placement area for a relatively long time. Should the dredged material contain pollutants, strong winter waves would not resuspend the contaminants. Also a minimum size of 3 square nautical miles is recommended, which would be adequate for placement of 26 to 40 mcy of material annually. However, when site-specific information is available, it is not unreasonable to use that information to determine whether a site is suitable for the area of interest. Indeed, Pequegnat (1984) recommends that where existing sites are suitable for their areas, they should not be excluded from consideration just because they do not meet the criteria for an ideal ODMDS.

In this document, the cost and safety issues involved in the transportation of dredged material were the limiting factors in determining the ZSF boundaries. Especially, a mid-shelf site (approximately 51 km [32 miles] offshore) and a site beyond the continental shelf would not be feasible because of dredging costs, safety, and limits on monitoring and surveillance. However, the amount and quality of the material to be dredged allowed the selection of the chosen ZSF boundaries since deep water and larger placement sites were not necessary.

Based primarily on the efficiency of the dredging operation in terms of time, cost, and safety and the general uniformity of the area near the ARBC, the ZSF for the proposed ODMDS is an area approximately 29 km (18 miles) long and 8 km (5 miles) wide adjacent to both sides of the ARBC (Figure 1-4). The ZSF thus encompasses an area of roughly 233 $km^2$ (90 square miles). All areas outside this ZSF are excluded, unless some other factor arises that excludes all of the ZSF.

### 2.3.3 Characterization of Material and Site Sizing

#### 2.3.3.1 Characterization of the Materials Expected to Be Dredged

Only material dredged from the ARBC to maintain the authorized channel depth would be placed at the proposed ODMDS. The maintenance-dredged material is generally comprised of silt with some sand and clay (7-12 percent sand, 81-88 percent silt, and 6-7 percent clay) (PBS&J 2008). Grain size analyses of dredged material sediments based on the samples collected for the 2008, 2002 and 1996 contaminant assessments are listed in Table 2.3-1, along with the results of chemical analyses.

The material to be removed from the ARBC navigation channel through maintenance dredging has been characterized by sampling and analysis of channel bottom sediments, performed to determine the acceptability and potential impacts of dredged material placement at BU sites and ODMDSs. Sediment, elutriate, and water quality sampling have been conducted to evaluate the

environmental conditions and potential impacts of dredging the ARBC and material placement at the designated disposal areas. In February 2008, samples were collected at reference locations, the channel site, and within the ODMDS-West area (PBS&J 2008). Contaminant assessments for the channel and disposal areas were also performed under contract to MVN in 2002 (PBS&J 2002) and in 1996 (Espey, Huston & Associates, Inc. 1997). Results of the analyses are listed in Table 2.3-1 and Table 2.3-2.

#### 2.3.3.1.1 Sediment Quality

The February 2008 sampling event for the contaminant assessment included collection of sediment samples for analysis from three locations along the ARBC channel alignment, three locations in the proposed ODMDS-West disposal area (ODMDS-West sediment quality data are discussed in Section 3.1.5.1.1 of this DEIS), and the reference area southeast of the channel (Tables 2.3-1 and 2.3-2; PBS&J 2008). Arsenic, beryllium, cadmium, chromium, lead, nickel and zinc were detected at all channel locations and at the reference location. The observed concentration ranges of each of these metals in the channel sediments were similar to the concentrations in the reference area. Selenium was detected at one channel sample location, and was not detected in the reference area sample. Thallium was not detected in the channel sample locations, but was present at a concentration just above the detection limit at the reference location. Total and trivalent chromium results were identical for each sample, reflecting the absence of hexavalent chromium in the maintenance-dredged material and surrounding area.

Ten samples for sediment quality were collected along the ARBC channel alignment for the 2002 contaminant assessment, along with sampling of the reference area (Table 2.3-1; PBS&J 2002). Overall, the observed metals concentrations were similar to the results of the ARBC sampling conducted in 2008. Silver was detected in one channel sample and the reference area at concentrations just above the detection limit. Sixteen samples were collected for analysis of sediment quality during the 1996 contaminant assessment (Table 2.3-1; Espey, Huston & Associates, Inc. 1997). Arsenic, beryllium, cadmium, silver, thallium, and trivalent chromium were not detected in the 1996 analyses. In general, the concentrations of other metals were observed at ranges similar to those found in the 2008 and 2002 results, as well as the reference area concentrations for the 1996 sampling event (Table 2.3-1). Zinc was detected at 112 milligrams per kilogram (mg/kg) in one sample, but the results do not indicate the presence of contamination based on the observed range and distribution of zinc concentrations.

In addition to metals, sediment samples from the ARBC collected during the 2008, 2002 and 1996 sampling events were also analyzed for inorganic and organic priority pollutants (Table 2.3-1; Espey, Huston & Associates, Inc. 1997; PBS&J 2002; PBS&J 2008). Ammonia and total organic carbon were the only non-metals detected. Total organic carbon was detected at channel locations and reference area locations at concentrations below 5 percent during both the 2008 and 2002 sampling events. No organic carbon was detected in any channel samples from the 1996 contaminant assessment, with a detection limit of 0.1 percent.

**Table 2.3-1.** Dredged Material Quality Analytical Results

| Analyte | Units | 2008 Data | | | 2002 Data | | | 1996 Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Range | Detection Rate | Reference Area | Range | Detection Rate | Reference Area | Range | Detection Rate | Reference Area |
| **Metals** | | | | | | | | | | |
| Arsenic | mg/kg | 7-11 | 3/3 | 6.9 | 4-7 | 10/10 | 3 | N/A | | N/A |
| Beryllium | mg/kg | 0.6-1.0 | 3/3 | 0.8 | 1-7 | 2/10 | ND | N/A | | N/A |
| Cadmium | mg/kg | 0.3-0.4 | 3/3 | 0.2 | 0.2-0.4 | 10/10 | ND | N/A | | N/A |
| $Chromium_{(TOT)}$ | mg/kg | 18-30 | 3/3 | 25 | 14-25 | 10/10 | 11 | 19-48 | 16/16 | 29 |
| $Chromium_{(III)}$ | mg/kg | 18-30 | 3/3 | 25 | 14-25 | 10/10 | 11 | N/A | | N/A |
| Copper | mg/kg | 14-20 | 3/3 | 15 | 14-27 | 10/10 | 7 | 14-36 | 16/16 | 14 |
| Lead | mg/kg | 13-19 | 3/3 | 15 | 21-35 | 10/10 | 14 | 4-6 | 16/16 | 4 |
| Nickel | mg/kg | 9-11 | 3/3 | 10 | 21-32 | 10/10 | 16 | 22-49 | 16/16 | 26 |
| Selenium | mg/kg | 0.3 | 1/3 | ND | 1 | 1/10 | ND | ND | 0/16 | ND |
| Silver | mg/kg | N/A | | N/A | 0.5 | 1/10 | 0.4 | N/A | | N/A |
| Thallium | mg/kg | ND | 0/3 | 0.2 | 0.2-1 | 10/10 | ND | N/A | | N/A |
| Zinc | mg/kg | 58-83 | 3/3 | 69 | 66-96 | 10/10 | 51 | 67-112 | 16/16 | 80 |
| **Organic Carbon and Ammonia** | | | | | | | | | | |
| Ammonia – N | mg/kg | 248-292 | 3/3 | 243 | 5-190 | 10/10 | 9 | 1-29 | 16/16 | 5 |
| TOC | % | 2.9-3.8 | 3/3 | 1.9 | 0.5-1.8 | 10/10 | 0.5 | ND | 16/16 | ND |
| **Organic Compounds** | | | | | | | | | | |
| TPH | mg/kg | ND | 0/3 | ND | 45-347 | 5/10 | ND | ND | 0/16 | ND |
| Chrysene | µg/kg | ND | 0/3 | ND | ND | 0/10 | ND | 35 | 1/16 | ND |
| Fluoranthene | µg/kg | ND | 0/3 | ND | ND | 0/10 | ND | 46 | 1/16 | ND |
| Pyrene | µg/kg | ND | 0/3 | ND | ND | 0/10 | ND | 32 | 1/16 | ND |
| Bis (2-ethylhexyl) phthalate | µg/kg | ND | 0/3 | ND | 114-246 | 3/10 | 142 | ND | 0/16 | ND |
| **Grain Size Distribution** | | | | | | | | | | |
| Gravel | % | 0-3 | | 0 | 0-0.3 | | 0 | 0 | | 0 |
| Sand | % | 7-12 | | 8 | 1.8-10.2 | | 22 | 3-45 | | 3 |
| Silt | % | 81-88 | | 81 | 35-61 | | 58 | 22-53 | | 44 |
| Clay | % | 6-7 | | 11 | 37-60 | | 20 | 33-67 | | 53 |

**Table 2.3-2**
2008 Disposal Area Sediment Analytical Results – ODMDS-West

| Analyte | Units | Sample Locations | | | Reference Area |
|---|---|---|---|---|---|
| | | DA-1 | DA-2 | DA-3 | |
| **Metals** | | | | | |
| Arsenic | mg/kg | 7.5 | 10.1 | 6.5 | 6.9 |
| Beryllium | mg/kg | 0.85 J | ND | 0.68 J | 0.84 J |
| Cadmium | mg/kg | 0.3 | 0.3 | ND | 0.2 |
| $Chromium_{(TOT)}$ | mg/kg | 26 | 32 | 22 | 25 |
| $Chromium_{(III)}$ | mg/kg | 26 | 32 | 22 | 25 |
| Copper | mg/kg | 17 | 21 | 12 | 15 |
| Lead | mg/kg | 11 | 22 | 14 | 15 |
| Nickel | mg/kg | 11 | 29 | 8 | 10 |
| Selenium | mg/kg | ND | ND | ND | ND |
| Thallium | mg/kg | 0.2 | 0.2 | 0.2 | 0.2 |
| Zinc | mg/kg | 74 | 78 | 90 | 63 |
| **Organic Carbon and Ammonia** | | | | | |
| Ammonia – N | mg/kg | 237 | 253 | 212 | 243 |
| **Grain Size Distribution** | | | | | |
| Sand | % | 1-23 | | | 8 |
| Silt | % | 21-33 | | | 81 |
| Clay | % | 45-78 | | | 11 |

Ammonia was detected at all ARBC sample locations and at the reference area during the 2008 sampling event (PBS&J 2008). With observed concentrations ranging from just over 240 mg/kg to nearly 300 mg/kg at the channel and reference areas (Table 2.3-1), the results indicate the widespread presence of available nitrogen that has the potential to act as a nutrient for biological activity. Research on the distribution of organic nitrogen in the northern Gulf of Mexico indicates that riverine sources such as the Mississippi and Atchafalaya Rivers are the predominant sources of available nitrogen (Lopez-Veneroni and Cifuentes 1994). Changes in ammonia concentrations over time throughout the project are shown by comparison of the 2008 data with the 2002 and 1996 sampling results for ammonia (Table 2.3-1). The 2002 data indicated a much greater variability in ammonia concentrations across the study area, with concentrations ranging from 5 to nearly 200 mg/kg, with lower concentrations present at select locations in the channel and at the reference area. Even lower concentrations were observed in the 1996 data, with a maximum observed concentration of 29 mg/kg from the channel, and 5 mg/kg at the reference area. Because of the similarities in ammonia concentrations observed at the channel and reference area for the sampling events, dredged material placement is not expected to change the sediment quality in the disposal area.

Sediments from the ARBC sampled to characterize dredged materials have also been analyzed to determine concentrations of potential organic contaminants, including total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAHs) and chlorinated pesticides, herbicides and polychlorinated biphenyls (PCBs) (Table 2.3-1). These compounds are present in emissions and discharges from a variety of industrial processes and pollution sources, and they may persist in the environment and bioaccumulate. Bis(2-ethylhexyl phthalate, a plasticizer and common laboratory contaminant, was detected in 3 of 10 channel samples and the reference

sample from the 2002 sampling event, with observed concentrations from just over 100 micrograms per kilogram (µg/kg) to nearly 250 µg/kg. This compound was not detected in the 2008 or 1996 sampling events. The PAHs chrysene, fluoranthene and pyrene were detected in 1 of 16 channel samples from the 1996 event, with concentrations below 50 µg/kg. TPH was detected in 5 of 10 channel samples from 2002, with concentrations ranging up to nearly 350 mg/kg. Chemical analyses, suspended particulate phase bioassays, solid phase bioassays, and bioaccumulation studies conducted in 2008 indicated no causes for concern (PBS&J, 2008). The NOAA Effect Range – Low (ERL) for arsenic was exceeded in some channel sediment samples from the 2008 contaminant assessment, but the bioassays and bioaccumulation studies conducted as part of the assessment indicated no concern. The presence of these organic compounds in limited sampling results from individual sampling events reflect the changing conditions over time, and do not indicate a persistent, contiguous area of organic sediment contamination in the channel and reference areas.

#### 2.3.3.1.2 Water Quality

Conventional water quality parameters are summarized in Table 2.3-3. For the 2008, 2002 and 1996 contaminant assessments, elutriate and water samples were collected from locations in the ARBC, and from the reference area located southeast of the channel (Espey, Huston & Associates, Inc. 1997; PBS&J 2002; PBS&J 2008). Elutriate and water quality results and applicable Water Quality Standards (WQS) and EPA Water Quality Criteria (WQC) are listed in Tables 2.3-4 and 2.3-5. Antimony, arsenic, cadmium, copper, nickel, selenium, and zinc were detected in elutriates from the channel sample locations and from the reference area. None of the metals concentrations in the water samples was at or above the acute or chronic WQS or WQC. Arsenic, cadmium, copper, lead, nickel and zinc were detected in elutriate samples from channel locations and the reference area in the 2002 sampling results. None of the detected concentrations were at or above existing WQS or WQC. Barium, chromium, copper, lead, and zinc were detected in elutriates of samples from the channel alignment in the 1996 contaminant characterization effort but were below applicable WQS or WQC.

Ammonia was detected in all elutriate samples from the ARBC and the reference area for the 2008 sampling event, but was present in concentrations below applicable water quality standards. No water quality standard has been determined for total organic carbons (TOC), and elutriate results for this parameter are provided to indicate potential interaction of dredged materials with waters of the disposal area. Concentrations of 3 to 5 mg/L were found in the elutriate samples from the channel locations, and 2 mg/L from the reference area in the 2008 results. For the 2002 sampling event, ammonia was detected in all channel sample elutriates, with concentrations ranging from 2 to 5 mg/L. TOC in the 2002 data ranged from 6 to 64 mg/L, and TPH was detected in 5 of 10 elutriates, with concentrations ranging from 2 to 8 mg/L. The detected TPH concentrations in the 2002 elutriate samples are consistent with the detected concentrations in sediment samples for this parameter.

Analyses of water samples collected in 2008 resulted in detection of antimony, arsenic, cadmium, copper, nickel, selenium and zinc at the channel sample locations. None of the metals concentrations in the elutriates was at or above the applicable acute or chronic WQS or WQC. Arsenic, copper, lead, mercury, nickel and zinc were detected in water samples from channel

locations and in the 2002 sampling results. Of these metals, lead and mercury were not detected at the reference area. None of the detected concentrations were at or above existing WQS or WQC. Barium, copper, lead, and zinc were detected in water samples from the channel alignment and reference area in the 1996 contaminant characterization effort, and none of the results exceeded applicable WQS or WQC.

**Table 2.3-3.** Water Quality Conventional Parameters.

| Parameters | Units | 2008 | | 2002 | | 1996 | |
|---|---|---|---|---|---|---|---|
| | | Low | High | Low | High | Low | High |
| Temperature | ºC | 13.2 | 17.2 | 16.6 | 20.9 | 11.9 | 18.2 |
| pH | Standard Units | 7.37 | 8.01 | 7.38 | 11.13* | 7.25 | 8.35 |
| Dissolved Oxygen | mg/l | 7.58 | 9.64 | 4.96 | 7.74 | 6.75 | 7.90 |
| Salinity | ppt | 0.02 | 31.58 | 11.0 | 13.5 | 0.0 | 21.6 |

*High pH values recorded during the 2002 sampling event probably do not reflect actual conditions, based on alkalinity and buffering capacity of marine waters.

**Table 2.3-4.** Elutriate Analytical Results

| Analyte | Units | Federal Water Quality Criteria | | LA Water Quality Standards | | 2008 Data | | | 2002 Data | | | 1996 Data | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Acute | Chronic | Acute | Chronic | Range | Frequency of Detections | Reference Concentration | Range | Frequency of Detections | Reference Concentration | Range | Frequency of Detections | Reference Concentration |
| Arsenic | µg/l | N/A | N/A | N/A | N/A | 0.5-1 | 3/3 | 1 | ND | 0/10 | NA | NA | | NA |
| Beryllium | µg/l | 69 | 36 | 69 | 36 | 2-4 | 3/3 | 3 | 1-4 | 7/10 | NA | ND | 0/16 | NA |
| Cadmium | µg/l | 40 | 8.8 | 45.4 | 10 | 0.2-0.3 | 2/3 | 0.3 | 0.9-2 | 3/10 | NA | ND | 0/16 | NA |
| $Chromium_{(TOT)}$ | µg/l | N/A | N/A | N/A | N/A | ND | 0/3 | ND | ND | 0/10 | NA | 1-2 | 4/16 | NA |
| $Chromium_{(III)}$ | µg/l | N/A | N/A | 515 | 103 | ND | 0/3 | ND | ND | 0/10 | NA | NA | | NA |
| Copper | µg/l | 4.8 | 3.1 | 3.63 | 3.63 | 0.9-1.2 | 3/3 | 0.6 | 5 | 1/10 | NA | 1-7 | 10/16 | NA |
| Lead | µg/l | 140 | 5.6 | 209 | 8.08 | ND | 0/3 | ND | 0.2-2 | 4/10 | NA | 1-5 | 4/16 | NA |
| Nickel | µg/l | 74 | 8.2 | 74 | 8.2 | 2-5 | 3/3 | 3 | 0.6-6 | 4/10 | NA | ND | 0/16 | NA |
| Selenium | µg/l | 290 | 71 | N/A | N/A | 2-5 | 3/3 | 5 | ND | 0/10 | NA | ND | 0/16 | NA |
| Silver | µg/l | 2.3 | N/A | N/A | N/A | ND | 0/3 | ND | ND | 0/10 | NA | ND | 0/16 | NA |
| Thallium | µg/l | N/A | N/A | N/A | N/A | ND | 0/3 | ND | ND | 0/10 | NA | NA | | NA |
| Zinc | µg/l | 90 | 81 | 90 | 81 | 2-12 | 3/3 | 1 | 0.2-8 | 10/10 | NA | 2-76 | 10/16 | NA |
| Ammonia | mg/l | 17.2 | 2.58 | N/A | N/A | 0.3-0.4 | 3/3 | 0.3 | 2-9 | 10/10 | NA | NA | | NA |
| TOC | mg/l | N/A | N/A | N/A | N/A | 3-5 | 3/3 | 3 | 5-64 | 10/10 | NA | NA | | NA |
| TPH | mg/l | N/A | N/A | N/A | N/A | ND | 0/3 | ND | 2-8 | 4/10 | NA | ND | 0/16 | NA |

**Table 2.3-5.** Water Quality Analytical Results.

| Analyte | Units | Federal Water Quality Criteria | | LA Water Quality Standards | | 2008 Data | | | 2002 Data | | | 1996 Data | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Acute | Chronic | Acute | Chronic | Range | Frequency of Detections | Reference Concentration | Range | Frequency of Detections | Reference Concentration | Range | Frequency of Detections | Reference Concentration |
| Arsenic | µg/l | N/A | N/A | N/A | N/A | 0.6-0.8 | 3/3 | 0.6 | 0.6-1.0 | 2/10 | ND | NA | | NA |
| Beryllium | µg/l | 69 | 36 | 69 | 36 | 1.3-2.2 | 3/3 | 2.1 | 0.1-1.1 | 10/10 | 0.1 | ND | 0/10 | ND |
| Cadmium | µg/l | 40 | 8.8 | 45.4 | 10 | 0.25-0.27 | 2/3 | ND | ND | 0/10 | ND | ND | 0/10 | ND |
| $Chromium_{(TOT)}$ | µg/l | N/A | N/A | N/A | N/A | 0.46-0.85 | 2/3 | ND | ND | 0/10 | ND | 1.5-5.2 | 9/16 | ND |
| $Chromium_{(III)}$ | µg/l | N/A | N/A | 515 | 103 | 0.46-0.85 | 2/3 | ND | ND | 0/10 | ND | NA | | NA |
| Copper | µg/l | 4.8 | 3.1 | 3.63 | 3.63 | 0.8-1.2 | 3/3 | 0.6 | 0.1-9.3 | 8/10 | 2.8 | 1.5-15 | 8/16 | ND |
| Lead | µg/l | 140 | 5.6 | 209 | 8.08 | ND | 0/3 | ND | 0.4-0.9 | 2/10 | ND | 1.6-9.4 | 16/16 | 1.9 |
| Nickel | µg/l | 74 | 8.2 | 74 | 8.2 | 1.1-1.5 | 3/3 | 1.5 | 0.4-8.1 | 4/10 | 1.0 | ND | 0/10 | ND |
| Selenium | µg/l | 290 | 71 | N/A | N/A | 1.7-4.8 | 3/3 | 5.4 | ND | 0/10 | ND | ND | 0/10 | ND |
| Silver | µg/l | 2.3 | N/A | N/A | N/A | ND | 0/3 | ND | ND | 0/10 | ND | ND | 0/10 | ND |
| Thallium | µg/l | N/A | N/A | N/A | N/A | ND | 0/3 | ND | 0.1 | 1/10 | ND | NA | | NA |
| Zinc | µg/l | 90 | 81 | 90 | 81 | 0.55-0.96 | 3/3 | 0.89 | 4-20 | 10/10 | 16 | 7-52 | 10/16 | 9.4 |
| Ammonia | mg/l | 17.2 | 2.58 | N/A | N/A | 1.3-1.6 | 3/3 | 1.8 | 0.1-0.2 | 10/10 | 0.1 | NA | | NA |
| TOC | mg/l | N/A | N/A | N/A | N/A | 3.6-5.1 | 3/3 | 3.2 | 6-34 | 10/10 | 6 | NA | | NA |
| TPH | mg/l | N/A | N/A | N/A | N/A | ND | 0/3 | ND | 0.1-2.7 | 9/10 | ND | ND | 0/10 | ND |

### 2.3.3.2 Characterization of ODMDS-West

The ODMDS-West encompasses approximately 35,000 acres (140 $km^2$ [54 square miles]) of shallow open water at depths ranging from 1.8 to 7 m (6 to 23 ft) and extends from approximately the entrance to Atchafalaya Bay, sloping gently at about 0.01 degree to the southwest on the western side of the existing navigation channel. Historically, surface sediments in the ODMDS-West were predominantly silt and clay (IEC 1983; Dettman and Tracey 1990; Flemer et al. 1994; Trulli 1996). More recently, grain size analysis of the sediments sampled as part of the contaminant assessments conducted by PBS&J (2008) found material from the ODMDS-West consisting of approximately 1-23 percent sand, 21-33 percent silt, and 45-78 percent clay.

### 2.3.3.3 ODMDS Size Determination

The size of the proposed ODMDS-West was determined based upon the need to: (1) maximize the discharge distance away from the ARBC to minimize the run back of the deposited dredged material into the channel; and (2) allow for adjacent pumping of the dredged material from within the reaches of the ARBC. As a result, the dimensions of the proposed ODMDS-West were determined to be 29 km (18.0 miles) long (length of the ARBC) and 5 km (3.0 miles) wide (typically the pumping distance at which a hydraulic pipeline cutterhead suction dredge may no longer be cost effective without a booster pump, depending on the size of the dredge).

The configuration of the proposed ODMDS-West is designed for efficient routine placement of dredged material from the ARBC and to minimize the return of dredged material placed in the ODMDS to the channel. This consideration led to the establishment of a long, narrow site parallel to the channel. The site lends itself to surveillance of individual dredged material placement operations and monitoring. The long, relatively narrow configuration of the proposed ODMDS-West limits its overall area. This site design can assist with calculating the conservation of elements in the dredged material between dredging and final placement operations. This calculation could be very valuable if an area of contamination is located in the proposed ODMDS-West. Conversely, the orientation of the proposed ODMDS-West broadside to the prevailing currents in the area increases the chance that placed material will disperse away from the ARBC.

As discussed in Section 1.2, the currently proposed Section 102(c) ODMDS-West differs slightly from the existing Section 103(b) ODMDS-West at its upper end, resulting in an area only 16 miles (26 km [14 nautical miles]) long—2 miles shorter than the ZSF length described in Section 2.3.2.4. The purpose of a shortened ODMDS-West is to accommodate the southwesterly expansion of an adjacent Bird Island disposal site that is currently used by USACE for beneficial use of maintenance-dredged material removed from the ARBC, pursuant to Section 404 of the Clean Water Act (CWA) of 1977, and that is currently proposed for expansion by USACE in a separate project (Figure 1-2).

### 2.3.4 Establishment of Buffer Zones

#### 2.3.4.1 Buffer Zone Assignment

Pre and post-maintenance dredging bathymetric surveys conducted annually by MVN show no accumulation of material in either the ODMDS-East or ODMDS-West. These data indicate material dispersion at the placement sites. Based on the results of the surveys, accumulation modeling was not conducted. The information gained from this evaluation allowed the determination of the buffer zones discussed below.

##### 2.3.4.1.1 Biologically Sensitive Areas

No marine sanctuaries occur in the immediate vicinity of the ARBC. Shell Keys and Marsh Island Refuges are approximately 46 km (25 nautical miles) west of the ODMDS-East. Fishnet Bank, the closest protected Area of Biological Significance is approximately 90 nautical miles south of the ODMDS-East.

##### 2.3.4.1.2 Beaches and Recreational Areas

The nearest point of land is North Point au Fer Island and it is approximately 3.7 km (2 miles) from the existing and proposed ODMDSs. There are no beaches in the area of the proposed ODMDS-West. The Atchafalaya Delta WMA is located immediately adjacent to the upper end of the ODMDS-West, and provides recreational opportunities in the area. The only recreational activities that would be affected are fishing and boating. Since these effects are minor and temporary, no buffer zones were required for recreational areas.

##### 2.3.4.1.3 Navigation Channel

The potential ODMDSs should be located such that the transport and placement of dredged materials do not interfere with ongoing navigation operations in authorized channels and waterways. The candidate ODMDSs are located outside of the Navigation Channel and open-water approaches to the ARBC, therefore interference with navigation is not expected. All dredging and placement operations are closely coordinated with the USCG with issuance of a Notice to Mariners to dredging operators and the shipping interests to avoid interference with traffic.

### 2.3.5 Results of Phase I Evaluation

Based on the Phase I evaluation, establishment of the ZSF indicates that two sites are available for ODMDS designation under MPRSA Section 102(c) (Table 2.0-1). These sites are the existing ODMDS-East and the site formerly designated under MPRSA 103(b), the ODMDS-West. Unless the ODMDS-West is re-designated as a permanent Section 102(c) site by EPA, as of August 2012 placement of maintenance-dredged material must return to ODMDS-East. The alternative carried forward through Phases II and III of the analysis is ODMDS-West; however, ODMDS-East is often referenced for comparison purposes.

## 2.4 EVALUATION OF ELEVEN SPECIFIC CRITERIA – PHASE II

Eleven specific factors prescribed in 40 CFR Part 228.6 are used in evaluating the proposed ODMDS site to assure that the general criteria are met. Evaluation of the eleven specific criteria focuses on the ODMDS-West (Table 2.0-1). The ODMDS-East is referenced only for comparison purposes, as its use is essentially equivalent to the No-Action Alternative. The characteristics of the proposed ODMDS-West are reviewed below in terms of these eleven specific factors.

### 2.4.1 40 CFR 228.6(a) (#1)

*Geographical position, depth of water, bottom topography, and distance from coast.*

The proposed ODMDS-West is a 26.0-km-long by 4.8-km-wide (16.0-mile long by 3.0 mile-wide) rectangular area located west of and parallel to the ARBC (Figure 1-2), and bound by the following coordinates:

Northwest Corner - 29°22′06″ N, 91°27′38″ W
Northeast Corner - 29°20′30″ N, 91°25′13″ W
Southeast Corner - 29°09′16″ N, 91°35′12″ W
Southwest Corner - 29°10′52″ N, 91°37′33″ W

The depth of the site ranges from 1 to 7 m (4 to 23 ft) MLG, and the total area is approximately 129 $km^2$ (48 square miles). The center of the ODMDS-West is approximately 30 km (19 miles) from the mouth of the Atchafalaya River. North Point of Point au Fer Island is approximately 4 km (2.5 miles) east of the northern end of the proposed site. Point au Fer Shell Reef, an area that has been subjected to extensive shell dredging, lies just shoreward of the proposed site.

As designated by 65 CFR 314.92 on May 18, 2000, the existing ARBC ODMDS-East is approximately 29.8 km long by 0.8 km wide (18.5 miles long and 0.5 mile wide), located in a water depth averaging 4.9 m (16 ft). The ARBC ODMDS-East is bounded by the following coordinates (Figure 1-2):

Northwest Corner - 29°20′60″ N, 91°23′33″ W
Northeast Corner - 29°20′44″ N, 91°23′10″ W
Southeast Corner - 29°08′15″ N, 91°34′51″ W
Southwest Corner - 29°07′59″ N, 91°34′28″ W

The continental shelf is approximately 149 km (93 miles) wide in the vicinity of the Atchafalaya River Delta. It is a gently sloping (<1°) submarine plain with many isolated sea knolls and seamounts (Bureau of Land Management [BLM] 1987; Weissberg et al. 1980a, 1980b; Phillips and James 1988). The ODMDS-West is located in the nearshore area of the plain. Except for being located adjacent to the dredged channel, the area occupied by the ODMDS is typical in depth and bottom topography to the continental shelf in the vicinity of the Atchafalaya River Delta.

### 2.4.2 40 CFR 228.6(a) (#2)

*Location in relation to breeding, spawning, nursery, feeding or passage areas of living resources in adult or juvenile phases.*

The northwestern Gulf of Mexico is a breeding, spawning, nursery, and feeding area for shrimp, menhaden, and bottom fish. Many of the species migrate seasonally between estuaries and the Gulf. Because the timing of species movements vary, some migration can occur at almost any time of the year (Day et al., 1989).

The proposed ODMDS-West is located in a region dominated by species that are estuarine-dependent (Darnell et al., 1983; Phillips and James, 1988; Day et al., 1989). Commercially important species likely found in the area include white shrimp, brown shrimp, Gulf menhaden, and sand sea trout. Commercially important shellfish and fish that inhabit the nearby bay environment include oyster, blue crab, black drum, white shrimp, and brown shrimp.

Limited interferences with nearshore fisheries may occur during placement of maintenance-dredged material. The Atchafalaya estuary has a broader expanse of direct connection with the open Gulf of Mexico than any other estuary along the Louisiana coast. A small portion of this passage route may impede movement/migration of some marine organisms (e.g., shrimp) during periods of active dredging and placement. The settling of dredged material and the sediment plume in and near the ODMDS might also impede localized movement/migration of marine organisms on the continental shelf. However, the effect of these impediments on the movement/migration of marine organism populations affected would be very small and probably undetectable. The stress and possible mortality of individual organisms encountering adverse conditions during dredging and placement operations in the ODMDS would be negligible compared to the passage of the far greater majority of individuals crossing into or out of the estuary and at other locations. Additionally, any impact would also occur at any other ODMDS location near the ARBC.

Placement of material at the proposed ODMDS-West would have negligible effects on endangered and threatened species. Occurrences of whales off Louisiana are considered rare and because the animals generally inhabit waters far deeper than those in the proposed ODMDS, it is unlikely that maintenance-dredged material placement operations would impact whales.

Sea turtles could potentially be found in the proposed ODMDS-West, although the persistent high turbidity makes the area unsuitable for regular use of this area by sea turtles, which generally depend on their sight to feed. Dredging operations might affect sea turtles through incidental take. Hopper dredging has been identified as a source of mortality to sea turtles in inshore waters (Dickerson and Nelson 1990; Magnuson et al. 1990; U.S. Fish and Wildlife Service [USFWS] and NMFS 1991, 1992), not placement operations. Designation of the ODMDS-West has been requested for the placement of future maintenance material dredged from the ARBC by hydraulic cutterhead pipeline dredging and hopper dredging. If hopper dredges are used, there is a possibility of impact to sea turtles, as there would be no matter where the ODMDS is located. Hydraulic cutterhead pipeline dredging

operations have not been identified as a source of sea turtle mortality. Hopper dredging will be conducted in accordance with all reasonable and prudent measures and implementing terms and conditions provided to MVN by NMFS in its 2007 Biological Opinion (NMFS 2007) and any subsequent Biological Opinion, to avoid sea turtle mortality.

### 2.4.3 40 CFR 228.6(a) (#3)

*Location in relation to beaches or other amenity areas.*

The nearest point of land is North Point of Point au Fer Island that is approximately 4 km (2.5 miles) from the northeast end of the proposed ODMDS-West. There are no recreational parks or beaches near the proposed ODMDS-West. It may be possible to observe the placement plume from boats in the vicinity during the active period of maintenance-dredged material placement within the site. The plume resulting from the placement of dredged material is not expected to be visible from land because of the distance from land and the existing turbid nature of the water in the area. The plume is expected to dissipate quickly after completion of the placement operations. Except for the minor effects of these limited observations, there should be no effects to the aesthetics of the area.

### 2.4.4 40 CFR 228.6(a) (#4)

*Types and quantities of wastes proposed to be disposed of and proposed methods of release, including methods of packaging the waste, if any.*

Material dredged from the ARBC is mainly comprised of silt, with lesser amounts of sand and clay (Dettmann and Tracey 1990; PBS&J 2002; PBS&J 2002). Sediment sampling as part of the contaminant assessments conducted by PBS&J (2008) found dredged material from the ARBC consisting of approximately 7-12 percent sand, 81-88 percent silt, and 6-7 percent clay. Based on dredging records since 2002, the volume of maintenance-dredged material to be removed from the ARBC for disposal to the ODMDS-West is approximately 10.8 mcy per fiscal year. Material is removed from the ARBC using a hydraulic cutterhead pipeline dredge and released within the ODMDS as uncohesive slurry. The ARBC is dredged annually and the average length of the dredging contract is 60 to 90 days. It is expected that future disposal operations will follow the past disposal pattern with respect to types, quantities, and methods of release. Any material disposed of at the site would be required to comply with the criteria of the Ocean Dumping Regulations (40 CFR Pans 220 to 229). None of the material will be packaged in any way.

### 2.4.5 40 CFR 228.6(a) (#5)

*Feasibility of surveillance and monitoring*

The proposed ODMDS-West is in relatively shallow water and is close to shore, which facilitates surveillance and monitoring of the site. Operational observations can be made using shore-based radar, aircraft, and day-use boats. A draft Site Management and Monitoring Plan (SMMP) incorporating monitoring requirements (the Site Monitoring Program) has been developed jointly

by EPA and MVN for the proposed ODMDS-West and existing ODMDS-East. The primary purpose of the Site Monitoring Program is to evaluate the impact of dredged material on the marine environment. The SMMP is included in Appendix A of this DEIS.

### 2.4.6 40 CFR 228.6(a) (#6)

*Dispersal, horizontal transport, and vertical mixing characteristics of the area, including prevailing current velocity, if any.*

Current patterns in the vicinity of the proposed ODMDS are highly complex. Although tides, Loop current intrusions, and river flow may affect the local currents, these currents are influenced predominately by winds (Phillips and James, 1988). Thus, the direction and velocity of the currents vary throughout the year. Winds are a particularly strong driving force in late autumn, winter, and early spring. Net water flow in the winter is to the northwest; however, rapid flow reversals to the southeast occur periodically in concert with wind direction (Crout and Hamiter 1981; Phillips and James 1988; Walker and Hammack 2000). The near shore current patterns are somewhat more complex in summer. In the absence of strong winds and the presence of a stratified water column, current patterns become considerably less distinct. Net flow in summer can be either to the east or west (Crout and Hamiter 1981; Phillips and James 1988; Walker and Hammack 2000). Spinoff eddies from the Loop current occasionally enter the region, producing flows to the southeast near the ARBC (Weissberg et al. 1980a, 1980b).

Current speeds generally range from 10 to 30 centimeters per second (cm/s) in the vicinity of the proposed ODMDS. Minimum speeds of 5 to 30 cm/s occur in June, July, and August; whereas the highest recorded current speeds in the vicinity range from 70 to 140 cm/s and occur during strong winter storms (Weissberg et al. 1980a, 1980b). Stagnant periods with little or no current motion, lasting as long as 6 days, have been recorded in April, May, and July (Weissberg et al. 1980a, 1980b). Current speeds may reach 200 cm/s during hurricanes, which occur, on average, approximately once every four years (Weissberg et al. 1980a, 1980b; Phillips and James 1988; NOAA 2013a).

In the absence of strong currents, the bulk of the maintenance-dredged material settles on the bottom of the particular area of a site being used at that time. A portion of the plume (fines) will be transported in the direction of the current over a wider area of the disposal site and, to some extent, outside the disposal site. This material will eventually settle over a wide area. Plume measurements were taken by Schubel et al. (1978) during dredged material disposal operations at the ODMDS-East. Background suspended solids concentrations were approximately 100 mg/L and currents were to the southwest at 9 to 19 cm/s. During placement operations, suspended solids concentrations as high as 300 mg/L were found a quarter of a mile downcurrent from the end of the discharge pipe. During another set of observations made when current directions were to the west and to the northeast, suspended solids concentrations of 300 mg/L were measured at 0.6 to 1.0 mile downcurrent from the end of the discharge pipe. For comparison purposes, total suspended solids (TSS) concentrations in this area of the continental shelf normally range between 250 to 400 mg/L.

The maintenance-dredged material is proportionally very small compared to the sediment load delivered by the discharge of the Atchafalaya River to the area. During disposal operations, a temporary mound of maintenance-dredged material may be initially formed within the ODMDS. However, flow of the noncohesive slurry and resuspension of the maintenance-dredged material results in the disappearance of the mound through dispersal and horizontal transport. The net result would be the remixing of maintenance-dredged material with other materials from the original source. The natural sediment load of the Atchafalaya is estimated to be approximately 40 to 50 percent of the combined discharge from the Mississippi and Atchafalaya Rivers, which is 210 million tons/year (Walker and Hammack 2000).

According to a sediment budget modeled by Teeter et al. (2003) for a hypothetical 10-mcy shoal in the ARBC, placement of material in the ODMDS-West would reduce runback to the channel by 5 mcy but increase lateral inflow by the same amount, when compared to placement in ODMDS-East. Although placement in ODMDS-West reduced runback to the channel, within approximately 10 weeks, the difference was made up through lateral inflow. Based on this analysis, the annual potential lateral source is estimated at approximately 30 mcy, which is a reasonable rate, given the parameters identified during the study (Teeter et al. 2003). Thus, while placing material on the west side of the ARBC did not eliminate shoaling, it did reduce runback of material into the channel, when compared to placing material on the east side of the channel. The 10-week decrease in the amount of time it takes material to reenter the ARBC, then, would decrease the overall annual maintenance dredging effort (i.e., dredging frequency) needed for the ARBC while providing vessels with a longer period of safe navigation access between maintenance dredging events.

### 2.4.7 40 CFR 228.6(a) (#7)

*Existence and effects of current and previous discharges and dumping in the area (including cumulative effects).*

The area proposed for selection has been used for the disposal of maintenance-dredged material since 2002. Bathymetric surveys taken prior to and after disposal operations indicate there is no persistent mounding and the maintenance-dredged material is relatively quickly dispersed (see mounding discussion in Section 2.3.1.2). No measurable effects from previous disposals have been noticed.

Studies conducted on the ODMDS-East in the early 1980s and 1990s did not identify effects from dredged material placement in the water column, sediments, or benthos of the site. These studies were conducted during placement activities, as well as 10 and 15 months following placement activities (USAC, 1996). Although these studies were conducted at the ODMDS-East, it is reasonable to expect that, because of the proximity of the proposed ODMDS-West, there would also be no effects from placement at ODMDS-West.

### 2.4.8 40 CFR 228.6(a) (#8)

*Interference with shipping, fishing, recreation, mineral extraction, desalination, fish and shellfish culture, areas of special scientific importance and other legitimate uses of the ocean.*

The proposed ODMDS-West is outside the navigation channel and therefore does not interfere with shipping. The shallow nature of the continental shelf in the area requires ships to remain in the navigation channels away from the ODMDS-West. Smaller recreational and commercial fishing vessels will pass over the ODMDS-West without interference from dredged material mounds that may temporarily form and that are expected to be relatively low and to disperse relatively quickly. Hydraulic cutterhead dredges and disposal pipelines may cause minor interference, but are not expected to interfere with shipping traffic. All dredging and placement operations are closely coordinated with the USCG with issuance of a Notice to Mariners to dredging operators and the shipping interests to avoid interference with traffic.

Recreational fishing and boating takes place throughout the area of the ODMDS-West. Ship Shoal is located approximately 47 km (29 miles) east of the ODMDS-West; Trinity and Tiger Shoals are about 45 km (28 miles) west of the site. Smaller fishing shoals are within 4.7 km (2.9 miles) of the ODMDS-West and Point au Fer Reef is located just north of the site. There may be some short-term interference with recreational activities at the ODMDS-West, particularly during disposal operations. The plumes of maintenance-dredged material and activities associated with the dredging operations could have a minor impact on targeted fish stocks, which may tend to avoid the area of active placement, temporarily affecting recreational fishing in the area. This interference would be short-term and restricted to the relatively small area of the ODMDS-West being used for dredged material placement at any particular time. Trawling and crabbing in the channel and near the placement area may experience interference during dredging operations.

There are numerous active oil and gas platform located in the west and south end the ODMDS-West and other platforms are located adjacent to the east, south, and west of the site. Additionally, several large natural gas pipelines cross the ODMDS-West. Because of the dispersive nature of the site, past experience with dredged material placement has not indicated interference with oil and gas exploration or production. No other types of mineral extraction are taking place either within the site or within the general vicinity of the site. It is not expected that use of the site for placement of maintenance-dredged material would interfere with any other legitimate use of the ocean in this general area.

No desalination or artificial finfish or shellfish culture facilities are located within the site. The nearest oyster leases are located approximately 6 km (4 miles) east of the ODMDS-West, near Point au Fer (Ernie Dugas 1995, personal communication, Oyster Survey Section LDWF; USACE 1996; LDNR 2012). Fish and shellfish that naturally occur within the site may be affected by placement of dredge material at the site, particularly bottom-dwelling organisms that may be trapped and smothered. Material dispersed from the site is expected to settle in thin layers and be mixed with the naturally occurring sediments in the region. Thus, dispersion and transport of this material outside of the site should not adversely affect the fish and shellfish in the area. Additionally, because the transport of suspended material from the ODMDS-West

would be primarily parallel to the coastline and in a generally westward direction for much of the year, effect of placement operations on oyster lease areas near Point au Fer would be minimal and consistent with natural conditions. There have been no impacts to oyster leases from the use of the interim-designated ODMDS-West, thus no impact is expected from its continued use.

Two areas designated as wildlife management areas or wildlife refuges and that are used for recreational use are located in the project area. The 140,000-acre Atchafalaya Delta WMA, managed by the LDWF, encompasses the developing delta in Atchafalaya Bay (Figure 2.4-1). The Atchafalaya Delta WMA is located immediately adjacent to the upper end of the existing Section 103(b) ODMDS-West. The Shell Keys National Wildlife Refuge and Russell Sage - Marsh Island State Wildlife Refuge is located approximately 29 miles (47 km) west of the ODMDS-West. The transport of suspended materials from the ODMDS-West would mainly be parallel to the coastline, and concentrations of suspended materials produced during dredging operations are expected to be within background levels within a few miles or so of the ODMDS-West (May 1973). Suspended materials originating from the ODMDS-West may drift into adjacent portions of the Atchafalaya Delta WMA; however, the effects of these suspended materials would likely be indiscernible from ambient conditions in these areas. There have been no significant impacts to these areas from use of the interim-designated ODMDS-West, and no impacts are expected from its continued use.

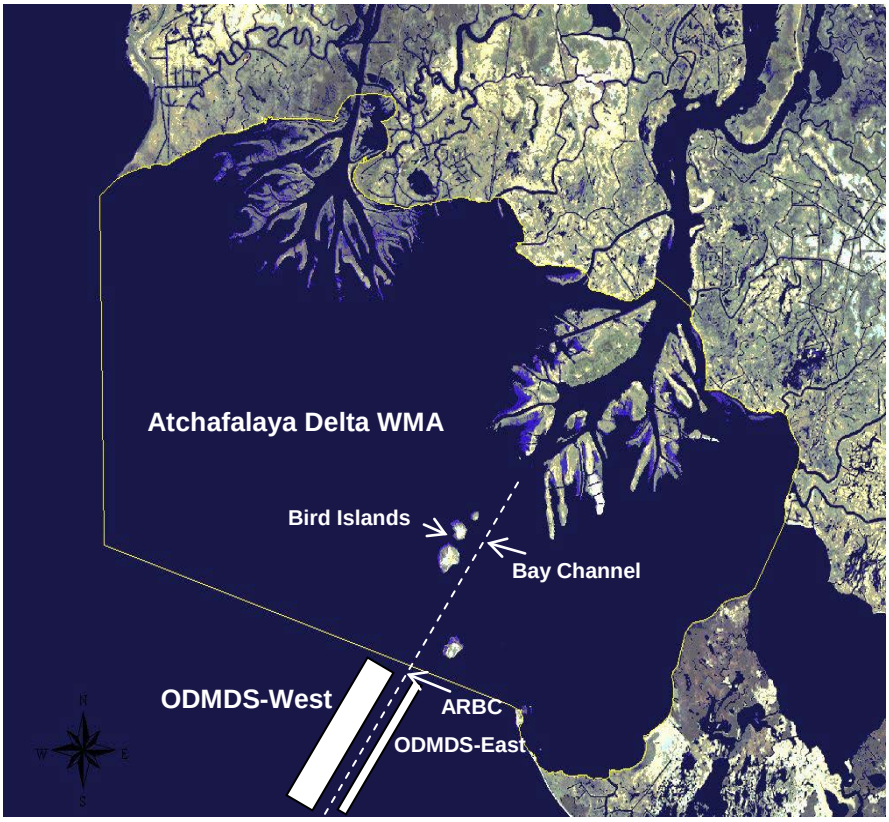


**Figure 2.4-1.** Atchafalaya Delta Wildlife Management Area (WMA), adjacent to the ODMDS-West and ODMDS-East (not drawn to scale).

Various universities and state and Federal agencies have studied the biological, geomorphological, and hydrological development of the Atchafalaya Delta. This includes scientific studies that are periodically carried out in the offshore region and the bays of the area. As the Atchafalaya Delta progrades from the Atchafalaya Bay into the Gulf of Mexico, it is likely that scientific interest in the area will continue. Placement of dredged material into the ODMDS-West is not expected to interfere with any such studies.

### 2.4.9 40 CFR 228.6(a) (#9)

*Existing water quality and ecology of the site as determined by available data or by trend assessment or baseline surveys.*

The water quality and ecology of the proposed ODMDS-West generally reflect that of the nearshore region off the Louisiana coast affected by discharges from the Atchafalaya River. The variations in water quality depend on the amount and mixing of freshwater runoff that is highly variable (Phillips and James 1988). Data collected during the IEC (1983) surveys and the EPA-ERLN (Dettmann and Tracey 1990) survey are generally comparable to historic data for the area as summarized in Phillips and James (1988). Neither the IEC (1983) nor the EPA-ERLN (Dettmann and Tracey 1990) water column data were taken during maintenance-dredged material placement operations; therefore, these data reflect ambient conditions. Similarly, water quality and sediment contaminant data from the 2008, 2002 and 1996 contaminant assessments all indicated no water quality impacts related to the placement of dredged material. Additional detail regarding these data, as well as additional discussion of water quality can be found in sections 4.1.4 and 4.1.5.

Macrofaunal assemblages near the ARBC ODMDSs have been examined during benthic investigations of several proposed salt dome brine diffuser sites (Parker et al., 1980; Weissberg et al., 1980a, 1980b). These studies characterized nearshore assemblages typical of estuarine areas, with communities dominated by polychaete worms, small molluscs, and macrocrustaceans. Most species displayed seasonal population fluctuations, with recruitment during winter and spring. Stations sampled by IEC (1983) in the vicinity of the ODMDS-East were further inshore and shallower than the proposed brine diffuser sites; however, the same general macrofaunal assemblage was found. During both surveys, polychaetes dominated the macrofauna.

Central Louisiana Gulf coastal waters are inhabited by numerous species of finfish and shellfish that can be characterized as estuary-related or demersal shelf inhabitants. Nektonic species and fast swimmers that may occur within the area of the ODMDS are attracted to oil rigs, which provide reef-like environments in the Gulf. Most, but not all, of the larger predators occur seasonally on the northern Gulf shelf, appearing in spring and leaving in the fall (Darnell et al. 1983). The density distribution of total fish and Penaeid shrimp catch in the northwestern Gulf has historically been highest off Louisiana (NMFS 2012). This may be directly attributable to the extensive estuarine nursery areas of Louisiana (Darnell et al. 1983; Darnell and Kleypas 1987). Recreational fishing, including fishing, crabbing, and shrimping, is popular in the vicinity of the ODMDSs.

### 2.4.10 40 CFR 228.6(a) (#10)

*Potentiality for the development or recruitment of nuisance species in the disposal site.*

Past placement of maintenance-dredged material at the existing ODMDS-East and ODMDS-West has not resulted in the development or recruitment of nuisance species. Therefore, placement of maintenance-dredged material at the proposed ODMDS-West is not expected to result in development or recruitment of nuisance species.

### 2.4.11 40 CFR 228.6(a) (#11)

*Existence of or in close proximity to the site of significant natural or cultural features of historical importance.*

The USACE Submerged Cultural Resource Database contains historical accounts of 52 shipwrecks in the Atchafalaya River and 7 shipwrecks in Atchafalaya Bay. These records indicate historical use of the Atchafalaya Basin. In 1996, a remote sensing survey was conducted in the ODMDS-East. This study found that while several anomaly clusters existed, which may represent shipwrecks, the geomorphologic and bathymetric data indicates that between 5 and 6 m (17 and 21 ft) of sedimentation had occurred in the area between 1839 and 1996. A vessel wrecked more than 157 years ago may have at least 5 m (17 ft) of sediment covering it. As a result of this survey, it was concluded that the placement of maintenance-dredged materials in the proposed ODMDS-West would not add appreciably to the impact already induced by progradation of the Atchafalaya Delta during the last century. There is no other information suggesting the presence of significant natural or cultural resources of historical importance in the vicinity of the proposed ODMDS-West. The results of the 1996 remote sensing study can be applied to the present study given its proximity to the previously designated ODMDS-East.

## 2.5 FINAL EVALUATION AND SITE SELECTION — PHASE III

Based upon the Phase I evaluation, the Nearshore Alternative Site 1, Mid-Shelf Alternative Site, and Deepwater Alternative Site were eliminated from consideration, primarily based on criteria used to establish the ZSF (Table 2.0-1). The ODMDS-East and ODMDS-West alternatives are considered reasonable. However, as previously described, use of the ODMDS-East site is essentially equivalent to the No-Action Alternative. The ODMDS-East is referenced only for comparison purposes. As with the Phase II evaluation, then, the third phase of evaluation addresses only the ODMDS-West. The evaluation ensures that the site is environmentally suitable in accordance with the five general criteria for site selection established by EPA (40 CFR Part 228.5). The EPA has determined, based on the information and analyses in this Draft EIS, that the ODMDS-West site is acceptable under the five general criteria outline below.

### 2.5.1 Five General Criteria

#### 2.5.1.1 40 CFR 228.5(a) (#1)

*The dumping of materials into the ocean will be permitted only at sites or in areas selected to minimize the interference of disposal activities with other activities in the marine environment, particularly avoiding areas of existing fisheries or shellfisheries, and regions of heavy commercial or recreational navigation.*

The ODMDS-West is located adjacent to and parallel to the ARBC. This location reduces the distance that the maintenance-dredged material must be transported, minimizing interference with other activities in the marine environment. There may be some short-term interference with fishing activities during placement operations. No interference with these or other marine activities is expected outside the brief periods of placement operations. There have been no impacts to existing oyster leases located northeast of the ODMDS area near Point au Fer from the use of the existing ODMDS-East, or ODMDS-West (which has been used since 2002), and no impact is expected to occur in the future as a result of using the proposed ODMDS-West.

#### 2.5.1.2 40 CFR 228.5(b) (#2)

*Locations and boundaries of disposal sites will be so chosen that temporary perturbations in water quality or other environmental conditions during initial mixing caused by disposal operations anywhere within the site can be expected to be reduced to normal ambient seawater levels or to undetectable contaminant concentrations or effects before reaching any beach, shoreline, marine sanctuary, or known geographically limited fishery or shellfishery.*

Placement of maintenance-dredged material will produce a turbidity plume. This plume will disperse to the point where it would be indistinguishable from the turbidity naturally occurring in the area. Turbidity resulting from maintenance-dredged material placement is not expected to be distinguishable from the natural turbidity occurring in the vicinity of North Point and in Atchafalaya Bay, except temporarily. There are no marine sanctuaries in the immediate vicinity of the ODMDS (USFWS 1981). Fishnet Bank, the nearest protected Area of Biological Significance, is approximately 104 miles south of the ODMDS. Any impacts from placement of dredged material are expected to be minor. Based on the current regime noted in Section 3.1.3.2, the transport of suspended materials from the ODMDS would mainly be parallel to the coastline, and concentrations of suspended materials produced during dredging operations are expected to be within background levels within a few miles or so of the ODMDS (May 1973). There are no Public Oyster Areas within the ODMDS-East or ODMDS-West, and the nearest oyster leases are approximately 4 miles east of the ARBC and ODMDSs, near Point au Fer (LDNR 2012). The potential impact on oyster beds in nearby Atchafalaya Bay is expected to be minimal. These organisms, as well as others in the region, are naturally subjected to periodic episodes of high, suspended-solids concentrations from wave-induced resuspension of nearshore sediments and from the waters of the Atchafalaya River.

### 2.5.1.3 40 CFR 228.5(c) (#3)

*If, at any time during or after disposal site evaluation studies, it is determined that existing disposal sites presently approved on an interim basis for ocean dumping do not meet the criteria for site selection set forth in 228.5–228.6, the use of such sites will be terminated as soon as suitable alternative disposal sites can be designated.*

This criterion does not apply to the proposed ODMDS-West since it is not an existing site approved on an interim basis. However, studies to date indicate that the proposed ODMDS meets the requirements of the MPRSA. Surveys of the site and vicinity indicated that water quality, sediments, and biological life were generally similar to surrounding areas. An existing designated ODMDS (the ODMDS-East) is located immediately across the navigation channel from the proposed site. No adverse environmental effects were detected outside the site boundaries during site investigation surveys (IEC 1983; Dettmann and Tracey 1990; Flemer et al. 1994; Trulli 1996) of ODMDS-West.

### 2.5.1.4 40 CFR 228.5(d) (#4)

*The sizes of ocean disposal sites will be limited in order to localize for identification and control any immediate adverse impacts and to permit the implementation of effective monitoring and surveillance programs to prevent adverse long-range impacts. The size, configuration, and location of any disposal site will be determined as a part of the disposal site evaluation or designation study.*

The size of the ODMDS-West has been identified to cover an area as small as possible to reasonably meet the criteria stated at 40 CFR 228.6(a) for the ARBC project and for efficient placement of material dredged from the ARBC. The size and location of the proposed ODMDS also minimizes the return of dredged material from the ODMDS to the channel. This consideration led to the establishment of a long site parallel to the channel with an area of 140 $km^2$ (54 square miles). The site lends itself to surveillance of individual dredged material placement operations and long-term monitoring. The configuration of the ODMDS-West limits its overall area to a dimension of 29.0 by 4.8 km (18.0 miles long by 3.0 miles) wide. The width of 4.8 km (3.0 miles) is typically the pumping distance at which a hydraulic pipeline cutterhead suction dredge may no longer be cost effective without a booster pump, depending on the size of the dredge. Teeter (2003) recommended westward disposal at the greatest practicable distance from the channel to minimize runback into the channel. The orientation of the ODMDS broadside to the prevailing currents in the area increases the chance that material placed in the ODMDS will be moved from the site before undesirable mounding can occur.

### 2.5.1.5 40 CFR 228.5(e) (#5)

*EPA will, wherever feasible, designate ocean dumping sites beyond the edge of the continental shelf and other such sites that have been historically used.*

In this area of the Gulf of Mexico, an ODMDS beyond the continental shelf would be at least 135 km (84 miles) from the area to be dredged. A dredged material placement site beyond the

continental shelf would not be feasible due to, among other things, increased safety risks, increased cost of dredged material transportation, and increased costs for site characterization, monitoring, and surveillance studies.

## 2.6 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

### 2.6.1 Evaluation of Constraints

#### 2.6.1.1 Oceanographic Constraints

With time, material placed within the ODMDS during maintenance activities (see Section 4.1.2.7) will disperse and be carried down current. Since net sediment transport is generally to the northwest, use of the ODMDS to the east of the channel (ODMDS-East) would increase the likelihood that the dredged material would be carried back into the channel. Therefore, all areas east of the channel are excluded from consideration for the ODMDS.

#### 2.6.1.2 Cultural and/or Historic Constraints

A 1996 cultural and historic resources survey identified several anomaly clusters that could be shipwrecks. However, these clusters currently lie under more than 5.5 m (18 ft) of sediment and thus the placement of dredged material would not affect these resources. Therefore, there are no constraints due to cultural or historic resources.

#### 2.6.1.3 Nonliving Resources Constraints

Local currents in the vicinity of the ODMDS-West are predominantly influenced by winds and, to a lesser degree, tides, Loop Current intrusions, and river flow. Net flow is to the northwest throughout most of the year (Wells et al. 1981; Weissberg et al. 1980a, 1980b). However, net flow in the summer can either be to the east or the west (Crout and Hamiter 1981; Weissberg et al. 1980a). Winds are a particularly strong driving force in the late autumn, winter, and early spring. Net water flow in the winter is to the northwest; however, rapid flow reversals to the southeast occur periodically and follow changes in wind direction (Weissberg et al. 1980a, b; Crout and Hamiter 1981). In the absence of strong winds and the presence of a stratified water column, current patterns become considerably less distinct (Weissberg et al. 1980a, 1980b). Tides may dominate current direction during winter periods of slack winds; however, tidal influences result in little or no net water or sediment displacement at the site.

The Atchafalaya River is a distributary of the Mississippi and presently carries about 30 percent of the Mississippi River's total water and sediment load (Wells et al. 1981; USACE 2004). Murray (1998) found the sediment plume from Atchafalaya Bay flowed to the west particularly during fall, winter and spring but its direction of travel could change rapidly with major wind direction shifts. The ARBC crosses a shallow, flat, reach of the inner Gulf of Mexico shelf with bottom sediment consisting of fine particles, easily resuspended into the water column. These resuspended sediments may be transported in several different directions depending on wind direction and strength, river flows, longshore currents and tides. Channel morphology (relatively deep compared to the surrounding inner shelf bottom) and its orientation (perpendicular to

typical long shore currents) enhance the capture and retention of sediments. Several studies document fluff, or fluid mud, accumulations on the inner shelf and within the channel (Van Heerden and Kemp 2000). Sediments that accumulate in the Gulf portion of the ARBC result from a combination of littoral transport and inputs from the Atchafalaya River. Currently, the presence of fluff in the ARBC has made it very difficult to maintain the authorized 6-m (20-ft) MLG channel depth through the ARBC. The fluff returns to the channel within weeks after maintenance dredging is complete and interferes with the passage of certain types of vessels. A recent review of literature addressing the accumulation of sediment within the ARBC and options for placement of dredged material to reduce runback indicated that placement of the maintenance-dredged material on the west side of the ARBC (ODMDS-West) would reduce the frequency of maintenance dredging, over the long term (PBS&J 2007).

The Gulf of Mexico oil industry has changed dramatically over recent years and the status of oil and gas related activity will be dynamic until the price of these products stabilizes. Extensive oil and gas development occurs within the Atchafalaya River Delta and in the vicinity of the ODMDS-East and ODMDS-West. Placement of dredged material in the ODMDS-West will not directly affect oil and gas pipelines or other infrastructure.

#### 2.6.1.4 Living Resources Constraints

The northwestern Gulf of Mexico is an important breeding, spawning, and nursery ground for many fish, shrimp, and crab species. The named shoals nearest to the site, Ship Shoal, Trinity, and Tiger Shoals, are approximately 47 km (29 miles) from the ODMDS-West. Smaller fishing shoals are within about 4.7 km (2.9 miles) and Point au Fer Reef is located just north of the site (NMFS, 1980). The area of the proposed ODMDS-West is dominated by estuarine species. Because the area is currently being used as an ODMDS, there would be no additional impacts to Essential Fish Habitat (EFH). The only marine fish with Critical Habitat near the ZSF is the Gulf Sturgeon, which has a present range of Lake Pontchartrain and the Pearl River system in Louisiana east to the Suwannee River in Florida (68 FR 13370). The nearest designated Critical Habitat is Lake Pontchartrain east of the Lake Pontchartrain Causeway. Therefore, potential impact to the Gulf sturgeon or its critical habitat is not a factor in ODMDS site selection.

#### 2.6.1.5 Environmental Quality Constraints

As noted in the sections of this document that address characterization of the material to be dredged, water quality in the ZSF, the quality and characteristics of sediment in the ZSF, the environmental impacts of ocean placement in the preferred sites, and the existing conditions and impacts on the benthos, no environmental quality constraints on the maintenance material site selection have been identified beyond those included in the buffer zone development for potential ODMDSs.

#### 2.6.1.6 Recreational Uses Constraints

As noted in the discussion of the ZSF, the only recreational use that could potentially be affected by dredged material placement would be non-commercial fishing. Because there are no offshore

platforms in the proposed ODMDS alternatives that attract game fish and contribute to recreational fishing opportunities, no recreation use buffer zone is needed.

### 2.6.2 Preferred Alternative

Based on the studies and analysis, the preferred alternative is the MPRSA Section 102(c) designation of the ODMDS-West for continued placement of maintenance-dredged material.

The majority of the proposed ODMDS-West has been used for the placement of maintenance-dredged material since 2002. Continued use of the site would subject the area within the site boundaries to the same environmental effects that have existed since 2002. Except for the periodic burial of bottom organisms and the temporary presence of a placement plume, these effects have been minimal. Relocation of the ODMDS away from the ODMDS-West would subject new open bay bottom to the effects of maintenance-dredged material placement.

The proposed ODMDS-West site is located in a dynamic environment characterized by high variability in physical factors. Correspondingly, the organisms that occur there are adapted to natural stresses and are able to recover more rapidly than those organisms adapted to more stable conditions.

The environmental characteristics of the ODMDS-West are practically identical to those of the existing ODMDS-East (EPA, EIS 1998). If similar placement techniques are applied at the west side alternative site as are currently used, the environmental effects of maintenance-dredged material placement would be expected to be similar to the current effects at the Section 103(b) ODMDS-West.

According to MVN analysis of annual pre and post-maintenance dredging surveys at the ODMDS-West, adverse environmental effects outside the boundaries of the proposed ODMDS-West were not detected during prior use of this site, and therefore, are not expected to result from continued use of the site.

The proposed ODMDS-West was found to comply with the criteria for evaluation of ocean disposal sites established in 40 CFR Sections 228.5 and 228.6 of EPA's Ocean Dumping Regulations.

With its permanent, Section 102(c) designation the ODMDS-West would remain the primary disposal options for maintenance-dredged material removed from the ARBC. However, the ODMDS-East would retain its Section 102(c) designation and would remain a secondary disposal option for future dredging efforts in the ARBC on those occasions when disposal to the east side of the channel may be warranted.

# 3.0 AFFECTED ENVIRONMENT

This section provides a brief description of the land and ocean areas near the ARBC. This is the ODMDS study area as the term is used in this DEIS. Thus, this section provides information for a much broader area than the ZSF.

## 3.1 PHYSICAL ENVIRONMENT

### 3.1.1 Climate and Meteorology

The climate of the northern Gulf of Mexico and adjacent coastal areas is influenced by four primary features: (1) the North American continental land mass, (2) the summer weather pattern known as the Bermuda high pressure cell, (3) subtropical latitudes, and (4) characteristically warm water temperatures of the northern Gulf of Mexico. The result is a humid, subtropical climate with mild winters and long, hot summers. The average monthly regional barometric pressure typically ranges from a minimum of 1014–1016 millibars during the summer months to a maximum of approximately 1021 millibars during the winter. The low pressure conditions of summer occur when the equatorial trough shifts northward, while the winter high pressure trend reflects the presence and influence of continental cold air masses (MMS 1988). Coastal Louisiana has an annual mean air temperature of 23 degrees Celsius (°C) (73 degrees Fahrenheit [°F]). July and August are the warmest months, with a mean temperature of 29°C (84°F); January is the coldest month with a mean temperature of 17°C (63°F).

Major rainstorms are associated with tropical disturbances and hurricanes in summer and early fall, and with frontal activity of extra tropical cyclones in late fall, winter, and spring. Convective thunder showers produce intense but localized rain in late spring and summer. Westerly winds in summer and northerly winds in winter frequently interrupt the normal pattern and bring drier weather. Rainfall is abundant in the area. Based on the 30-year average (1981-2010), the average total annual precipitation is approximately 60.4 inches, with a monthly average of 5.03 inches (NOAA 2013).

The study area is susceptible to tropical waves, tropical depressions, tropical storms, and hurricanes. Historical data from 1899 to 2012 indicate that 32 hurricanes and 43 tropical storms have made landfall along the Louisiana coastline (NOAA 2013a). The largest recent hurricanes were Katrina and Rita in 2005 (Category 3), Gustav in 2008, and most recently, Isaac in 2012, which resulted in substantial coastal land loss in the vicinity. Overall marsh loss (i.e., conversion to open water) resulting from Katrina and Rita throughout the entire Mississippi Deltaic Plain of southeastern Louisiana was as follows: fresh marsh—22 square miles; intermediate marsh—49 square miles; brackish marsh—18 square miles; salt marsh—27 square miles (USGS 2006). Hurricanes Gustav and Isaac caused additional damage in the vicinity.

### 3.1.2 Air Quality

The EPA, under the requirements of the Clean Air Act (CAA), has established National Ambient Air Quality Standards (NAAQS) for seven contaminants, referred to as "criteria" pollutants (40 CFR 50). These are carbon monoxide (CO), nitrogen dioxide ($NO_2$), ozone ($O_3$), particulate

matter less than 10 microns in diameter ($PM_{10}$), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), lead (Pb), and sulfur dioxide ($SO_2$). The NAAQS standards include primary and secondary standards. The primary standards were established at levels sufficient to protect public health with an adequate margin of safety. The secondary standards were established to protect the public welfare from the adverse effects associated with pollutants in the ambient air. The primary and secondary standards are presented in Table 3.1-1.

The EPA *Green Book Nonattainment Areas for Criteria Pollutants* (Green Book) maintains a list of all areas within the United States that are currently designated "nonattainment" areas with respect to one or more criteria air pollutants. Nonattainment areas are discussed by county or metropolitan statistical area (MSA). MSAs are geographic locations, characterized by a large population nucleus, that are comprised of adjacent communities with a high degree of social and economic integration. MSAs are generally composed of multiple counties. Review of the Green Book indicates that St Mary Parish is currently in attainment for all Federal NAAQS pollutants, including the 8-hour ozone standard (EPA 2011a). This classification is maintained through the results of area-wide air quality monitoring studies. Therefore, further analysis required by the CAA general conformity rule (Section 176(c)) would not apply for the proposed Federal action.

**Table 3.1-1.** Primary and secondary NAAQS for the seven contaminants established by EPA.

| National Ambient Air Quality Standards [3][4] | | | | |
|---|---|---|---|---|
| | Primary Standard | | Secondary Standard | |
| Criteria Pollutant | Concentration Limit | Averaging Time | Concentration Limit | Averaging Time |
| Carbon monoxide | 9 ppmv ( 10 mg/m$^3$ ) | 8-hour (1) | None | |
| | 35 ppmv ( 40 mg/m$^3$ ) | 1-hour (1) | | |
| Sulfur dioxide | 0.03 ppmv ( 80 µg/m$^3$ ) | Annual (arithmetic mean) | 0.5 ppmv ( 1300 µg/m$^3$ ) | 3-hour (1) |
| | 0.14 ppmv ( 365 µg/m$^3$ | 24-hour (1) | | |
| Nitrogen dioxide | 0.053 ppmv ( 100 µg/m$^3$ ) | Annual (arithmetic mean) | Same as primary | |
| Ozone | 0.075 ppmv ( 150 µg/m$^3$ ) | 8-hour (2) | Same as primary | |
| | 0.12 ppmv ( 235 µg/m$^3$ ) | 1-hour (3) | Same as primary | |
| Lead | 0.15 µg/m$^3$ | Rolling 3-month average | Same as primary | |
| | 1.5 µg/m$^3$ | Quarterly average | Same as primary | |

**Table 3.1-1. Continued**

| | | | |
|---|---|---|---|
| Particulate Matter ($PM_{10}$) | 150 µg/m$^3$ | 24-hour [(4)] | Same as primary |
| Particulate Matter ($PM_{2.5}$) | 15 µg/m$^3$ | Annual [(5)] (arithmetic mean) | Same as primary |
| | 35 µg/m$^3$ | 24-hour [(6)] | Same as primary |

(1) Not to be exceeded more than once per year.
(2) The 3-year average of the fourth-highest daily maximum 8-hour average at each monitor within the area over each year must not exceed 0.075 ppmv.
(3a) The expected number of days per calendar year with maximum hourly averages above 0.12 ppm must be equal to or less than 1.
(3b) As of June 15, 2007, the U.S. EPA revoked the 1-hour ozone standard in all areas except for certain parts of 10 states.
(4) Not to be exceeded more than once per year on average over 3 years.
(5) The 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15 µg/m$^3$.
(6) The 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within the area must not exceed 35.5 µg/m$^3$.

## 3.1.3 Oceanography

Physical oceanographic parameters influence the extent of water column mixing and sediment transport and affect the chemical environment at an ODMDS. Strong temperature or salinity gradients inhibit mixing of surface and bottom waters, whereas waves aid mixing. Waves of sufficient size may also resuspend bottom sediments, thereby affecting the turbidity of the water and contributing to sediment transport. Currents, especially bottom currents, influence the direction and influence the extent of sediment transport into and out of the ODMDS. Tidal currents may contribute to the transport of dredged material from a placement site.

### 3.1.3.1 Water Masses

Water masses in the nearshore Louisiana area are influenced by freshwater discharge from the Mississippi and Atchafalaya Rivers, coastal estuaries, and intrusions of Loop Current and associated water (Comiskey and Farmer 1981). Influences from riverine and estuarine discharges are greater in nearshore than in mid-shelf areas. Conversely, characteristics of water masses in the mid-shelf region are influenced to a greater extent by Gulf waters and broad scale circulation patterns.

Atchafalaya Bay was once the delta system for the Mississippi River as it flowed into the Gulf of Mexico prior to its re-routing through New Orleans to the east (Walker et al. 2003). Therefore, the area used to receive significantly more flow and sediment load and, as a result, the bay is very shallow with an average depth of 5 ft (1.5 m) MLG. Historically, this higher flow would have pushed much further into Atchafalaya Bay and the mixing zone where river water and seawater met would have been much further seaward than its current position. Over the past few decades, a series of flow control structures have been constructed on the Mississippi River to balance flow (and sediment load) between the Atchafalaya River and the Mississippi River. Under this flow balancing program, the Atchafalaya River receives about 30 percent of the '31° North-latitude' combined flow of the Mississippi River and Red River (ETS 2006; Mead and Moody 2010). The river discharges into Atchafalaya Bay in southern Louisiana through two

outlets, Lower Atchafalaya (70 percent of the discharge) and Wax Lake (30 percent) (Neill and Allsion 2005). The Wax Lake Outlet diverts about 30-40 percent of the Atchafalaya River water (approximately 10-12 percent of the Mississippi River discharge; Roberts et al. 2003).

River discharges and tidal movement influence the temperature and salinity regime, as well as concentrations of nutrients, trace metals, and suspended sediments in nearshore waters (Murray 1976). Maximum combined seasonal discharge from the Mississippi and Atchafalaya Rivers occurs in April, with minimum discharge occurring in September. Runoff volumes from other tributaries feeding the northcentral Gulf are typically highest in May (Barrett et al. 1973). The Atchafalaya River, with a drainage basin of approximately 228,410 $km^2$ when measured from just downstream of the confluence of the Red River and the Old River Control Structure to its outlets along the Gulf of Mexico, is one of the nation's largest river systems in terms of flow (Demas et al. 2001). Based on river flow data for 2001–2003, from the Simmesport gage, which is located upstream of Morgan City, Atchafalaya River flows in dry months were between 75,000-140,000 cubic feet per second (cfs) and between 200,000-450,000 cfs during the wetter months (ETS 2006). Annual mean river flow between 1935-2001 was 204,154 cfs (Walker et al. 2002).

In spring 2011, historic flooding occurred on the Mississippi River. With the volume of the Mississippi River flows reaching 1.5 million cfs and rising at Red River Landing and in close coordination with local, state and national partners and stakeholders, MVN commenced the partial opening of the Morganza Floodway on May 14, 2011. The Morganza Floodway is located 186 river miles above New Orleans on the west bank of Pointe Coupee Parish and is designed to divert a portion of the river's floodwaters southward guided by the East Atchafalaya River levee before joining the Atchafalaya River Basin Floodway near Krotz Springs, La. At peak operation, 17 of the 125 total bays were open and passed 182,000 cubic feet of water per second (USACE 2012). Peak discharge through the floodway occurred from May 18 to 22. MVN began closing bays on May 24, 2011, and completed that operation on July 7. Besides inundating floodplains, agricultural fields, and homes, the flooded Mississippi and Atchafalaya Rivers delivered huge sediment loads to the Gulf of Mexico and Atchafalaya Bay.

Coastal rivers may form distinct nearshore low salinity zones with widths determined by discharge volumes and turbulent mixing (Murray 1976). The extent of vertical and horizontal mixing within these low salinity zones will vary seasonally depending upon currents, winds and density differences between the freshwater plume and nearshore marine waters. Salinity generally increases with distance from shore and reflects the dilution of riverine water with greater volumes of saline Gulf water. Consequently, salinities are generally higher further offshore of the existing and proposed sites (Weissberg et al. 1980a). Vertical stratification may occur where freshwater river discharges intermix with Gulf waters (Turgeon 1981; Fotheringham and Weissberg 1979) when low salinity waters from coastal rivers overlay colder, more saline bottom waters during a period of minimal vertical mixing (Fotheringham and Weissberg 1979). Vertical stratification of the water column in the vicinity of the dredging reaches and ODMDSs may occur in summer, while the water column is well-mixed during winter (Weissberg et al. 1980a, 1980b). Summer intrusions of high salinity bottom waters occur in the mid-shelf area (Fotheringham and Weissberg 1979), with a strong halocline evident during the summer at a depth of 7 to 8 m (23 to 26 ft) (Weissberg et al. 1980a). Prolonged vertical stratification during summer can promote oxygen depletion in bottom waters, resulting in mass mortalities of benthic

organisms throughout large areas of the western and central Louisiana Shelf (Fotheringham and Weissberg 1979; Harper et al. 1981). Whether these intrusions are strong or occur frequently in the existing or proposed ODMDS-West is not clear, so it is not known if or how these intrusions of saline bottom waters affect the ODMDS-East or West. However, it should be noted that the ODMDS-West occurs in water that is between 2 and 7 m (6 and 23 ft) in depth; the more shallow water is not likely to allow for vertical stratification.

### 3.1.3.2 Circulation and Currents

Circulation in the Gulf of Mexico is complex and influenced by the Loop Current, tides, winds, and river discharge (U.S. Department of Energy [USDOE] 1978). The major feature of broad scale circulation in the Gulf is the Loop Current, which as a continuation of the Yucatan Current, enters the Gulf through the Yucatan Strait, penetrates up to 29°N in summer, turns clockwise, and leaves the Gulf through the Florida Straits. During winter, the Loop Current is confined to the southeastern Gulf, and passes through the Straits of Florida with little intrusion into the central Gulf (Hubertz 1967; Leipper 1970). Eddy-like rings pinched off from the Loop Current, have sufficient momentum to be major contributors to circulation in the central and western Gulf (Sturges and Leben 2000). These Gulf eddies may be higher in salinity than near-shore waters and may be zones of elevated nutrients relative to the surrounding Gulf waters.

Local currents in the vicinity of the existing and proposed ODMDSs are predominantly influenced by winds and, to a lesser degree, tides, Loop Current intrusions, and river flow. Net flow is to the northwest throughout most of the year (Wells et al. 1981; Weissberg et al. 1980a, 1980b). Prevailing south east winds break off warm core eddy's from the Gulf Loop Current and carry this warm tropical water further west along the Texas and Louisiana coast lines as the Louisiana-Texas Coastal Current (LTCC). The LTCC is a major dynamic feature responsible for the distribution of fresh water, sediment and nutrients on the northwestern shelf of the Gulf of Mexico (Jarosz and Murray 2005). Studies have indicated that this current exhibits a distinct although asymmetric annual cycle during which it flows downcoast, i.e., westward along the Louisiana coast and then southward along the Texas coast in fall, winter, and spring; however, in summer, the flow reverses and moves upcoast (eastward) (Wiseman et al. 1999; Jarosz and Murray 2005; Rouse et al. 2005).

Current speeds near the ODMDSs are typically 10.1 cm/s to 29 cm/s (0.33 to 0.98 ft/s [0.23 to 0.67 mph]) to the northwest, although this pattern is affected by passage of cold fronts, when current flows to the east at speeds ranging from 70 to 140 cm/s during strong winter storms (Weissberg et al. 1980a, 1980b; Wells and Kemp 1982). Walker et al. (2002) reported generally similar findings offshore of the ARBC. Frontal passages produce winds typically first from the southwest and then from the northwest. Teeter et al. (2003) report that these reversals occur 30 to 40 times per year leading to set-up and set-down in water levels up to 2.3–3.3 ft (0.7–1.0 m) in height and the formation of wind-driven currents (Walker and Hammack 2000). Walker and Hammack concluded that these water level changes lead to large NW–SE exchanges of water between Atchafalaya Bay and the coastal ocean, and lead to increased resuspension and Suspended Particulate Material (SPM) concentrations. Current velocities near the landward end of the ARBC are 9.1 to 48.8 cm/s (0.3 to 1.6 ft/s [0.20 to 1.09 mph]) and pulse related to tidal

changes. Currents do not fully reverse because of tide but change direction based on river flows to the south from Atchafalaya Bay and to the west from longshore drift.

Nearshore current patterns are somewhat more complex in summer. Net flow in the summer can either be to the east or the west (Crout and Hamiter 1981; Weissberg et al. 1980a). Minimum speeds of 6.1 to 33.5 cm/s (0.2 to 1.1 ft/sec [0.20 to 0.75 mph]) occur during June, July, and August (Weissberg et al. 1980a, 1980b).

Winds blowing towards the west occur 62 percent of the time (Walker and Hammack 2000) and these typically fair weather periods are characterized by small amounts of sediment transported to the west (Pepper et al. 1999). Winds are a particularly strong driving force in the late autumn, winter, and early spring. Net water flow in the winter is to the northwest; however, rapid flow reversals to the southeast occur periodically and follow changes in wind direction (Weissberg et al. 1980a, 1980b; Crout and Hamiter 1981).

In the absence of strong winds and the presence of a stratified water column, current patterns become considerably less distinct. Stagnant periods with little or no current motion have been recorded in April, May, and July, and may last for as long as six days (Weissberg et al. 1980a, 1980b). Tides may dominate current direction during winter periods of slack winds; however, tidal influences result in little or no net water or sediment displacement at the site.

With surface salinities during mean Atchafalaya River discharge ranging from 0.5 to 5 parts per thousand (ppt) along the channel, vertical stratification of salinity is common particularly in the ARBC, although not in the shallow waters adjacent to it (ETS 2006). This stratification is relatively persistent and at times reflects near-bottom flows moving landward at velocities up to 45.7 cm/s (1.5 ft/s [1.02 mph]) in the channel under surface flows moving the opposite direction towards the sea (Teeter et al. 2003). Stratification and current flows in the channel are believed to play important roles in concentrating fluff both vertically and longitudinally in the channel.

#### 3.1.3.3 Waves and Tides

Waves in the northern Gulf are a combination of wind-generated waves and swell entering from the open Gulf. Wave direction generally follows the wind direction and its seasonal patterns; wind and wave directions are similar to each other during 80 percent of the year (Wiseman et al. 1975: cited in Wells et al., 1981). According to Wiseman et al. (1975), 93 percent of the waves are under 1.5 m (5 ft) high, and 41 percent of these lower height waves approach from the southeast quadrant.

Tides are semidiurnal and diurnal with a mean range of 0.6 m (1.9 ft) near the landward end of the ARBC. Tidal currents are large relative to the remainder of the Louisiana-Texas coast with maximum surface current amplitudes of about 9.1 cm/s (0.3 ft/s [0.20 mph]) (DiMarco and Reid 1998). Tidal currents tend to increase as depth decreases nearer shore. The principal component of semidiurnal tides is the lunar component with a tidal ellipse oriented from north to south. Tidal flow within the tidal ellipse is clockwise. The principal lunar component of the semidiurnal tide propagates counterclockwise around the Gulf of Mexico. Diurnal tidal

components exhibit strong vertical shear and a tidal ellipse that is oriented from north-northeast to south-southwest.

### 3.1.3.4 Bathymetry

The Atchafalaya River and Atchafalaya Bay lie along the general boundary between two physiographic regions: (1) the Chenier Plain and (2) the Deltaic Plain (Kolb and Van Lopik 1958; Wells et al. 1981). The Chenier Plain, extending west from Marsh Island, Louisiana to East Bay, Texas has a relatively smooth and regular shoreline fronted by intermittent mudflats and breached by small inlets that connect with shallow marshy estuaries (Wells et al., 1981; Gosselink et al. 1979). The Chenier Plain system is a unique depositional environment consisting of successive beach and dune ridges lying on muddy marsh deposits that have been overlapped by younger mudflat marshes (Shepard 1973; Weissberg et al. 1980a). The Deltaic Plain is characterized by a shoreline with numerous bays and extensive marshes with numerous small lakes (Wells et al. 1981).

Most of Louisiana is located in the vicinity of the Gulf coast geosyncline, the axis of which generally corresponds to the trend of the present coastline (Weissberg et al. 1980a, 1980b). The geosyncline has been gradually subsiding since the early Mesozoic Era in response to the large amount of deltaic sedimentation from the Mississippi River and its tributaries and the tectonic regime associated with the opening of the Gulf of Mexico.

The continental shelf off eastern Louisiana has been completely overlapped by the Mississippi Delta during the past 500 years (Fisk et al. 1954). West of the Delta, a trough extends about 37 km (20 nautical miles) to the shelf edge and can be traced down the gentle outer slope over 92 km (50 nautical miles) until it emerges into the broad fan of the Mississippi Cone (Shepard 1973). Adjacent to this trough, the shelf off Atchafalaya Bay extends offshore to the shelf-break, which occurs at a depth of about 152 m (500 ft) (Shepard 1973). The shelf slopes gently basinward at about 0.04° to the continental slope.

Louisiana's coastal zone is covered predominantly by late quaternary sediments (Hall and Bouma 1976). The continental shelf west of the Mississippi Delta is blanketed by a thick layer of terrestrial sediments that grade from sand near the shore to silt and clay further offshore (Uchupi and Emery 1968). The nearshore coastal area of Louisiana is characterized by a shallow, gently sloping plain punctuated by sand and shell shoals. Several shoals are located near Atchafalaya Bay (Figure 1-3): (1) Ship Shoal, located 46 km (29 miles) east of the ODMDS-East, (2) Trinity Shoal, approximately 45 km (28 miles) west of the ODMDS-East, and (3) Tiger Shoal, located inshore of Trinity Shoal (NMFS 1980). Two unnamed shoals are located immediately west (approximately 4.7 km [2.9 miles]) of the seaward end of the ODMDS-East (NMFS 1980). The nearshore shoals typically rise 1.8 to 4 m (6 to 13 ft) from the bottom to a depth of 1.8 to 4 m (6 to 13 ft) below the water surface (NMFS 1980). Point au Fer Shell Reef is a massive shell reef that lies about 5.6 km (3.5 miles) shoreward of the ODMDS-East; this reef is roughly 0.9 km (0.58 mile) wide and extends nearly 37 km (23.0 miles) across the mouth of Atchafalaya Bay (USACE 1978).

Two major types of deposition occur in the Louisiana coastal area (Coleman 1966; Hall and Bouma 1976). One is a result of sediment input from present and former Mississippi River distributaries. Examples of this type of deposition are the Mississippi Delta and the present prograding Atchafalaya River Delta. The other depositional regime is a result of coastal sediment transport processes outside of the areas of deltaic sedimentation. These processes have produced features such as mud flats and the Chenier Plain west of Marsh Island.

The Atchafalaya River is a distributary of the Mississippi and has a natural sediment load estimated to be approximately 40 to 50 percent of the combined discharge from the Mississippi and Atchafalaya Rivers (Walker and Hammack 2000). Starting in about 1952, accelerated sedimentation in Atchafalaya Bay marked the beginning of subaqueous delta growth (Shlemon 1975). From that time to 1973, prodelta clays and silty clays aggraded the bay bottom seaward of both the Lower Atchafalaya River outlet and the Wax Lake outlet. Since that time, sands have been prograding over finer delta clays and silts, and areas of emergent vegetation have expanded rapidly in Atchafalaya Bay (Roberts and Van Heerden 1982). With mean circulation and subsequent sediment transport in an east to west direction, longshore transport will continue to extend coastal progradation in that direction (Roberts and Van Heerden 1982; Neill and Allison 2005). While some researchers have theorized the complete infilling of Atchafalaya Bay with the subaerial delta prograding onto the continental shelf within decades (Shelmon 1975; Roberts and Van Heerden 1982), Neill and Allison (2005) predict the final accretion to sea level and complete filling of the outer Atchafalaya Bay, with subsequent prograding over the surface of the adjacent shelf, on timescales of 100s of years. Neill and Allison attribute these less rapid predictions for subaerial delta growth to factors such as subsidence, benthic shear stresses during winter storms, dredged material disposal activities, and reduced sediment accumulation rates relative to further offshore.

### 3.1.4 Water Quality

The chemical parameters that reflect the affected environment and potential impacts of an ODMDS include suspended solids, nutrients important to phytoplankton growth (ammonia, nitrates and phosphates), dissolved and particulate trace elements (such as cadmium, mercury. and lead), and synthetic organic compounds (such as polychlorinated biphenyls [PCBs], chlorinated pesticides and herbicides, and phenolic compounds). High levels of suspended solids can reduce light penetration through the water column and inhibit phytoplankton productivity. Suspended solids may also block the respiratory structures of fishes and other organisms. Nutrients are essential for growth and reproduction of phytoplankton; however, under certain conditions and at elevated levels, these nutrients can promote eutrophication and subsequent depletion of dissolved oxygen.

As part of its surface water quality monitoring program, the Louisiana Department of Environmental Quality (LDEQ) routinely monitors 25 parameters on a monthly or bimonthly basis using a fixed station, long-term network (Monitored Assessments) (LDEQ 1996). Based upon those data and the use of less-continuous information (Evaluated Assessments), such as fish tissue contaminants data, complaint investigations, and spill reports, the LDEQ has assessed water quality fitness for the following uses: primary contact recreation (swimming), secondary contact recreation (boating, fishing), fish and wildlife propagation, drinking water supply, and

oyster propagation (LDEQ 1996). Based upon existing data and more subjective information, water quality is determined to either fully, partially, or, not support those uses. A designation of "threatened" is used for waters that fully support their designated uses but that may not fully support certain uses in the future because of anticipated sources or adverse trends in pollution. According to the Louisiana Department of Environmental Quality (LDEQ) *2010 Louisiana Water Quality Inventory: Integrated Report (305(b)/303(d)* (LDEQ 2011), the Atchafalaya Bay and Delta and Gulf Waters to State 3 mile limit (segment LA010901_00)) fully support the designated water body uses for primary and secondary contact recreation uses. The segment does not support the designated use for fish and wildlife propogation or oyster propagation. Impairment of the oyster propogation use is due to pathogens (fecal coliform bacteria). Suspected sources of impairment of the oyster propogation use include permitted discharges, permitted petroleum/natural gas production activities, and natural sources. Impairment of the fish and wildlife propogation use is due to mercury in fish tissue. Suspected sources of impairment of the fish and wildlife propogation use include atmospheric deposition-toxics and unknown sources. As a result of the segment's 303(d) listing (i.e., impaired water), and in accordance with Section 303(d) of the Federal Clean Water Act, the LDEQ is required to prepare a total maximum daily load (TMDL) for fecal coliform bacteria for the entire length of Grand-Tiger Pass. A TMDL is the amount of a pollutant that a waterbody can assimilate without exceeding the established water quality standard for that pollutant. Through a TMDL, pollutant loads can be allocated to point sources and nonpoint sources discharging to the waterbody, and target loads can then be calculated.

In February 2008, water and sediment samples from the ARBC, a Reference Area, and the Section 103(b) ODMDS-West were collected for chemical and grain size analyses, water column toxicity bioassays, benthic toxicity tests/solid phase toxicity bioassays, and bioaccumulation tests (PBS&J 2008). Results of these analyses were evaluated pursuant to the EPA criteria at 40 CFR, Part 227 and 228. The evaluation indicates that the dredged material proposed for disposal into the proposed Section 102(c) ODMDS-West is suitable for open water disposal without special management conditions.

On April 21, 2010, an explosion occurred onboard the mobile drilling platform *Deepwater Horizon* in the Gulf of Mexico. The rig sank approximately 52 miles southeast of Venice on April 22, 2010, causing a massive oil spill and continuous release of approximately 206 million gallons of crude oil over an 85-day period about 40 miles southeast of Federal navigation dredging areas at the mouth of the Mississippi River. In the wake of the *Deepwater Horizon* oil spill, MVN has been closely monitoring aerial reconnaissance surveys, shoreline assessment reports, drogue tracks, and other oil plume tracking and contaminant information available from the National Ocean Service, Office of Response and Restoration, ResponseLINK website (https://responselink.orr.noaa.gov/).

A report entitled "Summary Report for Sub-Sea and Sub-Surface Oil and Dispersant Detection: Sampling and Monitoring" was prepared for the USCG Federal On-Scene Coordinator for the *Deepwater Horizon* incident by the Operational Science Advisory Team, and provided to MVN in December 2010. A review of the report's sediment and water quality data revealed that oil-related contaminants and dispersants from the incident did not impact the Atchafalaya Bay.

A query of the USCG National Response Center database revealed no reported significant spills or other incidents of significant pollution in the vicinity of the ARBC and adjacent disposal areas from August 31, 2010 thru July 12, 2012.

Based on MVN's review of oil spill tracking and contaminant information pertaining to the *Deepwater Horizon* incident, the sampling and analyses performed in 2008 for the ARBC as part of the contaminant assessment, and the lack of any additional significant spills or incidents of pollution in the project vicinity since 2010, there is no reason to believe that dredged material from future maintenance events in the ARBC portion of the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana project would be unsuitable for open water disposal.

### 3.1.4.1 Temperature

Factors influencing water temperatures in the study area include discharges from the Atchafalaya and Mississippi Rivers and ambient Gulf water temperatures. The latter are affected by the climate of the northern Gulf of Mexico and currents that affect the temperature distribution of Gulf waters, including the Loop Current and other local current patterns. Holland et al. (1983) observed Atchafalaya River temperatures ranging from 4.5°C to 32.0°C (40°F to 89°F). River water temperatures varied with season and river stage. Monthly average coastal water temperatures measured at Grand Isle, Louisiana range from 16.1°C (61°F) in January to 29.4°C in July and August (NOAA 2008). Water temperatures measured by PBS&J (2008) during the February 2008 sampling event for the contaminant assessment ranged from 13.2°C to 17.2°C (56°F to 63°F), with temperature generally increasing with distance from the shoreline (Table 2.3-3). The April 2002 temperature measurements along the ARBC indicated that the warmest waters occurred at the mid-point of the dredged channel, with lower water temperatures closer to shore and deeper waters (Table 2.3-3). Observed temperatures ranged from 16.6°C to 20.9°C (62°F to 21°F). Water temperatures measured during December 1996 also indicated increasing water temperatures with distance from shoreline, ranging from 11.9°C to 18.2°C (53°F to 65°F) (Table 2.3-3).

### 3.1.4.2 Salinity

Salinity of open marine waters is typically on the order of 35 ppt under normal conditions. Inputs of freshwater from the Atchafalaya and Mississippi Rivers affect the areal and temporal distribution of water salinity at the ARBC and disposal areas, with the variations related to regional current patterns and the volume of river discharges. River waters are typically much lower in salinity. Holland et al. (1983) observed total dissolved solids concentrations in lower Atchafalaya River waters ranging from 146 to 347 mg/L, which would be equivalent to salinity values of less than 1 ppt. The LATEX A-Team (1996) observed seasonal trends in salinity across the northern Gulf related to weather-related current patterns. They noted that typical salinities in November were lower along the northern coast, as low salinity river discharges diluted marine waters along the coast. During summer conditions, currents oriented along the western Gulf coast confine river discharges to the central portion of the northern Gulf coast, decreasing salinities in the project area compared to shelf waters further west and south. Flemer et al. (1994) observed salinities in nearshore areas approaching freshwater conditions, while salinities near the offshore disposal areas were approximately 25 ppt.

Salinity data collected from the project area during February 2008 as part of the contaminant assessment indicated salinities ranging from just below 6 ppt to nearly 32 ppt, with salinity generally increasing with distance from the shoreline along the ARBC and disposal areas, and the highest values observed at the reference location southeast of the channel (Table 2.3-3). Data from the April 2002 sampling event showed more homogeneous salinity distribution across the area, with salinity ranging from 11 to 13.5 ppt (Table 2.3-3). The December 1996 salinity measurements along the channel ranged from 0 to nearly 22 ppt, with salinity increasing with distance from the shoreline (Table 2.3-3). ETS (2006) reported salinities ranging from only 0.5-5 ppt along the ARBC creating a vertically stratified water column at the mixing zone where the two opposing water masses meet. These data reflect the localized influence of Atchafalaya River discharges on salinity in the project area, with seasonal variations observed similar to those described by Walker and Hammack (2000).

### 3.1.4.3 Dissolved Oxygen

Dissolved oxygen concentrations in the project area were observed to generally range from 6 to 7.5 mg/L (Flemer et al. 1994). These findings indicate that oxygen concentrations were above the range of values generally accepted as an indication of hypoxic conditions (<2 mg/L). Oxygen depletion has been described as a seasonally dominant feature in the north central Gulf of Mexico that reflects the influence of discharges from the Mississippi and Atchafalaya Rivers (Rabalais et al. 1991, 1992, 1994, 1995). However, other investigators have found complex relationships among inputs of organic matter, nutrients and development of hypoxic conditions in the northern Gulf of Mexico. Krug (2007) attributes development of the seasonal hypoxic zone to input of nutrients to the shallow marine environment related to wetland losses in Barartaria and Terrebonne Bays, as well as discharges from the Mississippi and Atchafalaya Rivers, with the input of the Atchafalaya River being of increased importance with increased sediment deposition in Atchafalaya Bay and the nearby shelf since the flood event of 1973. Eadie et al. (1994) found a general correlation between increased nutrient loading in the Mississippi River discharge and primary productivity of the marine environment of the central Gulf shelf. Gordon and Goñi (2003) described a complex relationship between organic matter types deposited in shelf sediments near Atchafalaya bay, with contributions from grassy plant debris and soil organic matter related to river discharges and marine organic matter. Marine organic matter was found to have a significant contribution to shelf sediments present at depths greater than 10 m (33 ft), indicating primary productivity was important in at water depths greater than those present at the ARBC and the disposal areas.

Dissolved oxygen concentrations observed in the project area have not indicated the presence of hypoxic conditions (Table 2.3-3). Data from the February 2008 sampling efforts for the contaminant assessment show that dissolved oxygen concentrations in the project area ranged from 7.6 to 9.6 mg/L. At the salinities and water temperatures present during the sampling event, these concentrations indicate that the waters were near the saturation limit for dissolved oxygen (Weiss 1970). The April 2002 measurements of dissolved oxygen at the ARBC ranged from 5 to 7.7 mg/L, with the higher concentrations generally observed closer to the shoreline. Based on the results, hypoxic conditions were not present in the study area during the sampling

event. The December 1996 sampling data also reflect the presence of well oxygenated waters across the ARBC project area, with concentrations ranged from 6.7 to 7.7 mg/L.

#### 3.1.4.4 pH

The pH of marine waters is typically slightly alkaline, reflecting the buffering alkalinity produced by the carbonate system, with observed values in shallow waters typically between 7.8 and 8.5 (Drever 1982). Data from the February 2008 sampling efforts for the contaminant assessment indicate that pH ranged from 7.5 to 8.1 across the study area (Table 2.3-3). Results for pH measurements from the December 1996 sampling event ranged from 7.2 to 8.3, reflecting the neutral to mildly alkaline conditions expected in an area of marine waters influenced by the discharge of fresh water from the Atchafalaya River (Table 2.3-3).

#### 3.1.4.5 Nutrients

The discharge of the Atchafalaya River has a significant impact on the concentration of nutrients in the coastal zone, and these nutrient loadings contribute to the development of hypoxia that is observed on a seasonal basis in the north central Gulf. Caffrey and Day (1986) investigated variations in nutrient concentrations in Atchafalaya Bay during high spring discharge of the Atchafalaya River and during passage of cold fronts. The results illustrated how the physical factors of tides, winds, and river discharge interact to control nutrient concentrations. Atchafalaya River discharge waters typically have high suspended solids, nitrate, total phosphorus and total nitrogen concentrations compared to nearshore Gulf waters that are not influenced by riverine discharges. Holland et al. (1983) observed nutrient concentrations in the Atchafalaya River near its discharge to the Gulf of 0.02 to 0.72 mg/L total phosphorous and 0.6 to 8.6 mg/L total nitrogen. Ammonia-nitrogen was detected in water samples from the February 2008 sampling event at concentrations ranging from 1.3 to 1.8 mg/L (Table 2.3-5), less than the chronic water quality criteria of 2.58 mg/L (EPA 1989). Previously, ammonia-nitrogen was detected at up to 0.18 mg/L during the April 2002 sampling event (Table 2.3-5). The ammonia-nitrogen concentrations present in the water samples generally correlated with the observed concentrations in the associated sediment samples collected at each location for both events (Tables 2.3-1 and 2.3-5).

During the May 2011 flood event, stream-flow rates in the Mississippi and Atchafalaya Rivers were nearly twice that of normal conditions. This significantly increased the amount of nitrogen transported by the rivers into the Gulf of Mexico. According to USGS estimates, 164,000 metric tons of nitrogen (in the form of nitrite plus nitrate) were transported by the Mississippi and Atchafalaya Rivers to the northern Gulf (USGS 2012). The amount of nitrogen transported to the Gulf in May 2011 was 35 percent higher than average May nitrogen loads estimated in the last 32 years (Coastal Care 2012).

#### 3.1.4.6 Turbidity and Suspended Solids

Turbidity in this part of coastal Louisiana is influenced by resuspension of sediments and runoff from the Atchafalaya River (Walker and Hammack 2000). The discharge plume from the Atchafalaya River has been detected as far as 29 km (18 miles) offshore (Walker and Hammack

2000). Concentrations of TSS commonly range from 250 to 400 mg/L in Atchafalaya Bay, but increase to more than 800 mg/L seaward of the Point au Fer Shell Reef with some measurements up to 2,300 mg/L in the ARBC (ETS 2006). The increase in concentration results from wave resuspension of soft sediments deposited rapidly as prodelta clays during calm weather periods. The concentrations of suspended sediments in the turbid zone decrease across the shelf to the plume edge approximately 25 to 28 km (15 to 17 miles) offshore. Outside the plume, typical shelf suspended sediment concentrations are 1 mg/L or less. The inorganic sediment fraction was 80 percent or more of the suspended solids by weight when the total suspended solids concentrations exceeded 10 mg/L (Walker 2001) distributions and concentrations of trace metals in the Gulf of Mexico are variable and probably related to land runoff, biological activity, man-made inputs and physical processes (Frey et al. 1981; Trefry 1981; Phillips and James 1988). The Atchafalaya River (including the Red River) carries about 30 percent of the volume and 40-50 percent of the suspended sediment load of that in the Mississippi River (Mossa and Roberts 1990; Myint and Walker 2002). Sediment loading to the shelf from the Atchafalaya River discharge increased greatly after the 1973 flood in the Mississippi River Basin, with annual sediment discharge to the estuarine and marine environment estimated at over 200 mcy per year (Krug 2007). In spring 2011, the flooded Mississippi and Atchafalaya Rivers delivered huge suspended sediment loads to the Gulf of Mexico and Atchafalaya Bay. Approximately two times more suspended sediment entered the Gulf of Mexico from the Atchafalaya River Basin than from the main stem of the Mississippi River (Welch et al. 2012). Recent studies by Khan et al. (2011) found that post-flood sediment accumulation was greatest in the Atchafalaya Basin (1.61 ± 0.96 g cm-2) compared to the Mississippi Delta, Barataria, and Terrebonne basins. Since the flood, the USGS has been monitoring sediment dynamics in the Atchafalaya River and Bay to understand the impacts on the basin's ecosystem.

### 3.1.4.7 Trace Metals

Distributions and concentrations of trace metals in the Gulf of Mexico are variable and probably related to land runoff, biological activity, man-made inputs and physical processes (Frey et al. 1981, Trefry 1981, Phillips and James 1988). Several trace elements are necessary micronutrients for life processes of organisms; however, metals such as mercury and cadmium can be toxic when present at elevated concentrations in water or in food sources. The major source of dissolved and particulate trace metals to the Gulf is discharge from the Mississippi and Atchafalaya Rivers. In previous studies of sediment quality in the project area, trace metal concentrations in waters from the ARBC and comparable reference stations were below detection limits (Dettmann and Tracey 1990; Trulli 1996). Results from sampling event for the 2008 contaminant assessment detected antimony, arsenic, cadmium, chromium, copper, nickel selenium and zinc in waters at the ARBC area (Table 2.3-5; PBS&J 2008). None of the observed concentrations exceeded available Federal Water Quality Criteria for protection of aquatic life in marine environments or Louisiana Water Quality Standards for either acute or chronic effects (Table 2.3-5). One sample contained copper at approximately 30 percent of the applicable water quality standards, all other concentrations detected were at least an order of magnitude smaller than the Standards or Criteria. Results of the April 2002 and December 1996 sampling events and contaminant assessments also did not detect any metals at concentrations at or above applicable water quality standards or criteria (Table 2.3-5; Espey, Huston & Associates, Inc. 1997; PBS&J 2002).

#### 3.1.4.8 Organic Compounds

Studies of water quality in the project area have found that concentrations of potential organic contaminants were below detection limits for volatile organic compounds, semivolatile organic compounds, chlorinated pesticides and herbicides, and polychlorinated biphenyls (Dettmann and Tracey 1990; Trulli 1996). These organic contaminants were not detected in water samples collected from the project area during the February 2008, April 2002 and December 1996 sampling events conducted for contaminant assessments (Table 2.3-5; Espey, Huston & Associates, Inc. 1997; PBS&J 2002; PBS&J 2008). TPH was detected in water samples from the April 2002 sampling event at concentrations up to 2.7 mg/L (Table 2.3-5). TPH was not detected in water samples collected during other sampling events, indicating the presence of petroleum in the environment has not persisted over time at these concentrations in the project area.

### 3.1.5 Sediments

#### 3.1.5.1 Sediment Quality and Characteristics

##### 3.1.5.1.1 Sediment Quality

The February 2008 sampling event for the contaminant assessment included collection of sediment samples for analysis from three locations in the proposed (ODMDS-West) disposal area, three locations along the ARBC channel alignment, and the reference area southeast of the channel (Tables 2.3-1 and 2.3-2; PBS&J 2008). Arsenic, beryllium, cadmium, chromium, lead, nickel and zinc were detected at most channel and disposal area locations and at the reference location. The observed concentration ranges of each of these metals in the channel and disposal area sediments were similar to the concentrations in the reference area. Selenium was detected at one channel sample location, and was not detected in the disposal area or reference area sample. Thallium was not detected in the channel sample locations, but was present at a concentration just above the detection limit at the disposal area and reference location. Total and trivalent chromium results were similar for each sample, reflecting the absence of hexavalent chromium in the maintenance-dredged material and surrounding area.

Ten samples for sediment quality were collected along the ARBC channel alignment for the 2002 contaminant assessment, along with sampling of the reference area (Table 2.3-1; PBS&J 2002). Overall, the observed metals concentrations were similar to the results of the channel sampling conducted in 2008. Silver was detected in one channel sample and the reference area at concentrations just above the detection limit. Sixteen samples were collected for analysis of sediment quality during the 1996 contaminant assessment (Table 2.3-1; Espey, Huston & Associates, Inc. 1997). Arsenic, beryllium, cadmium, silver, thallium, and trivalent chromium were not detected in the 1996 analyses. In general, the concentrations of other metals were observed at ranges similar to those found in the 2008 and 2002 results, as well as the reference area concentrations for the 1996 sampling event (Table 2.3-1). Zinc was detected at 112 milligrams per kilogram (mg/kg) in one sample, but the results do not indicate the presence of contamination based on the observed range and distribution of zinc concentrations.

In addition to metals, sediment samples from the ARBC and proposed ODMDS-West disposal area collected during the 2008, 2002 and 1996 sampling events were also analyzed for inorganic and organic priority pollutants (Tables 2.3-1 and 2.3-2; Espey, Huston & Associates, Inc. 1997; PBS&J 2002; PBS&J 2008). Ammonia and total organic carbon were the only non-metals detected. Total organic carbon was detected at channel and disposal area locations and reference area locations at concentrations below 5 percent during both the 2008 and 2002 sampling events. No organic carbon was detected in any channel samples from the 1996 contaminant assessment, with a detection limit of 0.1 percent.

Ammonia was detected at all ARBC and disposal area locations and at the reference area during the 2008 sampling event (PBS&J 2008). With observed concentrations ranging from just over 240 mg/kg to nearly 300 mg/kg at the channel and reference areas, and 212 mg/kg to 253 mg/kg at the disposal area (Tables 2.3-1 and 2.3-2), the results indicate the widespread presence of available nitrogen that has the potential to act as a nutrient for biological activity. Research on the distribution of organic nitrogen in the northern Gulf of Mexico indicates that riverine sources such as the Mississippi and Atchafalaya Rivers are the predominant sources of available nitrogen (Lopez-Veneroni and Cifuentes 1994). Changes in ammonia concentrations over time throughout the project are shown by comparison of the 2008 data with the 2002 and 1996 sampling results for ammonia (Table 2.3-1). The 2002 data indicated a much greater variability in ammonia concentrations across the study area, with concentrations ranging from 5 to nearly 200 mg/kg, with lower concentrations present at select locations in the ARBC and at the reference area. Even lower concentrations were observed in the 1996 data, with a maximum observed concentration of 29 mg/kg from the channel, and 5 mg/kg at the reference area. Because of the similarities in ammonia concentrations observed at the channel, disposal area, and reference area for the sampling events, dredged material placement is not expected to change the sediment quality in the disposal area.

Sediments from the ARBC sampled to characterize dredged materials have also been analyzed to determine concentrations of potential organic contaminants, including total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAHs) and chlorinated pesticides, herbicides and polychlorinated biphenyls (PCBs) (Table 2.3-1). These compounds are present in emissions and discharges from a variety of industrial processes and pollution sources, and they may persist in the environment and bioaccumulate. Bis (2-ethylhexyl) phthalate, a plasticizer and common laboratory contaminant, was detected in 3 of 10 channel samples and the reference sample from the 2002 sampling event, with observed concentrations from just over 100 micrograms per kilogram (µg/kg) to nearly 250 µg/kg. This compound was not detected in the 2008 or 1996 sampling events. The PAHs chrysene, fluoranthene and pyrene were detected in 1 of 16 channel samples from the 1996 event, with concentrations below 50 µg/kg. TPH was detected in 5 of 10 channel samples from 2002, with concentrations ranging up to nearly 350 mg/kg. Chemical analyses, suspended particulate phase bioassays, solid phase bioassays, and bioaccumulation studies conducted in 2008 indicated no causes for concern (PBS&J 2008). The NOAA Effect Range – Low (ERL) for arsenic was exceeded in some channel sediment samples from the 2008 contaminant assessment, but the bioassays and bioaccumulation studies conducted as part of the assessment indicated no concern. The presence of these organic compounds in limited sampling results from individual sampling events reflect the changing conditions over

time, and do not indicate a persistent, contiguous area of organic sediment contamination in the channel and reference areas.

A report entitled "Summary Report for Sub-Sea and Sub-Surface Oil and Dispersant Detection: Sampling and Monitoring" was prepared for the USCG Federal On-Scene Coordinator for the *Deepwater Horizon* incident by the Operational Science Advisory Team, and provided to MVN in December 2010. A review of the report's sediment quality data revealed that oil-related contaminants and dispersants from the incident did not impact the Atchafalaya Bay.

A query of the USCG National Response Center database revealed no reported significant spills or other incidents of significant pollution in the vicinity of the ARBC and adjacent disposal areas from August 31, 2010 thru July 12, 2012.

Based on MVN's review of oil spill tracking and contaminant information pertaining to the *Deepwater Horizon* incident, the sampling and analyses performed in 2008 for the ARBC, and the lack of any additional significant spills or incidents of pollution in the project vicinity since 2010, there is no reason to believe that dredged material from future maintenance events in the ARBC of the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana project would be unsuitable for open water disposal.

#### 3.1.5.1.2 Sediment Characteristics

Sediments on the shelf off the Atchafalaya Bay range from sand to clayey silt to silty clay. Nearshore sediments are predominately (>95 percent) silts and clays. Sediments become increasingly coarse in the seaward direction; at approximately the 10-m contour, sediments are predominately (>70 percent) sand (Hausknecht 1980; Weissburg et al. 1980b). Seaward of the 10-m (35-ft) contour, sediments consist of clayey silts and silty clays. Grain size generally becomes coarser during the winter months due to the resuspension of silts and clays by storm turbulence (Hausknecht 1980). Sediments over this region are chiefly of terrigenous origin, containing less than 30 percent calcium carbonate (Uchupi and Emery 1968). The shelf also contains numerous hills largely composed of salt domes and partly of mud diapers (Uchupi and Emery 1968; Shepard 1973).

The shelf in the vicinity of the ARBC is considered a dispersive area where maintenance-dredged material is expected to erode because of the energy resulting from waves and currents (USACE 1996). The bottom sediments of the nearly flat (regional slope of about 0.03°) inner Gulf shelf surrounding the ARBC consist of fine muds and silts (Adams et al. 1982; Neill and Allison 2005).

During IEC (1983) surveys in December 1980 and May - June 1981, surficial sediments in the ODMDS-East were predominantly silts and clays. In December 1980 and May - June 1981, the percentage of fines (silt and clay) and sand ranged from 82 to 100 percent and from 0 to 18 percent, respectively. The clay fraction was slightly higher in May - June than in December. This was probably a function of lower wave current energy in late spring and summer relative to winter, and inputs of fines from the river in spring.

Surface sediments in the ODMDS-West are predominately silt and clay (IEC 1983; Dettman and Tracey 1990; Flemer et al. 1994; Trulli 1996; PBS&J 2008). Grain size analysis of the sediments sampled as part of the contaminant assessments conducted by PBS&J (2008) found material from the ODMDS-West consisting of approximately 1-23 percent sand, 21-33 percent silt, and 45-78 percent clay (Table 2.3-2).

The maintenance-dredged material in the ARBC is generally comprised of silt with some sand and clay (7-12 percent sand, 81-88 percent silt, and 6-7 percent clay) (PBS&J 2008). Finer sediments are generally found towards the south end of the channel. Grain size analyses of dredged material sediments based on the samples collected for the 2008, 2002 and 1996 contaminant assessments are listed in Table 2.3-1, along with the results of chemical analyses. It is interesting to note that since the 1996 contaminant assessment, grain size distribution at the ARBC reference station (located southeast of the ARBC) has changed over time, with the silt component increasing from 44 percent in 1996 to 81 percent in 2008. This mirrors, somewhat, a similar trend in dredged material grain size distribution at the ARBC, where the silt component has increased from 22-53 percent in 1996 to 81-88 percent in 2008. While the naturally variable sediment characteristics in the vicinity make it difficult to make inferences as to what may cause the apparent changes in grain size here over time, it is possible that sediments from the ARBC—particularly from the south end of the channel where finer sediments predominate—are occasionally (e.g., during winter cold fronts) transported in the direction of the reference station where they may ultimately settle and accumulate.

### 3.1.5.2 Sediment Transport

The Atchafalaya River and the expanding deltas at its outfall into the Gulf of Mexico provide sediment essential for offsetting coastal land loss. The actively prograding deltas in Atchafalaya Bay are one of the few remaining portion of Louisiana's coastal region where land mass is being created. Prior to 1952, significant deltaic sedimentation was confined almost exclusively to the interior of the Atchafalaya Basin, with the major portion of the rivers sediment load being deposited in the many lakes, swamps, bayous and other catchments located throughout the basin. Two significant events took place between the 1940s and 1950s, which significantly altered the sedimentation patterns within the basin and increased the sediment load discharging into Atchafalaya Bay. First, the last of the major lakes in the southern Atchafalaya Basin (Grand Lake and Six-Mile Lake) was filled with delta deposits and second, the USACE constructed the Wax-Lake Outlet flood-conveyance channel from Six-Mile Lake to Atchafalaya Bay. These events both decreased the storage capacity and trapping efficiency of the basin while increasing the efficiency and ability for the river to deliver sediments, primarily as suspended load, to Atchafalaya Bay. Since this time over 150 $km^2$ of new land has developed in Atchafalaya Bay (OCPR 2011). The Atchafalaya and Wax Lake deltas have rapidly evolved through the processes of seaward channel extension and bifurcation as well as lobe fusion and upstream growth by coarse sediments (primarily fine sand). This process is characteristic of the early constructional phase of the delta cycle and signifies that the Atchafalaya-Wax Lake system is the latest lobe within the Mississippi River Delta Plain (Roberts et al. 2003).

Atchafalaya River flows at Morgan City ranged from 2,124 to 3,964 cubic m/sec (75,000 to 140,000 cubic ft/sec) during dry months (July through November) and up to 200,000 to 450,000

cubic ft/sec during wetter months (December through June) over the period from 2001 to 2003 (ETS 2006). River flows transport large amounts of sediment into Atchafalaya Bay and into the vicinity of the ARBC. The ARBC is at the seaward end of the Atchafalaya River that receives about 30 percent of the volume and 40-50 percent of the suspended sediment load (and as much as 60 percent of the bedload [Hupp et al. 2008]) of that in the Mississippi River (Mossa and Roberts 1990; Myint and Walker 2002; Mead and Moody 2010). Teeter et al. (2003) report that the current freshwater river flow carries 94 million tons (9.55×107 kg) per year of sediment into the top of the Atchafalaya River Basin. The majority of this sediment is believed to be carried down the river and deposited in the basin and deltas which make up the Atchafalaya Bay. Huh et al. (1996) and Walker et al. (2002), respectively, predict 88 and 80 million tons of sediment per year enters Atchafalaya Bay of which Thomas et al. (1988) estimate 25 percent, or approximately 22 million tons (2.2 × 107 kg), remains in the bay itself. Teeter et al. (2003) estimate roughly 18 million tons of silt and 27 million tons of clay pass through the Bay near the landward end of the ARBC each year. More recent sediment flux estimates at Simmesport suggest a decreasing sediment supply to the basin due to declining sediment loads in the Mississippi and Red Rivers (Galler and Allison 2008; Hupp et al. 2008; Kirkeeng 2010; Meade and Moody 2010). However, data presented by both Roberts et al. (1997) and Twilley et al. (2008) describing the flux of sediment through the Wax Lake Outlet and past Morgan City do not show a similar decrease as that observed at Simmesport. Typical annual dredging for the ARBC is between 9-11 mcy/yr of dredged material (Teeter et al. 2003).

The Mississippi River flood of 2011 delivered vast quantities of sediments to the Gulf of Mexico and Atchafalaya Bay. Approximately two times more suspended sediment entered the Gulf of Mexico from the Atchafalaya River Basin than from the main stem of the Mississippi River (Welch et al. 2012). Recent studies by Khan et al. (2011) found that post-flood sediment accumulation was greatest in the Atchafalaya basin (1.61 ± 0.96 g cm-2) compared to the Mississippi Delta, Barataria, and Terrebonne basins. Since the flood, the USGS has been monitoring sediment dynamics, including sediment depositional patterns, in the Atchafalaya River and Bay to understand the impacts on delta development and the basin's ecosystem.

The sediment-laden water from the Atchafalaya River creates a turbid plume usually directed towards the west along the shore that is visible from satellites. Murray (1998) found the sediment plume from Atchafalaya Bay flowed to the west particularly during fall, winter and spring but its direction of travel could change rapidly with major wind direction shifts. Annual loading of sediment discharges from the Atchafalaya River increased significantly with the 1973 flood event, which increased the percentage of Mississippi River flow and sediment load captured by the Atchafalaya River.

The ARBC crosses a shallow, flat, reach of the inner Gulf of Mexico shelf with bottom sediment consisting of fine particles, easily resuspended into the water column. These resuspended sediments may be transported in several different directions depending on wind direction and strength, river flows, longshore currents and tides. The erosive conditions that are favorable to repeated open-water, dispersive disposal of most maintenance-dredged material from the channel, facilitate transport of fine sediments into the channel. Channel morphology (relatively deep compared to the surrounding inner shelf bottom) and its orientation (perpendicular to typical long shore currents) enhance the capture and retention of sediments.

Cold front passages occur between October and April on three- to five-day cycles. Winter storms that occur 20 to 30 times each year may reverse the direction of flow generally towards the southeast (Walker and Hammack 2000); however, the direction of sediment transport may vary widely (Pepper et al. 1999). Turbidity, probably as a result of sediment resuspension, increases during these events when the wind is blowing offshore. Seventy to 80 percent of the sediment load in these situations is resuspended from the Gulf bottom by waves and the remainder is advected from Atchafalaya Bay (Walker and Hammack 2000).

Several studies document fluff, or fluid mud, accumulations on the inner shelf and within the ARBC. Teeter et al. (2003) defines fluff as 'sediment material with solids content and bulk density less than about 18.7 and 75 dry pound per cubic yard (300 and 1200 kg m–3), respectively, and a corresponding moisture content (water weight over sediment weight) above about 300 percent'. Teeter et al. (2003) suggest that fluff forms by the rapid deposition of fine-grained silt and clay flocs from suspension and is maintained by periodic agitation (such as waves, currents or vessel navigation). Such material might not impede navigation, but left undisturbed, it settles, loses volume and converts to fluid mud, which in turn densifies into a fully-settled bed'. Observations by SCUBA over a 22-year period revealed unconsolidated mud layers on the shelf in the study area up to 0.9 m (3 ft) thick (Van Heerden and Kemp 2000). Measurements of fluff in the channel ranged from 0.9 to 3.5 m (3 to 11 ft) thick and could vary in the same location up to plus or minus 0.6 m (2 ft) over a 6-week period. They also report observing fluff washing out of the channel when vessels passed. Teeter et al. (2003) measured accumulations of fluff in the channel over a similar channel reach to that observed by Van Heerden and Kemp. Other studies reported development of fluff over the inner shelf, particularly during and after frontal passage.

The transport of fine sediments, from both fluvial sources and littoral drift, contributes to the substantial shoaling that occurs in the ARBC. Persistent shoaling occurs in the vicinity of the mixing zone, where the freshwater and saline water meet. The meeting of the two sometime opposing water masses leads to a slowing down of water velocities increasing flocculation and settling of suspended sediment. According to ETS (2006), the mixing zone and resultant shoal is generally located in the ARBC around Channel Station 800+00 (18,000 m upstream of the seaward end of the channel). The average amount of shoal material dredged from the ARBC for placement in the ODMDS-East and Bird Island-East between 1996 and 2002 was approximately 12.8 mcy per year, of which, approximately 10.9 mcy per year was placed in the ODMDS-East (Table 1). The average amount of material dredged from the ARBC for placement in the ODMDS-West and Bird Island-West (since 2002) is about 12.6 mcy per fiscal year, of which, approximately 10.8 mcy per fiscal year is placed in the ODMDS-West every 7.4 months (Table 1-1).

### 3.1.5.3 Hazardous, Toxic, or Reactive Wastes

Dredged materials and sediments beneath navigable waters proposed for dredging qualify as Hazardous, Toxic, or Reactive Wastes (HTRW) per Engineering Regulations (ER) 1165-2-132 (June 26, 1992), only if it is within the boundaries of an EPA-designated Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or National Priority List (Superfund) site, or if it is within the boundaries of a site designated by a state for a response

action under CERCLA. Neither the ARBC nor the proposed ODMDS are within the boundaries of such areas.

### 3.1.5.4 Oil and Gas

The Gulf of Mexico oil and gas industry has changed dramatically over recent years. Because international as well as domestic policies shape the trends in exploration, rig utilization, and lease acreage, the status of oil and gas related activity will be dynamic until the price of these products stabilizes.

The western and central portions of the Gulf of Mexico (GOM) region (offshore Texas, Louisiana, Mississippi, and Alabama) are major offshore oil and gas areas, and most of the equipment and facilities supporting offshore GOM oil and gas operations are located in these areas (BOEM 2011). Extensive oil and gas development occurs within the Atchafalaya River Delta and in the vicinity of the ODMDS-East and ODMDS-West. The ODMDS-West is located within three active lease blocks of the Eugene Island section, which is a small section of the Gulf of Mexico Inner Continental Shelf. There are numerous platforms within the ODMDS-West in the western and southwest areas. In addition there are several oil and gas lines crossing the ODMDS-West that consist of several gas lines, including a 51 cm (20-inch) and 76 cm (30-inch) ANR Gas line, a 56 cm (22-inch) Trunkline Gas line, a 51 cm (20-inch) Contango Operators, Inc., gas line, a 30-inch Enbridge Offshore Gas line. There are approximately 43 smaller gathering lines connecting wells and platforms that lie near and within the proposed disposal site. Currently there are a total of 48 pipeline structures located within the ODMDSs. Figure 3.1-2 shows the offshore platforms within the GOM's Central Planning Area, as well as key related onshore and offshore infrastructure which include ports, supply bases, shipyards, platform fabrication yards, pipe yards, oil refineries, gas processing facilities, helicopter pads, pipelines, and other infrastructure.

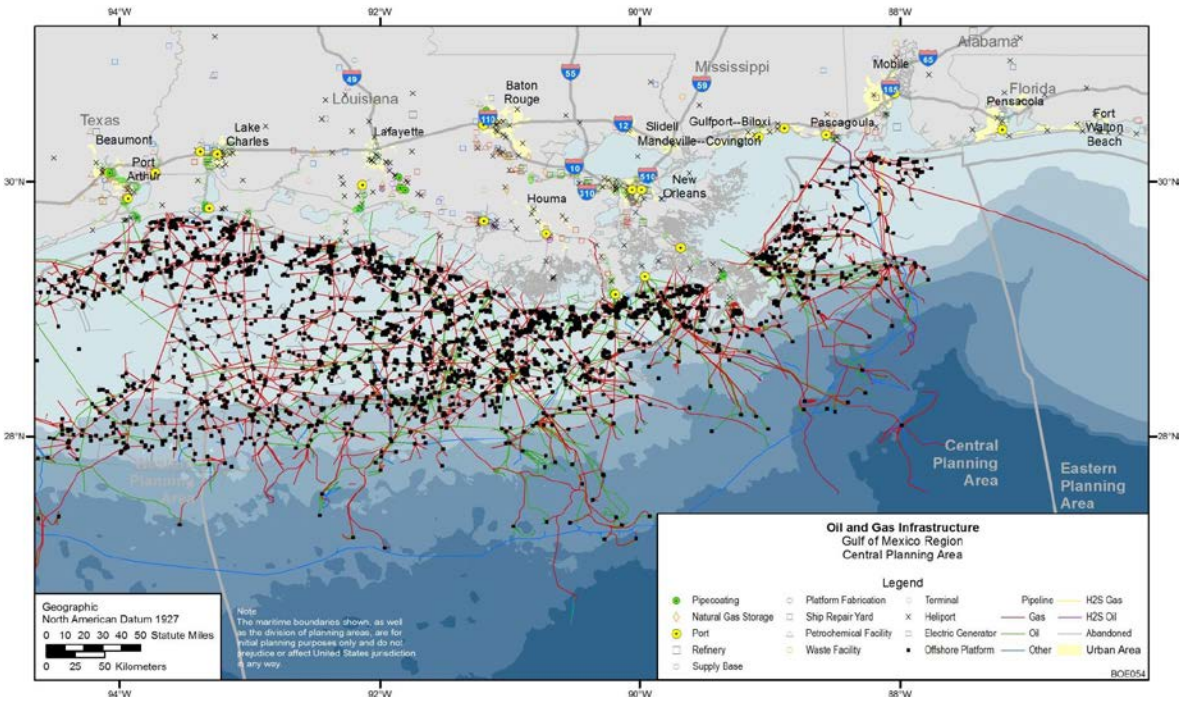


**Figure 3.1-2.** Oil and gas infrastructure locations in the GOM region Central Planning Area (BOEM 2011)

## 3.2 BIOLOGICAL ENVIRONMENT

### 3.2.1 Plankton

#### 3.2.1.1 Phytoplankton

The phytoplankton community in Louisiana coastal waters is diverse and productive, exhibiting large spatial and temporal fluctuations. Within coastal Louisiana waters, diatoms typically constitute 70 to 100 percent of the phytoplankton standing crop; dinoflagellates and blue-green algae contribute small and seasonally variable numbers to the assemblage. In contrast, blue-green algae (especially *Trichodesmium thiebauti*) and coccolithophores (particularly *Coccolithus huxleyi*) are dominant components of the phytoplankton in offshore waters (Cromiskey and Farmer 1981). Cell density is highest in coastal bays and the neritic zone, and decreases seaward (Weissberg et al. 1980b). Both the mid-shelf area and nearshore areas have similar patterns of phytoplankton composition and biomass (Weissberg et al. 1980b).

#### 3.2.1.2 Zooplankton

Zooplankton in the northern Gulf can be characterized as inhabitants of any of five zoogeographic zones; oceanic, continental slope transition, central continental shelf, coastal neritic, and estuarine zone. These zones are geographically variable, and their boundaries may reflect influences from water masses and current patterns. Zooplankton communities in each of the five zones are dominated by copepods; however, the dominant species may vary between zones. For example, within coastal areas, temperate copepod species (e.g., *Acartia tonsa*, *Paracalanus crassirostis*, *Eucalanus pileatus*) are typically dominant, whereas tropical-subtropical species (e.g., *Euchaeta marina*, *Copilia mirabilis*) are dominant in oceanic regions (Comiskey and Farmer 1981). Euphausiids, chaetognaths, and larval crustaceans also contribute substantially to zooplankton communities on the shelf. Zooplankton densities generally decrease with increased distance from shore (USDOE 1978; Comiskey and Farmer 1981).

### 3.2.2 Benthos

Macroinfaunal assemblages in Louisiana shelf areas are composed of euryhaline organisms characteristic of the open bay and mud bottom habitats from Port Aransas, Texas to Mobile, Alabama (Parker et al. 1980). Polychaetes and, to a lesser extent, phoronids and pelecypods, generally are the most abundant macroinfaunal groups, comprising approximately 95 percent of the benthic population off Louisiana (Weissberg et al. 1980).

Nearshore benthic organisms respond to seasonal changes in the hydrological regime, especially to winter and summer pulses of dissolved nutrients, which result in increases in plankton populations and subsequent increases in food supply. Variability in the abundance and composition of the benthos reflect seasonal changes in the nearshore environment. In contrast, the offshore hydrographic regime is more constant. Consequently, seasonal abundance patterns are less distinct in offshore regions (Comiskey and Farmer 1981).

Macrofaunal assemblages near the ARBC ODMDSs have been examined during benthic investigations of several proposed salt dome brine diffuser sites (Parker et al. 1980; Weissberg et al. 1980a, 1980b). These studies characterized nearshore assemblages typical of estuarine areas. Communities were dominated by polychaete worms (particularly *Mediomastus* sp., *Aglaophamus* sp., *Paraprionospio* sp., *Magelona* sp., and, *Owenia* sp.), small molluscs (*Mulinia lateralis* and *Nassarius* sp.), and macrocrustaceans (shrimp and crabs). Macrofaunal organisms consist mainly of deposit and suspension feeders; however, omnivores and carnivores were also well represented. The dominant organisms were small-bodied, opportunistic species capable of rapid colonization of disturbed sediment. Most species displayed seasonal population fluctuations. Recruitment occurred during winter and spring; populations declined during summer and autumn due to predation and environmental stresses such as sediment disturbance by storms or anoxic conditions in bottom waters.

Stations sampled by IEC (1983) in the vicinity of the ODMDS-East were further inshore and shallower than the proposed brine diffuser sites; however, the same general macrofaunal assemblage was found. During both surveys, polychaetes dominated the macrofauna, particularly *Mediomastus californiensis*, *Cossura* sp., and *Paraprionospio pinnata*a. During the December survey the little surf clam (*M. lateralis*) was very abundant at a station west of the site, probably as a result of seasonal recruitment characteristic of this species (Parker et al. 1980). By the following survey in late spring (May - June), *M. lateralis* was abundant only at one station within the site. Other common members of this assemblage were the carnivorous ribbon worms, *Cerebratulus* cf. *lacteus* (and other unidentified rhynchocoelans) and the snail, *Nassarius acutus*.

### 3.2.3 Finfish and Shellfish

Numerous species of finfish and shellfish inhabit the waters off the central Louisiana coast and can be characterized as estuary-related or demersal shelf inhabitants. Estuarine-related species can be estuary-dependent species or low-salinity, tolerant species. Estuarine-dependent species typically are dependent upon the coastal bays, lagoons, and estuaries as low-salinity nursery areas for juveniles. These species include white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), Gulf menhaden (*Brevoortia patronus*), red drum (*Sciaenops ocellatus*), black drum (*Pogonias cromis*), spotted seatrout (*Cynoscion nebulosus*), sand seatrout (*C. arenarius*), sheepshead (*Archosargus probatocephalus*), silver perch (*Bairdiella chrysoura*), spot (*Leiostomus xanthurus*), striped mullet (*Mugil cephalus*) and blue crab (*Callinectes sapidus*) (Darnell et al. 1983).

Demersal shelf residents are abundant fauna of the continental shelf. These species include broken-necked shrimp (*Trachypenaeus similis*), barred searobin (*Prionotus martis*), blackfin searobin (*P. rubio*), dwarf sand perch (*Diplectrum bivittatum*), sand perch (*D. formosum*), inshore lizardfish (*Synodus foetens*), pancake batfish (*Halieutichthys aculeatus*), and shoal flounder (*Syacium gunteri*) (Darnell et al. 1983).

Nektonic species and fast swimmers that may occur within the area of the ODMDSs include sharks, tarpons, clupeids, carangids, dolphins, mackerels, wahoos, tunas, and billfishes. These species are also attracted to oil rigs, which provide reef-like environments in the Gulf. Most, but

not all, of the larger predators occur seasonally on the northern Gulf shelf, appearing in spring and leaving in the fall (Darnell et al. 1983).

Many species of shellfish inhabit Louisiana coastal waters and include white, pink (*Farfantepenaeus duorarum*), and brown shrimp, blue crab, lesser blue crab (*C. similis*), and swimming crabs (*Portunus* sp.) (Landry and Armstrong 1980).

Waters off central and western Louisiana shoreward of the 36-m (120-ft) isobaths are one of the most heavily fished areas in the world (NMFS 2012). Louisiana provides approximately 78 percent (approximately 1 billion pounds) of the total catch of finfish and shellfish in the Gulf of Mexico by weight and approximately 40 percent ($248 million) by value (NMFS 2012). Central Louisiana (which includes Atchafalaya Bay) contributes approximately 50 percent to these Louisiana totals (NMFS 2012). This may be directly attributable to the extensive estuarine nursery areas of Louisiana, including the waters of Atchafalaya Bay (Darnell et al. 1983; Darnell and Kleypas 1987). In addition, the estuaries are also known to export considerable quantities of organic material, thereby enriching the adjacent continental shelf areas (Darnell and Soniat 1979).

The most valuable species commercially harvested in waters off central Louisiana include white and brown shrimp, blue crab, Gulf menhaden, southern flounder (*Paralichthys lethostigma*), and Eastern oyster (*Crassostrea virginica*). Gulf menhaden, sheepshead, black drum, red drum, spotted seatrout, and sand seatrout are also commercially important species in the area. Recreational fishing, including fishing, crabbing, and shrimping, is popular in the vicinity of the ODMDSs.

### 3.2.4 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act of 1996 (MSFCMA) defines Essential Fish Habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." The estuarine and marine waters in St. Mary Parish, as well as the northern Gulf of Mexico, are designated as EFH. In particular, EFH identified by the Gulf of Mexico Fishery Management Plan (FMP) in St. Mary Parish and adjoining waters—including Atchafalaya Bay—include estuarine water column and estuarine water bottoms, including mud, rock, sand, intertidal vegetation, and shell substrates. No "Habitat Areas of Particular Concern" have been identified in the project vicinity.

The proposed project is located within an area identified as EFH for brown shrimp (*Farfantepenaeus aztecus*), white shrimp (*Litopenaeus setiferus*), red drum (*Sciaenops ocellatus*), lane snapper (*Lutjanus synagris*), king mackerel (*Scomberomorus cavalla*), cobia (*Rachycentron canadum*), bonnethead shark (*Sphyrna tiburo*), and Atlantic sharpnose shark (*Rhizoprionodon terraenovae*) (Table 3.2-1).

In addition to being designated as EFH for the species listed in Table 3.2-1, the proposed project area provides nursery and foraging habitats that support a variety of economically important marine fishery species, such as Atlantic croaker, spotted seatrout, gulf menhaden, blue crab, and striped mullet. Some of these species serve as prey for other fish species managed under the

MSFCMA by the Gulf of Mexico Fishery Management Council (i.e., mackerels, snappers, and groupers) and highly migratory species managed by NMFS (i.e., billfishes and sharks).

**Table 3.2-1.** EFH species in the project area.

| Common Name | Life Stage | EFH |
|---|---|---|
| brown shrimp | eggs<br>larvae/post larvae<br>juvenile | planktonic, sand/shell/soft bottom, SAV emergent marsh, oyster reef |
| white shrimp | eggs<br>larvae/post larvae<br>juvenile<br>adult | 9-34 m, planktonic, soft bottom, emergent marsh |
| red drum | larvae/post larvae<br>juvenile<br>adults | all estuaries planktonic, SAV, sand/shell/soft bottom, emergent marsh, pelagic |
| lane snapper | eggs<br>larvae<br>juvenile | 4-130 m, reefs, sand/shell/soft bottom, SAV, mangrove |
| king mackerel | larvae<br>juvenile<br>adults | 9-180 m, pelagic |
| cobia | juvenile | 5-183 m, pelagic |
| bonnethead shark | juvenile | inlets, estuaries, coastal waters <25 m |
| Atlantic sharpnose shark | juvenile | <40 m, Atchafalaya delta |

### 3.2.5 Mammals, Reptiles and Birds

The diversity of marine mammals and reptiles is typically lower in nearshore regions than in the adjacent offshore regions of the northern Gulf (Bahr and Hebrard 1976). Several migratory bird species utilize nearshore areas for overwintering, breeding, and/or nesting, whereas offshore areas may be inhabited by strictly pelagic species.

Five species of sea turtles occur in the northern Gulf: green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys coriacea*) and loggerhead (*Caretta caretta*) (NMFS 2003). Feeding and nesting activities in the north-central Gulf off Louisiana have been reported only for the Kemp's ridley turtle.

Several species of whales and dolphins occur in the northern Gulf. The only species of marine mammal common to nearshore waters is the Atlantic bottlenose dolphin (*Tursiops truncatus*), which occurs in greatest numbers within tidal passes, and feeds on shrimp and larger fish (Bahr and Hebrard 1976). The greatest numbers of mammals typically occur along the outer shelf and shelf-break. For example, the short-finned pilot whale (*Globicephala macrorhyncus*), sperm whale (*Physeter catodon*), and Atlantic spotted dolphin (*Stenella plagiodon*) are most common in outer shelf and open Gulf waters (USDOE 1978).

Numerous species of oceanic birds and waterfowl may occur throughout the year in the nearshore region off Louisiana. Southern coastal Louisiana is within the Central Flyway and provides resting or overwintering grounds for a number of migratory species; e.g., blue and green winged teal (*Anas discors* and *A. carolinensis*), widgeon (*A. americana*), and canvasback (*Aythya valisineria*). Permanent residents of waters off the Louisiana coast, including those in the vicinity of the existing and proposed ODMDSs, may include frigatebirds (*Fregata magnificens*), gannets (*Morus bassanus*), and Audubon's shearwaters (*Puffinus lherminieri*). Densities of birds are seasonally variable, generally increasing from October through December.

Bird populations further offshore may consist of pelagic species such as frigatebirds, shearwaters (*Puffinus griseus* and *P. lherminieri*), and jaegers (*Sterocoratius pomarinus* and *S. parasiticus*).

### 3.2.6 Threatened and Endangered Species

According to a U.S. Fish and Wildlife Service (USFWS) letter dated July 1, 2011, which provided comments in accordance with the Fish and Wildlife Coordination Act (FWCA), Endangered Species Act (ESA), Bald and Golden Eagle Protection Act (BGEPA), and the Migratory Bird Treaty Act (MBTA) for those areas within MVN proposed FY12 Operations and Maintenance Dredging and Disposal Plans for federally-maintained navigation channels, protected species that may occur in the ARBC near the proposed project area include the piping plover (*Charadrius melodus*), West Indian manatee (*Trichechus manatus*), and sea turtles. The pallid sturgeon (*Scaphirhynchus albus*) may also occur in the project area. Brown pelicans and other colonial nesting wading birds and seabirds protected under the MBTA may be encountered in the project area as well.

Piping Plover

The piping plover, as well as its designated critical habitat, occurs along the Louisiana coast (http://critical habitat.fws.gov/crithab). Piping plovers winter in Louisiana and may be present eight to ten months of the year (LDWF 2011). They depart for the wintering grounds from mid-July through late October and remain until late March or April. Piping plovers forage on intertidal beaches, mudflats, sand flats, algal flats, and wash-over passes with no or very sparse vegetation. They roost in unvegetated or sparsely vegetated areas, which may have debris, detritus, or micro-topographic relief offering refuge from high winds and cold weather. They also forage and roost in wrack deposited on beaches. Piping plovers occur along the Gulf of Mexico shoreline and on bird islands adjacent to the northernmost extent of the ARBC. Piping plovers could occur along the shoreline and in the intertidal of the project vicinity during winter migration, but are not permanent residents of the area. Construction activities associated with

the proposed project may cause piping plovers occurring near the project area to be temporarily displaced to nearby areas containing foraging and loafing habitat. Piping plover designated critical habitat occurs on islands immediately north of the proposed work, but not directly within the ARBC dredging limits or the proposed disposal area.

Pallid Sturgeon

The pallid sturgeon is an endangered fish found in Louisiana, in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the Old River Control Structure Complex); it is possibly found in the Red River as well. The pallid sturgeon is adapted to large, free-flowing, turbid rivers with a diverse assemblage of physical characteristics that are in a constant state of change. Detailed habitat requirements of this fish are not known, but it is believed to spawn in Louisiana. Pallid sturgeon, especially juveniles, appear to be at risk for entrainment in cutterhead dredges, because of their benthic holding behavior and their relatively low burst swimming speed (Hoover et al. 2005). The density of pallid sturgeon in the lower Atchafalaya River Delta is thought to be low; however, there have been limited sampling efforts in that area. Because pallid sturgeon are strictly freshwater fish, they are probably absent from the Atchafalaya River Delta during low river flows when more saline water from Atchafalaya Bay intrudes upriver to a greater extent. If project construction is planned during these events, impacts to pallid sturgeon due to dredging activities are unlikely. Although pallid sturgeons are unlikely to occur in the project area, USFWS has recently provided MVN with recommendations to further reduce the unlikely chance of encountering pallid sturgeons or other fish species while conducting dredging/disposal activities.

West Indian Manatee

West Indian manatees, also known as sea cows, are large aquatic mammals found in shallow, slow-moving rivers, estuaries, salt water bays, canals, and coastal areas. Range is generally restricted to the southeastern United States, although individuals may occasionally venture as far north as Massachusetts and as far west as Texas (USFWS 2011). They are rare visitors to coastal Louisiana, occasionally entering Lakes Pontchartrain and Maurepas, and associated coastal waters and streams during the summer months. Most manatee sightings in Louisiana occur east of the Mississippi River (Wilson 2003). They have also been reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of Louisiana. It is extremely unlikely that manatees would be found in the project area or elsewhere in the ARBC and the surrounding shallow open waters; however, if manatees are observed within 100 yards of the "active work zone" during proposed dredging/disposal activities, MVN would implement the appropriate special operating conditions (e.g., no operation of moving equipment within 50 ft of a manatee; all vessels should operate at no wake/idle speeds within 100 yards of work area; siltation barriers, if used, should be re-secured and monitored; report manatee sightings or collisions), as provided by the USFWS, Lafayette, Louisiana Field Office. Special operating conditions for manatees would be included in any MVN plans and specifications developed prior to dredging/disposal activities.

Sea Turtles

Loggerhead sea turtles nest within the coastal United States from Louisiana to Virginia, with major nesting concentrations occurring on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida (NMFS/USFWS 2009). In Louisiana, loggerhead sea turtles are known to nest on the Chandeleur Island (LDWF 2011). Nesting and hatching for loggerheads in the Gulf of Mexico occur from May through November.

Green sea turtles are more tropical in their distribution, and are rarely seen in Louisiana coastal waters (LDWF 2011). Nesting in the Southeastern U.S. occurs roughly from June through September (NMFS/USFWS 1991). Nesting within the project area is highly unlikely, as green sea turtles prefer to nest on high-energy beaches with deep sand and little organic content. Furthermore, the Minerals Management Service (1997) indicated that reports of green sea turtle nesting in the northern Gulf are "isolated and infrequent."

The most seriously endangered of the sea turtles, Kemp's Ridley turtles occur mainly in bays and coastal waters of the Atlantic Ocean and Gulf of Mexico (NMFS/USFWS 1992a). Nesting occurs on the northeastern coast of Mexico and occasionally on Texas Gulf Coast beaches from April to July. No Kemp's Ridley sea turtle nesting habitat occurs near the project site, and nesting has not been known to occur in the area. Along the Louisiana coast, turtles are generally found in shallow nearshore and inshore areas, and especially in salt marsh habitats, from May through October.

The hawksbill is a small sea turtle, generally spending most of its life in tropical waters such as the warmer portions of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (NMFS/USFWS 1993). Hawksbills frequent rocky areas, coral reefs, shallow coastal areas, lagoons, narrow creeks, and passes. Nesting may occur on almost any undisturbed deep-sand beach in the tropics—in North America, the Caribbean coast of Mexico is a major nesting area. In the continental United States, nesting sites are restricted to Florida where nesting is sporadic at best (NMFS/USFWS, 1993). Due to the lack of suitable foraging and nesting habitats, there is a low probability of this species occurring within the project area.

The leatherback sea turtle is the largest, deepest diving, and most migratory and wide ranging of all the sea turtles (NMFS/USFWS 1992). Leatherbacks are mainly pelagic, inhabiting the open ocean and seldom entering coastal waters except for nesting purposes. Nesting in the United States is mainly confined to the Florida coast, and no nesting has been reported from Louisiana (Gunter 1981).

The National Marine Fisheries Service (NMFS) is responsible for aquatic marine endangered and threatened sea turtles. High levels of sediment in the water column and low prey availability probably preclude any high use of sea turtles in the lower Atchafalaya River (Baird 1997). However, a seasonal restriction has been recommended by NMFS (2003 and 2007) during formal consultation undertaken pursuant to Section 7 of the ESA. This restriction was based on potential impacts of hopper dredging operations on species of threatened and endangered sea turtles. The recommendation, which is part of a NMFS Regional Biological Opinion, is to restrict hopper dredging to the period from December 1 through March 31, during which sea turtle abundance is

at a minimum. This recommendation pertains to actual dredging operations, including placement of the dredge material in EPA-designated ODMDSs. Hopper dredging will be conducted in accordance with all reasonable and prudent measures and implementing terms and conditions provided to MVN by NMFS in its 2007 Biological Opinion (NMFS 2007), and any subsequent Biological Opinion, to avoid sea turtle mortality. According to the Regional Biological Opinion, the annual documented USACE incidental take per fiscal year for the Louisiana Coastal Area is expected to consist of 7 Kemp's Ridleys, 3 green turtles, 1 hawksbill, and 15 loggerhead turtles. As of 2003, NMFS had not documented sea turtle takes from MVN dredging in the ARBC (NMFS 2003); however, MVN has developed internal protocols for managing, documenting, reporting, and coordinating incidental takes to ensure compliance with the provisions of the Regional Biological Opinion (NMFS 2007 and 2010). Hydraulic cutterhead pipeline dredging operations have not been identified as a source of sea turtle mortality.

Brown Pelican/Colonial Nesting Wading Birds and Seabirds

The brown pelican (*Pelecanus occidentalis*), a year-round resident of coastal Louisiana that may occur in the project area, was removed from the Federal List of Endangered and Threatened Wildlife (i.e., "delisted") by USFWS on November 17, 2009. Despite its recent delisting, brown pelicans—and other colonial nesting wading birds and seabirds—remain protected under the Migratory Bird Treaty Act of 1918. Portions of the proposed project area may contain habitats commonly inhabited by colonial nesting wading birds and seabirds. To minimize disturbance to pelicans and other colonial nesting birds and seabirds potentially occurring in the project area, MVN would observe restrictions on activity provided by the USFWS, Lafayette, Louisiana Field Office. Special operating conditions addressing pelicans and other colonial nesting wading birds and seabirds (reporting presence of birds and/or nests; no-work distance restrictions—2000 ft for brown pelicans, 1000 ft for colonial nesting wading birds, and 650 ft for terns, gulls, and black skimmers; bird nesting prevention and avoidance measures; marking discovered nests) would be included in any MVN plans and specifications developed prior to dredging/disposal activities. In addition, dredging/disposal activities would be restricted to non-nesting periods for colonial nesting wading birds and seabirds, when practicable.

### 3.2.7 Marine Sanctuaries and Special Biological Resource Areas

No marine sanctuaries occur in the immediate vicinity of the either the existing or proposed ODMDSs. Shell Keys and Marsh Island Wildlife refuges are approximately 47 km (29 miles), west of the ODMDS-East (USFWS 1981). Fishnet Bank, the closest protected Area of Biological Significance, is approximately 104 miles south of the ODMDS-East.

## 3.3 SOCIOECONOMIC ENVIRONMENT

The Atchafalaya Bay is located in both St. Mary and Terrebonne Parishes. The ARBC, however, is located in St. Mary Parish. The Louisiana State Seaward Boundaries, measured from the MLLW line and which separate State from Federal waters determines the jurisdiction over activities that occur in those waters; for instance, the seaward limit of each State's Coastal Zone and the extent of waters from which States receive all revenues from oil and gas exploration.

Socioeconomics describes the social and economic characteristics of the study area for the ARBC project. The principal socioeconomic study area of the ARBC project consists of the parishes of St. Mary and Terrebonne. Information regarding population, employment, income, and other economic conditions was obtained from the U.S. Census Bureau. Several demographic variables are analyzed to characterize the affect on community and surrounding area, including population size and distribution, the means and amount of employment, and income generation. The main census data resources are the U.S. Census Bureau and the Bureau of Economic Analysis (BEA) and include: (1) Demographic Profile Data Search – Summary File 1 of the 2010 census and (2) 2008 Economic Census of Business.

Oil and gas and associated industries and the fishing industry are the two major economic contributors in this region of Louisiana. Both of these industries depend on reliable navigational channels to develop or harvest offshore resources and either transport these goods back to onshore ports or, in the case of the oil and gas industry, to service the facilities that operate offshore.

## 3.3.1 Demography and Economics

### 3.3.1.1 St. Mary Parish

St. Mary Parish has a total area of 2,898 $km^2$ (1,119 square miles), comprising 1,587 $km^2$ (613 square miles) of land and 1,311 $km^2$ (506 square miles) of water. The total area is 45.23 percent water. As of the census of 2010, there were 54,650 people, 20,457 households, and 14,179 families residing in the parish (U.S. Census Bureau 2011). This population represents an increase of 1,150 since the 2000 Census count of 53,500 (U.S. Census Bureau 2011). The population density was 89 people per square mile (34/$km^2$). There were 23,028 housing units at an average density of 14.5/$km^2$ (38 per square mile). The racial makeup of the parish was 59 percent White, 32.5 percent Black or African American, 1.8 percent Native American, 1.7 percent Asian, 0.02 percent Pacific Islander, 2.6 percent from other races, and 2.0 percent from two or more races. Hispanic or Latino population was 5.3 percent of the population. Home languages were reported as 5.43 percent speaking French or Cajun French, 2.45 percent speaking Spanish and 1.59 percent Vietnamese.

Of the 20,457 households, 29.3 percent had children under the age of 18 living with them, 44.8 percent were married couples living together, 18.0 percent had a female householder with no husband present, and 30.7 percent were non-families. Individuals comprised 25.8 percent of all households and 25.5 percent of the households had someone living alone who was 65 years of age or older. The average household size was 2.63 and the average family size was 3.15.

In the parish the population was spread out with 28.2 percent under the age of 20, 6.6 percent from 20 to 24, 24.7 percent from 25 to 44, 27.4 percent from 45 to 64, and 12.8 percent who were 65 years of age or older. The median age was 37.5 years. Males and females comprised 49.4 percent and 50.6 percent of the population, respectively.

Median income (2010) for a household in the parish was $40,517, and the median income for a family was $48,065. Males had a median income of $49,333 versus $26,043 for females. The

per capita income for the parish was $20,738. About 15.9 percent of families and 18.5 percent of the population were below the poverty line, including 29.1 percent of those under age 18 and 16.2 percent of those ages 65 or over.

#### 3.3.1.2 Terrebonne Parish

Terrebonne Parish was formed in 1822 from part of Lafourche Parish. The parish has a total area of 2,080 square miles (5,387 km²), of which 1,255 square miles (3,250 km²) of it is land and 825 square miles (2,137 km²) of it (39.66 percent) is water. As of the census of 2010, there were 111,860 people, 40,091 households, and 29,001 families residing in the parish (U.S. Census Bureau 2011). The population density was 34/km² (89 people per square mile). There were 43,887 housing units at an average density of 13.5/km² (35 per square mile). The racial makeup of the parish was 70.3 percent White, 18.9 percent Black or African American, 5.7 percent Native American, 1.0 percent Asian, 0.01 percent Pacific Islander, 2.0 percent from other races, and 2.1 percent from two or more races. Hispanic or Latino account for 4.0 percent of the population. Home language of French or Cajun French is reported at 10.7 percent, while 1.5 percent speak Spanish at home.

There were 40,091 households out of which 32.7 percent had children under the age of 18 living with them, 49.9 percent were married couples living together, 15.7 percent had a female householder with no husband present, and 27.7 percent were non-families. According to the census, 21.9 percent of all households were made up of individuals and 7.4 percent had someone living alone who was 65 years of age or older. The average household size was 2.75 and the average family size was 3.20.

In the parish the population was spread out with 28.9 percent under the age of 20, 7.2 percent from 20 to 24, 26.8 percent from 25 to 44, 25.8 percent from 45 to 64, and 11.2 percent who were 65 years of age or older. The median age was 35 years. Males and females comprised 49.7 percent and 50.3 percent of the population, respectively.

The median income for a household in the parish was $48,860, and the median income for a family was $27,381. Males had a median income of $49,290 versus $28,230 for females. The per capita income for the parish was $23,589. About 13.1 percent of families and 16.8 percent of the population were below the poverty line, including 25.8 percent of those under age 18 and 9.0 percent of those ages 65 or over.

### 3.3.2 Industry

#### 3.3.2.1 St. Mary Parish

Table 3.3-1 shows 2008 to 2010 industry earnings in St. Mary Parish. The top five earning industries are: (1) manufacturing; (2) transportation; (3) government and government enterprises; (4) agriculture and mining; and (5) professional and scientific services, management, and administrative and waste management services. From 2008 to 2010, total industry earnings decreased by almost 6 percent. Government and government enterprises grew the most in absolute terms over this period at over $11 million. The transportation, warehousing, and

utilities sector was second in absolute terms at nearly $7 million. In terms of percentage, the fastest growing industries from 2008 to 2010 were arts, entertainment, recreation, accommodation and food services (6 percent); and government and government enterprises (5 percent).

**Table 3.3-1**
Major Industry Earnings, St. Mary Parish, 2008–2010 (in $1,000)

| Industry | 2008 | 2009 | 2010 |
|---|---|---|---|
| Agriculture, forestry, fishing, and mining | 253,682 | 232,580 | 260,211 |
| Construction | 69,484 | 67,099 | 72,196 |
| Manufacturing | 310,905 | 321,841 | 313,861 |
| Wholesale trade | 67,003 | 60,378 | 62,767 |
| Retail trade | 71,060 | 74,726 | 72,601 |
| Transportation, warehousing, utilities | 286,709 | 224,832 | 223,062 |
| Information | 7,587 | 7,572 | 7,316 |
| Finance, insurance, real estate | 108,135 | 99,106 | 107,320 |
| Professional, scientific, management, administrative and waste management | 133,134 | 116,469 | 109,183 |
| Educational, health and social services | not shown | not shown | not shown |
| Arts, entertainment, recreation, accommodation and food services | 44,203 | 45,511 | 47,222 |
| Other services (except public administration) | 65,287 | 66,034 | 62,179 |
| Government and government enterprises | 258,494 | 265,607 | 270,348 |

Source: Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, Table CA05 (NAICS), http://www.bea.gov/iTable

### 3.3.2.2 Terrebonne Parish

Table 3.3-2 shows 2008 to 2010 industry earnings in Terrebonne Parish. The top five earning industries are: (1) agriculture and mining; (2) manufacturing; (3) government & government enterprises; (4) educational, health and social services; and (5) professional and scientific services, management, and administrative and waste management services. From 2008 to 2010, total industry earnings decreased by approximately 7 percent. Government and government enterprises grew the most in absolute terms over this period at almost $28 million. The educational, health and social services sector was second in absolute terms at $13 million. In terms of percentage, the fastest growing industries from 2008 to 2010 were finance, insurance, and real estate (16 percent); and government and government services (8 percent).

**Table 3.3-2**
Major Industry Earnings, Terrebonne Parish, 2008–2010 (in $1,000)

| Industry | 2008 | 2009 | 2010 |
|---|---|---|---|
| Agriculture, forestry, fishing, and mining | 592,116 | 531,193 | 431,266 |
| Construction | 235,456 | 228,121 | 242,729 |
| Manufacturing | 522,018 | 461,607 | 361,757 |
| Wholesale trade | 126,842 | 114,967 | 114,326 |
| Retail trade | 221,134 | 221,711 | 219,277 |
| Transportation, warehousing, utilities | 272,981 | 258,815 | 271,239 |
| Information | 20,307 | 19,976 | 19,721 |
| Finance, insurance, real estate | 197,326 | 186,937 | 229,393 |
| Professional, scientific, management, administrative and waste management | 316,497 | 294,694 | 327,326 |
| Educational, health and social services | 308,682 | 308,725 | 322,155 |
| Arts, entertainment, recreation, accommodation and food services | 110,240 | 108,649 | 117,127 |
| Other services (except public administration) | 146,063 | 141,984 | 136,373 |
| Government and government enterprises | 363,208 | 381,650 | 391,029 |

Source: Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, Table CA05 (NAICS), http://www.bea.gov/iTable

## 3.3.3 Employment

### 3.3.3.1 St. Mary Parish

Table 3.3-3 shows employment by major sector for 2008 to 2010. The table indicates a decline in total employment between the years 2008 and 2010. Government and government enterprises are the leading employment sector for the parish with manufacturing second. Virtually every employment sector saw a loss in number of jobs from 2008 to 2010.

**Table 3.3-3**
Industry Employment, St. Mary Parish, 2008–2010

| Industry | 2008 | 2009 | 2010 |
|---|---|---|---|
| Agriculture, forestry, fishing, and mining | 3,146 | 3,023 | 2,869 |
| Construction | 1,877 | 1,741 | 1,753 |
| Manufacturing | 4,803 | 4,935 | 4,566 |
| Wholesale trade | 1,054 | 992 | 1,017 |
| Retail trade | 2,802 | 2,849 | 2,729 |
| Transportation, warehousing, utilities | 3,465 | 2,967 | 2,818 |
| Information | 199 | 208 | 201 |
| Finance, insurance, real estate | 2,651 | 2,512 | 2,614 |
| Professional, scientific, management, administrative and waste management | 3,159 | 2,840 | 2,633 |
| Educational, health and social services | not shown | not shown | not shown |
| Arts, entertainment, recreation, accommodation and food services | 2,294 | 2,293 | 2,260 |
| Other services (except public administration) | 2,077 | 2,028 | 1,933 |
| Government and government enterprises | 5,455 | 5,473 | 5,502 |
| Total Parish Employment (including other activities) | 34,849 | 33,835 | 33,207 |

Source: Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, Table CA25N (NAICS), http://www.bea.gov/iTable

### 3.3.3.2 Terrebonne Parish

Table 3.3-4 shows employment by major sector for 2008 to 2010. The table indicates a decline in total employment between the years 2008 and 2010. Retail is the largest employment sector in the parish with government and government services second. Information; education, health, and social services; and government and government services were the only employment sectors that saw an increase in number of jobs from 2008 to 2010.

**Table 3.3-4**
Industry Employment, Terrebonne Parish, 2008–2010

| Industry | 2008 | 2009 | 2010 |
|---|---|---|---|
| Agriculture, forestry, fishing, and mining | 7,094 | 6,346 | 5,578 |
| Construction | 4,054 | 3,730 | 3,827 |
| Manufacturing | 6,638 | 6,534 | 6,208 |
| Wholesale trade | 2,122 | 1,997 | 1,928 |
| Retail trade | 7,767 | 7,927 | 7,705 |
| Transportation, warehousing, utilities | 3,665 | 3,407 | 3,394 |
| Information | 417 | 433 | 425 |
| Finance, insurance, real estate | 3,561 | 3,320 | 3,396 |
| Professional, scientific, management, administrative and waste management | 6,462 | 5,728 | 6,278 |
| Educational, health and social services | 5,878 | 5,931 | 6,027 |
| Arts, entertainment, recreation, accommodation and food services | 5,338 | 4,949 | 4,966 |
| Other services (except public administration) | 3,676 | 3,555 | 3,207 |
| Government and government enterprises | 7,285 | 7,471 | 7,519 |
| Total Parish Employment (including other activities) | 63,957 | 61,328 | 60,458 |

Source: Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, Table CA25N (NAICS), http://www.bea.gov/iTable

## 3.3.4 Environmental Justice

Executive Order 12898 (1994) on Environmental Justice requires that environmental analyses of proposed Federal actions address any disproportionately high and adverse human health or environmental effects on minority and low-income communities. Federal agencies' responsibility under this order shall also apply equally to Native American programs. In addition, each Federal agency must ensure that public documents, notices, and hearings are readily accessible to the public.

The project area falls partially within Census Tract 409, in St. Mary Parish. As noted in Section 3.3.1.1, St. Mary Parish includes about 41 percent of the population as a minority and about 15.9 percent of families and 18.5 percent of the population were below the poverty line, including 29.1 percent of those under age 18 and 16.2 percent of those ages 65 or over.

## 3.3.5 Recreation

Recreational activities that are popular in the vicinity of the project area include boating for pleasure, fishing, crabbing, shrimping, and passive recreational activities, such as observation of wildlife and nature study.

## 3.3.6 Cultural and Historic Resources

The coastal area of Louisiana has been an important navigation route since prehistoric times. At present, there are two recorded shipwrecks in the coastal waters of Louisiana and numerous other wrecks reported for the rivers and bayous. At least 59 historic shipwrecks are recorded in the USACE submerged cultural resources database for the Atchafalaya River.

A brief navigational history of the coastal water of the Gulf of Mexico and an inventory of known shipwrecks in the study area is provided in the report entitled *A History of Waterborne Commerce And Transportation Within the U.S. Army Corps of Engineers, New Orleans District and an Inventory of Known Underwater Cultural Resources* prepared by Coastal Environments, Inc (Pearson et al. 1989). This study documents 52 shipwrecks in the Atchafalaya River and seven in the Bay. Information on these shipwrecks was obtained from various historic documents and cartographic data. The historic record represents an incomplete biased sample of the archaeological database as not all shipwrecks were recorded in documents.

The Atchafalaya River represents the largest north-south waterway between Bayou Teche to the west and the Mississippi River to the east. The River runs approximately 233 km (145 miles) from the Mississippi River to the Gulf. Historically, the upper end of the Atchafalaya River was connected to both the Mississippi and Red Rivers. It was not until the 1930s that this navigation route was altered by the construction of the east and west guide levees and the Old River control structure. In the 1880s, a railroad from Bayou Teche to New Orleans was built that ran approximately 201 km (125 miles). By 1885 the Morgan Railroad accounted for 90 percent of the commerce between the Teche region and New Orleans reducing the need for transportation by boat. It was not until the GIWW opened that shipping by boat became a viable alternative to the railroad.

Literature about the Atchafalaya River indicates a high probability for historic shipwrecks since it was along a historic shipping route. Due to the proximity of the proposed disposal site to the Atchafalaya River channel, shipwrecks are the cultural resource with the greatest potential for impact by use of an ODMDS adjacent to the ARBC.

The assessment of probability for significant underwater resources is determined by utilizing several data sets. These include (1) the number of known boat wrecks in a waterway as determined by the historical record, (2) the known intensity of vessel use and waterborne commerce on a waterway as documented in the historical literature, and (3) and the known natural and human impacts on shipwrecks along individual waterways. By utilizing these criteria, a range of probability zones can be assigned to various waterways and research can be designed to fit the needs of a particular area.

A Phase I marine remote sensing survey of the Atchafalaya Ocean Dredged Material Disposal Site was conducted from June to August of 1996 (Seidel et al. 1998). This survey was conducted to "insure that potential effects to submerged historic properties were adequately considered in Operations and Maintenance (O&M) dredging and disposal activities."

The survey results indicated that while numerous magnetic and side scan anomalies were located in the project area, most of these were attributable to modem debris, re-deposited debris from previous dredging operations, or signatures associated with pipelines and oil and gas field activities. The survey identified several anomaly clusters were that may have a moderate to high potential of representing submerged cultural resources, but evaluation of these anomalies was not possible without inspection by a diver or some other type of verification.

The results of the survey conducted in 1998 concluded that the "impact from the disposal of dredged materials in the Atchafalaya ODMDS is highly unlikely to add appreciably to the impacts already induced by the progradation that has occurred in the study area during the last century." No further archeological investigations were recommended as a result of the surveys conducted.

In September 2004, a Phase I marine archeological remote sensing survey of the proposed Atchafalaya River Bar Channel Fluff/Fluid Mud Pilot Plan project areas located in St. Mary Parish, Louisiana was conducted by R. Christopher Goodwin & Associates, Inc. (Randolph et al. 2008). The project area included locations for a sump, main channel and cross channels, and two parallel channels located on the east and west sides of the main channel.

This survey recorded a total of 3,134 magnetic perturbations, 207 acoustic anomalies, and 10 sub-bottom profiler anomalies. A total of 163 target clusters were identified and analyzed to determine their likelihood of representing submerged cultural resources. Of the targets identified, Target 51 was identified as having the potential of representing a submerged cultural resource. Target 51 was located in the east parallel channel, and it was recommended that the target be avoided or that additional investigations be conducted to determine if it indeed represents a submerged cultural resource. The proposed permanent re-designation under Section 102(c) of the Marine Protection, Research, and Sanctuaries Act (MPRSA) for the Atchafalaya River Bar Channel (ARBC), Ocean Dredged Material Disposal Site-West (ODMDS-West) to receive maintenance-dredged material from the ARBC will avoid Target 51.

Research in archival and secondary sources provided good indications of the potential for historic shipwrecks in the project area, as well as the historic contexts within which these resources may be understood. Geological and geomorphological data also was compiled, providing information on site formation processes, as well as the potential for shipwreck preservation. Prior to commencing the remote sensing survey, reconnaissance of the project area was undertaken primarily to ascertain water depths and the presence of potential obstructions such as oil or gas platforms. This reconnaissance survey indicated more than 3 ft of sediment had deposited in some areas since the NOAA charts were prepared.

Section 106 of the National Historic Preservation Act (NHPA) requires all Federal agencies with jurisdiction over a federally assisted, or federally permitted undertaking to account for the effects of their undertakings on properties included in or eligible for the, National Register of Historic Places. To comply with Section 106 of the NHPA, consultation was initiated with the Louisiana State Historic Preservation Officer (LA SHPO) in a letter dated May 9, 2012, and with federally recognized tribes in a letter dated June 1, 2012.

### 3.3.7 Aesthetics (Visual Resources)

The project area is located approximately 16 miles offshore of the mouth of the Atchafalaya River in Atchafalaya Bay. The open-water area is devoid of any type of development, save for some oil and gas platforms and related infrastructure in the vicinity. Industrial complexes, ship harbors, and marinas along the adjacent shoreline are generally out of view. Land-based thoroughfares in the vicinity offer no view sheds into the immediate project area. The area

remains relatively natural and scenic and is a haven for recreational opportunities such as fishing and nature observation. View sheds to the project area are offered only from the ARBC, the surrounding bays, and the Gulf of Mexico.

### 3.3.8 Military Restrictions

No military restrictions would apply to the ARBC ODMDS selection process. There are no Military Warning Areas within 40 km (25 miles) of Atchafalaya River (www.gomr.mms.gov/homepg/regulate/environ/MWA_boundries.pdf).

# 4.0 ENVIRONMENTAL CHARACTERIZATION OF NO-ACTION AND PROPOSED ALTERNATIVES

The impacts to the physical and biological environment that are discussed in this document are the result of maintenance-dredged material placement, not site designation *per se*. Site designation provides an acceptable ocean location for the placement of ARBC maintenance-dredged material. The No-Action Alternative would allow maintenance-dredged material to be placed in the Section 103(b) ODMDS-West until July 31, 2012 after which, placement would revert to the Section 102(c) ODMDS-East. The proposed alternative is the permanent, Section 102(c) designation of the ODMDS-West that would allow placement to continue to thereafter 2012. It is believed that dredged material placed in the ODMDS-East returns to the ARBC at a higher rate than dredged material placed in the ODMDS-West. Section 102(c) designation of the ODMDS-West is intended to allow a long-term reduction in required dredging compared to the required dredging frequency if placement is returned to the ODMDS-East. Since the ODMDS-East and ODMDS-West are relatively close to each other and have very similar physical, chemical, and biological conditions, the primary difference between the No-Action Alternative (return of disposal to the ODMDS-East after July 31, 2012) and the proposed alternative is the expected long-term reduction of dredging and disposal if the proposed alternative is implemented. Consequently, impacts described below that are likely to result from maintenance dredging and disposal activities are expected to be less with the proposed alternative than with the No-Action Alternative. Impacts to the physical and biological environment with the proposed alternative would be the same as those historically and currently experienced at the Section 103(b) ODMDS-West.

## 4.1 PHYSICAL ENVIRONMENT

### 4.1.1 Climate and Meteorology

#### 4.1.1.1 No-Action Alternative

The proposed work in the ARBC and subsequent maintenance-dredged material placement in the ODMDS-East is not expected to result in any changes to short-term or long-term meteorological conditions.

#### 4.1.1.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are the same as those of the No-Action Alternative (ODMDS-East). No direct or indirect impacts are expected to climate or meteorological conditions.

### 4.1.2 Air Quality

#### 4.1.2.1 No-Action Alternative

With implementation of the ODMDS-East, direct and indirect impacts to ambient air quality within the project area—and possibly farther afield—are expected to be temporary, and primarily due to the emissions of construction equipment (i.e., fuel combustion and resulting engine exhausts). Due to the short duration of the proposed project and the nature of this construction equipment, any emissions increases or impacts to ambient air quality are expected to be short-term and insignificant and are not expected to cause or contribute to a violation of Federal or State ambient air quality standards, nor would they alter the status of the parish regarding "attainment' of NAAQS. The total volatile organic compound emissions for this project during construction are anticipated to be well below the *de minimis* level of 100 tons per year. Once all construction activities associated with the proposed action cease, air quality within the vicinity is expected to return to pre-construction conditions.

#### 4.1.2.2 Proposed ODMDS-West Alternative

With implementation of the proposed ODMDS-West, direct and indirect impacts to air quality would be the same as, or less than, those of the No-Action Alternative and similar to the *de minimis* impacts that have occurred here (i.e., the Section 103(b) ODMDS-West) during disposal operations since 2002.

Emissions from dredging of the ARBC and disposal to the ODMDS-West have been estimated in terms of equipment engine (diesel) emissions calculated for volatile organic compounds (VOC) and nitrogen oxides, which are ozone precursors. Emissions from dredging activities were estimated based on assumed equipment requirements, quantities of material to be removed, and the duration of dredging in the ARBC based on historical maintenance dredging operations. Dredging and disposal activities require a hydraulic dredge and multiple cranes, tug boats, barges, and support boats generally over a period of 90 days. Emissions were estimated using emissions factors derived from EPA's *Exhaust and Crankcase Emissions Factors for Nonroad Engine Modeling—Compression-Ignition* (EPA 2010). Table 4.1-1 summarizes the results of the emissions analyses for the ODMDS-West Alternative. Yearly emissions associated with implementing the ODMDS-West Alternative would be 3.9 tons per year of volatile organic compounds and 92.3 tons per year of nitrogen oxides. These emission quantities are below the CAA conformity threshold of 100 tons per year per pollutant. Consequently, the ODMDS-West Alternative would have a less than significant air quality impact.

The lower average volumes historically dredged from the ARBC for ODMDS-West disposal compared to ODMDS-East disposal may result in reduced emissions per dredge cycle with the permanent implementation of the ODMDS-West.

**Table 4.1-1.** Annual engine emissions totals for volatile organic compounds (VOC) and nitrogen oxides (NOx) with implementation of the ODMDS-West Alternative.

| Total Calculated Emissions | | |
|---|---|---|
| Type of Construction Equipment – Engine Horsepower (hp) | VOC tons/yr | NOx tons/yr |
| Diesel Dredge – 9500 hp | 3.078 | 69.255 |
| Diesel Crane – 350 hp | 0.063 | 2.079 |
| Diesel Dozer – 100 hp | 0.050 | 0.554 |
| Diesel Derrick Crane – 175 hp | 0.055 | 0.977 |
| Diesel Tug Boat - 900 hp | 0.243 | 5.468 |
| Diesel Tug Boat - 600 hp | 0.162 | 6.912 |
| Anchor Barge – 125 hp | 0.035 | 0.628 |
| Skidder Barge – 100 hp | 0.045 | 0.498 |
| Diesel Crew Boat – 600 hp | 0.108 | 3.564 |
| Diesel Survey Boat – 400 hp | 0.072 | 2.376 |
| TOTALS | 3.911 | 92.311 |

Emissions Formula: (lbs/hp-hr)x(hp)x(hr)x(days)x(# of units)/2000 = tons/yr

NOTE: The listed equipment is the type and number of equipment that may typically be used for a dredging and disposal project.

### 4.1.3 Oceanography

As described in the following subsections, the impacts of the ODMDS-West Alternative are the same as those of the No-Action Alternative. Only miniscule impacts to water masses, circulation and currents, waves and tides, and bathymetry are expected from use of the Proposed ODMDS-West Alternative or the No-Action Alternative.

#### 4.1.3.1 No-Action Alternative

Placement of maintenance-dredged material in the ODMDS-East will not significantly change physical and chemical conditions in Atchafalaya Bay. Atchafalaya River discharge is a large contributor to the physical and chemical conditions in this area of the northern Gulf of Mexico. The area is dispersive and any mounding that is expected immediately following disposal is not expected to be persistent. Historical data collected during bathymetric surveys of the ODMDS-East conducted prior to and after MVN disposal operations indicate that there is no long-term mounding. Placement of maintenance-dredged material into the ODMDS-East would continue to result in material being transported back into the navigation channel by prevailing westerly currents.

#### 4.1.3.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are similar to those of the No-Action Alternative. No net mounding has occurred from disposal at this site in the past, based on MVN analysis of pre and post-maintenance dredging surveys conducted annually at the Section 103(b) ODMDS-

West since 2002, and no future mounding is expected. Disposal of maintenance-dredged material into the ODMDS-West may reduce the amount and rate of material being transported back into the navigation channel by prevailing westerly currents. Subsequently, the reduced shoaling rate would decrease the overall annual maintenance dredging effort needed for the ARBC, as well as the amount of maintenance dredging required over the long term (Teeter et al. 2003).

### 4.1.4 Water Quality

Placement of maintenance-dredged material should not appreciably degrade ambient water quality within or adjacent to the ODMDSs. In general, changes in water quality associated with placement are relatively short-term, with conditions returning to normal within a period of minutes to hours. Dredge material placement will likely cause temporary increases in turbidity and suspended solids concentrations, and a reduction in light penetration in the immediate vicinity; however, since the project area is a naturally turbid environment and resident biota are generally adapted to, and very tolerant of, high suspended sediment concentrations, the effects would be negligible. A reduction in light penetration may indirectly affect phytoplankton (i.e., primary) productivity in the area as the amount of photosynthesis carried out by phytoplankton is reduced. Localized temporary pH changes, as well as a reduction in dissolved oxygen levels, may also occur during maintenance events. No evidence of persistent alterations of near-bottom water quality at the ODMDS-East or adjacent waters were detected during IEC (1983) surveys. Results of several long-term studies at nearshore locations, summarized by Brannon (1978), indicate that maintenance-dredged materials have limited chronic impacts on the water quality at placement sites.

Based on MVN's review of oil spill tracking and contaminant information pertaining to the *Deepwater Horizon* incident, the sampling and analyses performed in 2008 for the ARBC, and the lack of any additional significant spills or incidents of pollution in the project vicinity since 2010, there is no reason to believe that dredged material from future maintenance events in the ARBC portion of the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana project would be unsuitable for open water disposal.

#### 4.1.4.1 Temperature

##### 4.1.4.1.1 No-Action Alternative

Dredging and dredged material placement in the ODMDS-East will not change water temperatures in the ARBC or the ODMDS.

##### 4.1.4.1.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are similar to, or slightly less than, those of the No-Action Alternative. No changes in water temperature are expected from dredging and disposal activities since the dredging frequency and average quantity of dredged material placed is expected to be less with the proposed action.

#### 4.1.4.2 Salinity

##### 4.1.4.2.1 No-Action Alternative

Dredging and dredged material placement in the ODMDS-East will not significantly change salinity in the ARBC or the ODMDS.

##### 4.1.4.2.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are the same as those of the No-Action Alternative. No changes in salinity are expected from dredging and placement activities since the dredging frequency and average quantity of dredged material placed will be less with the proposed action.

#### 4.1.4.3 Dissolved Oxygen

##### 4.1.4.3.1 No-Action Alternative

With implementation of the No-Action Alternative there will be some localized disturbances to ambient dissolved oxygen levels in the project area; however, direct and indirect impacts will be short-lived. Materials with potential oxygen demand are generally present in dredged material. Their release following placement imposes both a chemical and biochemical oxygen demand (COD and BOD) on the water column. However, Schubel et al. (1978) showed that the effects of adding oxygen-demanding material to the water column are functions of the length of time the material resides in the water column and the amount of water available for dilution. In shallow water, like that at the ODMDS-East, approximately 95–99 percent of the dredged material is placed close to the discharge source and within several minutes after release. The remaining 1–5 percent of the dredged material is deposited within a few hours after discharge (Schubel et al. 1978). Only a small percentage of the oxidizable components in dredged material are reactive on a time-scale comparable to the settling rate of the majority of the discharged particulate matter. The reduced forms of sulfur, iron, and manganese present in sediment interstitial waters place an immediate oxygen demand on the water column. The organic matter and sulfide minerals present in the dredged sediments also exert an oxygen demand, but on a longer time scale. Most of the decomposition of organic matter is accomplished by bacterial degradation; oxidation of sulfide minerals is generally limited to surficial sediment layers. Once the dredged material is deposited, the oxygen demand on the overlying waters is dependent on the expulsion of interstitial water during compaction and, thereafter, is diffusion-limited (Schubel et al. 1978).

##### 4.1.4.3.2 Proposed ODMDS-West Alternative

Similar to the No-Action Alternative, continued use of the ODMDS-West for long-term placement of maintenance dredge material may cause localized and temporary declines in dissolved oxygen concentrations. When under conditions where stratification of the water column and hypoxic conditions exist, hypoxia may be exacerbated by the discharge of maintenance-dredged material. Since the proposed alternative is intended to reduce the need for

maintenance dredging over the long term, declines in dissolved oxygen resulting from the disposal of dredged material will occur less frequently with the proposed alternative. Less frequent dredging and dredged material placement may reduce the possibility of lowered dissolved oxygen when hypoxic conditions are present.

#### 4.1.4.4 pH

##### 4.1.4.4.1 No-Action Alternative

Dredging and dredged material placement in the ODMDS-East will not significantly change pH of waters in the ARBC or the disposal area.

##### 4.1.4.4.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are the same as those of the No-Action Alternative. No changes in water pH are expected from dredging and placement activities since the dredging frequency and quantity of dredge material placed will be less with the proposed action.

#### 4.1.4.5 Nutrients

##### 4.1.4.5.1 No-Action Alternative

Resolubilization of nutrients is common from both polluted and nonpolluted sediments dredged from coastal areas (Windom 1976). Results of elutriate tests performed on dredged materials from the Atchafalaya Bay Channel demonstrated releases of soluble organic nitrogen (total kjeldahl nitrogen [TKN]) and carbon (USACE 1978).

Releases of nitrogen, especially ammonia-nitrogen, are common from dredged materials (Windom 1975). Coastal waters are characteristically limited with respect to nitrogen (Ryther and Dunstan 1971); therefore, localized releases may temporarily stimulate phytoplankton productivity (Ryther and Dunstan 1971). Elevated concentrations of ammonia, sufficient to cause toxicity to aquatic organisms, at the disposal site or adjacent areas are unlikely (Brannon 1978). Increased ammonia concentrations in the water column are ephemeral and subsequent decreases result from rapid dilution and mixing (Wright 1978).

Localized increases in phosphorus concentrations following disposal are typically of short duration due to rapid adsorption onto suspended particulate matter, particularly clay particles (Wright 1978; Windom 1975). Chronic water quality problems resulting from long-term leaching of nutrients from dredged sediments are not expected (Brannon et al. 1978).

Studies conducted at the ODMDS-East measured releases of ammonium and silicate species during dredged material disposal; however, concentrations were quickly diluted to background levels. Dissolved orthophosphate, ammonia, and silicate levels were not affected by disposal (Schubel et al. 1978; Heaton 1978). Observed ammonia concentrations in sediments at the ARBC, ODMDS-West, and the reference area indicate that dredged materials and undisturbed

sediments have similar ammonia concentrations (PBS&J 2008). The observed ammonia concentrations in elutriate samples indicates that the dredged material placement would not be expected to result in the exceedance of applicable water quality criteria for chronic or acute exposures to aquatic life.

#### 4.1.4.5.2 Proposed ODMDS-West Alternative

Similar to the No-Action Alternative, continued use of ODMDS-West for placement of maintenance-dredged materials would not be expected to result in the exceedance of applicable water quality criteria for chronic or acute exposures of ammonia to aquatic life. If maintenance dredging frequency and the average quantity of dredged material are reduced as expected with the proposed alternative, the frequency of nutrient loading events resulting from dredged material placement is expected to be less than the No-Action Alternative.

### 4.1.4.6 Turbidity/Suspended Solids

#### 4.1.4.6.1 No-Action Alternative

Dredged material placement can result in a temporary increase of turbidity levels and suspended solid concentrations in the water column (USACE 1980). The duration of a turbidity plume will depend on particle size and density, currents, and turbulent mixing (Wright 1978). Dredged materials from the ARBC contain appreciable quantities of fines, which may remain suspended for periods of minutes to hours. Wright (1978) concluded that at most dredged material placement sites, increases in turbidity persisted for only a few hours and, in addition, "… storms, river discharge and other natural phenomena resulted in turbidity increases of much greater magnitude than those associated with disposal."

Studies conducted at the ODMDS-East during dredged material placement noted that turbidity plumes were of limited duration and areal extent (Heaton 1978; Schubel et al. 1978).

#### 4.1.4.6.2 Proposed ODMDS-West Alternative

Continued use of the ODMDS-West on an ongoing basis would be expected to result in similar or slightly less contributions to turbidity in the area as the No-Action Alternative, with transient and highly localized changes in turbidity in the project area associated with dredging and disposal operations. The proposed alternative is expected to lessen the frequency at which turbidity plumes resulting from dredged material disposal occur since the dredging frequency and the average quantity of material placed will be less with the proposed action.

### 4.1.4.7 Trace Metals

#### 4.1.4.7.1 No-Action Alternative

Measurements of trace metals in the water column and elutriate samples indicate that the placement of dredged materials in the past may have limited, transient impacts on water quality with respect to copper concentrations. Based on the 2008 sediment, water, and elutriate data

from the ARBC, ODMDS-West, and reference area, placement of maintenance-dredged materials from the project is not expected to have an observed direct impact on water quality that would result in the exceedance of applicable water quality criteria or standards because of trace metal concentrations.

#### 4.1.4.7.2 Proposed ODMDS-West Alternative

Similar to the No-Action Alternative, and based on the 2008 sediment, water and elutriate data from the ARBC, ODMDS-West, and reference area, placement of maintenance-dredged materials from the project is not expected to have an impact on water quality that would result in the exceedance of applicable water quality criteria or standards because of trace metal concentrations since the dredging frequency and average quantity of material placed will be less with the proposed action.

### 4.1.4.8 Organic Compounds

#### 4.1.4.8.1 No-Action Alternative

Synthetic organics, such as pesticides and polychlorinated biphenyls (PCBs) do not occur naturally in sediments, but result from anthropogenic contamination (Brannon 1978). Chlorinated hydrocarbons have low water solubility, and are rapidly bound to sediments with only small quantities released to interstitial waters (Burks and Engler 1978).

Concentrations of pesticides and PCBs in waters overlying the ODMDS-East or West immediately following disposal have not been measured. However, IEC (1983) surveys within and around the existing ODMDS-East did not detect most chlorinated hydrocarbons in the water column; only dieldrin, the DDT derivative, p, p'-DDE, and the PCB, Arochlor 1254, were present above detection limits. All concentrations were below their respective EPA single measurement criterion (45 FR 79318 et seq.). Contaminant assessments conducted in 2008, 2002, and 1996 did not detect concentrations of organic pollutants that exceeded any applicable water quality standards or criteria (Espey, Huston & Associates, Inc. 1997; PBS&J 2002; PBS&J 2008).

#### 4.1.4.8.2 Proposed ODMDS-West Alternative

Similar to the No-Action Alternative, ongoing use of the ODMDS-West for dredged material placement is not expected to change water quality of the project area related to the presence of organic compounds in the dredged materials since the dredging frequency and average quantity of material placed will be less with the proposed action.

### 4.1.5 Sediments

### 4.1.5.1 Sediment Quality and Characteristics

#### 4.1.5.1.1 No-Action Alternative

Nearshore sediments are a major sink for riverine and anthropogenic trace metals (Trefry 1977). Sediments dredged from river mouths and coastal navigation channels, therefore, may contain levels of trace metals, which are elevated relative to estuarine sediments more removed from anthropogenic sources (Holmes 1973). However, releases of trace metals from sediments, and subsequent changes in placement site water quality, cannot be predicted solely on the basis of bulk chemical analysis of the dredged sediments (Windom 1975; Brannon et al. 1978). For example, studies conducted by the USACE Dredged Material Research Program (DMRP) (Brannon 1978), and by Windom (1975, 1976) demonstrate that following placement of dredged material, the concentrations of certain dissolved metals (e.g., copper, cadmium, and lead) in ODMDS waters may be regulated by adsorption onto soluble iron oxides.

Studies at the ODMDS-East (Schubel et al. 1978; Heaton 1978) found no well-defined plume of dissolved trace metals during dredged material placement, and no linear relationship between dissolved and particulate trace metals. A few anomalously high levels of manganese were observed; however, these were associated with high TSS concentrations (approximately 1,000 mg/L) near the discharge point. Concentrations of dissolved zinc, copper, chromium, cadmium, and lead were low (usually below detection levels) throughout the Atchafalaya sampling area. Comparisons between concentrations in the dredged material plume and in reference water showed no apparent differences. Therefore, it may be concluded that no substantial release of these metals occurred during dredged material placement (Schubel et. al. 1978; Heaton 1978).

Long-term solubilization of trace metals from dredged materials is minimal, and too small to produce significant adverse impacts to water quality (Brannon 1978; Windom 1975, 1976). For example, surveys conducted by IEC (1983) found the greatest particulate trace metal concentrations were associated with highest TSS concentrations. Dissolved trace metals exhibited an inverse relationship with TSS and particulate trace metal concentration, which may be caused by scavenging of metals from solution onto sediment particles (Brannon 1978; Windom 1975, 1976). Dissolved manganese and lead levels varied widely throughout the survey area; however, concentrations were comparable to those from previous studies. Total (particulate plus dissolved) trace metal concentrations were below their respective EPA minimum marine water quality criteria (45 FR 79318 et sq.).

Elutriate tests are intended to indicate the potential for release of dissolved trace metals from dredged sediment during dredging or placement. Elutriate tests conducted by USACE (1978) on the dredged material from the ARBC indicated little or no release of trace metals except, for manganese, which is generally released in the elutriate test (Brannon 1978; Heaton 1978) or Louisiana WQS. IEC (1983) conducted elutriate tests on sediments outside and within the ODMDS-East. Except for zinc, which showed a slight release, results were similar to those of

USACE (1978). Trace metals released from sediments within and outside the ODMDS-East were similar.

Elutriate tests were also conducted for the 1996 and 2002 contaminant assessments and for samples collected in February 2008. None of the elutriate samples exceeded water quality criteria or standards from the 2008 sampling event. One sample from the 2002 data and three samples from the 1996 data exceeded the chronic water quality criteria and the Louisiana acute and chronic water quality standard for copper. It should be noted that the elutriate concentrations that exceeded the standards were within an order of magnitude of the applicable water quality limits. Based on mass balance considerations and the relative volume of suspended sediment compared to the volume of the water column and residence time of water in the ODMDS, it was determined that any water quality effect would be temporary in nature would be met, via dilution, before the discharge plume reaches the boundaries of the ODMDS.

There is nothing in the chemical analyses, suspended particulate phase bioassays, solid phase bioassays, or bioaccumulation study that would indicate a concern (PBS&J 2008). The NOAA ERL for arsenic was exceeded in some ARBC sediment samples from the 2008 contaminant assessment, but the bioassays and bioaccumulation studies conducted as part of the assessment indicated no concern. Therefore, based on the guidance provided by the Regional Implementation Agreement (RIA) among the EPA and the USACE, New Orleans and Galveston Districts (EPA/USACE 2003), the conclusion of this testing is that no significant adverse impacts are anticipated with the ocean placement of these sediments, and that the Limiting Permissible Concentration (40 CFR 227.29(a)) for the water column and solid phase, including bioaccumulation, are met.

#### 4.1.5.1.2 Proposed ODMDS-West Alternative

Proposed use of the ODMDS-West on an ongoing basis would have similar effects or slightly less as the No-Action Alternative on the expected sediment quality in the project area since the dredging frequency and average quantity of material placed will be less with the proposed action. Previous elutriate sample results have indicated potential exceedance of water quality standards and criteria for copper that could represent temporary conditions that would not be expected to persist over time or outside of the ODMDS. In addition, the 2008 contaminant assessment did not identify any sediment, elutriate or water concentrations of toxic constituents that indicate potentially significant impacts of dredging or material disposal at the ARBC and designated disposal locations (PBS&J 2008).

### 4.1.5.2 Sediment Transport

#### 4.1.5.2.1 No-Action Alternative

Under the No-Action Alternative, maintenance-dredged material from the ARBC would be placed in the ODMDS-East. Based on historical dredging and disposal quantities, approximately 12.8 mcy of shoal material would be dredged from the ARBC during annual maintenance events, of which, approximately 10.9 mcy of material would be placed in the ODMDS-East. Based on review of studies conducted in regards to accumulation of fluff in the ARBC (Van Heerden and

Kemp 2000; Teeter et al. 2003; ETS 2006), placement of material at the ODMDS-East will result in increased dredging frequency over time. This is because under normal weather conditions, net sediment transport is most frequently (63 to 75 percent of the time) towards the west, except when cold fronts are passing (PBS&J 2007). Thus, continued placement of dredged material in the ODMDS-East is likely to increase the amount and rate of shoal material runback into the ARBC.

#### 4.1.5.2.2 Proposed ODMDS-West Alternative

With this alternative, maintenance-dredged material from the ARBC would be placed in the ODMDS-West. Based on historical dredging and disposal quantities, approximately 12.6 mcy of shoal material would be dredged from the ARBC during annual maintenance events, of which, approximately 10.8 mcy of material would be placed in the ODMDS-West. Continued placement of maintenance-dredged material from the ARBC into the ODMDS-West will result in less frequent dredging over the long term (see Table 1-1; PBS&J 2007; Teeter et al. 2003). As previously described, this is because, under normal weather conditions, net sediment transport is most frequently (63 to 75 percent of the time) towards the west, except when cold fronts are passing. Thus, although the shoaling rate will continue to be high because of the dynamic nature of the area, substantial dredged material runback into the ARBC is significantly reduced when material is placed in the ODMDS-West.

### 4.1.5.3 Hazardous, Toxic, or Radioactive Wastes

#### 4.1.5.3.1 No-Action Alternative

Neither the ARBC nor the proposed disposal areas are within the boundaries of an EPA-designated CERCLA or National Priority List, or within the boundaries of a site designated by a state for a response action under CERCLA. No HTRW sites have been identified in the ODMDS-East. Thus, there is no potential for HTRW impacts from placement at the ODMDS-East.

#### 4.1.5.3.2 Proposed ODMDS-West Alternative

No HTRW sites have been identified in the ODMDS-West. Therefore, there is no potential for HTRW impacts from placement of dredged material at the ODMDS-West.

### 4.1.5.4 Oil and Gas

#### 4.1.5.4.1 No-Action Alternative

Placement of dredged material in the ODMDS-East will not directly affect oil and gas pipelines or other infrastructure. In the future, access to pipeline structures may become limited due to shallow water depths caused by the natural deposition of sediments. However, this limitation is not a result of use of the ODMDS-East.

#### 4.1.5.4.2 Proposed ODMDS-West Alternative

As noted for the No-Action Alternative, continued placement of dredged material in the ODMDS-West will not directly affect oil and gas pipelines or other infrastructure.

## 4.2 BIOLOGICAL ENVIRONMENT

In general, the placement of dredged material presents four potential problems to aquatic organisms: (1) temporary increases in turbidity, (2) changes in physical or chemical characteristics of the habitat, (3) smothering by burial, and (4) introduction of pollutants (Hirsch et al. 1978). The magnitude of adverse impacts on the existing fauna depends on the similarity of the dredged sediments to existing sediments, frequency of placement, thickness of the overburden, types of organisms present, and physical characteristics of the habitat (Pequegnat et al. 1990). It is often difficult to distinguish adverse effects caused by sediment placement from changes due to natural variability in habitat or species abundances (Wright 1978; Hirsch et al. 1978).

### 4.2.1 Plankton

#### 4.2.1.1 No-Action Alternative

Direct and indirect effects of dredged material disposal on plankton are difficult to assess because of the high natural variability of populations. The influences of tidal and river discharges, as well as diel changes in zooplankton abundances, increase the difficulty of detecting disposal effects. Sullivan and Hancock (1977) concluded that, for most oceanic areas, natural plankton fluctuations are so large that field surveys would not be useful for detecting the impacts of dredged material disposal.

Placement at the ODMDS-East would result in temporary increases in turbidity. Turbidity increases have been found to decrease productivity of phytoplankton in laboratory studies (Sherk 1971); however, the decrease in phytoplankton production has been found to be offset by the increase in nutrient content (Morton 1977; Kamykowski et al. 1977). BLM (1987) found total zooplankton production to be inversely related to turbidity. In past studies of the impacts of maintenance-dredged material placement from turbidity and nutrient release, the effects on plankton are both temporary and localized (May 1973; Odum and Wilson 1962; Brannon et al. 1978; Kraus 1991; Dragos and Peven 1994). Thus, the impacts of dredged material placement at the ODMDS-East are not expected to be significant.

#### 4.2.1.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative would be similar to those of the No-Action Alternative. The temporary increases in turbidity could impact phytoplankton productivity and zooplankton production. Impacts would be temporary and localized and are, therefore, not expected to be significant. These impacts would be less over the long term with the proposed alternative due to anticipated reductions in ARBC dredging frequency and dredged material volumes.

### 4.2.2 Benthos

#### 4.2.2.1 No-Action Alternative

With implementation of the No-Action Alternative, there would be some direct and indirect impacts to benthos in the form of physically altered open water bottom habitat, and temporary increases in turbidity during disposal activities. Direct effects of dredged material disposal (i.e., burial of organisms) are restricted to the immediate area of an ODMDS (Hirsch et al. 1978). Previous investigations of the effects of burial of benthic infauna demonstrated that adverse impacts are typically limited to non-motile species (Richardson et al. 1977); active or motile species are capable of burrowing up through 22.9 cm (9 inches) of overburden (Maurer et al. 1978). Nevertheless, maintenance-dredged material placement at an ODMDS will likely smother some epifaunal and infaunal organisms. Consequently, densities and diversity will temporarily decline (USACE 1978). However, benthic assemblages in the northern Gulf experience high natural variability in abundances and diversity due to seasonal changes in adult mortality and larval recruitment rates (Parker et al. 1980). Sediment particles that become suspended due to construction activities may impact filter-feeding benthic invertebrates by fouling feeding apparatuses if the concentration of such particles is excessively high. Clams and oysters, in particular, may experience a reduction in pumping rates with increased turbidity (Loosanoff 1961). Other lethal and non-lethal effects of turbidity include ingestion of non-food particles by shellfish and polychaete worms; clogging of pores and gills; erosion of gills and other apparatuses such as fins, tentacles, and cilia that may be used for locomotion and feeding; burial of eggs and juveniles; and burial of substrates that may be needed for cover, attachment, and reproduction. Indirect impacts to benthos may occur in water bottom areas adjacent to the ODMDS-East, as placed material disperses away from the ODMDS with the prevailing currents and settles in these other areas.

Recently deposited sediment will be recolonized by motile infaunal organisms burrowing up through the overburden, by species migrating from adjacent undisturbed areas, and/or by recruitment of larvae and juvenile forms (Hirsch et al. 1978). Specific recolonization patterns will be influenced by the composition of the new sediment and adjacent benthic communities (Oliver et al. 1977).

Although sessile or slow moving benthic organisms may be smothered in areas of the ODMDS-East where dredged materials are deposited, the consequences of temporarily disrupting the benthic community at the ODMDS cannot be easily evaluated (Wright 1978). Hirsch et al. (1978) concluded that "the more naturally variable the environment, the less effect dredging and placement will have, because animals and plants common to the unstable areas are adapted to stressful conditions and have life cycles that allow them to withstand the stresses imposed by dredging and disposal. Habitat disruption can also be minimized by matching the physical characteristics of the maintenance-dredged materials to the substrate found at the disposal site." Both ODMDSs (East and West) are located in an area much of which is relatively shallow and that is naturally disturbed by wind-generated waves, sediment transport from river inflows, and current patterns. The sediments in this area are physically and chemically similar to those in the ODMDSs and the maintenance-dredged material. Because of the dynamic nature of the

environment, and the apparent absence of significant adverse effects on water or sediment quality, it is unlikely that previous dredged material placement activity at either ODMDS has measurably altered the benthic habitat or will do so as a result of placement. Some benthic species could potentially indirectly benefit from the abundance of introduced detritus, and subsequent food resources, from deposited dredge material.

Some benthic invertebrate mortality due to removal may occur during maintenance dredging of the ARBC prior to the ODMDS disposal event; however, these species would gradually recolonize the area. The time necessary for a benthic community to recover after dredging is highly variable; however, it is assumed that repopulation of benthic organisms would begin within a month of dredging. Benthic populations in clay bottoms would likely return to pre-dredging levels within a year, while on sandy bottoms recovery would probably be faster.

No causes for concern were indicated in the chemical analyses, suspended particulate phase bioassays, solid phase bioassays, or bioaccumulation study conducted in 2008 (PBS&J 2008). The NOAA ERL for arsenic was exceeded in some ARBC sediment samples from the 2008 contaminant assessment, but the bioassays and bioaccumulation studies conducted as part of the assessment indicated no concern. Therefore, no significant adverse impacts to resident benthos at the ODMDS-East are anticipated with the ocean placement of these sediments.

No significant adverse impacts to benthic organisms, due to changes in water or sediment quality, were detected during a DMRP study of aquatic dredged material disposal impacts (Wright 1978). Results of IEC (1983) surveys indicated no long-term, persistent effects of disposal on benthic communities at the ODMDS-East. The macrofaunal assemblages within and around the ODMDS-East were characteristic of the general region and dominated by polychaetes. Many of the dominant organisms were small-bodied, opportunistic species capable of rapid recolonization of disturbed sediments. Large macroinvertebrates (mainly shrimp and crab) were also common throughout the area.

#### 4.2.2.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative on resident benthos are similar to those of the No-Action Alternative. Impacts to the benthic community would be the same as, or slightly less than, impacts from the No-Action Alternative, and would be expected to occur less frequently or with less intensity since the dredging frequency and average quantity of material placed will be less with the proposed action. Based on MVN analysis of pre and post-maintenance dredging surveys conducted annually at the Section 103(d) ODMDS-West since 2002, the approximately 10.8 mcy of dredged material expected to be placed in the proposed ODMDS-West during annual maintenance cycles has the potential to make the water 3 to 4 inches shallower. Soft substrates in this newly created subtidal habitat would eventually be re-colonized by motile benthic organisms burrowing up through the overburden, by species migrating from adjacent undisturbed areas, and/or by recruitment of larvae and juvenile forms.

### 4.2.3 Finfish and Shellfish

#### 4.2.3.1 No-Action Alternative

With the continued placement of dredged material at the ODMDS-East, there may be some direct and indirect impacts to fisheries in the form of physically altered open water bottom habitat in the ODMDS and adjacent areas, and temporary increases in turbidity during disposal activities. Historically-impacted shallow open water bottom habitat would continue to be altered during each maintenance dredging event. Data sufficient to characterize the effects of maintenance-dredged material placement on nekton inhabiting both the ODMDS-East and ODMDS-West are unavailable. However, DMRP studies suggest fish usually are not directly affected by maintenance-dredged material placement (Wright 1978). The mobility of nektonic organisms generally precludes adverse effects due to burial with sediment. No known unique nekton habitats or spawning areas occur within the ODMDSs. Adverse effects to motile nekton species from intermittent and localized placement at the sites would be negligible. Brown shrimp, white shrimp, and crabs may be directly impacted through the filling of shallow open water areas with dredged materials; however, these species could potentially indirectly benefit from the abundance of introduced detritus, and subsequent food resources, from these materials. Sediment particles that become suspended due to construction activities may impact filter-feeding shellfish species by fouling feeding apparatuses if the concentration of such particles is excessively high. Clams and oysters, in particular, may experience a reduction in pumping rates with increased turbidity (Loosanoff 1961). Since the project area is a naturally turbid environment and the majority of resident finfish and shellfish species are generally adapted to, and very tolerant of, high suspended sediment concentrations, the effects of turbidity and suspended solids on fisheries in the area would likely be negligible.

Localized burial of benthic fauna may decrease the abundance of fish prey items, causing temporary declines in finfish abundance and diversity at the ODMDS. Results of DMRP studies assessing the effects of dredging on demersal fish were ambiguous. Wright (1978) reported that in some cases relatively higher numbers of fish occurred at an ODMDS after placement of dredged material. In other cases, short-term avoidance of ODMDSs by finfish was observed after placement. Wright (1978) concluded: "Some question exists as to whether this behavior represented avoidance of the (dredged) material or was the result of normal seasonality and the sampling techniques that were used."

Nearshore areas of the northern Gulf of Mexico, including the waters off Louisiana, support one of the most productive fisheries in the United States (see Section 3.2.3). Coastal areas with sand/silt substrates, including the ODMDS-East (and ODMDS-West), are used seasonally by many commercial species for feeding, breeding, and passage; however, none of these activities are unique or restricted to the ODMDS area. Fishing activities for demersal and pelagic fish and shrimp extend throughout the year, but activity is greatest in spring and summer. Consequently, some interference with commercial fishing from dredged material disposal in nearshore regions is inevitable. The ODMDSs represent only a small portion of the total fishing grounds of the northern Gulf of Mexico. Any adverse effects are likely to be restricted to the disposal site proper. Therefore, dredged material disposal at the ODMDS-East will potentially affect only a small percentage of fisheries resources during a given maintenance dredging and disposal cycle.

Temporary placement (floating) of the dredge pipeline in open water areas of the ODMDS-East is not expected to significantly affect fish resources.

There are no Public Oyster Areas within the ODMDS-East (or ODMDS-West), and the nearest oyster leases are approximately 4 miles east of the ARBC and ODMDSs, near Point au Fer (LDNR 2012). Because the transport of suspended materials from the ODMDS is mainly parallel to the coastline and in a generally westward direction during most of the year, adverse effects of disposal operations on these oyster beds should be minimal. In addition, the oyster beds are naturally subjected to periodic episodes of high, suspended solid concentrations from the waters of the Atchafalaya River. There have been no impacts to oyster leases from past use, and no impact is expected to result from any future use of the ODMDS-East.

As previously noted, no causes for concern were indicated in the chemical analyses, suspended particulate phase bioassays, solid phase bioassays, or bioaccumulation study conducted in 2008 (PBS&J 2008). No significant adverse impacts to fisheries are anticipated with the ocean placement of dredged channel sediments into the ODMDS.

#### 4.2.3.2 Proposed ODMDS-West Alternative

Previously-impacted open water bottom habitat would continue to be altered during each disposal event in the ODMDS-West. Based on MVN analysis of pre and post-maintenance dredging surveys conducted annually at the Section 103(d) ODMDS-West since 2002, the approximately 10.8 mcy of dredged material expected to be placed in the proposed ODMDS-West during annual maintenance cycles has the potential to make the water 3 to 4 inches shallower. Effects of maintenance-dredged material placement on nekton (e.g., finfish and shrimp species) and benthic fauna (e.g., crabs and oysters) in the ODMDS-West are expected to be negligible and at most equal to effects described for the No-Action Alternative since the dredging frequency and average quantity of material placed will be less with the proposed action.

Temporary placement of the dredge pipeline in open water areas of the proposed ODMDS-West is not expected to significantly affect fish resources.

### 4.2.4 Essential Fish Habitat

#### 4.2.4.1 No-Action Alternative

With implementation of the No-Action Alternative, initially some EFH for brown shrimp, white shrimp, red drum, lane snapper, king mackerel, cobia, bonnethead shark, and Atlantic sharpnose shark will be directly impacted in the ODMDS-East. The ODMDS-East site encompasses approximately 9.25 square miles of Atchafalaya Bay water bottoms. An evaluation of EFH in the project area was coordinated with NMFS. NMFS provided comments to MVN in a letter on October 19, 2011. General categories of EFH potentially impacted by the placement of dredged material in the ODMDS-East include estuarine water bottoms and estuarine water column. According to NMFS, potential adverse impacts to these categories of EFH are considered temporary and minor. Potential impacts include the disruption/smothering of mud/sand substrates and related benthic communities associated with estuarine soft water bottoms during a

maintenance event. Short term EFH impacts would include a temporary and localized increase in estuarine water column turbidity during the placement of dredged material in the ODMDS; however, the project area is a naturally turbid environment and increased turbidity is not expected to significantly affect EFH needs within the project area.

Dredged material disposal would create new subtidal habitat and EFH in the area, and may add nutrients and detritus to the existing food web and contribute to the overall productivity of the area. Thus, some positive direct and indirect impacts to EFH and EFH-dependent species are anticipated with placement in the ODMDS-East.

#### 4.2.4.2 Proposed ODMDS-West Alternative

The proposed ODMDS-West site encompasses approximately 48 square miles of Atchafalaya Bay water bottoms. According to NMFS, this subtidal habitat is categorized as EFH. General categories of EFH potentially impacted by the placement of dredged material in the ODMDS-West include estuarine water bottoms and estuarine water column. According to NMFS, potential adverse impacts to these categories of EFH are considered temporary and minor. The impacts of the ODMDS-West Alternative to EFH are similar to those of the No-Action Alternative but are expected to occur less frequently and be less intensive because of the smaller amount of material placed per maintenance cycle. Impacts to EFH would be the same as the impacts currently experienced at the site. Previously-impacted estuarine water bottoms and estuarine water column would continue to be altered during each disposal event in the ODMDS-West. Based on MVN analysis of pre and post-maintenance dredging surveys conducted annually at the Section 103(d) ODMDS-West since 2002, the approximately 10.8 mcy of dredged material expected to be placed in the proposed ODMDS-West during annual maintenance cycles has the potential to make the water 3 to 4 inches shallower; thus, creating new subtidal habitat and EFH in the area.

### 4.2.5 Mammals, Reptiles, and Birds

#### 4.2.5.1 No-Action Alternative

Specific effects of dredged material placement on marine mammals and reptiles have not been studied. Because of their relatively large size and the mobility of most species, direct impacts should be negligible at the ODMDS-East. In addition, the ODMDS represents only a small portion of the total range of the mammal and reptile species occurring in the north central Gulf of Mexico. Placement would not occur in geographically restricted feeding, breeding, or passage areas of mammals, birds, or reptiles. Sea turtle prey availability in the project area could be reduced temporarily because of turbidity. The placement of material should not jeopardize any marine turtles' population or critical habitat.

#### 4.2.5.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are similar in nature to those of the No-Action Alternative but are expected to occur less frequently, over the long term since the dredging

frequency and average dredged material placement quantity will be less with the proposed action.

### 4.2.6 Threatened and Endangered Species

#### 4.2.6.1 No-Action Alternative

Infrequent and localized placement at the ODMDS-East would have no adverse impacts on the food sources, migratory passage, or breeding areas of threatened or endangered mammals, birds, turtles, or fish. These species do not commonly occur in the area, are relatively motile, and would be able to avoid the area during maintenance dredging and dredged material placement. The ODMDS-East does not contain critical habitat for federally-listed species. Reduced prey availability for some of the species may occur on a temporary basis.

#### 4.2.6.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are similar to those of the No-Action Alternative but would be expected to occur less frequently, over the long term. Impacts to threatened or endangered species would be the same as the impacts currently experienced at the site.

Although threatened or endangered species may occur within the general project vicinity, their presence within the open waters of the proposed project areas is unlikely. Furthermore, the proposed project area does not contain critical habitat for federally-listed species, and the open water areas and habitats surrounding the project area would allow them to easily avoid the project activities. The ARBC and existing Section 103(b) ODMDS-West have previously been disturbed and have undergone routine maintenance dredging/disposal events in the past. Therefore, the proposed action is unlikely to cause adverse direct or indirect impacts to (i.e., "not likely to adversely affect") federally-listed threatened or endangered species, or their critical habitat, under the jurisdiction of USFWS. USFWS concurred with this determination in a letter dated January 26, 2012. Additionally, MVN has concluded that no critical habitat for any threatened, endangered, or candidate species under the purview of National Marine Fisheries Service, Protected Resources Division has been designated within the project area, and that there would be no adverse impacts (i.e., "no effect") to any of the NMFS federally-listed species that could potentially occur within the project area.

### 4.2.7 Marine Sanctuaries and Special Biological Resource Areas

#### 4.2.7.1 No-Action Alternative

There are no marine sanctuaries or special biological resources in the immediate area of either ODMDS. Shell Keys and Marsh Island Wildlife Refuges are approximately 47 km (29 miles) west of the ODMDS-East. Fishnet Bank, the closest protected Area of Biological Significance, is approximately 167 km (104 miles) south of the ODMDS-East. Because of the substantial distance between the ODMDS-East and the nearest marine sanctuary, refuge, or Area of Biological Significance, no impacts to such areas are expected.

#### 4.2.7.2 Proposed ODMDS-West Alternative

The distance between the proposed ODMDS-West and the nearest marine sanctuary, refuge, or Area of Biological Significance is approximately a similar distance as described for the ODMDS-East. Therefore, the proposed ODMDS-West is not expected to impact such areas.

## 4.3 SOCIOECONOMIC ENVIRONMENT

### 4.3.1 Demography and Economics

#### 4.3.1.1 No-Action Alternative

Demography and economics of St. Mary Parish and Terrebonne Parish are related to the overall level of economic activity in the region. Under the No-Action Alternative, the dredging and material placement actions are not expected to change the demographics and levels of economic activity in St. Mary and Terrebonne Parishes.

#### 4.3.1.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are similar to those described for the No-Action Alternative but are expected to occur with lower frequency over the long term than with the No-Action Alternative since the dredging frequency and the average dredged material placed will be less with the proposed action. Impacts to the levels of economic activity associated with commercial and recreational fisheries would be the same as currently experienced in the project area.

### 4.3.2 Industry

#### 4.3.2.1 No-Action Alternative

Nearshore areas of the northern Gulf of Mexico support one of the most productive fisheries in the United States for shrimp, menhaden, and bottom fish including croaker, drum, and sea trout. Coastal areas with sand/silt substrates, including the ODMDS-East, are used seasonally by many commercial species for feeding, breeding, and passage activities; however, none of these activities are unique or restricted to these sites. Fishing for demersal and pelagic fish and shrimp extend throughout nearshore and shelf regions. Consequently, some interference between commercial fishing and maintenance-dredged material disposal in nearshore regions is inevitable. The ODMDS represents only a small portion of the total fishing grounds of the northern Gulf of Mexico and ODMDS use occurs for only a small portion of each year. Any adverse effects are likely to be restricted to the disposal sites. Therefore, maintenance-dredged material disposal will potentially affect only a small percentage of this resource over relatively short periods of time.

No causes for concern were indicated in the chemical analyses, suspended particulate phase bioassays, solid phase bioassays, or bioaccumulation study conducted in 2008 (PBS&J 2008).

The NOAA ERL for arsenic was exceeded in some ARBC sediment samples from the 2008 contaminant assessment, but the bioassays and bioaccumulation studies conducted as part of the assessment indicated no concern. Therefore, no significant adverse impacts are anticipated with the ocean placement of these sediments. Commercial and recreational fisheries are, therefore, likely to be only slightly impacted by ODMDS use and only for a short time period.

The disposal of maintenance-dredged materials could present two potential hazards to navigation: (1) mounding within the disposal site, and (2) interference of the dredge and/or pipeline with vessel traffic.

Mounding and/or shoaling may temporarily occur within the ODMDS-East immediately following disposal. However, historical pre and post-dredging bathymetric data collected by MVN indicate that there is very little net mounding because of the fluid nature of the dredged material and the dispersive nature of the area.

Hydraulic cutterhead dredges and disposal pipelines may cause minor and temporary interference by blocking sections of the ARBC, but are not expected to interfere significantly with shipping traffic. Barges or hopper dredges, if required, may potentially interfere with shipping in the ARBC; however, these interferences are unlikely, as dredging operations are closely coordinated with representatives of the navigation industry and a Notice to Mariners is posted by the USCG.

#### 4.3.2.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are expected to be similar to those described for the No-Action Alternative but are expected to occur less frequently over the long term since the dredging frequency and average quantity of dredged material placed will be less with the proposed action. Impacts to commercial and recreational fisheries and to navigation would be the same as the impacts currently experienced at the site. The continued maintenance of the ARBC may cause temporary changes in operations by the oil and gas and transportation industries using the channel; however, dredging operations are coordinated with navigation interests to allow continued use of the waterway during maintenance dredging operations.

### 4.3.3 Employment

#### 4.3.3.1 No-Action Alternative

Disposal in the existing ODMDS-East will not affect employment in St. Mary Parish or Terrebonne Parish. The frequency of dredging would increase over the long term once dredged material placement shifted from the Section 103(b) ODMDS (ODMDS-West) back to the ODMDS-East. Employment by commercial fishing, oil and gas, and recreational service industries would not be impacted by the No-Action Alternative.

#### 4.3.3.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are similar to those of the No-Action Alternative. No direct impacts to employment would occur. While the frequency of dredging would be maintained at a lower rate over the long term with the permanent designation of the ODMDS-West, the overall employment in St. Mary and Terrebonne Parishes would not be affected by the change in activity level. Employment in other industries, including commercial fishing, oil and gas, and recreational services, would not be affected by the Section 102(c) designation of the ODMDS-West.

### 4.3.4 Environmental Justice

The EPA's guidance for determining whether there is a minority community where environmental justice effects could occur gives both quantitative and qualitative measures: if the affected area's minority population is over 50 percent, and if the minority population in the affected area is "meaningfully greater" than that in the general population. U.S. 2010 Census data was used to identify the percentage of minority and low income populations within the study area to determine whether environmental justice impacts would occur. Data indicated the percentage of individuals who are listed as minorities in the parishes of the study area. The demographic analysis also identified percentages of study area residents living below the poverty level.

#### 4.3.4.1 No-Action Alternative

Under the No-Action Alternative dredging of the ARBC would continue and placement of the dredged material would shift to the ODMDS-East after July 31, 2012. There would be no impact to any populations, minority, low-income, or otherwise, because the project area is in open waters of Atchafalaya Bay and the Gulf of Mexico. Because there would be no disproportionate effect to minorities or low income populations, the No-Action Alternative would not have any impact relative to Environmental Justice.

#### 4.3.4.2 Proposed ODMDS-West Alternative

The proposed ODMDS-West Alternative would not result in environmental justice impacts. As described for the No-Action Alternative, the ODMDS-West is located in open waters of Atchafalaya Bay and the Gulf of Mexico. No populations would be affected by continued use of the site for placement of maintenance-dredged material from the ARBC. Thus, there would not be a disproportionate impact to minority or low-income populations or property in the study area.

### 4.3.5 Recreation

#### 4.3.5.1 No-Action Alternative

With implementation of the No-Action Alternative, the recreational environment in and around the project site would experience limited short-term disruption imposed by the physical size and

working activities imposed by the floating dredge facility and associated dredge pipeline. Dredging activities would increase turbidity in the area where work is being performed and in the vicinity of the discharge pipe. This turbidity would disrupt some recreational activity occurring within the work area; however, these adverse impacts would be temporary and short lived.

#### 4.3.5.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are similar to those of the No-Action Alternative. Impacts to recreation would be the same or slightly less than the impacts currently experienced at the site but would be expected to occur less frequently or with less intensity since the dredging frequency and average quantity of material placed will be less with the proposed action.

### 4.3.6 Cultural and Historic Resources

#### 4.3.6.1 No-Action Alternative

The short-term and long-term impacts of placing maintenance-dredged material on top of submerged cultural resources have never been fully assessed. It has been assumed by some that once material had been deposited in an area that the damage, if any, had already been done. The waterways of the ARBC are dynamic, hence the need for maintenance dredging and for continual placement of dredged material in the same areas. However, adverse impacts to submerged cultural resources could result from placement of maintenance-dredged material on top of any significant cultural resources in the ODMDS area. Adverse impacts include: 1) increase weight of sediments on any significant shipwreck, and 2) localized burial of possible shipwrecks changing their environment and possibly increasing the rate of decay (USACE 2002). While temporary mounding of maintenance-dredged material may occur within the ODMDS, these mounds disperse fairly quickly. The placed sediments are reworked by waves and littoral currents and are moved out of the ODMDS, thus removing any additional over burden.

Geomorphological and bathymetric data obtained during the 1996 survey discussed in Section 3.3.5 indicates that between approximately 5 and 6 m (17 and 21 ft) of sedimentation has occurred in the area between 1839 and the present (USACE 2002). Based on these sedimentation rates, any vessel wrecked more than 157 years ago could be covered by at least 5 m (18 ft) of sediment. As a result of this survey, it appears the disposal of maintenance-dredged materials in the Atchafalaya ODMDS could not add appreciably to the impact already induced by delta progradation during the last century. Thus, potential impacts to cultural resources resulting from continued placement of maintenance-dredged material at the ODMDS-West or resumed placement at ODMDS-East are expected to be negligible.

#### 4.3.6.2 Proposed ODMDS-West Alternative

The impacts from the ODMDS-West alternative are the same as those described for the No-Action Alternative. Impacts to cultural and historic resources would be the same as the impacts currently experienced at the ODMDS-West. Section 106 consultation with the LA SHPO was

initiated on May 9, 2012 and with federally recognized tribes on June 1, 2012. MVN requested concurrence with the determination that no historic properties would be affected (36 CFR Part 800.4(d)(1)) with implementation of the proposed action. The LA SHPO concurred with the finding of no effect to historic properties on May 24, 2012. Consulting parties were given 30 days to respond to this determination in accordance with 36 CFR 800. The Jena Band of Choctaw Indians concurred with the finding of no effect to historic properties in a letter dated July 11, 2012. In the event that significant cultural and historic resources are encountered, work in the location of the site would be halted, and an MVN archeologist would be notified for evaluation and further consultation under Section 106 of the NHPA.

### 4.3.7 Aesthetics (Visual Resources)

#### 4.3.7.1 No-Action Alternative

With implementation of the No-Action Alternative, there would be some direct impacts to aesthetic (visual) resources. The visual resources of the project corridor would be temporarily impacted by construction activities related to implementing the proposed action and by transport activities needed to move equipment and materials to and from the site. However, this temporary impact would most likely affect visual resources from boating and other water traffic only. Dredged material disposal in the ODMDS-East would create a temporary turbidity plume. The plume would not be visible from shore, and would disperse after disposal operations cease. The additional discoloration of naturally turbid waters would be minor, and likely, unnoticeable. No excessive noises or odors are expected.

#### 4.3.7.2 Proposed ODMDS-West Alternative

The impacts of the ODMDS-West Alternative are similar to those of the No-Action Alternative. Impacts to visual resources would be the same or slightly less than those of the No-Action Alternative but would be expected to occur less frequently or with less intensity since the dredging frequency and average quantity of material placed will be less with the proposed action.

## 4.4 CUMULATIVE IMPACTS

Cumulative impact has been defined by the CEQ as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such action." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

No individual projects were determined as pertinent to the cumulative impacts from ODMDS site designation. However, types of activities can be addressed. Cumulative impacts could occur at the proposed ODMDS-West if the impacts of other activities in the area (e.g., shipping, recreational and commercial fishing, and oil and gas exploration and production) compounded the impacts of designation and, thus, placement of dredged material in the proposed ODMDS-West. To assess this, one must determine whether the impacts that are likely with these activities would affect the ecosystems impacted by dredged material placement in the ocean. The only

expected impacts from dredged material placement are localized, short-term, temporary impacts to the water column and longer-term but still temporary impacts to the water bottoms and associated benthos. Shipping and recreational and commercial fishing would impact neither of these resources unless there was a spill of fuels or cargo. There is no way to quantify these events but they are not common and would have to co-occur with placement, which is expected to occur on 1- to 5-year intervals, before cumulative impacts would occur. Cumulative impacts from oil and gas drilling and dredged material placement cannot be expected. There are platforms in the vicinity, and the pipelines that connect them to shore, that could potentially result in an oil spill. The long-term impacts of the *Deepwater Horizon* oil spill on coastal Louisiana are uncertain at this time. This spill, and any future oil spills, could potentially adversely impact USACE water resources projects and studies within the Louisiana coastal area. Potential impacts could include factors such as changes to existing or baseline conditions, as well as changes to future-without and future with project conditions. The USACE will continue to monitor and closely coordinate with other Federal and state resource agencies and local sponsors in determining how to best address any potential problems associated with the oil spill that may adversely impact USACE water resources development projects/studies. This could include revisions to proposed actions as well as the generation of supplemental environmental analysis and documentation for specific projects/studies as warranted by changing conditions. Additional environmental stressors such as hypoxia could add to impacts from ODMDS site designation. While the placement of dredged material could temporarily reduce the dissolved oxygen content of water column at the ODMDS-West during placement, as discussed in Section 3.4.3, the area of hypoxia in the Gulf of Mexico is quite large, ranging from Galveston to the Mississippi Delta, relative to the area of the proposed ODMDS-West. Thus the dredged material component of any cumulative impacts from oxygen demand is expected to be insignificant.

Dredging and placement of maintenance material, as well as these other types of activities and stressors, have been ongoing for decades off the Atchafalaya Bay with no indication of significant cumulative environmental deterioration. Placement of additional material in the proposed ODMDS-West, which should be very similar to that placed currently at the same site under Section 103(b), should not change the situation. The ODMDS-West would have no significant environmental justice or socioeconomic impacts and would not contribute to any cumulative environmental justice or socioeconomic impacts.

Previously-impacted open water bottom habitat, estuarine water bottom and associated EFH, and estuarine water column would continue to be altered during each ARBC maintenance dredging and disposal event with the continued use of the ODMDS-West upon the site's Section 102(c) designation. Failure to designate the ODMDS-West pursuant to Section 102(c)—the No-Action Alternative—would result in a return to use of the ODMDS-East, after the ODMDS-West site's expiration on July 31, 2012. While disposal to the smaller (6,000 acres) ODMDS-East would result in less water bottom impact in the short term, it has been demonstrated that dredged material placed in the ODMDS-East returns to the ARBC at a higher rate than dredged material placed in the ODMDS-West. Designation of the ODMDS-West is intended to allow a long-term reduction in required dredging compared to the required dredging frequency if placement is returned to the ODMDS-East. Consequently, long-term impacts that are likely to result from maintenance dredging disposal activities are expected to be less with the proposed alternative (ODMDS-West) than with the No-Action Alternative (ODMDS-East).

## 4.5 ADVERSE ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED

In general, few significant adverse impacts result from maintenance-dredged material placement. Increases in turbidity, releases of nutrients or trace metals, disturbance of open water bottom habitat and associated reductions in benthic faunal abundance and diversity are short-term and localized effects that could occur. Results of DMRP studies indicate that impacts within the site are minimized when placement occurs in naturally variable, high-energy environments (Hirsch et al. 1978). The ODMDS-West is situated in a dynamic, nearshore environment; thus, long-term or cumulative impacts will be minimal, and mitigation measures should be unnecessary. Results of the IEC (1983) surveys at the ODMDS-East suggest that previous dredged material placement has not caused significant degradation of the water or sediment quality or persistent changes in the composition of the fauna in areas adjacent to the ODMDS-East. The same would be expected for the ODMDS-West.

Limited interference with nearshore fisheries may occur from placement of dredged material. The ODMDS-West is located within passage areas of nekton that seasonally migrate to and from the estuaries, bays, and Gulf during various stages of their life cycle. Maintenance dredging and placement activities could be restricted to periods of the year when these migrations are diminished or periods of greater turbulence (i.e., more rapid sediment dispersion). However, the ODMDS represents only a small percentage of the total nearshore fishing grounds. Therefore, mitigating measures to reduce interferences with commercial or recreational fishing are not warranted.

## 4.6 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Long-term degradation of water or sediment quality, which might decrease the long-term productivity or value of resources, has not been detected within or adjacent to the ODMDS-East and is therefore not expected to occur at the ODMDS-West. Commercial fishing and sportfishing at and near the site should not be significantly impaired because the site constitutes a small percentage of the total fishing grounds. Adverse effects on the productivity of the nearshore region adjacent to the ODMDSs due to localized and intermittent disposal activities are considered negligible in comparison to the economic benefits derived from maintaining the ARBC.

## 4.7 ANY REVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible or irretrievable resources committed to the proposed action include:

1. Loss of energy resources used as fuel for dredges, pumps, and dredged material placement vessels.

2. Loss of economic resources due to costs of ocean disposal.
3. Loss of benthic organisms due to burial.

## 4.8 ENERGY AND NATURAL OR DEPLETABLE RESOURCES REQUIREMENTS AND CONSERVATION POTENTIAL OF VARIOUS ALTERNATIVES AND MITIGATION MEASURES

Within the bounds of the guidelines for site designation, the distance traveled by the dredges, which accounts for dredging and fuel requirements, is kept to a minimum with use of the ODMDS-West. Use of the ODMDS-West requires the least amount of energy for maintaining the ARBC because of reduced frequency of dredging over the long term when compared to use of the ODMDS-East.

## 4.9 COMPLIANCE WITH COASTAL ZONE MANAGEMENT PLANS (CZMP)

It has been the policy of the State of Louisiana to put to BU, to the fullest extent possible, the use of dredged material under the purview of the Louisiana CZMP. However, MVN engineering studies have indicated that the transport of material from the ARBC for the purpose of marsh and/or island creation at a nearshore location would be cost and equipment prohibitive—exceeding the current Federal Standard and not economically justified. Additionally, the material to be dredged is comprised of fine silt and clay and is very fluid. This material has little value for BU applications and its use is not based on sound engineering practices.

MVN has clearly demonstrated a commitment to using dredged material from the upper Atchafalaya River Bar and Bay channels beneficially where practicable. The permanent Section 102(c) designation of the ODMDS-West would not preclude future consideration of beneficial use alternatives as the physical characteristics of the ARBC change. As discussed earlier in this DEIS, MVN will continue to explore the possibility of using greater amounts of shoal material from the ARBC beneficially, if and when the bed load composition in the channel becomes more suitable (i.e., courser-grained) for marsh and/or island creation as active progradation of the Atchafalaya Delta continues. It is anticipated that additional modifications (e.g., further reduction of the site's footprint) to the proposed ODMDS-West may be deemed appropriate to accommodate future expansion of the Bird Island-West site and/or other beneficial use efforts as greater quantities of suitable material become available in the area. Any modifications to the proposed ODMDS-West (or ODMDS-East) site in the future would require the preparation of the appropriate accompanying environmental compliance and supporting documentation.

# 5.0 COORDINATION

## 5.1 BACKGROUND

The EPA, in cooperation with MVN, published a notice of intent (NOI) to prepare a Draft EIS for the designation of an ODMDS in the Gulf of Mexico off the mouth of the Atchafalaya River, St. Mary, Louisiana. The NOI was published in the *Federal Register* (Volume 76, Number 140) on July 21, 2011. The NOI requested comments concerning significant issues for evaluation in the EIS be provided to EPA.

## 5.2 EIS SCOPING

The NEPA provides for an early and open public process for determining the scope of issues (problems, needs, and opportunities), resources, impacts, and alternatives to be addressed in the EIS. This process is referred to as "scoping." Scoping is used to: a) identify the affected public and agency concerns; b) facilitate an efficient Draft EIS preparation process; c) define the issues and alternatives that will be examined in detail in the Draft EIS; and d) save time in the overall process by helping to ensure that the draft statement adequately address relevant issues. Scoping is a process, not an event, or a meeting; it continues throughout the Draft EIS process and may involve meetings, telephone conversations, and/or written comments. Scoping is a critical component of the overall public involvement program.

Scoping was accomplished by correspondence with affected Federal, State, tribal, and local agencies, and with anticipated interested parties. Appropriate Federal, State, tribal, and local entities were invited to participate as a cooperating agency. The scoping process was initiated with the publishing of the NOI in the *Federal Register* (Volume 76, Number 140) on July 21, 2011. Scoping continued with the distribution of a scoping input request letter and project information package on September 15, 2011, followed by a 45-day scoping comment period.

Following the scoping period, a Scoping Report was prepared by EPA and MVN. The Scoping Report outlined the project background and scoping process to date and summarized the key issues identified by members of the public during the scoping period. The Scoping Report was distributed to all Federal, State, tribal, and local agencies and interested parties that provided comments during the scoping comment period and is included in Appendix B of this Draft EIS.

The beneficial use of dredged material was the major issue identified during the EIS scoping process. The EPA supports the use of dredged material for beneficial purposes and is currently taking an active role in efforts to reduce wetland loss and coastal erosion in Louisiana. However, EPA has no authority to impose, either directly or indirectly, a blanket prohibition on ocean disposal of dredged material. More specifically, EPA is authorized by Section 102(c) of MPRSA to designate recommended sites or times for ODMDS disposal. The selection and evaluation of an ODMDS is based primarily on the general and specific criteria contained in Part 228 of the Ocean Dumping Regulations. In response to the EIS scoping comments, a non-ocean (i.e., beneficial use) disposal alternative discussion is included in Section 2.2 of this Draft EIS. However, it should be noted that this alternative discussion has been included based on the intent

of NEPA which states that reasonable alternatives outside the jurisdiction of the responsible agency can be evaluated.

Implementation of a beneficial use alternative is considered under 40 CFR Part 227, Subpart C, Need for Ocean Dumping. The evaluation of beneficial use as well as other alternatives to ocean dumping are addressed during the USACE's project review process. Prior to the disposal of dredged material at a designated site, the USACE applies the Part 227 criteria, including Subpart C, and evaluates compliance with the Ocean Dumping Regulations.

## 5.3 PUBLIC REVIEW PROCESS

The Notice of Availability and request for public comments on this Draft EIS will be published in the *Federal Register*. The Draft EIS will be made available to interested agencies, groups, and individuals for a 45-day review and comment period. The Draft EIS may be viewed at the EPA website: http://www.epa.gov/region6/water/ecopro/current_action.html.

## 5.4 MAILING LIST

Copies of this Draft EIS will be provided, by request, to Federal, state, parish, and local agencies; tribes; businesses; libraries; museums; universities; environmental organizations, groups and individuals; and scoping participants. The complete distribution list will be available upon request from the EPA at the following address:

U.S. EPA, Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

## 5.5 RULE-MAKING PROCESS

Concurrent with or shortly after distribution of this draft EIS, the EPA will publish a proposed rule-making in the *Federal Register*. The proposed rule-making has a 45-day review and comment period. A Final EIS will then be prepared, taking into account all comments received on the Draft EIS and proposed rule-making. The Final EIS has a 30-day review and comment period. The EPA's final rule-making, which serves the same purpose as a Record of Decision, addresses comments received on the Final EIS. ODMDS designation (pursuant to Section 102(c) of MPRSA) becomes effective 30 days after publication of the final rule-making in the *Federal Register*.

## 5.6 COASTAL ZONE CONSISTENCY

A Coastal Zone Consistency Determination was prepared by EPA and submitted to LDNR's Office of Coastal Management (OCM) for consistency review on February 27, 2012. In a letter dated April 30, 2012, OCM concurred with the determination that the proposed action (the permanent, MPRSA 102(c) designation of the ODMDS-West) is consistent with the Louisiana Coastal Resources Program (LCRP). Usage of the ODMDS-West by MVN would still require individual evaluation and concurrence with consistency determinations on a case-by-case basis.

# 6.0 PREPARERS

This Draft EIS was coordinated and prepared by Mr. John Fiorentino (Biologist), MVN in cooperation with Dr. Jessica Franks (Dredge Material Management & Ocean Disposal Coordinator), EPA, Region 6. Much of the information contained herein is largely adapted from the 2009 Preliminary Draft EIS (Document No. 080178), prepared for MVN by PBS&J.

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# APPENDIX A

## Site Management and Monitoring Plan

ATCHAFALAYA RIVER BAR CHANNEL, LOUISIANA

# SITE MANAGEMENT PLAN
# FOR THE MAINTENANCE DREDGING
# OCEAN DREDGED MATERIAL DISPOSAL SITES EAST AND WEST

AS REQUIRED BY
SECTION 102 OF THE
MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT

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The following Site Management and Monitoring Plan for the Atchafalaya ocean dredged material disposal sites East and West complies with Section 102©(3) of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. Section 1401, et seq.) as amended by Section 506of the Water Resources Development Act Amendments of 1992 (WRDA 92; public Law 102-580), and has been approved by the following officials of Region 6 and the U. S. Environmental Protection Agency, and New Orleans District of the US Army corps of Engineers.

_____ _____

Ron Curry Date
Regional Administrator
Region 6
U.S. Environmental Protection Agency

_____ _____

Edward R. Fleming Date
Colonel, Corps of Engineers
New Orleans District
U.S. Army Corps of Engineers

This plan goes into effect up on the date of the last signature for a period not to exceed 10 years. The plan shall be reviewed and revised more frequently if site use and conditions at site indicate a need for revision.

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**SITE MANAGEMENT AND MONITORING PLAN**

**ATCHAFALAYA RIVER BAR CHANNEL, LOUISIANA**
**OCEAN DREDGED MATERIAL DISPOSAL SITES EAST AND WEST**

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## LIST OF TERMS

| | |
|---|---|
| ARBC | Atchafalaya River Bar Channel |
| CFR | Code of Federal Regulations |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| ERL | Effects Range - Low |
| million cy | 1,000,000 cubic yards |
| MLLW | NOAA Mean Lower Low Water datum |
| MPRSA | Marine Protection, Research, and Sanctuaries Act of 1972 |
| MVN | U. S. Army Corps of Engineers – Mississippi Valley, New Orleans District |
| NMFS | National Marine Fisheries Service |
| ODMDS | Ocean dredged material disposal site |
| RIA | Regional Implementation Agreement |
| SMMP | Site management and monitoring plan |
| SPI | Sediment Profile Imaging |
| USACE | U. S. Army Corps of Engineers |
| USEPA | U. S. Environmental Protection Agency |
| WRDA | Water Resources Development Act of 1992 |

**SITE MANAGEMENT AND MONITORING PLAN**

**ATCHAFALAYA RIVER BAR CHANNEL, LOUISIANA**
**OCEAN DREDGED MATERIAL DISPOSAL SITES EAST AND WEST**

## 1.0 INTRODUCTION

It is the responsibility of the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE) under the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 to manage and monitor each of the Ocean Dredged Material Disposal Sites (ODMDSs) designated by the EPA pursuant to Section 102 of MPRSA. Section 102(c)(3) of the MPRSA requires development of a Site Management and Monitoring Plan (SMMP) for each ODMDS and review and revision of the SMMP not less frequently than every 10 years. The 1996 document, *Guidance Document for Development of Site Management Plans for Ocean Dredged Material Disposal Sites* (EPA/USACE, 1996) and the EPA, Region 6 and USACE Mississippi Valley – New Orleans District ODMDS Regional Implementation Agreement (RIA) (EPA/USACE, 2003) have been used as guidance in developing this SMMP.

This SMMP is intended to provide management and monitoring strategies for disposal in the ODMDS East and West locations utilized for Atchafalaya River Bar Channel (ARBC) improvement and maintenance dredging projects. Final designation of ODMDS-East was first sought in 1983. Upon review of the Environmental Impact Statement (EIS), EPA requested that additional surveys be conducted, which were included in the 1990 Supplemental EIS and eventually compiled into the 1997 Final EIS. ODMDS-East received its final designation in 2000. However, use of the ODMDS-East site was discontinued in 2002 due to concerns with transport of material from this site back into the bar channel. This concern necessitated the creation of a new ocean disposal site, leading to the selection of ODMDS-West. The first SMMP specifically for ODMDS-West was published in 2002 as an appendix under Environmental Assessment #348, Atchafalaya River and Bayous Boeuf, Chene, and Black, LA Navigation Project as designated under MPRSA Section 103, but was never signed. The most current SMMP in use for all ARBC ODMDS projects was signed in 1996 and supported the use of only the ODMDS-East. This document supports the use of both the ODMDS-West as well as the ODMDS-East. This revision to the Atchafalaya Bar Channel ODMDS SMMP supersedes all previous SMMPs for ARBC ODMDS projects. Upon finalization of this revised SMMP, the SMMP provisions shall be requirements for all dredged material disposal activities and monitoring activities at the site. The SMMP itself, however, does not authorize the use of any ODMDS for ocean disposal of dredged materials. Use of any ODMDS for ocean disposal of dredged materials is regulated under a permit (or contract specification) under MPRSA section 103. All Section 103 (MPRSA) ocean disposal permits or contract specifications shall be conditioned as necessary to assure consistency with the SMMP. Nothing in this SMMP operates to relieve the USACE from statutory requirements (or to satisfy any such requirements) applicable to the authorization to use an ODMDS for ocean disposal of dredged material other than the requirement that any such use comply with the provisions of the SMMP.

## 2.0 SITE MANAGEMENT

The Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. Section 1401, et seq.)

is the legislative authority regulating the disposal of dredged material into ocean waters, including the territorial sea. The transportation of dredged material for the purpose of placement into ocean waters is permitted by the USACE or, in the case of Federal projects, authorized for disposal under MPRSA Section 103(e), applying environmental criteria established by the EPA in the Ocean Dumping Regulations (40 CFR Parts 220-229).

Section 228.3 of the Ocean Dumping Regulations established disposal site management responsibilities, stating that "management of a site consists of regulating times, rates, and methods of disposal and quantities and types of materials disposed of; developing and maintaining effective ambient monitoring programs for the site; conducting disposal site evaluation designation studies; and recommending modifications in site use and/or designation."

This SMMP for the ARBC ODMDS East and West was developed jointly by EPA, Region 6 and USACE Mississippi Valley - New Orleans District (MVN), in accordance with Section 102(c)(3) of the MPRSA, as amended by WRDA 92. At a minimum the SMMP shall include but not be limited to:

- A baseline assessment of conditions at the site;
- A program for monitoring the site;
- Special management conditions or practices to be implemented at each site that are necessary for the protection of the environment;
- Consideration of the quantity and physical/chemical characteristics of dredged materials to be disposed of at the site;
- Consideration of the anticipated use of the site over the long-term; and
- A schedule for review and revision of the plan.

**2.1 Site Management Objectives**

The purpose of ODMDS management is to ensure that placement activities do not unreasonably degrade or endanger human health, welfare, the marine environment, or economic potentialities. The specific management objectives for the ODMDSs are as follows:

1. Ocean discharge of only that dredged material that satisfies the criteria set forth in 40 CFR Part 227 Subparts B, C, D, E, and G and Part 228.4(e) and is suitable for unrestricted placement at the ODMDS;
2. Avoidance of excessive mounding either within the site boundaries or in areas adjacent to the site, as a direct result of placement operations.

These objectives will be achieved through the following measures:

1. Regulation and administration of ocean dumping permits;
2. Development and maintenance of a site monitoring program;
3. Evaluation of permit compliance and monitoring results.

The objective of the SMMP is to provide guidelines in making management decisions necessary to fulfill mandated responsibilities to protect the marine environment. The following

sections provide the framework for meeting these objectives.

**2.2 Roles and Responsibilities**

Development of SMMPs for ODMDSs within MVN's area of operation is the joint responsibility of EPA, Region 6 and the MVN. Both agencies are responsible for assuring that all components of the SMMP are implementable, practical, and applicable to site management decision-making.

Specific responsibilities of EPA and the MVN are:

In accordance with Section 102 (c) of the MPRSA, EPA is responsible for designation/de-designation of ODMDSs, for evaluating environmental effects of disposal of dredged material at these sites and for reviewing and concurring on dredged material suitability determinations.

The MVN is responsible for evaluating dredged material suitability and issuing MPRSA Section 103 permits, regulating site use, and developing and implementing disposal-monitoring program.

Where use of an EPA-designated site is not feasible, the MVN may, with concurrence with EPA, Region 6 select an alternative site in accordance with Section 103(b) of the MPRSA as amended by Section 506 of WRDA 1992.

**2.3 Funding**

Physical, chemical, and biological effects-based testing shall be undertaken on sediments to be deposited at the ODMDS. This testing will be conducted at least every 5 years, contingent on the availability of funds, or as necessary to address contaminant concerns due to unanticipated events, and will be funded by the permittee if the project is permitted or MVN for Federal projects. The permittee or MVN, as appropriate, shall also be responsible for costs associated with placement site hydrographic monitoring. Should monitoring indicate that additional studies and/or tests are needed at the ODMDSs, the cost for such work would be shared by the permittee or MVN and EPA Region 6. Physical, chemical, and biological effects-based testing at the ODMDS, or in the site environs after discharge that is not required as a result of hydrographic monitoring, shall be funded by EPA Region 6. Federal funding of all aspects of this SMMP is contingent on availability of appropriated funds.

**2.4 Baseline Assessment of Site Conditions and Disposal Site History**

The location of ODMDS-East and ODMDS-West, i.e., adjacent and parallel to the ARBC and the rectangular configuration of the sites involves only short transport of the dredged material from the channel to the sites, typically through a floating pipeline. This minimizes interference with other activities such as fishing and navigation in the site environs during dredging and disposal operations. The sites are also easily accessible for surveillance and monitoring.

2.4.1 Site Characterization for ODMDS-East

The ARBC ODMDS-East is located east of and parallel to the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana bar channel and is approximately 18.5 miles long and 0.5 miles wide (Figure 1). For the purposes of this SMMP, all coordinates are based upon the North

American Datum of 1983 unless otherwise noted. The coordinates of the rectangular-shaped site are as follows:

29° 20' 59.92" N, 91° 23' 33.23" W
29° 20' 43.94" N, 91° 23' 09.73" W
29° 08' 15.46" N, 91° 34' 51.02" W
29° 07' 59.43" N, 91° 34' 27.51" W

The center of the site is approximately 19 miles from the mouth of the Atchafalaya River. North Point of the Point Au Fer Island is about 2 miles east of the northern end of the site. Point au Fer Shell Reef, and an area that has been subjected to extensive shell dredging, lies just shoreward of ODMDS-East.

Baseline conditions at the ARBC ODMDS-East were assessed during the site designation process. Details of the baseline conditions, including descriptions of the marine environment in the site vicinity and the physical, chemical, and biological characteristics of the sediments and the water column at the site are contained in the "Supplemental Final Environmental Impact Statement, Atchafalaya River Bar Channel, Ocean Dredged Material Disposal Site, St. Mary Parish, Louisiana," prepared by USEPA,
Region 6 in November 1998.

2.4.2 Site Characterization for ODMDS-West

The ARBC ODMDS-West is located west of and parallel to the ARBC. It is approximately 16 miles long and 3 miles wide (Figure 1). For the purposes of this SMMP, all coordinates are based upon the North American Datum of 1983 unless otherwise noted. The coordinates of the ODMDS-West are as follows:

29° 22′ 06″ N, 91° 27′ 38″ W
29° 20′ 30″ N, 91° 25′ 13″ W
29° 09′ 16″ N, 91° 35′ 12″ W
29° 10′ 52″ N, 91° 37′ 33″ W

The center of the ODMDS-West is approximately 20 miles from the mouth of the Atchafalaya River. North Point au Fer Island is approximately 2.5 miles east of the northern end of the site. Point au Fer Shell Reef lies just shoreward of the ODMDS-West.

The ODMDS-West encompasses approximately 31,400 acres or 49 square miles of open water. The inner limit of the ODMDS-West is 2,650 feet from the ARBC centerline. The site ranges from 6 to 23 ft in depth.

Baseline conditions at the ARBC ODMDS-West were assessed during the site designation process. Details of baseline conditions, including descriptions of the marine environment in the site vicinity and physical, chemical, and biological characteristics of the sediments and water column at the site, are described in the "Draft Environmental Impact Statement, Atchafalaya River Bar Channel, ODMDS-West Environmental impact Statement, St. Mary Parish, Louisiana (USEPA/USACE 2013).

### 2.4.3 Reference Site Characterization

Reference sampling stations for this project have been established based on the Area Approach. The sediment reference sampling stations are located southeast of the ARBC at the following coordinates (NAD 1983):

29° 07′ 00″ N, 91° 31′ 30″ W
29° 08′ 00″ N, 91° 29′ 00″ W
29° 09′ 00″ N, 91° 27′ 00″ W

### 2.4.4 Historical Use of ODMDS-East

As described in the "Site Management Plan Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site (USACE 1996)," the 1977 interim ARBC ODMDS-East was a long, thin area that paralleled the bar channel reach of the navigation channel, shaped in order to simplify disposal from the bar channel that had been taking place since 1974. At the time of the site designation studies, no changes to the size of the site were recommended. However, MVN did recommend an alteration of the site's footprint prior to designation and publication of the Supplemental Draft EIS on February 6, 1991. MVN called for extension of the ODMDS-East on both ends to plan for current and future increases to the length of the bar channel as the Atchafalaya Delta progrades gulfward. In the proposed rule, the ODMDS-East's dimensions were 30.4 km (19 mi) long and 0.8 km (0.5 mi) wide.

Later in 1991, the northernmost end of the ODMDS-East was converted to use as a CWA Section 404 beneficial use disposal area, with the intent of creating island habitat for colonial nesting seabirds. After these two alterations, the ODMDS-East's dimensions are 29.6 km (18.5 mi) long and 0.8 km (0.5 mi) wide.

The ODMDS-East received final designation in 2000, under 65 FR 31492 (18 May 2000). The Rivers and Harbors Act of June 25, 1910 authorized MVN to construct and maintain the Atchafalaya River, Morgan City to the Gulf of Mexico, LA, project which provided a navigation channel 20 feet deep, 200 feet wide and 15.75 miles long from the 20-foot contour in the Atchafalaya Bay, approximately 4 miles beyond the mouth of the Atchafalaya River, to the 20-foot contour in the Gulf of Mexico. Traffic sufficient to warrant maintenance of the authorized navigation channel to full project dimensions did not immediately develop. The channel was progressively enlarged during maintenance events from 10- by 100-feet in 1939 to 20- by 200-feet in 1974.

The Rivers and Harbors Act of 1968 authorized construction of the Atchafalaya River and Bayous Chene, Boeuf, and Black, LA, project which incorporated the existing project and provided for an increase in channel width of the navigation channel in Atchafalaya Bay and bar to 400 feet. Construction of the channel in the bay and bar was initiated in April, 1974 and completed in December of the same year. History of disposal of dredged material from the Atchafalaya River Bar Channel prior to construction of the enlarged channel in 1974 is incomplete. Dredging records dating back to 1957 indicate that maintenance of discontinuous reaches of the bay and/or bar channel occurred on an annual basis from 1957 until 1974 except for 1961. It is likely that dredged material was placed unconfined in open water on either side of the navigation channel.

**Table 1. Disposal History of ODMDS-East**

| Start Date | Finish Date | Volume Placed (cubic yards) |
|---|---|---|
| **7 Jun 73** | 21 Aug 73 | 3,557,062 |
| **11 Apr 74** | 6 Dec 74 | 14,409,109 |
| **1975** | No Dredging | 0 |
| **21 Aug 75** | 10 Feb 77 | 10,888,170 |
| **1977** | No Dredging | 0 |
| **1978** | No Dredging | 0 |
| **8 Dec 78** | 2 Apr 79 | 10,992,792 |
| **1980** | No Dredging | 0 |
| **4 Jul 81** | 10 Nov 81 | 9,236,530 |
| **1982** | No Dredging | 0 |
| **26 Jun 83** | 1 Nov 83 | 10,674,563 |
| **25 Sep 85** | 8 Feb 86 | 8,500,000 |
| **2 Jul 87** | 31 Aug 87 | 10,035,209 |
| **6 Aug 88** | 22 Nov 88 | 10,302,961 |
| **29 Jun 89** | 12 Sep 89 | 11,111,114 |
| **2 Aug 90** | 17 Nov 90 | 9,446,109 |
| **31 Jan 91** | 17 Apr 91 | 1,643,900 |
| **7 May 91** | 25 Sep 91 | 9,559,859 |
| **20-Feb-92** | 4-May-92 | 1,000,000 |
| **11-May-92** | 2-Dec-92 | 9,630,972 |
| **14-Mar-93** | 19-May-93 | 4,035,076 |
| **10-Jun-93** | 16-Sep-93 | 11,700,000 |
| **14-Aug-93** | 14-Sep-93 | 2,254,937 |
| **14-Apr-94** | 26-May-94 | 1,836,445 |
| **27-May-94** | 16-Oct-94 | 8,757,597 |
| **23-Jun-95** | 25-Oct-95 | 9,311,000 |
| **16-Apr-96** | 16-Dec-96 | 11,589,416 |
| **30-Sep-97** | 9-Dec-97 | 6,968,673 |
| **16-Aug-98** | 21-Nov-98 | 10,942,132 |
| **11-Aug-99** | 23-Oct-99 | 10,847,337 |
| **26-Jun-00** | 18-Aug-00 | 10,749,971 |
| **27-Feb-01** | 29-Apr-01 | 9,554,971 |
| **29-Apr-01** | 6-May-01 | 1,269,887 |
| **22 Sep 01** | 13 Apr 02 | 9,168,753 |
| **TOTAL** | | 239,974,545 |
| **AVERAGE PER FISCAL YEAR CYCLE** | | 8,274,984 |

Between 1974 and 1991, all of the dredged material removed during routine maintenance of the bar channel was placed in the ODMDS. Prior to the 1991 maintenance event, the 193-acre upper end of the ODMDS was incorporated into a 360-acre disposal area designated under Section 404 of the Clean Water Act for placement of dredged material for creation of islands for colonial nesting seabirds. Beginning with the 1991 maintenance event and during subsequent annual maintenance events, dredged material from the bar channel suitable for stacking has been used beneficially by deposition in the Section 404 site. Material not suitable for beneficial use has been placed in the ODMDS.

Historical use of the ODMDS-East between 1973 and 2002 are depicted in Table 1. Available maintenance dredging contract information does not distinguish dredging work performed between the ARBC and other Atchafalaya River dredging reaches prior to 1973, therefore, disposal information prior to 1973 is not included. Historically, the ODMDS-East has received dredged material from the ARBC via a cutterhead hydraulic pipeline dredge, discharging directly into the site.

**Table 2. Disposal History of ODMDS-West**

| Date of Disposal Operation | | Disposal Method | Reach Dredged | Volume Placed (cubic yards) |
|---|---|---|---|---|
| Start | Finish | | | |
| 21-Aug-02 | 27-Oct-02 | Unconfined | Sta. 650 to Sta. 1340 | 6,797,817 |
| 24-Nov-02 | 12-Feb-03 | Unconfined | Sta. 776 to Sta. 1355 | 9,125,381 |
| 10-Nov-03 | 12-Feb-04 | Unconfined | Sta. 650 to Sta. 1353 | 9,099,924 |
| 9-Apr-04 | 21-May-04 | Unconfined | Sta. 650 to Sta. 1216 | 5,720,499 |
| 8-Jan-05 | 27-Apr-05 | Unconfined | Sta. 650 to Sta. 1355 | 12,917,556 |
| 3-May-06 | 5-Jul-06 | Unconfined | Sta. 650 to Sta. 1355 | 8,168,569 |
| 4-Feb-07 | 27-Apr-07 | Unconfined | Sta. 650 to Sta. 1339 | 8,576,338 |
| 20-Jul-07 | 10-Dec-07 | Unconfined | Sta. 695 to Sta. 1244 | 6,261,539 |
| 17 Jun-08 | 26-Sep-08 | Unconfined | Sta. 650 to Sta. 1270 | 9,545,797 |
| 26-Aug-09 | 15-Jun-10 | Unconfined | Sta. 650 to Sta. 1355 | 11,246,103 |
| 8 Oct 10 | 11 Feb 11 | Unconfined | Sta. 650 to Sta. 1355 | 9,230,662 |
| 8 Aug 11 | 23 Sep 11 | Unconfined | Sta. 650 to Sta. 1355 | 319,179 |
| 27 Sep 11 | 18 Nov 11 | Unconfined | Sta. 650 to Sta. 1355 | 372,457 |
| **TOTAL** | | | | **97,381,821** |
| **AVERAGE PER FISCAL YEAR CYCLE** | | | | **10,820,202** |

2.4.5 Historical Use of ODMDS-West

The ARBC ODMDS-West has been used for disposal of dredged materials since 2002 under the authority of MPRSA Section 103 (b). As described in the "Draft Environmental Impact Statement, Atchafalaya River Bar Channel, ODMDS-West Environmental impact Statement, St. Mary Parish, Louisiana," (EPA 2013) the proposed ARBC ODMDS-West was evaluated for the continued placement of maintenance dredged material originating from the ARBC, at an approximate average volume of 10.8 million cy per dredging cycle (Table 2). The ODMDS-West is situated in a high-energy erosional zone and can generally accept large volumes of dredged material with little apparent net change to the bottom. The dredged material discharged into this site will disperse relatively quickly because of the high percentage of fine grain components and because of the location of the site in a high energy, nearshore area where waves, currents, winds, and tides constantly mix and redistribute sediments, and thus, the dredged material, over a wide area. The site is situated within the inlet zone and is adjacent to the channel, providing easy access for dredged material placement operations and reduced costs.

The size of the ODMDS-West was determined based upon: 1) the need to maximize the discharge distance away from the ARBC to minimize the run back of the deposited dredged

material into the channel; and 2) the need to allow for adjacent pumping of the dredged material from within the reaches of the ARBC. As a result, the dimensions of the proposed ODMDS-West were determined to be 16.0 miles long and 3.0 miles wide (typically the pumping distance at which a hydraulic pipeline cutterhead suction dredge may no longer be cost effective without a booster pump, depending on the size of the dredge).

The ODMDS-West has received approximately 10.8 million cubic yards (mcy) per fiscal year dredging cycle at an average frequency of once every 7.4 months. This frequency and volume is expected to continue into the future. Material is dredged from the ARBC via a cutterhead hydraulic pipeline dredge, discharging no closer than 5,000 feet from the ARBC centerline in an effort to limit run-back of fluff material into the channel. Dredged volumes since 2002 are depicted in Table 2.

**Table 3: Sediment Composition**

| LOCATION | % SAND | % SILT | % CLAY |
|---|---|---|---|
| **Channel** | 9.5 | 82.6 | 6.9 |
| **ODMDS-West** | 13.6 | 28.7 | 57.7 |
| **ODMDS-East** | 44.6 | 33.1 | 22.3 |
| **Reference Area** | 8.0 | 80.9 | 11.1 |

### 2.5 Dredged Material Volumes

Since 1973, the ARBC has been dredged every year except 1975, 1977, 1978, 1980, and 1982, with the dredged material placed at the ODMDS-East, ODMDS-West, Bird Island-East (Section 404), and/or Bird-Island-West (Section 404). Both Bird Island-East and Bird Island-West are Clean Water Act Section 404 designated dredged material disposal sites, abutting the northern boundary of the ODMDSs (Figure 2).

Since 1973, the annual quantity of material placed at either ODMDS has ranged from about 3.6 million cy to about 18 million cy, or averaging approximately 8.3 million cy for the ODMDS-East and 10.8 million cy for the ODMDS-West per fiscal year when maintenance dredging is required. The dredged material originating from the ARBC is predominantly made up of silts with traces of sand and clay (Table 3), as confirmed from samples collected in February 2008 (PBS&J, 2008). It is anticipated that annual maintenance of the ARBC will continue in the future as authorized channel dimensions will need to be maintained.

**Table 4: Sediment Quality Assessment History**

| Date | Type of Testing | Reference |
|---|---|---|
| **December 1996** | Bulk Analyses & Toxicity Assessment | EH&A, 1997 |
| **April 2002** | Bulk Analyses, Toxicity, & Bioaccumulation Assess | PBS&J, 2002 |
| **February 2008** | Bulk Analyses, Toxicity, & Bioaccumulation Assess | PBS&J, 2008 |

### 2.6 Dredged Material Suitability

On September 24, 1992, a RIA was executed between USEPA Region 6 and USACE-MVN (USEPA/USACE, 2003). The RIA was revised and updated, and a new RIA issued November 3, 2003. This RIA described protocols for evaluating the quality of the dredged material and

implementation of the "GREEN BOOK" (USEPA/USACE, 1991). These protocols describe chemical parameters to be analyzed, as well as required detection limits. It also specifies how toxicity testing and bioaccumulation assessments are to be conducted, as well as organisms to be utilized. Since that time, all sediment evaluations have been conducted in accordance with the RIA. The dredged material from the ARBC has been evaluated several times to determine suitability for offshore placement. This testing was performed to determine levels of metals and organic constituents, as well as toxicity and bioaccumulation assessments. A history of the testing performed on sediments destined for placement in the ODMDS-East and ODMDS-West is summarized in Table 4. The results of the testing indicated that the material was suitable for offshore placement without special management or handling during disposal operations.

**2.7 Anticipated Site Use**

Maintenance dredging of the ARBC is required on an annual basis. Dredged material is typically removed using hydraulic cutterhead pipeline dredges and discharged as non-cohesive slurry though a floating pipeline. It is anticipated that if dredged material is removed by hopper dredge the material will be primarily discharged by agitation. It is anticipated that annual maintenance of the ARBC and disposal of dredged material into the ODMDS-East and the ODMDS-West will continue in the future. On the average, approximately 10.8 million cy of dredged material will be placed at the ODMDS-West and/or the ODMDS-East per fiscal year dredging cycle, estimated to be once every 7.4 months.

**2.8 Special Management Conditions or Practices**

As previously discussed, evaluations of sediment quality have indicated that the material from the channel is suitable for offshore placement. However, all operations shall be conducted such that the dredged material remains within the bounds of the ODMDSs immediately following descent to the ocean floor, and placed in a location to minimize return of the placed material back into the ARBC. The 2003 fluid mud study found that sediment from the ARBC predominantly drifted to the northwest; therefore, when using the ODMDS-West, placement of dredged material no closer than 5,000 feet from the ARBC centerline is required for the greatest possible reduction of sediment runback into the channel while minimizing dredging cost increases associated with the addition of longer lengths of discharge pipeline. During disposal operations, a baffle plate may be positioned on the end of the discharge pipeline to ensure placement of dredged material within the western most portions of the designated boundary of the ODMDS.

A seasonal hopper dredging restriction has been recommended by the National Marine Fisheries Service (NMFS, 2007) during formal consultation undertaken pursuant to Section 7 of the Endangered Species Act. This restriction was based on potential impacts of hopper dredging operations on several species of threatened and endangered sea turtles. The recommendation is to restrict hopper dredging to the period from December 1 through March 31, during which sea turtle abundance is at a minimum in the Gulf of Mexico. This recommendation pertains, however, only to actual hopper dredging operations. Hopper dredging would be conducted in accordance with all reasonable and prudent measures and implementing terms and conditions described in the 2007 Gulf of Mexico hopper dredging regional biological opinion (NMFS, 2007). Hydraulic cutterhead dredges are exempt from these sea turtle protection measures because their operations are not known to result in injuries to sea turtles.

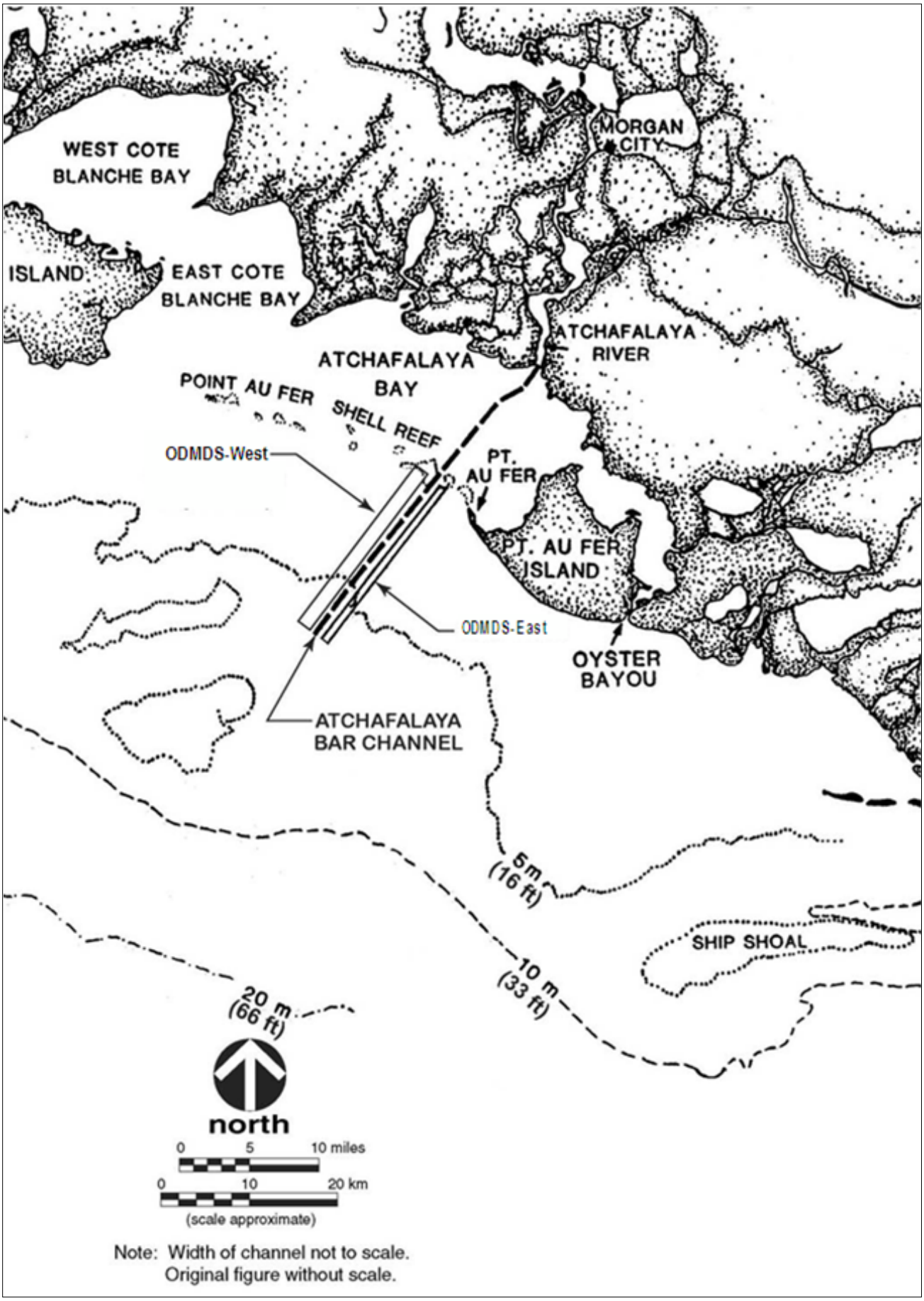


**Figure 1. Atchafalaya Bar Channel - ODMDS East and ODMDS West. (Source: PBS&J 2008)**

## 3.0 SITE MONITORING

The MPRSA establishes the need for including a monitoring program as part of the Site Management and Monitoring Plan. Site monitoring is conducted to ensure the environmental integrity of a disposal site and the areas surrounding the site and to verify compliance with the site designation criteria, any special management conditions, and with permit requirements. Monitoring programs should be flexible, cost effective, and based on scientifically sound procedures and methods to meet site-specific monitoring needs.

The intent of the monitoring program is to provide the following:

1. Information indicating whether the disposal activities are occurring in compliance with the permit and site restrictions;
2. Information indicating short-term and long-term fate of materials disposed of in the marine environment
3. Information concerning the short-term and long-term environmental impacts of the disposal.

The primary purpose of the Site Management and Monitoring Program is to determine whether dredged material site management practices, including disposal operations, at the sites need to be changed to avoid unreasonable degradation or endangerment of human health or welfare or the marine environment. Monitoring results will be used for making decisions, preventing unacceptable adverse effects beyond each site's boundary, and ensuring regulatory compliance over the life of the ODMDS East and West. Emphasis will be placed on determining physical impacts, since, to date, dredged material from the ARBC has been determined to be acceptable for ocean placement; however, consideration of contaminants will also be included.

Testing of dredged material is conducted based on "GREENBOOK" and RIA procedures; however it is necessary to verify the decisions made regarding the suitability of the dredged material are correct and that the material is not having an adverse impact to the environment.

The size and location of the ARBC ODMDS East and West were determined pursuant to the General Criteria as listed in 40 CFR 228.5, and the Specific Criteria at 40 CFR 228.6(a). There are no significant environmental resources delineated within or immediately outside of the ODMDS East and West. The primary concern regarding ODMDS use is the potential for short-term build up of dredged material, such that a hazard to navigation is presented. Since these sites are dispersive in nature, it is expected that material will eventually be transported outside of the site boundaries. It is also expected that this material will not move in distinct mounds, but instead will blend with the surrounding environment causing a progressive transition to sediment containing a higher percentage of silt and clay.

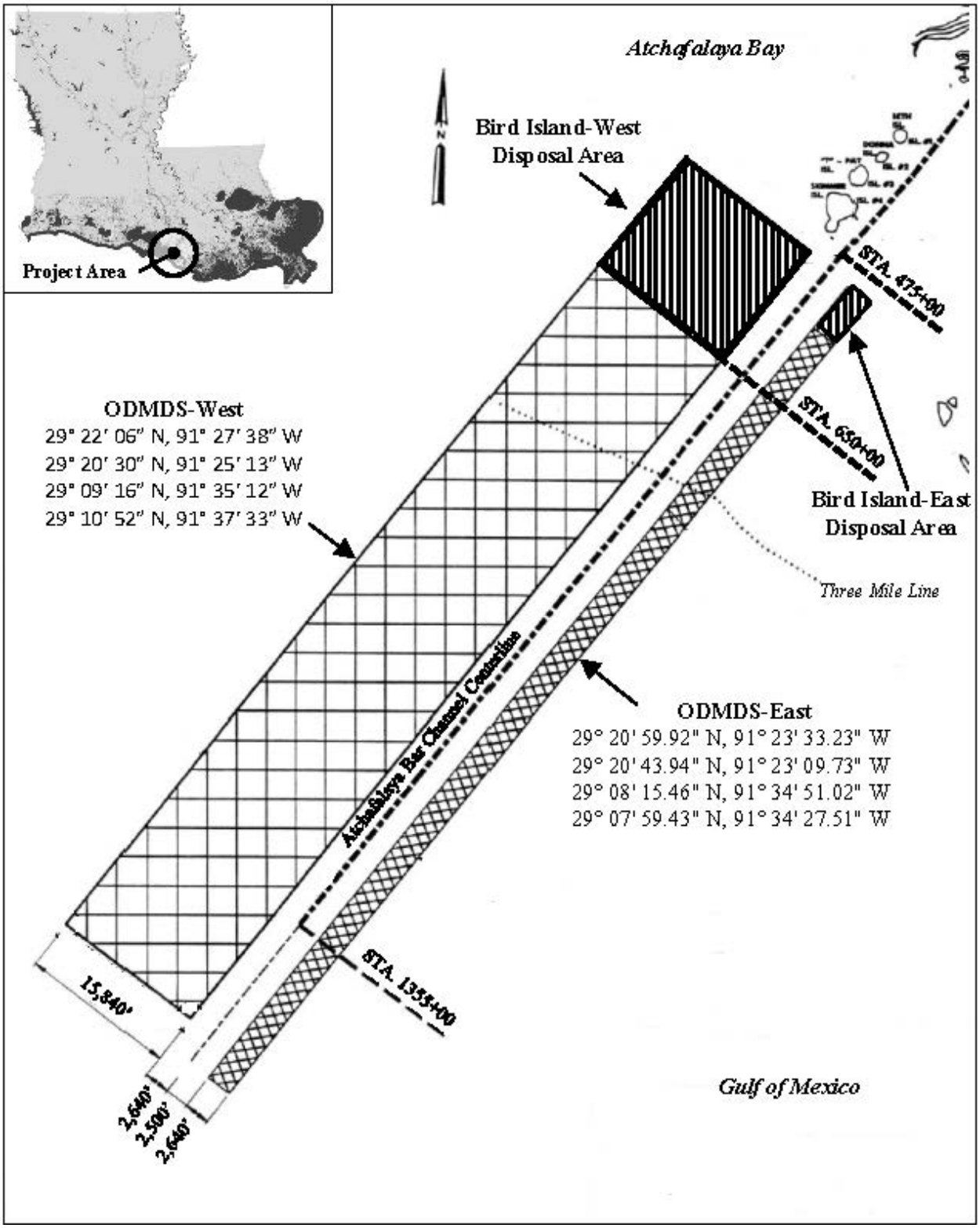


**Figure 2. Atchafalaya Bar Channel - Disposal Sites *(coordinate system = NAD83).***

Discharges of dredged material outside of the ODMDS East and West boundaries will be treated as "unauthorized discharges." Such discharges may occur as a result of dredging equipment malfunction during dredging operations with spillage of material outside of the ODMDS boundaries, or discharge of dredged material in close proximity to an ODMDS boundary such that it falls outside of the site during descent to the seafloor. While significant environmental resources were not identified immediately outside of the ODMDS East and West boundaries during site designation evaluations, unauthorized discharges may be detrimental to immobile or slow moving benthic organisms. A laboratory study conducted by Maurer et al. (1978) suggested that benthic organisms can burrow through 6-9 inches of dredged material without significant impacts to the benthic community. The formation and persistence of mounds above this 6-9 inch threshold, as a direct result of unauthorized discharges outside of the ODMDS boundaries, warrants additional investigation to determine if benthic communities have been adversely impacted.

### 3.1 Baseline Monitoring

Table 5 summarizes various site characterization surveys of the ODMDS-East and ODMDS-West conducted by the USACE, EPA, and others as part of the designation process and subsequent monitoring to evaluate the dredge material management effectiveness for the ODMDS East and West. These surveys will serve as the main body of data for future monitoring of the impacts associated with the use of the ARBC ODMDS East and West.

### 3.2 Disposal Monitoring

The MVN will monitor and record the location of discharge points during dredging and disposal operations. At a minimum, the following information will be documented:

a) Disposal vessel name
b) Location of disposal points
c) Estimated volume dispersed at disposal points
d) Description of material disposed
e) Source of Dredged Material
f) Date, time and location at start of initiation and completion of disposal event

All data will undergo appropriate Quality Assurance / Quality Control procedures, such that compiled information accurately captures dredging and disposal operations. Currently, the best available sources of data for cutterhead dredges are the contractor-furnished As-Built Drawing and Narrative Completion Report. When available, data from other cutterhead dredge monitoring systems (similar to those available for hopper dredges through the USACE Dredging Quality Management Support Center) will be used to supplement or in place of contractor-furnished data. Dredging and disposal data will be provided to the EPA R6 in the Post-Disposal Summary Report described in Section 3.4 of this SMMP. Should an unauthorized discharge occur outside of the ODMDS, MVN will notify the EPA Region 6 within a reasonable period of time upon discovery of the event.

## Table 5. Surveys Conducted at the Atchafalaya ODMDS-East and ODMDS-West

| Survey/Study | Site | Date | Conducted by | Objectives | Reference |
|---|---|---|---|---|---|
| Analyses of native water, bed material, and elutriate samples of major Louisiana waterways, 1975 | ODMDS-East | 1976 | USGS | Channel bed toxicity & elutriate sample assessment | Demas 1976 |
| Analyses of native water and dredged material from southern Louisiana waterways, 1975-76 | ODMDS-East | 1977 | USGS | Dredged material toxicity assessment | Demas and Higgins 1977 |
| Analyses of native water, core material, and elutriate samples collected from the Atchafalaya River and Atchafalaya Bay | ODMDS-East | 1977 | USGS | Channel bed core material toxicity & elutriate sample assessment | Demas 1977 |
| Bioassay and bioaccumulation testing of proposed dredge sediments in the Atchafalaya River, Louisiana | ODMDS-East | Mar 1979 | ERT | Bioaccumulation and bioassay assessment | Drawas et al. 1979a |
| Bioassay testing of proposed dredge sediments in the Atchafalaya River, Louisiana | ODMDS-East | June 1979 | ERT | Bioassay assessment | Drawas et al. 1979b |
| Analyses of native water, bottom material, elutriate samples, and dredged material from selected southern Louisiana waterways and selected areas in the Gulf of Mexico, 1979-81 | ODMDS-East | 1983 | USGS | Dredged material toxicity assessment & elutriate sample assessment | Lurry 1983 |
| Report of Field Study | ODMDS-East | 1983 | IEC | Acquire data for final site designation – water, sediment, biological, and tissue analyses | IEC 1983 |
| National Oceanic Survey Chart 11351 – Port au Fer to Marsh Island | ODMDS-East | 1989 | DOC, NOAA, NOS | Establish bathymetry for safe navigation | DOC, NOAA, NOS 1989 |
| Draft data report: results of toxicity tests on sediments collected from dredged navigation channels along the Louisiana Coast | ODMDS-East | 1990 | EPA, ERLN | Bulk chemistry & toxicity analysis | Dettmann and Tracey 1990 |
| Contaminant Assessment | ODMDS-East | Mar 1991 | Anacon | Water & elutriate analysis | n/a |
| Benthic macrofaunal community structure in ocean dredged material disposal sites in Louisiana: Preliminary analysis | ODMDS-East | 1994 | EPA | Water quality, sediment, toxicity, benthos | Flemer et al. 1994 |
| Region VI Contaminated Sediment Study – Phase III | ODMDS-East, ODMDS-West | June/July 1996 | Battelle | Bulk sediment, toxicology, benthics, fish community, and tissue analysis in ODMDS and reference sites | Trulli 1996 |
| Recommendations for Reduction of shoaling in the Atchafalaya River navigation bar channel | Bay, Channel | 2000 | Louisiana State University | Study of the nature and seasonality of fluff, and its response to ship traffic | van Heerden and Kemp 2000 |
| Factors affecting fluff and fluid mud accumulation in the Atchafalaya Bar Channel | Bay, Channel | 2003 | USACE | Effects of disposal site location, channel enlargement, and structural measures on shoaling in the channel | Teeter et al. 2003 |
| Atchafalaya Bar Channel Fluff & Fluid Mud Study | Bay, Channel | Dec 2003 | USACE, GVI | Analysis of fate and transport pathways of fluid mud/fluff to determine appropriate management alternatives | GVI 2003 |
| Silt sediment transport study to investigate fate and efficiency of dredging and characterization of lateral dredge disposal sites | ODMDS-East, ODMDS-West | 2006 | ETS | Silt tracer study using fluorescents to evaluate effectiveness of dustpan dredging | ETS 2006 |

## 3.3 Bathymetric Surveys

### 3.3.1 Routine Bathymetric Surveys

The ODMDS-West and the ODMDS-East are both located outside of the safety fairway for large vessel traffic, therefore, the mounding will be considered in regard to shallow-draft vessels, only. Since the sites are dispersive, movement of material from the site is expected to occur after disposal operations cease. It is expected that the material will not move in distinct mounds, but instead will blend with the surrounding environment causing a progressive transition to sediment containing a higher percentage of silt and clay. Considering the grain-size characteristics of typical maintenance dredged material from this channel, significant mounding is not expected subsequent to discharge operations. The threshold elevation for mounding of dredged material within the ODMDS East or West will be five (5) feet above the existing bottom elevation while maintaining at least two (2) feet of clearance between the top of the mound and the water's surface.

Discharge of dredged material in close proximity to an ODMDS boundary may result in a portion of the material falling outside of the ODMDS during descent to the seafloor. That portion of dredged material falling outside of the ODMDS during descent would be considered an unauthorized discharge. Such an unauthorized discharge may produce a mound that is partially within the ODMDS and partially outside of the ODMDS. For discharge points documented within 500 feet of an ODMDS boundary, the presence of a distinct seafloor mound – either in excess of 1 foot above background variation observed along a survey transect line that bisects the mound; or 6-9 inches above background variation on a transect line along the ODMDS boundary and parallel to the discharge point – may indicate that dredged material was partially discharged outside of the ODMDS.

Bathymetric surveys will be used to monitor for mounding to ensure a navigation hazard is not produced, help determine if dredged material was discharged outside of the ODMDS boundaries, to assist in verification of material placement, and to monitor bathymetry changes and trends. Results from post and pre dredge bathymetry shall be provided to EPA Region 6 when completed as part of the summary report (See Section 3.4).

Bathymetric surveys for each ARBC maintenance dredging contract will be obtained before the start of disposal operations, and within 45 days following completion of disposal operations. Bathymetric surveys shall be conducted by the MVN or site user along transects within the ODMDS. These transects shall primarily be oriented parallel to the channel and centered on the areas of discharge in the ODMDS (approximately 5,000 feet west of the channel centerline for the ODMDS West, and approximately 4,500 feet east of the channel centerline for the ODMDS East). Additional bathymetric survey transects will be performed parallel to, and 1,000 feet east and west of, these discharge-centered survey transect lines. The spacing of the transect line nearest to the ODMDS boundary may be adjusted to fall within or along the boundary line (i.e., less than 1,000 feet from the discharge-centered transect line).

The minimum performance standards from table 3-1 in *Hydrographic Surveying* shall be followed. Horizontal location of the survey lines and depth sounding points will be determined by an automated positioning system utilizing a differential global positioning system. The

vertical datum will be referenced to prescribed NOAA Mean Lower Low Water (MLLW) datum. The horizontal datum should be referenced to the local State Plane Coordinate System (SPCS) for that area or in Geographical Coordinates (latitude-longitude). The horizontal reference datum should be the North American Datum of 1983 (NAD 83).

Bathymetric surveys shall be obtained using a USACE or contract survey vessel equipped with electronic surveying capabilities. The vessel must be equipped with positioning equipment with a horizontal precision of one (1) to three (3) meters. The fathometer, which shall display real-time depth on real-time location, must have a precision of approximately 0.5 feet. All data shall be collected using methodology described in Engineer Manual EM 1110-2-1003, dated January 1, 2002 [http://140.194.76.129/publications/eng-manuals/em1110-2-1003/toc.htm].

Data Analysis

- If deposited dredged material is not mounding to heights greater than the 5-foot threshold height above the existing bottom elevation, while maintaining at least 2 feet of clearance between the top of the mound and the water's surface, and there is no evidence of a significant discharge of dredged material outside of the ODMDS boundaries, then the management objectives are met.

- If mounding heights within the ODMDS exceed the safe navigation threshold (mounds greater than 5 feet high or with less than 2 feet of clearance from the water's surface); or there is evidence of an unauthorized discharge (known discharge point within 500 feet of an ODMDS boundary and associated distinct mound with a height in excess of 1 foot within the ODMDS or 6-9 inches along the ODMDS boundary), subsequent advanced bathymetric surveys of the affected area will be performed to monitor mound dispersion or persistence. If these bathymetric surveys indicate that the dredged material has dispersed, no further action is necessary. However, should the surveys indicate that a dredged material mound is persistent, MVN and EPA Region 6 will develop appropriate management actions. Such actions could include notifying mariners of a hazard, modifying future disposal operations to reduce the likelihood of mound formation, expansion or relocation of the ODMDS, or physically altering the mound.

### 3.3.2 Bathymetric Surveys Conducted for Unauthorized Discharges

Discharges of dredged material outside of the ODMDS East and West boundaries will be treated as "unauthorized discharges". Such discharges may occur as a result of dredging equipment malfunction during dredging operations with spillage of material outside of the ODMDS boundaries, or discharge of dredged material in close proximity to an ODMDS boundary such that it falls outside of the site during descent to the seafloor. In the event of an unauthorized discharge outside of the ODMDS, bathymetric surveys will be conducted to identify the extent of the affected area or estimate the quantity of dredged material associated with the discharge. In such situations, joint discussions between EPA Region 6 and MVN will determine management actions appropriate to resolve the unauthorized discharge.

## Table 6. ARBC ODMDS Monitoring Strategies and Action Thresholds

| Goal | Technique | Sponsor | Rationale | Frequency | Action Threshold | Management Options | |
|---|---|---|---|---|---|---|---|
| | | | | | | Threshold Not Exceeded | Threshold Exceeded |
| Monitor Bathymetric Trends | Routine Bathymetric Survey | Contractor/ USACE | Determine the extent of the disposal mound and movement of material beyond limits of ODMDS | Pre and post disposal (45 days) for significant projects (>50,000cy) | (1)Mounding >5 ft; <2 ft draft allowance in shallow waters<br>(2) Evidence of an unauthorized discharge outside of ODMDS boundary | Continue Monitoring | Initiate Advanced Bathymetric Surveys of the affected area. |
| | Advanced Bathymetric Survey | Contractor/ USACE | Determine changes in dispersion of material until impacts are no longer observed | As Needed | (1)Mounding > 5 ft; <2 ft draft allowance in shallow waters<br>(2) Persistence of a mound (limited or no dispersion observed between surveys) | Continue Monitoring | Consider various management options, ex.<br>(1)Modify disposal method/placement<br>(2)Restrict disposal volumes<br>(3) expansion of ODMDS<br>(4) relocation of ODMDS |
| Ensure Safe Navigation Depth | Bathymetry | Contractor/ USACE | Determine height of mound | Post disposal (45 days) for significant projects (>50,000cy) | Mound height >5 ft; <2 ft draft allowance in shallow waters | Continue Monitoring | (1)Modify disposal method/placement<br>(2)Direct disposal operators to avoid areas shallower than XX feet<br>(3)Physically level material shallower than 2 feet<br>(4)Notify mariners of mound location and depth |
| Project Disposal Monitoring | Post Disposal Summary Report | Contractor/ USACE | (1) Ensure management requirements are being met;<br>(2) to assist in site monitoring | 90 days after project completion | Disposal records required by SMMP are not submitted or are incomplete | Continue monitoring | Request extension from EPA Region 6 |
| ODMDS Trend Assessment | Water and Sediment Quality, Benthic Community Analysis (40CFR228.13) | EPA | Periodically evaluate the impact of disposal on the marine environment (40CFR 228.9) | Approximately every 10 years as funding allows. | (1) Absence from the site of pollution sensitive biota<br>(2) Progressive non-seasonal changes in water or sediment quality | Continue Monitoring | (1)Conduct Environmental Effects Monitoring or Advanced Environmental Effects Monitoring<br>(2)Review dredged material evaluation procedures<br>(3)Consider isolating dredged material (capping) |

## Table 6 (continued). ARBC ODMDS Monitoring Strategies and Action Thresholds

| Goal | Technique | Sponsor | Rationale | Frequency | Action Threshold | Management Options | |
|---|---|---|---|---|---|---|---|
| | | | | | | Threshold Not Exceeded | Threshold Exceeded |
| Environmental Effects Monitoring | Chemical Monitoring | EPA | Determine if chemical contaminants are significantly elevated[1] within and outside of site boundaries | Implement if (1) disposal footprint extends significantly beyond the site boundaries; or (2) if Trend Assessment results warrant | Contaminants are found to be elevated[1] | Discontinue monitoring | (1)Institute Advanced Environmental Effects Monitoring<br>(2)Implement case specific management options (ie. Remediation, limits on quantities or types of material) |
| | Benthic Monitoring | | Determine whether there are adverse changes in the benthic populations outside of the site and evaluate recovery rates | | Adverse changes observed outside of the site that may endanger the marine environment | | |
| Advanced Environmental Effects Monitoring | Tissue Chemical Analysis | EPA | Determine if the site is a source of adverse bioaccumulation which may endanger the marine environment | Implement if Environmental Effects Monitoring warrants | Benthic body burdens and risk assessment models indicate potential for food chain impacts | Discontinue monitoring | (1) Discontinue site use<br>(2)Implement case specific management options (ie. Remediation, limits on quantities or types of material) |
| | Benthic Monitoring | | Determine if the site is a source of adverse sub-lethal[2] changes in benthic organisms which may endanger the marine environment | | Sub-lethal effects are unacceptable | | |

1. Significantly elevated: Concentrations above the range of contaminant levels in dredged sediments that the Regional Administrator and the District Engineer found to be suitable for disposal at the ODMDS.
2. Examples of sub-lethal effects include without limitation the development of lesions, tumors, development abnormality, and/or decreased fecundity.

### 3.4 Reporting and Data Formatting

3.4.1 Project Initiation and Unauthorized Discharge Reporting.

MVN should notify EPA within 15 days prior to the beginning of a dredging cycle or project disposal. Should an unauthorized discharge occur outside of the ODMDS boundaries, MVN will notify EPA Region 6 via email within a reasonable period of time upon discovery of the event.

3.4.2 Post Disposal Summary Report

A Post Disposal Summary Report will be provided to EPA Region 6 within 90 days after project completion (see Section 3.2).

The report should include the following:

- dredging project title;
- permit number and expiration date (if applicable);
- contract number;
- name of contractor(s) conducting the work,
- name and type of vessel(s);
- disposal timeframes for each vessel;
- estimated dredged material volumes placed,
- disposal event dates and locations;
- dates of pre- and post-disposal bathymetric surveys of the ODMDS; and
- a narrative discussing MVN's investigation of any unauthorized discharges.

The report will be in the form of a narrative with the following sections: 1) introduction, 2) description of dredging and disposal operations, 3) description of pre- and post-disposal bathymetry including synopsis of findings, and 4) a summary. The summary will include a table with the following columns: ID (row identifier), ODMDS, Date of Disposal, Gross Cubic Yards Placed, and Discharge Location (Latitude (North) and Longitude (West). The narrative should also include relevant figures or maps (depicting all discharge points) that support MVN's interpretation of project data. As-Built drawings with detailed construction information will be provided on CD.

If applicable, the report should also include a narrative discussing any unauthorized discharges, indicate the time it occurred and when it was reported to the EPA Region 6, discuss the circumstances surrounding the discharge, and identify specific measures taken to prevent reoccurrence.

### 3.5 Summary of Past Monitoring Survey Results

Previous surveys conducted regarding the Atchafalaya ODMDS-East and ODMDS-West are listed in Table 5. Results from investigations presented in the ODMDS East EIS, the ODMDS West EIS, and subsequent surveys will serve as a baseline for the monitoring of impacts from placement of dredged material within the ARBC ODMDS East and West locations. The existing data consists of multidisciplinary analyses including, but not limited to: water and sediment chemistry, sediment mapping, bathymetry, physical oceanographic conditions, and

biological studies related to benthic macroinvertebrates and fisheries. No adverse impacts to aquatic life have yet to be observed within the ODMDS or surrounding area.

### 3.6 Environmental Effects Monitoring Reporting

Other federal and state agencies, academia, and non-government organizations conduct research in the Atchafalaya Bay. EPA Region 6 and MVN will periodically review the findings of these groups or request data that are relevant to the navigation channel, ODMDS, and project area to improve our understanding of site environs. Conversely, EPA Region 6 and MVN should make every effort to provide project reports and data to interested parties upon request. New or existing information that is relevant to management of the ODMDS should be incorporated into future versions of this SMMP.

### 3.7 Future Monitoring Efforts

Changes in bathymetry at the ODMDS East or West will continue to be monitored in accordance with Section 3.3. Additionally, trend assessment surveys of the sediment, benthos and water column will continue to be performed periodically (approximately every 10 years) by EPA as budgets allow. Should future disposal at the ODMDS East or West result in unacceptable adverse impacts, further studies may be required to determine the persistence of these impacts, the extent of the impacts within the marine system, and/or possible means of mitigation. In addition, the management plan presented may require revision based on the outcome of any monitoring program.

## 4.0 SITE MANAGEMENT PLAN REVIEW AND REVISION

Pursuant to Section 102(c) of the MPRSA, as amended by WRDA 1992, the SMMP for the ARBC ODMDS East and West will be reviewed not less frequently than 10 years after adoption and every 10 years, thereafter.

Modifications or updates to the SMMP may be necessary, based on scheduled reviews, as specific needs are identified for the project, and/or if results from monitoring surveys or reports indicate that continued use of the ODMDS-East or -West would lead to unacceptable environmental impacts.

Modifications or updates to the SMMP may be proposed by the MVN or EPA Region 6. Following a 30-day review period of the proposed changes(s), the modifications may be incorporated into the plan by mutual consent of both agencies.

## 5.0 IMPLEMENTATION

This plan is effective from the date of signature for a period not to exceed 10 years as outlined in Section 3.4.

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# APPENDIX B

# Scoping Report

US Army Corps of Engineers
New Orleans District

# SCOPING REPORT

## Designation of the Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site Pursuant to Section 102 of the Marine Protection, Research, and Sanctuaries Act of 1972

## St. Mary Parish, Louisiana

**December 2011**

# SCOPING REPORT

## Designation of the Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site Pursuant to Section 102 of the Marine Protection, Research, and Sanctuaries Act of 1972

## St. Mary Parish, Louisiana

## November 2011

## 1.0 INTRODUCTION

The National Environmental Policy Act (NEPA) of 1969 established a nationwide policy to include in every recommendation or report on proposals for major Federal actions significantly affecting the environment, a detailed statement of the environmental impact of the proposed action. Such detailed statements are referred to as environmental impact statements (EIS).

The U.S. Environmental Protection Agency, Region 6 (EPA), in cooperation with the U.S. Army Corps of Engineers (USACE), New Orleans District (CEMVN), published a notice of intent (NOI) to prepare a draft EIS for the designation of an Ocean Dredged Material Disposal Site (ODMDS) in the Gulf of Mexico off the mouth of the Atchafalaya River, St. Mary, Louisiana. The NOI was published in the *Federal Register* (Volume 76, Number 140) on July 21, 2011.

The EPA, Region 6, in accordance with EPA's October 29, 1998 Notice of Policy and Procedures for Voluntary Preparation of National Environmental Policy Documents (63 FR 58045), and in cooperation with CEMVN, will prepare an EIS for the designation of an ODMDS in the Gulf of Mexico off the mouth of the Atchafalaya River, St. Mary Parish, Louisiana. An EIS is needed to provide the information necessary to designate an ODMDS. The NOI was issued Pursuant to Section 102(c) of the Marine Protection, Research and Sanctuaries Act of 1972 (MPRSA), and 40 CFR Part 228 (Criteria for the Management of Disposal Sites for Ocean Dumping).

The CEMVN and EPA are proposing the permanent designation of an ODMDS, pursuant to Section 102(c) of MPRSA, located in the Gulf of Mexico off the mouth of the Atchafalaya River, for the continued disposal of dredged material removed from the bar channel of the federally-authorized and maintained project, Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana. Since 2002, shoal material removed from the Atchafalaya River bar channel (ARBC) not suitable for beneficial use has been placed at a temporary ODMDS on the west side of the channel (the ODMDS-West) under the authority of Section 103(b) of MPRSA. In 2007, USACE requested, and received from EPA, a 5-year extension for the continued use of the MPRSA Section 103(b) ODMDS-West. The approval for ODMDS-West use is scheduled to expire in

August 2012, at which time it can no longer receive shoal material dredged from the ARBC unless it is re-designated as a MPRSA Section 102(c) site by EPA.

The NEPA provides for an early and open public process for determining the scope of issues (problems, needs, and opportunities), resources, impacts, and alternatives to be addressed in the EIS. This process is referred to as "scoping." Scoping is used to: a) identify the affected public and agency concerns; b) facilitate an efficient draft EIS preparation process; c) define the issues and alternatives that will be examined in detail in the draft EIS; and d) save time in the overall process by helping to ensure that the draft statement adequately address relevant issues. Scoping is a process, not an event, or a meeting; it continues throughout the draft EIS process and may involve meetings, telephone conversations, and/or written comments. Scoping is a critical component of the overall public involvement program.

Scoping was accomplished by correspondence with affected Federal, State, tribal, and local agencies, and with anticipated interested parties. Appropriate Federal, State, tribal, and local entities were invited to participate as a cooperating agency. The scoping process was initiated with the publishing of the NOI in the *Federal Register* (Volume 76, Number 140) on July 21, 2011. Scoping continued with the distribution of a scoping input request letter and project information package on September 15, 2011, followed by a 45-day scoping comment period.

This Scoping Report outlines the project background and scoping process to date, and summarizes the key issues identified by members of the public during the initial scoping period. Section 6.0 of this report contains a detailed summary of comments received.

## 2.0 STUDY AUTHORITY

The authority for designation of ocean disposal sites is the MPRSA of 1972 (86 Stat. 10S2), as amended (33 U.S.C.A. 1401 et seq.). Title I of the MPRSA, which is the Act's primary regulatory section, authorizes the Administrator of the EPA to establish permit programs for ocean disposal of non-dredged materials (Section 102) and the Secretary of the Army acting through the USACE to establish permit programs for ocean disposal of dredged materials (Section 103). Title I also requires the EPA to establish criteria, based on the factors listed in Section 102(a), for the review and evaluation of permits under the EPA and USACE permit programs. Section 1 02( c) of Title I authorizes the EPA, considering criteria established pursuant to Section 102(a), to designate recommended ocean disposal sites or times for dumping of non-dredged and dredged materials. Section 103(b) of Title I of the MPRSA, as amended by Section 501 of the Water Resources Development Act of 1992 (P.L. 102-S80, October 31, 1992), authorizes the Secretary of the Army, with the concurrence of the Administrator of the EPA, to select an alternative ODMDS. The criteria and factors established in Section 102(a) relating to site selection are used in selecting the alternative site. Disposal of dredged material at the alternative site is limited to a period of 5 years unless the EPA pursuant to Section 102(c) subsequently designates the site. An ODMDS selected pursuant to Section 103(b) may continue for an additional 5 years if no other feasible disposal site has been designated by the EPA; the continued use of the alternative site is necessary to maintain navigation and facilitate interstate or international commerce; and the EPA determines that the continued use of the site does not pose an unacceptable risk to human health, aquatic resources, or the environment.

Construction and maintenance of the Federal navigation project, Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, was authorized by the Rivers and Harbors Act of 1968, House Document 155, 90th congress, 1st Session, which provides for the following plan of improvement:

a) a channel 20 feet deep over a bottom width of 400 feet from the vicinity of the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico via the Gulf Intracoastal Waterway (GIWW), Bayou Chene, the Avoca Island-Cutoff Bayou drainage channel, the Lower Atchafalaya River, and the existing project across Atchafalaya Bay to the 20-foot-depth contour in the Gulf of Mexico. The channel width in Bayou Boeuf is reduced to 300 feet where necessary because of industrial development on both sides of the bayou.

b) a 20-foot-deep by 400-foot-wide channel in Bayou Black and the GIWW from the major shipyard on Bayou Black at U.S. Highway 90 to Bayou Chene. Construction of the inland portions of Bayous Boeuf and Black was completed in June 1978. Construction of the Bayou Chene and Avoca Island-Cutoff reach was completed in September 1981. The navigation channel is maintained to project dimensions of-24 feet MLG (2 feet of advanced maintenance plus 2 feet of allowable over-depth) by 400 feet.

## 3.0 PURPOSE AND NEED

The ARBC is located in an area of heavy sedimentation. The bed load fraction of the sediment carried by the Atchafalaya River is deposited mainly in Atchafalaya Bay, resulting in delta accretion and progradation. The ARBC must receive periodic maintenance dredging to ensure safe navigation access to Morgan City, the Gulf Intracoastal Waterway, and Bayous Chene, Boeuf, and Black from the Gulf of Mexico. Prior to 2002, shoal material that could not be used beneficially was placed at an existing MPRSA Section 102(c) site on the east side of the ARBC (the ODMDS-East). Concern has been expressed, and USACE studies have shown, that maintenance-dredged material—especially fluid mud, or “fluff—placed on the east side of the ARBC (particularly at the ODMDS-East) is rapidly transported back into the navigation channel by prevailing littoral currents. Following the MPRSA Section 103(b) designation of the ODMDS-West in 2002, the USACE, Engineering Research and Development Center, performed monitoring studies to determine whether placing maintenance-dredged material on the west side of the channel was more effective at reducing shoaling in the channel, thus, reducing the dredging frequency and costs. These studies found that while placing material on the west side of the ARBC did not eliminate shoaling, it did reduce runback of material into the channel, when compared to placing material on the east side of the channel. These findings were corroborated by the results of more recent studies on sediment transport in the project area performed on behalf of USACE in 2006.

The need for the proposed action (the permanent, MPRSA Section 102(c) designation of the ODMDS-West) is to reduce the amount and rate of shoal material runback into the ARBC (i.e., reduce the shoaling rate), and thus, decrease the overall annual maintenance dredging effort needed for the ARBC while providing vessels with a longer period of safe navigation access between maintenance dredging events.

## 4.0 PROPOSED ACTION

The USACE and EPA are proposing the permanent, Section 102(c) designation of the ODMDS-West for the disposal of maintenance-dredged material from the ARBC when ocean disposal is the preferred disposal alternative. The proposed Section 102(c) ODMDS-West retains the same width (3 miles) as the existing Section 103(b) ODMDS-West, but differs slightly at its upper end, resulting in an area only 16 miles [26 km (14 nautical miles)] long. The resulting reduced area of the proposed Section 102(c) ODMDS-West, then, is approximately 32,000 acres [129 $km^2$ (50 square miles)]. The reduced size of the proposed Section 102(c) ODMDS-West would accommodate the southwesterly expansion of an adjacent Bird Island disposal site that is currently used by USACE for beneficial use of maintenance-dredged material removed from the ARBC, pursuant to Section 404 of the Clean Water Act (CWA) of 1977, and that is currently proposed for expansion by USACE in a separate project (Proposed Expansion of Bird Island Placement Site - Public Notice mailed July 13, 2011). The continued progradation and accretion of the Atchafalaya Delta and related increases in the sediment bed load fraction (i.e., accelerated sedimentation) in nearshore portions of Atchafalaya Bay and the ARBC have allowed for additional beneficial use of maintenance-dredged material where practicable, and thus, the opportunity to expand the Section 404 Bird Island site in a southwesterly direction and into the footprint of the Section 103(b) ODMDS-West.

Coordinates of the four corners of the proposed Section 102(c) ODMDS-West are as follows: Northwest Corner - 29°22′06″N, 91°27′38″W; Northeast Corner - 29°20′30″N, 91°25′13″W; Southeast Corner - 29°09′16″N, 91°35′12″W; Southwest Corner - 29°10′52″N, 91°37′33″W.

Other site alternatives considered include the “no action” alternative, defined as not designating an ocean disposal site; non-ocean (beneficial use) placement alternatives; a nearshore area disposal site; a mid-shelf area disposal site; and a deepwater area disposal site. The goal of the site selection process is to select a location which minimizes the risk of harm to the marine environment and human health and facilitates the necessary dredging and subsequent placement of dredged sediments. The site must meet selection criteria specified in EPA’s Ocean Dumping Regulations. The preparation of an EIS is an integral part of the site designation process. The EIS will present information to evaluate the suitability of potential sites and disposal alternatives. It will be based on available information as well as new material developed specifically for this site designation and will succinctly document the considerations made in locating the ODMDS at a specific location.

## 5.0 SCOPING PROCESS

The NEPA affords all persons, organizations and government agencies the right to review and comment on proposed major Federal actions that are evaluated by a NEPA document. This is known as the “scoping process.” The scoping process is the initial step in the preparation of the EIS and will help identify (1) the range of actions (project, procedural changes) (2) alternatives (both those to be rigorously explored and evaluated and those that may be eliminated), and (3) the range of environmental resources considered in the evaluation of environmental impacts.

A Scoping Input Request Letter requesting comments regarding the scope of the study was sent to Federal, state, and local agencies; and interested groups and individuals on September 15, 2011 (refer to Appendix A for the complete mailing list). Scoping comments were received by CEMVN and EPA over a 45-day period in response to the Scoping Input Request Letter.

This Scoping Report presents and summarizes the comments received following the publishing of the NOI on July 21, 2011, including the 45-day scoping comment period beginning September 15, 2011 and ending October 31, 2011. The Scoping Report indicates where in the EIS individual comments would likely be addressed. The Scoping Report will be mailed out to all individuals and agencies that provided comments during the scoping period, and will also be appended to the draft EIS when that document becomes available. In addition, the Scoping Report can be viewed at the following web address: http://www.epa.gov/region6/water/ecopro/current_action.html.

## 6.0 SCOPING COMMENTS

Scoping comments document the public's concerns about the scope of the proposed course of action as well as identify significant resources and suggested alternatives. Scoping comments will be considered during the study process and in preparation of the draft EIS. A total of 11 written comments were received during the scoping period. Letters were received from 4 Federal agencies, 3 state agencies, 2 tribes, and 1 individual (2 letters) (Appendix B).

Table 1 summarizes each scoping comment and indicates by EIS subject matter, where an individual comment would likely be addressed in the draft EIS. EIS categories include: Purpose and Need for Action; Alternatives; Affected Environment; Environmental Consequences; Consultation and Coordination; and Cumulative Impact. Compliance with Regulations (Federal, state and local environmental laws and regulations) is also included in this latter category. An individual scoping comment may be categorized under more than one EIS subject matter heading.

## 7.0 SCOPING PARTICIPANTS

Scoping comments were received from the following agencies, tribes, and individuals during the scoping period:

National Marine Fisheries Service, Habitat Conservation Division
National Park Service
Natural Resources Conservation Service
U.S. Fish and Wildlife Service
Louisiana Department of Wildlife and Fisheries, Office of Wildlife
Louisiana Department of Natural Resources, Office of Coastal Management
Louisiana Department of Environmental Quality, Business and Community Outreach Division
Choctaw Nation of Oklahoma
Alabama-Coushatta Tribe of Texas
Mr. William A. Fontenot
Mr. William A. Fontenot, on behalf of the Delta Chapter of the Sierra Club

**Table 1:** Consolidated comments and location in DEIS where they will be discussed.

**Location in DEIS:**
**PN** – Purpose and Needs **Alt –** Alternatives **AE –** Affected Environment **EC –** Environmental Consequen**c**es **CC –** Consultation and Coordination **CI –** Cumulative impact. Copies of all written comments are provided in Appendix B.

| Location in DEIS | | | | | | Comments |
|---|---|---|---|---|---|---|
| **PN** | **Alt** | **AE** | **EC** | **CC** | **CI** | |
| | | | | | | *By letter dated October 19, 2011, Virginia M. Fay, Acting Assistant Regional Administrator, National Marine Fisheries Service comments:* |
| | | X | X | | | (1) The NMFS concurs with the initial evaluation provided in the package that material removed from the bar channel is not suitable for wetland development and its disposal at the proposed location is not expected to have significant impacts to EFH and related marine fishery resources. |
| | | | | X | | (2) Coordination responsibilities for projects potentially impacting EFH would be fulfilled through our review and comment on project related documents prepared in fulfillment of the National Environmental Policy Act. |
| | | X | X | | | (3) General categories of EFH potentially impacted by the proposed dredging and disposal activities include estuarine water bottoms and estuarine water column. Fishery management plans for these species have been developed by the Gulf of Mexico Fishery Management Council. Potential adverse impacts to these categories of EFH are considered temporary and minor such as disruption of benthic communities and increased turbidity of the water column. |
| | | X | | | | (4) In addition to being designated as EFH for the species listed, the proposed project area provides nursery and foraging habitats that support a variety of economically important marine fishery species, such as Atlantic croaker, spotted seatrout, gulf menhaden, blue crab, and striped mullet. |
| | X | | X | | | (5) The NMFS recommends the draft EIS identify EFH and related marine fishery resources of concern and address potential impacts to those resources for all alternatives being evaluated. |
| | | | | | | *By email dated August 17, 2011, Steven Wright, National Park Service, Southeast Regional Office, Planning and Compliance Division comments:* |
| | | X | | | | (1) Based on the information provided in the Subject Notice of Intent, the National Park Service has no comments at this time. We appreciate the opportunity to provide input regarding the resources and issues that will be evaluated. |
| | | | | | | *By letter dated September 20, 2011, W. Britt Paul, Acting State Conservationist, Natural Resources Conservation Service comments:* |
| | | | X | | | (1) The project map submitted with your request indicates that the proposed construction areas will not impact prime farmland and therefore is exempt from the rules and regulations of the Farmland Protection Policy Act (FPPA)—Subtitle I of Title XV, Section 1539-1549. Furthermore, we do not predict impacts to NRCS work in the vicinity. |
| | | X | | | | (2) For specific information about the soils found in the project area, please visit our website at: http://websoilsurvey.nrcs.usda.gov/ |

**Table 1:** Consolidated comments and location in DEIS where they will be discussed.

**Location in DEIS:**
**PN** – Purpose and Needs **Alt –** Alternatives **AE –** Affected Environment **EC –** Environmental Consequen**c**es **CC –** Consultation and Coordination **CI –** Cumulative impact. Copies of all written comments are provided in Appendix B.

| Location in DEIS | | | | | | Comments |
|---|---|---|---|---|---|---|
| **PN** | **Alt** | **AE** | **EC** | **CC** | **CI** | |
| | | | | | | *By letter dated October 25, 2011, Brad Rieck, Acting Field Supervisor, Louisiana Ecological Services Office, U.S. Fish and Wildlife Service comments:* |
| | | X | X | | | (1) The proposed project would be located in an area where the threatened piping plover (*Charadrius melodus*) may be present. Construction activities may cause piping plovers occurring near the project area to be temporarily displaced to nearby areas containing foraging and loafing habitat. Piping plover designated critical habitat occurs on islands immediately north of the proposed work, but not directly within the dredging limits or the disposal area. |
| | | X | | | | (2) Federally listed as an endangered species, the West Indian manatee (*Trichechus manatus*) may occur in the project area. Manatees may infrequently be observed in the Mississippi River and coastal areas of southeastern Louisiana. |
| | | X | | | | (3) The endangered pallid sturgeon (*Scaphirhynchus albus*) may also occur in the project area. The density of pallid sturgeon in the lower portion of the Atchafalaya Delta is thought to be low; however, there have been limited sampling efforts in that area. Furthermore, the pallid sturgeon is believed to be a strictly freshwater fish, and is probably completely absent from the Atchafalaya River Delta during low river flows when more saline water from Atchafalaya Bay intrudes upriver to a greater extent. |
| | | X | | X | | (4) Endangered and threatened sea turtles forage in the nearshore waters, bays, and sounds of Louisiana. The National Marine Fisheries Service (NMFS) is responsible for aquatic marine threatened or endangered species. Please contact Eric Hawk (727/824-5312) at the NMFS Regional Office in St. Petersburg, Florida, for information concerning those species in the aquatic environment. When sea turtles leave the aquatic environment and come ashore to nest, however, the Service is responsible for consultation. Accordingly, we recommend that you contact this office if your activities would occur on beach areas during sea turtle nesting season (depending on the species in question). |
| | | X | | X | | (5) The proposed project would be located in an area where colonial nesting waterbirds may be present. Until a new, comprehensive coast-wide survey is conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season. For areas containing nesting shorebirds/seabirds species (i.e., gulls, terns, plovers, and skimmers) all activity occurring within 650 feet of a nesting colony should be restricted to the non-nesting period, depending on the species present, and no part of the project should occur outside those windows. We recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season (i.e., the time period outside the activity window). A complete list of those species and their respective project activity window is available upon request. |
| | | X | | | | (6) The proposed project is located immediately south of the Louisiana Department of Wildlife and Fisheries' (LDWF) Atchafalaya Delta Wildlife Management Area (Main Delta), in St. Mary Parish. That Wildlife Management Area (WMA) consists of approximately 15,000 acres of fresh marsh and scrub-shrub, which provide habitat for numerous waterfowl, alligators, furbearers, and fish. Trapping for furbearers and commercial fishing are permitted. Numerous species of non-game amphibians, reptiles, birds, mammals, and invertebrates also utilize the area. Recreational uses of the area include fishing, hunting, birding, and camping.. |

| **Table 1:** Consolidated comments and location in DEIS where they will be discussed. | | | | | | |
|---|---|---|---|---|---|---|
| **Location in EIS:**<br>**PN** – Purpose and Needs **Alt –** Alternatives **AE –** Affected Environment **EC –** Environmental Consequen**c**es **CC –** Consultation and Coordination **CI –** Cumulative impact. Copies of all written comments are provided in Appendix B. | | | | | | |
| **Location in EIS** | | | | | | Comments |
| **PN** | **Alt** | **AE** | **EC** | **CC** | **CI** | |
| | | | X | X | | (7) The proposed project is not expected to impact the WMA, but because of the very near proximity of the project, all work plans should be provided to the LDWF for their review. |
| | | | X | | | (8) The permanent ODMDS-West would have the same type of impact as the temporary site, but over a slightly smaller area. Some benthic organisms will be buried and killed by dredged material, but they are expected to recolonize from nearby populations. The increase in turbidity expected during disposal operations would be temporary, and impacts to nekton would be minimal because animals in this area are adapted to the normally turbid conditions in the Atchafalaya River delta. |
| X | | | | | | (9) The Service recognizes the economic importance of commercial navigation and thus the need for periodic dredging of several sections of the Atchafalaya River navigation channel, including the ARBC, to maintain safe operating conditions for those vessels. |
| | | | | | | *By letter dated October 11, 2011, Kyle Balkum, Biologist Program Manager, Louisiana Department of Wildlife and Fisheries, Office of Wildlife comments:* |
| | X | | | | | (1) The LDWF supports the permanent designation of the ODMDS as long as it can be modified as needed. Since the bar channel is part of a prograding delta system that is very dynamic, ODMDS may not be the only option for future maintenance dredging in this area. LDWF supports the ability to use alternative techniques for disposal in this area if deemed appropriate. |
| | X | | | | | (2) The LDWF does not oppose a permanent designation of an ODMDS site in the bar channel. However, LDWF recommends more beneficial use of dredged material such as the creation of bird nesting islands and marsh nourishment within the boundary of the Atchafalaya Delta Wildlife Management Area. The proper use of dredge material will provide improved habitat conditions for wildlife and fishery resources. |
| | | | | | | *By letter dated August 22, 2011, Keith Lovell, Administrator, Interagency Affairs/Field Services Division, Louisiana Department of Natural Resources, Office of Coastal Management (OCM) comments:* |
| X | X | | | | | (1) The OCM recognizes the importance of maintaining navigation to Louisiana's ports, and fully understands the need for appropriate disposal sites for dredged material; however, OCM can not endorse a disposal site which does not result in the beneficial use of material for wetland creation, restoration, and/or protection. The LCRP requires beneficial use of all dredged material, to the maximum extent practicable, in order to help slow the dramatic loss of coastal wetlands our state is extending. Our concern is that by awarding this site a permanent designation, the U.S. Army Corps of Engineers – New Orleans District is provided with a non-beneficial and less costly alternative to beneficial use of this dredged material. |
| | X | | X | | | (2) The long-term indirect impacts of creating a permanent ODMDS is not complimentary to the mission of this Office. At this time OCM can not fully support the designation of a permanent ODMDS on the west side of the ARBC. The OCM strongly encourages EPA to fully evaluate these indirect effects of this action on the natural and human environment of Louisiana. |

**Table 1:** Consolidated comments and location in DEIS where they will be discussed.

**Location in DEIS:**
**PN** – Purpose and Needs **Alt –** Alternatives **AE –** Affected Environment **EC –** Environmental Consequen**c**es **CC –** Consultation and Coordination **CI –** Cumulative impact. Copies of all written comments are provided in Appendix B.

| Location in DEIS | | | | | | Comments |
|---|---|---|---|---|---|---|
| **PN** | **Alt** | **AE** | **EC** | **CC** | **CI** | |
| | X | X | X | X | X | *By email dated September 23, 2011, Beth Altazan-Dixon, Louisiana Department of Environmental Quality, Business and Community Outreach Division comments:*<br>(1) After reviewing your request, the Department has no objections based of the information provided in your submittal.<br>(2) Currently, St Mary Parish is classified as attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations.<br><br>*By letter dated October 20, 2011, Ian Thompson, Director Historic Preservation Department, Choctaw Nation of Oklahoma comments:*<br>(1) The Choctaw Nation of Oklahoma has reviewed project(s) and based on the information provided to the best of our knowledge it will have no adverse effect on any historic properties in the project' area of potential effect. However, should construction expose buried archaeological or building materials such as chipped stone, tools, pottery, bone, historic crockery, glass or metal items, or should it uncover evidence of buried historic building materials such as rock foundation, brick, or hand poured concrete, this office should be contacted immediately.<br><br>*By letter dated October 12, 2011, Bryant Celestine, Historic Preservation Office, Alabama-Coushatta Tribe of Texas comments:*<br>(1) Upon review of your September 15, 2011 submission, St. Mary Parish exists beyond our scope of interest for the state of Louisiana. Therefore, no impacts to cultural assets of the Alabama-Coushatta Tribe of Texas will occur in conjunction with this proposal.<br><br>*By letter dated August 16, 2011, Mr. William Fontenot comments (Several comments made by Mr. Fontenot were specific to ongoing and proposed USACE beneficial use-disposal efforts in bird islands located east and west of the ARBC. As these are separate USACE projects and are not covered in this DEIS; but rather, other NEPA-related documents, these comments are not presented in this Scoping Report.):*<br>(1) The Atchafalaya River shipping channel and the spoil disposal areas are located in the middle of the Atchafalaya Delta Wildlife Management Area.<br>(2) The EPA and Corps of Engineers need to provide more information in the draft EIS on all other projects and developments that are directly or indirectly connected with the Atchafalaya Bar Channel and Spoil Disposal Area and any of their potential or real cumulative impacts. For instance, the 18-mile Atchafalaya Bar Channel and spoil disposal areas are identified by the EPA as part of the larger project called the Bayous Chene, Boeuf, Black and Atchafalaya River Project, which is more than 53 miles long. If the Atchafalaya Bar Channel did not exist then the Chene, Boeuf and Black project and most of the development related to the oil and gas industry from Intracoastal City in the western end of Vermillion Bay to Port Fourchom, just west of Grand Isle, would not exist today. |

| **Table 1:** Consolidated comments and location in DEIS where they will be discussed. | | | | | | |
|---|---|---|---|---|---|---|
| **Location in DEIS:**<br>**PN** – Purpose and Needs **Alt –** Alternatives **AE –** Affected Environment **EC –** Environmental Consequen**c**es **CC –** Consultation and Coordination **CI –** Cumulative impact. Copies of all written comments are provided in Appendix B. | | | | | | |
| **Location in DEIS** | | | | | | Comments |
| **PN** | **Alt** | **AE** | **EC** | **CC** | **CI** | |
| | | X | | | | (3) These navigation projects, and especially the Chene, Boeuf, Black and Atchafalaya River Navigation Project are intimately connected together as the primary pathway for the massive offshore drilling rigs that are built at Amelia and moved down the Atchafalaya Bar Channel to the deeper waters of the Gulf of Mexico. Without the deeper Atchafalaya Bar Channel none of the massive rigs would have been built at the complex of construction sites in Amelia. Probably most of the support facilities along the Intracoastal Navigation Canal from Grand Isle to Intracoastal City would also not have been built without the Atchafalaya Bay Bar Canal. |
| | | | | | X | (4) The EIS being developed by the EPA and Corps of Engineers should provide the information on the cumulative and comprehensive impacts to coastal resources, including water, wetlands and especially fish and wildlife and their habitat from all related projects and development as a result of the Atchafalaya Bar Channel. Adverse impacts have happened from the deepening of navigation channels, such as from the many tons of toxic and hazardous waste dumped and buried at dozens of locations as well as many hundreds of acres of highly-productive wetlands and coastal waters that have been filled in or dramatically altered. No comprehensive assessments of all of these coastal-altering activities have been pulled together before now and no effort has been made to determine the cumulative adverse impacts from navigation and mineral exploration, drilling and development on water quality, wetlands, fish and wildlife resources as well as their habitat. |
| | | | | | X | (5) Federal laws and court rulings have given us some excellent examples of how and why comprehensive and cumulative impacts need to be identified and evaluated when projects like dredging and the placement of spoil is being considered. Federal laws like the National Environmental Policy Act, the Clean water Act and the National Marine Policy Act provide opportunities for federal officials to insure that their work will not only improve the productivity of agencies and projects but help to protect our natural resources for present and future generations. Over the last eighty years Louisiana has lost more than one million acres of coastal land and wetlands. Most of these losses are the direct result of failure of officials on projects—like the Bayous Chene, Boeuf and Black and the Atchafalaya River navigation channel—to consider or evaluate land losses from dredging and filling of waters and the failure to provide for bank stabilization. |
| | | | | | X | (6) Since this project is on state land, the bed of Atchafalaya Bay, and since this bay is under the jurisdiction of the State Land Office and the Louisiana Department of Wildlife and Fisheries, I expect both the EPA and the Corps of Engineers to develop a close working relationship with officials in these and other relevant state agencies. Whenever our various public officials can work together they are usually more productive. |

| **Table 1:** Consolidated comments and location in DEIS where they will be discussed. | | | | | | |
|---|---|---|---|---|---|---|
| **Location in DEIS:**<br>**PN** – Purpose and Needs **Alt –** Alternatives **AE –** Affected Environment **EC –** Environmental Consequen**c**es **CC –** Consultation and Coordination **CI –** Cumulative impact. Copies of all written comments are provided in Appendix B. | | | | | | |
| **Location in DEIS** | | | | | | Comments |
| **PN** | **Alt** | **AE** | **EC** | **CC** | **CI** | |
| X<br>X | | X<br>X<br>X | | X | | *By letter dated November 8, 2011, Mr. William Fontenot, Conservation Chair, Delta Chapter of the Sierra Club comments:*<br>(1) After reading the many documents which are available to us the Executive Committee of the Delta Chapter of the Sierra Club believes that the Environmental Protection Agency and the Corps of Engineers were correct in their determination that an Environmental Impact Statement should be prepared on the disposal of dredged material in Atchafalaya Bay.<br>(2) The primary reason for this extensive navigation project in south central Louisiana is to facilitate the movement of the massive oil well drilling structures which are built at the various construction sites along the Intracoastal Waterway near Amelia, Louisiana and then transported on the project known as the Atchafalaya, Chene, Boeuf and Black navigation project to their drilling locations in the Gulf of Mexico.<br>(3) Over the last eighty years Louisiana has lost more than a million acres of coastal lands and wetlands. A considerable amount of this loss of critical habitat for fish and wildlife resources and for the areas needed to buffer Louisiana from hurricanes has happened in the Morgan City area.<br>(4) Inasmuch as Jean Lafitte National Historical Park is one of many interest which has been notified of this type of activity, so should the Atchafalaya National Heritage Area, also a program of the Department of the Interior/National Park Service. In 2006 the U.S. Congress passed legislation which created the Atchafalaya National Heritage Area which includes more than 10 million acres in fourteen parishes, including the Atchafalaya Floodway, Atchafalaya River Basin and the Atchafalaya Bay. |

# APPENDIX A

## Mailing List for Scoping Input Request Letter

**MAILING LIST FOR SCOPING INPUT REQEST LETTER**

**Federal Agencies**

U.S. Environmental Protection (EPA), Region VI, Office of Planning and Coordination
EPA, Region VI, Marine and Wetlands Section
EPA, Region VI, Groundwater/UIC Section
EPA, Region VI, Air Planning Section
EPA, Office of Federal Activities
U.S. Fish & Wildlife Service
National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), Habitat Conservation Division
NMFS, Protected Species Division
NOAA, Program, Planning & Integration
Natural Resources Conservation Service
Federal Emergency Management Agency, Region VI
National Register of Historic Places
Council on Environmental Quality
U.S. Department of Housing and Urban Development
U.S. Advisory Council on Historic Preservation
Federal Highway Administration
U.S. Army Corps of Engineers (USACE), Policy Review Branch
USACE, Vicksburg District
U.S. Department of Interior, National Park Service, Jean Lafitte Historical Park
U.S. Department of Interior, Office of Environmental Policy and Compliance
U.S. Department of Energy, Office of Environmental Compliance
U.S. Department of Transportation, Federal Aviation Administration, Southwest Region

**Tribes**

Alabama Coushatta Tribe of Texas
Caddo Nation of Oklahoma
Choctaw Nation of Oklahoma
Coushatta Tribe of Louisiana
Chitimacha Tribe of Louisiana
Jena Band of Choctaw Indians
Mississippi Band of Choctaw Indians
Quapaw Tribe of Oklahoma
Seminole Tribe of Florida
Seminole Nation of Oklahoma
Tunica-Biloxi Tribe of Louisiana

**State Agencies and Officials**

Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources, Office of Coastal Management
Louisiana Department of Natural Resources, Office of Conservation
Louisiana Department of Natural Resources, Coastal Restoration Division
Louisiana Department of Natural Resources, Title & Records Section

Louisiana Department of Environmental Quality
Louisiana State Historic Preservation Officer
Louisiana Department of Health and Hospitals
Louisiana Department of Public Works
Louisiana Department of Transportation and Development
Louisiana Department of Agriculture and Forestry
Louisiana Department of Culture, Recreation & Tourism
Louisiana Division of Administration
Louisiana State Attorney General's Office
Louisiana State Board of Commerce & Industry, Research Division
Governor's Office for Coastal Activities

Honorable Bobby Jindal
Honorable David Vitter
Honorable Mary Landrieu
Honorable "Steve" Scalise
Honorable Charles W. Boustany Jr.
Honorable Sam Jones
Honorable Simone Champagne
Honorable "Charlie" Melancon
Honorable "Butch" Gautreaux
Honorable "Joe" Harrison
Honorable John Flemming
Honorable Rodney Alexander
Honorable William "Bill" Cassidy
Secretary of State Jay Dardenne

**Interested Businesses, Groups, and Individuals**
Natural Resources Defense Council, Inc.
Louisiana Audubon Council
Earl K. Long Library
Port Aggregates, Inc.
State Library of Louisiana
Avoyelles Parish Library
The Waterways Journal
Mr. David M. Frank
Coalition of Coastal Parishes
Atchafalaya Basin Levee District
Coalition to Restore Coastal Louisiana
Mr. William A. Fontenot
Louisiana Nature Conservancy
St. Mary Land & Exploration Co.
Tulane University Libraries, Louisiana Collection
Times-Picayune
Grayling Hadnott
Rory Nettles

State-Times/Morning Advocate
Dr. Michael P. Evans
National Wildlife Federation
Mr. Josh Gilman, PE, D.WRE
Mr. Joseph V. Frank III
Bernard McMenamy Cont. Inc.
Kansas City Southern Railway Company
Engineering Development Group
Mr. Sean M. Duffy
American Rivers, Inc.
Norfolk Southern
Ducks Unlimited
B.W. Farrell Inc.
Trigon Exploration Inc.
Robert P. Waldron Inc.
Mr. George Strain, Continental Land and Fur Co. Inc.
Williams-McWilliams Co. Inc.
Ford Construction Company
Luhr Bros. Inc.
Massaman Construction Company
Audubon Society, New Orleans
Mr. George Pivach, Jr.
Circle Inc.
Mr. "Wally" Gator Landry, Crucial, Inc.
Mr. Dean Wolcott, BDR
Mr. John Snell, WVUE-TV
Mr. Bobby Brennan
Port of New Orleans
Pontchartrain Materials Corp.
Mr. Darwin Lee, LADNR
Berry Brothers General Contractors
Penny Crappell, Town of Berwick
Mr. John Taliancich
Mr. Jay Vincent
Tulane University, Army ROTC
Kim Holden, Fox 8 Live, WVUE-TV
J.H. Menge & Co.
Aux LLC
Mr. Louis A. Ratcliff, Town of Berwick
Mr. Allen J. Benoit, Town of Berwick
Entergy
Bonnet Carre Rod & Gun Club, Environmental Committee
Mr. Bob Breck, Fox 8 Live, WVUE-TV
Gulf Restoration Network
Mr. Gary Beadle, Town of Berwick
Mr. Damon Robison, Town of Berwick

Mr. Edgar Thomas, Jr., Town of Berwick
Mr. Troy M. Lombardo, Town of Berwick
Tennessee Gas Pipeline
Ms. Kathy Pitre
Supervisor U.S. Coast Guard
Mr. Larry P. Bergeron, City of Morgan City
Mr. Luke P. Manfre, City of Morgan City
Mr. Carl Kraemer, City of Morgan City
Ms. “Peg” M. Rentrop, City of Patterson
Mr. Dave Lowery, City of Patterson
Robert Joseph Moreau, Ph.D.
Mr. Duval H. Arthur, Jr.
Town of Berwick
Leslie R. Suazo
KWBJ Channel 39
Mr. “Tim” Hymel, City of Morgan City
Mr. “Ron” Bias, City of Morgan City
KQKI/KDLP
Diamond Services Corporation
Mr. L.L. “Larry” Mendoza, Jr., City of Patterson
Mr. “Mike” Accardo, City of Patterson
Ms. Barbara Dodds
Mr. Mike Plaisance, Plaisance Dragline & Dredging Co. Inc.
Mr. Donald Landry
Morgan City Daily Review
Mr. Timothy I. “Tim” Matte, City of Morgan City
Mr. Louis J. Tamporello, Jr., City of Morgan City
St. Mary Journal
Mr. Rodney A. Grogan, City of Patterson
Mr. “Joe” Russo, III, City of Patterson
Ms. Claire D. Sawyer, City of Patterson
Mr. William L. Yeats, Jr.
WHC Inc.
Mr. Charlie Mestayer
Mr. Clarence A. Vappie, Town of Baldwin
Mr. Mike J. Caesar, Town of Baldwin
Mr. Carol J. Vining, St. Mary Parish
Mr. Paul P. Naquin, St. Mary Parish
Mr. Dale J. Rogers, City of Franklin
Mr. Merlin Price, St. Mary Parish Council
Mr. Eugene P. Foulcard, City of Franklin
Capt. K.C. Siverd
CF Bean Corporation
Ms. Lorraine Thibodaux, Town of Baldwin
H. Gene St. Germain, Town of Baldwin
Mr. Wayne J. Breaux, Town of Baldwin

Mr. Raymond Harris, Jr., City of Franklin
Mr. Chuck D. Autin, City of Franklin
Carr Oil Company, Inc.
Mr. Logan J. Fromenthal, Jr., City of Franklin
Mr. "Chuck" Walters, City of Franklin
CL Jack Stelly & Associates Inc.
Mr. "Mike" Lancelin, Town of Baldwin
Mr. Herbert E. Druilhet, Jr., Town of Baldwin
Cultural & Historical/Research & Development
Mr. Raymond Harris, Jr., City of Franklin
Mr. Lester "Motor Totor" Levine, City of Franklin
Mr. Ken Singleton, City of Franklin
St. Mary Parish Police Jury
Mr. Glen J. Hidalgo, City of Franklin
Mr. David Hanagriff, City of Franklin
Mr. Kevin J. Voisin, City of Franklin
Mr. Joseph H. Garrison, Sr., City of Franklin
Mr. Steve F. Bierhorst, City of Franklin
Mr. Daniel Oakley
Louisiana State University, Government Documents
Mr. Craig A. Johnson, LSU, Louisiana Geographic Information Center
Mr. Neil Minor, City of Franklin
District Conservationist, St. Mary Parish
Mr. Craig Mathews, City of Franklin
Mr. Gary Duhon, City of Franklin
Dr. Charles Wilson, LSU, Office of Sea Grant Development
Mr. Jim Wilkins, LSU, Sea Grant Legal Program
Ms. Stephanie Zumo, State of Louisiana
Mr. Kenny P. Scelfo, Sr., City of Franklin
Mr. Charles "Butch" Middleton, City of Franklin
Mr. Albert Foulcard, City of Franklin
St. Mary Parish Library
Port of Greater Baton Rouge
Louisiana State University, Department of Geography and Anthropology
Mr. Mike Strain, Louisiana Department of Agriculture and Forestry
Mr. Randy Lanctot, Louisiana Wildlife Federation
Mr. Carl J. Brevelle, USDA Forest Service
Hydro Consultants Inc.
Arkansas State Bank Department
Leigh Haynie, Atchafalaya Basinkeeper
G. Paul Kemp, Ph D., National Audubon Society, Gulf Coast Initiative
Mr. Andrew Harrison, Jr., Harrison Law, LLC.
East Baton Rouge City-Parish Council

# APPENDIX B

## Scoping Comment Letters

**UNITED STATES DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

October 19, 2011 F/SER46/KC:jk
225/389-0508

Ms. Joan Exnicios, Acting Chief
Environmental Planning and Compliance Branch
Planning, Programs, and Management Division
New Orleans District, U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Ms. Exnicios:

NOAA's National Marine Fisheries Service (NMFS) has received your letter dated September 15, 2011, transmitting the Information Package titled, "**Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site (ODMDS).**" The New Orleans District (NOD) and U.S. Environmental Protection Agency are proposing the permanent designation of an Ocean Dredged Material Disposal Sites pursuant to Section 102(c) of the Marine Protection, Research, and Sanctuaries Act of 1972, located in the Gulf of Mexico off the mouth of the Atchafalaya River. Dredge material removed from the Atchafalaya River Bar Channel of the federally authorized Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, would be disposed along it's west side or right descending bankline (ODMDS-West). According to the transmittal letter, an Environmental Impact Statement (EIS) would be prepared to evaluate the use of the ODMDS-West.

Based on the information provided in the Information Package, the proposed disposal site encompasses 54 square miles of Atchafalaya Bay water bottoms. It should be noted that this subtidal habitat is categorized as essential fish habitat (EFH) under provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). NMFS concurs with the initial evaluation provided in the package that material removed from the bar channel is not suitable for wetland development and its disposal at the proposed location is not expected to have significant impacts to EFH and related marine fishery resources. Nevertheless, NMFS has a "findings" with the NOD under provisions of Magnuson-Stevens Act that coordination responsibilities for projects potentially impacting EFH would be fulfilled through our review and comment on project related documents prepared in fulfillment of the National Environmental Policy Act.

General categories of EFH potentially impacted by the proposed dredging and dredge disposal activities include estuarine water bottoms and estuarine water column. Detailed information on federally managed fisheries and their EFH is provided in the 2005 generic amendment of the Fishery Management Plans for the Gulf of Mexico prepared by the Gulf of Mexico Fishery Management Council (GMFMC). Potential adverse impacts to these categories of EFH are considered temporary and minor such as the disruption of benthic communities and increased turbidity of the water column.

NMFS recommends the draft EIS identify EFH and related marine fishery resources of concern and address potential impacts to those resources for all alternatives being evaluated (i.e., both nearshore and offshore sites). In addition, NMFS recommends the draft EIS evaluate EFH and marine fisheries in

separate sections. The EFH section of the draft document should include the following information provided in Table 1 below.

Table 1: EFH species, life stages, and habitat associated with proposed ODMDS-West.

| Species | Life stage | Essential Fish Habitat |
|---|---|---|
| brown shrimp | eggs<br>larvae/post larvae<br>juvenile | planktonic, sand/shell/soft bottom, SAV, emergent marsh, oyster reef |
| white shrimp | eggs<br>larvae/post larvae<br>juvenile<br>adult | 9-34 m, planktonic, soft bottom, emergent marsh |
| red drum | larvae/post larvae<br>juvenile<br>adults | all estuaries planktonic, SAV, sand/shell/soft bottom, emergent marsh, pelagic |
| lane snapper | eggs<br>larvae<br>juvenile | 4-130 m, reefs, sand/shell/ soft bottom, SAV, mangrove |
| king mackerel | larvae<br>juvenile<br>adults | 9-180 m, pelagic |
| cobia | juvenile | 5-183 m, pelagic |
| bonnethead shark | juvenile | inlets, estuaries, coastal waters <25 m |
| Atlantic sharpnose shark | juvenile | <40 m, Atchafalaya delta |

In addition to being designated as EFH for the species listed in Table 1, the proposed project area provides nursery and foraging habitats that support a variety of economically important marine fishery species such as Atlantic croaker, spotted seatrout, gulf menhaden, blue crab, and striped mullet. Some of these species serve as prey for other fish species managed under the Magnuson-Stevens Act by the GMFMC (i.e., mackerels, snappers, and groupers) and highly migratory species managed by NMFS (i.e., billfishes and sharks). This information should be detailed in the draft EIS.

We appreciate the opportunity to review and comment on the Information Package.

Sincerely,

Virginia M. Fay

Virginia M. Fay
Acting Assistant Regional Administrator
Habitat Conservation Division

c:
FWS, Lafayette, Walther
EPA, Dallas, Mick
LA DWF, Balkum
LA DNR, Lovell
F/SER4, Dale
F/SER46, Swafford
Files

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506
October 25, 2011

Colonel Edward R. Fleming
District Commander
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Fleming,

The U.S. Fish and Wildlife Service (Service) has reviewed the September 15, 2011, letter from the United States Army Corps of Engineers (Corps), New Orleans District, in which the Corps and the U.S. Environmental Protection Agency, Region 6 (EPA) propose the permanent designation of an Ocean Dredged Material Disposal Site (ODMDS) in the Gulf of Mexico off the mouth of the Atchafalaya River, St. Mary Parish, Louisiana. The EPA and the Corps intend to jointly prepare an Environmental Impact Statement (EIS) to evaluate alternatives and potential environmental impacts due to the permanent designation of an existing temporary ODMDS. We offer the following comments under the authority of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), the National Environmental Policy Act of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347), and the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

Prior to 2002, shoal material dredged from the Atchafalaya River Bar Channel (ARBC) that was deemed unsuitable for beneficial use by the Corps was deposited in an existing site on the east side of the channel (ODMDS-East). According to the U.S. Army Corps of Engineers, when dredged material was deposited in the ODMDS-East, some of the material was eventually transported back into the channel, exacerbating the regular shoaling from riverine sediment input. In 2002, a site on the west side of the channel was designated as a temporary ODMDS (ODMDS-West) for shoal material that was not used beneficially. The proposed permanent designation of the existing temporary ODMDS-West on would allow the continued disposal of dredged material removed from the bar channel of the federally-authorized and maintained project, Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana.

The proposed permanent ODMDS-West will be a 16 mile long by 3 mile wide rectangular area similar to the existing temporary ODMDS-West, except that its length would be shortened by 2 miles on the north end; that area is proposed as a Bird Island Disposal Site Expansion.

**Threatened and Endangered Species**

The proposed project would be located in an area where the threatened piping plover (*Charadrius melodus*) may be present. The piping plover is a small (7 inches long), pale, sand-colored shorebird that winters in Louisiana and may be present for 8 to 10 months annually. Piping plovers arrive from

their northern breeding grounds as early as late July and remain until late March or April. They feed on polychaete marine worms, various crustaceans, insects and their larvae, and bivalve mollusks that they peck from the top of or just beneath the sand. Piping plovers forage on intertidal beaches, mudflats, sand flats, algal flats, and wash-over passes with no or very sparse emergent vegetation. They roost in unvegetated or sparsely vegetated areas, which may have debris, detritus, or micro-topographic relief offering refuge to plovers from high winds and cold weather. They also forage and roost in wrack (i.e., seaweed or other marine vegetation) deposited on beaches. In most areas, wintering piping plovers are dependent on a mosaic of sites distributed throughout the landscape, because the suitability of a particular site for foraging or roosting is dependent on local weather and tidal conditions. Plovers move among sites as environmental conditions change, and studies have indicated that they generally remain within a 2-mile area. Major threats to this species include the loss and degradation of habitat due to development, disturbance by humans and pets, and predation.

On July 10, 2001, the Service designated critical habitat for wintering piping plovers (Federal Register Volume 66, No. 132); a map of the seven critical habitat units in Louisiana can be found at http://criticalhabitat.fws.gov/crithab. Their designated critical habitat identifies specific areas that are essential to the conservation of the species. The primary constituent elements for piping plover wintering habitat are those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes that support those habitat components. Constituent elements are found in geologically dynamic coastal areas that contain intertidal beaches and flats (between annual low tide and annual high tide), and associated dune systems and flats above annual high tide. Important components (or primary constituent elements) of intertidal flats include sand and/or mud flats with no or very sparse emergent vegetation. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting plovers.

Construction activities may cause piping plovers occurring near the project area to be temporarily displaced to nearby areas containing foraging and loafing habitat. Piping plover designated critical habitat occurs on islands immediately north of the proposed work, but not directly within the dredging limits or the disposal area.

Federally listed as an endangered species, the West Indian manatee (*Trichechus manatus*) may occur in the project area. West Indian manatees frequently enter Lakes Pontchartrain and Maurepas, and associated coastal waters and streams during the summer months (i.e., June through September). Manatee occurrences in Louisiana are increasing, and they have been regularly reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of southeastern Louisiana. Manatees may also infrequently be observed in the Mississippi River and coastal areas of southwestern Louisiana. Threats to this species include collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution. Cold weather and outbreaks of red tide may also adversely affect these animals.

The endangered pallid sturgeon (*Scaphirhynchus albus*) may also occur in the project area. The pallid sturgeon is found in Louisiana, in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the Old River Control Structure Complex); it is possibly found in the Red River as well. The pallid sturgeon is adapted to large, free-flowing, turbid rivers with a diverse assemblage of physical characteristics that are in a constant state of change. Detailed habitat requirements of this fish are not known, but it is believed to spawn in Louisiana. Habitat loss through river channelization and dams has adversely affected this species throughout its range. Entrainment issues associated with dredging operations in the Mississippi and Atchafalaya Rivers and through

diversion structures off the Mississippi River are two potential effects that should be addressed in future planning studies and/or in analyzing current project effects. Juvenile pallid sturgeon appear to be at risk for entrainment in hydraulic dredges, because of their benthic holding behavior and their relatively low burst swimming speed. The density of pallid sturgeon in the lower portion of the Atchafalaya River Delta is thought to be low; however, there have been limited sampling efforts in that area. As river morphology changes further downstream, habitat suitability for this species is generally thought to also gradually decrease towards the river mouth. Furthermore, the pallid sturgeon is believed to be a strictly freshwater fish, and is probably completely absent from the Atchafalaya River Delta during low river flows when more saline water from Atchafalaya Bay intrudes upriver to a greater extent.

Although pallid sturgeon are unlikely to occur in the project area, the Service offers the following recommendations. These are <u>not</u> requirements, but their implementation may further reduce the unlikely chance of encountering pallid sturgeons or other fish species while conducting dredging activities.

1. To the extent possible, schedule dredging activities in the project area during low flow periods, when salt water occurs on the channel bottom further upriver than during normal or high river flows.

2. Consider implementing special operating procedures for hydraulic dredges that were developed to protect sea turtles, and are required for those species in some dredging areas. Those procedures include minimizing suction pump operation while the draghead or cutterhead is suspended in the water column.

3. If hopper dredges are utilized, explore the feasibility of using a rigid sea turtle deflector, which is designed to protect sea turtles by preventing them from entering the draghead, and evaluate the effectiveness of that device for pallid sturgeon and other fish species.

Endangered and threatened sea turtles forage in the nearshore waters, bays and sounds of Louisiana. The National Marine Fisheries Service (NMFS) is responsible for aquatic marine threatened or endangered species. Please contact Eric Hawk (727/824-5312) at the NMFS Regional Office in St. Petersburg, Florida, for information concerning those species in the aquatic environment. When sea turtles leave the aquatic environment and come onshore to nest, however, the Service is responsible for consultation. Accordingly, we recommend that you contact this office if your activities would occur on beach areas during the sea turtle nesting season (depending on the species in question).

**Migratory Birds**

The proposed project would be located in an area where colonial nesting waterbirds may be present. Colonies may be present that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries. That database is updated primarily by monitoring the colony sites that were previously surveyed during the 1980s. Until a new, comprehensive coast-wide survey is conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season. For areas containing nesting shorebird/seabird species (i.e., gulls, terns, plovers, and skimmers) all activity occurring within 650 feet of a nesting colony should be restricted to the non-nesting period, depending on the species present, and no part of the project should occur outside those windows. We recommend that on-site contract personnel be informed of the need to

identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season (i.e., the time period outside the activity window). A complete list of those species and their respective project activity windows is available upon request.

**State Wildlife Management Areas**

The proposed project is located immediately south of the Louisiana Department of Wildlife and Fisheries' (LDWF) Atchafalaya Delta Wildlife Management Area (Main Delta), in St. Mary Parish, Louisiana. That Wildlife Management Area (WMA) consists of approximately 15,000 acres of fresh marsh and scrub-shrub, which provide habitat for numerous waterfowl, alligators, furbearers, and fish. Trapping for furbearers and commercial fishing are permitted. Numerous species of non-game amphibians, reptiles, birds, mammals, and invertebrates also utilize the area. Recreational uses of the area include fishing, hunting, birding, and camping.

The proposed project is not expected to impact the WMA, but because of the very near proximity of the project, all work plans should be provided to the LDWF for their review.

**Project Impacts**

The permanent ODMDS-West would have the same type of impact as the temporary site, but over a slightly smaller area. Some benthic organisms will be buried and killed by dredged material, but they are expected to recolonize from nearby populations. The increase in turbidity expected during disposal operations would be temporary, and impacts to nekton would be minimal because animals in this area are adapted to the normally turbid conditions in the Atchafalaya River Delta.

**Recommendations**

The Service recognizes the economic importance of commercial navigation and thus the need for periodic dredging of several sections of the Atchafalaya River navigation channel, including the ARBC, to maintain safe operating conditions for those vessels.

The Service also supports the beneficial use of dredged material for fish and wildlife habitat creation and restoration. The Service previously recommended in a July 1, 2011, letter that material dredged from the ARBC be used beneficially for habitat creation and restoration. According to the Corps, the dredged material from this part of the channel is typically low in percent sand and therefore has been deemed unsuitable for creating persistent subaerial land. However, the upper portion of the ARBC is likely to contain a higher percentage of sand, and the Corps has now determined that material from that area may be suitable for creating bird island habitat. In a July, 13, 2011, Public Notice, the Corps proposed the designation of the upper 2 miles of the existing temporary ODMDS-West as an expansion of the area available to create islands for colonial nesting birds. The northern part of the proposed permanent ODMDS-West is also located near that upper section of the ARBC. If more sections of the ARBC are found to contain suitable material, the ODMDS-West should be considered for new expansion areas for bird island creation in the future.

The Service offers the following recommendations for incorporation into project planning and implementation to help protect and enhance fish and wildlife resources:

1. Non-beneficial disposal of dredge material into the proposed ODMDS should be considered as a last resort, and conducted only when dredged material composition is such that beneficial use is impossible.

2. The Corps should recheck the dredge material composition before each dredging event to determine if more sections of channel bottom material could be used beneficially to create or restore habitat for fish and wildlife resources. That information should be provided to the resource agencies prior to the development of dredging plans and specifications.

The Service looks forward to continued coordination with the EPA and the Corps during the preparation of the draft EIS. We appreciate the opportunity to review the public notice, and offer comments to further protect fish and wildlife resources. If you need further assistance or have questions regarding this letter, please contact David Castellanos (337/291-3112) of this office.

Sincerely,

Brad Rieck
Acting Field Supervisor
Louisiana Ecological Services Office

cc: USACE, New Orleans District (Attn: Mr. John Fiorentino)
EPA, Region 6, 1445 Ross Avenue, Dallas, Texas 75202-2733 (Attn: Ms. Jessica Franks, PhD)
NMFS, Baton Rouge, LA
LDWF, Baton Rouge, LA
OCPR, Baton Rouge, LA
LDNR, CMD, Baton Rouge, LA

**Fiorentino, John MVN**

| | |
|---|---|
| **From:** | Steven_M_Wright@nps.gov |
| **Sent:** | Wednesday, August 17, 2011 12:57 PM |
| **To:** | franks.jessica@epa.gov |
| **Cc:** | Fiorentino, John MVN; waso_eqd_extrev@nps.gov; shawn_alam@ios.doi.gov |
| **Subject:** | Notice of Intent, Prepare Environmental Impact Statement, Designation of an Ocean Dredged Material Disposal Site (ODMDS) in the Gulf of Mexico Off the Mouth of the Atchafalaya River; DOI (ER-11/0616) |

Dr. Franks,

Notice of Intent to prepare an Environmental Impact Statement, Designation of an Ocean Dredged Material Disposal Site (ODMDS) in the Gulf of Mexico off the mouth of the Atchafalaya River.

Based on the information provided in the subject Notice of Intent, the National Park Service has no comments at this time.

We appreciate the opportunity to provide input regarding the resources and issues that will be evaluated.

Steven M. Wright
National Park Service
Southeast Regional Office
Planning & Compliance Division
100 Alabama Street SW
Atlanta, GA 30303
(404) 507-5710

**United States Department of Agriculture**

NRCS

Natural Resources Conservation Service
3737 Government Street
Alexandria, LA 71302

(318) 473-7751
Fax: (318) 473-7626

September 20, 2011

Joan Exnicios
DOA
P.O. Box 60267
New Orleans, Louisiana 70160-0267

RE: Atchafalaya River Bar Channel Ocean Dredged Material Site

Dear Joan:

I have reviewed the above referenced project for potential requirements of the Farmland Protection Policy Act (FPPA) and potential impact to Natural Resource Conservation Service projects in the immediate vicinity.

Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

The project map submitted with your request indicates that the proposed construction areas will not impact prime farmland and therefore is exempt from the rules and regulations of the Farmland Protection Policy Act (FPPA)—Subtitle I of Title XV, Section 1539-1549. Furthermore, we do not predict impacts to NRCS work in the vicinity.

For specific information about the soils found in the project area, please visit our Web Soil Survey at the following location:

http://websoilsurvey.nrcs.usda.gov/

Please direct all future correspondence to me at the address shown above.

Respectfully,

W. Britt Paul ACTING FOR
Acting State Conservationist

BOBBY JINDAL
GOVERNOR

State of Louisiana

ROBERT J. BARHAM
SECRETARY

DEPARTMENT OF WILDLIFE AND FISHERIES
OFFICE OF WILDLIFE

JIMMY L. ANTHONY
ASSISTANT SECRETARY

**October 11, 2011**

United States Army Corps of Engineers
New Orleans District
Regional Planning and Environment Division South
Attn: Mr. John Fiorentino
P. O. Box 60267
New Orleans, LA 70160-0267

RE: *Application Number: Atchafalaya River bar channel (ARBC), ODMDS-West*
*Applicant: U.S. Army Corps of Engineers, N.O. District & U.S. Environmental Protection Agency*
*Notice Date: September 15, 2011*

Dear Mr. Fiorentino:

The professional staff of the Louisiana Department of Wildlife and Fisheries (LDWF) has reviewed the above referenced notice. Based upon this review, the following has been determined:

LDWF supports the permanent designation of the ODMDS as long as it can be modified as needed. Since the bar channel is part of a prograding delta system that is very dynamic, ODMDS may not be the only option for future maintenance dredging in this area. LDWF supports the ability to use alternative techniques for disposal in this area if deemed appropriate.

LDWF does not oppose a permanent designation of an ODMDS site in the bar channel. However, LDWF recommends more beneficial use of dredge material such as the creation of bird nesting islands and marsh nourishment within the boundary of the Atchafalaya Delta Wildlife Management Area. The proper use of dredge material will provide improved habitat conditions for wildlife and fishery resources.

The Louisiana Department of Wildlife and Fisheries submits these recommendations to the U.S. Army Corps of Engineers in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.). Please do not hesitate to contact Habitat Section biologist Chris Davis at 225-765-2642 should you need further assistance.

Sincerely,

Kyle F. Balkum
Biologist Program Manager

cd/rb/cl

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**BOBBY JINDAL**
GOVERNOR

**SCOTT A. ANGELLE**
SECRETARY

# State of Louisiana

**DEPARTMENT OF NATURAL RESOURCES**

**OFFICE OF COASTAL MANAGEMENT**

August 22, 2011

Jessica Franks, PhD
U.S. EPA, Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

RE: **C20110326** - Comments on the Notice to Prepare an Environmental Impact Statement (EIS) for the Designation of an Ocean Dredged Material Disposal Site (ODMDS) in the Gulf of Mexico off the Mouth of the Atchafalaya River, St. Mary Parish

Dear Dr. Franks:

The Louisiana Department of Natural Resources, Office of Coastal Management (OCM), has been invited to provide comments in response to the above referenced notice to prepare an EIS for the designation of a permanent ODMDS on the west side (right-descending bank) off the mouth of the Atchafalaya River. As the agency responsible for administering the federally-approved Louisiana Coastal Resources Program (LCRP), we look forward to being in receipt of your consistency determination for this activity, as required by the Coastal Zone Management Act of 1972, as amended. We will also appreciate the opportunity to review the Draft EIS when it is completed, and offer these preliminary remarks.

This open water site has been in use since 2002, when it was approved as a temporary disposal area for material dredged from the Atchafalaya River and Atchafalaya River Bar Channel (ARBC) during periodic maintenance. OCM recognizes the importance of maintaining navigation to Louisiana's ports, and fully understands the need for appropriate disposal sites for dredged material; however, OCM can not endorse a disposal site which does not result in the beneficial use of that material for wetland creation, restoration and/or protection. The LCRP requires beneficial use of all dredged material, to the maximum extent practicable, in order to help slow the dramatic loss of coastal wetlands our state is experiencing. Our concern is that by awarding this site a permanent designation, the U. S. Army Corps of Engineers – New Orleans District is provided with a non-beneficial and less costly alternative to beneficial use of this dredged material.

The long-term indirect impacts of creating a permanent ODMDS is not complementary to the mission of this Office. Louisiana's coastal communities and infrastructure are becoming increasingly vulnerable to the harmful effects of tropical storms as our coastal wetlands continue

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to decline. OCM is cognizant that valuable sediment recovered during maintenance dredging operations in the ARBC and other navigation channels should be beneficially utilized to reduce this wetland loss; however, the material is routinely wasted in ocean disposal. The Corps has long maintained that the cost of pumping dredged material from the ARBC to a suitable beneficial use site is prohibitively expensive, exceeding their Federal Standard, and this rationale has been used as a justification to avoid so doing. At this time OCM can not fully support the designation of a permanent ODMDS on the west side of the ARBC. OCM strongly encourages EPA to fully evaluate these indirect effects of this action on the natural and human environment of Louisiana.

We thank you for the opportunity to comment. If you have any questions or wish to discuss this further, please call Jeff Harris of the Consistency Section at (225) 342-7949.

Sincerely,

Keith Lovell

Keith Lovell
Administrator
Interagency Affairs/Field Services Division

KL/JDH/cmc

cc: John Fiorentino, COE-NOD
Dave Butler, LDWF

**Fiorentino, John MVN**

**From:** Beth Altazan-Dixon [Beth.Dixon@LA.GOV]
**Sent:** Friday, September 23, 2011 11:17 AM
**To:** Fiorentino, John MVN
**Subject:** DEQ SOV 110920/2740 USACE-Atchafalaya River Bar Channel

September 23, 2011

Joan M. Exnicios, Chief

USACE Environ. Planning Branch

P.O. Box 60267

New Orleans, LA 70160-0267

john.fiorentino@usace.army.mil <mailto:john.fiorentino@usace.army.mil>

RE: 110920/2740

USACE-Atchafalaya River Bar Channel

Ocean Dredged Material Disposal Site

St. Mary Parish

Dear Ms. Exnicios:

The Department of Environmental Quality (LDEQ), Business and Community Outreach Division has received your request for comments on the above referenced project.

After reviewing your request, the Department has no objections based on the information provided in your submittal. However, for your information, the following general comments have been included. Please be advised that if you should encounter a problem during the implementation of this project, you should immediately notify LDEQ's Single-Point-of-contact (SPOC) at (225) 219-3640.

- Please take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project.

* If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.

1

* If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.
* All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-3181 to determine if your proposed project requires a permit.

· If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit application or Notice of Intent must be submitted no later than June 1, 2011. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx <http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx> or by contacting the LDEQ Water Permits Division at (225) 219- 3181.

* If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, you should contact the Corps directly regarding permitting issues. If a Corps permit is required, part of the application process may involve a water quality certification from LDEQ.
* All precautions should be observed to protect the groundwater of the region.
* Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.
* Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.
* If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

Currently, St. Mary Parish is classified as attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations.

Please send all future requests to my attention. If you have any questions, please feel free to contact me at (225) 219-3958 or by email at beth.dixon@la.gov <mailto:beth.dixon@la.gov> .

Sincerely,

Beth Altazan-Dixon

Performance Management

LDEQ/Business and Community Outreach Division
Office of the Secretary

P.O. Box 4301 (602 N. 5th Street)
Baton Rouge, LA 70821-4301
Phone: 225-219-3958
Fx: 225-325-8148

Email: beth.dixon@la.gov

# Choctaw Nation of Oklahoma

P.O. Box 1210 • Durant, OK 74702-1210 • (580) 924-8280

**Gregory E. Pyle**
Chief

**Gary Batton**
Assistant Chief

October 20, 2011

U.S. Army Corps of Engineers
New Orleans District
Regional Planning and Environment Division South
Attn: Mr. John Fiorentino (CEMVN-PDC-CEO)
P.O. Box 60267
New Orleans, Louisiana 70160-0267

Dear John Fiorentino:

We have reviewed the following proposed project (s) as to its effect regarding religious and/or cultural significance to historic properties that may be affected by an undertaking of the projects area of potential effect.

**Project:** ***Atchafalaya River Bar Channel – Ocean Dredge Material Disposal Site***

**Project Location:** ***Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana***

**Comments:** The Choctaw Nation of Oklahoma has reviewed project (s) and based on the information provided to the best of our knowledge it will have **no adverse effect** on any historic properties in the project's area of potential effect. However, should construction expose buried archaeological or building materials such as chipped stone, tools, pottery, bone, historic crockery, glass or metal items, or should it uncover evidence of buried historic building materials such as rock foundations, brick, or hand poured concrete, this office should be contacted immediately @ 1-800-522-6170 ext. 2137.

Sincerely,

Ian Thompson PhD, RPA
Director Historic Preservation Department
Tribal Archaeologist, NAGPRA Specialist
Choctaw Nation of Oklahoma

By: _____
Caren A. Johnson
Administrative Assistant

IT/cj

*Choctaws...growing with pride, hope and success!*

ALABAMA-COUSHATTA TRIBE OF TEXAS
571 State Park Road 56 • Livingston, Texas 77351 • (936) 563-1100

October 12, 2011

U.S. Army Corps of Engineers
New Orleans District
Attn: CEMVN-PDC-CEC (Fiorentino)
P.O. Box 60267
New Orleans, LA 70160-0267

Dear Mr. Fiorentino:

On behalf of Mikko Oscola Clayton Sylestine and the Alabama-Coushatta Tribe, our appreciation is expressed on your efforts to consult us regarding the Atchafalaya River Ocean Dredged Material Disposal Site proposal in St. Mary Parish.

Our Tribe maintains ancestral associations throughout the state of Louisiana despite the absence of written records to completely identify Tribal activities, villages, trails, or grave sites. However, it is our objective to ensure significances of Native American ancestry, especially of the Alabama-Coushatta Tribe, are administered with the utmost attention.

Upon review of your September 15, 2011 submission, St. Mary Parish exists beyond our scope of interest for the state of Louisiana. Therefore, no impacts to cultural assets of the Alabama-Coushatta Tribe of Texas will occur in conjunction with this proposal.

Should you require further assistance, please do not hesitate to contact us.

Respectfully submitted,

Bryant J. Celestine
Historic Preservation Officer

Telephone: 936 – 563 – 1181 celestine.bryant@actribe.org Fax: 936 – 563 – 1183

William A. Fontenot
632 Drehr Ave.
Baton Rouge, LA 70806
225-383-5673
wafont@cox.net

August 16, 2011

Jessica Franks, PhD
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733
Franks.jessica@epa.gov

Dear Dr. Franks,

Thank you so much for providing me with information on the plans by the U.S. EPA to prepare an Environmental Impact Statement (EIS) on the dredging by the U.S. Army Corps of Engineers in Atchafalaya Bay and the placement of the dredged material on the west side of the navigation channel. The document linked to the public notice is titled, "US Army Corps of Engineers Request for MPRSA Section 102 (c) Designation of ODMDS-West for Continued Placement of Maintenance–Dredged Material from the Atchafalaya River Bar Channel." Please accept the following as my comments on this document.

On page nine of this document there is a list of Wildlife Management Areas that are described as being eight and 29 miles from the areas where dredging and spoil disposal are planned. This is not a correct description of the area where the U.S. Army Corps of Engineers has been dredging and dumping spoil for many years. The Atchafalaya River shipping channel and the spoil disposal areas are located in the middle of the Atchafalaya Delta Wildlife Management Area. This is one of the largest state Wildlife Management Areas and includes the two emerging bird-foot deltas at the mouth of the Atchafalaya River and Wax Lake Outlet as they empty into Atchafalaya Bay. This 250,000 acre Wildlife Management Area was created many years ago when J. Burton Angelle was the secretary of the Louisiana Department of Wildlife and Fisheries and Sandra Thompson was the Secretary of the Department of Culture recreation and Tourism. For the EPA to put out a public document without recognizing the importance of this Wildlife Management Area is troubling and I hope does not indicate a lack of attention to this sensitive location.

In theory, the use of sandy spoil to build Bird Island East and Bird Island West with sand-rich spoil is a good idea. However, the document lacks any information regarding what efforts will be exerted to maintain these "bird islands" and for how long. The document also lacks an answer to whether or not the Corps of Engineers has any plans to "improve" these sandy islands with appropriate native marine and terrestrial vegetation that would help to provide stability and durability for these sandy islands.

Other government agencies, such as the U.S. Fish and Wildlife Service, the U.S. Department of Forestry, the Louisiana Department of Wildlife and Fisheries, the Louisiana Department of Natural Resources and the Louisiana Department of Agriculture and Forestry should work with the Corps of Engineers and the EPA to develop plans for making these islands more stable and attractive for birds and aquatic species. There might also be some resources—other than the budget of the Corps of Engineers—available to improve and stabilize these new islands.

The draft EIS should evaluate the design of these islands so they will be more likely to last in the dynamic waters of the Gulf of Mexico. I have visited many barrier islands and none of the natural islands around the world are in the shape of squares or rectangles. The only barrier island I am aware of which is a square is the man-made disposal island in Minamata Bay, Japan where massive quantities of hazardous waste, like mercury-contaminated sediment, was buried.

The public notice made no mention that just last week the Corps of Engineers ended public comment on their plans to expand the size of Bird Island West. The EPA and Corps of Engineers must provide the public with information on all of the permits for dredging and filling that are connected with or in the general vicinity of the Atchafalaya Bar Channel in order for the public to be properly informed.

The EPA and Corps of Engineers need to provide more information in the draft EIS on all other projects and developments that are directly or indirectly connected with the Atchafalaya Bar Channel and Spoil Disposal Area and any of their potential or real cumulative impacts. For instance, the 18-mile Atchafalaya Bar Channel and spoil disposal areas are identified by the EPA as part of the larger project called the Bayous Chene, Boeuf, Black and Atchafalaya River Project, which is more than 53 miles long. If the Atchafalaya Bar Channel did not exist then the Chene, Boeuf and Black project and most of the development related to the oil and gas industry from Intracoastal City in the western end of Vermillion Bay to Port Fourchom, just west of Grand Isle, would not exist today.

These navigation projects, and especially the Chene, Boeuf, Black and Atchafalaya River Navigation Project are intimately connected together as the primary pathway for the massive offshore drilling rigs that are built at Amelia and moved down the Atchafalaya Bar Channel to the deeper waters of the Gulf of Mexico. Without the deeper Atchafalaya Bar Channel none of the massive rigs would have been built at the complex of construction sites in Amelia. Probably most of the support facilities along the Intracoastal Navigation Canal from Grand Isle to Intracoastal City would also not have been built without the Atchafalaya Bay Bar Canal.

The EIS being developed by the EPA and Corps of Engineers should provide the information on the cumulative and comprehensive impacts to coastal resources, including water, wetlands and especially fish and wildlife and their habitat from all related projects and development as a result of the Atchafalaya Bar Channel. Adverse impacts have

happened from the deepening of navigation channels, such as from the many tons of toxic and hazardous waste dumped and buried at dozens of locations as well as many hundreds of acres of highly-productive wetlands and coastal waters that have been filled in or dramatically altered. No comprehensive assessments of all of these coastal-altering activities have been pulled together before now and no effort has been made to determine the cumulative adverse impacts from navigation and mineral exploration, drilling and development on water quality, wetlands, fish and wildlife resources as well as their habitat.

Federal laws and court rulings have given us some excellent examples of how and why comprehensive and cumulative impacts need to be identified and evaluated when projects like dredging and the placement of spoil is being considered. Federal laws like the National Environmental Policy Act, the Clean water Act and the National Marine Policy Act provide opportunities for federal officials to insure that their work will not only improve the productivity of agencies and projects but help to protect our natural resources for present and future generations. Over the last eighty years Louisiana has lost more than one million acres of coastal land and wetlands. Most of these losses are the direct result of failure of officials on projects—like the Bayous Chene, Boeuf and Black and the Atchafalaya River navigation channel—to consider or evaluate land losses from dredging and filling of waters and the failure to provide for bank stabilization.

Since this project is on state land, the bed of Atchafalaya Bay, and since this bay is under the jurisdiction of the State Land Office and the Louisiana Department of Wildlife and Fisheries, I expect both the EPA and the Corps of Engineers to develop a close working relationship with officials in these and other relevant state agencies. Whenever our various public officials can work together they are usually more productive.

I look forward to working with the staff of the EPA and the Corps of Engineers on the proposed Environmental Impact Statement for the maintenance dredging and placement of dredged material in the Gulf of Mexico waters of Atchafalaya Bay.

Sincerely yours,

William A. Fontenot

cc: John F. Fiorentino
U.S. Army Corps of Engineers
Coastal Environmental Compliance Section
P.O. Box 60267
New Orleans, LA 70160-0267
john.fiorentino@usace.army.mil

William A. Fontenot
Conservation Chair, Delta Chapter of the Sierra Club
632 Drehr Ave.
Baton Rouge, LA 70806
225-383-5673
wafont@cox.net
November 8, 2011

RECEIVED
EPA REGION VI
11 NOV 15 PM 1:43
ECOSYSTEMS PROTECTION BR.

Jessica Franks, PhD
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733
Franks.jessica@epa.gov

RE: Support for the proposed Environmental Impact Statement on dredging activities in Atchafalaya Bay, Louisiana

Dear Dr. Franks,

The EPA and Corps of Engineers have sent out a number of public notices on the plans by these agencies to declare the spoil disposal area on the west side of the Atchafalaya Bay Navigational Channel as a permanent disposal area.

The Sierra Club offers the two suggestions below:

1 - After reading the many documents which are available to us, the Executive Committee of the Delta Chapter of the Sierra Club believes that the Environmental Protection Agency and the Corps of Engineers were correct in their determination that an Environmental Impact Statement should be prepared on the disposal of dredged material in Atchafalaya Bay.

Clearly, the dredging of a navigational channel for approximately 18 miles in Atchafalaya Bay, which is part of the much larger Atchafalaya, Chene, Boeuf and Black Navigation Project, is a major federal action which we believe requires an Environmental Impact Statement.

We also believe that these two federal agencies should, in the near future, prepare a comprehensive Environmental Impact Statement for the entire 70 mile project known as the Atchafalaya, Chene, Boeuf and Black Navigation Project rather than just the smaller proposed EIS for the very limited 18 mile section of the larger 70 plus mile navigation project.

The primary reason for this extensive navigation project in south central Louisiana is to facilitate the movement of the massive oil well drilling structures which are built at the various construction sites along the Intracoastal Waterway near Amelia, Louisiana and then transported on the project known as the Atchafalaya, Chene, Boeuf and Black navigation project to their drilling locations in the Gulf of Mexico.

While some environmental assessments have been developed by the EPA and Corps of Engineers in previous decades there is a real need for a comprehensive Environmental Impact

statement on the alterations an impacts which have occurred over the last 80 years in the waters, wetlands and shores of the Intracoastal Waterway and other waters in and near this very productive industrial construction area which is located in one of the most dynamic coastal environmental areas in the USA.

Over the last eighty years Louisiana has lost more than a million acres of coastal lands and wetlands. A considerable amount of this loss of critical habitat for fish and wildlife resources and for the areas needed to buffer Louisiana from hurricanes has happened in the Morgan City area.

The EPA and Corps of Engineers have never developed a comprehensive environmental impact statement which has considered all of the adverse impacts to fish and wildlife resources, their habitat, water and air quality, waters and wetlands and human health in the Morgan City area of Louisiana.

Over the last eighty years our Sierra Club members have visited, photographed and evaluated hundreds of fish and wildlife areas, construction sites, waste storage and disposal areas and alterations for navigation, flood protection and the movement and storage of water. None of our federal and state agencies have considered all of the activities like flood control, navigation and waste disposal and how these thousands of activities have dramatically impacted human health and the environment.

2 – Inasmuch as Jean Lafitte National Historical Park is one of many interests which has been notified of the draft EIS, so should the Atchafalaya National Heritage Area, also a program of the Department of the Interior/National Park Service. In 2006 the U.S. Congress passed legislation which created the Atchafalaya National Heritage Area which includes more than 10 million acres in fourteen parishes, including the Atchafalaya Floodway, Atchafalaya River Basin and the Atchafalaya Bay. All of these wetlands are part of this dramatic heritage area. .

The state staff for the Atchafalaya National Heritage Area is located in the office of the Lieutenant Governor. The Program Director is Debra Credeur, 1051 North Third St., P.O. Box 44243, Baton Rouge, LA 70804-4243,

The Delta Chapter of the Sierra Club looks forward to working with the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers in updating all of the environmental considerations for dredging and spoil placement in Atchafalaya Bay which is part of the Atchafalaya, Chene, Boeuf and Black Navigation Project.

Sincerely yours,

William A. Fontenot