United States
Environmental Protection
Agency

Region 6
1445 Ross Avenue
Dallas, TX 75202

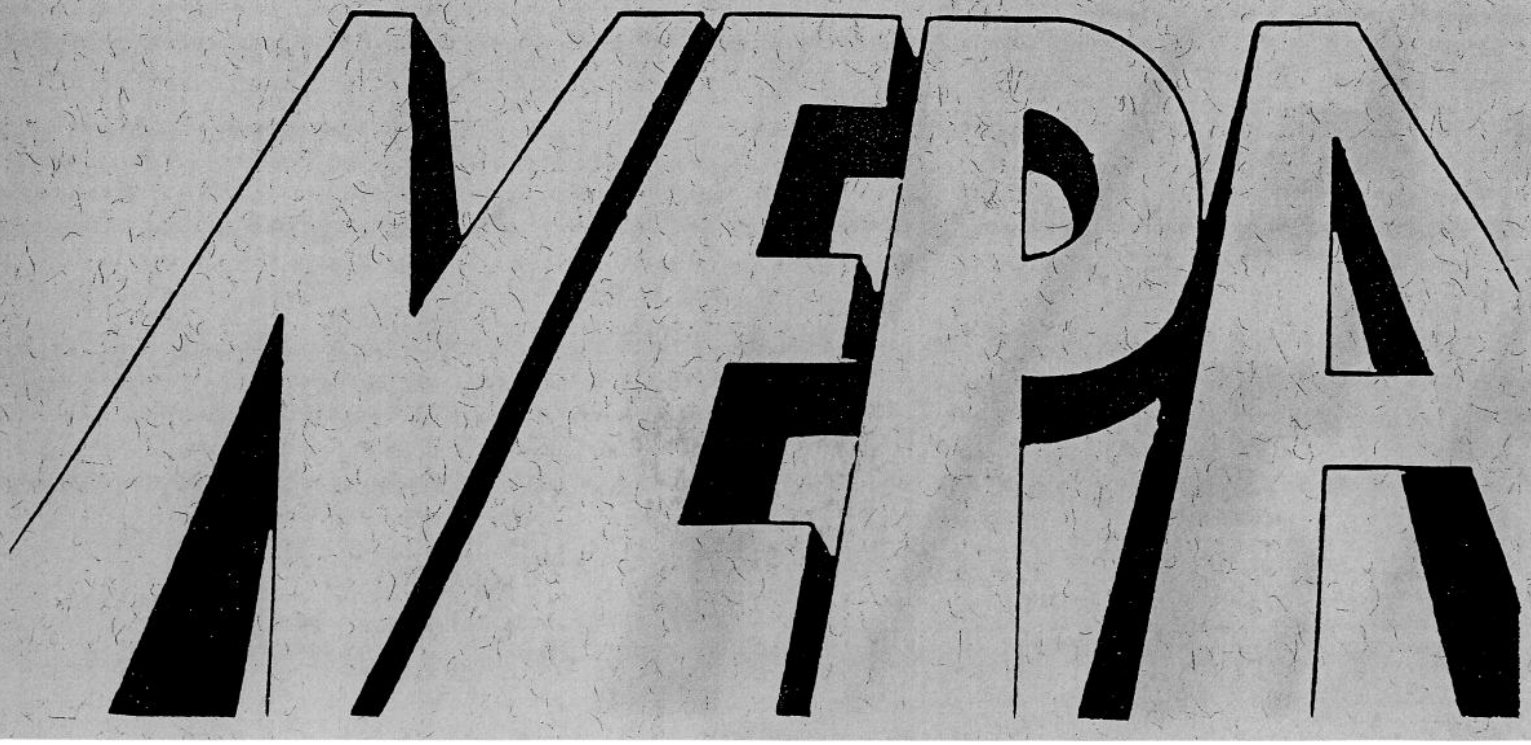
November 1998
906/11-98-003

EPA

ENVIRONMENTAL IMPACT STATEMENT

SUPPLEMENTAL FINAL

ATCHAFALAYA RIVER BAR CHANNEL OCEAN DREDGED MATERIAL DISPOSAL SITE ST. MARY PARISH, LOUISIANA



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

NOV 1 9 1998

TO INTERESTED AGENCIES, OFFICIALS, PUBLIC GROUPS AND INDIVIDUALS:

Enclosed is a copy of the Supplemental Final Environmental Impact Statement (SFEIS) on the U.S. Environmental Protection Agency's (EPA) proposed final designation of the Ocean Dredged Material Disposal Site (ODMDS) for the Atchafalaya River Bar Channel in St. Mary Parish, Louisiana.

In consideration of the comments received on EPA's Supplemental Draft (SDEIS), this SFEIS includes: 1) a revised and updated Summary, 2) revisions and additions to the environmental analyses in the SDEIS, 3) EPA's responses to comments received on the SDEIS, 4) EPA's preferred alternative, 5) EPA's consistency determination with Louisiana's Coastal Zone Management Program, and 6) the Site Management Plan.

EPA encourages public participation in the decision-making process and invites comments on the SFEIS. Please provide written comments, within 30 days of EPA's notice of availability in the *Federal Register*, to: EPA, Region 6, Office of Planning and Coordination, (EN-XP), 1445 Ross Avenue, Dallas, Texas 75202-2733, Attn: Robert D. Lawrence, Chief.

Sincerely yours,

Gregg A. Cooke
Regional Administrator

Enclosure

ABSTRACT

SUPPLEMENTAL FINAL ENVIRONMENTAL IMPACT STATEMENT
ATCHAFALAYA RIVER BAR CHANNEL
OCEAN DREDGED MATERIAL DISPOSAL SITE DESIGNATION

AGENCY: U.S. Environmental Protection Agency (EPA)

ACTION: Ocean Dredged Material Disposal Site (ODMDS) Designation for the Atchafalaya River Bar Channel, St. Mary Parish, Louisiana

CONTACT: Robert D. Lawrence, Chief of the Office of Planning and Coordination, EPA (6EN-XP), 1445 Ross Avenue, Dallas, Texas 75202-2733. Telephone: (214) 655-2258.

SUMMARY: EPA proposes to designate an Ocean Dredged Material Disposal Site (ODMDS) for disposal of dredged material from the Atchafalaya River Bar Channel, pursuant to Section 102(c) of the Marine Protection, Research, and Sanctuaries Act. EPA has determined, based on the completed Supplemental Final Environmental Impact Statement (SFEIS), that the proposed ODMDS is environmentally acceptable, and that its Section 102(c) designation would be consistent, to the maximum extent practicable, with the State of Louisiana's Coastal Resources Program. The SFEIS will be made available for 30-day public review and comment, and EPA's final action will be documented in the Record of Decision and final rulemaking published in the Federal Register.

RESPONSIBLE OFFICIAL: Myron O. Knudson
Gregg A. Cooke
Regional Administrator

SUMMARY

The U.S. Environmental Protection Agency (EPA), Region 6, proposes to designate the Section 103(b) alternative Ocean Dredged Material Disposal Site (ODMDS) for disposal of dredged material from the Atchafalaya River Bar Channel, pursuant to Section 102(c) of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972. EPA's final designation is based on the evaluations of the environmental consequences conducted in compliance with the National Environmental Policy Act (NEPA), including the 5 general [40 CFR 228.5] and 11 specific criteria [40 CFR 228.6(a)] as required by the MPRSA, and consistency with Section 307 of the Coastal Zone Management Act of 1972.

The Atchafalaya River Bar Channel ODMDS was designated on an interim basis in the 1972 MPRSA regulations. That interim designation continued through 1996, based on amendments to the regulations in January 1980. Section 506 of the Water Resources Development Act (WRDA) of 1992, amended MPRSA such that beginning January 1, 1997, open water offshore disposal could only be into ODMDSs either designated by EPA under Section 102(c) of the Act or selected by the COE under Section 103(b) as an alternative site. Since EPA had not ruled on final designation by January 1, 1997, the ODMDS was selected by the COE as a 103(b) alternative to accommodate annual channel maintenance dredging beyond 1996 for 5 years (and with a 5 year extension). Assuming the extension of the COE's Section 103(b) selection allows the continued use of the ODMDS through the year 2006, EPA is to designate the ODMDS site pursuant to Section 102(c) of MPRSA, or to find that the site is inappropriate for final designation.

Through the NEPA process, EPA evaluated its proposed action, and other reasonable alternatives including no action and those not within the jurisdiction of the agency, in order to provide an environmentally acceptable site for the disposal of dredged material removed from the Atchafalaya River Bar Channel. Four ocean disposal alternatives were considered for the proposed ODMDS. These included: 1) the west side of the Atchafalaya River Bar Channel site, 2) a shallow-water site, 3) a mid-shelf site, and 4) a deep-water site. Seven non-ocean disposal alternatives were also considered, including beach nourishment, marsh creation, single point discharges, LDNR's one-third/two-third plan, and CWPPRA projects. Under the no-action alternative, EPA would withdraw its 1991 proposed rule and not designate the Atchafalaya River Bar Channel ODMDS under Section 102(c) of the MPRSA. The two basic results of the no-action option are: 1) dredged material would continue to be disposed of at the ODMDS for a maximum of 10 years under Section 103(b) of the MPRSA; and 2) after that time, dredging would cease, or EPA would reevaluate site designation. If maintenance dredging ceases, the channel would become unnavigable, resulting in adverse socioeconomic impacts. Under the preferred alternative, EPA would permanently designate the proposed ODMDS. Roughly 9 million cubic yards of bar channel material would be disposed of annually, directly impacting 9.14 square miles, having an average water depth of about 16 feet. The COE would continue to notify EPA and other agencies each year of its intent to use the ODMDS for disposal through the annual dredging conferences.

Section 307 of the Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et. seq., requires that "each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with state approved management programs." Compliance with the Louisiana Coastal Resources Program Guideline 4.2, and Section 307, 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. Based on this evaluation, and the SFEIS on the Atchafalaya River Bar Channel ODMDS St. Mary Parish, Louisiana," the EPA has determined that its Section 102(c) designation of the proposed ODMDS would be consistent, to the maximum extent practicable, with the LCRP. In addition, prior to each dredging operation, a Consistency Determination is made by the COE and concurred on by LDNR wherein consideration is given to the beneficial use of dredged material to the maximum extent practicable.

It is generally recognized that: 1) EPA's Section 102(c) designation does not authorize the use of the site, and each proposed annual dredging project requires an individual "consistency determination" concurrence from LDNR; 2) the farther away the ODMDS is located from the channel, the more costly the disposal alternative; and 3) many of the predicted environmental impacts on biological life are generally the same at all alternative disposal sites. These include the direct impacts of sediment that settles on the site in relationship to the dynamic nature of the area, erosion and transport, and the type and diversity of the organisms affected (e.g., some organisms adapt to typically turbid conditions). However, while direct impacts (i.e., economic and environmental) of dredged material disposal can be very similar, the indirect impacts in qualitative terms on the coastal zone (e.g., loss of productivity) of not using the material for beneficial uses (e.g., wetland restoration, enhancement or creation) can be very different depending on the site.

EPA recognizes the direct, indirect, and cumulative effects of ODMDS and non-ocean disposal alternatives, and supports the use of the dredged material beneficially to improve the long-term productivity of the coastal zone. The proposed Section 102(c) ODMDS is considered environmentally acceptable and needed for future disposal when more beneficial use options are not economically feasible. The EPA's final designation of the proposed ODMDS under authority of Section 102(c) of MPRSA will not prohibit the future consideration (e.g., through CWPPRA, et al.) and use of dredged material beneficially, with its indirect and cumulative benefits to the near shore region.

Criteria of Part 228 of the Ocean Dumping Regulations (40 CFR Parts 220 to 229) deal with the evaluation of the proposed dumping of material in ocean waters in relation to continuing management of ocean disposal sites to prevent unreasonable degradation of the marine environment from all wastes being dumped into the ocean. As specified in 40 CFR 228.4, all studies for the evaluation and potential selection of dredged material disposal sites will be conducted in accordance with the appropriate requirements specified in 40 CFR 228.5 of the general criteria, and 40 CFR 228.6(a) of specific criteria, for site selection. These criteria identify factors considered when evaluating an ODMDS to prevent unreasonable degradation of the marine environment.

Based on this evaluation, EPA's preferred alternative is the final designation of the proposed ODMDS for the disposal of material dredged from the Atchafalaya River Bar Channel. EPA's designation of, and final rulemaking on, the proposed ODMDS, under authority granted to EPA by the MPRSA 102(c) process, would provide an environmentally acceptable site for the disposal of dredged material when beneficial use alternatives are not feasible . If there were no final designation of the proposed ODMDS by EPA, the COE may continue to use the site for a maximum of 10 years, under the MPRSA 103(b) process. EPA supports additional COE funding from Congress, CWPPRA, the State Restoration Program, and other sources for disposal operations. Final designation of the proposed ODMDS under authority of Section 102(c) of the MPRSA does not prohibit the future consideration of beneficial use alternatives as additional funding becomes available.

Section 102(c) of the MPRSA, as amended by WRDA 1992, and Part 228 of the Ocean Dumping Regulations establish the requirement for an ODMDS monitoring program. Section 228.9 states that the primary purpose of a monitoring program is to evaluate the impact of disposal on the marine environment by referencing the monitoring results to a set of baseline conditions. A site monitoring program is included in the site management plan, included as Appendix A of this SFEIS. The results of the monitoring program will be used by EPA and the COE to determine if site management practices need to be changed to avoid unreasonable degradation of the marine environment.

Special management strategies currently applicable to the proposed ODMDS include:

a. Suitable dredged material from the Atchafalaya River Bar Channel will be discharged into a Section 404 disposal area for beneficial use to construct islands for colonial nesting seabirds and/or wetlands.

b. Only dredged material determined by the COE, NOD, and EPA, Region 6 to satisfy the criteria set forth in 40 CFR Part 227 Subparts B, C, D, E, and G, and Part 228.4(e) of the Ocean Dumping Regulations will be considered for unrestricted placement at the proposed ODMDS. Additional evaluation of management options will be required for any dredged material which does not meet with the criteria.

c. No disposal operations will take place when swells exceed 3 feet.

d. The discharge point within the ODMDS will be determined by the Government Inspector on board the dredge during disposal operations. Depending on prevailing currents, the Government Inspector will direct discharge to ensure maximum retention time of dredged material within the ODMDS and minimize movement of dredged material into the navigation channel and/or off the ODMDS.

The site management plan for the proposed ODMDS would be reviewed and revised, if necessary, not less frequently than 10 years after adoption and every 10 years thereafter. A modification to the plan may be proposed by either EPA or COE. The modification would be incorporated into the plan by mutual consent of both agencies. Because the proposed ODMDS

has been used historically without significant environmental impacts, site monitoring consists of hydrographic surveys at and adjacent to the proposed ODMDS pre- and post-disposal. The purpose of the surveys is to determine whether mounding that could adversely impact navigation or benthic community recovery is occurring at or adjacent to the site as a direct result of disposal operations. The EPA and COE review the results of the monitoring program to determine if modifications of site management practices are necessary.

EPA prepared a Draft EIS on the designation of the Atchafalaya River Bar Channel ODMDS in November, 1983. Six comment letters were received on the Draft EIS; based on these responses, EPA determined that a Supplemental Draft (SDEIS) was necessary to correct information deficiencies and include more recent data fulfilling the requests of most of the commenting agencies. The SDEIS was completed and distributed for review in December 1990. Comments received on the SDEIS, and EPA's responses, are included in Appendix B of this SFEIS.

Table of Contents

1.0 INTRODUCTION

1.1 Proposed Action

The U.S. Environmental Protection Agency (EPA), Region 6, proposes to designate the Section 103(b) alternative Ocean Dredged Material Disposal Site (ODMDS) for disposal of dredged material from the Atchafalaya River Bar Channel, pursuant to Section 102(c) of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972. EPA's final designation is based on the evaluations of the environmental consequences conducted in compliance with the National Environmental Policy Act (NEPA), including the 5 general [40 CFR 228.5] and 11 specific criteria [40 CFR 228.6(a)] as required by the MPRSA, and consistency with Section 307 of the Coastal Zone Management Act of 1972.

1.2 Background

This Supplemental Final Environmental Impact Statement (SFEIS) evaluates the environmental consequences of EPA's final decision regarding designation of an ocean disposal site for the disposal of dredged material removed from the bar channel of the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, navigation project (hereafter, referred to as the Atchafalaya River Bar Channel). This SFEIS is prepared in accordance with NEPA; MPRSA, as amended; EPA's Ocean Dumping Regulations (40 CFR 220 to 229); and other applicable Federal environmental legislation.

Title I of the MPRSA authorizes the Administrator of the EPA, and the Secretary of the Army acting through U.S. Army Corps of Engineers (COE), to establish permit programs for ocean disposal of non-dredged and dredged materials, respectively. Title I also requires EPA to establish criteria, based on the factors listed in Section 102(a), for the review and evaluation of permits under the EPA and COE permit programs. In addition, Section 102(c) of Title I authorizes EPA, considering criteria established pursuant to Section 102(a), to designate ODMDSs or times for dumping of non-dredged and dredged materials.

The Atchafalaya River Bar Channel ODMDS was designated on an interim basis in the 1972 MPRSA regulations. That interim designation continued through 1996, based on amendments to the regulations in January 1980. Section 506 of the Water Resources Development Act (WRDA) of 1992, amended MPRSA such that beginning January 1, 1997, open water offshore disposal could only be into ODMDSs either designated by EPA under Section 102(c) of the Act or selected by the COE under Section 103(b) as an alternative site. Since EPA had not ruled on final designation by January 1, 1997, the ODMDS was selected by the COE as a 103(b) alternative to accomodate annual channel maintenance dredging beyond 1996 for 5 years (and with a 5 year extension). Assuming the extension of the COE's Section 103(b) selection allows the continued use of the ODMDS through the year 2006, EPA is to designate the ODMDS site pursuant to Section 102(c) of MPRSA, or to find that the site is inappropriate for final designation.

1.3 NEPA Review Process

EPA voluntarily committed to prepare Environmental Impact Statements (EISs) in evaluating its ODMDS designations under the 11 specific criteria (§ 228.6) and 5 general criteria (§ 228.5) in the Ocean Dumping Regulations. EPA prepared the Draft EIS in November 1983, and determined a Supplemental EIS was warranted in December 1989. The Supplemental Draft EIS was completed in December 1990, and EPA's proposal to designate the Atchafalaya River Bar Channel ODMDS was published in the *Federal Register* on February 6, 1991.

1.4 Purpose and Need for EPA's Proposed Action

Pursuant to Section 102(c) of MPRSA, the purpose and need of EPA's proposed action is the final designation of the Atchafalaya River Bar Channel ODMDS. Through the NEPA process, EPA is evaluating its proposed action, and other reasonable alternatives including no action and those not within the jurisdiction of the agency, in order to provide an environmentally acceptable site for the disposal of dredged material removed from the Atchafalaya River Bar Channel.

The Atchafalaya River Bar Channel is the main distributary within the developing delta complex of the Atchafalaya River, which receives approximately 30 percent of the Mississippi River water and sediment discharge. Consequently, sedimentation rates in the channel are large and dredging is required annually. Delta development is expected to fill Atchafalaya Bay with sediments over the next 50 years. As this occurs, the bar channel will move seaward and the location of annual maintenance dredging will gradually expand toward the Gulf of Mexico.

The COE is responsible for planning and conducting the necessary maintenance dredging and disposal operations for the Atchafalaya River Bar Channel. The channel provides ship access from the Gulf of Mexico to Morgan City, the Gulf Intercoastal Waterway, and the bayous Chene, Bouef and Black. Ship traffic includes oil field supply boats, offshore tugs and supply vessels, fishing boats, and barges. Large offshore oil platforms are periodically barged down the channel.

Each year, the COE notifies EPA and other interested agencies via annual dredging conferences of its intent to use the ODMDS for disposal. In accordance with the "Regional Implementation Agreement for Testing and Reporting Requirements for Ocean Disposal of Dredged Material" the proposed dredging is evaluated under 40 CFR Parts 227 and 228 by the COE and EPA prior to each use of the ODMDS.

The COE is expected to be the primary user of the Atchafalaya ODMDS. Although the COE does not issue itself a disposal permit, it must meet the same criteria that apply to any permit applicant before dredged material can be discharged into the ODMDS. If a non-Federal entity seeks use of the ODMDS for dredged material disposal, the COE applies the criteria in 40 CFR Parts 227 and 228 as a part of its public interest review of the non-Federal permit application.

2.0 DESCRIPTION AND EVALUATION OF ALTERNATIVES

2.1 No Action

Under the no-action alternative, EPA would withdraw its 1991 proposed rule and not designate the Atchafalaya River Bar Channel ODMDS under Section 102(c) of the MPRSA. The two basic results of this alternative are: 1) dredged material would continue to be disposed of at the ODMDS for a maximum of 10 years under Section 103(b) of the MPRSA; and 2) after that time, dredging would cease, or EPA would reevaluate site designation. If maintenance dredging ceases, the channel would become unnavigable, resulting in adverse socioeconomic impacts.

2.2 Final Designation of the Proposed Site

Under this proposed alternative, EPA would permanently designate the proposed ODMDS. Roughly 9 million cubic yards of bar channel material would be disposed of annually, directly impacting 9.14 square miles, having an average water depth of about16 feet. The COE would continue to notify EPA and other agencies each year of its intent to use the ODMDS for disposal through the annual dredging conferences.

The boundaries of the proposed ODMDS (shown below) differ from those of EPA's interim-designated site, but are approximately the same as the boundaries of the site described in the SDEIS and the proposed rule, dated February 6, 1991.

Interim-Designated Site	SDEIS/Proposed Rule Site	Proposed Site
29E 20' 50"N 91E 24' 03"W	29E 21' 24.92"N 91E 23' 11.00"W	29E 20' 59.92"N 91E 23' 33.23"W
29E 11' 35"N 91E 32' 10"W	29E 21' 08.86"N 91E 22' 47.47"W	29E 20' 43.94"N 91E 23' 09.73"W
29E 11' 21"N 91E 31' 37"W	29E 07' 59.43"N 91E 34' 27.51"W	29E 08' 15.46"N 91E 34' 51.02"W
29E 20' 36"N 91E 23' 27"W	29E 08' 15.46"N 91E 34' 51.02"W	29E 07' 59.43"N 91E 34' 27.51"W

EPA's interim-designated ODMDS was approximately 0.5 miles wide by 12 miles long, located parallel to and east of the Atchafalaya River Bar Channel. The ODMDS described in the Supplemental Draft EIS was rectangular-shaped, approximately 0.5 miles wide by 19 miles long, and located on the east side of the Atchafalaya River Bar Channel. The proposed ODMDS is shifted slightly to the east, and the northern and southern ends are extended to accommodate actual and potential increases in dredged material from navigation channel as the Atchafalaya Delta moves, or progrades, gulfward.

In 1991, the COE incorporated the northern end (about 200 acres) of the ODMDS into an area designated under Section 404 of the Clean Water Act for the placement of dredged material to create islands (about 360 acres) for colonial nesting seabirds. Suitable material from the Atchafalaya River Bar Channel continues to be used beneficially in the Section 404 site and unsuitable material is placed in the ODMDS.

Figure 2.1 depicts the location of the proposed ODMDS in relation to the surrounding area, including landmarks referred to throughout this document. Figure 2.2 illustrates the relative locations of EPA's 1972 interim-designated and currently proposed ODMDS. The center of the proposed site is approximately 16 miles from the mainland coast. The proposed site has an average depth of approximately 16 ft and a total area of approximately 9.14 sq. mi. Hereinafter, unless specifically noted, reference to the ODMDS, site, or proposed site will be taken to mean EPA's proposed Atchafalaya River Bar Channel ODMDS, as presented in this section.

2.3 Relocation of the Proposed Site

Four alternative (ocean disposal) sites were considered for the proposed ODMDS. These included: 1) the west side of the Atchafalaya River Bar Channel site, 2) a shallow-water site, 3) a mid-shelf site, and 4) a deep-water site (see Figure 2.3).

2.3.1 West Side of the Channel

Because currents throughout the year result in sediment transport to both the northwest and the southeast, relocation of the proposed ODMDS to the west side of the Atchafalaya River Bar Channel was considered. The boundary coordinates of this (29.15 square miles or about 18,500 acres) alternative site are: 29E21'30.26"N, 91E24'17.86"W, 29E22'44.01"N, 91E26'06.36"W, 29E08'45.82"N, 91E35'35.55"W, 29E10'59.60"N, and 91E37'23.80"W (also, see Figure 2.3).

Although local currents in the vicinity of the proposed ODMDS are influenced by tides, loop current intrusions, and river flow; the direction and velocity of currents are predominantly influenced by the wind (Phillips and James 1988). Early studies by Morgan *et al.* (1953), analysis of ERTS images of the Atchafalaya Bay by Wells, Crout, and Kemp (1981), as well as visual inspection of recent infrared aerial photos (taken January, 1995), reveal that the turbidity plume of sediment-laden waters from the Atchafalaya River and Bay are transported in a westerly drift.

As previously noted, net water flow in the winter is to the northwest, with periodic flow reversals, due to shifting winds, to the southeast (Weissberg *et al.* 1980a,b; Crout and Hamiter 1981; Phillips and James 1988). Net flow in the summer can be either to the east or the west (Weissberg *et al.* 1980a,b; Crout and Hamiter 1981; Phillips and James 1988).

The environmental characteristics of the west side of the Atchafalaya River Bar Channel alternative site are practically identical to the proposed ODMDS (IEC 1983, Dettmann and Tracey 1991, Flemer *et al.* 1994). If similar disposal techniques are applied at the west-side

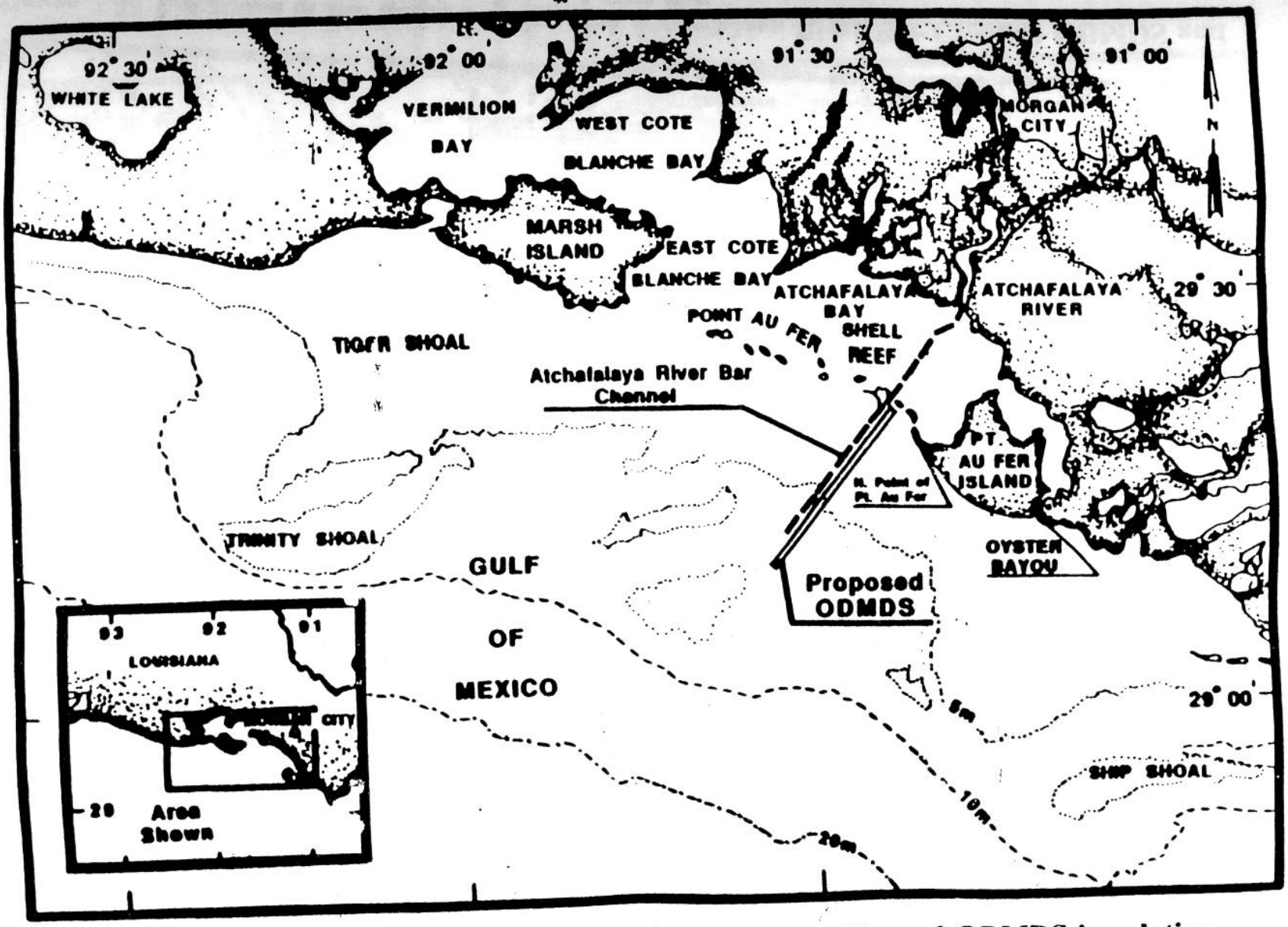


Figure 2.1. Location of the proposed Atchafalaya River Bar Channel ODMDS in relation to landmarks in the surrounding area.

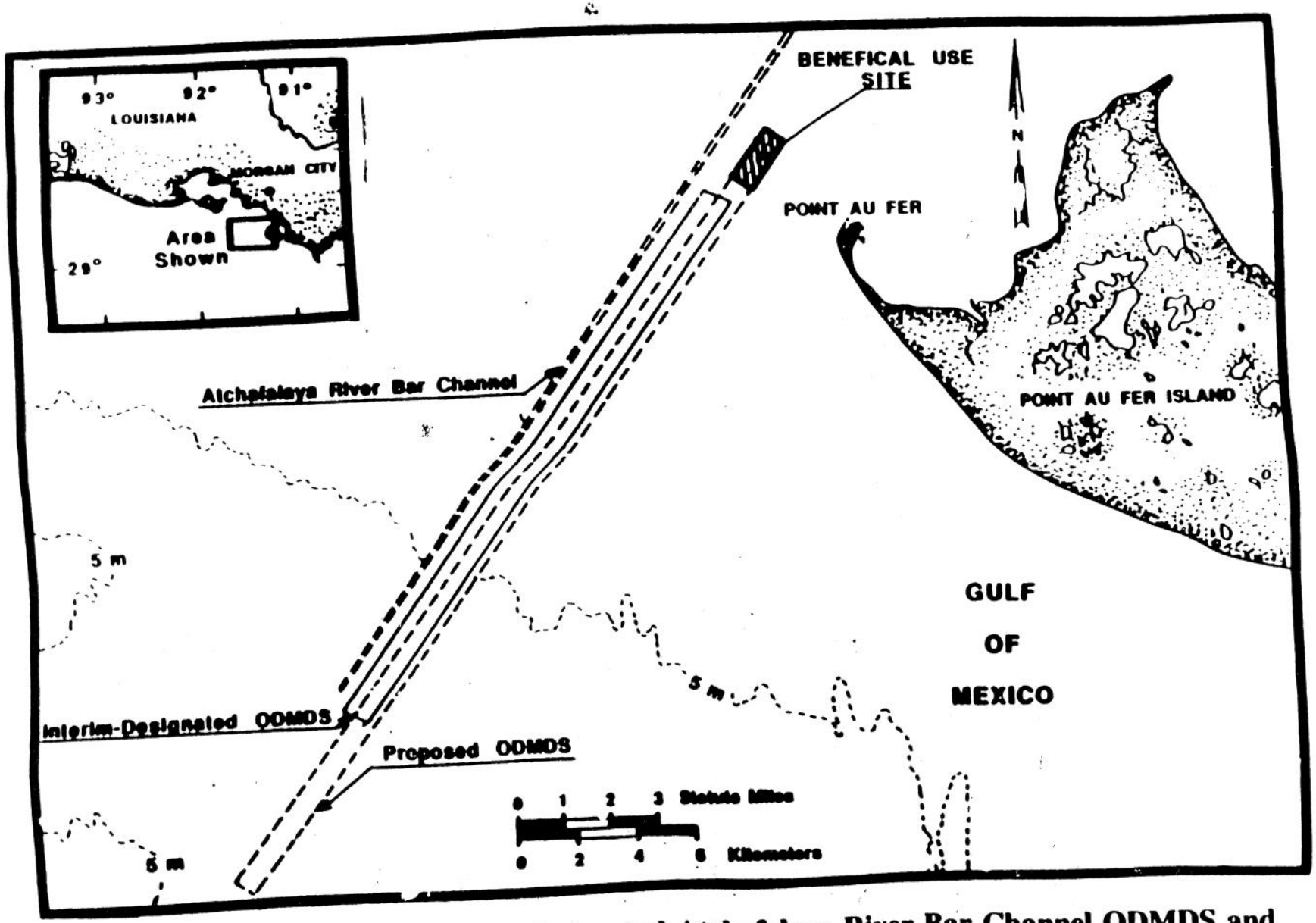


Figure 2.2. Locations of the interim-designated Atchafalaya River Bar Channel ODMDS and the proposed Atchafalaya River Bar Channel ODMDS.

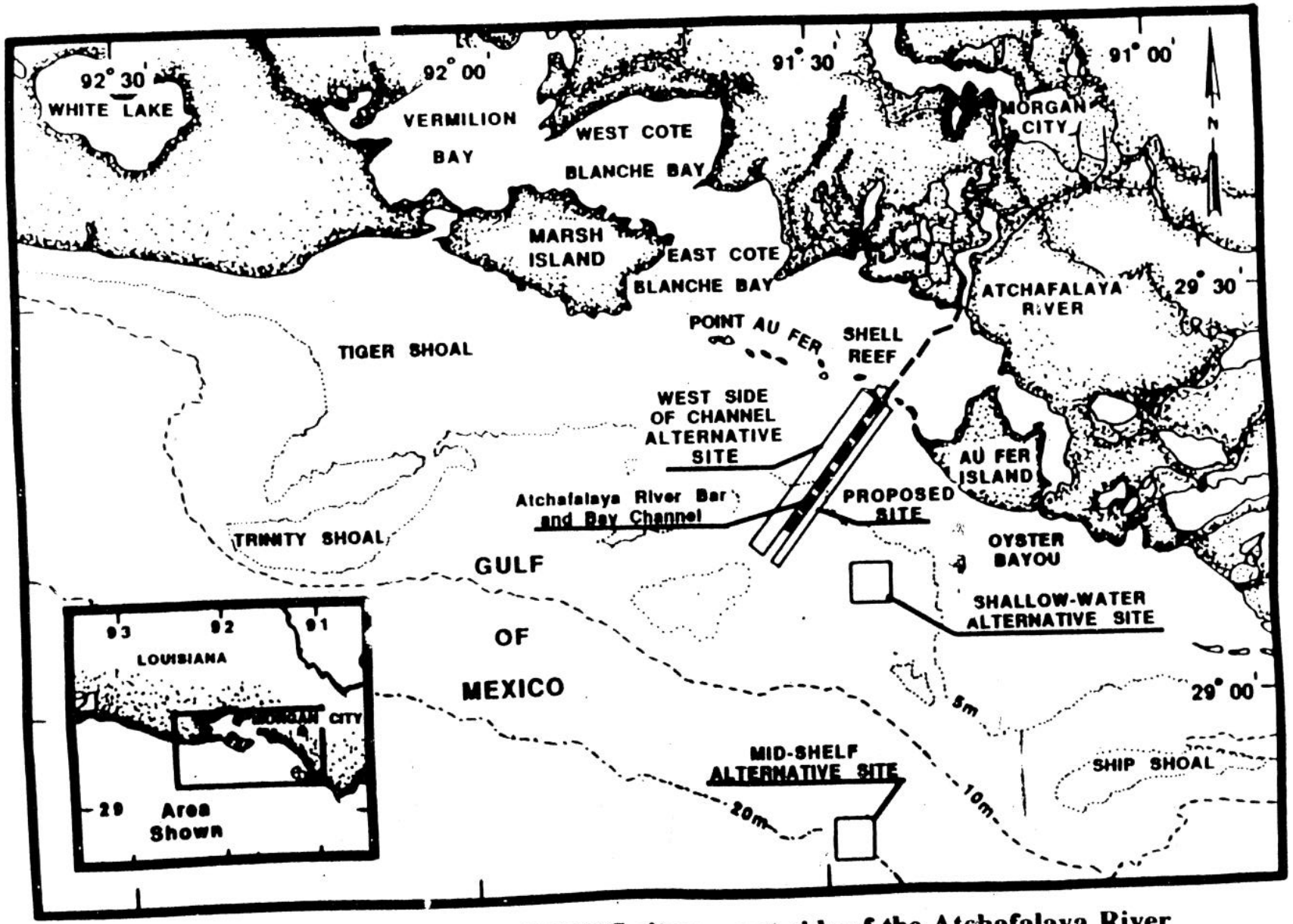


Figure 2.3. Locations of alternative ODMDS sites: west side of the Atchafalaya River Bar Channel alternative, shallow-water alternative, and midshelf alternative.

alternative site, the environmental effects of dredged-material disposal would be quite similar to those at the proposed ODMDS. To minimize impacts, disposal operations would necessarily be conducted during those times when influencing weather systems and wind conditions can guide the direction of discharge plume to the west. There is some evidence that disposal in the existing ODMDS has resulted in dredged material re-filling the navigation channel to the west, particularly when predominant currents are from the southeast.

The estimated cost for transportation of 9 million cubic yards of dredged material annually removed from the Atchafalaya River Bar Channel to be deposited in a west-side ODMDS would be approximately $2,720,000 including 20% contingencies. Relocation of the proposed ODMDS to an alternative west-side site would subject a new area of the ocean to the effects of dredged material disposal. See Cost Comparison of ODMDS Alternatives in Table 2.1.

2.3.2 Shallow-water Site

Productive fishing banks are located east of the proposed ODMDS. Oil and gas facilities are located throughout the near shore areas. To avoid conflict with these and other permitted uses in the area, an alternative shallow-water ODMDS could be located approximately 9.2 miles south and 2.3 miles east of the center of the proposed ODMDS, which is centered at approximately 29E08'30"N and 91E25'30"W (see Figure 2.3).

This shallow-water site would be deeper overall than the proposed ODMDS but not deep enough to substantially change the physical stresses on the bottom sediment. According to the information presented in Darnell *et al.* (1983) and Phillips and James (1988), the bottom sediments and biological characteristics of the proposed site and shallow-water site are practically identical. Therefore, with similar disposal techniques at the alternative shallow-water site, the environmental effects would be quite similar to those at the proposed ODMDS. If hopper dredges or barges were 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 at the shallow-water site would also be similar to those at the proposed site.

The estimated cost for transportation of 9 million cy of dredged material annually removed from the Atchafalaya River Bar Channel to an alternative shallow-water ODMDS is $14,580,000 including 20% contingencies. Relocation of the proposed ODMDS to an alternative shallow-water site would subject a new area of the ocean to the effects of dredged-material disposal. See Cost Comparison of ODMDS Alternatives in Table 2.1.

2.3.3 Mid-shelf Site

The mid-shelf coast of Louisiana is a productive area with oil and gas lease tracts and pipelines located throughout. Therefore, to principally avoid oil and gas lease tracts and pipelines,

Table 2.1 Cost Comparisons of ODMDS Alternatives**

Alternatives	Amount Cubic Yards	Total Cost $/yr	Avg Cost $/CY
1. Final Designation of the Proposed Site	9 million	2.72 million	0.30
2. Relocation of the Proposed Site			
A. West Side of the Channel	9 million	2.72 million	0.30
B. Shallow-Water Site	9 million	14.58 million[a]	1.62
C. Mid-Shelf Site	9 million	37.00 million[a]	4.11
D. Deep-Water Site	9 million	71.11 million[a]	7.90
3. Non-Ocean Disposal			
A. Beach Nourishment at Point au Fer Island	9 million	14.42 million[ab]	1.60[c]
B. Marsh Creation in Atchafalaya Bay	9 million	15.95 million[ab]	1.77[c]
C. Single Point Discharge (Unconfined)	9 million	3.35 million[ab]	0.37[c]
D. Single Point Discharge (Confined)			
1) Pumping costs	9 million	3.62 million[ab]	0.40[c]
2) Construction 2 disposal cells w rock dikes, shell dikes, native material, sediment fences, geotextile tubes, or plastic sheet piling		40.00million[a] and greater	4.85 (1st yr.)
E. LDNR (one-third/two-third) Plan		2.72 million	0.30
1) Pumping costs from Sta 475 to 850 to 103 ODMDS	3.9 million	1.37 million[b]	0.35[c]
2) Pumping costs from Sta 850 to 1340 to 102 ODMDS	5.1 million	1.35 million	0.26
F. Marsh Creation Northwest of Point au Fer Island		11.34 million[b]	w/o CWPPRA 1.25[c] (1st yr) 0.65 after
1) Construction of rock dike, 1st year(CWPPRA)		5.4 million[a]	w/ CWPPRA 0.65
2) Pumping costs for marsh creation–from Sta 475 to 850	3.9 million	4.59 million[ab]	1.17[c]
3) Pumping costs from Sta 850 to 1340 to 102 ODMDS	5.1 million	1.35 million	0.26
G. CWPPRA-proposed Lake Chapeau Project		10.10 million	1.12[c]
1) Pumping costs to Lake Chapeau	3.9 million	8.72 million[ab]	2.24[c]
2) Pumping costs from Sta 850 to 1340 to 102 ODMDS	5.1 million	1.35 million	0.26

** Cost estimates from COE, based on single contract at October 1996 price levels. EPA considers reasonable.

a Including 20% contingencies annually.

b A portion of total cost (unquantified) would be offset or reduced by the "beneficial use" of dredged material.

c Added value to coastal zone should close "cost gap" between beneficial use and ODMDS disposal options.

an alternative site in the shape of a square with center coordinates of approximately 28E49'00"N and 91E27'30"W was developed to have the same area as the proposed site (see Figure 2.3).

Depths in the area of the mid-shelf site are approximately 60 ft. The site would be approximately 32 miles from shore and somewhat closer and due west of Ship Shoal. The surrounding area in the vicinity of the proposed mid-shelf 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 midshelf area, being of greater depth, is less dynamic than the shallow-water area containing the proposed ODMDS. The disposed dredged material would be subjected to a slower rate of erosion and transport. As a result of the slower rate of transport, the layers of mixed site sediments and dredged material deposited outside the site boundaries could be thicker than those deposited at the proposed site.

The physical effects on the bottom organisms at the mid-shelf site would be different from those at the proposed ODMDS. Because the mid-shelf site would necessitate the use of barges to transport the dredged material, the material would undergo a certain amount of compaction and dewatering enroute to the site. Since the material dredged from the channel is mostly silt and clay, when the material is finally dumped at the site, it will probably be cohesive enough to settle to the bottom in clumps. This, combined with reduced wind-driven currents and storm effects at the 60-ft depth, would create a mound on top of the natural sediment at the site. Some organisms would be covered and smothered during the dumping operations. Others would 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 disposed material on an otherwise very flat sediment area could conceivably create new habitat for benthic organisms.

The estimated cost for transportation of 9 million cy of dredged material annually removed from the Atchafalaya River Bar Channel to be deposited at the mid-shelf ODMDS is $37,000,000 including 20% contingencies. Impacts of the mid-shelf site include the increased costs of dredged-material disposal and onsite monitoring efforts. Use of a cutter head pipeline dredge would not be feasible due to the distance, and hopper dredges or barges would be required. Surveillance and monitoring methods would be similar to those of the proposed 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. See Cost Comparison of ODMDS Alternatives in Table 2.1.

2.3.4 Deep-water Site

The deep-water region is the area seaward of the continental shelf edge. The edge of the continental shelf in this part of Louisiana is about the 360-ft depth contour. 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 and gas pipelines and structures are also located in the area.

A deep-water disposal site could be located off the continental shelf directly south of the proposed site, about 84 miles from the Atchafalaya River navigation channel.

Due to a breakup of the descending plume, disposed dredged material at the deep-water site should be dispersed over a much larger area than at a midshelf site or the proposed ODMDS site. Once the sediments reached bottom, they should tend to remain in place, subject to slow erosion and transport. The physical effects of deep-water disposal of dredged material on bottom organisms, phytoplankton, zooplankton, and nekton should be similar to those at the proposed ODMDS site or the mid-shelf alternative site. Some bottom organisms, phytoplankton, and zooplankton could be trapped and perish, and nekton could avoid the descending plume.

The increased travel distance would increase the costs, and the large number of oil and gas platforms in the area would increase the safety hazards associated with dredged material disposal. Operating in open-ocean waters for longer periods of time and navigating through oil and gas fields and their associated traffic increases the possibility of emergencies and/or dumping the dredged material before reaching the disposal site. Surveillance and monitoring would also be more difficult and costly. Surveillance could be carried out through reports, ship riders, shipboard "black boxes," and overflights. Monitoring would require special equipment because of the need to operate in the open ocean and deep water.

The estimated cost for transportation of 9 million cy of dredged material annually removed from the Atchafalaya River Bar Channel to be deposited at the deep-water ODMDS is $71,110,000 including 20% contingencies. This annual dredged material disposal cost is increased by the need to use hopper dredges or barges, as well as the long turn around time between loading and unloading of the barges. See Cost Comparison of ODMDS Alternatives in Table 2.1.

2.4 Non-Ocean Disposal Alternatives

Section 307 of the Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et. seq., requires that "each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with state approved management programs." Compliance with the Louisiana Coastal Resources Program Guideline 4.2, and Section 307, 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." Under provisions of the Louisiana Coastal Resources Program, for each dredging operation a Consistency Determination is made wherein consideration is given to the beneficial use of dredged material to the maximum extent practicable.

In 1991, the COE incorporated the northern end (about 200 acres) of the ODMDS into an area designated under Section 404 of the Clean Water Act for the placement of dredged material to create islands (about 360 acres) for colonial nesting birds. Since that time, approximately 750,000 cys of dredged material has been used annually at this beneficial use site (see Figure 2.2).

In 1996, dredged material from about Station 474+00 to Station 650+00 was placed to a height of 6 ft in a 6,000-ft by 2,600-ft area (i.e., 360 acres) east of the bar channel to construct a bird island. In previous years, only material from about Station 475+00 to Station 570+00 was used for island construction. However, hydrographic surveys have indicated that the hard-bottom extended beyond Station 570+00, and as a result, dredged material removed between Station 570+00 and Station 650+00 was also used for bird island creation.

Active nesting areas have been observed on these islands. To compensate for compaction and subsidence during the marsh creation process, the COE initially mounds the dredged material to a height of 4 ft. If there is sufficient material such that the 5 ft height restrictions of the disposal areas to the east of the bay channel are exceeded, then dredged material can be disposed farther to the east or west for additional wetland creation.

It is anticipated that the quantity of dredged material from the navigation channel will increase as the Atchafalaya Delta progrades or moves gulfward. As this occurs, the COE may add to the dredged material at the Section 404 site and include additional sites for beneficial uses.

2.4.1 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 considered as possible locations for beach nourishment (see Figure 2.4). Section 145 of P.L. 94-587 as amended reads as follows:

> The Secretary of the Army, acting through the Chief of Engineers, is authorized upon request of the State, to place on the beaches of such State beach quality sand which has been dredged in construction and maintaining navigation inlets and channels adjacent to such beaches, if the Secretary deems such action to be in the public interest and upon payment by such State of 50% of the increased cost thereof above the cost required for alternate methods of disposing of such sand.

Most of the dredged material removed between station 650+00 and station 1340+00 is a loosely consolidated fluid mud commonly referred to as "fluff." As such, this material is considered less suitable for unconfined point disposal. When hydraulically pumped, it would flow as a fluid and does not have a high sand component that is typically used for the classic beach nourishment projects. Even though the dredged material pumped onto the shoreline would not provide a classic sandy beach, the shoreline and adjacent marshes would be nourished, to some extent, by the fines contained in the fluff. As the fluff material was pumped onto the shoreline, the fines would eventually drop out of solution and provide a thin layer of fine material over the shoreline and adjacent marshes. The degree to which this type of disposal would benefit the shoreline and adjacent marshes is also limited due to the high energy environment characteristic of the gulf coastal shores.

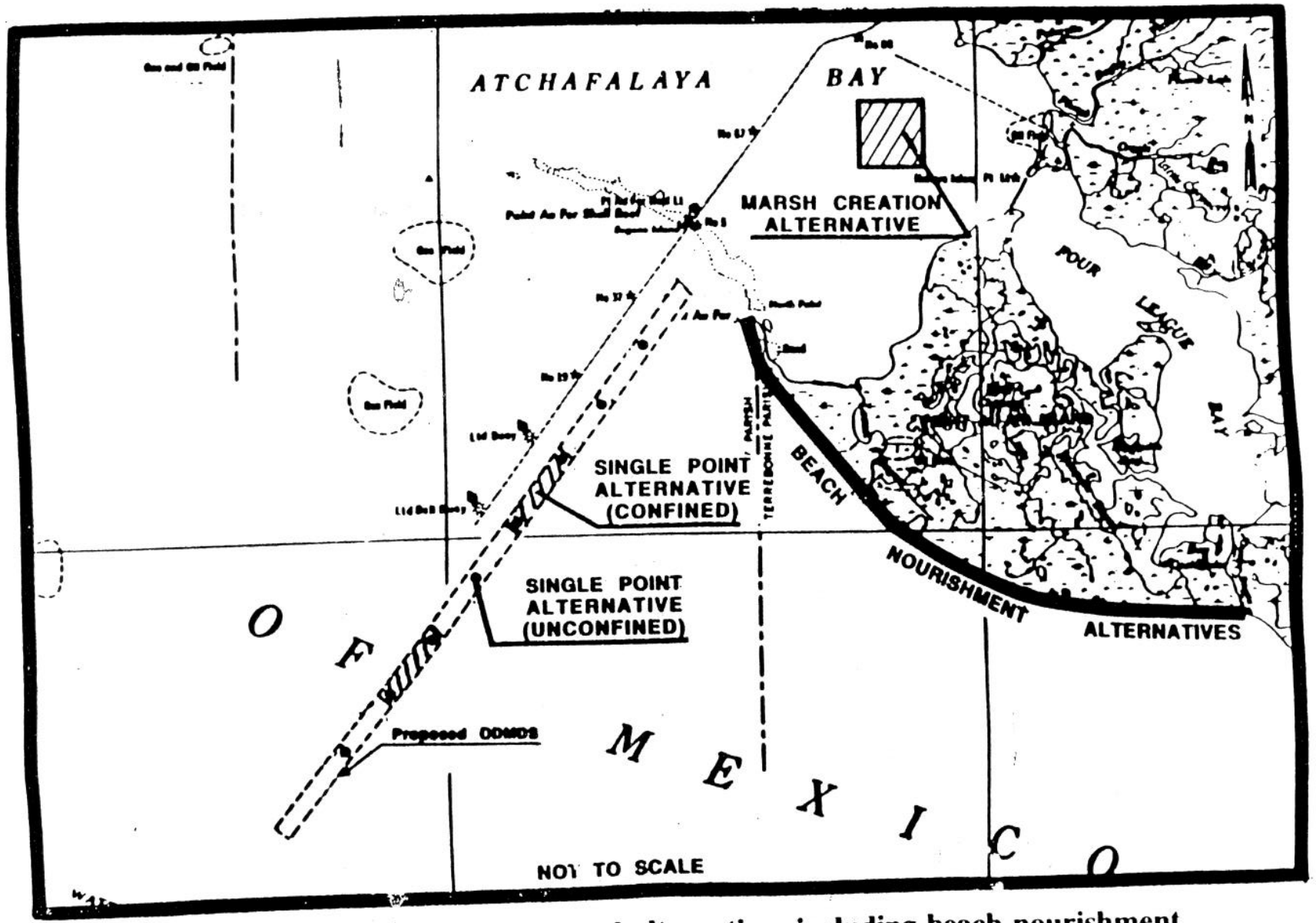


Figure 2.4. Locations of non-ocean disposal alternatives including beach nourishment, marsh creation, single point (unconfined) discharge, and single point (confined) discharge alternatives.

The shoreline, from North Point of Point au Fer Island to Oyster Bay, is approximately 2 and 20 miles, respectively, from the upper and lower ends of the proposed ODMDS. The estimated cost for transportation of 9 million cy of dredged material annually removed from the Atchafalaya River Bar Channel for the purpose of beach nourishment at this site would be approximately $14,420,000 including 20% contingencies. See Cost Comparison of ODMDS Alternatives in Table 2.1.

Recognizing the above cost and material constraints, the distance from the bar channel 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 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 bar channel.

2.4.2 Marsh Creation

Dredged material removed from the Atchafalaya River Bar Channel may also be used for marsh creation in the vicinity of the prograding Atchafalaya Delta (Figure 2.4). Pumping the dredged material from the bar channel to the proposed marsh creation site in the Atchafalaya Bay would require the use of at least two boosters. Also, the nature of the material dredged from the bar channel makes it less suitable for marsh creation. Although temporary mounding at the site would be expected, wave action and storm events in the unconfined, shallow water area would rapidly spread the material to a uniform level over the bay bottom.

The additional transportation distances from the Atchafalaya River Bar Channel to this suggested marsh creation area would be from 10 to 29 miles. The estimated annual costs for pumping 9 million cy of dredged material from the bar channel to unconfined marsh creation sites in Atchafalaya Bay, a distance in excess of 10 miles would be approximately $15,950,000 including 20% contingencies. See Cost Comparison of ODMDS Alternatives in Table 2.1.

2.4.3 Single Point (Unconfined) Discharge

Unconfined open-water disposal using single point discharge approximately every two miles along the entire length of the Atchafalaya River Bar Channel (total length along the proposed ODMDS is about 18.5 miles) was also considered (see Figure 2.4). The objective of such disposal would be the creation/establishment of islands for use by colonial nesting seabirds.

The estimated annual costs for pumping 9 million cy of dredged material from the bar channel to unconfined single point discharge points located approximately every two miles along the length of the Atchafalaya River Bar Channel (total length along the proposed ODMDS is about 18.5 miles) would be approximately $3,350,000 including 20% contingencies. See Cost Comparison of ODMDS Alternatives in Table 2.1.

As previously described, the dredged material removed from the Atchafalaya River Bar Channel between station 475+00 and station 650+00 has been deposited in the Section 404 site for bird islands. However, most of the dredged material removed from the bar channel (between station 650+00 and station 1340+00) is a loosely consolidated fluid mud that is less suitable for unconfined disposal.

2.4.4 Single Point (Confined) Discharge

Because of the poor characteristics of the dredged material removed from the bar channel, discharge into confined disposal sites located within the proposed ODMDS was also considered (see Figure 2.4). Each confined disposal site would be approximately 2-miles long by 1/2-mile wide. Dredged material removed from the northernmost half of the bar channel would be placed in a confined disposal site with center located at approximately 4 miles from the head of the proposed ODMDS. Dredged material removed from the southernmost half of the bar channel would be placed into a confined disposal site located approximately 12 miles from the northernmost head of the proposed ODMDS. Specific options include the following:

2.4.4.1 Confined disposal using native material for dikes - is a short-term option considering the amount of material needed and the time needed for compaction and dewatering.

2.4.4.2 Confined disposal using sediment fences - is a means of holding sediment, with appropriate materials (e.g., Christmas trees), long enough for dewatering and settlement.

2.4.4.3 Confined disposal using shell dikes - is 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.

2.4.4.4 Confined disposal using rock dikes - is 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.

2.4.4.5 Confined disposal using anchored geotextile tubes - is not tested but have other applications in holding sediment in shallow water situations.

2.4.4.6 Confined disposal using plastic sheet piling - has installation advantages over rock, and the cost of the material is more reasonable. An additional value of sheet piling is its reuse after the sediment has compacted.

The estimated average costs for construction of the above confined disposal sites (approximately 2 miles by 0.5 miles) is approximately $40,000,000. The estimated annual costs for pumping 9 million cy of dredged material from the bar channel into two confined disposal sites located adjacent to the Atchafalaya River Bar Channel is approximately $3,620,000, including 20% contingencies. See Cost Comparison of ODMDS Alternatives in Table 2.1.

Confinement of the material would eventually allow some of the material to settle out. However, an accurate estimate of the 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.

2.4.5 LDNR's Alternatives

2.4.5.1 One-Third/Two-Third Plan

The Louisiana Department of Natural Resources (LDNR) recommended that material dredged between station 475+00 and station 850+00 of the Atchafalaya River Bar Channel be disposed of in the upper one-third of the COE's Section 103 ODMDS. However, LDNR stipulated that before placement of dredged material into the Section 103 ODMDS, all attempts at beneficial use must first be exhausted by the COE (see Figure 2.5). The estimated cost for transportation of the 3.9 million cy of dredged material removed from the upper one-third of the bar channel for disposal into the adjacent COE Section 103 ODMDS is approximately $1,370,000 per year, including 20% contingencies.

This LDNR recommendation also included that material dredged between stations 850+00 and 1340+00 of the Atchafalaya River Bar Channel should be disposed of adjacent to this portion of the channel (essentially the lower two-thirds of EPA's proposed Section 102 ODMDS). The dividing point between the one-third/two-third plan would be located about 10 statute miles (near station 850+00, located at approximate coordinates 29E17'34"N, 91E27'17"W) from Fishing Point on Point au Fer Island. The northern corners of LDNR's recommended Section 102 ODMDS would lie near approximate coordinates 29E17'17"N, 91E26'50"W, and 29E17'00"N, 91E26'28"W. (See Figure 2.5). The estimated cost of disposing approximately 5,100,000 million cy of material dredged from the lower two-thirds of the bar channel (from station 850+00 to station 1340+00) is approximately $1,350,000, including 20% contingencies. See Cost Comparison of ODMDS Alternatives in Table 2.1.

2.4.5.2 Marsh Creation Northwest of Point au Fer Island

As noted above, LDNR proposed that before material dredged from the upper one-third of the bar channel (station 475+00 and station 850+00) could be disposed into the proposed Section 103 ODMDS, all beneficial use alternatives should be ruled out by the COE. One beneficial use option for the material dredged from the upper one-third of the bar channel is for it to be deposited into confined disposal sites located along the northwest portion of Point au Fer Island and adjacent reefs for the purpose of marsh creation (see figure 2.5). LDNR suggested that the confinement dikes for this marsh creation site be funded through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA).

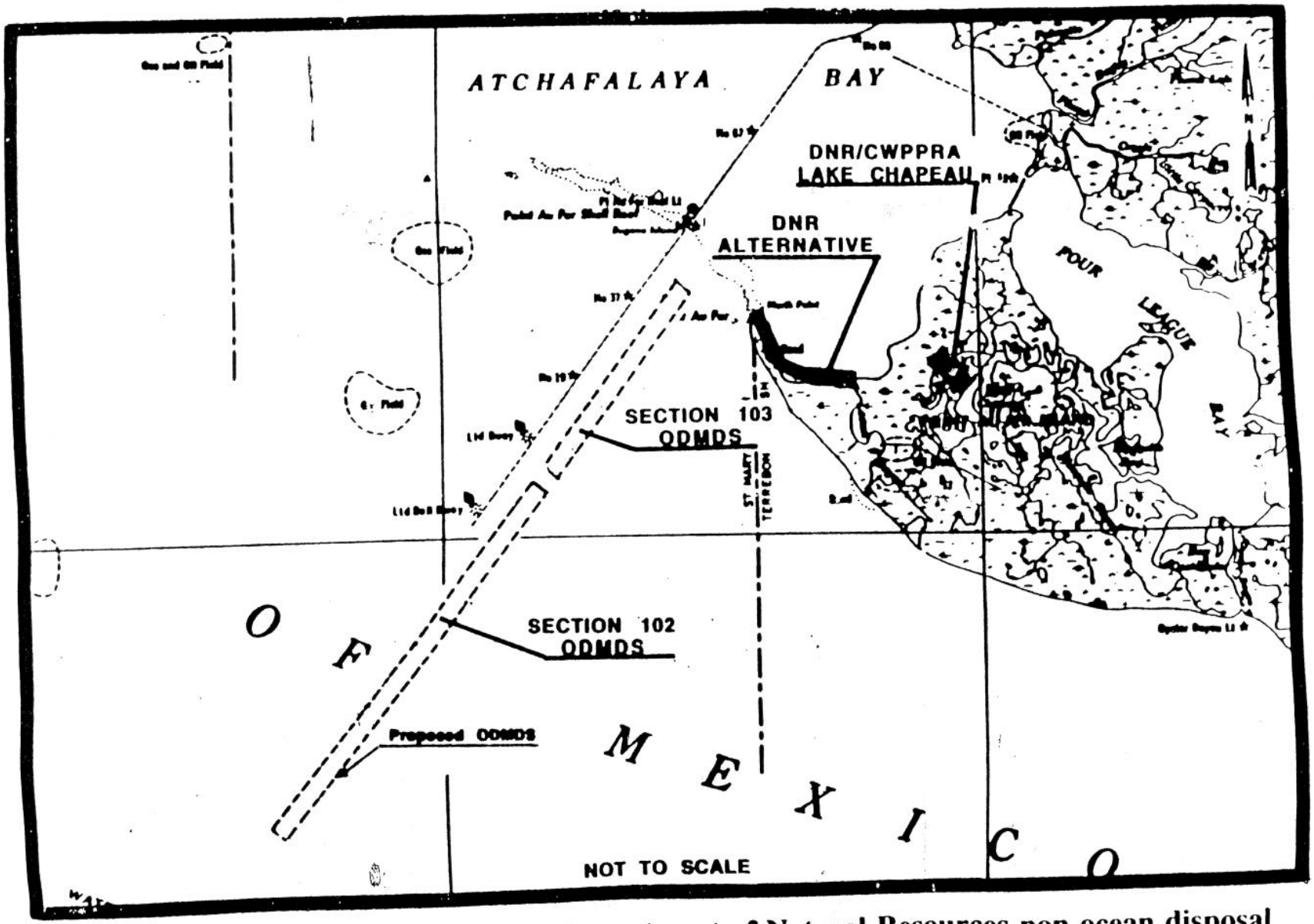


Figure 2.5. Locations of the Louisiana Department of Natural Resources non-ocean disposal multi-part alternative.

Under LDNR's conceptual plan, a 11,500-foot containment dike located in the Atchafalaya Bay would enclose approximately 141 acres of shallow open water area (approximately 3 ft deep). Approximately 3 million cy of dredged material removed from the upper one-third of the bar channel could be pumped into the marsh creation site. Dredged material would be pumped into the bay side of the disposal area to a height of about 3 ft near the containment dikes, and allowed to flow onto the adjacent shoreline and marshes.

Due to the nature of the dredged material, it should flow overland and provide some shoreline and marsh nourishment. The containment dike in the bay would provide some moderation to the high energy conditions characteristic of the gulf, which would primarily benefit the shoreline and adjacent marshes. The estimated cost of the CWPPRA-funded containment dikes would be approximately $5,400,000. Should the CWPPRA Task Force decide not to fund the construction of the containment dikes, the COE would then be responsible for this cost.

The estimated annual cost of transportation of approximately 3.9 million cy of dredged material removed from the upper one-third of the bar channel for marsh creation in the Atchafalaya Bay along the northwest shoreline of Point au Fer Island and adjacent reefs would be approximately $4,589,000 including 20% contingencies. Should the CWPPRA Task Force not provide funding for construction of the containment dikes, the total estimated cost to the COE for the first year would be approximately $9,989,000. See Cost Comparison of ODMDS Alternatives in Table 2.1.

2.4.5.3 CWPPRA-proposed Lake Chapeau Project

LDNR proposed that material dredged from the upper one-third of the bar channel be disposed of into the CWPPRA-proposed Lake Chapeau Sediment Input and Hydrologic Restoration, Point Au Fer Island project (PTE-23/26/A33). The Lake Chapeau project was described and evaluated in the 3rd Priority Project List Report (November, 1993).

The proposed Lake Chapeau project center is located at approximately 29E26'00"N, 91E15'00"W (see Figure 2.5). The proposal includes pumping the dredged material to a thickness of about 1 ft over an 1,800-acre area. The objective of the project is to restore the marshes west of Lake Chapeau, reestablish the hydrologic separation of the Locust Bayou and Alligator Bayou watersheds, and help reestablish the natural drainage patterns of the Lake Chapeau area. The dredged material removed from the upper one-third of the bar channel would flow overland. Existing vegetated marshlands would primarily benefit from the action by slowing down the disposal material thereby allowing the fine material to settle out, thereby contibuting to marsh nourishment and marsh creation.

The estimated annual cost of transportation of approximately 3.9 million cy of dredged material removed from the upper one-third of the bar channel for completion of the CWPPRA-proposed Lake Chapeau project on Point au Fer Island would be approximately $8,720,000 including 20% contingencies. See Cost Comparison of ODMDS Alternatives in Table 2.1.

2.4.5.4 Additional Beneficial Uses.

Additional beneficial uses for dredged material for beach nourishment, bird nesting/roosting, island creation, marsh creation, and others will be considered and evaluated prior to the actual use of the site (i.e., the COE's selected Section 103 site or EPA's proposed Section 102 site). The COE does not issue itself a disposal permit; however, the requirements that must be met before dredged material from a COE project can be discharged into the ODMDS are the same as when a permit is required. Prior to dredged-material disposal at an ocean site, the COE evaluates compliance with the Part 227 criteria of the Ocean Dumping Regulations, including Subpart C, the need for ocean dumping with EPA.

2.5 Summary of ODMDS and Non-Ocean Disposal Alternatives

In basic terms: 1) it is generally recognized that EPA's Section 102(c) designation does not authorize the use of the site, and each proposed annual dredging project requires an individual "consistency determination" concurrence from LDNR; 2) the farther away the ODMDS is located from the channel, the more costly the disposal alternative; and 3) many of the predicted environmental impacts on biological life are generally the same at all alternative disposal sites. These include the direct impacts of sediment that settles on the site in relationship to the dynamic nature of the area, erosion and transport, and the type and diversity of the organisms affected (e.g., some organisms adapt to typically turbid conditions). However, while direct impacts (i.e., economic and environmental) of dredged material disposal can be very similar, the indirect impacts in qualitative terms on the coastal zone (e.g., loss of productivity) of not using the material for beneficial uses (e.g., wetland restoration, enhancement or creation) can be very different depending on the site (see Matrix 2.1).

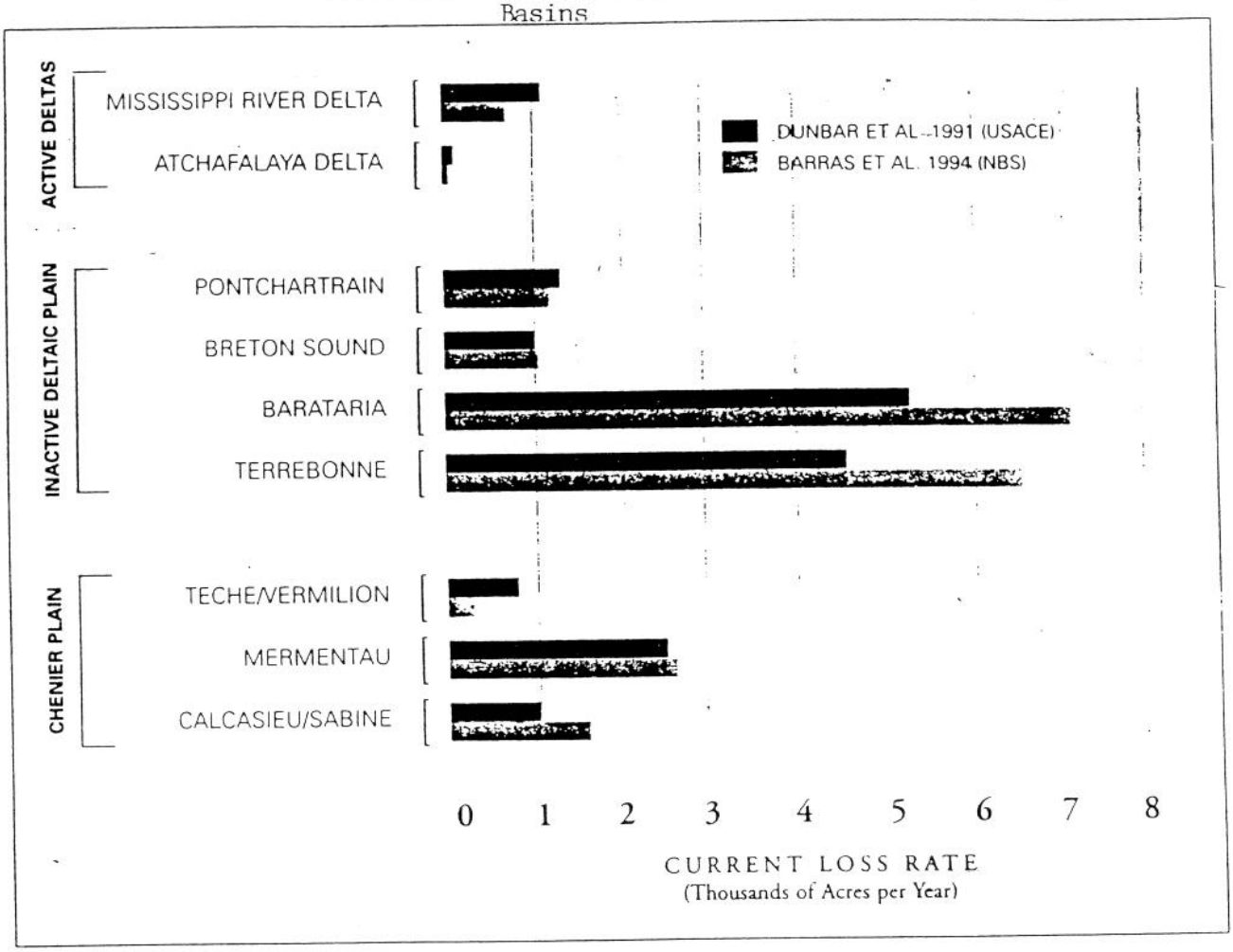
According to the Louisiana Coastal Wetlands Conservation and Restoration Task Force (1997), varying degrees of land loss occurred among the State's nine hydrologic basins from 1956 to 1990. The Atchafalaya Basin, one of Louisiana's two active deltas, had the lowest wetland loss of 0.1 square miles, or 64 acres per year. The Atchafalaya Basin also recorded areas of gain or net land area increase. In contrast, the largest wetland loss of 11.1 square miles, or 7,104 acres per year, occurred in the Barataria Basin. In addition to the Barataria Basin, the other major areas of loss occurred in the Mississippi River, Terrebonne, Mermentau, and Calcasieu-Sabine Basins (See Figure 2.6).

In an effort to offset Louisiana's wetland loss of between 25 and 35 square miles per year, LDNR plans and implements coastal restoration projects. Since 1991, most of these projects have been supported with funds (75% Federal and 25% State) under the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA). Through the CWPPRA planning process, six priority lists, with a total of 80 restoration projects, have been developed. Selection is based on multiple criteria, including anticipated wetland benefits, costs, and contributions toward the restoration needs of Louisiana's nine coastal hydrologic basins.

Matrix 2.1
Potential Impacts of Disposal Alternatives on Coastal Zone

Disposal Alternatives / Environmental Impacts		Alteration of Aquatic Habitats								Creates New Habitat
		Direct (Site) Loss				Indirect (Coastal Zone) Loss				
		Reduced Productivity	Elimination of Habitat	Reduced Nutrient Flow	Displacement of Species	Loss of Near shore Productivity	Loss to Biological Life of Area	Irreversible Commitment of Resources	Irretrievable Commitment of Resources	
ODMDS Site Designation	East Side Channel	X	X	X	X	X	X	X	X	
	West Side Channel	X	X	X	X	X	X	X	X	
	Shallow-Water Site	X	X	X	X					X
	Mid-Shelf Site	X	X	X	X	X	X	X	X	
	Deep-Water Site	X	X	X	X	X	X	X	X	
Beneficial Use of Dredged Material	Bird Islands	X	X	X	X					X
	Beach Nourishment	X	X	X	X					X
	Marsh Creation	X	X	X	X					X
	LDNR (1/3-2/3) Plan	X	X	X	X					X
	Point au Fer Island	X	X	X	X					X
	Lake Chapeau Project	X	X	X	X					X

Figure 2.6 Wetland Losses from Louisiana Hydrologic Basins



Source: LCWCRTF (1997)

Loss rates are based on the most recent time period of analysis (1983-90 and 1978-90 for USACE and NBS, respectively).

USACE values are exclusive of any wetland gains during that period.

One CWPPRA project (i.e., PTE-23/26A/33 - Lake Chapeau Marsh Creation) will help to restore and/or enhance wetlands in localized areas of need. This project utilizes Atchafalaya Bay bottom sediments to fill open water and broken marsh areas. Plugs will be installed to restore natural drainage pathways, allowing suspended sediments to settle, and thus restore and enhance a portion of these central marshes.

In summary, EPA recognizes the direct, indirect, and cumulative effects of ODMDS and non-ocean disposal alternatives, and supports the use of the dredged material beneficially to improve the long-term productivity of the coastal zone. The proposed Section 102 ODMDS is environmentally acceptable and needed for future disposal when more beneficial use options are not economically feasible. The EPA's final designation of the proposed ODMDS under authority of Section 102 of MPRSA will not prohibit the future consideration (e.g., through CWPPRA, et al.) and use of dredged material beneficially, with its indirect and cumulative benefits to the near shore region.

3.0 ENVIRONMENTAL SETTING

Environmental characteristics potentially affected by ocean disposal are generally categorized as geological, chemical, or biological; physical oceanography and meteorological processes influence the fate and effects of released dredged material. The following is a general description of the environmental setting and characteristics of the proposed project area.

3.1 Climate

The semi-tropical climate of the northern Gulf of Mexico and adjacent coastal areas is influenced by four factors: (1) the North American continental land mass, (2) the Azores-Bermuda high-pressure cell, (3) subtropical latitudes, and (4) warm Gulf waters (EPA 1984). The average monthly pressure reaches a minimum of 1,014 to 1,016 millibars from west to east over the northern Gulf during the summer, but attains a maximum of 1,021 millibars during the winter. The minimum average monthly pressure occurs during the summer when the equatorial trough shifts northward; however, the maximum pressure occurs during the winter as a result of the presence and influence of continental cold air (DOI, MMS 1988). Coastal Louisiana has an annual mean air temperature of 23 degrees C. July and August are the warmest months, with a mean temperature of 29 degrees C; January is the coldest month, with a mean temperature of 17 degrees C.

Dinnel and Wiseman (1986) estimate the (30-year mean) annual precipitation rate at 37 inches per year for the west Louisiana/Texas shelf. The greatest amount of rainfall with any single event is associated with tropical storms in August, September, and October (Brower *et al.* 1972).

Summer weather is dominated by a southerly flow of air. In winter, winds, influenced by frontal activity, generally blow from easterly directions with less of a southern and more of a northern component. Maximum wind speed is generally 23 mph; however, wind speeds, up to 203 mph have been measured during hurricanes (tropical cyclones) (Weissberg *et al.* 1980b).

Hurricanes and tropical storms typically enter the Gulf of Mexico from the southeast and turn to a northerly direction as the system approaches the Louisiana coast (Crutcher and Quayle 1974). Tropical storms occur most frequently between June and October, with peak frequency in the Louisiana coastal and offshore region in September. Weissberg *et al.* (1980b) estimate that a hurricane affects the Louisiana coastline about every 4 years.

3.2 Physical Oceanography

Because of the near shore location of the proposed ODMDS, wind, river flow, and tidal currents are the most influential of the flow-driving mechanisms. Peak discharge of the Atchafalaya River, a major distributary of the Mississippi River, occurs in May (10,522 m^3/s, or 371,532 ft^3/s) and lowest discharge occurs in September (2,500 m^3/s, or 88,275 ft^3/s). Along the central Gulf coast, tide ranges are small, typically less than 1.6 ft (Denes and Caffrey 1988), and

therefore tides have a small influence on flow. Net flow in the area of the proposed ODMDS is to the northwest most of the year (Weissberg *et al.* 1980a,b; Wells *et al.* 1981). Coastal winds are from the southeast at the beginning of the flood season. But as spring progresses, the winds along south Texas coast become favorable for upwelling and the local flow reverses and turns toward the north and east.

Waves in the northern Gulf are a combination of wind-generated waves and swell from the open Gulf. Wave direction generally follows wind direction and its seasonal patterns. Wind and wave direction are similar during 80% of the year (Wiseman *et al.* 1975, cited in Wells *et al.* 1981).

Current speeds generally range from 0.2 to 0.6 knots (kn) at the proposed ODMDS (Wells and Kemp 1982). Minimum speeds of 0.1 to 0.6 kn occur during June, July, and August, whereas the highest recorded current speeds in the vicinity of the proposed ODMDS range from 1.4 to 2.7 kn and occur during strong winter storms (Weissberg *et al.* 1980a,b). Current speeds of up to 3.9 kn may occur during hurricanes off Atchafalaya Bay.

3.3 Geology

The Atchafalaya River and Atchafalaya Bay lie roughly in the middle of two physiographic regions: (1) the chenier plain and (2) the deltaic plain (Kolb and Van Lopik 1958; Wells *et al.* 1981). 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 marshlands have expanded rapidly in Atchafalaya Bay (Roberts and van Heerden 1982). At this rate, by the end of the century, bay filling will be complete and the subaerial delta will be prograding onto the continental shelf (in the area of the proposed ODMDS). With mean circulation (and sediment transport) in an east to west direction, coastal progradation will occur in that direction (Roberts and van Heerden 1982).

The proposed ODMDS lies in 7 to 23 ft of water, extending from approximately the entrance to Atchafalaya Bay and sloping gently at about 0.01 degree to the southwest on the eastern side of the existing navigational channel. During the two IEC surveys (IEC 1983), surficial sediments in the proposed ODMDS were predominantly silt and clay (IEC 1983). Dettmann and Tracey (1991), and Flemer *et al.* (1994) found that channel sediments were also predominantly silts and clays at all stations sampled. Generally, the percentages of silts and clays varied along a depth gradient for both channel/disposal and reference stations. In the December 1980 and May-June 1981 IEC (1983) surveys, combined silt and clay content ranged from 82 to 100%, and sand content ranged from 1 to 18%. The clay fraction was slightly lower in December than in May-June, possibly due to resuspension of fine sediments during winter frontal activity. Sediment types were generally the same inside and outside the proposed ODMDS.

3.4 Water Column

Because of the proximity of the proposed ODMDS to the Atchafalaya River outlet, water column conditions are dependent upon the quantity and quality of water discharged from this outlet and the water quality of the near shore waters of the northern Gulf of Mexico.

3.4.1 Salinity. Flemer *et al.* (1994) found that salinities in the proposed ODMDS and reference areas varied with depth. Salinities ranged from 9.5 and 8.0 parts per thousand (ppt) near shore, 19.1 and 17.6 ppt at mid-depth, and 25.8 and 24.4 ppt at offshore disposal and reference stations, respectively.

3.4.2 Dissolved Oxygen. In summer, calm winds, freshwater discharge, and intrusions of shelf waters may cause density stratification of the water column. Restricted vertical mixing can result in oxygen-depleted bottom waters. Oxygen depletion or hypoxic conditions of bottom waters [operationally defined as <2 milligrams per liter (mg/L)] are seasonally dominant features of the Louisiana continental shelf adjacent to the deltas of the Mississippi and Atchafalaya Rivers (Rabalais *et al.* 1991, 1992, 1994, 1995). The most persistent zone of hypoxic bottom-water in U.S. coastal waters may cover 16,500 km^2 during mid-summer on the inner continental shelf from the Mississippi River to the upper Texas coast; with spatial configuration of the zone varying interannually (Rabalais *et al.* 1995).

Flemer *et al.* (1994) found DO concentrations ranged from 7.5 and 7.0 mg/L at near shore, 6.3 and 6.2 mg/L at middepth, and 6.3 mg/L at both offshore disposal and reference stations, respectively. These findings exceed the generally accepted <2 mg/L operational definition of hypoxic waters. Oxygen depletion is a seasonally dominant feature of the continental shelf of Louisiana. If the proper conditions exist, oxygen-depleted bottom water could occur in the area of the proposed ODMDS. However, these conditions would more probably exist further offshore of the proposed ODMDS. The shallow water and proximity of the proposed ODMDS to the discharge of the Atchafalaya River discharge probably prevent stagnation of the bottom waters long enough for oxygen-depleting conditions to develop. Also, Flemer *et al.* (1994) found pH values ranged from a high of 8.8 at near shore disposal site to 7.4 at both disposal and reference stations offshore.

3.4.3 Nutrients. The discharge of the Atchafalaya River has a significant impact on the concentration of specific nutrients in the coastal zone. Caffrey and Day (1986) investigated variations in nutrient concentrations in Fourleague Bay and Atchafalaya Bay during high spring discharge of the Atchafalaya River and frontal passage. The results illustrate how the physical factors of tides, winds, and river discharge interact to control nutrient concentrations. The Atchafalaya River discharge produced high suspended solids, nitrate, total phosphorus and total Kjeldahl nitrogen concentrations. Nitrate, total phosphorus, and suspended solids concentrations were all correlated and were found to be negatively correlated to the tide. Total Kjeldahl nitrogen was correlated with wind stress. Ammonia was produced in the coastal waters and sediments (Teague *et al.* 1988) not coming from the Atchafalaya River discharge.

3.4.5 Turbidity and Suspended Solids. Turbidity in coastal Louisiana waters is influenced by resuspension of surficial sediments and runoff from the Atchafalaya and Mississippi Rivers. Discharge plumes from the Atchafalaya River have been detected as far as 18 miles offshore. Wells *et al.* (1981), Adams *et al.* (1982), and Wells and Kemp (1982) have described (using LANDSAT imagery) and measured the well-defined mud stream of turbid waters exiting the Atchafalaya River and entering the Gulf. Within Atchafalaya Bay, suspended sediment concentrations ranged from 250 to 400 mg/L, but increased to more than 800 mg/L seaward of the Point au Fer Shell Reef. The increase in concentration may have resulted from wave resuspension of soft sediments deposited rapidly as prodelta clays or during calm weather periods. The concentrations of suspended sediments in the turbid zone decreased across the shelf to the plume edge approximately 16 to 17 miles offshore. Outside the plume, typical shelf suspended sediment concentrations are 1 mg/L or less.

IEC surveys measured high turbidity within and around the proposed ODMDS; values ranged from 7 to 55 nephelometric turbidity units (NTUs) in late spring and from 14 to 34 NTUs in winter (IEC 1983). A wide range (10 to 102 mg/L) of total suspended solids was measured during stormy December weather at the ODMDS. A smaller, less variable range (23 to 60 mg/L), with a generally decreasing offshore trend, occurred during the May - June survey.

3.4.6 Trace Metals. Distributions and concentrations of trace metals in the Gulf are variable and related to land runoff, biological activity, anthropogenic inputs, and physical processes (Frey *et al.* 1981; Trefry 1981; Phillips and James 1988). The major source of dissolved and particulate trace metals to the Gulf is discharge from the Mississippi and Atchafalaya Rivers and, to a lesser extent, from coastal embayments.

With noted exceptions, the EPA-ERLN survey (Dettmann and Tracey 1991) found trace metal concentrations in waters from the Atchafalaya River Bar Channel and a comparable reference station were below detection limits. Concentrations of barium, iron, and manganese from the channel sample were somewhat greater than reference site concentrations. However, there are no EPA marine acute or chronic criteria for these elements. The copper concentration detected at the reference site exceeded EPA's acute criteria; the copper concentration at the channel site was less than the detection limit. The presence of some heavy metals in the waters does not indicate these materials are necessarily toxic to the water column and benthic organisms. These constituents are typically bound to the surfaces of sediment particles and are not easily separated from the particles under conditions found in the environment.

3.4.7 Organic Compounds. The EPA-ERLN survey (Dettmann and Tracey 1991) of water samples for selected organic volatiles and semivolatiles, pesticides, and PCBs were below detection limits for both the mid-channel or comparable reference station. Hence, concentrations were less than ranges reported in the literature for the region.

3.5 Sediment Chemistry

A variety of contaminants, such as trace metals, petroleum hydrocarbons, CHCs, arid organic materials, can accumulate in marine sediments. Elevated concentrations of marine sediment contaminants generally result from anthropogenic inputs such as municipal and industrial waste, urban and agricultural runoff, atmospheric fallout from urban centers, and accidental spillage. Silty and clayey sediments have a greater absorptive capacity for trace contaminants, and typically have higher total organic carbon (TOC) levels than coarser material because of their large ratio of surface area to volume and charge density.

In the following discussion, unless otherwise noted, parameter concentrations are given in relation to the dry weight of the sample.

3.5.1 Hydrocarbons. The EPA-ERLN survey (Dettmann and Tracey 1991) found that the percent carbonate, percent total carbon, and percent organic carbon for mid-channel station (0.20, 2.52, 2.32, respectively) was similar to the reference station (0.22, 1.33, 1.11, respectively). The EPA-ERLN survey (Dettmann and Tracey 1991) of water samples for selected organic volatiles and semivolatiles, pesticides, and PCBs were below detection limits for both the mid-channel or comparable reference station. Hence, concentrations were less than ranges reported in the literature for the region.

3.5.2 Trace Metals. Discharge from the Mississippi and Atchafalaya Rivers is the primary source of trace metals to sediments in the northern Gulf (Tillery 1980). Mean concentrations and ranges of trace metals measured in surficial sediments at the proposed ODMDS (IEC 1983; Flemer *et al.* 1994) and in the Atchafalaya River Bar Channel sediments (Dettmann and Tracey 1991) are compared in table 4.2 (see Section 4.1.7.1 Sediment Characteristics). Concentrations of trace metals generally exhibited little variation over the survey area.

3.6 Biology

The biological characteristics of an ODMDS are important because resident biota may be affected by disposal of dredged material. This section includes information about phytoplankton, zooplankton, finfish and shellfish, benthos, marine mammals, marine birds, and endangered and threatened species.

3.6.1 Phytoplankton and Zooplankton. Within coastal Louisiana waters, diatoms typically constitute 70% to 100% of the phytoplankton standing crop; dinoflagellates and blue green algae contribute small and seasonally variable numbers to the assemblage. Phytoplankton biomass undergoes large spatial and temporal fluctuations. The average density of phytoplankton in near shore waters is 1.1 billion cells/m^3. (Hulbert and Corwin 1972). Zooplankton communities are dominated by copepods; zooplankton densities generally decrease with increased distance from shore (DOE 1978; Comiskey and Farmer 1981).

3.6.2 Finfish and Shellfish. Faunal studies indicate that an abundant and varied community exists both within the proposed ODMDS and adjacent to the site (Darnell *et al.* 1983; Jennings 1985; Lassuy 1983; Perry and McIlwain 1986; Reagan 1985; Sutter and McIlwain 1987; and Sutter *et al.* 1986a,b). Darnell *et al.* (1983) list 52 species as being abundant resident fauna of the continental shelf. More than 42 species of shellfish inhabit Louisiana coastal waters.

A survey of the macrofaunal distribution and abundance for reference and disposal sites by Flemer *et al.* (1994) found 38 and 40 taxa of which sites shared 29 taxa in common. Taxa collected in this study correspond closely to those identified in other near-coastal and estuarine waters of the northern Gulf of Mexico (Gaston and Weston 1983; Gaston and Nasci 1988; Giammona and Darnell 1990; Gaston and Edds 1994). Wright *et al.* (1978) reported similar dominant taxa present at stations in 10 to 15 m waters at a dredged material disposal site in the Gulf of Mexico offshore of Galveston Bay, Texas. Variability in average abundance within sites was often as large as that between sites. Differences in average taxa richness do not show a consistent association between reference and disposal sites.

Waters off central and western Louisiana shoreward of the 36-m (120-ft) isobath are one of the most heavily fished areas in the world (Kutkuhn 1966; DOC, NOAA 1982; Pechman *et al.* 1985; DOC, NMFS 1989). Louisiana provides approximately 78% (approximately 1.9 billion pounds) of the total catch of finfish and shellfish in the Gulf of Mexico by weight and approximately 40% ($263 million) by value (Pechman *et al.* 1985). Central Louisiana (which includes the Atchafalaya area) contributes approximately 50% to these Louisiana totals (DOC, NMFS, 1980). Important species in waters off central Louisiana include: white shrimp (*Penaeus setiferus*), brown shrimp (*Penaeus aztecus*), gulf menhaden (*Brevoortia patronus*), red drum (*Sciaenops ocellatus*), black drum (*Pogonias crosis*), spotted seatrout (*Cynoscion nebulosus*), sand seatrout (*Cynoscion arenarius*), sheepshead (*Archosargus probatocephalus*), blue crab (*Callinectes sapidus*) and oyster (*Crassostrea virgica*).

Large volumes of industrial or commercial fish are harvested from shelf waters off Louisiana and processed for fish protein concentrate, pet food, and fertilizer (Moore *et al.* 1970; Dunham 1972). Approximately 110 million pounds of "groundfish" are landed annually for this purpose. In addition, an estimated 661 million pounds are harvested and discarded as by-catch by commercial shrimpers (Sutter and McIlwain 1987). The principal components of this fishery are Atlantic croaker (*Micropogonias undulatus*), longspine porgy (*Stenotomus caprimus*), sand seatrout (*Cynoscion arenarius*), and hardhead catfish (*Arius felis*). The greatest catches are made during the winter and summer, in depths of 23 to 131 ft (Moore *et al.* 1970).

Within Atchafalaya Bay, oyster reefs have become stressed with fresh water and sediment. During periods of low river flow (every few years), salinities in the bay can become elevated to the point at which oyster growth is optimal. When this happens, scattered oyster beds build. These areas, however, may be eliminated by freshwater flow in subsequent years. Louisiana has the largest shell fishery for oysters in the Gulf of Mexico; annual landings are about 9 million pounds (Stanley and Sellers 1986).

3.6.3 Benthos. Studies of macrofaunal assemblages near the proposed ODMDS (Parker *et al.* 1980; Weissberg *et al.* 1980a,b), as well as stations sampled during the IEC (1983) surveys of the proposed ODMDS, found the same general macrofaunal assemblages. Communities were dominated by annual species, the majority of which were polychaete worms (particularly *Mediomastus* spp., *Aglaophamus* spp., *Paraprionospio pinnata*, *Magelona* spp., and *Owenia* sp.), small molluscs (*Mulinia lateralis* and *Nassarius* sp.), and macrocrustaceans (shrimp and crab). The macrofaunal organisms consist mainly of deposit and suspension feeders; however, omnivores and carnivores are also well represented (Parker *et al.* 1980). The dominant organisms are small-bodied, opportunistic species capable of rapid colonization of disturbed sediments. Other common members of this assemblage were the carnivorous rhynchocoels (*Cerebratulus* cf. *lacteus* and other unidentified rhynchocoels) and the snail *Nassarius acutus*. Most of these species complete their life cycle in one year or less.

Recruitment occurs during late autumn, winter, and early spring, allowing the larvae of polychaetes and molluscs to settle before the onset of stressful summer conditions which may be associated with low concentrations of dissolved oxygen and high temperatures in bottom waters (Parker *et al.* 1980; Rabalais 1988). Population densities generally peak in late spring and early summer, and later decline to the winter minimum (Parker *et al.* 1980; Weissberg *et al.* 1980a,b).

Soft sediment benthic macrofaunal communities often show a large temporal variability (Gaston and Weston 1983) which contributes to high spatial variability. Flemer *et al.* (1994) provide a cogent discussion of ecosystem dynamics and the illusion of ecosystem recovery. Their comments point out that many dimensions remain unaddressed by simple empirical comparisons of a few structural indicators of community change which is typical of ecological "impact" assessment. Hence, the apparent recovery or movement of a disturbed system (such as a disposal site), towards the reference or pre-disturbed state may be an illusion because the systems may be moving in opposite directions or are masked due to background variation.

3.6.4 Marine Mammals. The diversity of marine mammals is typically lower in near shore regions than in the adjacent offshore regions of the northern Gulf (Bahr and Hebrard 1976). Fritts *et al.* (1983) found that the Louisiana coastal area off Marsh Island, 23 miles to the west of the proposed ODMDS, contained the lowest diversity of marine mammals of any area surveyed in the Gulf. The most abundant marine mammal is the Atlantic bottlenose dolphin (*Tursiops truncatus*), accounting for 79% of the marine mammal sightings made by Fritts *et al.* (1983) off Louisiana. In observations by these authors, the sperm whale (*Physeter catodon*), short-finned pilot whale (*Globicephala melas*), spotted dolphin (*Stenella frontalis*), striped dolphin (*Stenella coeruleoalba*), and unidentified *Stenella* species accounted for 5% of the sightings, and the remaining 16% were unidentified dolphin species.

3.6.5 Marine Birds. Beaches and wetlands of the north-central Gulf are populated by many migrant and nonmigrant species of coastal and marine birds. Species may be categorized into four groups: waterfowl, wading birds, shorebirds, and seabirds. Waterfowl consist mainly of ducks and geese. Most of the waterfowl in the northern Gulf are overwintering migrants, with numbers peaking in November and December. Brackish and freshwater marshes are the major waterfowl

habitats, supporting 4 to 7 million migratory waterfowl per season (DOI, MMS, 1989). DOI, U.S. Fish and Wildlife Service have located waterfowl concentrations in the coastal areas around the Atchafalaya River Delta (USFW 1981).

Very few wading birds are seen offshore in the Gulf. The most abundant species are the tricolored heron (*Egretta tricolor*), snowy egret (*Egretta thula*), and cattle egret (*Bubulcus ibis*). According to the USFW (1981), wading bird colonies are located primarily in the area of the Atchafalaya River Delta.

Shorebirds consist of species within the taxa Lari to Limnicolae (including phalaropes, jaegers, gulls, terns, and skimmers) and some species within the taxa Pelecaniformes (in particular, pelicans and cormorants). Gulls and terns accounted for 96% of the birds sighted by Fritts *et al.* (1983) off Marsh Island, Louisiana. The most abundant species were the laughing gull (*Larus atricilla*), herring gull (*Larus argentatus*), royal tern (*Sterna maxima*), and ring-billed gull (*Larus delawarensis*), which accounted for 42% of the shorebirds sighted. Unidentified gulls and terns accounted for 50% of the shorebirds sighted. One bridled tern (*Sterna anaethetus*) individual was sighted. Phalaropes (*Phalaropus* spp.), jaegers (*Stercorarius* spp.), and black skimmers (*Rynchops niger*) were sighted in low numbers (<1% of shorebirds sighted). The american white pelican (*Pelecanus erthrorhynchos*) and double-crested cormorant (*Phalacrocorax auritus*) accounted for about 3% of the sightings. Only one brown pelican (*Pelecanus occidentalis*) was sighted, indicating that the population of this species is still low. Since 1968, brown pelicans have not bred in Louisiana (Lowery, 1974; Fritts *et al.* 1983). Least terns (*Sterna antillarum*) have been identified as nesting on Point au Fer Island (USFW 1981).

Seabirds likely to be found in the proposed project area include the taxa Procellariidae: shearwaters, petrels, and storm-petrels) and some species in the taxa Pelecaniformes: gannets, boobies, tropicbirds, and frigatebirds (Lowery 1974; Fritts *et al.*, 1983).

Martin and Lester (1990) conducted aerial surveys of known wading bird and seabird nesting colonies in the vicinity of the proposed ODMDS (Point au Fer and the general vicinity of the Atchafalaya Bay channel segment) in late April to July 1990. Ten of the 13 colony sites surveyed were active; a total of 13 different species were found actively nesting. The white ibis (*Eudocimus albus*) was the most abundant nesting species, accounting for 52% of the nesting birds surveyed.

3.6.6 Federally Listed Endangered and Threatened Species. According to the National Marine Fisheries Services (NMFS), five endangered whale species including the sei (*Balaenoptera borealis*), finback (*Balaenoptera physalus*), humpback (*Megaptera novaeangliae*), right (*Eubalaena glacialis*) and sperm whale (*Physeter macrocephalus*) might be present in offshore Louisiana waters. During aerial surveys conducted May 1980 - April 1981 in the region south of Marsh Island, Louisiana, there was only one sighting of endangered whales (Fritts *et al.* 1983). The sighting was of a pod of four sperm whales 142 miles south of Marsh Island. Other endangered whale species have been previously sighted off Louisiana, but they are typically found in water greater than 3,300 ft deep (Schmidly 1981; Fritts *et al.* 1983).

According to the NMFS, three species of turtle classified as endangered (the hawksbill (*Ertmochelys imbricata*), Kemp's ridley (*Lepidochelys kempi*), and leatherback (*Dermochelys coriacea*)); and two species of turtle classified as threatened (the green (*Chelonia mydas*) and loggerhead (*Caretta caretta*)) may occur in the proposed project area (Department of Commerce, NMFS 1989; Colleen Coogan 1995). Any of the turtles could potentially inhabit the general vicinity of the proposed ODMDS (NMFS and USFW 1991a,b; NMFS and USFW 1992; NMFS and USFW 1993; USFW and NMFS 1992).

3.7 Cultural Resources

The coastal area of Louisiana has been an important navigation route since prehistoric times. Archeological evidence of prehistoric vessels (e.g., canoes and rafts) used in the Gulf of Mexico and coastal rivers and bayous to exploit marine resources have been documented at several sites throughout Louisiana (Davis 1984; Neuman 1984). 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 a 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 Pearson *et al.* (1989). This study documents 52 shipwrecks located in the Atchafalaya River, and 7 shipwrecks located in the Atchafalaya Bay. Pearson *et al.* (1989) documents 42 shipwrecks located throughout Gulf coastal waters of Louisiana.

Review of the literature for the Atchafalaya Basin indicates a high probability for the occurrence of historically important shipwrecks in the proposed ODMDS. Due to the proximity of the proposed ODMDS to the Atchafalaya River navigation channel, shipwrecks are the cultural resource which have the greatest potential for negative impacts from dredging and disposal operations at the proposed ODMDS. Shipwrecks are most likely to be found near the Point Au Fer Shell Reef and at the mouth of the Atchafalaya River. Hence, the northernmost portion of the proposed ODMDS, located near the Point Au Fer Shell Reef, would have the greatest potential to contain submerged cultural resources. Under contract to the COE, R. Christopher Goodwin and Associates are conducting a submerged cultural resource survey of the proposed ODMDS. Results for the survey will be coordinated with the Louisiana State Historic Preservation Officer.

3.8 Recreation

Coastal regions off Louisiana are extensively used for recreational activities, including fishing, swimming, pleasure boating, beach combing, and diving. In addition, camping, picnicking, and hunting occur along the shoreline. Because the proposed ODMDS is close to shore, some recreational activities (boating, fishing, and diving) may occur within or near the site. Beach combing, swimming, camping, and hunting are restricted to the immediate shoreline.

3.9 Navigation

The dredged channel of the Atchafalaya River is used for navigation; dredging is necessary to maintain the navigation channel in a usable condition. The volume of trade carried through the

Atchafalaya River channel (that section from Morgan City, Louisiana to the 20-foot contour in the Gulf of Mexico) has decreased from approximately 9.9 million tons in 1985 to 7.3 million tons in 1986 (COE 1994).

A preliminary assessment, dated July 3, 1996, and titled "Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, Dredged Material Management Plan, Preliminary Assessment, Summary of Findings and Recommendations" was prepared by the Planning Division of the New Orleans District, COE. The findings of this preliminary assessment indicate that continued maintenance of the subject project to its current authorized dimensions of 20 by 400 feet may not be warranted, based upon economic productivity, and available disposal capacity. The economic parameters compiled for this preliminary assessment indicated that the number of vessels currently operating over the waterway are far below that assumed to justify the construction and subsequent maintenance of the project to its authorized dimensions. It was concluded that maintaining a 20-by 400-foot channel may not be warranted and that further studies will be required to substantiate the level of traffic movements, the number of offshore wells being drilled in the project area, and the associate benefits of the project. The preliminary assessment further indicated additional work is required to establish a management plan and that final recommendations would be based on detailed studies.

3.10 Oil and Gas

Extensive oil and gas development occurs within the Atchafalaya River Delta and the proposed ODMDS area. Within three areas off Atchafalaya Bay (i.e., South Marsh Island, Eugene Island, and Ship Shoal), 26.9% of Louisiana's oil and gas fields occur (Offshore 1982). The proposed ODMDS is located within State blocks (i.e., Eugene Island 16, 34, and 35) and Federal Outer Continental Shelf blocks (i.e., Eugene Island 39, 40, 55, 56, 62, and 63). Block 63 has three individual structures and a complex of three more, with one producing platform existing within the proposed ODMDS. Block 39 has a single structure and a two-structure complex; Block 56, a single structure; and Block 62, a two-structure complex. None of the structures in Blocks 39, 56, or 62 are located within the proposed ODMDS. Several gas lines cross the proposed ODMDS, including a 20-in.United Gas line; a 22-in.Trunkline Gas line; and 10-in., 20-in., and 30-in. Michigan Wisconsin Gas lines. Several smaller gathering lines connecting wells and platforms also exist near the proposed ODMDS, especially in Blocks 62 and 63.

3.11 Marine Sanctuaries

No marine sanctuaries occur within the immediate vicinity of the proposed ODMDS. The Atchafalaya River Delta State Wildlife Management Area is located approximately 12 miles north of the proposed ODMDS. The Russell Sage Foundation Marsh Island Wildlife Refuge (which includes Marsh Island and the Shell Keys National Wildlife Refuge) is located approximately 22 miles to the west of the site (USFW 1981). Fishnet Bank, the closest protected Area of Biological Significance, is approximately 99 miles south of the proposed ODMDS.

4.0 ENVIRONMENTAL CONSEQUENCES

Criteria of Part 228 of the Ocean Dumping Regulations (40 CFR Parts 220 to 229) deal with the evaluation of the proposed dumping of material in ocean waters in relation to continuing management of ocean disposal sites to prevent unreasonable degradation of the marine environment from all wastes being dumped into the ocean. As specified in 40 CFR 228.4, all studies for the evaluation and potential selection of dredged material disposal sites will be conducted in accordance with the appropriate requirements specified in 40 CFR 228.5 of the general criteria, and 40 CFR 228.6(a) of specific criteria, for site selection.

The following evaluation of the environmental consequences of selecting and utilizing the proposed ODMDS is based on the five general [40 CFR 228.5] and the eleven specific criteria [40 CFR 228.6(a)] as required by the MPRSA. These criteria identify factors considered when evaluating an ODMDS to prevent unreasonable degradation of the marine environment.

4.1 Eleven Specific Criteria for the Selection of Sites [40 CFR 228.6(a)]

4.1.1 Geographical position, depth of water, bottom topography, and distance from coast [40 CFR 228.6(a)(1)].

The proposed Atchafalaya River Bar Channel ODMDS is located east of and parallel to the Atchafalaya River bar channel and is approximately 18.5 miles long (see Figure 1.1). Boundary coordinates of the proposed ODMDS site are 29E20'59.92"N, 91E 23' 33.23"W; 29E20'43.94"N, 91E23'09.73"W; 29E08'15.46"N, 91E34'51.02"W; and 29E07'59.43"N, 91E34'27.51"W. The average depth of the site is approximately 16 ft and the total area is approximately 9.2 square miles. The center of the ODMDS is approximately 16 miles from the mouth of the Atchafalaya River. North Point of Point au Fer Island is about 2 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 (see Figure 1.2).

The continental shelf is approximately 93 miles wide off the Atchafalaya Basin. It is a gently sloping submarine plain with many isolated sea knolls and seamounts (Phillip and James 1988; BLM 1987; Weissberg *et al.* 1980a,b). The Atchafalaya River Bar Channel ODMDS is located in the near shore area (i.e., to a depth of about 75 ft) of the plain. The ODMDS gently slopes from a depth of about 5 ft at its near shore end to about 22 ft at its seaward end. Except for being located adjacent to the dredged channel, the area occupied by the ODMDS is typical in depth and bottom topography to the overall Atchafalaya River area.

4.1.2 Location in relation to breeding, spawning, nursery, feeding, or passage areas of living resources in adult or juvenile phases [40 CFR 228.6(a)(2)].

The northwestern Gulf of Mexico is a breeding, spawning, nursery, and feeding area for shrimp, menhaden, and bottomfish. To complete their life cycles, many of the species migrate

seasonally between the coastal estuaries and the Gulf. Because the timing varies by species, some migration can occur at almost any time of the year (Day *et al.* 1989).

The proposed ODMDS is located in a region dominated by species that are estuary-related (Darnell *et al.* 1983; Phillips and James 1988; Day *et al.* 1989). This group of organisms is generally most abundant off Louisiana, but extends from the Mississippi River Delta to south of Brownsville, Texas. Off Louisiana, this group accounts for most of the region's commercially important shrimp and fish. Estuary-related species provided by Darnell *et al.* (1983) (see also Lassuy 1983; Jennings 1985; Reagan 1985; Perry and McIlwain 1986; Sutter and McIlwain 1987) include three species of shrimp and 33 species of fish: those that are commercially important to Louisiana include white shrimp, brown shrimp, Gulf menhaden, and sand seatrout. Commercially important shellfish and finfish that inhabit the nearby bay environment include oyster, blue crab, black drum, red drum, and spotted seatrout. The sheepshead (Jennings 1985) and sand seatrout Sutter and McIlwain 1987) are also commercially important and recreationally important fishery species which also utilize the area during some portion of their life cycle. Juneau (1977) reports that when the brown and white shrimp landings were poor, fishermen turn to seabobs to provide an important supplement during times of economic stress.

White shrimp and brown shrimp compose the bulk of the shrimp fishery in the northern Gulf of Mexico. The penaeid shrimp use the many productive Louisiana estuaries, including Atchafalaya Bay, as nursery areas during the larval and juvenile stages. Adult penaeid shrimp spawn in near shore waters, producing many microscopic, semibuoyant eggs. White shrimp spawn from May to September, whereas the spawning period of brown shrimp appears to extend throughout the year, with peaks in spring and fall (DOE 1981). Within several hours, the eggs hatch into planktonic nauplii. The nauplii develop rapidly through a series of larval stages and are transported landward toward estuaries. Three to 5 weeks generally elapse between hatching and entry of the postlarval shrimp into brackish estuaries (Kutkuhn 1966). Once in the estuaries, the postlarvae rapidly metamorphose into juvenile shrimp, grow quickly, and reach commercial size in 2 to 4 months. The adult shrimp then leave the estuaries and return to the Gulf (Kutkuhn 1966). The major offshore movement of white shrimp occurs in the late summer and autumn (DOE 1981). Brown shrimp begin their return to the Gulf in late May to early June; their migration continues at least until August, when offshore populations peak (Barrett and Gillespie 1973; DOE 1981).

The proposed ODMDS represents a comparatively small area (9.14 mi^2) of the total range of the white and brown shrimp and their related communities; however, the nearby Atchafalaya River estuarine area is one of the region's major nursery areas. Point au Fer Shell Reef is shown on most nautical charts as a barrier between the open Gulf of Mexico and the Atchafalaya River estuarine area. Even though nautical charts show only a few passages through Point au Fer Shell Reef, the shell dredging in this area has been so extensive that the reef is no longer considered a barrier to these migrating species (Hoogland 1983).

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

would be unavailable to migrating shrimp (as well as some other migrating marine organisms) during periods of active dredging and disposal. Also, the settling dredged material and the sediment plume in and near the ODMDS would impede the movement/migration of shrimp (and other marine organisms) between the Gulf and Atchafalaya Bay. However, the effect of these impediments on the movement/migration of the overall shrimp populations (or other migrating marine organism's populations) would probably be small. The stress and possible mortality of individual organisms encountering adverse conditions during dredged material disposal in the ODMDS would be negligible compared to the passage of the far greater majority of individuals crossing in to or out of the estuary at other locations.

Limited interferences with near shore fisheries may occur during disposal of 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 would be unavailable for movement/migration of some marine organisms (e.g., shrimp) during periods of active dredging and disposal. Also, the settling disposal material and the sediment plume in and near the ODMDS would impede the movement/migration of some marine organisms (e.g., shrimp) between the Gulf and Atchafalaya Bay. However, the effect of these impediments on the movement/migration of marine organism populations affected, would be very small and probably undetectable. The stress on, and possible mortality of, individual organisms during dredging and disposal operations in the ODMDS should also be very small.

Disposal of material at the proposed ODMDS would have negligible effects on endangered and threatened species. The National Marine Fisheries Service (NMFS 1989; Colleen Coogan 1995, personal communication, NMFS) provide a list of endangered whale species which may be found in the vicinity of the proposed ODMDS: sei, fin, humpback, right, and sperm. Occurrences of whales off Louisiana are considered rare (NMFS 1989; Colleen Coogan 1995, personal communication, NMFS), and because the animals generally inhabit waters far deeper than those in the ODMDS, it is unlikely that disposal operations would have any impact on whale species.

According to NMFS (Colleen Coogan 1995, personal communication, NMFS), there are three species of turtle (hawksbill, Kemp's ridley, and leatherback) classified as endangered and two species of turtles (green and loggerhead) classified as threatened which may occur in the project area. Any of the turtles could potentially inhabit the ODMDS. Dredging operations affect sea turtles through incidental take and by degrading the habitat. Hopper dredging has been identified as a source of mortality (incidental take) to sea turtles in inshore waters (Dickerson and Nelson 1990; Magnuson et al. 1990; USFWS and NMFS 1991, 1992a,b). However, disposal of maintenance material dredged from the Atchafalaya River Bar Channel is by hydraulic cutter head pipeline dredge, this type of operations has not been identified as a source of sea turtle mortality.

4.1.3 Location in relation to beaches and other amenity areas [40 CFR 228.6(a)(3)].

The nearest point of land is North Point of Point au Fer Island (Figure 1.2), about 2 miles from the northeast end of the proposed ODMDS. It may be possible to observe the disposal plume from North Point or from boats in the vicinity during the active period of dredged-material

disposal within the site. The plume is expected to dissipate quickly after completion of the disposal operations. Except for the minor affects of these limited observations, there should be no effects on the aesthetics of the area. There are no other known recreational parks or beaches in proximity to the proposed ODMDS.

4.1.4 Types and quantities of wastes proposed to be disposed of, and proposed methods of release, including methods of packing the waste, if any [40 CFR 228.6(a)(4)].

Material dredged from the upper one-third of the bar channel generally is comprised of 26% sand, 30% silt, and 44% clay, and material from the lower two-thirds of the bar channel generally is comprised of 7% sand, 44% silt, and 49% clay (Espey, Huston 1997).

An estimated 9 to 11 million cy of material is removed from the Atchafalaya River Bar Channel using a hydraulic cutter head pipeline dredge and released within the ODMDS as an uncohesive slurry. The bar channel is dredged annually; 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 Parts 220 to 229). None of the material will be packaged in any way.

4.1.5 Feasibility of surveillance and monitoring [40 CFR 228.6(a)(5)].

The proposed ODMDS is shallow and close to shore, which facilitates surveillance and monitoring of the site. Operational observations can be made using shore-based radar, aircraft, ship riders, and day-use boats. Monitoring would be facilitated by the database that has been established for the ODMDS by surveys conducted by IEC (1983), EPA-ERLN (Dettmann and Tracey 1990), and Flemer *et al.* (1994). A monitoring program has been developed by EPA in cooperation with the COE for the proposed ODMDS. A copy of the monitoring program is included as Part 6 of the Site Management Plan (see page 13 of Appendix A to this SFEIS).

4.1.6 Dispersal, horizontal transport and vertical mixing characteristics of the area, including prevailing current direction and velocity, if any [40 CFR 228.6(a)(6)].

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 predominantly 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 (correlated with similar changes in wind direction) occur periodically (Weissberg *et al.* 1980a,b; Crout and Hamiter 1981; Phillips and James 1988). 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 the west (Weissberg *et al.* 1980a,b; Crout and Hamiter 1981; Phillips and James 1988). Spinoff eddies from the loop current occasionally enter the region, producing flows to the southeast near the existing site (Weissberg *et al.* 1980a,b).

Current speeds generally range from 10 to 30 cm/s in the vicinity of the 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,b). 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,b). One study conducted during dredged-material disposal operations indicated currents may range from 2 to 25 cm/s in a southwest direction (Schubel *et al.* 1978). Current speeds may reach 200 cm/s during hurricanes, which occur about once every 4 years (Weissberg *et al.* 1980a; Phillips and James 1988).

In the absence of strong currents, the bulk of the dredged material being disposed 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 Atchafalaya ODMDS. Background suspended solids concentrations were approximately 100 mg/L and currents were to the southwest at 9 to 19 cm/s. During disposal operations, suspended solids concentrations as high as 300 mg/L were found 0.41 km downstream from the end of the discharge pipe. During another set of observations made when current directions were to the west and to the northeast (current speeds not reported), suspended solids concentrations of 300 mg/L were measured at 0.97 km to 1.64 km downstream from the end of the discharge pipe. As is shown below, naturally occurring concentrations of suspended solids as high as 800 mg/L have been reported in the area where Schubel *et al.* (1978) made their observations.

Currents in the area can reach velocities sufficient to resuspend the disposed dredged material. The resuspended material would be transported in the direction of the current causing the resuspension. During these periods, constant mixing of the dredged material and sediments originally in the area takes place. The mixed dredged material and background sediments settle as the velocity decreases and become resuspended when some event again raises the current velocity.

Analysis by the New Orleans District COE shows that sediment transport at the ODMDS is both to the northwest and to the southeast. The prevailing northwest currents are relatively weak and generally transport silt-sized and clay-sized particles. In the winter, however, stronger currents to the southeast, which are driven by the passage of cold-air outbreaks (northers), transport the latter particle sizes plus sand-sized particles. Gale-force winds for a duration of 20 to 30 hours are common during the passage of one of the cold-air outbreaks, which occur from 15 to 30 times each year (Phillips and James 1988).

The dredged material represents a small portion of the material carried into the general area by the runoff of the Atchafalaya River. During disposal operations, a mound of dredged material may be initially formed within the ODMDS. However, periodic resuspension of the dredged material results in the disappearance of the mound through dispersal and horizontal transport. The net result would be the remixing of dredged material with other materials from the original source. The natural sediment load of the Atchafalaya is estimated to be 191 million cy/year, of which 153 million cy/year is deposited in the prograding delta and 69 million cy/year is transported primarily to the west (Wells and Kemp 1982). Naturally occurring suspended solid concentrations of 250 to 400 mg/L have been recorded in Atchafalaya Bay, and concentrations of more than 800 mg/L have been reported seaward of Point au Far Shell Reef (Wells and Kemp 1982). The high offshore concentration was attributed to wave-induced resuspension of the area's soft sediments. Although there would be dispersal and horizontal transport of the dredged material from the ODMDS, site surveys reported by IEC (1983) concluded that past dredged material disposal has caused no identifiable long-term effects in this region, which is naturally affected by periodic episodes of high turbidity.

4.1.7 Existence and effects of current and previous discharges dumping in the area (including cumulative effects) [40 CFR 228.6(a)(7)].

The effects of previous discharges in the ODMDS on various environmental parameters has been examined by IEC (1983), EPA-ERLN (Dettmann and Tracey 1991), and Flemer *et al.* (1994); this information is presented below. Methodology, quality assurance and quality control follows generally accepted practices and is specified or referenced in each respective document.

No mounds were detected in the site during EPA/IEC surveys performed during December 1980 and May-June 1981 (IEC 1983). Bathymetric surveys performed during April and May 1996 by the New Orleans District COE did not detect any mounding at the site. There were spatial and temporal differences in the IEC (1983) results for various parameters, including grain size, chlorinated hydrocarbons, and oil and grease. However, no statistically significant differences among sampling stations within the site and reference stations both east and west of the site were detected. No effects from dredged material disposal could be identified in the water column, sediments, or benthos of the site. Dredged-material disposal at the ODMDS took place during February 1979, 10 months and 15 months, respectively, prior to the IEC December 1980 and May-June 1981 surveys. Dredged-material disposal was in progress during the April-May 1996 survey.

An analysis of benthic macrofaunal community structure, and associated sediment characteristics following dredged material disposal in the ODMDS, was conducted during October 1991 by Flemer *et al.* (1994). This study documented benthic macrofaunal community structure, sediment particle size, and chemical analyses for pesticides, and polychlorinated biphenyuls (PCB's), petroleum hydrocarbons, and heavy metals.

4.1.7.1 Sediment Characteristics

IEC (1983) sampled sediments at the ODMDS and reference area outside the ODMDS. Dettman and Tracey (1991) sampled sediments from the Atchafalaya River Bar Channel and a reference area. Flemer *et al.* (1994) sampled sediments from within the ODMDS and nearby reference areas. None of these sample sites were the same (see Figures 2.1, 2.2, 2.3, and 2.4).

Hydrography-sediment. Surficial sediments collected during both IEC (1983) surveys (December and May-June) were predominantly silts and clays at all stations, but exhibited some temporal and spatial textural variability. Results were similar to previous observations within and adjacent to the ODMDS (COE 1978). Overall ranges for percentages of sand, silt, and clay were 0.1% to 17.1%, 31.7% to 55.1% and 28.1% to 68.2%, respectively. Gravel content was minimal at all stations. Clay content increased somewhat at most stations between the December and May-June surveys, whereas percentages of sand and silt usually decreased.

Dettmann and Tracey (1991) found that channel sediments were also predominantly silts and clays at all stations (table 4.1). Overall ranges for percentages of sand, silt, and clay were 2.12% to 26.26%, 45.56% to 58.09%, and 27.14% to 51.24%, respectively. Mean percentages of sand was greatest at the near shore channel station (25.41%), whereas mean sand percentages decreased at mid-channel and offshore-channel stations (5.79% and 3.00%, respectively).

Table 4.1. Sediment analysis Atchafalaya River Bar Channel site and reference site (Dettmann and Tracey 1991).

SITE	MEAN %SAND	MEAN %SILT	MEAN %CLAY
Channel C-1	25.41	46.92	27.66
Channel C-2	5.79	53.73	40.48
Channel C-3	3.00	53.91	43.09
Reference R-1	34.29	42.56	23.15
Reference R-2	20.15	54.94	24.90
Reference R-3	2.41	57.89	39.70

Material dredged from the upper one-third of the bar channel generally is comprised of 26% sand, 30% silt, and 44% clay, and material from the lower two-thirds of the bar channel generally is comprised of 7% sand, 44% silt, and 49% clay (Espey, Huston 1997).

Flemer *et al.* (1994) found depths increased from 1.1 m near shore to 3.5 m offshore. Flemer also found that sediment particle size was highly variable along the depth gradient for reference and disposal sites and moderately variable at comparable sampling depths between

reference and disposal sites. Sediment samples were wet-sieved through a 63 µm mesh sieve to separate sands and silt/clay fractions. Near shore stations, reference and disposal sites were characterized by course sand particles of 60% and 56.6%. This size category decreased to 1.9% and 9.8% at reference and disposal middepth stations, which were the stations with the largest differences in percent sand between reference and disposal sites. Offshore stations in both the reference and disposal sites contained about 3.4% sand.

Chemical analysis. Comparison of concentrations of trace metals in sediments collected by IEC (1983), EPA-ERLN (Dettmann and Tracey 1991), and Flemer *et al.* (1994) is presented in Table 4.2. These data are presented for comparison purposes as there are no established standards for concentrations of sediment contaminants.

Table 4.2. Comparison of trace metal concentrations in surficial sediments collected by IEC (1983), EPA-ERLN (Dettmann and Tracey 1991), and Flemer *et al.* (1994).

Metal	Study					
	IEC (1983) (Concentrations µg/g dry weight)	EPA-ERLN (Dettmann and Tracey 1991) (Concentrations in µg/g dry weight)		Flemer et al. (1994) (Concentrations µg/g wet weight)		
	Mean (n=40) concentrations (and ranges) over both surveys	Stations		Disposal (Reference) Stations		
		C2	B3	Near shore	Mid-depth	Offshore
Arsenic (As)	3.0 (1.8-4.4)	12.37	7.66	11 (11)	34 (42)	34 (25)
Aluminum (Al)	NT	51675	55863	ND (ND)	ND (ND)	ND (ND)
Silver (Ag)	NT	<0.01	<0.02	NT (NT)	NT (NT)	NT (NT)
Cadmium (Cd)	0.15 (<0.08-0.33)	0.63	0.24	NT (NT)	NT (NT)	NT (NT)
Chromium (Cr)	1.9 (0.8-2.9)	94.8	108.2	3.8 (4.5)	11 (14)	11 (10)
Copper (Cu)	10 (7.5-16)	33.0	22.9	4.0 (4.4)	14 (18)	12 (10)
Iron (Fe)	NT	48796	47590	NT (NT)	NT (NT)	NT (NT)
Mercury (Hg)	0.055 (0.037-0.078)	<0.46	<0.50	ND (ND)	ND (ND)	ND (ND)
Manganese (Mn)	590 (250-950)	2233	991	NT (NT)	NT (NT)	NT (NT)
Nickel (Ni)	5.5 (3.9-9.1)	49.4	43.1	10 (11)	22 (29)	21 (20)
Lead (Pb)	16 (9.7-24)	28.0	24.6	7.5 (6.8)	18 (23)	20 (16)
Antimony (Sb)	NT	0.69	0.56	NT (NT)	NT (NT)	NT (NT)
Selenium (Se)	NT	NT	NT	ND (ND)	ND (ND)	ND (ND)
Tin (Sn)	NT	2.27	2.07	NT (NT)	NT (NT)	NT (NT)
Zinc (Zn)	25 (17-45)	173.9	185.6	16 (13)	31 (43)	31 (28)
NT = Not Tested ND = Not Detected						

The IEC (1983) survey found that concentrations of trace metals in surficial sediments generally exhibited little variation over the survey area. The EPA-ERLN survey (Dettmann and Tracey 1991) of sediments taken from the mid-channel station of the Atchafalaya bar channel was similar to those taken from nearby reference station. Flemer *et al.* (1994) found that selected trace metal concentrations in sediments approximated each other between reference and disposal sites; and were lower in near shore than in offshore samples.

Concentrations of total organic carbon (TOC) in sediments, determined only for the December IEC (1983) survey, showed little variability and were generally low. Values ranged from 0.15 to 8.2 mg/g with an overall mean of 1.84 mg/g. No spatial patterns were apparent. The EPA-ERLN survey (Dettmann and Tracey 1991) found that the percent carbonate, percent total carbon, and percent organic carbon for mid-channel station C-2 (0.20, 2.52, 2.32, respectively) was similar to the reference station R-2 (0.22, 1.33, 1.11, respectively).

Concentrations of cyanide and phenols at the ODMDS were generally below detectable levels (IEC 1983). Cyanide was detected at low levels (<0.7 µg/g) at a few stations, both inside and outside the ODMDS, during each survey; no spatial trends were evident. Cyanide levels were also low (<0.5 µg/g) in a previous study of the ODMDS and vicinity (COE 1978). Phenols, determined only in December, were not detected in any of the samples (IEC 1983).

The EPA-ERLN survey (Dettmann and Tracey 1991) found 19 of 32 selected organic pesticides, at concentrations above the detection limit, in sediments from an Atchafalaya River Bar Channel site. Of these, 13 substances detected in the bar channel site were not detected in an adjacent reference site (concentrations in ng/g dry weight): PCB018 (0.12), PCB028 (0.29), PCB044 (0.28), heptachlor epoxide (0.06), ortho-para DDE (0.16), alpha chlordane (0.22), transnonachlor (0.12), PCB118 (0.41), para-para-DDD (2.27), PCB105 (0.26), PCB138 (0.62), PCB187 (0.29), PCB170 (0.12). Only 4 substances were detected in the bar channel that exceeded, by an order of magnitude, the detection limit: alpha chlordane 0.22 ng/g (detection limit = 0.02 ng/g), PCB118 0.41 ng/g (detection limit = 0.04 ng/g), para-para-DDD 2.27 ng/g (detection limit = 0.04 ng/g), and PCB138 0.62 ng/g (detection limit = 0.04 ng/g).

The IEC (1983) survey found sedimentary chlorinated hydrocarbon (CHC) concentrations at stations inside and outside the ODMDS were generally low, and detectable only for dieldrin, pp'DDE, pp'DDD, and PCBs (Arochlors 1016 and 1254) (IEC 1983). PCB (1254), DDE, and DDD were present in measurable quantities during both December and May-June surveys. Dieldrin (2.2 to 4.7 ng/g) was detected only in December, whereas PCB (1016) was present only during May-June (26 to 74 ng/g).

The EPA-ERLN survey (Dettmann and Tracey 1991) analyzed sediments from an Atchafalaya River Bar Channel site and a reference site for poly-aromatic hydrocarbons (PAHs). In all cases, both the channel and the reference sites concentrations of PAHs, except for perylene, were within an order of magnitude of the detection limit. Perylene was an order of magnitude higher than the detection limit (station C-2 = 141.38 ng/g dry wt, detection limit = 5.60 ng/g dry wt).

Selected chlorinated hydrocarbon pesticides (aldrin, BHC isomers [alpha, beta, gamma/lindane], chlordane, chlorpyrifos [dursban], DDE (P.P'), DDD (P.P'), dieldrin, endrin, endosulfan I, endosulfan II, endosulfan sulfate, heptachlor, heptachlor epoxide, hexachlorobenzene, methoxychlor, mirex, toxaphene) and PCB's were not detected in sediments tested by Flemer *et al.* (1994) above detection limits of 0.010 µg/g wet weight. Petroleum hydrocarbons were not detected in any sediment sample above 1.0 µg/g wet weight, the method detection limit.

The IEC (1983) survey found oil and grease concentrations were high (8 and 15 mg/g) at one station during December 1980; however, during May-June 1981 at this station oil and grease concentrations were <0.5 mg/g. Concentrations at the remaining stations ranged only from 0.4 to 2.2 mg/g over both surveys (IEC 1983).

Total hydrocarbon concentrations ranged from 98 to 125 µg/g, but did not show any pattern of variability between stations or surveys (IEC 1983). Saturated hydrocarbon levels (55 to 77 µg/g) were somewhat higher during May-June than December, whereas aromatic and olefinic hydrocarbon concentrations were similar during the two surveys (40 to 65 µg/g) (IEC 1983). There were no significant differences between sediments from the ODMDS and control areas outside the site.

As described above, sediment physical and chemical characteristics were generally similar within and adjacent to the ODMDS. The only identified effects of dredged material disposal on sediments include a few relatively high concentrations for sedimentary constituents (alpha chlordane, some chlorinated biphenols, para-para-DDD, iron, aluminum, perylene, zinc, oil, and grease) were measured within the ODMDS. The area is influenced by shallow water depths, frequent resuspension of bottom sediments by winds and waves, and input of large quantities of fine sediments from riverine sources. Furthermore, dredged materials released at the ODMDS are similar to background sediments in the vicinity and are widely distributed by natural processes after deposition.

Elutriate Tests. Elutriate tests were made on sediments collected during the May-June IEC survey (IEC 1983). Results from a station inside the ODMDS were similar to those from a station outside the ODMDS. Where there were differences between the two stations, releases were generally greater from the station sediments outside the ODMDS. For example, manganese releases were indicated in all replicates at both stations, but were a factor of 2 greater than sediments outside the ODMDS. There was zinc release in one replicate from each station and, again, was substantially greater for the station outside the ODMDS. For the remaining trace metals, either releases were small or none was detected. Arsenic and cadmium were released in comparatively small quantities in all replicates. Chromium, copper, mercury, nickel, and lead were retained and/or scavenged from solution by the solid phase.

The results of elutriate tests on sediments collected by the EPA-ERLN survey (Dettmann and Tracey 1991) of the near shore and mid-channel stations showed that barium and iron were the only trace metals to exceed detection limits. Barium was greater, by a factor of 2 and 4, respectively; iron was greater by a factor of 2 and 6 magnitudes, respectively. In all other cases,

no releases of trace metals were detected. Elutriate tests for selected organic volatiles, semivolatiles, pesticides, and PCBs, resulted in no releases detected for either the near shore or mid-channel stations.

Elutriate tests have generally shown that contaminants in dredged sediments, particularly heavy metals and chlorinated hydrocarbons, are not released, or are released only in negligible amounts (Wells, Crout, and Kemp 1981; Dettman and Tracey 1991).

4.1.7.2 Tissue Chemistry

Concentrations of trace metals and CHCs in organisms collected in trawls in the vicinity of the ODMDS were measured (IEC 1983). Trace-metal (cadmium, chromium, copper, mercury, manganese, nickel, lead, and zinc) levels in two species of penaeid shrimp (*Xiphopenaeus kroyeri* in December and *Trachypenaeus similis* in May-June) were low and within or below previously reported ranges for these species in the general area of the ODMDS (Tillery 1980). Of the trace metals examined, concentrations were highest for zinc (9.4 to 14 µg/g) and copper (5.1 to 8.9 µg/g); a similar situation was indicated by Tillery's data. Arsenic concentrations ranged from 5.9 to 8.5 µg/g; no historical data were available for comparison. Mercury concentrations (0.007 to 0.015 µg/g) were low. Trace-metal concentrations were generally comparable for organisms collected inside versus outside the ODMDS. Since different species were collected during the two surveys, temporal comparisons are not warranted.

CHC levels were determined in shrimp *X. kroyeri* during the December survey and in crabs (*Callinectes similis*) during May-June (IEC 1983). Of the compounds examined, only dieldrin, pp'DDE, and PCB (Arochlor 1254) were detected. Concentrations in shrimp inside and outside the ODMDS, respectively, were dieldrin, 2.40 and 1.01 ng/g; pp'DDE, 2.76 and 2.02 ng/g; PCB, 11.2 and 15.1 ng/g. Concentrations in crab inside and outside the ODMDS, respectively, were dieldrin, 28.7 and 16.3 ng/g; pp'DDE, 23.5 and 8.3 ng/g; PCB, 65.9 and 80.6 ng/g. Concentrations in shrimp were substantially lower than those in crab, although all values were well below Food and Drug Administration action/tolerance levels for edible marine organisms. CHC levels in crab were somewhat greater inside the ODMDS than outside; data are insufficient to define any cause for this difference. Levels were similar for shrimp collected inside versus outside the ODMDS. No historical data for CHCs in these species were available for comparison; however, levels were comparable to other Gulf of Mexico marine organisms recorded by Atlas (1981).

4.1.7.3 Microbiology

Counts of total and fecal coliform bacteria were low in sediments during both surveys at the Atchafalaya River ODMDS (IEC 1983). In December, the most probable number (MPN) of total coliforms per gram ranged from 9 MPN/100 g at one station to 189 MPN/100 g at another station. Fecal coliforms ranged from nondetectable to 99 MPN/100 g. During the May-June survey, one station inside and one station outside the ODMDS were sampled for coliforms in sediments; both yielded very low numbers. There were no discernible differences between inside and outside the ODMDS with reference to total or fecal coliforms and sediment.

Crab and shrimp collected inside and outside the ODMDS contained low numbers of total coliforms during both surveys (IEC 1983). Fecal coliforms were not detected in any of the tissue samples (IEC 1983).

4.1.8 Interference with shipping, fishing, recreation, mineral extraction, desalination, fish and shellfish culture, areas of special scientific importance and other legitimate uses of the ocean [40 CFR 228.6(a)(8)].

The proposed ODMDS is outside the navigation channel and, thus, not in the path of ocean-going vessels. Some smaller boats may pass over the site; however, since any mounds are expected to be short-lived, there should be no interference with this passage. Hydraulic cutter head pipeline dredges and disposal pipelines do not interfere with shipping traffic. All dredging and disposal operations are closely coordinated among the dredging operators and the shipping interests to avoid interference with traffic. Without dredging, the channel would be impassible to most shipping.

Recreational fishing and boating takes place throughout the area in the vicinity of the ODMDS. Ship Shoal is located approximately 28 miles east of the ODMDS; Trinity Shoal and Tiger Shoal are about 28 miles west of the site (Figure 1.2). Smaller fishing shoals are within 29 miles of the ODMDS (DOC, NOAA 1980; 1989); Point au Fer Shell Reef is located just north of the site (Figure 1.2). Overall, there would be some short term interference with recreational activities at the ODMDS, particularly during disposal operations. The plumes of dredged material could have a minor impact on targeted fish stocks, temporarily affecting recreational fishing in the area. This interference would be short term and restricted to the relatively small area of the ODMDS being used for disposal at the particular time.

There is active oil and gas development in the area occupied by the ODMDS. One platform is located in the south end of the proposed site and other platforms are located to the east, south, and west of the site. Several natural gas pipelines cross the ODMDS. The COE has responsibility for permitting all structural placements on the Outer Continental Shelf and for pipelines located in fairways and anchorages. Past experience with use of the site for disposal of dredged material 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 in the general vicinity of the site.

No desalination or artificial fish and shellfish culture facilities are located within the site. Naturally occurring fish and shellfish within the site, particularly bottom-dwelling types, would be affected by the dredged-material disposal. Some of these may be trapped and smothered during disposal operations. Dispersion and transport of the dredged material outside the site should not adversely affect the fish and shellfish. The material dispersed from the site would settle in very thin layers and be mixed with the naturally occurring sediments of the region.

The nearest oyster leases are located about 4 miles to the east of the ODMDS, near Point au Fer (Ernie Dugas 1995, personal communication, Oyster Survey Section LDWF). Because the transport of suspended materials from the ODMDS would be mainly parallel to the coastline,

effects of disposal operations on these oyster beds would 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 the use of the interim-designated disposal site; no impact is expected to occur in the future from use of the proposed ODMDS.

The Louisiana State Atchafalaya Delta Wildlife Management Area is located about 8 miles to the north of the proposed ODMDS. Shell Keys National Wildlife Refuge and Russell Sage - Marsh Island State Wildlife Refuge are located about 29 miles to the west of the proposed ODMDS. There has been no impacts to the refuges from the use of the interim-designated disposal site; no impact is expected to occur in the future from use of the proposed ODMDS.

The biological, geomorphological, and hydrological development of the Atchafalaya Delta has been studied by various universities and state and Federal agencies. Special scientific interest will undoubtedly follow as the Atchafalaya Delta progrades from the Atchafalaya Bay into the Gulf of Mexico. Periodically, scientific studies are also carried out in the offshore region and the bays of the area. Use of the site should not be expected to interfere with any such studies. It is not expected that use of the site for disposal of dredged material would interfere with any other legitimate use of the ocean.

4.1.9 The existing water quality and ecology of the site as determined by available data or by trend assessment of baseline surveys [40 CFR 228.6(a)(9)].

The water quality and ecology of the ODMDS generally reflect that of the near shore 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, which is highly variable (Phillips and James 1988). Data developed during the IEC (1983) surveys and the EPA-ERLN (Dettmann and Tracey 1991) 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 1991) water column data were taken during dredged material disposal operations; therefore, these data reflect normal ambient conditions.

4.1.9.1 Water Column

In the IEC surveys, salinities varied widely during both the December 1980 (15.0 to 26.6 o/oo) and the May-June 1981 (4.9 to 35.5 o/oo) surveys (IEC 1983). During December, mid-depth dissolved-oxygen levels ranged from 9.5 to 10.3 mg/L, whereas May-June values ranged from 6.8 to 8.9 mg/L. In the summer, calm winds, freshwater input, and intrusions of offshore waters may restrict vertical mixing in the near shore waters. Under these conditions, bottom waters can be depleted of oxygen. This hypoxic condition (dissolved-oxygen content of less than 2 ppm) may be an annual phenomenon, but the event is patchy and ephemeral and has been shown to affect shelf waters from the Mississippi Delta to the upper Texas coast (Phillips and James 1988). The IEC December survey (IEC 1983) reported a wide range of total suspended solid (TSS) concentrations (10 to 102 mg/L) when stormy weather was encountered; during the May-

June survey the TSS range was smaller (23 to 60 mg/L). With the exception of the maximum of 250 nephelometric turbidity units (NTU) at one station in December, turbidity levels were similar form May-June (7 to 55 NTU) and December (14 to 34 NTU) surveys. Values for pH were slightly higher in December relative to May-June; all values ranged between 8.1 and 8.5 (IEC 1983).

The EPA-ERLN survey (Dettmann and Tracey 1991) of water samples for selected organic volatiles and semivolatiles, pesticides, and PCBs were below detection limits for both the mid-channel and comparable reference station. With the following exceptions, concentrations of trace metals in waters from the Atchafalaya River Bar Channel and a comparable reference site were below detection limits (See Table 4.3). Concentrations of barium, iron, and manganese from the channel sample were greater, by a factor of 4, 2, and 3, respectively, than reference site concentrations. However, there are no EPA marine acute or chronic criteria for these elements. The copper concentration detected at the reference site exceeded EPA's acute criteria; the copper concentration at the channel site was less than the detection limit.

Flemer *et al.* (1994) found that salinities increased with depth and that reference stations had consistently lower salinities than comparable disposal area stations. Salinities ranged from 9.5 and 8.0 ppt at near shore, to 19.1 and 17.6 ppt for mid-depth to 25.8 and 14.4 ppt for offshore disposal and reference stations, respectively. Flemer *et al.* (1994) found that pH's were comparable between near shore and mid-depth stations (range 8.3 to 8.8), but decreased to 7.4 at both the disposal and reference offshore stations. Temperatures were similar at all stations, ranging from 23.7 degrees C to 22.0 degrees C. Dissolved oxygen was greatest in the near shore stations and decreased at mid-depth and offshore stations (range: 6.2 to 7.6 mg/liter).

In waters off southeastern Louisiana, concentrations of particulate trace metals within a given volume of water are largely a function of the quantity of particles present (Heaton 1978; Schubel *et al.* 1978; Tillery 1980; Philips and James 1988). During the IEC (1983) site survey, maximum concentrations for most particulate metals were measured at stations where the level of TSS was also greatest (102 mg/L). Overall ranges were 0.20 to 0.62 µg/L for arsenic; 0.02 to 0.07 µg/L cadmium; 0.27 to 0.82 µg/L for chromium; 0.40 to 1.2 µg/L for copper; 0.004 to 0.016 µg/L for mercury; 0.16 to 18 µg/L for manganese; 0.38 to 2.0 µg/L for nickel; 0.05 to 3.2 µg/L for lead; and 1.4 to 32 µg/L for zinc.

Total concentrations of trace metals that were taken in ambient waters during the two IEC surveys (IEC 1983) can be determined by directly adding the particulate concentrations (µg/L) to the dissolved concentrations (µg/L) that were taken at the same sampling station. Two water column trace metal samples were taken during each of the two surveys (IEC 1983). Total concentrations of arsenic, cadmium, chromium, lead, nickel, and zinc were below EPA marine acute and chronic water quality criterion (WQC). No water quality criterion have been set for manganese. Total mercury concentrations at station 6 (outside the site; see Figure 2.1) were 0.089 and 0.075 (µg/L) for the two surveys (IEC 1983). Both of these concentrations exceed the EPA marine chronic water quality criterion (0.025 µg/L) but do not exceed the marine acute water quality criterion (2.1 µg/L).

Table 4.3. Concentrations of trace metals in ambient waters from the Atchafalaya River Bar Channel and a reference site (Dettmann and Tracey 1991).

Trace Metal	Bar Channel (µg/L)	Reference Site (µg/L)	EPA Marine Acute and (Chronic) Criteria (µg/L)
Aluminum	<50	<50	N/A(N/A)
Antimony	<10	<10	N/A(N/A)
Arsenic	<5	<5	69(36)
Barium	80	24	N/A(N/A)
Beryllium	<1	<1	N/A(N/A)
Cadmium	<1	<1	43(9.3)
Chromium	<10	<10	1,100(50)
Cobalt	<10	<10	N/A(N/A)
Copper	<10	12	2.9(N/A)
Iron	2575	1480	N/A(N/A)
Lead	<3	<3	140(5.6)
Manganese	312	119	N/A(N/A)
Mercury	<0.2	<0.2	2.1(0.025)
Nickel	<10	<10	75(8.3)
Selenium	<1	<1	410(54)
Silver	<5	<5	2.3(N/A)
Thallium	<5	<5	N/A
Vanadium	<50	<50	N/A
Zinc	<10	<10	95(86)

Concentrations of most dissolved chlorinated hydro-carbons (CHCs) examined were below detectable levels at the two stations measured during both site surveys (IEC 1983). Only dieldrin (0.1 to 4.1 ng/L), the DDT derivative pp'DDE (24 to 53 ng/L), and the PCB Arochlor 1254 (0.4 to 0.6 ng/L) were present in measurable quantities. Concentrations of pp'DDE and PCB were below EPA marine water quality criteria. Dieldrin levels were substantially greater during May-June (4.1 ng/L) relative to December (0.1 ng/L); the higher level may have been

derived from coastal sources (IEC 1983). The 4.1 ng/L dieldrin concentration exceeds the EPA marine chronic water quality criterion (1.9 ng/L) but not the acute water-quality criterion (710 ng/L).

None of the water-column parameters measured during the IEC site surveys indicated that dredged material after disposal has permanent measurable effect on water quality in the area of the ODMDS (IEC 1983). Waters off southeastern Louisiana are generally turbid because of shallow depths and riverine influences. Levels of most parameters in the ODMDS appeared to be typical of the region (IEC 1983; Phillips and James 1988).

4.1.9.2 Biological Investigation

Benthic samples were taken and trawls made during site surveys in December 1980 and May-June 1981 (IEC 1983). Results indicated the species were representative of the area, and stations inside and outside the existing ODMDS were similar (IEC 1983; Phillips and James 1988). More recently, Flemer *et al.* (1994) examined benthic macrofaunal community composition and taxon abundance between reference and disposal sites to assess for possible gross effects of dredged material disposal on benthic macrofaunal recolonization and recovery. Flemer *et al.* conducted their study in October 1991; prior to this study, disposal of dredged material last occurred at the ODMDS site in May 1991.

Macrofauna. Polychaetes, particularly *Mediomastus californiensis, Paraprionospio pinnata,* and *Cossura* species, dominated the macrofauna sampled on both surveys (IEC 1983). During the December survey, the little surf clam *Mulinia lateralis* was very abundant, probably as a result of seasonal recruitment characteristic of this species (Parker *et al.* 1980; IEC 1983). By the following survey in late spring (May-June), *M. lateralis* was less abundant. Other common members of this assemblage were the carnivorous ribbon worms *Cerebratulus* cf. *lacteus* (and other unidentified ribbon worms) and the snail *Nassarius acutus*.

Comparisons between the December and the May-June IEC (1983) surveys show that as a result of greater densities of polychaetes, the overall abundance of macrofauna (individuals per square meter) generally increased from the December survey to the May-June survey. However, there were several sharp declines between the two surveys owing to reductions in numbers of *M. lateralis* (IEC 1983).

Flemer *et al.* (1994) also found *M. californiensis and P. pinnata* dominating abundance at both the disposal and reference sites (reference mean = 40.8/0.05 m^2 and disposal mean = 40.7/0.05 m^2). Other less abundant taxa (mean > 5.0 organisms/0.05 m^2 at a reference or disposal site) included the polychaetes, *P. ambigua, Spiochaetopterus oculatus,* and *Glycinde solitaria,* the bivalve *Mulinia lateralis,* the nemertean, *Nemertea* sp A., and unknown oligochaetes. Abundance of *Streblospio bendicti*, another much less abundant taxa, was significantly greater at the disposal site. Overall, an abundance of 10 of 17 taxa, whose mean abundance was greater than 1.0 organism/0.05 m^2, differed significantly among some stations at reference and disposal sites.

The survey of macrofaunal distribution and abundance for reference and disposal sites by Flemer *et al.* (1994) found 38 and 40 taxa of which sites shared 29 taxa in common. There was very little difference in average taxa richness/0.05 m^2 or overall average abundance/0.05 m^2 between reference and disposal sites. The general pattern of percent taxa and abundance group was approximately similar between Atchafalaya reference and disposal sites. Taxa collected in this study correspond closely to those identified in other near-coastal and estuarine waters of the northern Gulf of Mexico (Gaston and Weston 1983; Gaston and Nasci 1988; Giammona and Darnell 1990; Gaston and Edds 1994). Wright *et al.* (1978) reported similar dominant taxa present at stations in 10 to 15 m waters at a dredged material disposal site in the Gulf of Mexico offshore of Galveston Bay, Texas.

Flemer *et al.* (1994) found the average abundance of taxa was significantly greater ($P \leq 0.05$) by approximately a factor of three at the near shore reference compared to the near shore disposal station. Average abundance at the middepth disposal station was approximately twice that of the middepth reference station and the difference was significant ($P \leq 0.05$). Average abundance at offshore reference and disposal sites approximated each other. Variability in average abundance within sites was often as large as that between sites. Average taxa richness was significantly smaller at the Atchafalaya River near shore disposal station compared to all other stations, and this response variable was significantly larger at the offshore disposal station than at the near shore and middepth reference, and near shore disposal stations. These differences do not show a consistent association between reference and disposal sites or within measured environmental variables, e.g., percent sand or sediment chemical contaminant data. Evidence of recolonization by macrofauna of marine soft sediments in the northern Gulf of Mexico suggests recolonization should be well developed within about five months (Gaston *et al.* 1985). The "patchy" nature of community level indicators of recolonization masked possible effects of dredged material disposal at this study area.

Although differences were detected in community structure between reference and disposal sites, significant differences in average abundance and taxa richness between paired reference and disposal stations occurred only at the near shore location. If the measured differences are the result of dredged material disposal, then the magnitude is not large compared to the known seasonal and interannual variability of members of benthic macrofaunal communities reported in the literature (Flemer *et al.* 1994).

The ODMDS is a shallow area periodically disturbed by storms (Phillips and James 1988). The benthic assemblage is dominated by species that live for about 1 year and undergo rapid population expansions (Parker *et al.* 1980). Results of the IEC (1983) site surveys indicated that most macrofaunal species were distributed in patches throughout the study area and several, such as *Mediomastus* spp. and *P. pinnata*, are considered opportunistic. These endemic species have considerable ability to adapt to a range of natural disturbances in their habitat. Thus, if dredged-material disposal had affected the density of these organisms, these effects could not be discerned (IEC 1983).

Epifauna. During the site surveys, approximately 600 individuals representing eight invertebrate and 14 fish species were collected from otter trawls in the vicinity of the Atchafalaya River ODMDS (IEC 1983). Macrocrustaceans (shrimp and crabs) made up the bulk of the invertebrate catch; particularly abundant were the seabob shrimp (*Xiphopenaeus kroyeri*) in December, and the broken-necked shrimp (*Trachypenaeus similis*) and the lesser blue crab (*Callinectes similis*) in May-June (IEC 1983). More fish were collected during May-June than in December; the Atlantic croaker (*Micropogon undulatus*) was most abundant (IEC 1983).

Macroinvertebrates and demersal fish collected during both IEC (1983) site surveys, as well as Flemer *et al.*'s (1994) more recent survey, are characteristic of the area. Furthermore, relative numbers of dominant organisms collected, such as large numbers of sciaenids (drums and croakers), are similar to results of other studies conducted in the area (Landry and Armstrong 1980; Weissberg *et al.* 1980a,b; Phillips and James 1988).

4.1.10 Potentiality for the development or recruitment of nuisance species in the disposal site [40 CFR 228.6(a)(10).

In the past, disposal of dredged material at the ODMDS has not resulted in the development or recruitment of nuisance species. Continued disposal of dredged material at the site is not expected to result in such development or recruitment.

4.1.11 Existence at or in close proximity to the site of any significant natural or cultural features of historical importance [40 CFR 228.6(a)(11).

Historic preservation legislation [e.g., Section 106 of the National Historic Preservation Act of 1966 (as amended), and the Final Rule for Operation and Maintenance Of Army Corps of Engineers Civil Works Projects Involving the Discharge of Dredged Material Into Waters of the U.S. or Ocean Waters (33 CFR Parts 209, 335, 336, 337, and 338)], recognize the uniqueness of historic events by requiring evaluation of entire project areas, not just those areas with a "high probability" of a cultural resource. Studies conducted by the Minerals Management Service, which involved a literature search as well as a request for information from the Louisiana Historic Preservation Officer, did not demonstate any features of historical importance within the ODMDS (DOI, MMS 1987). Consideration of cultural features also includes consultation with the Louisiana State Historic Preservation Office to determine the presence of submerged cultural resources in the proposed ODMDS area.

The COE "Submerged Cultural Resource Database" contains historical accounts of 52 shipwrecks in the Atchafalaya River, and 7 shipwrecks in the Atchafalaya Bay. These records indicate historical use of the Atchafalaya Basin. Review of the literature for the Atchafalaya Basin also indicates a high probability for the occurrence of historically important shipwrecks in the proposed ODMDS. Due to the proximity of the proposed ODMDS to the Atchafalaya River navigation channel, shipwrecks are the cultural resource which have the greatest potential for negative impacts from dredging and disposal operations at the proposed ODMDS. Results from the literature review indicate shipwrecks are most likely to be found near the Point Au Fer Shell

Reef and at the mouth of the Atchafalaya River. Hence, the northernmost portion of the proposed ODMDS, located near the Point Au Fer Shell Reef, would have the greatest potential to contain submerged cultural resources.

The COE conducted a submerged cultural resource survey of the proposed ODMDS, the results of which were reviewed and coordinated with the State Historic Preservation Officer (SHPO) of Louisiana. Initial magnetic and side-scan sonar results indicate the presence of numerous anomalies located throughout the proposed ODMDS area. Magnetic and side scan anomalies from the proposed ODMDS area which are suggestive of a shipwreck will be examined to determine the nature of the anomaly. Any anomaly suggestive of a shipwreck will be located and documented for later analysis. If the anomaly is located within the proposed ODMDS, two alternative actions would be considered. First, the anomaly area would be avoided during any dredging and disposal operations. Second, depending on the availability of funds, additional investigation of the anomaly would be conducted to determine the exact nature of the anomaly and clear the area for dredging and disposal operations. The SHPO concurred with the COE's findings and recommendations, and no additional investigations are required.

Future dredging and disposal operations at the proposed ODMDS would consider the results of the submerged cultural resources survey. Plans and specifications for dredging contracts would continue to be reviewed by COE cultural resources specialists to ensure that significant cultural resources are not impacted by any proposed action. Any future disposal into the ODMDS area would be reviewed by COE archaeologists for compliance with Section 106 of the National Historic Preservation Act of 1966 (as amended), Final Rule for Operation and Maintenance Of Army Corps of Engineers Civil Works Projects Involving the Discharge of Dredged Material Into Waters of the U.S. or Ocean Waters (33 CFR Parts 209, 335, 336, 337, and 338), and requirements of the Louisiana SHPO.

4.2 Five General Criteria for the Selection of Sites [40 CFR 228.5]

4.2.1 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 commercial or recreational navigation [40 CFR 228.5(a)].

The proposed ODMDS is located adjacent to and parallel to the Atchafalaya River Bar Channel. This location reduces the distance that the 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 disposal operations. No interference with these or other marine activities is expected outside the brief periods of disposal operations. The nearest oyster leases are located to the northeast near Point au Fer (Ernie Dugas 1995, personal communication, Oyster Survey LDWF). To date, there has been no impacts to existing oyster

leases from the use of the disposal site; no impact is expected to occur in the future from use of the proposed ODMDS.

4.2.2 Locations and boundaries of the 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 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 shell fishery [40 CFR 228.5(b)].

Disposal of dredged material would produce a turbidity plume. This plume would quickly be dispersed to the point where it is indistinguishable from the turbidity naturally occurring in the area. The nearest point of land is North Point of Point au Fer, some 2.3 miles from the north end of the disposal site. The Atchafalaya Delta Wildlife Management Area, managed by the Louisiana Department of Wildlife and Fisheries, encompasses the developing delta in Atchafalaya Bay. Turbidity resulting from dredged-material disposal is not expected to be distinguishable from the natural turbidity occurring in the vicinity of North Point and in Atchafalaya Bay.

There are no marine sanctuaries in the immediate vicinity of the ODMDS. Shell Keys and Russell Sage - Marsh Island Wildlife refuges are approximately 29 miles west of the existing ODMDS. Fishnet Bank, the closest protected Area of Biological Significance, is approximately 104 miles south of the existing ODMDS. There are commercial fisheries and shellfisheries throughout the region. Any impacts from disposal are expected to be minor.

The transport of suspended materials from the ODMDS would mainly be parallel to the coastline, and concentrations of suspended materials produced during dredging operations is expected to be within background levels within a few kilometers of the ODMDS. The potential effect 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-solid concentrations from wave-induced resuspension of near shore sediments and from the waters of the Atchafalaya River.

4.2.3 If at anytime 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 40 CFR 228.5 to 228.6, the use of such sites would be terminated as soon as suitable alternative disposal sites can be designated [40 CFR 228.5(c)].

The studies to date indicate that the proposed ODMDS meets the requirements of both 40 CFR 228.5 and 40 CFR 228.6. Surveys of the site indicated that water quality, sediments, and biological life were generally similar inside and outside the site (IEC 1983, Dettman and Tracey 1991, Flemer *et al.* 1994). No adverse environmental effects were detected outside the site boundaries during site investigation surveys (IEC 1983, Dettman and Tracey 1991, Flemer *et al.* 1994).

4.2.4 The sizes of ocean disposal sites will be limited in order to localize for identification and control any immediate adverse impacts and permit the implementation of effective monitoring and surveillance programs to prevent adverse long-range impacts. The size, configuration, and location of any disposal site evaluation will be determined as a part of disposal site evaluation or designation study [40 CFR 228.5(d)].

The configuration of the proposed ODMDS was probably designed for easy disposal of material dredged from the Atchafalaya River Bar Channel. This consideration led to the establishment of a long narrow site parallel to the channel. Regardless of the original considerations, the site lends itself to surveillance of individual dredged-material disposal operations and long-term monitoring of the site. The long and narrow (i.e., 18.5 x 0.5 miles) configuration of the proposed ODMDS limits its overall area. Since by design the site receives dredged material from the adjacent areas in the channel, potential contaminants identified in the proposed ODMDS can be traced to source areas in the channel. This site design can assist with calculating the conservation of elements in the dredged material between dredging and final disposal operations. This calculation could be very valuable if a "hot spot" of contamination is located in the proposed ODMDS. Conversely, the orientation of the ODMDS broadside to the prevailing currents in the area increases the chance that disposed material will be moved off the site.

4.2.5 EPA will, wherever feasible, designate ocean dumping sites beyond the edge of the continental shelf and other such sites that have been historically used [40 CFR 228.5(e)].

In this area of the Gulf of Mexico, a disposal site beyond the continental shelf would be at least 84 miles from the area to be dredged. It was determined that a dredged- material disposal site beyond the continental shelf would not be feasible due to, among other things, increased safety risks and increased cost of transportation, site characterization studies, monitoring, and surveillance. In concert with the latter part of this criterion, approximately 80% of the proposed ODMDS has been historically used for disposal of dredged material.

5.0 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Direct, unavoidable, adverse impacts resulting from the placement of dredged material at the proposed ODMDS include:

Water Quality - increases in turbidity, and reductions of dissolved oxygen levels.

Biology - releases of trace metals, reductions of benthic fauna abundance and diversity, impediments in movement or migration of marine organisms, and possible stress and/or mortality of individual organisms.

Indirect, unavoidable, adverse impacts resulting from the placement of dredged material at the proposed ODMDS include:

Coastal Zone - loss of valuable (unquantified) marsh nourishment, forfeited marsh or wetland creation, and reductions in long-term productivity.

Socioeconomics - contributes to land loss, erosion and subsidence, effecting the locality of the use and governmental bodies.

Cumulative - loss of an estimated 400 acres of wetlands each dredging cycle, and sediment-rich water providing valuable marsh nourishment.

6.0 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Resources irreversibly or irretrievably committed to dredged material disposal at the proposed ODMDS include:

Energy - fuels for dredges, pumps, and disposal vessels.

Economics - monies expended to plan, evaluate and accomplish the operation.

Biology - benthic organisms buried by the dredged material.

Coastal Zone - a valuable resource with potential to create wetlands and provide sediment-rich waters for marsh nourishment.

Cumulative - potential loss of up to 9-11 million cubic yards of material annually.

7.0 EPA's PREFERRED ALTERNATIVE - FINAL DESIGNATION OF THE ATCHAFALAYA RIVER BAR CHANNEL ODMDS UNDER SECTION 102(c)

EPA's preferred alternative is the final designation of the proposed ODMDS pursuant to Section 102(c) of the MPRSA for the disposal of material dredged from the bar channel of the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, navigation project. EPA supports additional COE funding from Congress, CWPPRA, the State Restoration Program, and other sources for disposal operations. Moreover, final designation of the proposed ODMDS under authority of Section 102(c) of the MPRSA does not prohibit the future consideration of beneficial use alternatives as additional funding becomes available.

EPA's NEPA reveiw process was used to determine the environmental acceptability for continued use of the ODMDS, including impact analyses according to the 11 specific criteria [40 CFR228.6(a)] and the 5 general criteria (40 CFR 228.5) of the Ocean Dumping Regulations. In addition, EPA considered the data obtained by the site surveys of Interstate Electronics Corporation (IEC 1983); data from the EPA's and Science Applications International Corporation's (SAIC) Environmental Research Laboratory-Narragansett (ERLN) (Dettmann and Tracey 1990); and data from EPA's Region 6 sponsored study by Flemer *et al.* (1994); as well as other available information. In addition, in December 1980, and May-June 1981, IEC (1983) sampled 5 stations located within the proposed ODMDS, and 5 reference stations located outside the proposed ODMDS (Figures 7.1 and 7.2, respectively). Dettmann and Tracey (1990) conducted sediment toxicity tests on sediments sampled from 3 locations within the navigation channel, and 3 reference locations southeast of the proposed ODMDS (Figure 7.3 Flemer *et al.* (1994) studied benthic community structure at 3 locations (near shore, midsection, and offshore) within the proposed ODMDS and at 3 reference sites (near shore, midsection, and offshore) located west of the navigation channel (Figure 7.4). None of these studies sampled the same exact area.

Section 102(c) of the MPRSA, as amended by WRDA 1992, and Part 228 of the Ocean Dumping Regulations establish the requirement for an ODMDS monitoring program. Section 228.9 states that the primary purpose of a monitoring program is to evaluate the impact of disposal on the marine environment by referencing the monitoring results to a set of baseline conditions. A site monitoring program is included in the site management plan (Appendix A). The results of the monitoring program will be used by EPA and the COE to determine if site management practices need to be changed to avoid unreasonable degradation of the marine environment.

Special management strategies currently applicable to the proposed ODMDS include:

a. Suitable dredged material from the Atchafalaya River Bar Channel will be discharged into a Section 404 disposal area for beneficial use to construct islands for colonial nesting seabirds and/or wetlands.

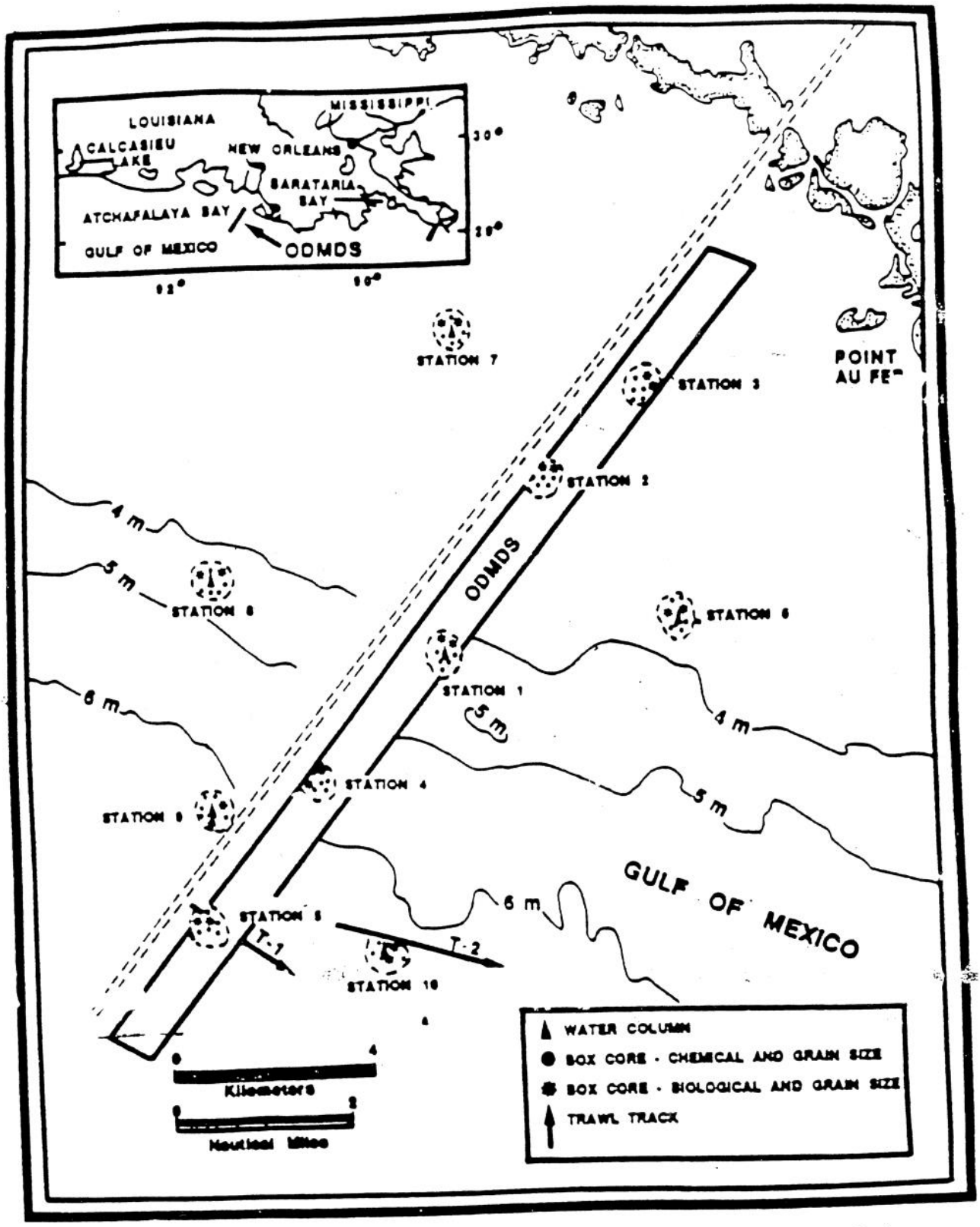


Figure 7.1 Station locations, IEC survey (December 1980) of the interim designated ODMDS (Adapted from IEC 1983).

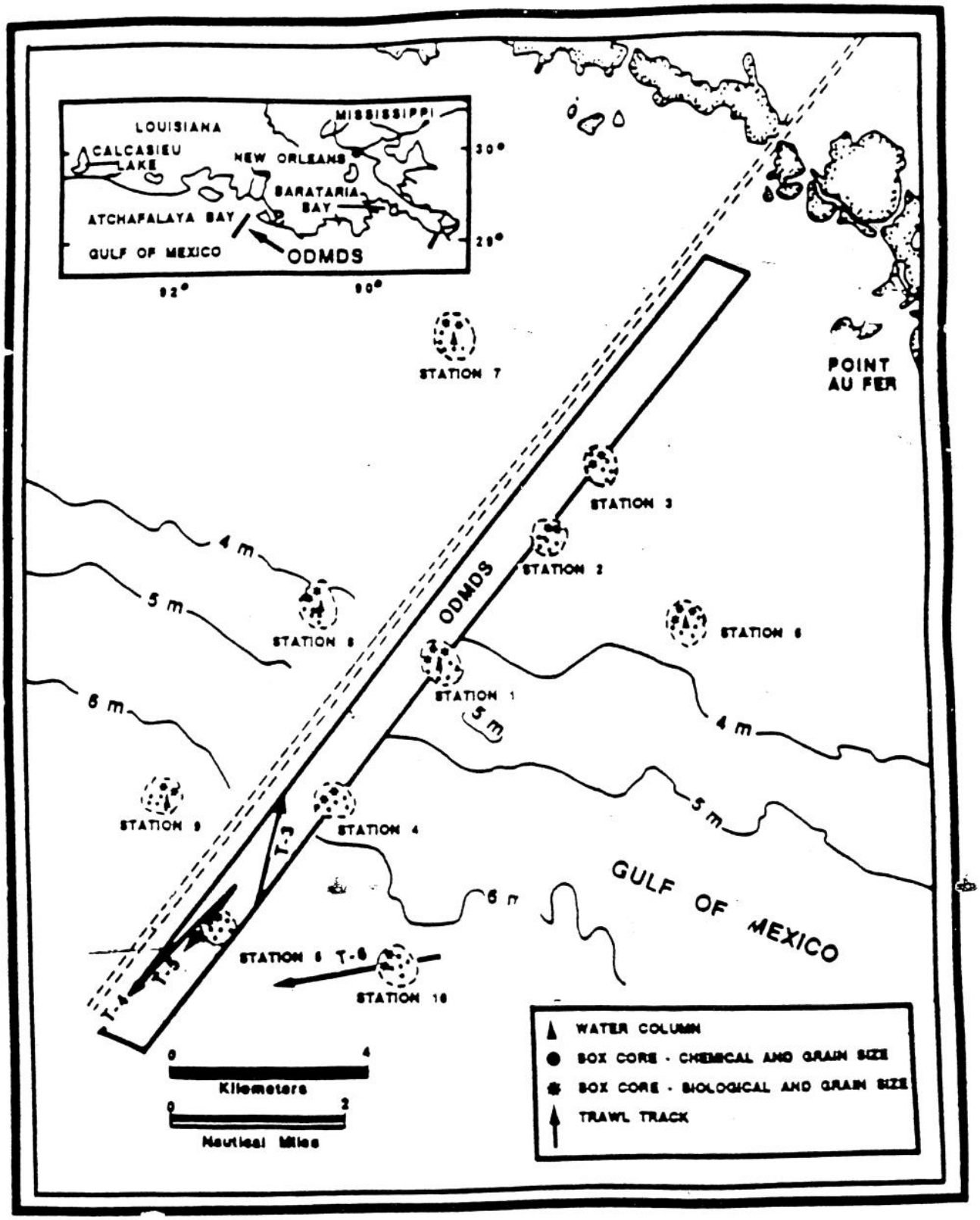


Figure 7.2 Station locations, IEC survey (May-June 1981) of the interim-designated ODMDS (Adapted from IEC 1983).

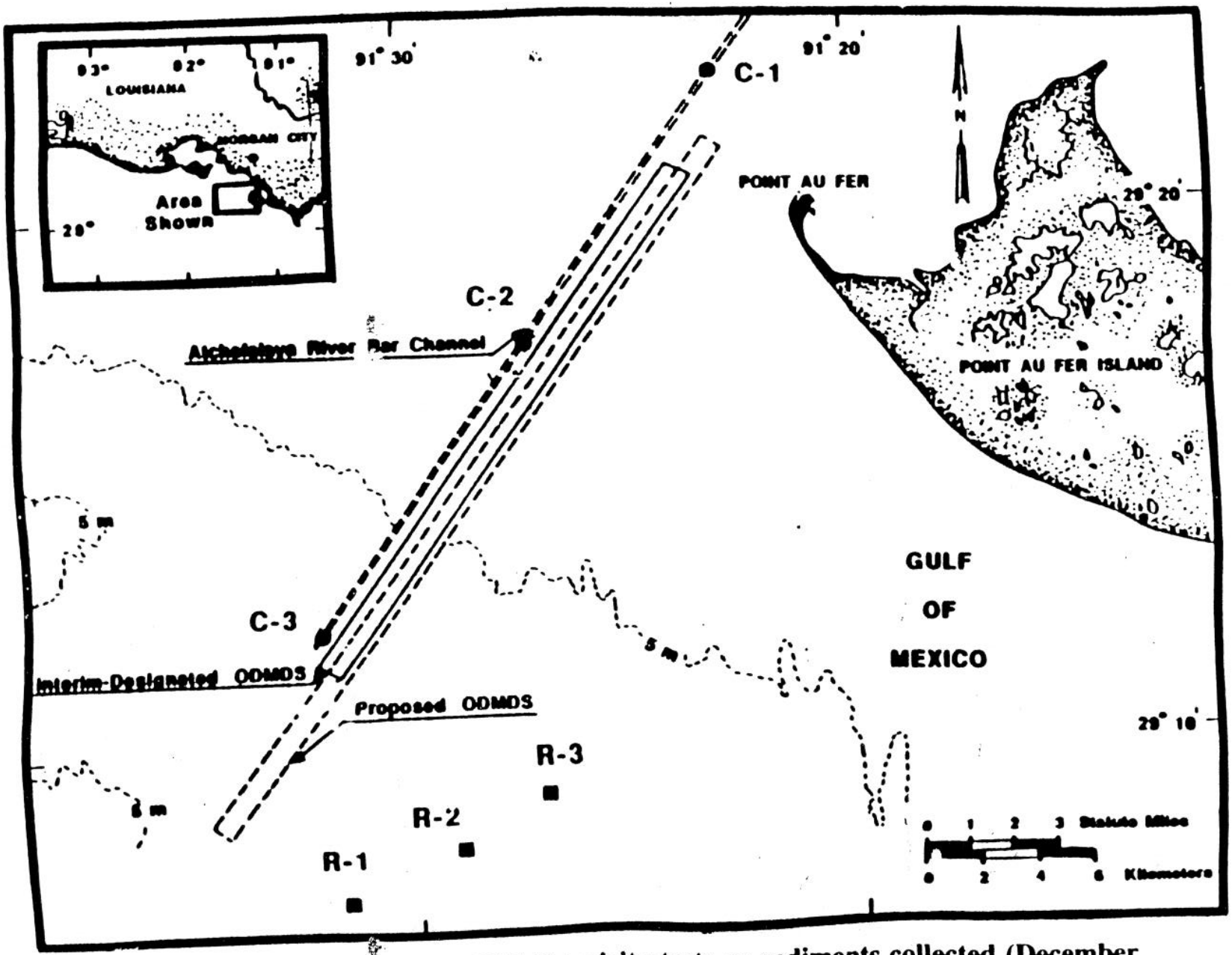


Figure 7.3 Station locations, EPA-ERLN toxicity tests on sediments collected (December 1990) from the interim-designated ODMDS (Adapted from Dettmann and Tracey 1990).

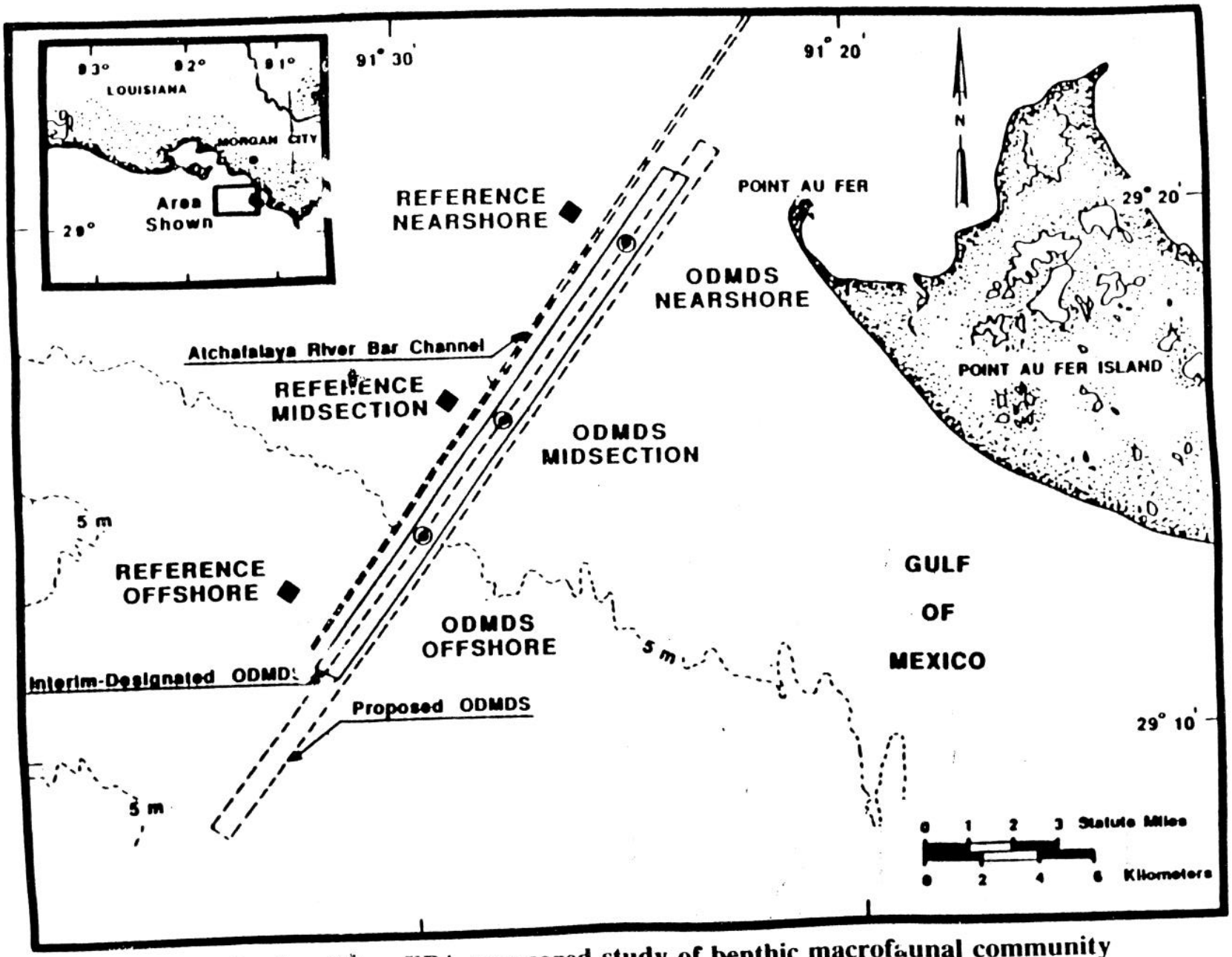


Figure 7.4 Station locations, EPA-sponsored study of benthic macrofaunal community structure in the interim-designated ODMDS (Adapted from Flemer *et al.* 1994).

b. Only dredged material determined by the COE, NOD, and EPA, Region 6 to satisfy the criteria set forth in 40 CFR Part 227 Subparts B, C, D, E, and G, and Part 228.4(e) of the Ocean Dumping Regulations will be considered for unrestricted placement at the proposed ODMDS. Additional evaluation of management options will be required for any dredged material which does not meet with the criteria.

c. No disposal operations will take place when swells exceed 3 feet.

d. The discharge point within the ODMDS will be determined by the Government Inspector on board the dredge during disposal operations. Depending on prevailing currents, the Government Inspector will direct discharge to ensure maximum retention time of dredged material within the ODMDS and minimize movement of dredged material into the navigation channel and/or off the ODMDS.

The site management plan for the proposed ODMDS would be reviewed and revised, if necessary, not less frequently than 10 years after adoption and every 10 years thereafter. A modification to the plan may be proposed by either EPA or COE. The modification would be incorporated into the plan by mutual consent of both agencies. Because the proposed ODMDS has been used historically without significant environmental impacts, site monitoring consists of hydrographic surveys at and adjacent to the proposed ODMDS pre- and post-disposal. The purpose of the surveys is to determine whether mounding that could adversely impact navigation or benthic community recovery is occurring at or adjacent to the site as a direct result of disposal operations. The EPA and COE review the results of the monitoring program to determine if modifications of site management practices are necessary.

8.0 COORDINATION

EPA prepared a Draft EIS on the designation of the Atchafalaya River Bar Channel ODMDS in November, 1983. Six comment letters were received on the Draft EIS; based on these responses, EPA determined that a Supplemental Draft (SDEIS) was necessary to correct information deficiencies and include more recent data fulfilling the requests of most of the commenting agencies. The SDEIS was completed and distributed for review in December 1990. Comments received on the SDEIS, and EPA's responses, are included in Appendix B of this SFEIS.

The status of compliance with applicable Federal, state, and other laws and regulations is presented in Table 8.1. The following agencies and other interested parties will receive a copy of this SFEIS.

U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Department of Defense, New Orleans District Corps of Engineers
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of Transportation, Coast Guard
Advisory Council on Historic Preservation
Louisiana Department of Environmental Quality
Louisiana Department of Natural Resources, Coastal Resources Program
Louisiana Department of Transportation and Development
Louisiana Department of Wildlife and Fisheries
Louisiana State Historic Preservation Officer

9.0 LIST OF PREPARERS

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Table 8.1 Environmental Compliance

LEGISLATION	COMPLIANCE
Federal Policies	
Abandoned Shipwreck Act of 1988	Partial
Archeological and Historic Act of 1974	Partial
Bald Eagle Act	Partial
Clean Air Act, as amended	Partial
Clean Water Act of 1977, as amended	Partial
Coastal Zone Management Act, as amended	Partial
Coastal Barrier Improvement Act of 1990	Partial
Endangered Species Act of 1973, as amended	Partial
Estuary Protection Act	Partial
Farmland Protection Policy Act	Partial
Federal Water Project Recreation Act, as amended	Partial
Fish and Wildlife Coordination Act, as amended	Partial
Floodplain Management (Executive Order 11988)	Partial
Food Security Act of 1985	Not Applicable
Land & Water Conservation Fund Act of 1965, as amended	Partial
Marine Protection, Research, and Sanctuaries Act of 1972	Partial
National Environmental Policy Act of 1969, as amended	Partial
National Historic Preservation Act of 1966, as amended	Partial
Ocean Dumping Regulations (40 CFR 220 to 220, as amended)	Partial
Prime and Unique Farmlands, 1980 CEQ Memorandum	Not Applicable
Protection and Enhancement of the Cultural Environment, 1971 (Executive Order 11593)	Partial
Protection of Wetlands (Executive Order 11990)	Partial
River and Harbor and Flood Control Act of 1970	Partial
Water Resources Development Acts of 1976, 1990 and 1992	Partial
Wild and Scenic River Act, as amended	Not Applicable
State Policies	
Air Control Act	Partial
Archeological Treasury Act of 1974, as revised	Partial
Louisiana Coastal Resources Program	Partial
Louisiana Natural and Scenic Rivers System Act	Not Applicable
Protection of Cypress Trees	Not Applicable
Water Control Act	Partial

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INDEX

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Appendix A

ADDENDUM TO
SITE MANAGEMENT PLAN
ATCHAFALAYA RIVER BAR CHANNEL
OCEAN DREDGED MATERIAL DISPOSAL SITE

The following are modifications to the Site Management Plan (SMP) for Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site (ODMDS), signed January 1997. This SMP was developed jointly by the U.S. Environmental Protection Agency, Region 6 and the U.S. Army Corps of Engineers, New Orleans District.

- Page 10, Para. 4, Line 6. The sentence "The dredged material generally is comprised of silty-clay with traces of sand (11% sand, 52% silt, 37% clay)." should be replaced with the following:

  "The dredged material from the upper one-third of the bar channel (between Stations 475+00 and 763+00) generally is comprised of 26.0% sand, 30.2% silt, and 43.9% clay. The dredged material from the lower two-thirds of the bar channel (between Stations 763+00 and 1340+00) generally is comprised of 7.2% sand, 44.1% silt, and 48.6% clay."

- Page 15, Section 4.0 ANTICIPATED SITE USE, Para. 2, Last Line. The sentence "The dredged material generally is comprised of silty-clay with traces of sand (11% sand, 52% silt, 37% clay)." should be replaced with the following:

  "The dredged material from the upper one-third of the bar channel (between Stations 475+00 and 763+00) generally is comprised of 26.0% sand, 30.2% silt, and 43.9% clay. The dredged material from the lower two-thirds of the bar channel (between Stations 763+00 and 1340+00) generally is comprised of 7.2% sand, 44.1% silt, and 48.6% clay."

- Page 16, Section 5.0 SPECIAL MANAGEMENT CONDITIONS OR PRACTICES. Paragraph b. "All dredged material from the Atchafalaya River Bar Channel not suitable for stacking for beneficial use will be discharged within the designated boundary of the ODMDS." should be omitted in its entirety.

These modifications are effective upon signature.

William B. Hathaway Director Water Quality Protection Division Region 6 Environmental Protection Agency	Date	Albert J. Guillot, P.E. Chief, Operations Division New Orleans District U.S. Army Corps of Engineers	Date

SITE MANAGEMENT PLAN
ATCHAFALAYA RIVER BAR CHANNEL
OCEAN DREDGED MATERIAL DISPOSAL SITE

1. GENERAL

The Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 (33 U.S. C. Section 1401, ff) 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 disposal into ocean waters is permitted by the Corps of Engineers or, in the case of federal projects, authorized for disposal under MPRSA Section 103(e), applying environmental criteria established by the Environmental Protection Agency in the Ocean Dumping Regulations (40 CFR Parts 220-229).

Section 102(c) of the MPRSA and 40 CFR Part 228.4(e)(1) authorize the Environmental Protection Agency (EPA) to designate ocean dredged material disposal sites (ODMDS) in accordance with requirements at 40 CFR Parts 228.5 and 228.6. Section 103(b) of MPRSA requires that the Corps of Engineers (COE) use dredged material sites designated by EPA to the maximum extent feasible. Where use of an EPA-designated site is not feasible, the COE may, with concurrence of EPA, select an alternative site in accordance with MPRSA 103(b).

Part 228.3 of the Ocean Dumping Regulations established disposal site management responsibilities; however, the Water Resources Development Act of 1992 (WRDA 92; Public Law 102-580) included a number of amendments to the MPRSA specific to ODMDS management. Section 102(c) of the MPRSA, as amended by Section 506 of WRDA 92, provides that:

1. Site management plans shall be developed for each ODMDS designated pursuant to Section 102(c) of the MPRSA.

2. After January 1, 1995, no ODMDS shall receive a final designation unless a site management plan has been developed.

3. For ODMDSs that received a final designation prior to January 1, 1995, site management plans shall be developed as

expeditiously as practicable, but no later than January 1, 1997, giving priority to sites with the greatest potential impact onthe environment.

4. Beginning on January 1, 1997, no permit or authorization for dumping shall be issued for a site unless it has received a final designation pursuant to Section 102(c) of the MPRSA or it is an alternate site selected by the COE under Section 103(b) of the MPRSA.

This site management plan for the Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site was developed jointly by the U.S. Environmental Protection Agency, Region 6 (EPA,Region 6) and the U.S. Army Corps of Engineers, New Orleans District (USACE,NOD). In accordance with Section 102(c) of the MPRSA, as amended by WRDA 92, the plan includes the following:

1. a baseline assessment of conditions at the site;

2. a program for monitoring the site;

3. special management conditions or practices to be implemented at the site that are necessary for protection of the environment;

4. consideration of the quantity of dredged material to be disposed of at the site, and the presence, nature, and bioavailability of the contaminants in the material;

5. consideration of the anticipated use of the site over the long term, including the anticipated closure date for the site, if applicable, and any need for management of the site after the closure of the site; and

6. a schedule for review and revision of the plan.

1.1 SITE MANAGEMENT OBJECTIVES

The purpose of ocean dredged material site management is to ensure that disposal activities do not unreasonably degrade the marine environment or interfere with other beneficial uses (e.g., navigation) of the ocean.

The specific objectives of management of the Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site (ODMDS) are as follows:

1. beneficial use of all dredged material of suitable grain size for stacking;

2. ocean disposal 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; and

3. avoidance of excessive and prolonged mounding either within the site boundaries or in areas adjacent to the site as a direct result of disposal operations.

1.2 ROLES AND RESPONSIBILITIES

In accordance with Section 102 (c) of the MPRSA and with the Regional Memorandum of Understanding between USACE, NOD and EPA, Region 6, on Management of ODMDSs signed March 15, 1988, EPA is responsible for designation of ODMDSs. Where use of an EPA-designated site is not feasible, the USACE, NOD may, with concurrence of EPA, Region 6 select an alternative site in accordance with Section 103(b) of the MPRSA as amended by Section 506 of WRDA 1992.

Development of Site Management Plans for ODMDSs within the New Orleans District is the joint responsibility of EPA, Region 6 and the USACE, NOD. Both agencies are responsible for assuring that all components of the Site Management Plans are implementable, practical, and applicable to site management decision-making.

1.3 FUNDING

Physical, chemical, and biological effects testing of dredged material prior to disposal at the ODMDS will be undertaken and funded by the USACE, NOD. The USACE, NOD also will be responsible for costs associated with disposal site hydrographic monitoring. Should monitoring indicate that additional studies and/or tests are needed at the ODMDS, the cost for such work would be shared by the USACE, NOD and EPA, Region 6. Physical, chemical, and biological effects testing at the ODMDS or in the site environs after disposal that is not required as a result of

monitoring will be funded by EPA, Region 6. Funding of all aspects of this site management plan is subject to Congressional budget constraints.

2.0 BASELINE ASSESSMENT

2.1 Site Characterization

The Atchafalaya River Bar Channel ODMDS is located east of and parallel to the Atchafalaya River and Bayous Chene, Boeuf, and Black, LA, bar channel and is 29.6 kilometers (km) (18.5 miles) long (Figure 1.). 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 16 km (10 miles) from the mouth of the Atchafalaya River. North Point of Point au Fer Island is about 4 km (2 miles) east of the northern end of the site. Point au Fer Shell Reef, an area that has been subjected to extensive shell dredging, lies just shoreward of the ODMDS.

Baseline conditions at the Atchafalaya River Bar Channel ODMDS have been assessed. Details of 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 "Final Environmental Impact Statement, Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site (ODMDS) Designation, St. Mary Parish, Louisiana" (EPA, 1996).

2.2 Disposal Site History

The Rivers and Harbors Act of June 25, 1910 authorized the USACE, NOD 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.

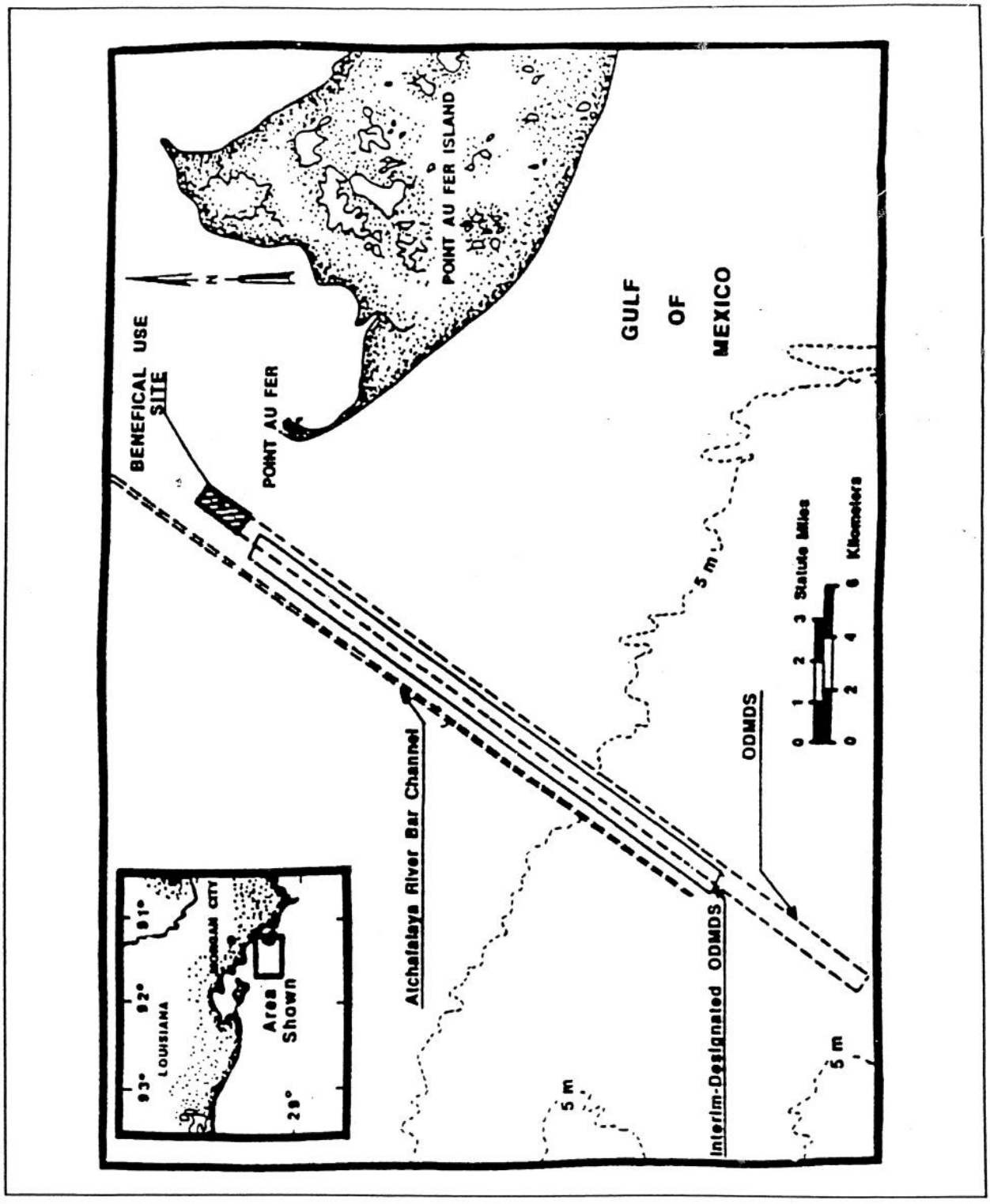

Figure 1. Atchafalaya River Bar Channel ODMOS.

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.

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. To date, approximately 750,000 cubic yards of dredged material has been placed annually at the Section 404 site. Material not suitable for beneficial use has been placed in the ODMDS. Table 1.1 provides a summary of the disposal history for the Atchafalaya River Bar Channel ODMDS.

Maintenance dredging of the Atchafalaya River Bar Channel is required on an annual basis and only material from the navigation channel is placed in the ODMDS. Material is removed using a hydraulic cutterhead pipeline dredge and is discharged as a slurry through a floating pipeline into the ODMDS. Dredging in the bar channel normally begins in January and continues through October; however, dredging is not continuous. Dredges may be assigned to the bar channel anytime between January and October to restore authorized channel dimensions. When a dredge is working in the bar channel, disposal operations will occur

Table 1.1. Date of disposal operations, methods of disposal, quantities of material disposed, reach dredged. Atchafalaya River Bar Channel reach extends from C/L Sta. 475+00 to 1340+00. Available information does not distinguish between the Atchafalaya River Bar Channel and others areas dredged prior to 1973.

DATE OF DISPOSAL OPERATION	METHOD OF DISPOSAL OPERATION	QUANTITIES OF MATERIAL DISPOSED (cubic yards)	REACH DREDGED
23 Jun to 25 Oct 95	cutterhead	9,311,000	C/L Sta. 475+00 to 1340+00
14 Apr to 26 May 94	cutterhead	1,836,445	C/L Sta. 568+00 to 817+80 and horseshoe area
27 May to 16 Oct 94	cutterhead	8,757,597	C/L Sta. 475+00 to 1340+00
10 Jun to 16 Sep 93	cutterhead	11,700,000	C/L Sta. 475+00 to 1340+00
14 Aug to 14 Sep 93	cutterhead	2,254,937	C/L Sta. 780+00 to 1010+00
14 Mar to 19 May 93	cutterhead	4,035,076	C/L Sta. 545+00 to 1057+00
11 May to 2 Dec 92	cutterhead	9,630,972	C/L Sta. 475+00 to 1340+00
20 Feb to 4 May 92	cutterhead	1,000,000	C/L Sta. 640+00 to 920+00 to 1030+00
7 May to 25 Sep 91	cutterhead	9,559,859	C/L Sta. 475+00 to 1340+00
31 Jan to 17 Apr 91	cutterhead	1,643,900	C/L Sta. 34+35 to 1429+15
2 Aug to 17 Nov 90	cutterhead	9,446,109	C/L Sta. 0+00 to 1340+00
29 Jun to 12 Sep 89	cutterhead	11,111,114	C/L Sta. 485+00 to 1325+00
6 Aug to 22 Nov 88	cutterhead	10,302,961	C/L Sta. 485+00 to 1325+00
2 Jul to 31 Aug 87	cutterhead	10,035,209	C/L Sta. 485+00 to 1325+00
25 Sep 85 to 8 Feb 86	cutterhead	8,500,000	C/L Sta. 485+00 to 1325+00

Table 1.1 continued.			
26 Jun to 1 Nov 83	cutterhead	10,674,563	C/L Sta. 475+00 to 1300+00
1982	NO DREDGING		
4 Jul to 10 Nov 81	cutterhead	9,236,530	C/L Sta. 475+00 to 1300+00
1980	NO DREDGING		
8 Dec 78 to 02 Apr 79	cutterhead	10,992,792	C/L Sta. 0+00 to 1340+00
1978	NO DREDGING		
1977	NO DREDGING		
21 Aug 75 to 10 Feb 77	cutterhead	10,888,170	C/L Sta. 0+00 to 1274+36
1975	NO DREDGING		
11 Apr to 6 Dec 74	cutterhead	14,409,109	C/L Sta. 478+84.2 to 1274+36.1
7 Jun to 21 Aug 73	cutterhead	3,557,062	-16 MLG+2X200 C/L Sta. 0+00 to 1150+00
12 Jul to 6 Oct 71	cutterhead	2,348,112	Range 50-112 -16MLG+2X200
3 Jul to 15 Aug 70	cutterhead	1,249,077	Range 1-43 -16MLG+2X200
30 Aug to 21 Dec 69	cutterhead	2,925,226	Range 50-115 -16MLG+2X200
1 Jul to 22 Aug 68	cutterhead	824,228	not listed
13 Oct to 5 Dec 68	cutterhead	1,263,258	Range 5 1/2 -43 -17MLGX200
4 Sep 67 to 30 Jun 68	cutterhead	642,632	Atchafalaya River, Morgan City to Gulf
26 Aug 66 to 18 May 67	cutterhead	1,769,284	Atchafalaya River, Morgan City to Gulf
25 Feb 66 to 27 Dec 67	cutterhead	3,024,214	Range 5 1/2 -43, 50-115 -16 MLG +2/x200
4 Apr to 2 May 65	cutterhead	765,150	Range 13-23, 35-40 -17MLG+1X200

Table 1.1 continued.			
10 Aug to 25 Sep 64	cutterhead	3,138,401	Range 6 1/2 - 43, 51-115 -16MLG+2X200
29 Aug to 15 Oct 63	cutterhead	3,002,752	Range 14-41, 55-112 -16MLG+2X200
5 Apr to 22 Jun 62	cutterhead	2,735,635	Range 6-22, 47-109 -16MLG+2X200
1 Jun to 5 Jul 60	cutterhead	1,711,680	Range 11-43, -16MLG+2X200
1 Nov to 22 Dec 60	cutterhead	1,866,915	-16MLG+2X200
23 Sep to 28 Nov 59	cutterhead	2,399,720	Sta 22+00 to 394+60, 40+50 to 392+50, -14MLG+2X145
20 Nov 57 to 26 Jan 58	cutterhead	1,937,705	Sta 48+55 to 323+80, 47+50 to537+45 -14MLG+2X145

24 hours a day, seven days a week until authorized channel dimensions are restored.

3.0 Quantity of Material and Presence of Contamination

3.1 Summary of information used to determine size of site, life span, and to protect against storm-induced erosion.

The Atchafalaya River Bar Channel ODMDS is a long, narrow site paralleling the bar channel reach of the Atchafalaya River and Bayous Chene, Boeuf, and Black, LA, navigation channel. When EPA designated it an interim ODMDS in 1977, the site had been used for disposal of dredged material from the bar channel since 1974. The configuration of the site probably resulted from ease of disposal from the navigation channel. No recommendations for changes in the size of the site were made as a result of the site designation studies.

Prior to completion of the supplemental draft EIS for site designation and publication of the proposed rule on February 6, 1991, USACE, NOD proposed extending the ODMDS limits on both the northern and southern ends to accommodate actual and potential increases in the length of the bar channel reach of the

navigation channel as the Atchafalaya Delta progrades gulfward. The ODMDS described in the proposed rule was 30.4 km (19 miles) long and 0.8 km (0.5 mile) wide.

In 1991, the northernmost end of the ODMDS was incorporated into a Section 404 disposal area for the beneficial use of dredged material to construct islands for colonial nesting seabirds. Deletion of the upper end of the ODMDS resulted in a site 29.6 km (18.5 miles) long and 0.8 km (0.5 mile) wide.

The location and configuration of the ODMDS involves only short transport of the dredged material from the navigation channel through floating pipeline to the site. This minimizes interference with other activities such as fishing and navigation in the site environs during dredging and disposal operations. The site also is easily accessible for surveillance of dredged material disposal operations and monitoring.

Like most ODMDSs in the Gulf of Mexico, the Atchafalaya River Bar Channel ODMDS is a dispersive site. The dredged material discharged into the site is expected to erode because of the high percentage of very fine-grained components and because of the location of the site in a high-energy inshore area where waves, currents, wind and tides constantly mix and redistribute the sediments and thus, the dredged material, over a wide area.

Since 1974, the Atchafalaya River Bar Channel has been dredged every year except for 1975, 1977, 1978, 1980, and 1982, and dredged material has been placed in the ODMDS. The quantity of dredged material discharged into the ODMDS each year has ranged from 760 thousand cubic meters (1 million cubic yards) to 10.6 million cubic meters (14 million cubic yards). The dredged material generally is comprised of silty-clay with traces of sand (11% sand, 52% silt, 37% clay). It is anticipated that annual maintenance of the Atchafalaya River Bar Channel and disposal of dredged material into the ODMDS will continue in the future. During each maintenance event, from 6.8 to 8.4 million cubic meters (9.0 to 11.0 million cubic yards) of dredged material will be discharged into the ODMDS.

3.2 Summary of requirements used to determine suitability of dredged material for disposal at the site.

In accordance with 40 CFR Parts 225 and 227 of the Ocean Dumping Regulations, national implementation guidance for the

MPRSA Section 103 Program (Ocean Dumping Program) was developed jointly by the Corps of Engineers and the Environmental Protection Agency. The guidance was to define technical procedures for testing dredged material to assess its compliance with the applicable physical, chemical and biological test provisions of Part 227 of the Ocean Dumping Regulations. A national guidance manual was first issued in 1977 and an updated version, "Evaluation of Dredged Material Proposed for Ocean Disposal (Testing Manual)", was issued in February, 1991.

The 1991 manual, commonly referred to as the "1991 Green Book", contains summaries and discussions of the procedures for ecological evaluation of dredged material required by the Ocean Dumping Regulations, tests to implement them, definitions, sample-collection and preservation procedures, evaluative procedures, calculations, and interpretive guidance. The manual also provides supporting references required for the evaluation of dredged material discharge applications in accordance with the regulations.

Because the "1991 Green Book" was national in scope, development of more detailed implementation guidance tailoring the procedures of the manual to local needs was encouraged. In October, 1992, the USACE, NOD and EPA, Region 6 signed a Regional Implementation Agreement (RIA), "Regional Implementation Agreement for Evaluating Dredged Material Proposed for Ocean Disposal Off the Louisiana Coast". This agreement was jointly developed by USACE, NOD and EPA, Region 6 to adapt the "1991 Green Book" procedures to the region.

The RIA applies to Corps Civil Works projects as well as to MPRSA Section 103 permit applications. It describes in detail the coordination process to be followed for dredged material evaluations to facilitate early coordination and to ensure each agency is aware of points in the process where communication and/or information exchange is required. The RIA contains lists of contaminants of concern of general application to the Louisiana coast. It addresses the implementation of a tiered testing framework specifying preferred test methods; procedures for collecting and storing samples of water and sediment for use in testing; specific benthic and water column test species to be used; required method detection limits; decision values to be used; and procedures for interpreting bioaccumulation results to make Tier III and Tier IV decisions. Locations of established reference sites also are included in the RIA.

In accordance with Part 225 of the Ocean Dumping Regulations, prior to the discharge of dredged material into the ODMDS the USACE, NOD must evaluate the proposed discharge in accordance with the criteria set forth in Part 227. The RIA requires that the information listed below be submitted by USACE, NOD to EPA, Region 6 at least 3 months before the advertisement date for the proposed maintenance event. When Government dredges will perform maintenance, the information must be submitted at the beginning of the Fiscal year or at least 3 months before anticipated dredging. After receiving the required information, EPA, Region 6 will make an independent evaluation of the proposed discharge in accordance with the criteria within 15 working days. EPA, Region 6 must inform USACE, NOD in writing whether or not the proposed discharge complies with the criteria. If EPA determines that the proposed discharge complies with the criteria, the USACE, NOD may proceed. If EPA determines that the proposed discharge does not comply with the criteria, ocean disposal of the dredged material is prohibited unless procedures for invoking economic impact are followed in accordance with 40 CFR Part 225.3 and EPA, Region 6 grants a waiver pursuant to 40 CFR Part 225.4.

Information provided to EPA, Region 6 prior to the discharge of dredged material into the ODMDS will include the following:

a. The proposed dredging project will be described to include: the volume and area to be dredged; extent of shoaling; interruption or changes in standard operations resulting from shoaling; the anticipated type of dredge and disposal vessel; anticipated start date and duration of the disposal operations; large scale map showing the location of the project; the project plan drawing; design depth and allowable overdepth; and disposal quantities and work details.

b. A short description of the last maintenance dredging performed.

c. A dredged material characterization/evaluation to include the following:

1. At a minimum, a Tier I evaluation shall be conducted for every dredging operation that will result in dredged material being discharge into the ODMDS. It is necessary to proceed through the tiered-testing procedures defined in the "1991 Green Book" and the RIA until sufficient information for making a definitive decision about the suitability of the dredged material

for ocean disposal has been generated.

2. Copies of the test results conducted according to the site specific sampling design and methods discussed in the RIA. These test results include data for all tests (physical, chemical, and biological), and the name of the laboratory(s) which performed the tests. When previous test results are being used for the evaluation, the date of the original submittal should be referenced.

3. A description of the sampling survey, including dates, sampling devices used, and the location of the sediment sampling stations, for each dredging area and reference site station by latitude and longitude, LORAN-C, or Global Positioning System and also in general terms, i.e., by channel marker, buoy number or other significant landmark.

4. All field sampling, laboratory testing, and quality assurance/quality control (QA/QC) procedures must be described, and analytical methods must be specified. References for laboratory protocols for physical, chemical, and biological analyses must be described including the following:

a) Method detection limits, detection limits achieved by the laboratory, and EPA method numbers and other approved methods that do not have a specific EPA number.

b) Test species used in each test, the supplier or collection site for each test species, and QA/QC procedures for test species acclimation and holding.

c) Location of control sediment samples and QA/QC procedures and rationale for presuming the control sediment is free of contaminants.

d) Source of seawater used in all biological tests.

e) Bioassay testing procedures and QA/QC information for the bioassays conducted.

f) Statistical analysis procedures.

d. A regulatory compliance evaluation including a review of the following subparts and sections of the Ocean Dumping Regulations:

1. Part 227 Subpart B - Environmental Impact

a) 227.1 Applicability

b) 227.4 Criteria for evaluating environmental impact

c) 227.5 Prohibited materials

d) 227.6 Constituents prohibited as other than trace contaminants

e) 227.9 Limitations on quantities of waste materials

f) 227.10 Hazards to fishing, navigation, shorelines or beaches

g) 227.13 Dredged materials

2. Part 227 Subpart C - Need for Ocean Dumping (all sections)

The USACE, NOD will evaluate alternative disposal options, particularly alternatives involving the beneficial use of dredged materials. The alternatives analysis will reflect not only current technological and cost considerations but also environmental impact information.

3. Part 227 Subpart D - Impact of the Proposed Dumping on Aesthetic, Recreational and Economic Values (all sections)

4. Part 227 Subpart E - Impact of the proposed Dumping on Other Uses of the Ocean (all sections)

5. Part 227 Subpart G - Definitions

6. Part 228.4(e) - Dredged Material Permits

Dredged material from the Atchafalaya River Bar Channel was sampled and analyzed in accordance with the "1991 Green Book" in 1991. A Tier III evaluation consisting of physical analyses, bulk sediment analyses, water chemistry and elutriate analyses, and toxicity bioassays was conducted. The results of the analyses indicated that the dredged material proposed for

discharge into the ODMDS was in compliance with the Ocean Dumping Criteria and was suitable for ocean disposal.

Although dredged material from the Atchafalaya River Bar Channel has been placed in the ODMDS annually since 1991, no additional sampling or analyses have been performed. Prior to each maintenance event, a Tier I evaluation has been conducted. Comprehensive analyses of existing and readily available information on the proposed dredged material, including spill reports from the U.S. Coast Guard, National Response Center, indicated "no reason to believe" that the proposed discharges of dredged material were not suitable for ocean disposal. Although the RIA states that "chemical and biological data greater than 5 years old may not be adequate to conduct evaluations", USACE, NOD and EPA, Region 6, will use best professional judgement in deciding when new chemical and biological data are needed.

4.0 ANTICIPATED SITE USE

Maintenance dredging of the Atchafalaya River Bar Channel is required on an annual basis and only dredged material from the navigation channel will be disposed into the ODMDS.

Dredged material will be removed using a hydraulic cutterhead pipeline dredge and will be discharged as a non-cohesive slurry through a floating pipeline into the ODMDS. The dredged material generally is comprised of silty-clay with traces of sand (11% sand, 52% silt, 37% clay).

Dredging in the bar channel normally begins in January and continues through October; however, dredgingis not continuous. Dredges may be assigned to the bar channel anytime between January and October to restore authorized channel dimensions. When a dredge is working in the bar channel, disposal operations will occur 24 hours a day, seven days a week until authorized channel dimensions are restored.

It is anticipated that annual maintenance of the Atchafalaya River Bar Channel and disposal of dredged material into the ODMDS will continue in the future. During each maintenance event, from 6.8 to 8.4 million cubic meters (9.0 to 11.0 million cubic yards) of dredged material will be discharged into the ODMDS.

5.0 SPECIAL MANAGEMENT CONDITIONS OR PRACTICES

Special management conditions or practices applicable to the ODMDS include the following:

a. All dredged material from the Atchafalaya River Bar Channel suitable for stacking will be discharged into a Section 404 disposal area for beneficial use to construct islands for colonial nesting seabirds and/or wetlands.

b. All dredged material from the Atchafalaya River Bar Channel not suitable for stacking for beneficial use will be discharged within the designated boundary of the ODMDS.

c. Only dredged material determined by USACE, NOD and EPA, Region 6 to satisfy the criteria set forth in 40 CFR Part 227 Subparts B, C, D, E, and G and part 228.4(e) of the Ocean Dumping Regulations will be considered for unrestricted placement at the ODMDS. Additional evaluation of management options will be required for any dredged material which does not meet the criteria.

d. No disposal operations will take place when swells exceed 3 feet.

e. During disposal operations, a baffle plate will be positioned on the end of the discharge pipeline to ensure placement of dredged material within the designated boundary of the ODMDS.

f. The discharge point within the ODMDS will be determined by the Government Inspector onboard the dredge during disposal operations. Depending on prevailing currents, the Government Inspector will direct discharge to ensure maximize retention time of dredged material within the ODMDS and minimize movement of dredged material into the navigation channel and/or off the ODMDS.

6.0 MONITORING PROGRAM

Section 102(c) of the MPRSA, as amended by WRDA 1992, and Part 228 of the Ocean Dumping Regulations establish the requirement for an ODMDS monitoring program. Section 228.9 states that the primary purpose of a monitoring program is to evaluate the impact of disposal on the marine environment by

referencing the monitoring results to a set of baseline conditions. The results of a monitoring program are used to determine if site management practices need to be changed to avoid unreasonable degradation of the marine environment.

The results of investigations presented in the site designation Final Environmental Impact Statement (EPA, 1996) will serve as the main body of baseline data for the monitoring of impacts associated with the use of the Atchafalaya River Bar Channel ODMDS.

The Atchafalaya River Bar Channel ODMDS has been used historically without significant environmental impacts. The site is dispersive in nature, and no resources or amenities of concern that could be impacted by dredged material disposal at the ODMDS have been identified. To ensure that persistent mounding is not occurring, hydrographic monitoring will be performed at and adjacent to the site pre- and post-disposal. If the post-disposal survey indicates either mounding greater than 2.0 feet above pre-disposal elevation has occurred within the site or mounding geater than 12 inches above pre-disposal elevation has off the site, a subsequent hydrographic survey will be conducted prior to the next disposal event to ensure that dispersion of the previously deposited sediments has occurred. If this hydrographic survey indicates that the sediments have dispersed, no further action is necessary. However, should the survey indicate that mounding persists, USACE, NOD and EPA, Region 6 will determine management actions appropriate to the site to alleviate sediment mounding in subsequent disposal events.

7.0 SITE MANAGEMENT PLAN REVIEW AND REVISION

Pursuant to Section 102(c) of the MPRSA, as amended WRDA 1992, the site management plan for the Atchafalaya River Bar Channel ODMDS will be reviewed and revised, if necessary, not less frequently than 10 years after adoption and every 10 years thereafter. Modifications or updates to the site management plan may be proposed by either the USACE, NOD or EPA, Region 6. The modification may be incorporated into the plan by mutual consent of both agencies.

for William B. Hathaway
Director
Water Quality Protection Division
Region 6
Environmental Protection Agency

1/31/97
Date

Albert J. Guillot, P.E.
Chief, Operations Division
New Orleans District
U.S. Army Corps of Engineers

1/17/97
Date

RESPONSES TO COMMENTS

Five comment letters were received on the 1990 Supplemental Draft EIS, as follows.

Fish and Wildlife Service, Field Supervisor, Lafayette, LA.

National Marine Fisheries Service, Southeast Regional Office, St. Petersburg, FL. (Introduced by a letter from The Chief Scientist, National Oceanic and Atmospheric Administration)

Office of Environmental Affairs, U.S. Department of Interior, Albuquerque, NM.

Louisiana Department of Natural Resources, Office of Coastal Restoration and Management, Baton Rouge, LA.

Office of the Secretary, U.S. Department of Interior, Washington, DC.

Copies of each letter are reproduced herein; each letter is numbered at the top, and each comment within the letter is numbered in the left margin. Responses are provided immediately to the right of the comment.

LETTER NO. 1

UNITED STATES GOVERNMENT

memorandum

DATE: January 31, 1991

TO: Field Supervisor, Fish and Wildlife Enhancement, FWS, Lafayette, LA

SUBJECT: Review of Supplemental Draft Environ ental Impact Statement for the Atchafalaya River Bar Channel, Ocean Dredged Material Disposal Site Designation, St. Mary Parish, Louisiana (ER 91/5)

FROM: Assistant Regional Director, Fish and Wildlife Enhancement, FWS, Atlanta, GA (AWE) Attn: Dennis Chase

In response to Mr. Jonathan Deason's request of January 3, 1991, we have reviewed the subject Draft Environmental Impact Statement (Statement) and offer the following comments for inclusion in the Department's response.

General Comments

The Statement adequately addresses most habitat-related concerns that were presented in the Fish and Wildlife Service's December 13, 1989, scoping input letter to the Corps of Engineers.

Specific Comments

Pages 2-22 and 2-23, Nonocean Disposal Alternatives - This section addresses the possible uses of dredged material to refurbish shoreline and marsh habitats. Due to the nature of the material removed from the bar channel, and the distance to the nearest shore or marsh, such alternatives are limited. However, the Corps has previously placed material in shoaled areas adjacent to the Point Au Fer shell reefs. This placement has resulted in the creation of ephemeral islands that are used by sea birds. The Fish and Wildlife Service recommends that the Corps continue to place dredged material in order to build islands where possible, and to avoid shell reefs. Plans for spoil disposal to accomplish those goals should be developed in consultation with the Fish and Wildlife Service and the Louisiana Department of Wildlife and Fisheries.

1-1
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Summary Comments

The Service recommends that final designation of the disposal site require an interagency evaluation, prior to each dredging event, of the feasibility of using the dredged material to create marsh, reduce shoreline erosion, or build bird nesting/roosting islands.

Please contact David Dell of this office if you have any questions regarding these comments.

David W. Frugé

David W. Frugé

1-1 EPA concurs. Dredged material will continue to be placed in the Section 404 site to build islands for colonial nesting seabirds (see Appendix A, Site Management Plan).

1-2 Avoidance of shell reefs and oyster leases is assessed under specific Criterion 8 and general Criteria 1 and 2 (see pages 36, and 43-44, respectively, of SFEIS).

1-3 Alternative beneficial use sites to improve productivity, create new habitat, and reduce or prevent environmental damage will continue to be considered as a part of the CWPPRA planning process and interagency coordination between the EPA, COE, FWS, LDNR and others through annual COE dredging conferences. Beneficial uses of dredged material (e.g., to build bird islands) are evaluated in the SFEIS (see Sections 2, 5, 6 and 7).

LETTER NO. 2

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
The Chief Scientist
Washington DC 20230

February 4, 1991 11 PM 1:39

6 E-F

Mr. Robert E. Layton, Jr.
Regional Administrator, Region 6
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, Texas 75202-2733

Dear Mr. Layton:

Enclosed are comments to the Draft Environmental Impact Statement for Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site Designation, St. Mary Parish, Louisiana. We hope our comments will assist you. Thank you for giving us an opportunity to review the document.

Sincerely,

David Cottingham

David Cottingham
Director
Ecology and Environmental
Conservation Office

Enclosure

LETTER NO. 2 (continued)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9450 Koger Boulevard
St. Petersburg, Florida 33702

January 28, 1991

Mr. Robert E. Layton, Jr.
Regional Administrator, Region 6
U.S. Environmental Protection Agency (6E-F)
1445 Ross Avenue
Dallas, Texas 75202-2733

Dear Mr. Layton:

The National Marine Fisheries Service (NMFS) has received the Supplemental Draft Environmental Impact Statement (DEIS) titled Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site Designation (EPA 906/12-90-009). This DEIS analyzes the potential impacts of depositing dredged material into a shallow (16 ft. deep) area east of the Atchafalaya River Bar Channel in St. Mary Parish, Louisiana. The document was transmitted with your letter dated December 11, 1990.

Based on our review, we believe that the DEIS adequately addresses potential project impacts to living anadromous and marine fishery resources. However, several commercially and recreationally important fishery species, which utilize the area in question during some portion of their life cycle (Lassuy 1983, Reagan 1985, Perry and McIlwain 1986, Sutter et al. 1986), have been excluded from several tables in the DEIS. Although these species are of great economic value, they are not discussed in the citation used to generate the tables. Additionally, other fast swimming finfish species which may utilize the disposal area (Jennings 1985, Sutter and McIlwain 1987) were excluded from Table 3-11. We recommend that the following species be added:

2-1

Species	Common Name	Table No.
Callinectes sapidus	blue crab	3-9, 3-10
Sciaenops ocellatus	red drum	3-9, 3-11
Pogonias cromis	black drum	3-9, 3-11
Cynoscion nebulosus	spotted seatrout	3-9, 3-11
Archosargus probatocephalus	sheepshead	3-11
Cynoscion arenarius	sand seatrout	3-11

2-1 EPA concurs. The listed species have been included as important fish species within the affected environment (see page 20 of SFEIS).

We appreciate the opportunity to review and comment on the DEIS.

Sincerely,

Andreas Mager, Jr.
Assistant Regional Director
Habitat Conservation Division

LITERATURE CITED

Jennings, C.A. 1985. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico) -- sheepshead. US Fish Wildl Serv Biol Rep 82(11.29). US Army Corps of Engineers, TR EL-82-4. 10 pp.

Lassuy, D.R. 1983. Species profiles: life histories and environmental requirements (Gulf of Mexico) -- spotted seatrout. US Fish and Wildlife Service, Division of Biological Services. FWS/OBS-82/11.4. U.S. Army Corps of Engineers, TR EL-82-4. 14 pp.

Perry, H.M., and T.D. McIlwain. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico) -- blue crab. US Fish Wildl Serv Biol Rep 82(11.55). U.S. Army Corps of Engineers, TR EL-82-4. 21 pp.

Reagan, R.E. 1985. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico) -- red drum. US Fish Wildl Serv Biol Rep 82(11.36). U.S. Army Corps of Engineers, TR EL-82-4. 16 pp.

Sutter, F.C., and T.D. McIlwain. 1987. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico) -- sand seatrout and silver seatrout. US Fish Wildl Serv Biol Rep 82(11.72). U.S. Army Corps of Engineers, TR EL-82-4. 16 pp.

Sutter, F.C., R.S. Waller, and T.D. McIlwain. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico) -- black drum. US Fish Wildl Serv Biol Rep 82(11.51). U.S. Army Corps of Engineers, TR EL-82-4. 10 pp.

LETTER NO. 3

United States Department of the Interior

OFFICE OF THE SECRETARY
OFFICE OF ENVIRONMENTAL AFFAIRS
POST OFFICE BOX 728
ALBUQUERQUE, NEW MEXICO 87103

RECEIVED
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FED. ACTIVITIES BRANCH

6 E-F

February 12, 1991

ER 91/5

Mr. Norm Thomas, Chief
Federal Activities Branch
Environmental Protection Agency
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Mr. Thomas:

We have reviewed the Supplemental Draft Environmental Impact Statement (EIS) for the Atchafalaya River Bar Channel Ocean Dredged Material Disposal Site Designation, Central Gulf of Mexico, and have the following comments.

We find that this Supplemental Draft EIS adequately addresses most habitat related concerns that were raised in our earlier January 13, 1984 letter of comment on the Draft EIS as well as the comments provided by the Fish and Wildlife Service during the scoping phase for this EIS.

We note that material placed in shoaled areas adjacent to the Point Au Fer shell reefs has resulted in the creation of ephemeral islands that are used by sea birds. We recommend that the Corps of Engineers continue to place dredged material in order to build islands where possible, and to avoid shell reefs. Plans for spoil disposal to accomplish those goals should be developed in consultation with the Fish and Wildlife Service and the Louisiana Department of Wildlife and Fisheries. For technical assistance please contact the Field Supervisor, U.S. Fish and Wildlife Service, 825 Kaliste Saloom, Brandywine II, Suite 102, Lafayette, Louisiana 70508.

3-1
3-2
3-3

Thank you for the opportunity to comment on this Supplemental Draft EIS.

Sincerely,

Raymond F. Churan
Regional Environmental Officer

B-7

3-1 EPA concurs. Dredged material will continue to be placed in the Section 404 site to build islands for colonial nesting seabirds (see Appendix A, Site Management Plan).

3-2 Avoidance of shell reefs and oyster leases is assessed under specific Criterion 8 and general Criteria 1 and 2 (see pages 36, and 43-44, respectively, of SFEIS).

3-3 Alternative beneficial use sites to improve productivity, create new habitat, and reduce or prevent environmental damage will continue to be considered as a part of the CWPPRA planning process and interagency coordination between the EPA, COE, FWS, LDNR and others through annual COE dredging conferences. Beneficial uses of dredged material (e.g., to build bird islands) are evaluated in the SFEIS (see Sections 2, 5, 6 and 7).

Although the cost of beneficial use may be higher than the cost of ocean disposal, these alternatives should not be eliminated solely on that basis. Furthermore, a reasonable approach to evaluating the cost of ocean disposal must consider the potential benefits of beneficial use which are irrevocably lost through ocean disposal, and the extensive long-term surveillance and testing that will be required as part of the monitoring program if this site is designated.

4-4 Fourth, despite EPA's assertions to the contrary, this Department's past experiences suggest that designation of an ODMDS does preclude the Corps of Engineers (COE) giving serious consideration to beneficial use alternatives. Because the COE repeatedly maintains that it is required to use the least costly disposal alternative, ODMDS designation essentially forces the COE to utilize such sites and generally precludes the use of dredged material for beneficial purposes, unless a non-Corps entity provides funding for the additional cost. Designation of an ODMDS provides the economic standard (i.e., the "Federal Standard") against which other disposal options are measured, although beneficial use alternatives would usually be cost-effective if a near-shore ocean disposal site did not exist. Frankly, I believe that termination of the current site designation is
4-5 a reasonable and feasible alternative which should be given serious consideration in the alternatives analysis. In fact, I would argue that designation of any ocean disposal site should be considered only if no other alternative for disposal exists.

Finally, EPA's October 23, 1989, policy memorandum, issued by Rebecca Hanmer, clearly indicates that site designations are subject to the federal consistency provisions of the Coastal Zone Management Act (CZMA) of 1972 when those site designations "may be reasonably expected to result in impacts on the State's coastal zone." This Department believes that designation of the subject ODMDS would have appreciable impact on Louisiana's coastal zone; therefore, the proposed site designation is subject to the consistency provisions of the CZMA of 1972.

I note that this Department by January 11, 1984, letter to Mr. John Hill, objected to the proposed designation based largely on inadequate consideration of beneficial use alternatives in the Draft Environmental Impact Statement. I find that the responses offered by EPA in the SDEIS to this Department's January 11, 1984, objection do not address or resolve the issues and concerns raised in that letter. Accordingly, this Department's January 11, 1984, finding of inconsistency is still valid. Further, this Department will be unable to reconsider the consistency of the proposed site

4 - 4 It is generally recognized that EPA's Section 102(c) designation does not authorize the use of the site, and each proposed annual dredging project requires an individual consistency determination concurrence from LDNR.

4 - 5 The effects of EPA's no action alternative (i.e. not to complete its Section 102 site designation of the proposed ODMDS) has been evaluated in the SFEIS (see Section 2.1).

4-6 designation until it receives an updated consistency determination which has been prepared in accordance with the guidance provided in the National Oceanic and Atmospheric Administration's Federal Consistency regulations (15 CFR 930 Subpart C).

This Department does not object to maintaining the navigability of Louisiana's waterways. I contend, however, that such navigation projects provide strong national economic development benefits and that mitigation of the adverse environmental impacts associated with the construction and maintenance of these waterways must be considered a legitimate and necessary component of the project costs. Although EPA has argued that designation of an ocean disposal site does not preclude beneficial use of dredged material, it is axiomatic that a beneficial use project becomes almost unattainable once an ocean disposal site is made available. Recently, this Department and EPA have spent hundreds of hours "negotiating" with the COE regarding specific beneficial use projects in areas where OOMDS have been designated by EPA. Such case-by-case battles to achieve concurrence with the COE regarding individual beneficial use projects are a waste of both federal and state dollars and personnel resources.

I appreciate the opportunity to provide these comments. If you have any questions or need additional information, please contact, at your earliest convenience, Ms. Rachel Wilson, at 504/342-7591.

Sincerely,

David M. Soileau
Assistant Secretary

cc: Honorable John Breaux
U.S. Senator

Honorable J. Bennett Johnston
U.S. Senator

Honorable Jimmy Hayes
U.S. Representative

Honorable Murphy (Mike) Foster, Jr.
Louisiana State Senator

4 - 6 Appendix C of the SFEIS contains EPA's updated consistency determination prepared in accordance with Section 307 of the Coastal Zone Management Act.

simply acknowledges that it may be advantageous to the state to have a disposal site available for those times when beneficial use may not be possible.

If you have any questions concerning this determination please contact Jeff Harris of the Consistency Section at (225) 342-7949 or (800) 267-4019.

Sincerely,

Katherine G. Vaughan
Assistant Secretary

KGV/TWH/jdh

cc: Linda Mathies, COE-NOD
Bill Klein, COE-NOD
Fred Dunham, LDWF
Charlie Mestayer, CMD/FI

LOUISIANA COASTAL RESOURCES PROGRAM
CONSISTENCY DETERMINATION

PROPOSED EXPANSION AND 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

INTRODUCTION

Section 307 of the Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et. seq., requires that "each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with state approved management programs." Coastal Use Guidelines were written to implement the policies and goals of the Louisiana Coastal Resources Program (LCRP) and to serve as a set of performance standards for evaluating projects. Compliance with Section 307 and the LCRP requires compliance with applicable Coastal Use Guidelines. Therefore, in compliance with Section 307 guidelines, this U.S. Environmental Protection Agency (EPA) consistency determination evaluates the proposed Ocean Dredged Material Disposal Site (ODMDS) for the disposal of maintenance material dredged from the bar channel of the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, navigation project, hereafter referred to as the Atchafalaya River Bar Channel.

The U.S. Army Corps of Engineers (COE), as authorized by the River and Harbor Act of 1968 (Public Law 90-483), is responsible for maintaining the Atchafalaya River Bar Channel at its authorized depth. Without dredging and disposal, operating depths would decrease due to the heavy sediment load of the Atchafalaya River and limit economically important ship traffic utilizing the channel. The ODMDS for the Atchafalaya River Bar Channel would be designated by the EPA pursuant to Section 102(c) of the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA), as amended. EPA's final designation would provide an environmentally acceptable site for the continued disposal of dredged material removed from the Atchafalaya River Bar Channel when other beneficial uses are not feasible.

PROJECT DESCRIPTION

In 1977, the ODMDS was interimly designated by EPA for an indefinite period, pending completion of necessary studies and evaluation of its suitability for continued use. The 1992 Water Resources Development Act (WRDA) provided that after January 1, 1997, no authorization for ocean dumping shall be issued unless the site has received final designation by EPA under Section 102(c), or as an alternative site selected by the COE under Section 103(b), of MPRSA. Based on appropriate Federal statutes, a Supplemental Draft Environmental Impact Statement (SDEIS), and supporting documentation, EPA proposed designation of the Atchafalaya River Bar Channel ODMDS in the *Federal Register* on February 6, 1991. The Supplemental Final (SFEIS), responding to comments on the SDEIS regarding the suitability of the proposed ODMDS for final designation, was completed in August, 1998. In accordance with 40 CFR 228 of the Ocean Dumping Regulations, EPA's final rule-making package will be prepared and published in the *Federal Register* after expiration of the 30-day review period on the SFEIS.

The River and Harbor Act of 1910, authorized an 20 by 200 foot channel for the length of 15.75 miles from the 20 foot contour in Atchafalaya Bay (which is approximately 4 miles from the mouth of the Atchafalaya River) to the 20 foot contour in the Gulf of Mexico. Construction of the project was completed in 1914; and the project was incorporated into the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana project in 1968. The purpose of the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana navigation project is to provide ship access to Morgan City, the Gulf Intracoastal Waterway, and the Bayous Chene, Boeuf, and Black from the Gulf of Mexico. The navigation channel also provides an adequate navigation outlet for the major marine fabrication and repair facilities which build offshore petroleum drilling rigs, and to provide shelters of refuge for these rigs and related floating equipment from Gulf storms and hurricanes. The ship traffic in the channel consists of oilfield supply boats, offshore tugs, fishing boats, and barges. The volume of trade carried through the Atchafalaya River channel (that section from Morgan City, Louisiana to the 20-foot contour in the Gulf of Mexico) has decreased from approximately 9.9 million tons in 1985 to 7.3 million tons in 1986 (COE 1994).

The bar channel is located in an area of heavy sedimentation. The Atchafalaya River is a distributary of the Mississippi River and carries approximately 30% of the total water and sediment load (Wells *et al.* 1981). Sediment is deposited mainly in the Atchafalaya Bay, resulting in delta accretion and progradation. Wells *et al.* (1981) estimated that 53×10^6 m^3 of fine-grained sediment is carried from the Atchafalaya Bay onto the shelf every year. Sediments accumulate in the Gulf portion of the bar channel from a combination of littoral transport and input from the Atchafalaya River. The ODMDS has been used for disposal of maintenance material dredged from the bar channel without significant environmental impact, and no resources or amenities of concern that could be impacted by dredged material disposal have been identified.

The New Orleans District of the COE is responsible for maintaining the Atchafalaya River Bar Channel at its authorized depth. The channel is dredged annually; without dredging and disposal, operating depths would decrease due to the heavy sediment load from the Atchafalaya

River and limit economically important ship traffic utilizing the channel. Atchafalaya Bay is expected to fill with sediments within the next 50 years. As this process occurs, the quantity of material dredged within the bay is expected to decrease, whereas quantities of material from the bar channel are expected to remain about the same. Therefore, frequency of dredging in the bar channel is expected to remain the same. As the Atchafalaya Bay fills, the character of the bar channel sediment is expected to gradually change to a higher sand content. As this occurs, material suitable for beneficial use will be used by the COE to the maximum extent practicable for the creation of seabird nesting islands adjacent to the bar channel. Neither the alignment of the navigation channel, nor the location of the proposed Atchafalaya River Bar Channel ODMDS, is expected to be altered as the Atchafalaya Bay fills.

Figure 1.1 presents the proposed ODMDS in relationship to the surrounding area, including landmarks referred to in this document. Figure 1.2 illustrates the location of the proposed site in relationship to the interim-designated site. The center of the proposed site is approximately 16 miles from the mainland coast. The proposed ODMDS has an average depth of approximately 16 feet and a total area of approximately 9.14 square miles.

The interim-designated ODMDS was approximately 0.3 mile wide by 12 miles long located parallel to and on the east side of the Atchafalaya River Bar Channel. The limits of the proposed ODMDS are extended on both the northern and southern ends, and the site shifted slightly to the east, to accommodate actual and potential increases in the length of the bar channel reach of the navigation channel as the Atchafalaya Delta progrades gulfward. The boundaries of the proposed ODMDS are: 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, and 91°34'27.51"W. This expanded ODMDS was selected as a Section 103(b) site by the COE in 1997.

Approximately 9.0 to 11.0 million cubic yards (cy) of material are annually dredged from the Atchafalaya River Bar Channel using a hydraulic cutterhead (pipeline) dredge. Atchafalaya Bay is expected to fill with sediments within the next 50 years. As this occurs, the quantity of material dredged within the bay is expected to decrease, whereas quantities of material from the bar channel are expected to remain about the same. Therefore, frequency of dredging in the bar channel is expected to remain the same. As the Atchafalaya Bay fills, the character of the bar channel sediments is expected to gradually change to a higher sand content. However, neither the alignment of the navigation channel, nor the location of the Atchafalaya River Bar Channel ODMDS, is expected to be altered as Atchafalaya Bay fills.

At the request of the Louisiana Deparatment of Natural Resources (LDNR), the Louisiana Department of Wildlife and Fisheries (LDWF), and other state and Federal natural resource agencies, the COE incorporated (under Section 404 of the Clean Water Act) about 200 acres at the upper end of the ODMDS into a 360-acre dispoasal site for the creation of islands for colonial nesting seabirds. Since 1991, approximately 750,000 cys of dredged material have been placed annually at the Section 404 site. It is anticipated that the quantity of dredged material from the navigation channel suitable for beneficial use will increase in the future as the Atchafalaya Delta

GUIDELINES

1. Guidelines Applicable to All Uses

Guidelines 1.1 through 1.6: Acknowledged.

Guideline 1.7: It is the policy of the coastal resources program to avoid the following adverse impacts. To this end, all users and activities shall be planned, sited, designed, constructed, operated, and maintained to avoid to the maximum extent practicable significant:

a) Reductions in the natural supply of sediment and nutrients to the coastal system by alterations of freshwater flow.

Response: Dredging and disposal operations at the proposed ODMDS would not alter or reduce the natural supply of sediment and nutrients to the coastal system by alterations of freshwater flow. The Atchafalaya River Bar Channel is dredged annually using a hydraulic cutterhead (pipeline) dredge. The estimated annual volume of material dredged from the Atchafalaya River Bar Channel is approximately 9 to 11 million cy. Atchafalaya Bay is expected to fill with sediments within the next 50 years. As this occurs, the quantity of material dredged within the bay is expected to decrease, whereas quantities of material from the bar channel are expected to remain about the same. Material suitable for beneficial use will be used, to the maximum extent practicable, for the creation of seabird nesting islands adjacent to the bar channel. The Atchafalaya River is a distributary of the Mississippi River and carries approximately 30% of the total water and sediment load (Wells *et al.* 1981). Sediment is deposited mainly in the Atchafalaya Bay, resulting in delta accretion, and progradation. Wells *et al.* (1981) estimated that 53×10^6 m^3 fine-grained sediment is carried from the Atchafalaya Bay onto the shelf every year. Sediments that accumulate in the Gulf portion of the bar channel result from a combination of littoral transport and input from the Atchafalaya River.

b) Adverse econonic impacts on the locality of the use and affected governmental bodies.

Response: The volume of trade carried through the Atchafalaya River channel (that section from Morgan City, Louisiana to the 20-foot contour in the Gulf of Mexico) has decreased from approximately 9.9 million tons in 1985 to 7.3 million tons in 1986 (COE 1994). A preliminary assessment, dated July 3, 1996, and titled "Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana, Dredged Material Management Plan, Preliminary Assessment, Summary of Findings and Recommendations" was prepared by the Planning Division of the New Orleans District, COE. The findings of this preliminary assessment indicate that continued maintenance of the channel to its current authorized dimensions of 20 by 400 feet may not be warranted, based upon economic productivity, and available disposal capacity. The economic parameters compiled for this preliminary assessment indicated that the number of vessels currently operating over the

waterway are far below that assumed to justify the construction and subsequent maintenance of the project to its authorized dimensions. It was concluded that maintaining a 20- by 400-foot channel may not be warranted and that further studies will be required to substantiate the level of traffic movements, the number of offshore wells being drilled in the project area, and the associate benefits of the project. The preliminary assessment indicated additional work is required to establish a management plan and that recommendations would be based on more detailed studies.

No adverse economic impacts on the locality of use or governmental bodies are expected to occur due to dredging and disposal operations at the proposed ODMDS. The Atchafalaya River Bar Channel provides ship access to Morgan City, the Gulf Intracoastal Waterway, and the Bayous Chene, Boeuf, and Black from the Gulf of Mexico. The purpose of the project is to provide an adequate navigation outlet for the major marine fabrication and repair facilities which build offshore petroleum drilling rigs, and to provide shelters of refuge for these rigs and related floating equipment from Gulf storms and hurricanes. The ship traffic in the channel consists of oil field supply boats, offshore tugs, fishing boats, and barges. Without dredging and disposal, operating depths would decrease due to the heavy sediment load of the Atchafalaya River and limit economically important ship traffic utilizing the channel.

c) Detrimental discharges of inorganic nutrient compounds into coastal waters.

Response: There would be a temporary increase in the concentration of inorganic nutrient compounds due to resuspension of bottom sediments during dredging of material from the Atchafalaya River Bar Channel and during disposal operations at the proposed ODMDS. Studies conducted at the Atchafalaya River Bar Channel ODMDS 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). The values for total Kjeldahl nitrogen resulting from the elutriate tests (3.0 to 3.7 mg/l) were at the low end of values (3.5 to 14.6 mg/l) measured in Atchafalaya Bay and Fourleague Bay by Caffrey and Day (1986). Background values from the Atchafalaya River discharge may be greater than values produced during dredged material disposal. Resolubilization of nutrients is common from sediments dredged from coastal areas (Windom 1976). Localized increases in phosphorus concentrations following disposal are typically of short duration due to rapid adsorption onto suspended particulate matter, particularly clay particles (Windom 1975; Wright 1978). Releases of nitrogen, especially ammonia, 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. 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). However, any effects would be localized and of short duration, and would not be expected to present long-term or chronic negative environmental impacts.

d) Alterations in the natural concentration of oxygen in coastal waters.

Response: Although there would be localized impacts to dissolved oxygen levels due to disposal operations, dissolved oxygen levels would return to ambient conditions within a short time. Flemer *et al.* (1994) found dissolved oxygen values were greatest nearshore, and decreased at mid-depth and offshore stations ranging from 6.2 to 7.6 mg/l for both ODMDS sites and reference sites. These values excced the generally accepted hypoxic conditions (operationally defined as <2 mg/l or equivalent <2 ppm). Dissolved oxygen values within the Atchafalaya River Bar Channel ODMDS are comparable to dissolved oxygen values outside the proposed ODMDS (Schubel *et al.* 1978; Flemer *et al.* 1994). Dredging and disposal operations have not adversely impacted, in the long-term, dissolved oxygen levels at the proposed ODMDS. Long-term or chronic negative environmental consequences of dredged material disposal on dissolved oxygen levels at the Atchafalaya River Bar Channel ODMDS are not expected.

e) Destruction or adverse alterations of streams, wetland, tidal passes, inshore waters and waterbottoms, beaches, dunes, barrier islands, and other biologically valuable areas or protective coastal features.

Response: No such areas occur within the proposed ODMDS; hence, dredging and disposal operations at the proposed ODMDS would not destroy or adversely alter streams, wetlands; tidal passes, inshore waters and waterbottoms, beaches, dunes, barrier islands, and other biologically valuable areas or protective coastal features.

f) Adverse disruption of existing social patterns.

Response: Generally, dredging and disposal operations at the proposed ODMDS would not disrupt existing social patterns. However, nearshore areas of the northem Gulf of Mexico support one of the most productive fisheries in the United States for shrimp, menhaden, and bottom fish including croaker, drum, and spotted seatrout. Fishing activities for demersal and pelagic fish and shrimp extend throughout the nearshore and shelf regions. Fishing goes on throughout the year, but activity is greatest in spring and summer. Consequently, some interferences with commercial fishing and fisheries resources from dredged material disposal in nearshore regions are inevitable; however, none of these activities are unique or restricted to the ODMDS area. The Atchafalaya River Bar Channel ODMDS represents only a small portion of the total fishing grounds of the northen Gulf of Mexico. Also, any adverse effects restricted to the disposal site proper would primarily be during actual dredging and disposal operations. Therefore, dredged material disposal at the proposed ODMDS would constitute a periodic, short-term, direct impact on a very small portion of the fishing social pattern. In addition, the social patterns in Morgan City, and other areas associated with or dependent upon ship traffic, would be adversely impacted without the channel maintenance to remove the heavy sediment load of the Atchafalaya River that would limit economically important ship traffic utilizing the channel.

g) Alterations of the natural temperature regime of coastal waterways.

Response: Dredging and disposal operations at the proposed ODMDS would not adversely impact water temperatures in coastal waters. Flemer *et al.* (1994) measured water temperatures (October 1991) at nearshore, middepth, and offshore stations both within the proposed ODMDS and at comparable reference stations. Temperatures varied from 23.7°C and 23.5°C at nearshore disposal and reference stations, respectively; to 22.9°C at both the disposal and reference offshore stations. The National Marine Fisheries Service (NMFS) measured surface and bottom temperature and salinity values in the area of the Mississippi River discharge and extending west into the area of the ODMDS between October 1972 and January 1976 (Thompson and Lemming 1978). Seasonal changes in temperature were, attributed to a combination of wind (seasonal weather patterns), Mississippi River discharge, and occasional intrusions of the Loop Current. Water temperature within the area of the proposed ODMDS varied between approximately 16°C in January/February and 28°C in September/October. Water and air temperature reached a peak in July and August, accompanied by frequent calm winds.

h) Detrimental changes in existing salinity regimes.

Response: Dredging and disposal operations at the proposed ODMDS would not adversely impact existing salinity regimes in the area. Salinity values varied widely during surveys of the Atchafalaya ODMDS and the immediate vicinity (IEC 1983). Midwater salinity values ranged from 15 to 26 parts per thousand (ppt) in December 1980 and from 4.9 to 35.5 ppt in May-June 1981. The low salinity (4.9 ppt) in May-June 1981 was measured at the nearshore station west of the ODMDS. The Atchafalaya River water flows predominantly west as it enters the Gulf; a value of 15 ppt was measured at this station in December 1980. Salinities at all other stations were at the high end of the range of values. Flemer *et al.* (1994) found that salinities in the ODMDS and reference areas varied with depth. Salinities ranged from 9.5 and 8.0 ppt nearshore, from 19.1 and 17.6 ppt at middepth, 25.8 ppt at offshore, and 24.4 ppt at reference stations.

i) Detrimental changes in littoral and sediment transport processes.

Reponse: Dredging and disposal operations at the proposed ODMDS would not cause detrimental changes in littoral or sediment transport processes. Physical oceanographic parameters determine the extent of water-column mixing and sediment transport and affect the chemical environment at the ODMDS. Studies which examined openwater pipeline disposal operations at the Atchafalaya River Bar Channel ODMDS noted that turbidity plumes were of limited duration and areal extent (Heaton 1978; Schubel *et al.* 1978). Background levels of suspended sediment at the time of the studies were between 30 and 500 mg/l. Maximum total concentrations within the plume were about 1,500 mg/l, but were confined to a small area, less than 7.4 acres. The area of the measured plumes with concentrations greater than 300 mg/l never exceeded 210 acres. The linear extent of the 300-mg/l field was less than 0.6 mi.

Approximately 191 million cy/yr of fine sediments exit the Atchafalaya River (Wells and Kemp 1981, 1982; Wells *et al.* 1981); 153 million cy/yr are deposited in the prograding delta and 69 million cy/yr are transported elsewhere by currents of the Atchafalaya mud stream. Turbid water enters the Gulf of Mexico from the Atchafalaya River and flows predominantly westward along the shoreline as a muddy plume (i.e., the Atchafalaya mud stream). Wells and Kemp (1982) measured suspended solids concentrations in the mud stream and found that concentrations within Atchafalaya Bay range from 250 to 400 mg/l. Concentrations increase seaward of Point au Fer Shell Reef to more than 800 mg/l, perhaps resulting from wave resuspension of soft sediments that are deposited rapidly as pro-delta clays seaward of the bay mouth. Beyond the mud stream (31 to 39 miles), concentrations decrease across the shelf to 1 mg/l or less. The environmental consequences of disposal operations at the proposed ODMDS would be a temporary increase of turbidity levels and suspended solid concentrations in the water column, generally characterized as occurring for limited duration and confined to a small area. However, the disposal operation discharge plumes would be within the range of background levels for suspended sediments typical of turbid waters from the Atchafalaya River discharge.

j) Adverse effects of cumulative impacts.

Response: The 9-11 million cy of dredged material disposed into the proposed ODMDS constitutes an indirect, cumulative, loss of an important resource to the state, which LDNR suggests should be used to create wetlands and/or provide sediment-rich waters for marsh nourishment. EPA evaluated the direct, indirect and cumulative effects of the proposed ODMDS and non-ocean disposal alternatives in the SFEIS, and supports the use of dredged material beneficially to improve the long-term productivity of the coastal zone.

At the request of the LDNR, LDWF, and other Federal and state natural resource agencies, the COE incorporated upper end of the ODMDS 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. Since 1991, approximately 750,000 cys of dredged material have been placed annually at the Section 404 site (see figure 2.2).

In FY96, material removed from the bar channel at about Station 474+00 to Station 650+00 was placed to a height of about 6 ft. on approximately 360 acres east of the bar channel to construct a bird island. In previous years, only material from about Station 475+00 to Station 570+00 was placed for island construction. Hydrographic surveys conducted in FY '96 indicate that the hard - bottom extends beyond Station 570+00, so material removed between Station 570+00 and Station 650+00 was also placed in the bird island disposal area.

It is anticipated that the quantity of dredged material from the navigation channel suitable for beneficial use will increase in the future as the Atchafalaya Delta progrades gulfward. As this occurs, COE would place additional dredged material at the Section 404 site and designate additional sites for beneficial use as the need arises. Only dredged material from the navigation channel not suitable for beneficial use would be deposited in the proposed ODMDS.

EPA supports LDNR's cooperation in seeking additional funding from Congress, CWPPRA, the State Restoration Program, and other sources for COE disposal operations. Designation of the proposed ODMDS under authority of Section 102 of the MPRSA would not prohibit the future consideration of beneficial use alternatives as additional funding becomes available.

Generally, no direct, adverse, cumulative impacts have been detected and none are expected. However, due to the potential for bioaccumulation of toxic substances in the marine ecosystem, the concentrations of metals, hydrocarbons. organic volatiles, semivolatiles, pesticides, PCBs, and other toxic substances in sediments disposed of in the proposed ODMDS warrant continued monitoring to determine any future changes and subsequent responses/changes to dredging and disposal operations. Appropriate actions will be taken as described in the Site Management Plan for the proposed ODMDS.

k) Detrimental discharges of suspended solids into coastal waters, including turbidity resulting from dredging.

Response: No significant adverse impacts associated with the temporary increase in turbidity and suspended solids due to discharge of dredged material are expected. Any increases in turbidity and suspended solids would be of short duration and localized. However, the disposal operation discharge plumes would be within the range of background levels for suspended sediments typical of turbid waters from the Atchafalaya River discharge.

l) Reductions or blockage of water flow or natural circulation patterns within or into an estuarine system or a weuand forest.

Response: No reduction or blockage of water flow or natural circulation pattens within or into an estuarine system or a wetland forest is expected.

m) Discharges of pathogens or toxic substances into coastal waters.

Response: Sediments in the proposed ODMDS were examined for selected chlorinated hydrocarbon pesticides, PCBs, and petroleum hydrocarbons (Flemer *et al.* 1994). No chemicals in these classes were detected in any sediment samples above detection limits, and heavy metal concentrations approximated each other between reference and ODMDS sites. Metal concentrations were lower in nearshore samples at both the reference and ODMDS sites. Selected chlorinated hydrocarbon pesticides [aldrin, BHC isomers (alpha, beta, gamma/lindane), chlordane, chlorpyrifos (dursban), DDE, DDD, dieldrin, endrin, endosulfan I, endosulfan II, endosulfan sulfate, heptachlor, heptachlor epoxide, hexachlorobenzene, methoxychlor, mirex, and toxaphene] and polychorinated biphenyls (PCBs) were not detected in sediments tested by Flemer *et al.* (1994) above detection limits of 0.010 micro gram per gram (mg/g) wet weight. Petroleum hydrocarbons were not detected in any sediment sample above 1.0 mg/g wet weight, the method detection limit. Synthetic organic compounds, such as pesticides and PCBs, do not occur naturally in sediments, but result from anthropogenic contamination (Brannon 1978). Chlorinated

hydrocarbons (CHCs) have low solubility in water, are rapidly absorbed to sediments, and are released to interstitial waters only in small quantities (Burks and Engler 1978).

Elutriate tests are intended to indicate the potential for release of dissolved trace metals from dredged sediment when mixed with seawater. Elutriate tests conducted on dredged material from the Atchafalaya River Bar Channel indicated little or no release of trace metals, except for manganese (COE 1978). Release of manganese during elutriate testing is a common phenomenon (Brannon 1978; Heaton 1978). Similar results were obtained from elutriate testing. The tests were conducted on sediments from one station within, and one reference station outside, the Atchafalaya River Bar Channel ODMDS (IEC 1983). There was a slight release of zinc from sediments at both stations. Releases of metals from the ODMDS station and reference station sediments were similar. The results of elutriate tests on sediments collected from the Atchafalaya River bar channel by the EPA-ERLN survey (Dettmann and Tracey 1991) of the nearshore and mid-channel stations showed that barium and iron were the only trace metals to exceed detection limits. Elutriate tests for selected organic volatiles, semivolatiles, pesticides, and PCBs, resulted in no releases detected for either nearshore or mid-channel stations sampled.

Long-term or chronic negative environmental consequences of dredged material disposal at the proposed ODMDS are not expected. However, due to the potential for bioaccumulation of toxic substances in the marine ecosystem, the concentrations of metals, hydrocarbons, organic volatiles, semivolatiles, pesticides, PCBs, and other toxic substances in sediments disposed of in the proposed ODMDS warrant continued monitoring to determine any future changes and subsequent responses/changes to dredging and disposal operations. Appropriate actions will be taken in accordance with the Site Management Plan for the proposed ODMDS.

n) Adverse alteration or destruction of archaeological, historical, or other cultural resources.

Response: The COE Submerged Cultural Resource Database contains historical accounts of 52 shipwrecks in the Atchafalaya River, and 7 shipwrecks in Atchafalaya Bay. Review of the literature for the Atchafalaya Basin indicates a high probability for the occurrence of historically important shipwrecks due to the proximity of the proposed ODMDS to the Atchafalaya River navigation channel. The literature also indicates shipwrecks are most likely to be found near the Point Au Fer Shell Reef and at the mouth of the Atchafalaya River. Hence, the northernmost portion of the proposed ODMDS, located near the Point Au Fer Shell Reef, has the greatest potential to contain submerged cultural resources. The COE conducted a submerged cultural resource survey of the proposed ODMDS, the results of which were reviewed and coordinated with the State Historic Preservation Offlcer (SHPO) of Louisiana. Initial magnetic and side-scan sonar results indicate the presence of numerous anomalies located throughout the proposed ODMDS area. Magnetic and side scan anomalies from the proposed ODMDS area which are suggestive of a shipwreck will be examined to determine the nature of the anomaly. Any anomaly suggestive of a shipwreck will be located and documented for later analysis. If the anomaly is located within the proposed ODMDS, two alternative actions would be considered. First, the

anomaly area would be avoided during any dredging and disposal operations. Second, depending on the availability of funds, additional investigation of the anomaly would be conducted to determine the exact nature of the anomaly and clear the area for dredging and disposal operations. The SHPO concurred with the COE's findings and recommendations, and no additional investigations are required.

o) Fostering of detrimental secondary impacts in undisturbed or biologically highly productive wetland areas.

Response: Since no such areas exist within the proposed ODMDS, dredging and disposal operations at the proposed ODMDS would not foster detrimental secondary impacts in any such areas. EPA acknowledges, however, the Coastal Management Division of the LDNR's concern that the 9-11 million cy of dredged material disposed of at the proposed ODMDS constitutes an indirect, cumulative, impact from the loss of an important resource to the state (i.e., which could be used to create wetlands and/or provide sediment-rich waters for marsh nourishment). This is addressed in item j) above.

p) Adverse alteration or destruction of unique or valuable habitats, critical habitat for endangered species, important wildlife or fishery breeding or nursery areas, designated wildlife management or sanctuary areas, or forestlands.

Response: Since no such areas exist within the proposed ODMDS, these important resources would not be altered or destroyed by dredging and disposal operations at the proposed ODMDS.

q) Adverse alteration or destruction of public parks, shoreline access points, public works, designated recreation areas, scenic rivers, or other areas of public use and concern.

Response: Since no such areas exist within the proposed ODMDS, these public use concerns would not be adversely altered or destroyed by dredging and disposal operations at the proposed ODMDS.

r) Adverse disruptions of coastal wildlife and fishery migratory patterns.

Response: Limited interference with nearshore fisheries may occur during disposal of 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 would be unavailable to migrating shrimp during periods of active dredging and disposal. Also, the settling disposal material and the sediment plume in and near the proposed ODMDS would impede the movement/migration of marine organisms (e.g., shrimp) between the Gulf and Atchafalaya Bay. However, the effect of these impediments on the movement/migration of the particular marine organism populations would be very small and probably undetectable. The stress and possible mortality of individual organisms encountering adverse conditions during

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