U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
SILVER SPRING, MARYLAND

ENVIRONMENTAL ASSESSMENT OF ATCHAFALAYA SEDIMENT DELIVERY CWPPRA PROJECT PAT 2

ST. MARY PARISH, LOUISIANA

JUNE 1996

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JUNE 1996

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TASK ORDER NO. 56-DKNF-5-10004

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ENVIRONMENTAL ASSESSMENT
ATCHAFALAYA SEDIMENT DELIVERY
St. Mary Parish, Louisiana

1.0 INTRODUCTION

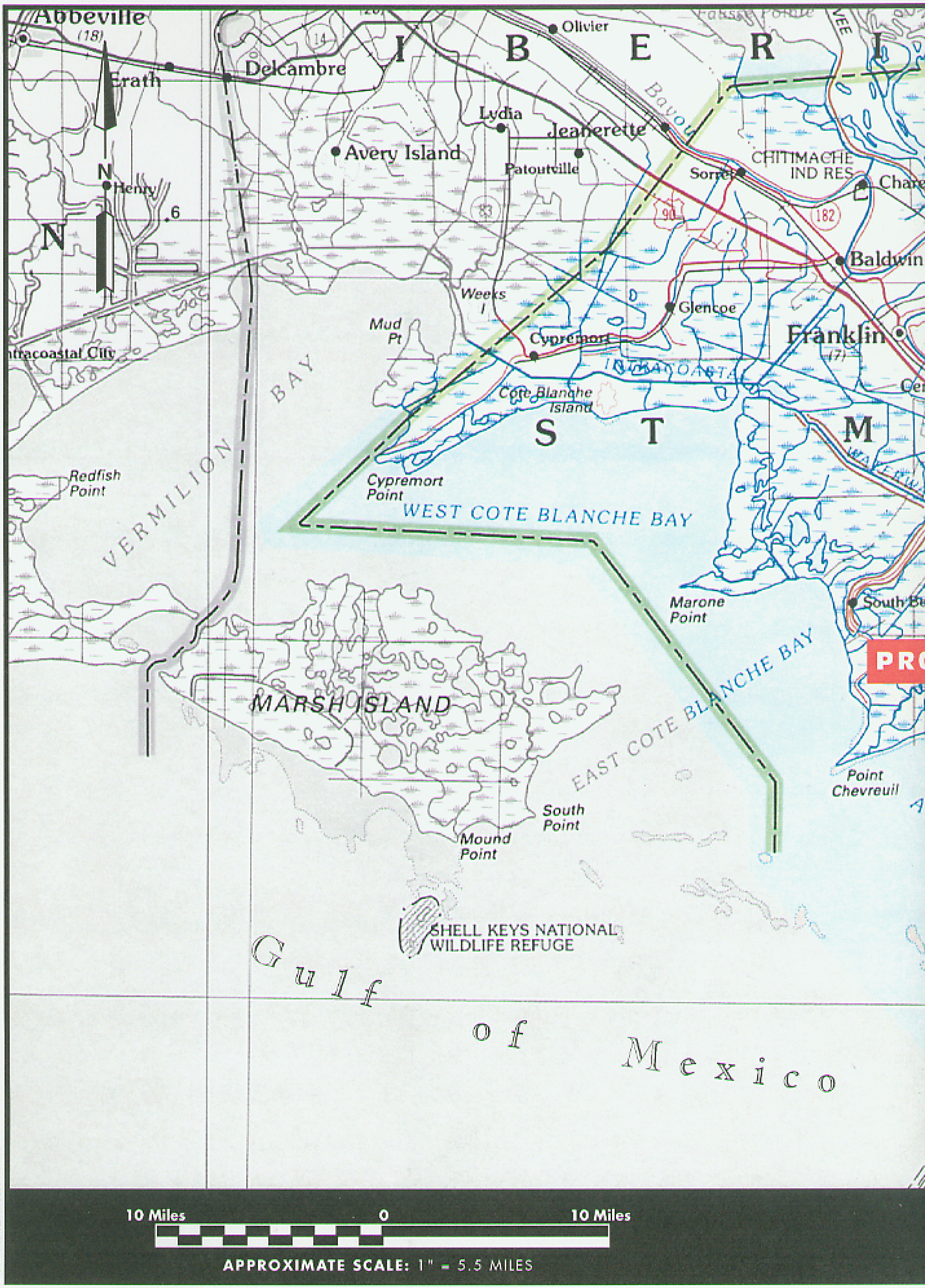
This Environmental Assessment (EA) evaluates the impacts of a project to enhance the eastern sub-delta development of the emerging lower Atchafalaya River Delta located in southeast St. Mary Parish, Louisiana, as shown in Figure 1. The project is named Atchafalaya Sediment Delivery and is referred to as PAT 2.

This project is part of the Coastal Wetlands Planning Protection and Restoration Act (Pub. L. No. 101-646, Title III-CWPPRA) made law in 1990. Five Federal agencies and the State of Louisiana have combined in a Task Force to implement the "comprehensive approach to restore and prevent the loss of coastal wetlands in Louisiana" mandated by CWPPRA. The five federal agencies involved are: the U.S. Department of the Army (USACOE), the U.S. Department of Commerce, the U.S. Department of Interior, the U.S. Department of Agriculture, and the U.S. Environmental Protection Agency (U.S. EPA). The Atchafalaya Sediment Delivery project was included on the Second Annual Priority Project List (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1992) and will soon be ready for construction.

The Atchafalaya Sediment Delivery project consists of restoring cross-sectional dimensions of two distributary channels, Natal Pass and Castille/Radcliffe Pass, located in the eastern lobe of the lower Atchafalaya Delta. These two channels represent tertiary pathways for suspended sediment to flow into the more eastern regions of the Atchafalaya Bay. These channels became blocked as a result of disposal of material dredged from the Atchafalaya River for navigation purposes. This project is designed to reopen these channels to enhance the distribution of suspended sediment into the shallow waters of the eastern Atchafalaya Bay.

1.1 Technical Background

The Louisiana Coastal Zone contains 7.9 million acres of which about 3 million acres are coastal marshes. These marshes are currently being converted to open water at a rate of 34.9 square miles per year (Barras *et al.*, 1994). This rate is similar to that measured in previous years by Gagliano *et al.* (1981) and DeLaune *et al.* (1991). This conversion is the result of natural and anthropogenic factors that have altered the hydrology and physical integrity of these wetlands and still persist today.


Abbeville
(18)
Erath
Delcambre
Olivier
I
B
E
R
I
N
Avery Island
Lydia
Jeanerette
Patoutville
Henry
Bayou
CHITIMACHE
IND RES.
Sorrel
Baldwin
N
Weeks
I
Glencoe
Franklin
(7)
Mud
Pt
Cypremort
Intracoastal City
BAY
Cote Blanche
Island
S
T
M
VERMILION
Redfish
Point
Cypremort
Point
WEST COTE BLANCHE BAY
Marone
Point
South
EAST COTE BLANCHE BAY
MARSH ISLAND
Point
Chevreuil
South
Point
Mound
Point
SHELL KEYS NATIONAL
WILDLIFE REFUGE
Gulf
of
Mexico
10 Miles
0
10 Miles
APPROXIMATE SCALE: 1" = 5.5 MILES

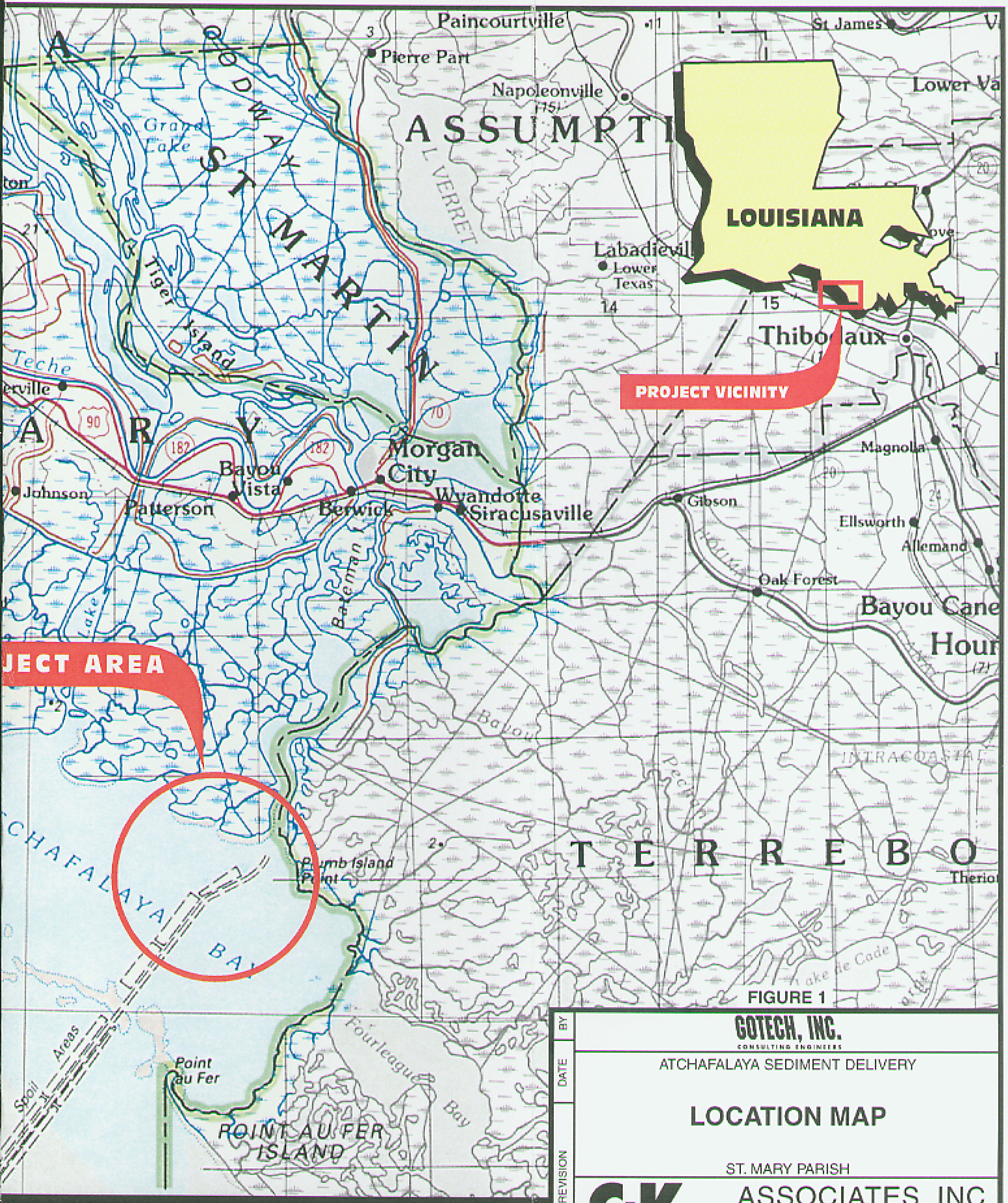


FIGURE 1

BY	GOTECH, INC. CONSULTING ENGINEERS
DATE	ATCHAFALAYA SEDIMENT DELIVERY
REVISION	**LOCATION MAP**
	ST. MARY PARISH
NO.	C-K ASSOCIATES, INC. BATON ROUGE, LOUISIANA

DRAWN	MPC	APPROVED	BKD
CHECKED	JSH	DATE	MAY 23, 1995
		DWG. NO.	B34-104-05

NOTE:
BASE MAP TAKEN FROM U.S.G.S. MAP "STATE OF LOUISIANA", DATED 1990, AT A SCALE OF 1:500,000

The primary pattern of land loss in the Louisiana Coastal Zone results from the submergence of coastal marshes and subsequent conversion to open water (Turner, 1990). Generally, submergence occurs when the rate of vertical accretion, including mineral sediment deposition and organic matter accumulation, does not equal or exceed the rate of geologic subsidence and the eustatic sea level rise. Consequently, these marshes begin to break apart and create open shallow ponds within the marsh interior. This ponding increases until the entire marsh area has converted to open water.

Coastal marshes are constructed and nourished by hydrological processes that influence site specific chemical, physical and biological processes which affect plant growth and mineral sediment deposition (Mendelssohn and Burdick, 1988). Because these processes are interrelated, the site specific factors influencing conversion of marsh to open water may vary widely and are difficult to assess.

Natural factors associated with coastal land loss include subsurface compaction and subsidence, eustatic sea level rise, physical substrate scouring and erosion, and periodic tropical cyclonic storms (Craig *et al.*, 1979; Boesch *et al.*, 1983). In addition, site specific natural influences, such as increased herbivore activity, can promote land loss within coastal marshes (Nyman *et al.*, 1993c).

Anthropogenic activity accounted for 26 percent of total wetland loss within Louisiana between 1955 and 1978 (Turner and Cahoon, 1988). These direct losses were caused by dredging canals and creating spoilbanks, draining land, and expanding agricultural and urban areas.

Turner and Cahoon (1988) attribute indirect causes of wetland loss to (1) temporal trends in estuarine salinity, (2) saltwater intrusion in waterways, (3) saltwater movement in marshes, (4) plant responses to salinity change and submergence, and (5) subsidence, water level rise and sediments. Indirect losses were exacerbated by levee construction for flood protection along the Mississippi River (Templet and Meyer-Arendt, 1988), extensive canal construction associated with oil and gas exploration (Turner *et al.*, 1982) and navigation channel development and maintenance dredging. These large scale perturbations altered existing patterns of surface hydrology and sediment distribution over large areas and facilitated saltwater intrusion into coastal marshes.

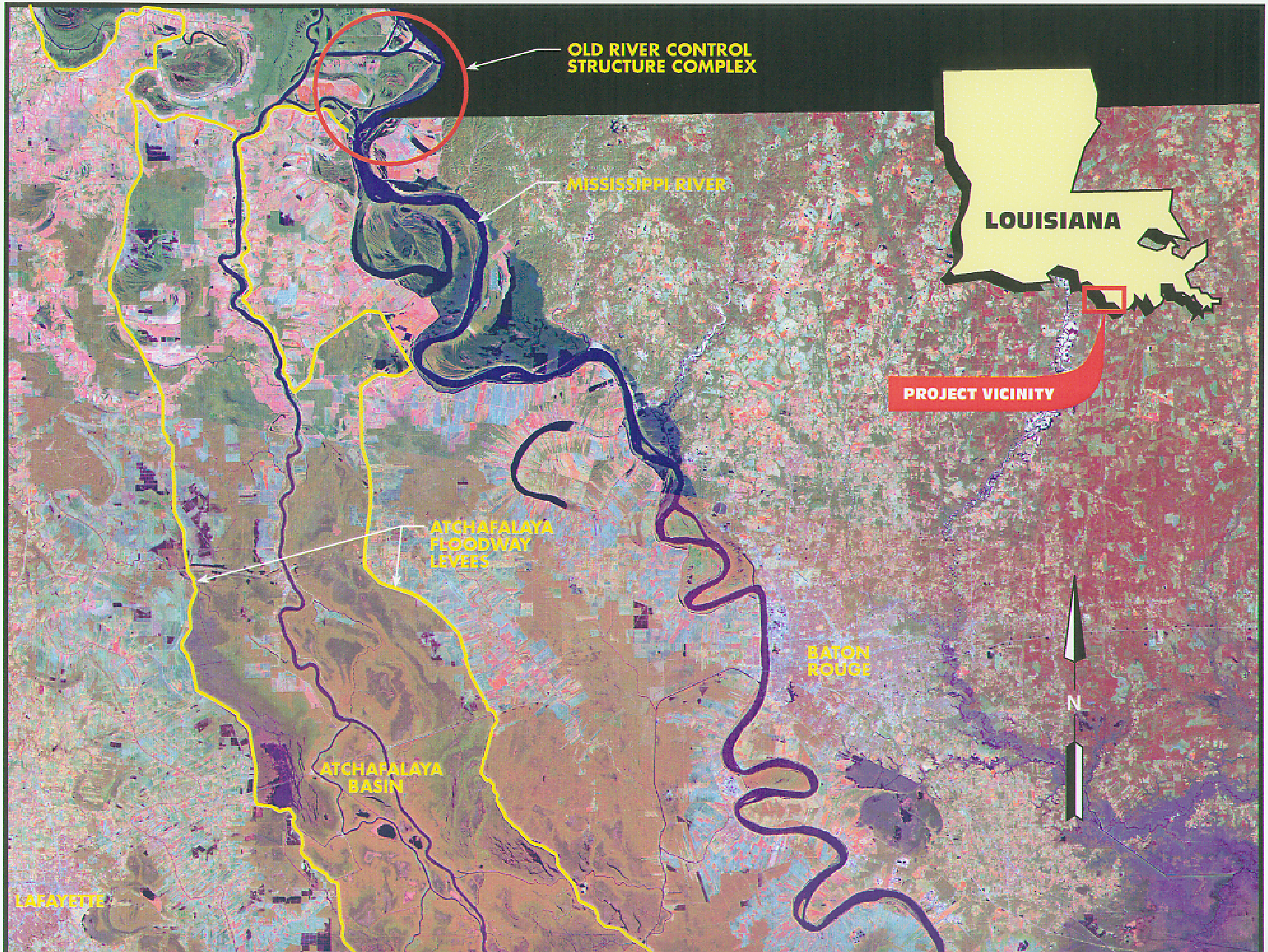
A major event affecting sediment distribution within the Louisiana Coastal Zone is the current channel shift occurring within the Mississippi River Delta complex. In 1900, the Atchafalaya River captured 13 percent of the Mississippi River's flow at the point of convergence near Simmesport, Louisiana, approximately 70 miles northeast of Lafayette, Louisiana (Morgan *et al.*, 1953). By 1952, this distributary had captured 30 percent of the Mississippi's flow and increased sedimentation was observed within the lower Atchafalaya Basin (Adams and Baumann, 1980). In

1963, this increased flow into the Atchafalaya River was regulated by the construction of the Old River Control Structure by the USACOE near Simmesport, Louisiana, as shown in Figure 2. The structure allows the USACOE to maintain a 30/70 split of the channel flow between the Atchafalaya and Mississippi Rivers during normal river stages. During floods or high river stages, more of the flow can be diverted down the Atchafalaya River.

The increased flow down the Atchafalaya from 1900 to 1952 initially transported abundant prodelta clays into the Atchafalaya Bay. This phase was proceeded by the deposition of fine sands at the mouth of the Atchafalaya River and Wax Lake Outlet (van Heerden and Roberts, 1988). In 1973, the emergence of a subaerial (above water) delta confirmed the presence of a new delta within the Atchafalaya Bay (van Heerden *et al.*, 1991). Sediment deposition in the new delta is highest during annual flooding events where flood water discharge into the Atchafalaya Bay averages over 400,000 cubic feet per second with a sediment load of 46.9 million tons (Roberts, 1980). This long-term source of sediment provides the basis for delta expansion and marsh creation throughout the shallow Atchafalaya Bay.

The significance of this new prograding delta is notable when contrasted with the rapid loss of coastal wetlands within the Louisiana Coastal Zone and especially near or adjacent to the current Mississippi River Delta. Wetlands adjacent to the lower Mississippi River and bird's foot delta represent areas of greatest land loss during the past 40 years (Barras *et al.*, 1994). Recent land gain reported (Barras *et al.*, 1994) within this rapidly subsiding area primarily is due to the deposition of dredged material on spoil banks. Comparatively, much of the land gain within the Atchafalaya Bay results from the emergence of the prograding subaerial delta. Over 6,800 acres of Atchafalaya Bay bottom have been converted to subaqueous (under water) delta since 1973 (U.S. Department of Commerce, 1992). This continuing deposition of sediment represents an important foundation needed for marsh creation and nourishment.

Historically, the Atchafalaya River system has been an integral part of regional flood control management, commerce, oil and gas exploration, fish and wildlife management, and recreation (U.S. Environmental Protection Agency, 1990). In addition, the fresh water and sediment discharge represents a sustaining influence on adjacent coastal marshes (Gosselink, 1984; Nyman and DeLaune, 1991; Randall and Day, 1987). For these reasons, state, federal, and university research interests have closely monitored the emergence of the prograding delta. Recent studies suggest that regular maintenance dredging of the Atchafalaya Bay channel by the USACOE has reduced the rate of natural delta progradation, disrupted the natural sediment delivery systems and promoted wetlands loss (U.S. Department of Commerce, 1992). Because mineral sediment deposition is a primary factor influencing the rate of vertical accretion in coastal marshes, the disruption of the


OLD RIVER CONTROL
STRUCTURE COMPLEX
LOUISIANA
MISSISSIPPI RIVER
PROJECT VICINITY
ATCHAFALAYA
FLOODWAY
LEVEES
N
BATON
ROUGE
ATCHAFALAYA
BASIN
LAFAYETTE

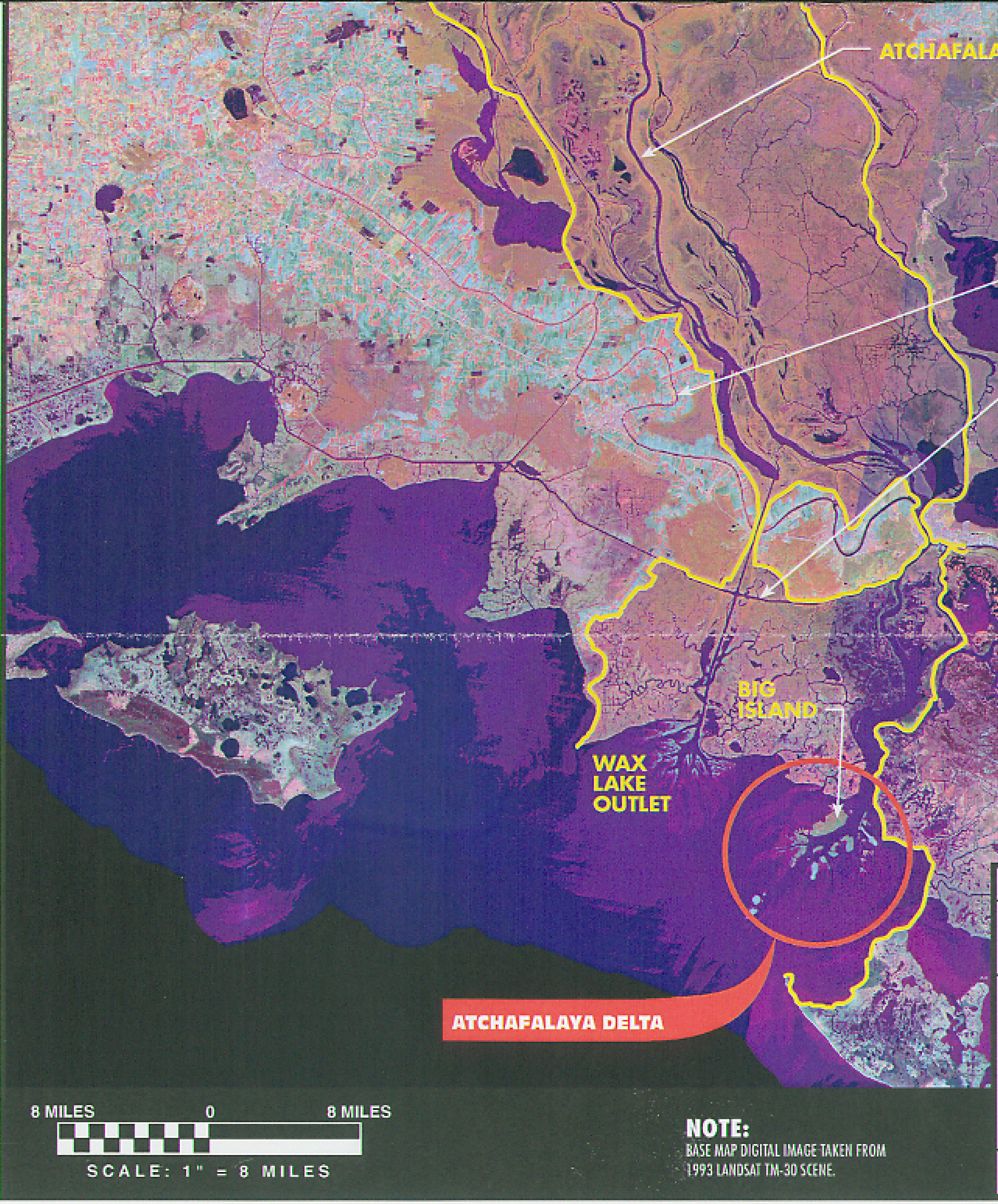


FIGURE 2

GOTECH, INC. CONSULTING ENGINEERS			
ATCHAFALAYA SEDIMENT DELIVERY			
ATCHAFALAYA RIVER BASIN			
ST. MARY PARISH			
C-K ASSOCIATES, INC. BATON ROUGE, LOUISIANA			
DRAWN	MPC	APPROVED	BKD
CHECKED	JSH	DATE	MAY 23, 1995
		DWG. NO.	B34-104-02

NO. | REVISION | DATE | BY

sediment delivery system in the prograding Atchafalaya would result in a long-term reduction in land gain.

As shown in Figure 3, the Atchafalaya Bay Channel runs through the center of the prograding delta. The USACOE maintains a 400-foot wide, 20-foot deep navigation channel in the center of the Atchafalaya Bay Channel. Maintenance dredging of this channel has adversely impacted the natural sediment delivery system of the river by channeling suspended sediment away from secondary distributary channels into deeper and more open waters (U.S. Department of Commerce, 1992; van Heerden *et al.,* 1991). The velocity of the water in the dredged channel increases erosion from the banks or heads of newly formed lobes resulting in a loss of land mass. In addition, the disposal of dredged material on the east and west sides of the channel has reduced or blocked flow through these channels. Thus the east and west migration of sediment through smaller distributary channels is reduced, subsequently reducing the delta building potential of the natural sediment delivery system (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993a). Because coastal wetlands evolve slowly as a result of annual sediment deposition and organic accumulation (Delaune *et al.,* 1987; Nyman *et al.,* 1993a, b, and d), a reduction in the volume of sediment and frequency of deposition reduces delta growth and marsh expansion and may cause a reduction of newly created wetlands.

On the west side of the Atchafalaya Bay Channel, Big Island was constructed by the deposition of dredged material. This 1,200-acre island, adjacent to the navigation channel, has elevations of +10 to +12 feet National Geodetic Vertical Datum (NGVD) and no distributary channels. Big Island's size, orientation, elevation, and lack of internal channelization inhibit marsh expansion in the western region of the prograding delta.

On the east side of the Atchafalaya Bay Channel, natural and man made influences have also decreased delta expansion. Erosion of the heads of newly formed lobes facing the navigation channel resulted in land loss from these areas. Dredged material was placed at the heads of these lobes beginning in 1987 to mitigate for this loss. Unexpectedly, some of this dredged material migrated into these secondary channels during seasonal storms and caused a sealing off of these channels (U.S. Department of Commerce, 1992). This resulted in a reduction in the easterly (lateral) transport of sediment and has resulted in land loss within this area.

The recognition that the potential for delta expansion had been reduced within the Atchafalaya Bay stimulated interest in designing mitigative measures to slow or reverse this trend. Specifically, the enhancement of delta creation to the east and west existing delta lobes became a primary focus of engineering design.

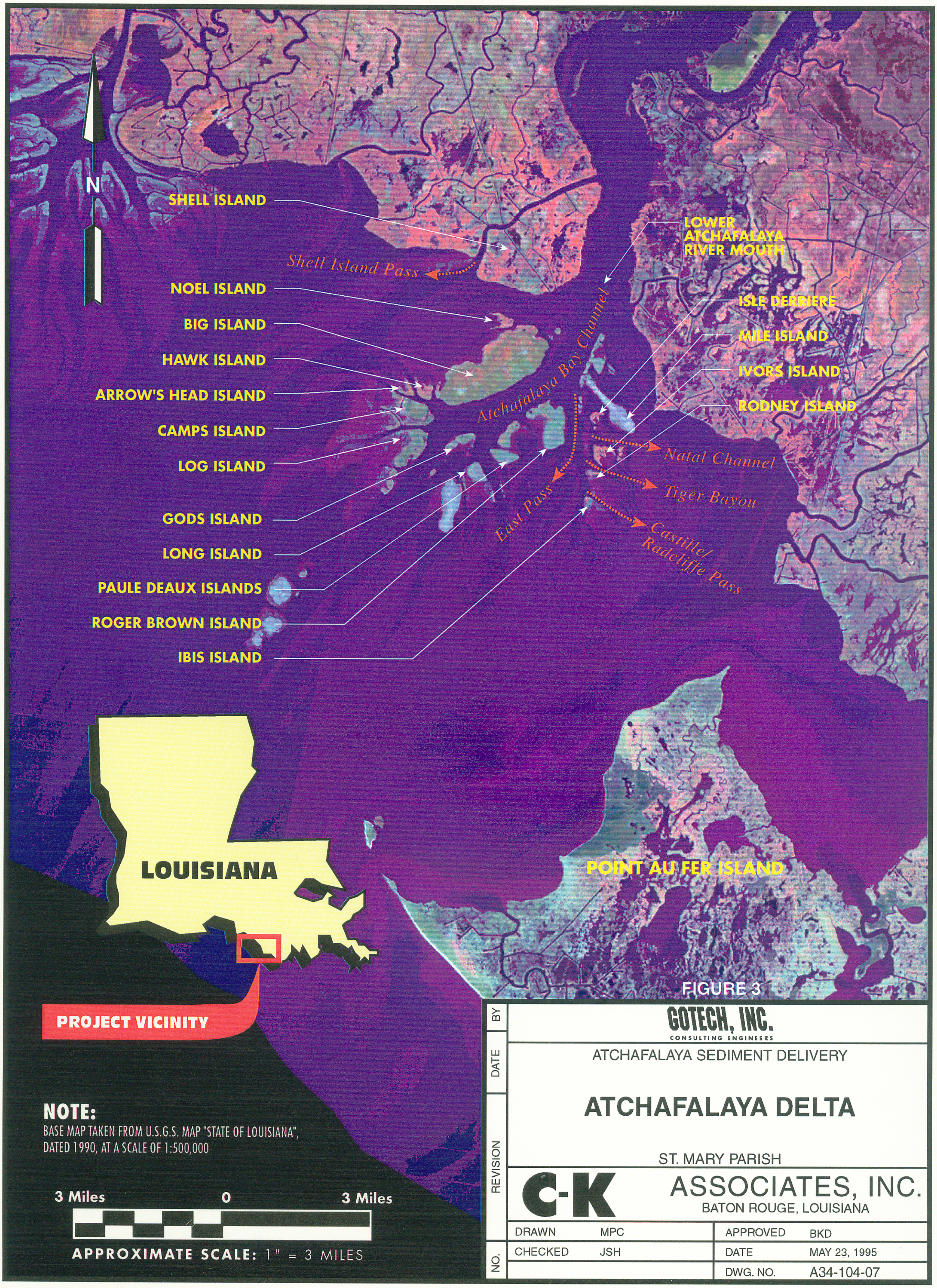


FIGURE 3

BY	GOTECH, INC. CONSULTING ENGINEERS
DATE	ATCHAFALAYA SEDIMENT DELIVERY
	ATCHAFALAYA DELTA
REVISION	ST. MARY PARISH
	C-K ASSOCIATES, INC. BATON ROUGE, LOUISIANA

NO.			
DRAWN	MPC	APPROVED	BKD
CHECKED	JSH	DATE	MAY 23, 1995
		DWG. NO.	A34-104-07

A conceptual plan evolved to enhance sediment delivery throughout the delta which involved the creation of a new distribution channel to the west and the unplugging of existing tertiary channels to the east. The dredging of a new channel to the west of Big Island involved several alternative alignments, whereas the unplugging or dredging of sealed channels to the east represents a routine activity.

In addition to creating or unplugging channels, observations of subaerial delta expansion within the Atchafalaya Bay suggest that strategic placement of spoil along the edge or front of subaqueous mud flats at the point of channel bifurcation could create elevations which would be conducive to the establishment of wetland vegetation and would enhance delta lobe development (Day *et al.*, 1987). During flood or storm events, water from the channel would flow over this man-made bank and deposit sediment behind the spoil area due to the reduced velocity of the water. An elevation of +3.0 feet NGVD is considered the target elevation of the spoil bank to achieve this effect in the Atchafalaya Bay (Day *et al.*, 1987). Thus, strategic placement of spoil resulting from the proposed dredging activity to create east-west distribution channels could create marsh elevations and enhance delta growth.

1.2 Project Location

The Atchafalaya Sediment Delivery project is located in the Atchafalaya Bay, in the lower southeast corner of St. Mary Parish, Louisiana. The project area is in the lower eastern half of the Atchafalaya River Delta near Latitude N-29°27'00' and Longitude W-91°17'30'.

1.3 Project Funding

Seventy-five percent of the funding for this project is provided through CWPPRA with 25 percent of the cost shared by the State of Louisiana Department of Natural Resources (LDNR). The project is administered by cooperative agreements between the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) and LDNR.

2.0 PURPOSE AND NEED FOR ACTION

2.1 Purpose

A major goal of CWPPRA is to "restore and prevent the loss of coastal wetlands in Louisiana." The purpose of the Atchafalaya Sediment Delivery project is to enhance the eastward development of the emerging lower Atchafalaya River Delta and its adjacent coastal wetlands. This purpose will be achieved by dredging open two primary distribution channels that discharge into the eastern Atchafalaya Bay. Dredged material from this operation will be placed strategically at five disposal sites along the new channels to further enhance delta development to the east. Figures 4 and 5 (adapted from the permit application) show the location of the two channels to be deepened and the designated disposal sites.

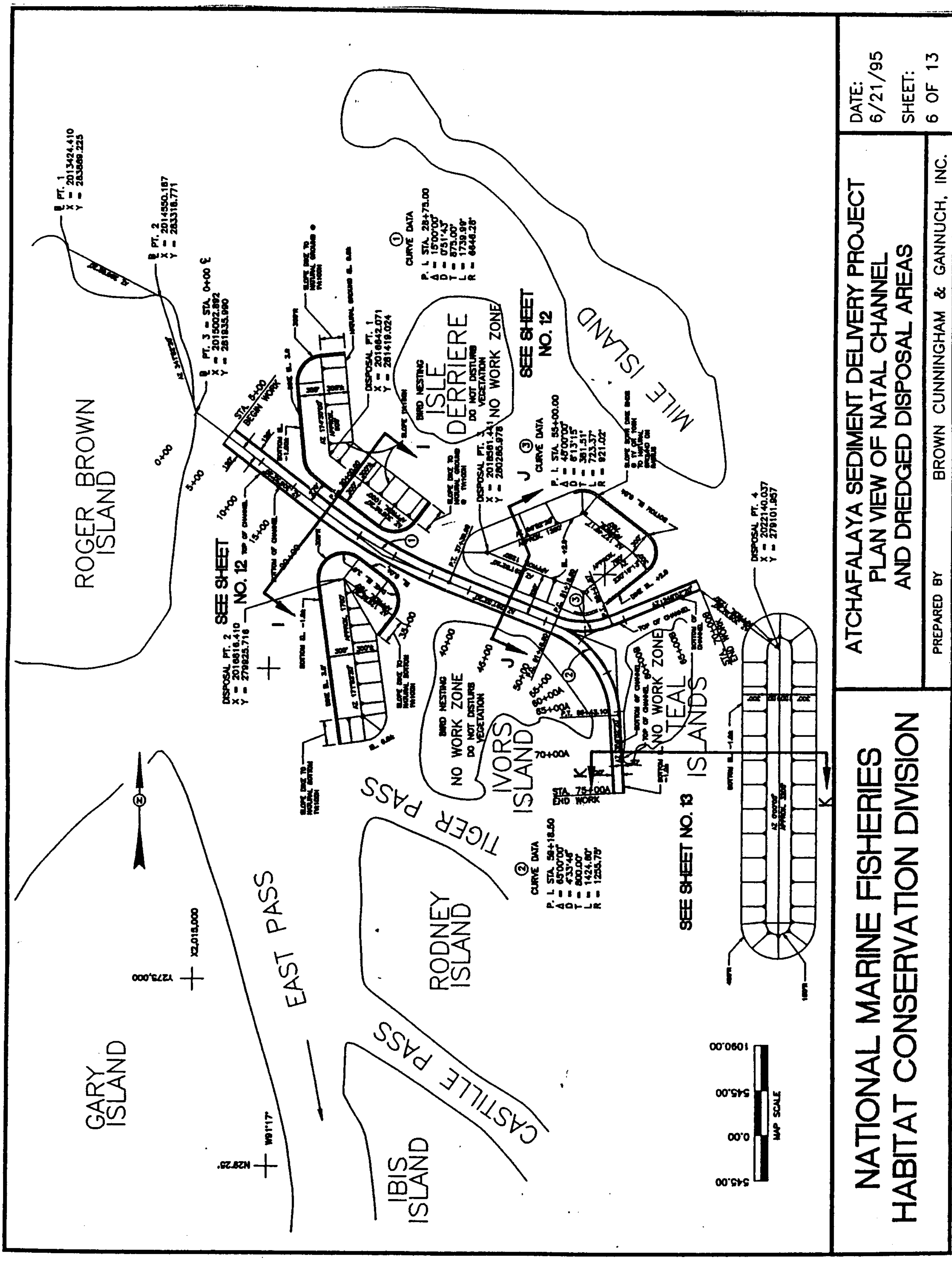
2.2 Need For Action

The Atchafalaya Sediment Delivery project is one of two CWPPRA projects designed to enhance the development of the Atchafalaya Delta. The need to implement the Atchafalaya Sediment Delivery project emanates from the project's long-term potential to create and sustain new delta and coastal wetlands in eastern Atchafalaya Bay. The Atchafalaya River is the primary distributary of Mississippi River and currently delivers an estimated 46.9 million tons of fine grain sediment annually to the shallow waters and prograding delta of Atchafalaya Bay. This sediment is a fundamental building block for coastal wetlands and provides the substrate on which biological activities occur.

Although loss of coastal wetlands in Louisiana is estimated at 34.9 square miles per year, the prograding Atchafalaya Delta represents the most significant area of actual land gain within the Louisiana Coastal Zone. Within the Atchafalaya Delta, however, there are areas of land loss. Comparison of the shape of islands on aerial photographs from 1978 to 1990 shows that the bay or eastern side of some of these islands and the submerged aquatic vegetation surrounding them has decreased. This is substantiated by Barras (1996) in habitat data from 1978, 1984 and 1988/90 photographs which identified 32, 22, and 50 acres, respectively as marsh loss within the 1,933 acre project area. Some of these changes are the result of sediment deprivation due to the closure of Natal Channel and Castile/Radcliffe Pass. Other losses could be attributed to lack of nourishment during low flood years. Reopening the two channels, which were closed by maintenance dredging material, would permit more natural delta building and nourishment in the project area.

2.2.1 Historic Shift in the Mississippi River Delta

The current shift in the locus of Mississippi River sediment deposition from the Mississippi River Delta, which formed approximately 1,000 years ago, to the Atchafalaya Bay is an extremely rare event. The new prograding Atchafalaya Delta marks the beginning of a building process that contributes to a very dynamic and productive ecosystem. The proposed sediment delivery projects will enhance and utilize existing hydrologic influences to continue to build and nourish coastal wetlands.



NATIONAL MARINE FISHERIES
HABITAT CONSERVATION DIVISION
ATCHAFALAYA SEDIMENT DELIVERY PROJECT
PLAN VIEW OF NATAL CHANNEL
AND DREDGED DISPOSAL AREAS
PREPARED BY
BROWN CUNNINGHAM & GANNUCH, INC.
DATE:
6/21/95
SHEET:
6 OF 13
ROGER BROWN ISLAND
ISLE DERRIERE
MILE ISLAND
IVORS ISLAND
TEAL ISLANDS
RODNEY ISLAND
GARY ISLAND
IBIS ISLAND
EAST PASS
TIGER PASS
CASTILLE PASS
SEE SHEET NO. 12
SEE SHEET NO. 13
BIRD NESTING
DO NOT DISTURB VEGETATION
NO WORK ZONE
STA. 5+00 BEGIN WORK
STA. 75+00A END WORK
MAP SCALE

FIGURE 4

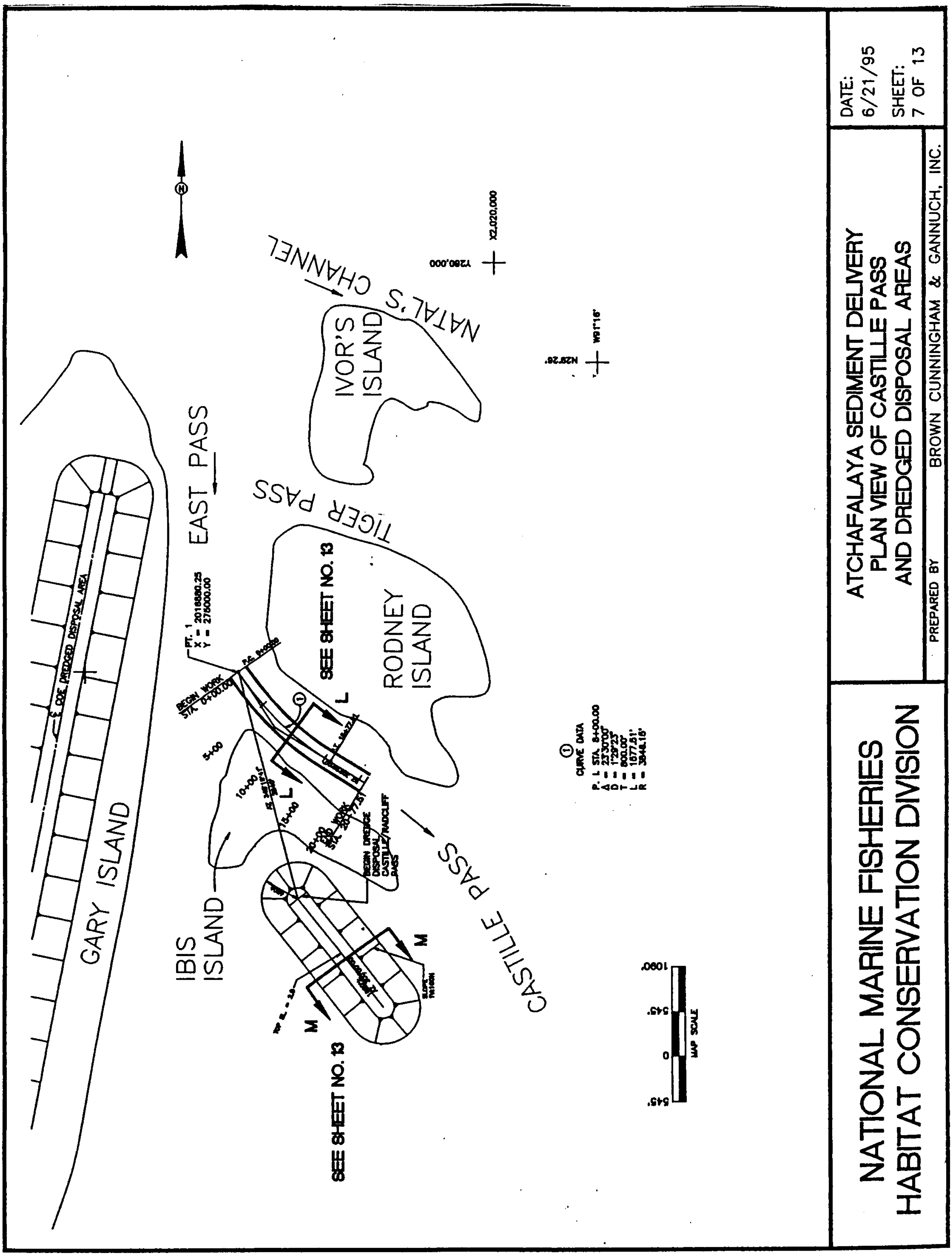

NATIONAL MARINE FISHERIES
HABITAT CONSERVATION DIVISION
ATCHAFALAYA SEDIMENT DELIVERY
PLAN VIEW OF CASTILLE PASS
AND DREDGED DISPOSAL AREAS
PREPARED BY
BROWN CUNNINGHAM & GANNUCH, INC.
DATE:
6/21/95
SHEET:
7 OF 13
GARY ISLAND
IBIS ISLAND
EAST PASS
TIGER PASS
RODNEY ISLAND
IVOR'S ISLAND
NATAL'S CHANNEL
CASTILLE PASS
SEE SHEET NO. 13
SEE SHEET NO. 13
BEGIN WORK
STA. 0+00.00
PT. 1
X = 2016890.25
Y = 275000.00
CURVE DATA
MAP SCALE
Y280,000
X2,020,000
N29°26'
W91°16'

FIGURE 5

2.2.2 Mitigation of Dredging Impacts

The embryonic stage of Atchafalaya Delta progradation represents a unique opportunity to implement long-term mitigative measures that enhance the delta building process while accommodating maintenance dredging for commercial navigation. Although maintenance dredging has reduced the potential for delta expansion, the magnitude of these impacts may be minimized by the implementation of effective measures to enhance delta development. Unlike the current Mississippi River Delta where extensive alterations to hydrologic processes were readily implemented and are difficult to alter, mitigative opportunities within the Atchafalaya Delta benefit from its geographic setting and current research and can be implemented during the early phases of delta development.

2.2.3 Protection of Highly Productive Freshwater Marshes

The loss of freshwater marshes in the Louisiana Coastal Zone from 1956 to the present represents a significant natural resource loss. The implementation of the Atchafalaya Sediment Delivery project will initially create about 230 acres of freshwater marsh. This new marsh will require approximately 735,750 cubic yards of dredged material which will be placed in no less than five locations to mimic delta development as shown in Figures 4 and 5.

The hydrologic sediment delivery process will be enhanced so that additional wetlands will continue to evolve during the life of the project. An estimated 320 acres of aquatic vegetation will benefit from project construction. About 30 acres will be protected from storm surge and erosion and 240 acres enhanced (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b).

2.2.4 Protection from Storm Surge and Flooding

The protection from hurricanes and storms provided by coastal wetlands and barrier islands off the Louisiana coast is well documented (US Army Corps of Engineers, 1984). The Atchafalaya Bay, with its prograding delta, provides critical protection to inland populations by buffering the effects of storm surges and subsequent flooding associated with hurricanes and tropical storms.

2.2.5 Long-Term Natural Resource Benefits

The long-term resource benefits represented by the Atchafalaya Sediment Delivery project are primarily derived from the natural resource value represented by the prograding Atchafalaya Delta and its adjacent freshwater marshes. The Atchafalaya River is the primary distributary of Mississippi River and currently transports an estimated 46.9 million tons of fine grain sediment annually.

The new prograding Atchafalaya Delta relies on the Atchafalaya River as its long-term source of sediment, fresh water, and other resources which contribute to the long-term sustainability of coastal wetlands. In turn, these wetlands provide natural resource benefits typically associated with freshwater marshes, including high quality wildlife and fisheries habitat.

2.2.6 Enhancement of Estuarine Habitat

The Atchafalaya Bay provides significant habitat for freshwater resident and estuarine dependent fishery species. This estuary provides nursery and foraging habitat that supports the production of valuable commercial and recreational fish and shellfish. The prograding delta with its freshwater influences, represents a source of energy and nutrients that contributes to the productivity of coastal marshes throughout the central Louisiana Coastal Zone.

2.3 Authorization

The NMFS is the Federal sponsor for implementation of the Atchafalaya Sediment Delivery project which was included on the Second Annual Priority Project List (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1992). This responsibility includes conducting an environmental evaluation and other activities involved for final decision-making in compliance with the National Environmental Policy Act (NEPA) of 1969. To meet NEPA compliance requirements an EA must be conducted for each wetland project site that is modified or restored. The Atchafalaya Sediment Delivery project, identified as PAT 2 in the CWPPRA Restoration Plan, is located in St. Mary Parish. It is classified as a critical, short-term project (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b).

3.0 ALTERNATIVES INCLUDING PROPOSED ACTION

The project site and scope were identified by the Louisiana Coastal Wetlands Conservation and Restoration Task Force (1993a) and are reviewed in the Second Priority Project List. An LDNR contracted Engineering Design Report and Engineering Summary for the Atchafalaya Sediment Delivery project was prepared by Brown Cunningham Gannuch, Inc. in March 1995 (Contract No. 25085-95-04). At the time of project conception, Natal Channel and Castille/Radcliffe Pass were the only two channels which needed to be reopened, therefore, the engineering report did not review other location alternatives. Various channel widths, lengths and depths were considered during the project design development process. Because the project was intended to simulate the natural deltaic system and restore sediment delivery processes, channel designs approximate the dimensions of natural channels. Designs for dredged material deposits also are similar to natural delta lobe patterns, within reasonable engineering and economic constraints. Therefore, the alternative analysis of this EA will be limited to the No Action Alternative and the Preferred Alternative.

3.1 No-Action Alternative

The no-action alternative would fail to create and protect valuable wetlands that provide and protect other resources in Louisiana. Furthermore, failure to mitigate the adverse impacts caused by maintenance dredging of the Atchafalaya Navigation Channel will result in the long-term reduction in the delta building process within the Atchafalaya Bay. The no-action alternative would not be responsive to the recommendations in the Louisiana Coastal Wetlands Restoration Plan and approved by the Task Force. Also, no action would be contrary to the recommendations in other long-term plans for protecting or restoring Louisiana's coastal wetlands (Edwards *et al.*, 1995; Gagliano, 1994; van Heerden, 1994).

Due to the need to protect our coastal wetlands, evidenced by the public funding through the CWPPRA, the no-action alternative was not the preferred alternative.

3.2 Preferred Alternative

3.2.1 General

There are two existing tertiary distributaries along East Pass that require reopening (dredging) to restore river flow and sediments to the north and east sides of East Pass, as part of the Atchafalaya Sediment Delivery project. These include Natal Channel, which is the first distributary on the east side of East Pass and Castille/Radcliffe Pass. This pass has been referred to as either Castille or Radcliffe Pass in earlier literature and maps. The single name Castille Pass will be used in the remainder of this EA for simplicity. Reopening or clearing of these two channels would be performed by dredging with a hydraulic cutterhead dredge. Dredged material would be placed at locations and elevations to enhance wetland creation. Careful attention was taken while planning so that during dredging and spoil deposition, methods and orientations that minimize the loss of existing wetlands, would be used. Disposal sites are located as far away as practical from the Atchafalaya Navigation Channel so as not to interfere with the USACOE maintained channel and disposal sites. The locations of these channels are shown in Figure 3 and preliminary engineering drawings are shown in Figures 4 and 5.

3.2.2 Natal Channel

The entire length of Natal Channel is presently silted in to elevation 0.0 NGVD at its mouth and has a bottom elevation of -1.0 foot NGVD near Teal Island, based upon recent field surveys conducted by an LDNR contractor. The proposed plan to re-open Natal Channel would be to construct a main trapezoidal channel having a 200-foot wide bottom at elevation -10.0 feet NGVD and side slopes of 1 vertical on 2 horizontal.

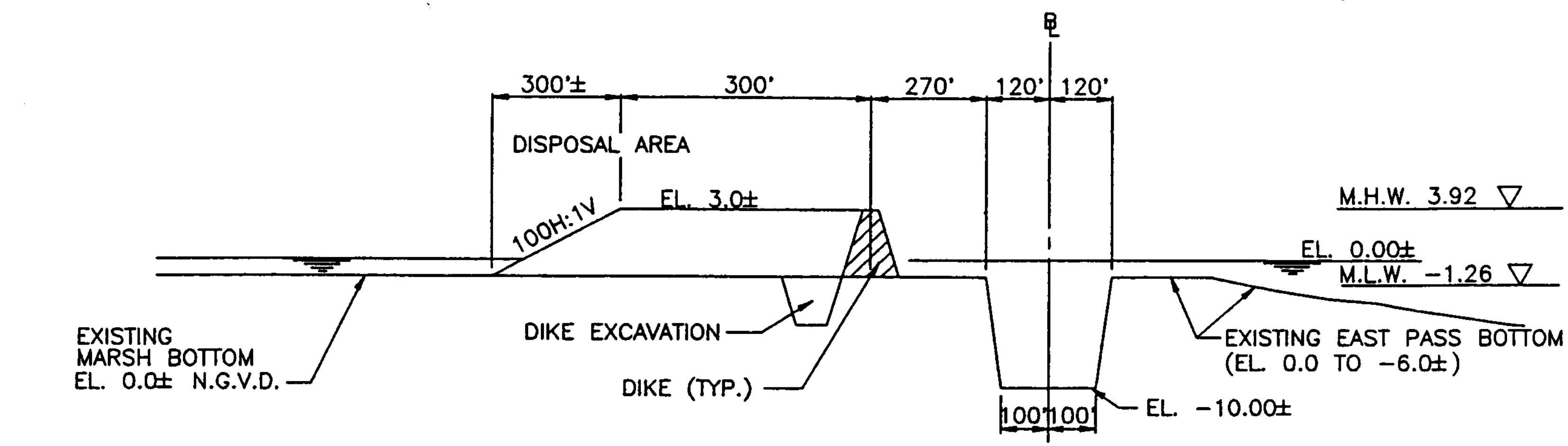
At Teal Island, the main channel would split into two curved smaller channels simulating natural bifurcations. Each smaller channel would have a 125-foot wide bottom at elevation -10.0 feet NGVD and 1 vertical on 2 horizontal side slopes. The main channel would start at the East Pass thalweg and extend some 5,100 feet towards the east where it then would split into two smaller channels. Curved Channel A would turn toward the south going between Ivors Island and Teal Island for a distance of nearly 2,500 feet. Channel B would curve towards the north for approximately 2,000 feet, passing along Teal Island's north side. Both channels empty into open water areas.

The total estimated dredged material volume from Natal Channel is 410,000 cubic yards.

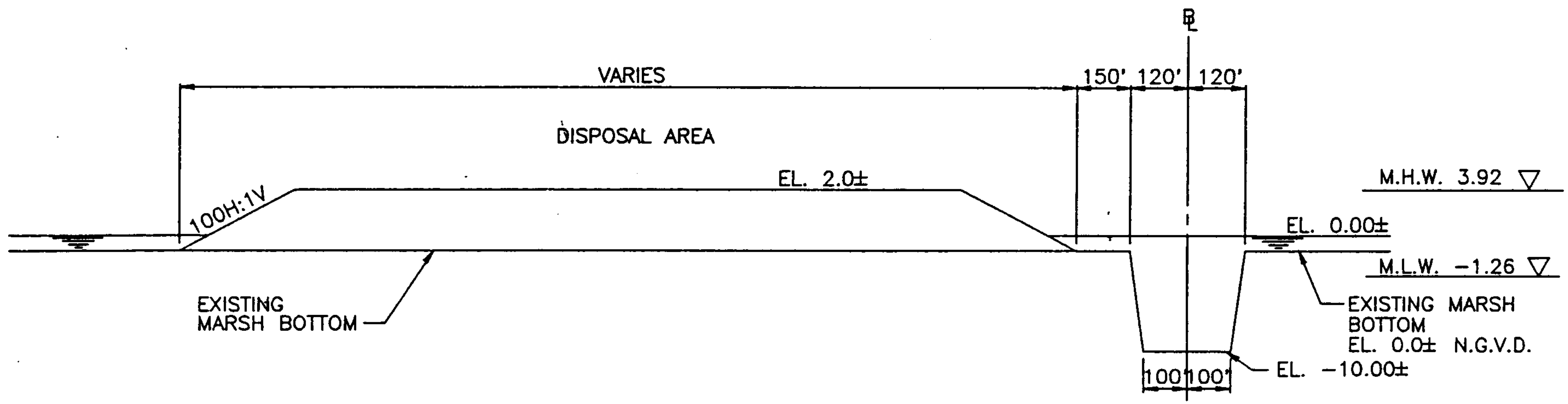
Natal Channel Disposal Areas

Four dredged material disposal areas are planned to receive the dredged material from Natal Channel as shown in Figure 4. Island lobe disposal areas would be constructed to elevate the contiguous delta flats and direct flows during high river stages to better carry sediments to the eastern delta areas. Figure 6 (taken from the permit application is a cross section drawing of a typical channel, dike and island lobe disposal area. In general, a continuous dike at elevation +3.0 feet NGVD would be constructed along the channel edge of the island lobe with a 300-foot wide berm, which would slope to the natural bottom with a 1 vertical on 100 horizontal slope. Dikes are designed to mimic the natural shape and would train water and sediments away from the channel.

Dredged material would be placed in shallow open water areas, avoiding placement on vegetated wetlands. Personnel from LDWF would be onsite to ensure that bird nests and fledglings are not disturbed. Project



SECTION I–I
STA. 20+00 – NATAL'S CHANNEL
SCALE NOT SHOWN



SECTION J–J
STA. 45+00 – NATAL'S CHANNEL
SCALE NOT SHOWN

NOTE: FOR DETAIL OF DIKE SEE SHEET 8.
ALL ELEVATIONS N.G.V.D.

NATIONAL MARINE FISHERIES HABITAT CONSERVATION DIVISION	ATCHAFALAYA SEDIMENT DELIVERY PROJECT TYPICAL CROSS SECTIONS SHOWING CHANNEL AND DISPOSAL AREAS	DATE: 6/21/95
	PREPARED BY BROWN CUNNINGHAM & GANNUCH, INC.	SHEET: 12 OF 13

FIGURE 6

construction is targeted for the fall when birds have fledged and spring high waters have subsided and should be before waterfowl hunting season opens. It may be necessary to dredge access/floatation channels to disposal areas. Borrow areas for dike construction would be filled with material dredged from the channels. Since dikes would be constructed to marsh elevation, breaching upon completion of construction would not be necessary except possibly at disposal site 3 in the event that the interior is not filled to marsh elevation.

- <u>Dredge Disposal Area 1</u>

  This area located on the north side of the channel entrance at East Pass and has a 900-foot long leg along East Pass and 1,000-foot long leg along the proposed cut. Disposal Area 1 has a capacity of 150,000 cubic yards of dredged material. The dike along the East Pass leg is positioned an average of 150 feet beyond the existing vegetation line to narrow the East Pass overbank area. This island lobe would become the new channel bank line.

- <u>Dredge Disposal Area 2</u>

  This area is located on the south side of the entrance to the new cut. Area 2 has a leg 1,700 feet long beside East Pass. The leg along the new channel is 750 feet long. The island lobe would have a continuous leading edge dike to define the bank line of the proposed cut. This disposal area has a dredged material capacity of 122,500 cubic yards.

- <u>Dredge Disposal Area 3</u>

  This diamond-shaped area (Figure 4) is located on the north side of the new channel south of Mile Island. The eastern sides are 780 feet long while the western sides are 1,250 feet long. A dike would be constructed along the two eastern sides to contain the dredged material. If the interior is not filled to marsh elevation, the dikes would be breached upon completion of the project. This would prevent impoundment of water within this disposal area and would allow fisheries ingress and egress. This disposal area has a dredged material capacity of 216,560 cubic yards.

- Dredge Disposal Area 4

  This area is located beyond Teal Island and is a straight island lobe extending for some 3,200 feet. This disposal area has a capacity of 100,000 cubic yards.

3.2.3 Castille Pass Channel

Surveys indicate that the entrance to Castille Pass has a subaqueous levee across the channel, restricting flow into the pass. The remainder of the pass has a fully defined channel averaging 6 feet deep and 200 feet wide. The plan is to reopen Castille Pass by dredging an enlarged channel with a 200-foot wide bottom at elevation -10.0 feet NGVD, starting at East Pass and extending southeast approximately 2,000 feet. Dredging would terminate at 10 foot NGVD contour.

Castille Pass Disposal Area

There is only one disposal area for reopening of the mouth of Castille Pass. This disposal area has a capacity of 146,700 cubic yards, is approximately 1,690 feet long, and located along the north side of the channel. All of the Castille Pass dredged material would be placed in this disposal area as shown in Figure 5.

4.0 AFFECTED ENVIRONMENT

The Atchafalaya Sediment Delivery project is located in the coastal area of south-central Louisiana within the Atchafalaya Bay Subbasin of the Atchafalaya River Basin. The Atchafalaya Bay Subbasin consists of the Atchafalaya Bay off St. Mary Parish and a portion of the Gulf of Mexico south of East Cote Blanche Bay and east of Marsh Island. The State of Louisiana owns the land and water bottoms in the Atchafalaya Bay which is leased and managed (Atchafalaya Delta Wildlife Management Area) (ADWMA) by the Louisiana Department of Wildlife and Fisheries (LDWF).

The effects of the Atchafalaya River and its prograding delta are a dominant factor influencing the ecology of the project area. From the early 1950s until 1973, prodelta clays and silty clays aggraded the bay bottom seaward of both the lower Atchafalaya River and the Wax Lake Outlet. The 1973 flood resulted in the transport and deposition of abundant quantities of sediments in Atchafalaya Bay. Prior to that flood, only a few small shoals were exposed at low tides, and these areas were primarily created from maintenance of the navigational channel. The 1973 flood resulted in the creation of subaerial lobes on the eastern and western sides of the river outlet, initiating a period of rapid delta development. 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). Delta growth, however, has been adversely affected by erosive storm events (van Heerden, 1983) and the presence of a few large spoil disposal areas. The delta complex includes more than 12.5 square miles of marshlands which have developed within Atchafalaya Bay since 1972 (van Heerden *et al.*, 1991). This prograding delta has affected the regional hydrologic regime by reducing the storage capacity of Atchafalaya Bay and confining water movement over a smaller surface area. Water circulation patterns have been altered and the freshwater influence in the general vicinity has increased.

The prograding delta has affected the need for maintenance dredging of the Atchafalaya Bay Channel (US Army Corps of Engineers, 1976). As originally authorized by the River and Harbor Act of June 1910 and superseded by the River and Harbor Act of 1968, the New Orleans District Corps of Engineers is responsible for maintaining the Atchafalaya River and Bayous Chene, Boeuf and Black (US Army Corps of Engineers, 1993). The channel follows a route along reaches of the Gulf Intracoastal Waterway and Bayou Chene, through the Avoca Island-Cutoff Bayou drainage channel to the lower Atchafalaya River, and from there across the Atchafalaya Bay to the 20-foot depth contour in the Gulf of Mexico. To maintain the 20-foot deep, 400-foot wide authorized channel, maintenance dredging has been conducted 16 times during the last 20 years (Nord, 1995) with the material dredged prior to 1987 from the upper segment being placed on the western side of the channel. Since 1987 and in accordance with the ADWMA Habitat Management Plan, the USACOE has placed most of the dredged material on the eastern side of the navigation channel.

The latest LDWF (1993-94) Annual Report states that the ADWMA comprises approximately 137,000 acres of which nearly 20,000 acres have been colonized by vegetative communities. During times of low water, extensive mud flats are exposed (LDWF, 1993). The delta formation on the eastern side of the Atchafalaya River Navigation Channel is approximately 1,900 acres in size (Figure 3). Vegetative composition is dependent on the age and general pattern of delta formation, ranging from willows (Salix nigra) on higher elevations to Sagittaria species in areas above mean low water. Newly created spoil islands often do not become vegetated for about a year and serve as nesting habitat for shore birds.

The original concept of this project was to reopen two distributary channels, Natal Channel and Castille Pass, which are located in the eastern half of the Atchafalaya Delta. Both channels were closed, principally as a consequence of the placement and subsequent erosion of dredged material. Natal Channel has completely silted in with no discernable channel present. Castille Pass is open except for the mouth which is plugged for a distance of about 500 feet but is extremely shallow for an additional 1,500 feet. Material dredged to reopen these distributary channels will be placed to imitate the natural river delta building patterns in shallow open waters on the eastern side of the navigation channel. Dredged material will be strategically placed to help maintain deposition flow patterns during high stage conditions in order to direct land building sediments to areas east of the present emergent lands. Vegetated wetlands will be avoided for dredge and fill activities.

4.1 Physical Environment

4.1.1 Geology, Soils and Topography

The Atchafalaya estuary is located between the Mermentau and Terrebonne/Timbalier systems and straddles the eastern edge of the Chenier Plain and western boundary of the Mississippi River Deltaic Plain. The Atchafalaya Bay, with an average depth of 5 feet, is the predominant feature of the estuary and contains two young, active deltas located at the lower Atchafalaya River and Wax Lake Outlet.

The Atchafalaya River is a major distributary of the Mississippi River, carrying about 30 percent of the Mississippi River flow to the coast (US Army Corps of Engineers, 1993). For the past 10 years, approximately 62 percent (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b) of the 236,000 cubic feet per second average daily flow has been conveyed by the lower Atchafalaya with the remainder flowing through Wax Lake Outlet. The lower Atchafalaya River has conveyed 65 percent and Wax Lake Outlet 35 percent of the average daily suspended sediment load of 221,000 tons. Approximately 40 percent of the suspended sediment entering the bay is deposited in the delta. The subaqueous delta began to form at the mouth of the lower Atchafalaya River between 1952 and 1962 with the introduction of silts and fine sands to the bay. By 1972, the underwater delta front advanced to the Point au Fer shell reef. The spring flood of 1973 produced the first natural subaerial growth in the delta (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b). The combined subaerial expression is now some 17,300 acres and represents the largest area of natural wetland growth in Louisiana (van Heerden, 1994).

The relatively flat inner continental shelf of the Atchafalaya Delta is conducive to sediment deposition and deltaic expansion unlike the seaward transport of sediments to the deeper continental slope off the Mississippi River (Boesch *et al.,* 1994). Sediments in Atchafalaya Bay are predominantly well sorted silty sand and sandy silt overlying prodelta clays. The delta front and distributary mouth bar deposits are primarily sands. The interior of the subaerial lobes consists of finer silts and clays deposited as a result of an influx of finer sediments (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b). Redistribution is enhanced in the shallow waters of the Atchafalaya Bay by resuspension by storm waves. Sediment that bypasses the Atchafalaya and Wax Lake

Outlet deltas is deposited on the shelf seaward of the bay, or pushed westward by long-shore currents (van Heerden, 1994).

Spoil islands were created just south of the mouth of the river and west of the channel during the 1973 maintenance dredging. Subsequent dredging of the channel with an hydraulic cutterhead dredge and deposition on the western side of the channel created Big Island with elevations of +10 to +12 feet NGVD in the interior (Fur and Refuge Division, 1990). The eastern portion of the delta grew more naturally and has been studied extensively (van Heerden, 1983; van Heerden et al, 1991; Day and Conner, 1988; Sasser and Fuller, 1988). However, since 1987, dredged material generally has been placed in the eastern portion of the delta at elevations to create marsh. During 1992-93 (Louisiana Department of Wildlife and Fisheries, 1993) nearly 300 acres and during 1993-94 (Louisiana Department of Wildlife and Fisheries, 1994) approximately 275 acres of wetland habitat were created.

4.1.2 Climate and Weather

The Atchafalaya River Delta area has a hot, subtropical climate. It is characterized by long, hot and humid summers, and short, mild and humid winters. Temperatures between May and October average between 88° to 90° Fahrenheit (F). Temperatures of 90°F or higher occur approximately 100 days between May and October with an average humidity of 62 percent.

Winter temperatures between November and April average 69°F with relative humidity between 30-85 percent. Cold spells usually last three days due to the dominance of warm gulf air moving inland from the coast year round. A winter temperature of 32° F or less is expected 15 days per year and there is a 20 percent chance of temperatures falling below 20°F during the winter.

Copious rains fall throughout the year as a result of the dominant coastal air masses moving inland and mixing with continental air. Average annual rainfall is 62 inches per year and heavy thunderstorms occur frequently. Less rainfall usually occurs in the fall months and snow only occurs at intervals of decades. During the past 90 years, six hurricanes and eight tropical storms have passed over the delta, the latest being Hurricane Andrew in August 1992.

4.1.3 Air Quality

Air quality over the delta is good. Air masses are highly unstable in this area due to coastal activity. There are no industrial or automotive air emissions in the area.

4.1.4 Surface Water Resources

Water Quality

The water quality of surface waters within the Atchafalaya Basin is good. Data from 1991 obtained from the Louisiana Department of Environmental Quality rates surface waters of the Atchafalaya Bay and Delta and Gulf waters to the 3-mile limit as adequate for primary contact recreation, secondary contact recreation, propagation of fish and wildlife, and oyster propagation (Louisiana Administrative Code, 1991). Isolated areas of oil and gas exploration and agricultural runoff of fertilizer and pesticides in the upper basin cause some concern for water quality. This influence appears to be isolated and does not significantly affect the overall water quality of the basin.

ADWMA personnel (Carloss, 1995) reported isolated cases of avian botulism in the vicinity of new spoil areas between November 1993 and March 1994. Over 600 dead ducks, mainly green-winged teal (Anas crecca carolinensis), were collected along with 196 other birds, primarily peeps.

Salinity

The Atchafalaya Basin is the most stable region in coastal Louisiana in terms of salinity (Boesch *et al.*, 1994). Large amounts of fresh water continue to pass through the system. Saltwater intrusion is rare due to flow from the Atchafalaya River. During most of the year, the salinity is typically below 0.5 parts per thousand in the lower Atchafalaya River. Prevailing seasonal winds and entrainment of diluted Gulf waters are secondary modifiers of the salinity isohalines (Orlando *et al.,* 1993).

4.1.5 Storm and Flood Protection

Storm, Wave and Erosion Buffers

The Atchafalaya Delta is the southernmost land area in St. Mary Parish and acts as the first line of defense against seasonal cyclonic storms. On August 26, 1992, Hurricane Andrew made landfall directly over the headquarters of the ADWMA which is located on an island southwest of Big Island on the western side of the Atchafalaya Bay Channel.

The presence of deltas at lower Atchafalaya River and Wax Lake Outlet has elevated water levels near the coast during floods (backwater effect), causing sediment-rich water to be transported into surrounding marshes (Roberts and van Heerden, 1982).

Erosion and Accretion Patterns

The landscape of the Atchafalaya Bay is constantly evolving due to Atchafalaya River stages, subsidence, cold fronts, waves and currents, and human activities, especially maintenance dredging. During flood years, island growth occurs with channel extension, bifurcation and initiation of narrow and sinuous overbank channels. Small channels fill with fine-grained sediment and gradually coalesce into small subaerial lobes. Along with lobe fusion, the addition of coarse sediments to the landward ends of lobes results in subaerial accretion in an upstream direction (van Heerden *et al.,* 1991).

Winter storm fronts have a significant impact on water surface elevations in Atchafalaya Bay. The southwesterly winds preceding the frontal passage cause a setup of water surface elevations in the bay. As the front passes, the northeasterly winds and water surface gradient push the water out of the bay causing a set down of water levels that exposes much of the delta front to wave action. Subaerial land in the delta is primarily lost during the winter months as a result of these storm fronts (van Heerden and Roberts, 1988). The eroded sediment either remains in the subaqueous portion of the delta and provides a base for future subaerial propagation or is swept from the bay by waves, tides, and riverine currents.

During hurricanes, a drawdown of water levels also occurs; then as the storm comes into the bay, water levels increase from the storm surge. In this process, storms rework the delta sediments in Atchafalaya Bay. Hurricane Andrew moved about 2 million cubic yards of sediment into the Chene, Boeuf and Black Navigation Channel in August 1992 (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b).

4.2 Biological Environment

4.2.1 Vegetative Communities

In a developing delta, environmental changes such as deposition, erosion, sedimentary compaction, subsidence and levee flank depression control plant invasion and growth. Physical and biotic characteristics that appear to be important in the establishment of plant associations in the Atchafalaya are elevation, sediment deposition rate, sediment grain size, and herbivore activity (Sasser and Fuller, 1988). In their studies of the vegetation in the Atchafalaya Delta, they reported three general patterns of vegetation as:

(1) Species which increased through time and converged on certain elevational zones [water willow (Justicia ovata), elephant ear (Colocasia esculenta), rice cutgrass (Leersia oryzoides), smartweed (Polygonum punctatum), American bulrush (Scirpus americanus), and cowpea (Vigna luteola)].

(2) Species relatively stable over time with elevational shifts attributable to local erosion or accretion [black willow (Salix nigra), sensitive jointvetch (Aeschynomene indica), spikerush (Eleocharis sp.), maidencane (Panicum sp.), bulltongue (Sagittaria falcata), softstem bulrush (Scirpus validus), and cattail (Typha domingensis)]; and

(3) Species present over a wide range initially, eventually disappearing at low elevations [wapato (Sagittaria latifolia), purple ammannia (Ammannia coccinea), sedge (Cyperus difformis), pennywort (Hydrocotyle sp.), climbing hempweed (Mikania scandens), delta duckpotato (Sagittaria platyphylla), and chicken spike (Sphenoclea zeylanica)].

Sagittaria marsh was the most important wetland habitat in the Atchafalaya Delta throughout the 1970s (Montz, 1978) and early 1980s but then declined sharply so that by 1986 only 20 percent of vegetated land was Sagittaria (Sasser and Fuller, 1988). Perennial species, Scirpus, water willow, and rice cutgrass replaced the annual Sagittaria sp. Black willow on the highest elevations and cattails on intermediate elevations were relatively stable through time. Vegetation dominating low intertidal marsh on the protected side of delta islands is delta duckpotato which is replaced at slightly higher elevations by wapato (Johnson *et al.,* 1985). American bulrush grows at higher elevations, and is usually more abundant on island "flanks" along secondary river channels. Cattails and bulltongue are found in areas having an intermediate percentage of sand and intermediate elevations.

Submerged aquatic vegetation occurs at the downstream ends of islands with the lowest elevations and lowest percentage of sands. Southern naiad (Najas quadalupensis) dominates in areas too deeply flooded and possibly too cold for emergence of delta duckpotato (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b). Wild-celery (Vallisneria americana), _stargrass (Heteranthera dubia) and pondweed (Potamogeton sp.) appear in shallower water and mud flats (Castellanos, 1994), and with additional accretion, emergent vegetation becomes established. Because the delta area is so dynamic and the waters are so turbid with suspended sediments, submerged aquatic vegetation varies in density and location from year to year (Sasser, 1995).

4.2.2 Fish and Wildlife Resources

Few studies of fish and crustacean populations have been conducted in the Atchafalaya Delta. Juneau and Barrett (1975) and Hoese (1976) sampled Vermilion and Atchafalaya Bays with gill nets and otter trawls. Thompson and Deegan (1983) sampled fishes with a trawl and seine in channels and creeks associated with natural and artificial islands. Those researchers reported that the nekton community of the Atchafalaya Delta consisted of freshwater, estuarine, estuarine-marine, and marine fishes and crustaceans with over 100 species recorded. The waters east of the navigation channel generally are fresh to low salinity. Blue catfish (Ictalurus furcatus), freshwater drum (Aplodinotus grunniens), channel catfish (Ictalurus punctatus, sunfishes (Lepomis sp.) are most likely to occur (Fur and Refuge Division, 1990). Spotted seatrout (Cynoscion nebulosus), sand seatrout (Cynoscion arenarius), black drum (Pogonias cromis), red drum (Sciaenops ocellata), blue crab (Callinectes sapidus), and penaeid shrimp occur during periods of higher salinities (Hoese, 1976). A study of nekton utilization of vegetated habitats in the Atchafalaya Delta is underway (Castellanos, 1994).

The fresh marsh habitat of the Atchafalaya River Delta supports large numbers of wintering waterfowl. Mallard (Anas platyrhynchos platyrhynchos), canvasback (Aythya valisineria, pintail (Anas acuta), green-winged teal (Anas crecca carolinensis), blue-winged teal (Anas discors), gadwall (Anas strepera), mottled duck (Anas fulvigula maculosa), coot (Fulica americana) and snow geese (Chen hyperborea) are commonly observed (Sasser and Fuller, 1988). The number of ducks utilizing this area in recent years numbered over 200,000 (Fur and Refuge Division, 1990).

In 1990 a census of wading birds and seabird nesting colonies was conducted in Louisiana. Twenty-seven species of colonial nesting waterbirds were studied (Martin and Lester, 1990). There were six study sites east of the Atchafalaya River Navigation Channel of which four were in the project vicinity. Black-crowned night heron (Nycticorax nycticorax), tricolored heron (Egretta tricolor) yellow-crowned night heron (Nycticorax violaceus), little blue heron (Egretta caerulea), snowy egret (Egretta thula), great egret (Casmerodius albus), white ibis (Eudocimus albus), and roseate spoonbill (Ajaia ajaja) nested on at least one of the islands in the project area. Surveys conducted by the LDWF in 1990 and 1993 (Vermillion, 1995) showed that two of the islands used in 1990 were not utilized as nesting sites in 1993. However in 1993, 750 white ibis, 373 cattle egret (Bubulcus ibis), 200 tricolored heron, 125 little blue heron, 100 snowy egret, 50 ibis (Plegadis sp.), 20 black crowned night heron, 15 roseate spoonbill and 10 yellow crowned night heron nests were reported on Teal Islands which are located near Natal Channel (Figure 4). Depending on the vegetative cover, some of these birds likely would return to this location in 1995. The activity window (incubation season, through fledgling) for the above species of birds, collectively, is from March 1 through September 1 (Martin and Lester, 1990).

4.2.3 Threatened and Endangered Species

The current list of endangered or threatened species was reviewed as part of this assessment. The project area is in the defined range for eagles and sea turtles. No sightings of sea turtles have been reported (McTigue, 1995). Bald eagles (Haliaeetus leucocephalus) have been spotted in the vicinity of Big Island (Carloss, 1995), however, there are no nests in the immediate area (See Appendix B).

4.3 Cultural Environment

4.3.1 Historical or Archeological Resources

Louisiana coastal waters have been traversed by watercraft since the earliest colonization of the region by Europeans. At present, 42 wrecks have been recorded in Louisiana coastal waters, seven in the Atchafalaya Bay. Due to the dependence on ship travel during the colonization of south Louisiana and the frequency of tropical storms in the area, there is the potential that historical ship remains may be located beneath the sediments that have accumulated during the past four or five decades.

Native American vessel relics might be located in Atchafalaya Bay since the Chitimacha Tribe of Louisiana hunted and fished the entire

Atchafalaya Basin. Although the Chitimacha were known to have communities near Grand Lake and the mouth of the Atchafalaya River, no permanent sites have been located in the ADWMA.

In the EA for deposition of dredged material within the Atchafalaya Delta, the USACOE (1985) stated that "No National Register properties or other cultural resources are recorded in the area of the proposed work. No impacts to cultural resources are expected and no cultural resources surveys are necessary."

4.3.2 Economics (Employment and Income)

Morgan City and Delcambre, Louisiana, are fishing ports located near the Atchafalaya Bay. The combined value attributed to the commercial fishing landings at these two ports in 1992 was $29.5 million or 2.6 percent of the total value of finfish landings in the continental United States. In 1993, the value dropped to $25.8 million and 2.4 percent (U.S. Department of Commerce, 1994). The overall 1989 value of the commercial fishing industry from all parishes adjacent to the Atchafalaya Basin and possibly influenced by fishery resources from marshes of the delta totaled $74.9 million. The 1990 value of these same industries was approximately $71.7 million (U.S. Army Corps of Engineers, 1994).

In addition to the economic impact from the commercial fishing industry, revenue is generated from recreational wildlife and fisheries activities within the delta. Since the 1970s when the delta became emergent, fishing, hunting and trapping have attracted sportsmen. Many local businesses in St. Mary Parish and especially Morgan City serve this market.

Navigation is an important part of the economy. The Chene, Boeuf, and Black navigation channel, completed in 1981, and the Gulf Intracoastal Waterway provide transportation routes for commercial and private traffic. Both Morgan City and Berwick are active ports with oil distribution, marine transportation, shipbuilding, and oil related businesses and industries operating along the riverfront (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b).

4.3.3 Land Use

Emergent land in the ADWMA is managed for game and habitat improvement for fish and wildlife. A 5-acre campground and the headquarters for the ADWMA are located on islands southwest of Big Island. Mooring areas for houseboats also are available.

Although there are several sites of hydrocarbon exploration and production located west of Big Island, there are none in this project area. The vast majority of emergent land is in various stages of natural delta succession.

4.3.4 Recreation

Access to the Atchafalaya Delta is by boat only, usually launched near Morgan City, 25 miles to the north. Because of the remoteness of this location, recreation is limited to fishing and hunting and perhaps bird watching. Hunting activity begins in September with dove season and continues through February with rabbit season (Fur and Refuge Division, 1990). Waterfowl hunting season is the most important with an average harvest of 2.3 ducks per hunter per day at the Atchafalaya River Delta during the 1980-88 season. The most important species were green-winged teal (Anas discors), mallard (Anas platyrhynchos), gadwall (Anas strepera), and mottled duck (Anas fulviqula). With the reduction in days and bag limits for the 1988-89 season, the weekday use was 20 hunters per day and weekend use averaged 75 hunters per day for a total of 1,700 man/days (Fur and Refuge Division, 1990). Most of the rabbit hunting takes place on Big Island.

No special hunting permits are required for rabbit, waterfowl (ducks and geese) rails, snipe, coot and gallinules. A daily permit during archery season for deer was initiated in October 1993 (LDWF, 1994). The close proximity of low and high marsh interspersed with bayous and potholes, dry ground and the freshwater of the bay comprise one of the best waterfowl areas in the state. Bear tracks have been reported on Big Island, however, a sighting has not been confirmed (Carloss, 1995).

Fishing

Because of the large size of Atchafalaya Bay, fishing opportunities are abundant. Commercial fishing varies dramatically with species and time of year. Shrimping during open season (May through August) occurs on the eastern side of the river during the spring season and on the western side during the fall (Fur and Refuge Division, 1990). Sport fishing generally focuses on red drum, but occurs beyond the project area where there is greater salinity influence. During periods of low river flow and rainfall, fishing improves in the more northerly portions of the bay. Commercial crabbing occurs from March through October. Netters (strike, set or seine) utilize the area for different species and seasons. Hoop nets, slat traps and trotlines are other gear used within the ADWMA (Fur and Refuge Division, 1990).

Furbearers and Alligators

Nutria (Myocastor coypus) is the most common furbearer in the delta area although muskrat (Ondatra zigethicus) also occurs there. Trapping probably began soon after emergent vegetation was established in the mid 1970s. Although alligator (Alligator mississippiensis) habitat on the ADWMA is limited, 35 tags were issued for 1994 (Carloss, 1995).

4.3.5 Noise

The delta represents a state-owned, remote area that has no industry other than several oil production platforms located west of the project area. Ambient noise in the area would result from oil and gas exploration, boats, hunters, or wildlife.

4.3.6 Infrastructure

As shown on Figure 2, the Atchafalaya Bay Channel, natural bifurcations and oil and gas access channels constitute the entire transportation network within the delta. ADWMA personnel maintain trails on Big Island and since 1991 have cleared areas for hardwood plantings (Carloss, 1995).

5.0 ENVIRONMENTAL CONSEQUENCES

In general, the adverse environmental consequences of the no-action alternative far exceed those of the preferred alternative. Without this project, the area east of the Atchafalaya Delta would remain starved of sediments now transported by the Atchafalaya Bay Channel to more open waters. Construction of the proposed activity would have short term localized impacts which would be offset by the long term environmental benefits. A thorough assessment of the environmental consequences of the preferred alternative is provided below.

5.1 Physical Environment

5.1.1 Geology, Soils and Topography

The proposed activity will simulate the natural river delta building patterns by restoring distributory channels and creating lobe islands and marshlands configured to help maintain good flow patterns during high stage conditions of the Atchafalaya River. Island lobe disposal areas are located at the main channel entrance and at the channel confluences (Figures 4 and 5).

The implementation of the Atchafalaya Sediment Delivery project will initially create approximately 185 acres near Natal Channel and 45 acres near Castille Pass. This new marsh will require approximately 735,750 cubic yards of dredged material which will be placed in five areas (four near Natal Channel and one adjacent to Castille Pass) to simulate delta development. The hydrologic sediment delivery process will be enhanced so that additional wetlands will continue to evolve to the east of the delta during the life of the project.

Since sediments dredged from the channels will be the source of material for delta lobe or wetland creation, these previously deposited sediments should be very similar to sediment-laden waters flowing into the Atchafalaya Bay. No potential for contamination is anticipated by use of these sediments since the drainage area has little or no industrial activity.

5.1.2 Climate and Weather

The channels and created wetlands are designed to maintain their structural integrity for a minimum of 20 years under standard weather conditions. Wetlands are not designed to withstand hurricane conditions and could be damaged by such events. Storms would redistribute sediments to the Atchafalaya Basin or the Bay depending on the direction and force of the winds and currents. Inclement weather could temporarily delay the implementation of the proposed activity. The areas filled with dredged material should vegetate and remain relatively unaffected by weather after compaction.

5.1.3 Air Quality

Minor temporary adverse impacts will result from the proposed activity. Exhaust emissions from construction equipment with airborne pollutants should be quickly dissipated by prevailing winds and be limited to the construction phase of the project.

5.1.4 Surface Water Resources

Short-term adverse impacts to surface water resources will be limited to the designated dredge sites in the Atchafalaya Bay and fill areas of the lobe islands and marshlands during construction. Short-term adverse impacts to surface water quality will include increased turbidity in surface waters near the dredge and discharge sites. These impacts will be limited to the construction phase of the project. Because the Atchafalaya Bay is a turbid system, impacts will be minor.

5.1.5 Storm and Flood Protection

Marsh elevations created by this project and the existing adjacent wetlands form the outermost land area of the central Louisiana Coastal Zone and act as the first line of defense against seasonal cyclonic storms. The new channels will provide an insignificant increase in area to divert Atchafalaya River runoff during high water stages. However, this benefit may be offset by the increased wetland areas created by deposition of dredged material. These changes are insignificant within the entire Atchafalaya River discharge area.

5.2 Biological Environment

5.2.1 Vegetative Communities

The proposed activity will result in positive long term impacts on vegetative communities within the project area. The implementation of the Atchafalaya Sediment Delivery project will initially create approximately 230 acres of freshwater marsh. Freshwater marshes in the Louisiana Coastal Zone have decreased during the past 50 years and are considered to be the most biologically productive of all coastal marshes. Table 1 shows estimated habitat changes for both initial construction and during the 20-year project life.

5.2.2 Fish and Wildlife Resources

Short-term adverse impacts to fish and wildlife will occur during the construction phase of the project. These impacts include smothering of non-mobile benthic organisms in the deposition sites, possible entrainment by the cutterhead dredge, and increased turbidity in waters near the designated dredge and fill sites. Dikes may convert to uplands over the life of the project, however, any dikes creating an impoundment would be breached after completion of the project to allow fisheries ingriss and egress. Approximately 1,000 acres within the 137,000 acre ADWMA will be impacted temporarily by dredge and fill activities. These impacts are limited to the shallow waters adjacent to Natal Channel and Castille Pass. The implementation of the proposed activity will not be conducted during the nesting season for migratory birds. Birds and mobile fishery species are expected to move out of the area directly impacted by dredging and filling.

The channels, dredged to obtain material for wetland creation and to provide for sediment delivery, will impact the shallow bay habitats now occupying Natal Channel and plugging the mouth of Castille Pass. Since these channels will be approximately -10 feet NGVD, impacts to water bottom biota will be temporary and minimal. Due to increased flows, the sides of the main channel might erode.

The proposed activity will improve long-term fishery resources by creating emergent wetlands and establishing island lobes which would provide shallow resting areas for juvenile aquatic organisms. Detrital material, formed by the breakdown of emergent or submerged vegetation will contribute to the food web of Atchafalaya Bay. Subaerial elevations, void of vegetation, are used as nesting sites by wading and shore birds. In addition to benefitting fish and wildlife resources, protected inland marsh provides critical habitat for wildlife species during storm events or excessive flooding. Establishing a more natural (bifurcated) channel system will enhance delta development on the eastern side of the Atchafalaya River Delta.

Table 1. Predicted habitat changes with the Atchafalaya Sediment Delivery project.

Habitat Type	Area Dredged (Acres)	Area Filled (Acres)	Habitat Created with Dredged Material (Acres)	Habitat Resulting from Project (Acres)
Shallow water bottom	79	225	125	1195
Submerged Aquatic Vegetation	-	5	13	320
Marsh	-	-	92	2200
TOTALS =	79	230	230	3,715

5.2.3 Threatened and Endangered Species

Although bald eagles have been sighted in the area, no impacts are anticipated to these threatened or endangered species due to the absence of nesting sites within the projected area.

The implementation of the project will create over 230 acres of habitat which likely would enhance the food base and foraging habitat suitable for bald eagles.

5.3 Cultural Environment

5.3.1 Historical or Archaeological Resources

No impacts are anticipated to historical or archaeological resources within the project area.

5.3.2 Economics

No impacts to economic resources will result from the proposed activity.

5.3.3 Land Use

No impacts to current land use will result from the proposed activity.

5.3.4 Recreation

Some temporary adverse short-term impacts to recreation will occur as a result of dredging activity. These include increased turbidity of surface water, increased noise within the project area, and possible interferences with waterfowl hunter access in the East Pass area during the time of construction.

Long term benefits from the proposed activity will include an increase in freshwater marsh habitat for fish and wildlife species desirable for hunting, fishing or observation.

5.3.5 Noise

Short term adverse impacts include increased noise associated with dredging the channels and placement of the dredged material. These impacts will be limited to the time of construction.

5.3.6 Infrastructure

No adverse impacts to regional infrastructure are anticipated. Dredging these channels will benefit navigation by reestablishing additional pathways for access.

6.0 CONCLUSIONS

This EA finds that no significant adverse environmental impacts are anticipated by the implementation of the Atchafalaya Sediment Delivery Project. This conclusion is based on a comprehensive review of relevant literature, site specific data, and project specific engineering reports. This finding supports the recommendations of the CWPPRA Task Force including NMFS, the sponsoring agency. The natural resource benefits anticipated from the implementation of the Atchafalaya Sediment Delivery project will enhance and sustain the diverse ecosystem found within the Atchafalaya Basin.

7.0 PREPARERS

This EA was prepared by GOTECH, Inc. and C-K Associates, Inc. under contract to NMFS. Sections were written by Mr. Bruce Dyson and Ms. Peggy Jones of GOTECH, Inc. and Mr. Jeff Heaton, Mr. Scott Nesbit and Ms. Laurie Pierce of C-K Associates, Inc. under the direction and guidance of Dr. Teresa McTigue of NMFS. In addition to Dr. McTigue, invaluable reference material and guidance were provided by Mr. Rickey Ruebsamen, Mr. Tim Osborn and Dr. Eric Zobrist of NMFS.

8.0 FINDING OF NO SIGNIFICANT IMPACT

Therefore, based on the conclusions of this document and the available information relative to the proposed Atchafalaya Sediment Delivery project (CWPPRA Project PAT 2), there will be no significant environmental impacts from this action. Furthermore, preparation of an Environmental Impact Statement for deepening two channels and establishing island lobes with the dredged material is not required by the National Environmental Policy Act or its implementing regulations.

________________________________ ______________

Rolland A. Schmitten — Date
Assistant Administrator for Fisheries
National Marine Fisheries Service
National Oceanic and Atmospheric Administration

APPENDIX A
LITERATURE CITED

LITERATURE CITED

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APPENDIX B

BIOLOGICAL ASSESSMENT REPORT

BIOLOGICAL ASSESSMENT REPORT

The current list of endangered or threatened species was reviewed as part of this Environmental Assessment. This review indicated that the project area is in the defined range for eagles, falcons and sea turtles. No sightings of sea turtles have been reported within the prograding Atchafalaya Delta (McTigue, 1995). Bald Eagles (Haliaeetus leucocephalus) and several species of falcons (Falconidae) have been spotted in the vicinity of Big Island, however, there are no known nests in the project area (Carloss, 1995).

Additional evidence suggesting that the proposed activity will have no adverse impacts on threatened and endangered species is contained in a 1985 environmental assessment prepared by the USACOE for the deposition of dredged material within the developing Atchafalaya River Delta. This report states, "no endangered or threatened species are expected or known to occur in the project area." A "Finding of No Significant Impact" was issued for project on August 28, 1985. A copy of this report follows.

The NMFS is undertaking the required coordination and consultation for this project area pursuant to the requirements of the Endangered Species Act and the National Historic Preservation Act.

ATCHAFALAYA RIVER AND BAYOUS CHENE, BOEUF, AND BLACK, LOUISIANA:

DEPOSITION OF DREDGED MATERIAL WITHIN THE DEVELOPING ATCHAFALAYA RIVER DELTA

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Description of Action. This action involves the disposal of dredged material from the lower Atchafalaya River on the east side of the channel in the developing delta. By doing so, no additional fresh marsh behind the currently used disposal areas on the west side would be disturbed, and the eroding delta islands on the east side could be rehabilitated.

Factors Considered in Determination. The Environmental Assessment (EA) has determined that there would be no significant impacts on the human environment. Approximately 100 acres of aquatic bottom habitat and tidal mudflats and a small amount of scrub-shrub habitat could be impacted.

Public Involvement. Upon signature of the FONSI, a Notice of Availability will be sent to concerned Federal, state, local, and other organizations and individuals known to have an interest in the proposed project. The proposed project has already been coordinated with the US Fish and Wildlife Service; National Marine Fisheries Service; Louisiana Department of Wildlife and Fisheries; and Louisiana Department of Natural Resources, Coastal Management Division. A copy of the FONSI and EA will be sent to the Environmental Protection Agency for review under The Clean Air Act. Any inquiries should be directed to Dr. Steve Mathies, (504) 838-2525.

Conclusion. This office has assessed the environmental impacts of the proposed action and has determined that the action would have no significant impact upon the human environment. Therefore, no Environmental Impact Statement will be prepared.

28 Aug 85
Date

Eugene S. Witherspoon
Colonel, Corps of Engineers
District Engineer

ATCHAFALAYA RIVER AND BAYOUS CHENE, BOEUF, AND BLACK, LOUISIANA:

DEPOSITION OF DREDGED MATERIAL WITHIN THE DEVELOPING ATCHAFALAYA RIVER DELTA

ENVIRONMENTAL ASSESSMENT

1. INTRODUCTION

1.1. Purpose. This assessment has been prepared to examine the environmental impacts of the deposition of dredged material within the developing Atchafalaya River delta and the need for an Environmental Impact Statement. Currently, the area to the west of the lower Atchafalaya River within the delta is environmentally cleared and is being used for the disposal of dredged material from the river. The continued use of these disposal sites would threaten or destroy varying amounts of productive fresh marsh. Additionally, some of the islands on the east side of the river channel have undergone substantial erosion over the past few years. By disposing of dredged material on the east side of the developing delta, we feel that the effects of erosion on the delta islands could be negated. Also, the marsh habitat behind the currently used disposal sites would be preserved from destruction caused by the deposition of dredged material.

1.2. Authorization. The River and Harbor Act of 1968 (Public Law 90-483) authorized the Corps involvement maintaining a navigational channel through the developing Atchafalaya delta. The Corps was directed to construct and maintain a 20-by 400-foot channel from the vicinity of the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico.

1.3. Alternatives. In consultation with representatives of the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Louisiana Department of Wildlife and Fisheries, and the Center for Wetland Resources at Louisiana State University, numerous disposal sites were evaluated. They agreed that future disposal should be allowed on the east side of the channel. The specific areas to be disposed upon would be selected prior to the initiation of work so as to maximize the environmental benefits to be derived from such action.

1.4. <u>Project Description</u>. This action involves the disposal of dredged material from the lower Atchafalaya River on the east side of the channel in the developing delta (see plates 1 and 2). By doing so, no additional fresh marsh behind the currently used disposal areas on the west side would be disturbed, and the eroding delta islands on the east side could be rehabilitated.

2. ENVIRONMENTAL IMPACTS

2.1. The proposed action could eventually impact as much as 100 acres of aquatic bottom and tidal mudflats and a small amount of scrub-shrub habitat due to the direct disposal of dredged material. Marsh habitat is expected to develop behind the stabalized eastern deltaic islands. Quantities and quality of marsh will be forecast in a report concerning delta management alternatives to be released in late 1986. Resident benthic communities in the impact area would be destroyed. Benthic recolonization would occur; however, recovery time would depend upon the biology of the affected benthos. The more mobile aquatic organisms, such as fishes, would vacate the affected area, and, therefore, not be affected.

2.2. Elevated turbidity levels resulting from construction activities would have a negligible impact on adjacent benthic and fish communities. Within the impact area, elevated turbidity levels would be localized and short termed.

2.3. Project implementation could impact a small amount of scrub-shrub habitat (eastern baccharis, marsh elder, and black willow). Existing vegetation and slow moving terrestrial organisms would be destroyed. The scrub-shrub community is of low habitat quality; however, it does provide good habitat for rabbits. The loss of acres of this habitat type would

Plate 1. General Location

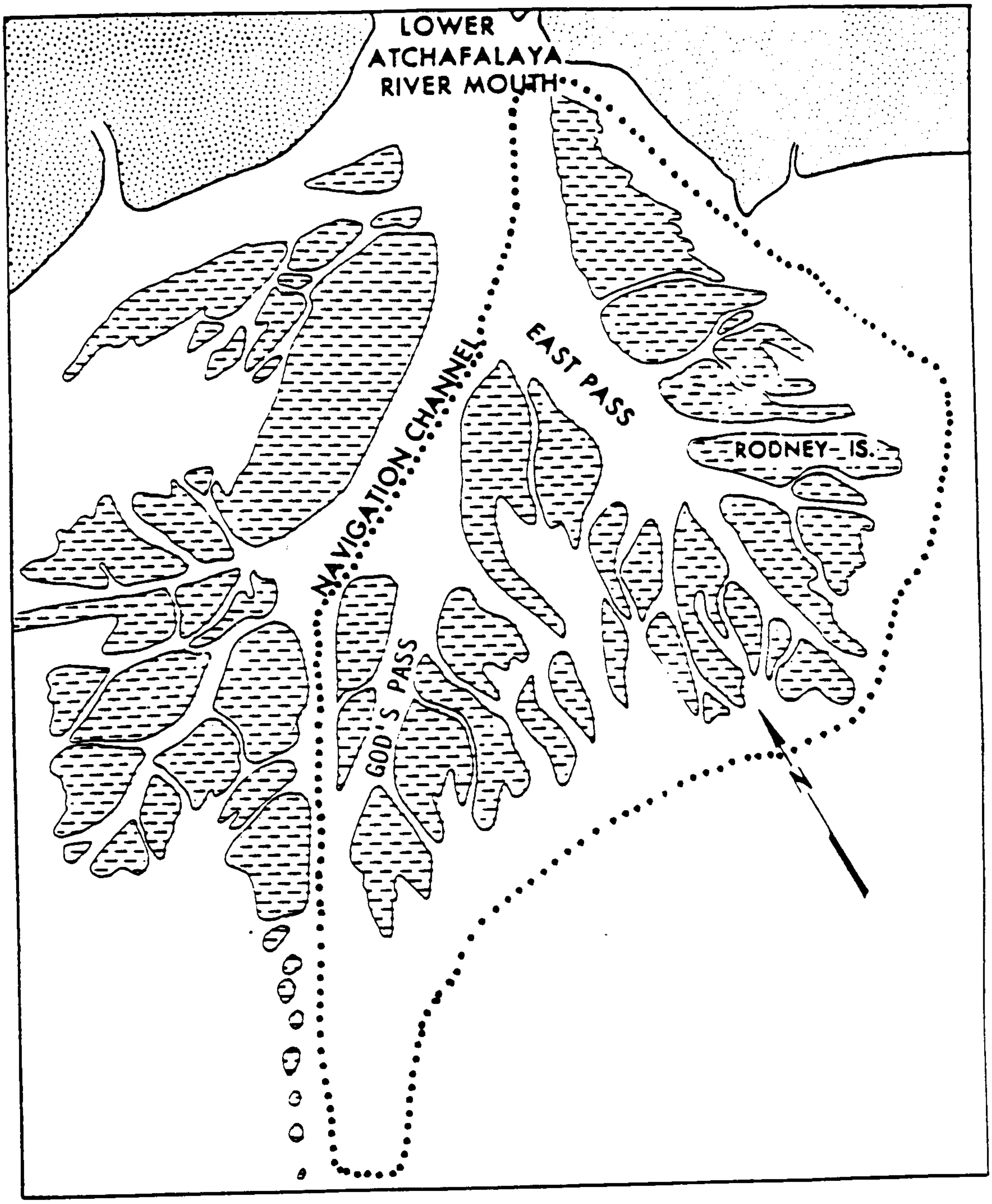

Plate 2. Designation of Deposition Area

have a localized adverse impact on small game, such as rabbits, and on song birds which use the woody shrubs for nesting and roosting. Given the amount of scrub-shrub habitat available in the general vicinity of the project, the overall loss of acres would be negligible.

2.4. No endangered or threatened species are expected or known to occur in the project area.

2.5. No National Register properties or other cultural resources are recorded in the area of the proposed work. No impacts to cultural resources are expected and no cultural resources surveys are necessary.

2.6. The proposed action would be consistent with the Louisiana Coastal Zone Management Guidelines (see Appendix A).

3. FACTORS CONSIDERED AND ESTIMATED IMPACTS

TABLE 1

	Not Appli-cable	Negli-gible	Undeter-minded	Beneficial Major	Beneficial Minor	Adverse Major	Adverse Minor
<u>SOCIAL IMPACT</u>							
Archeological Sites		X					
Community Cohesion		X					
CZM Plans		X					
Esthetics		X					
Historic Sites		X					
Land Use		X					
Noise		X					
People Displacement	X						
Public Health & Safety		X					
Recreation & Rec. Navigation							
<u>NATURAL RESOURCES IMPACTS</u>							
Air Quality		X					
Beach Accretion	X						
Ground Water		X					
Public Water Supplies	X						
Soil Erosion/Bank Erosion				X			
<u>BIOLOGICAL IMPACTS</u>							
Aquatic Habitat							X
Biological Productivity		X					
Endangered Species		X					
Existing Vegetation							X
Habitat Diversity		X					
Terrestrial Habitat							X
Threatened Species		X					

4. COORDINATION

4.1. The following Federal and state agencies were consulted and their input utilized in the formulation of this action:

a. U.S. Fish and Wildlife Service, Ecological Services, Lafayette Area Office
b. U.S. Environmental Protection Agency, Region VI
c. Louisiana Department of Wildlife and Fisheries

4.2. The following Federal and state agencies were contacted regarding the proposed project:

a. U.S. National Marine Fisheries Service, Galveston, Texas
b. Louisiana Department of Natural Resources, Coastal Management Division

4.3. None of the Federal or state agencies contacted objected to the proposed project. All of the agencies contacted will receive a copy of both the FONSI and EA.

4.4. A copy of the FONSI, EA, and Section 404 (b)(1) Evaluation (Appendix B) will be sent to the Environmental Protection Agency for review under the Clean Air Act.

4.5. A copy of the FONSI, EA, and our Consistency Determination (Appendix A) will also be sent to the Louisiana Department of Natural Resources, Coastal Management Division. This correspondence will conclude our coordination responsibilities with this agency.

4.6. A Notice of Availability of the FONSI will be mailed to the following concerned Federal, state, and other organizations and individuals known to have an interest in the proposed project.

J. Bennett Johnston, US Senator
Russell B. Long, US Senator
William "Billy" Tauzin, US Congressman

St. Mary Parish Police Jury, President
Terrebonne Parish Police Jury, President
City of Morgan City, Mayor

Eighth Coast Guard District, Commander
Louisiana Department of Transportation, Office of Public Works
State Historic Preservation Officer
Louisiana Department of Environmental Quality
Ecology Center of Louisiana
Orleans Audubon Society, c/o Mr. Barry Kohl
Delta Chapter Sierra Club, New Orleans, LA

5. COMPLIANCE WITH REGULATIONS

Compliance of the project with applicable Federal and state regulations is located in Table 2.

6. CONCLUSION

The deposition of dredged material on the east side of the lower Atchafalaya River channel in the developing delta would have negligible impacts on the human environment; therefore, no Environmental Impact Statement will be prepared.

Steve Mathies
Preparer

Suzanne R. Hawes
Chief, Environmental Quality Section

SRHawes for JCW
John C. Weber
Chief, Environmental Analysis Branch

Cletis R. Wagahoff
Chief, Planning Division

TABLE 2

THE RELATIONSHIP OF FORESHORE PROTECTION TEST SECTION TO APPLICABLE REQUIREMENTS

FEDERAL POLICIES	COMPLIANCE
Archeological and Preservation Act	Partial 1/
Clean Water Act	Partial 2/
Clean Air Act	Full
Coastal Zone Management Act	Full
Endangered Species Act	Full
Estuary Protection Act	N/A
Federal Water Project Recreation Act	Full
Fish and Wildlife Coordination Act	Full
Floodplain Management (E.O. 1988)	N/A
Land and Water Conservation Fund Act	N/A
Marine Mammal Protection Act	N/A
Marine Protection Research and Sanctuaries Act	N/A
National Environmental Policy Act	Full
Prime and Unique Farmlands, CEQ Memorandum	N/A
Protection of Wetlands (E.O. 11990)	N/A
River and Harbors Appropriation Act	N/A
Water Resources Planning Act	N/A
Watershed Protection and Food Prevention Act	N/A
Wild and Scenic Rivers Act	N/A
STATE POLICIES	
Air Control Act	Full
Louisiana Coastal Zone Management Plan	Full
Protection of Cypress Tress (E.O. 1980-3)	Full
Water Control Act	Full

1/ Full compliance will be achieved when letters of consultation are received from the State Historic Preservation Officer.

2/ Full compliance will be achieved when the State of Louisiana Water Quality Certificate is obtained.

APPENDIX C

CULTURAL RESOURCE ASSESSMENT REPORT

CULTURAL RESOURCE ASSESSMENT REPORT

No adverse impacts to cultural resources are anticipated from the proposed activity. This finding is based on an environmental assessment prepared for the deposition of dredged material within the developing Atchafalaya River Delta (USACOE, 1985). This report states the following:

> "No endangered or threatened species are expected or known to occur in the project area.
>
> No National Register properties or other cultural resources are recorded in the area of the proposed work. No impacts to cultural resources are expected and no cultural resources surveys are necessary."

A copy of this report is found in Appendix B, Biological Assessment Report.