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NATIONAL MARINE FISHERIES SERVICE
SILVER SPRING, MARYLAND**

**ENVIRONMENTAL ASSESSMENT
of
POINT AU FER ISLAND HYDROLOGIC
RESTORATION PROJECT
CWPPRA PROJECT PTE-22/24**

Terrebonne Parish, Louisiana

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ENVIRONMENTAL ASSESSMENT

POINT AU FER ISLAND HYDROLOGIC RESTORATION PROJECT

Terrebonne Parish, Louisiana

1.0 INTRODUCTION

This Environmental Assessment (EA) was prepared to evaluate the impacts of a project to plug several oil and gas access canals that are contributing to shoreline and interior marsh deterioration of a Louisiana barrier island.

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 Department of the Army, the Department of Commerce, the Department of Interior, the Department of Agriculture, and the U.S. Environmental Protection Agency (EPA). The Point au Fer Hydrologic Restoration 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.

1.1 Technical Background

Louisiana contains 7.9 million acres of coastal marshes that 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.

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). The Gulf of Mexico shoreline erosion rates along Point au Fer Island vary from 11.0 to 15.0 feet per year. Maximum erosion rates around Bay Castagner and Mosquito Bay are approximately 2 feet per year (May and Britsch, 1987). In addition, site specific natural influences such as increased herbivore activity can promote land loss within coastal marshes (Nyman et al., 1993b).

Anthropogenic activity suspected of contributing to coastal land loss includes levee construction for flood protection along the Mississippi River (Templet and Meyer-Arendt, 1988), and extensive canal construction associated with oil and gas exploration (Turner et al., 1982). Collectively, these activities may have advanced marsh loss by altering existing patterns of surface hydrology over large areas and facilitating saltwater intrusion into coastal marshes.

Numerous studies have indicated that extensive mineral exploration in the Louisiana coastal zone is a primary cause of marsh deterioration and its subsequent conversion to open water (Turner et al., 1984; Turner, 1990). In addition to direct wetland destruction from canal excavation and dredged material deposition (Johnson and Gosselink, 1982), these waterways are implicated as having altered hydrology, induced prolonged surface water retention (Scaife et al., 1983), disrupted sediment distribution patterns (Bahr et al., 1983), and facilitated saltwater intrusion and tidal export of unconsolidated organic marsh sediments (Craig et al., 1979; Gagliano and Wicker, 1989).

Generally, saltwater intrusion into brackish and intermediate marshes throughout the Louisiana coastal zone is viewed as a preliminary indication of marsh submergence. Saltwater intrusion results from natural and anthropogenic causes such as subsidence, global sea-level rise and the construction of access canals (Salinas et al., 1986; Reed and Cahoon, 1993). The rate of subsidence varies from basin to basin, and the hydrological impacts associated with canal construction are site specific. Therefore, site specific causes of saltwater intrusion must be clearly identified to determine if protection of specific marshes is cost effective or even possible.

Research has been conducted to identify specific physical, chemical, and biochemical factors that indicate marsh deterioration resulting from saltwater intrusion. These include increased soil salinity (Mendelssohn and Burdick, 1988), sulfate toxicity (Pezeshki et al., 1989), decreased organic accumulation (Nyman et al., 1993b; Nyman et al., 1993c), decreased soil density and increased subsurface erosion (Nyman et al., 1994). By identifying these factors, marsh restoration and protection projects can be properly designed and implemented.

1.2 Project Location

The project site is Point au Fer Island, an approximately 52,000-acre barrier island (U.S. Department of the Interior, 1990) located off the mainland of southwest Terrebonne Parish, 13 miles south and east of the mouth of the

Atchafalaya River. The Barataria - Terrebonne Estuary, which includes Point au Fer Island, has been included in the EPA's National Estuary Program.

1.3 Project Funding

Seventy-five percent of the funding for this project is provided through CWPPRA with 25 percent cost sharing by the State of Louisiana Department of Natural Resources (LDNR). The project is administered by cooperative agreements between the 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

The goal of CWPPRA is to "restore and prevent the loss of coastal wetlands in Louisiana." The purpose of the Point au Fer Island Hydrologic Restoration Project is to control shoreline erosion and reduce the deterioration of an interior brackish-intermediate marsh through the restoration of island hydrology in areas of man-made access canals.

The project focuses on two separate areas of the island referenced as Areas 1 and 2 (Figure 1). As shown in Figure 1, Area 1 is located in the southeastern section of the island and Area 2 is located in the southwestern section of the island.

Area 1 is subdivided into Areas 1A and 1B. Area 1A is located within an inland marsh located between Mosquito and Four League Bays on the southeastern section of the island. This site contains the intersection of two perpendicular canals named Transco and Hester Canals. The Transco Canal runs north-south and Hester Canal runs east-west. Area 1B is located at the southeast shoreline of the island where the Transco Canal nears the Gulf of Mexico. These pipeline and access canals were constructed in the late 1960's by the Transcontinental Gas Pipe Line Corporation.

Area 2 is located in the southwestern portion of the island where an oil well access canal, known as the Mobil Canal, parallels the shoreline of the island. This canal is separated from the shore by approximately 200 feet of beach. During Hurricane Andrew, this small land bridge was breached, exposing the canal to the Gulf of Mexico. Please see Figures 2, 3, and 4 for the Project Site Plan for Areas 1A, 1B and 2. Figures 5, 6, and 7 are 1990 aerial photos of the same areas.

2.1.1 Inland Marsh (Areas 1A, 1B)

Hester Canal is an access canal between Mosquito Bay and Four League Bay. As this canal crosses the inland marsh located between the two bays, it bisects an open pond area and establishes a direct waterway through the marsh to both bays. In addition, the intersecting Transco

Pipeline Canal has accelerated north-south tidal exchanges. Subsequently, the inherent hydrological regime that historically maintained and nourished the surrounding marsh was replaced by the higher energy, more saline hydrological regime of Four League Bay and the Gulf of Mexico. The purpose for plugging these canals is to preserve and protect this inland marsh by reestablishing the original hydrologic regime.

2.1.2 Shoreline Protection (Area 2)

Mobil Canal is an access canal that provides a navigable waterway to a developed oil and gas field located directly north of this canal. Mobil Canal parallels the southwestern shoreline of the island, separated from the shore by approximately 150 feet at the narrowest point and averaging only 200 feet along the reach. During Hurricane Andrew, the narrowest portion of shoreline was breached, exposing the canal to the Gulf of Mexico. Although additional protective stone was subsequently added by Mobil, the area remains at risk of further deterioration. The purpose of filling this canal is to restore and reinforce the shoreline and prevent an extended breach from developing that could eventually erode the interior marsh north of this location.

2.2 Need For Action

The need to protect and restore Point au Fer Island emanates from its significant natural resource value. The magnitude of these resources corresponds to the island's size and strategic location within the Louisiana coastal zone. Because of the ample sediment load generated by the Atchafalaya River, attention has focused on oil and gas activity as the primary source of land loss on Point au Fer Island. Numerous oil and gas access and pipeline canals have been constructed primarily in the southwestern portion of the island, although several long canals have been constructed in the east and northeast sections. These canals provide maritime access to numerous well sites and are suspected to be the cause of extensive hydrologic modifications. These modifications include shoreline erosion, the increased flushing of inland marshes, unintentional impoundment and the advancement of saline water into existing intermediate-brackish marshes. These influences may have adversely impacted physical marsh integrity and resulted in the conversion of inland marsh to open water.

The NMFS completed a preliminary investigation in July 1993, to develop a preliminary design for a series of canal plugs and shoreline stabilization for two areas of Point au Fer Island, Terrebonne Parish, Louisiana. The LDNR subsequently initiated design engineering in March 1994.

2.2.1 Protection from Storm Surge and Flooding

The protection from hurricanes and storms provided by barrier islands off the Louisiana coast is well documented (U.S. Army Corps of Engineers, 1984). Point au Fer Island is fronted on the north and west by the

Atchafalaya Bay; Four League Bay on the north and east; and the Gulf of Mexico to the south. This location provides critical protection to inland populations by buffering the effects of storm surges and subsequent flooding associated with hurricanes and tropical storms.

2.2.2 Highly Productive Intermediate-Brackish Marsh

The loss of intermediate-brackish marsh in the Louisiana coastal zone from 1956 to the present represents a significant natural resource loss. Intertidal marshes are among the most productive ecosystems on earth and their rapid disappearance may significantly impact the economy of south Louisiana.

2.2.3 Long-term Resource Benefits

Point au Fer Island represents a significant natural resource due to its size and relative stability. This 52,000-acre island is significantly larger than other nearby barrier islands and has a comparatively lower rate of land loss. In addition, recent data from various points on the island indicate that the current rate of vertical accretion equals the rate of subsidence. This stability is not found in nearby barrier islands located within the Mississippi Deltaic plain. Therefore, public funds used to implement restoration projects that prevent the rapid degradation of Point au Fer Island represent cost effective programs that are more likely to provide long-term benefits to the State of Louisiana.

2.2.4 Valuable Wildlife Habitat

Cultural remains of Native Americans uncovered on Point au Fer Island indicate the island's historical significance as a valuable habitat for wildlife and fisheries. In 1949, the island was an established fur and hide producing area for muskrat, raccoon, otter, mink and alligator. Marsh burning is practiced as a method to promote the growth of preferred vegetation for furbearers. Weirs and other water containment devices have been installed and managed to improve waterfowl habitat and attempt to reduce land loss. Thus, Point au Fer Island has always provided the people of the Louisiana with valuable, high quality wildlife habitat.

2.2.5 Marine Fisheries Habitat

The Atchafalaya Bay, including the inland marshes of Point au Fer Island, provide significant estuarine habitat for marine-transient and resident fishery species. This estuary, near the Gulf of Mexico spawning areas, provides nursery and foraging habitats that support the production of commercial and recreational fish and shellfish. Point au Fer Island, with its extensive marshes, is a significant part of the Louisiana estuarine system.

2.3 Authorization

The NMFS is the federal sponsor for implementation of this hydrologic restoration project which was included on the second Priority Project List (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1992). This responsibility includes conducting the 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 Point au Fer Hydrologic Restoration Project, identified as PTE-24/26 in the CWPPRA Restoration Plan, is located in the Terrebonne Basin. It is classified as a supporting, short-term project (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993).

3.0 ALTERNATIVES INCLUDING PROPOSED ACTION

The project site and scope were identified by NMFS as part of Task Force submittals on the second annual priority list. This project is one of many selected by the Task Force for the Terrebonne Basin. It will integrate well with the Lake Chapeau Hydrologic Restoration Project placed on the third annual priority list. Because of the ample sediment load from the Atchafalaya River, hydrologic restoration was selected over other alternatives such as marsh creation, marsh management, or sediment diversion. The activities planned for Lake Chapeau will augment the benefits of this project. Lake Chapeau and the canals involved in this project are the major areas of open water within Point au Fer Island. The range of alternatives for meeting the hydrologic restoration objective are discussed below. Consequences of the alternatives and proposed action are discussed in Section 5.0.

3.1 No-Action Alternative

The no-action alternative would fail to protect valuable coastal wetlands that provide and protect other resources in Louisiana. Specifically, failure to plug access canals that have breached the Point au Fer Island's shoreline and promoted tidal flushing of its inland marshes would intensify deterioration of this barrier island.

Due to the public need to protect and restore Point au Fer Island marshes as evidenced by the public funding through the CWPPRA, the no-action alternative was not the preferred alternative.

3.2 Structural Alternatives for Plug Design

A total of seven alternatives were initially evaluated for plug design (Woodward-Clyde Consultants, 1993). The alternatives considered were as follows:

Alternative 1	Use of dredged material
Alternative 2	Use of limestone to make a rip rap fence
Alternative 3	Use of wooden fences
Alternative 4	Use of bank material to fill sections of canal
Alternative 5	Use of water structures filled with cement grout
Alternative 6	Use of gabions and revetments
Alternative 7	Use of gunnite and mesh to form neutrally buoyant fences which would be anchored by soil anchors.

Alternative 1 (use of dredge material) was selected for Plugs 4 and 5 (later combined into one plug) and for all of Area 2. Alternative 1 was eliminated in the initial screening for the remaining plug locations because of cost and technical difficulties (booster pumps would be required to move the dredged materials to some plug locations). Other considerations for eliminating Alternative 1 were as follows: pricing of dredging operations are typically based on material placement; for each plug location, a relatively small quantity of material is needed requiring numerous equipment moves for all plugs (piping and dredge); and each equipment move would have a separate mobilization/demobilization or equipment handling component resulting in a very high cost per plug.

Alternatives 2, 3, and 4 were carried into a final selection process performed by the engineering firm of C-K Associates, Inc. The following provides reasons why Alternatives 2, 3 and 4 were eliminated. Alternative 2 was eliminated due to the low strength soils present in the canals. Soil sample analyses results from the canals indicated that the soils possessed little or no shear strength. Alternative 3 was eliminated due to environmental and project life considerations. In order to satisfy the project life criteria of 20 years, it was determined, based on engineering judgement, that a more substantial structure would be required to satisfy the project life requirements in the coastal environment. Alternative 4 was eliminated due to the limited amount of material available and the amount required to fill the canals. Based on survey data collected in the project areas, the amount of bank material available is significantly less than the amount required to fill the canals. Additionally, by using bank material, the project goal of restoring the hydrologic conditions of Point au Fer Island would not be met.

Alternative 5 was eliminated because the sediments in the canals did not have adequate load-bearing capacities based on the results of laboratory analysis. In the initial screening Alternatives 6 and 7 were eliminated, 6 because of cost and 7 because it was judged that the plug would be pulled up like a cork (high potential for structural failure) in a storm surge. An additional reason that Alternative 7 was eliminated was that it provided no advantage in constructability over Alternatives 3 or 5.

3.3 Non-Structural Alternative

A non-structural alternative of completely filling in the Hester and Transco Canals rather than building strategically located plugs was considered. This alternative would add considerable additional cost, could damage additional marsh due to the need for booster pumps and other special equipment, and would reduce even the historical hydrologic exchange across the area.

3.4 Preferred Alternative

This section presents the proposed actions for each project area. In the final selection process, two main types of plugs were considered for the project areas. These types can be divided into:

- Hard plugs consisting of a type of bulkhead construction using materials such as concrete, steel, timber and/or vinyl; or
- Soft plugs consisting of dredged fill, shell fill or earthen material.

Further detail on the specific type of plug selected is presented below. A primary consideration for the specific plug type was the field observation that the failure of the existing plugs in the area is due primarily to end-around erosion. Timber structures were selected based on high scoring on the evaluation matrix (Table 1) and their low cost. The selected timber structures will consist of 2 inches x 8 inches x 20 feet - 0 feet creosote timber sheathing attached to 2 inches x 8 inches x 18 feet - 0 feet creosote timber whalers. Creosote timber piles 50 feet long with a 12 inch butt will be driven every ten feet. The planned crest elevation for the structures is +2.0 National Geodetic Vertical Datum (NGVD) through the center of the canals and the crest elevation for the structures on the banks is 0.67 feet above the elevation of the bank, as the bank elevations vary. Observations have demonstrated that timber structures such as this constructed over 30 years ago would be performing today as designed had not end-around erosion occurred. To decrease the potential for end-around erosion, the structure will extend 30 feet into the canal banks. Reef shell will be placed on both sides of the structure to prevent washout and also to decrease the potential for end-around erosion. In two locations, reef shell fill without the timber structure will be used due to lower potential for plug failure. Each plug has been strategically positioned to restrict hydrologic flow from the canals while allowing natural tidal and wind-induced exchanges to continue.

3.4.1 Area 1A Proposed Actions

The main objective for the plug design is to build a structure that meets the project objectives of reducing saltwater intrusion and tidal flushing and that can survive a 20-year project life. Several types of hard plugs were considered for implementation at plug locations 1, 2, 3A, 4, 6, 7, and 8. The types evaluated included plugs constructed of concrete, timber, steel and vinyl. This type of design utilizes driven piles to provide structural stability and other structural material to eliminate water flow through the

structure. A thorough evaluation of each of these types of structures was performed to consider the durability of each structure, the field history of the life of similar structures, the consideration for maintenance, the vulnerability or susceptibility to damage from natural causes such as fire or a result of vandalism, and the overall installed cost of each structure. A weighting factor for each of these criteria was assigned based on above designated categories allowed for an objective evaluation of each of the type of structures. Table 1 summarizes the results of this evaluation, and the weighting factors are further defined as follows:

- (1) Durability - score from 1 to 25; how well the material is expected to perform in this application over the life of the project. (higher number indicates better durability)
- (2) Field proven - score from 1 to 30; how well (or if) the material has performed in the past in similar applications. (higher number indicates good past performance)
- (3) Low Maintenance - score from 1 to 10; how much maintenance will be required on the structure due to rotten timber, damaged piles, etc. over the life of the project. (higher number indicates lower maintenance)
- (4) Vulnerability to Vandalism or Fire - score from 1 to 5; potential for damage caused by vandals and/or controlled marsh burning. (higher number indicates less potential for damage)
- (5) Cost - score from 1 to 30; material cost and construction cost. (higher number indicates lower cost)


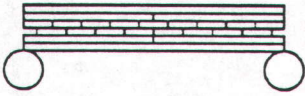


The total possible score of the screening factors is 100. As shown in Table 1, timber received a score of 75 points, with steel sheet pile also receiving 75 points. Concrete and vinyl each received 65 points.

Based on this evaluation, timber structures are the preferred alternative for the plug design. This decision is based primarily on the excellent past performances and long history of timber in very similar applications. Even though Table 1 indicated that steel may also be a viable alternative, the unanimous decision of C-K Associates, NMFS and LDNR was that a design consisting of timber would serve as the most feasible alternative.

3.4.2 Area 1B Proposed Actions

The preferred alternative is to place a reef shell plug at Area 1B. This plug, consisting of shell only, will be sufficient. Dredging in the Transco Canal will be required for barge access to the area where Plug 4 is to be placed. Although filling this section of the canal with dredged fill was considered, this alternative proved unfeasible when appropriate sand could not be located in the offshore areas near Area 1B.

**TABLE 1
Canal Plug Evaluation Matrix**

Plug Type	Approximate Costs (per linear foot)			Screening Factors					Total Score
				Durability	Field proven	Low maintenance	Invulnerable to vandalism or fire	Cost	
	Materials	Labor	Total						
Prestressed Concrete: 	\$281	\$400	\$681	25	20	10	5	5	65
Timber: 	\$102	\$303	\$405	15	30	5	0	25	75
Steel Sheet Pile: 	\$271	\$200	\$471	20	20	10	5	20	75
Vinyl Sheet Pile: 	\$150	\$106	\$256	15	15	5	0	30	65

Screening Factors/Weighting Criteria:

- Durability: 1-25
- Field proven: 1-30
- Low maintenance: 1-10
- Vulnerable to vandalism or fire: . . 1-5
- Cost: 1-30

3.4.3 Area 2 Proposed Actions

Placing dredged material obtained from offshore into this well access canal to plug an area parallel to the beach and another area that runs perpendicular to the beach was the unanimous decision.

The beach in the area within closest proximity to the access canal will be the center of the reach of the canal to be filled. This approach of filling the area will be consistent with the projected erosion rate of 10 feet per year and will establish a minimum of a 20-year life of the plug for this area. Approximately 125,000 cubic yards of dredged material are estimated to be required. Figure 4 depicts this concept.

If the dredge material received from offshore is not of sufficient quality or quantity to fill in the canal, use of dredge material from the Atchafalaya Channel is an option. Maintenance dredging occurs in the Atchafalaya Channel on an annual basis. At the present time, the material resulting from dredging is placed along the spoil bank. As an option, this material could be transported, via pipeline, to the canal. This option is not depicted on Figure 4. However, the dredging of the Atchafalaya Channel is separately permitted and performed by the New Orleans District COE.

As depicted on Figures 2 and 3, limited reaches of access dredging will be necessary in Areas 1A and 1B. Spoil areas will be adjacent to the dredged area.

3.4.4 Other General Proposed Actions

In regards to Area 2, dredged material will be placed at an elevation which is a minimum of two feet above the surrounding marsh to allow for consolidation of the dredged fill and underlying soils. Additionally, an inspection and maintenance program will be established for all the project areas to perform routine checks of each of the constructed plugs to ensure proper performance.

4.0 **AFFECTED ENVIRONMENT**

As shown in Figure 1, Point au Fer Island is a 52,000-acre island fronted by the Atchafalaya Bay to the north and west; Four League Bay to the north and east; and the Gulf of Mexico to the south. Point au Fer Island contains approximately 42,073 acres (U.S. Army Corps of Engineers, 1993) of intertidal brackish emergent marsh. As with most intermediate-brackish marshes throughout the Louisiana Coastal Zone, this island has experienced significant land loss primarily within its inland marshes (U.S. Department of the Interior, 1990). Yet, in contrast to other coastal marshes, Point au Fer Island has close proximity to the sediment rich waters of the prograding Atchafalaya delta (van Heerden, 1983; van Heerden et al., 1991).

Until the construction of oil and gas canals, the inland's intermediate-brackish marshes were hydrologically maintained by four bayou systems including Locust Bayou in the southwest, Alligator Bayou in the north, Burkes Bayou in the southcentral, and Little Mosquito Bayou in the southeast (See Figure 1). Lake Chapeau is located in the central portion of the island. Mosquito Bay and Bay Castagnier connect the eastern portion of the island with Four League Bay. Lake Chapeau is the headwater for Locust Bayou, which flows into Atchafalaya Bay, and Little Mosquito Bayou which drains into Mosquito Bay. Burkes Bayou is a tributary of Locust Bayou. Alligator Bayou, having historically maintained minimal hydrologic connection with Lake Chapeau, flows into Four League Bay. Surface hydrology was historically a gradual and low energy process in which tidal overbank flooding and sheetflow provided exchange between the bayous and adjacent marshes (Ensminger, 1988).

The effects of the Atchafalaya River and its prograding delta are a dominant factor influencing the ecology of Point au Fer Island. The arrival of abundant prodelta clays in the Atchafalaya Bay in the 1950's marked a channel shift within the Mississippi River Delta complex that has resulted in the creation of over 32 square kilometers of new marshlands 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. This process has altered water circulation patterns and increased the freshwater influence from the Atchafalaya River on Point au Fer Island. Consequently, there has been an overall increase in intermediate to brackish plant composition since 1956 as a result of the increased fresh water influence on the island (U.S. Department of Interior, 1990; Shaffer et al., 1992).

Land loss has occurred on Point au Fer Island despite increased fresh water influences and sediment loads in the adjacent surface waters. Although some research suggests that the prograding delta restricts sediment deposition within the island marshes, recent investigations from various researchers suggest the island is not submerging as rapidly as other Louisiana coastal wetlands. Data from 23 sampling sites near Mosquito Bay in the eastern section of the island indicates a mineral deposition rate between 1,385 - 1,594 grams/meter²/year (Nyman, 1994), exceeding the amount needed to offset a 1 centimeter per year submergence rate for brackish marshes (Nyman and DeLaune, 1991). In addition, there were no visible signs of plant stress in the study area suggesting an adequate rate of organic accumulation. Although no specific submergence rate for Point au Fer Island has been identified, the combined effect of adequate mineral and organic deposition equals or exceeds the average coastal submergence rate of 1.1 cm per year (Penland et al., 1988). These data indicate that adequate mineral sediment is transported into marshes by flooding events such as overbank flooding and winter storms. In addition, a zero accretion deficit suggests that access canals may exert the major role affecting inland land loss on Point au Fer Island.

Area 1A contains two canals, the Hester and Transco Canals, that link subbasins Mosquito Bay and Bay Castagnier that were previously separated by inland marsh as shown in Figure 2. These marshes, which were maintained by a gradual low energy hydrologic regime, are exposed via these canals to the external higher energy regime marked by increased water volume and salinity, greater tidal amplitude, and an accelerated rate of fluctuation.

Area 2 is located in the western portion of the island where an oil field access canal, known as the Mobil Canal, parallels the southwest shoreline of the island. This canal originates in Locust Bayou and connects to a developed oil field with numerous well heads and short access canals. Mobil Canal is separated from the shore by approximately 150-400 feet of beach. During Hurricane Andrew, a shoreline breach occurred exposing the Gulf to the Mobil Canal. Continuous wave action at this breach could result in an extended loss of shoreline and extensive deterioration of inland marshes.

4.1 Physical Environment

4.1.1 Geology, Soils and Topography

Geologically, Point au Fer Island is located in the western portion of the recent Mississippi River Deltaic plain where three periods of active sediment deposition have occurred during the past 8,000 years. This alluvial sediment deposition primarily resulted from westward channel shifting of the Mississippi River and subsequent emergence of the Maringouin, Teche, and Lafourche delta complexes. A typical soil profile of Point au Fer Island would indicate deep alluvial deposits of shell, sand, and clay comprising the subsurface stratum overlain with organic plant material at varying stages of decomposition.

The topography of Point au Fer Island typifies that of a Louisiana barrier Island. The highest elevations are located along the shoreline ranging between 4.6-6.0 feet above mean water level. Spoil banks along dredged access channels are elevated 2-3 feet above mean water level in the canals. The elevation of the interior marshes is between 0-1 feet and can be completely submerged during storm events. During Hurricane Andrew, Point au Fer Island was covered with up to 8 feet of water.

Three soil types have been identified in the project area. Saltwater marsh clays and mucky clays occur behind the beach rim from the Gulf of Mexico. These soils occur in the low natural levee ridges at near-gulf level and are subject to frequent tidal flooding. In a typical profile, the surface consists of mucky clay with recent coarse plant materials. The subsurface is predominantly clay, with occasional lenses of muck or mucky clay and fine sands.

4.1.2 Climate and Weather

Point au Fer Island 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 88-90° 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 3 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 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 Point au Fer Island, the latest being Hurricane Andrew in 1992.

4.1.3 Air Quality

Air quality at Point au Fer Island 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

Surface water resources at the site include resources attributed to Point au Fer Island and the surrounding surface waters of the Atchafalaya Basin and the Gulf of Mexico.

Coastal marshes are defined as "Waters of the United States" (33 CFR S.328.3 (a)(8)(b)) and are highly productive ecosystems that are built, nourished, and sustained by the fluvial processes of adjacent surface waters. Comparatively, Point au Fer Island is one of the more stable, healthy barrier islands in coastal Louisiana and continues to support its historical resource value by providing storm protection, wildlife habitat, nursery habitat for marine fishes and shellfishes, and recreational use. Although this island has sustained less deterioration than most barrier islands in the Louisiana coastal zone, data indicate that land loss has occurred on the island due to shoreline erosion and the conversion of inland marshes to open water.

A remote sensing analysis of land loss on Point au Fer Island revealed that 12 percent of the marsh on the island converted to shallow open water during the period 1956 to 1978 (U.S. Department of the Interior, 1990). This marsh loss occurred primarily in the central part of island and in areas impacted by oil and gas exploration (Früge, 1990). Rapid subsidence, increased water exchange, partial impoundment and other hydrologic alterations are thought to be responsible for this loss. As a result, the quantity and quality of wildlife habitat has been reduced, however, high-quality nursery habitat for estuarine-dependent fishes and shellfishes has been maintained. Although this conversion still supports high natural resource values, land loss may indicate a pattern of rapid deterioration that could adversely impact the overall health and ecology of the island.

Surface water resources surrounding Point au Fer Island include the Atchafalaya Bay, Four League Bay, Mosquito Bay and the Gulf of Mexico as shown in Figure 1. Surface water resources within Point au Fer Island are maintained by a series of natural bayous and man made access canals. Locust Bayou, Mosquito Bayou, Burkes Bayou and Alligator Bayou are the main natural waterways meandering through inland marshes. These natural waterways transport the fresh-to-brackish waters of the upper Atchafalaya Bay into the island's interior. Saline water from the Gulf of Mexico enters the inland marsh primarily via oil and gas access canals that open directly or indirectly to the Gulf of Mexico.

The water quality of surface waters within the Atchafalaya Basin is good. 1991 data from the Louisiana Department of Environmental Quality (DEQ) 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 or Point au Fer Island.

4.1.5 Storm and Flood Protection

Storm, Wave and Erosion Buffers

Point au Fer Island is the outermost land area in western Terrebonne Parish and acts as the first line of defense against seasonal cyclonic storms. Stabilization of the marshes will improve the capacity of the island to buffer tidal surges, thereby providing protection for inland areas.

Erosion and Accretion Patterns

The location of Point au Fer Island at the terminus of the Atchafalaya River suggests that a high potential exists for a gradual reversal of land loss rates and natural marsh recovery due to increased regional sediment loading (van Heerden and Roberts, 1988; Roberts and van Heerden, 1984)

4.2 Biological Environment

4.2.1 Vegetative Communities

Vegetative communities on Point au Fer Island are more extensive than those normally found on a Louisiana barrier island (McTigue, 1994). Beginning at the shoreline these include vegetative communities associated with dunes and washover sands (beach rim marsh), saline marsh, brackish marsh and intermediate marsh. The 1990 data indicate that there are 4,490 acres of intermediate marsh, 21,557 acres of brackish marsh, and 4,135 acres of saline marsh on Point au Fer Island (U.S. Department of the Interior, 1990). In addition to these marshes, spoil banks adjacent to dredged canals provide an upland site vegetated by upland species.

Vegetation of communities commonly found on Point au Fer Island include:

Beach Rim Marsh

Spartina patens, *Spartina alterniflora*, *Iva frutescens*, *Daubentonia texana*, *Baccharis halimifolia*, *Batis maritima*, *Opuntia stricta dillenii*, *Salicornia bigelovii*, and *Sesuvium maritimum*.

Saline Marsh

Spartina patens, *Spartina alterniflora*, *Juncus roemerianus*, *Scirpus robustus*, *Solidago sempervirens*, *Ipomea stolonifera*, *Paspalum vaginatum*, *Suaeda linearis*, and *Distichlis spicata*.

Brackish Marsh

It is not uncommon to find over 40 species of vegetation in unmanaged brackish marsh. Because much of the brackish marsh area on Point au Fer Island has been managed by fire, *Scirpus olneyi* and *Scirpus robustus*, in addition to *Spartina patens* and *Distichlis spicata*, remain dominant species. Additional species include *Sesuvium portulacastrum*, *Sabatia stellaris*, *Borrchia frutescens*, and *Fimbristylis castanea*.

Intermediate Marsh

In isolated areas, intermediate marsh is replacing brackish marsh on Point au Fer Island. There was no recorded intermediate marsh on the island

in 1958 or 1978, whereas there were approximately 5,000 acres of intermediate marsh recorded in 1990. This increase in intermediate marsh is the result of fresh water influences from the Atchafalaya River and its prograding delta. Vegetative species found in this marsh include *Salix nigra*, *Typha domingensis*, *Vigna repens*, *Sagittaria sp.*, *Echinochloa walteri*, *Eleocharis parvula*, *Leptochloa fascicularis*, *Aster subulatus*, *Baccharis halimifolia*, *Spartina cynosuroides*, *Cyperus spp.*, *Mikania scandens*, *Justica ovata*, *Scirpus validus*, *Scirpus americanus*, and *Sphenoclea zeylanica*.

4.2.2 Fish and Wildlife Resources

Point au Fer Island marshes provide high value habitat for those fish and wildlife species typically associated with brackish coastal wetlands. The island is also situated to serve as a temporary stopover for migratory birds. Within the adjacent waters of the Atchafalaya Bay, approximately 144,000 waterfowl overwinter including green-winged teal, gadwall, mallards, canvasbacks, coots, and pintails (Sasser and Fuller, 1988).

Point au Fer Island provides high quality habitat for a variety of estuarine and estuarine-dependent marine finfish, mollusks, and crustaceans. Such areas are also utilized throughout the northern gulf coastal zone as nursery habitat by larval and juvenile aquatic organisms and certain adult species during specific seasons of the year (Zimmerman et al., 1987; Herke, et al., 1987). The marshes provide tremendous quantities of detrital material which forms the base of the food chain in the Atchafalaya Bay estuary and contributes to maintaining the high level of fisheries productivity in the northern Gulf of Mexico.

Specific habitats within the project area are discussed below.

Beach Rim Marsh

The beach rim area is important for migratory song birds as winter habitat and during spring migrations. This area is the first landfall north of the Mexican coast and during inclement weather large numbers of trans-gulf migrants seek refuge on the elevated vegetation of this beach rim habitat. A site to rest, feed and obtain fresh water is critical to the survival of thousands of these birds. Wildlife utilizing the beach rim include nutria, raccoons, coyotes, and rabbits.

Saline Marsh

The total area of saline marsh has decreased due to the fresh water influence of the Atchafalaya River and shoreline retreat. Currently it is estimated that approximately 4,135 acres of saline marsh exist on Point au Fer Island. Those saline marshes which open to the gulf via bayous or canals are used extensively as feeding and nursery habitat by numerous

estuaries, as well as habitat for resident fish and wildlife including deep water areas for alligator mating or waterfowl protection during storm events.

4.2.3 Threatened and Endangered Species

The current list of endangered or threatened species was reviewed as part of this assessment. Although in the defined range for several species, no sightings or nests were noted during field visits. Occurrences of eagles, falcons and sea turtles are possible, particularly as a feeding area. Due to previously expressed concerns about sea turtles our assessment focused on their relative probability of occurrences in the project area.

The northern Gulf of Mexico is within the range of five species of sea turtles, including the Kemp's ridley (Lepidochelys kempi), a Federally listed endangered species. The Kemp's ridley occasionally appears along the Louisiana Gulf coast (Dundee and Rossman, 1989). Possible factors related to this occurrence include the widespread availability of preferred shallow water marine and estuarine habitat with high turbidity levels from proximity to the Mississippi River and distributaries (Frazier, 1980). Since the project site is located within a relatively shallow estuarine environment, the regional waters have a potential for occasional utilization by Kemp's ridley sea turtles as do other inshore and nearshore areas throughout the Louisiana coastal zone.

Point au Fer Island lies within NMFS Statistical Zone 15. To determine the extent to which the proposed work may affect the Kemp's ridley, literature documenting known occurrences within adjacent statistical zones along the Louisiana coast was examined. Documentation was based on historical and recent sightings, incidental catches and reports by commercial and recreational fisherman, observations by divers and commercial pilots, aerial surveillance, and strandings records (Fritts et al., 1983; Fuller et al., 1987; Teas, 1992a; and Teas, 1992b). In addition, a biological assessment of impacts to sea turtles from oyster shell dredging in Atchafalaya and adjacent waters was prepared by the U.S. Army Corps of Engineers, New Orleans District as part of an Environmental Impact Statement (EIS) in November 1987 (U.S. Army Corps of Engineers, 1987). This document was consulted to provide further detail regarding sea turtle occurrences and potential construction affects in this region. Our review of this information has revealed occurrences of Kemp's ridley sea turtles along the entire Louisiana coast; however, the area of highest relative incidence appears to be from Terrebonne Bay eastward through Chandeleur and Breton Sounds, and to the west in the vicinity of the Calcasieu Ship Channel. No unusually high incidences of occurrence were noted in NMFS Statistical Zone 15 in general, or at Point au Fer Island specifically.

4.3 Cultural Environment

4.3.1 Historical or Archeological Resources

The Louisiana coastal waters have been traversed by historic watercraft since the earliest colonization of the region. It is also possible that prehistoric vessels utilized these waters. At present, 42 recorded wrecks have occurred in Louisiana coastal waters and seven have occurred in the Atchafalaya Bay. This includes the sinking of the Chancellor in 1841 near Point au Fer Island (U.S. Army Corps of Engineers, 1987; U.S. Army Corps of Engineers, 1994). Due to the dependence on ship travel during the colonialization of south Louisiana and the frequency of tropical storms in the area, there is a strong potential that historical ship remains may be found in subbasins or near the shores of Point au Fer Island.

There is also the potential for inundated prehistoric archeological sites on Point au Fer Island. The Chitimacha Tribe of Louisiana were known to have communities near Grand Lake and the mouth of the Atchafalaya River. Although no permanent sites were located on the Island due to flooding, the Chitimacha hunted and fished the entire Atchafalaya Basin including Point au Fer Island (Faine and Bohlander, 1986). During the nineteenth century, trappers and hunters frequented the area hunting mink, muskrat, raccoon, and alligator and established trade routes to the east via the Atchafalaya Bay.

By letter of no objection dated March 10, 1995, the project has cleared review by the State Historic Preservation Officer. The U.S. Army Corps of Engineers, New Orleans District is currently coordinating the preparation of an assessment of cultural resource impacts associated with the project.

4.3.2 Economics (Employment and Income)

Point au Fer Island's inherent natural resources contribute significantly to the economy of south Louisiana. These resources serve as a basis that support extensive recreational and commercial fishing, shellfishing, trapping, and hunting industries as well as mineral exploration. The inland marshes of Point au Fer Island provide a nursery habitat for marine fisheries that are harvested throughout the Louisiana coastal zone.

Morgan City and Delcambre, Louisiana are fishing ports located near the Atchafalaya Bay. The combined value attributed to the commercial fishing industries of these two ports in 1989 was \$33.5 million dollars or 12 percent of the total value of U.S. finfish landings. The overall 1989 value of the commercial fishing industry from all parishes adjacent to the Atchafalaya Basin and possibly influenced by fishery resources of Point au Fer Island 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 on or near Point au Fer Island. For over 50 years, fishing, hunting, and trapping and have attracted sportsmen from all over the country to the Terrebonne Basin and many local businesses serve this market. Evidence of this is documented by the numerous marsh management plans that have been implemented within the basin to promote the recreational wildlife harvest.

There are existing oyster leases in the Bay Castagnier immediately east of Project Area 1A. These leases are not expected to be productive at this time due to the increasing freshwater input from the Atchafalaya River. Access and construction activities will be coordinated with all potentially affected lease holders.

Mineral exploration on Point au Fer Island has been conducted for over 50 years. Parish revenues and employment resulting from oil and gas exploration on and near Point au Fer Island reached their highest level from 1970 - 1985. During this time, numerous wells, storage facilities and pipelines were constructed and maintained by mineral exploration companies. Following the sharp decrease in the oil and gas industry during the mid 1980's, the economic benefits resulting from oil and gas exploration on Point au Fer Island have also decreased.

4.3.3 Land Use

The involved property is owned by the John M. Smyth Company and the Roman Catholic Church. The project area itself encompasses approximately 25 acres. However, the anticipated benefits of the project will impact approximately 3,000 acres of brackish emergent marsh and shallow vegetated water bottoms. Present and historical use includes fish and wildlife resource management and exploitation, and hydrocarbon exploration and production.

4.3.4 Recreation

The coastal marshes of the Terrebonne and Atchafalaya Basins, including Point au Fer Island, have attracted sportsmen for decades. Recreational use of Point au Fer Island results from its fish and wildlife resources. Historically, this includes fishing, hunting, boating, and trapping, although this barrier island could serve as an excellent site for migratory bird observation. The marshes of the island can be reached within hours of inland ports, provide protection from rough seas and are excellent habitat for fish and wildlife.

4.3.5 Noise

Point au Fer Island represents a privately owned, remote area that has no industry other than oil production. Ambient noise on the island would result from oil and gas exploration, boats, or wildlife.

4.3.6 Infrastructure

As shown on Figure 1, natural bayous and access canals constitute the entire transportation network on Point au Fer Island. These access canals are concentrated in the southwestern and eastern areas of the island.

5.0 ENVIRONMENTAL CONSEQUENCES

In general, the adverse environmental consequences of the no-action alternative are overwhelming compared to the preferred alternative. The conversion of marsh to open water at rates such as 34.9 square miles per year (Barras, et al., 1994) due to subsidence (Turner, 1990), erosion (Boesch et al., 1983), and saltwater intrusion (Reed and Cahoon, 1993) has well documented adverse environmental impacts which can be mitigated by restoration projects. All structural and non-structural alternatives, including the preferred, have short term localized impacts during construction, yet offer highly significant long term environmental benefits.

It should be noted that the no-action alternative could increase the change of fresh and brackish marsh to saline marsh vegetation. Selection of plug alternatives and use of plugs versus filling canals with dredged material were, therefore, evaluated from an engineering and cost viewpoint. A thorough assessment of the environmental consequences of the preferred alternative is, therefore, provided below.

5.1 Physical Environment

5.1.1 Geology, Soils and Topography

The proposed activity will have no impact on geology, soils or topography. The material used for construction of the plugs include local dredged material (shell, sands, and clay sediment) and wood pilings. The plugs are to not to extend above the height of the existing spoil banks, therefore no increased elevations or depressions will result from the activity.

Dredged material from the Gulf of Mexico borrow locations will be used for Area 2. The dredged material consists of naturally occurring material deposited over time by riverine and estuarine processes. The sources of this material are expected to be identical to the sources of sediment-laden waters washing into and over Point au Fer Island. No potential for contamination is anticipated by use of these sediments since the drainage area has little or no industrial activity. Borrow areas will be a minimum

of approximately one-half mile from shore and depths of less than 20 feet are expected.

Impacts from access dredging will be minimal, localized and short-term. Dredged material removed from borrow areas will be rapidly replaced by natural processes.

5.1.2 Climate and Weather

The canal plugs are designed to maintain their structural integrity for a minimum of 20 years under standard weather conditions. The plugs are not designed to withstand hurricane conditions and could be damaged by such events. In climate weather could temporarily delay the implementation of the proposed activity. The areas filled with dredged material should vegetate and remain unaffected by weather after compaction.

5.1.3 Air Quality

Minor 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

Short-term adverse impacts to surface water resources will be limited to the designated dredge sites in the Gulf of Mexico and fill areas of the canals during construction. The plugs to be constructed in the Mobil Canal consist of sand and clay dredged material transported and placed by pipelines that originate at the designated dredge sites (Figure 4) or in the Atchafalaya Channel. Minor short-term adverse impacts to surface water quality will include increased turbidity in surface waters of the Gulf near the dredge sites. These impacts are minor and will be limited to the construction phase of the project.

Long-Term Benefits

The long-term benefits to surface water resources resulting from the proposed activity include shoreline restoration and marsh protection. Stabilizing the shoreline will reduce the risk of breaching during storm events and protect the inland marshes from rapid erosion. Plugging of Transco and Hester Canals will reestablish the inherent hydrologic regime within the project area reducing the adverse impacts of tidally driven erosion and salt water intrusion to inland marshes. Filling the most seaward portions of the Mobil Canal will provide shoreline reinforcement and protect interior marshes from the Gulf. These activities will

contribute to restoring the integrity of the barrier island needed to maintain its surface water resources.

5.1.5 Storm and Flood Protection

The proposed activity will improve long-term storm and flood control resources of Point au Fer Island. This barrier island is the outermost land area in western Terrebonne Parish and acts as the first line of defense against seasonal cyclonic storms. Stabilizing shoreline and protecting the marshes from excessive erosion will improve the capacity of the island to buffer tidal surges, thereby providing protection for inland areas.

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 of Point au Fer Island. Plant health and vigor are necessary for overall marsh health and stability. Plugging canals that are adversely impacting inland marshes will contribute to long-term protection of its various vegetative communities. Because the accumulation of organic material is a primary factor influencing vertical accretion, protecting the inland marshes from excessive erosion and saltwater intrusion will increase the overall health and stability of the island. Long-term restoration of marshes could amount to as much as 800 acres in the project area (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993). In addition, filling of the canal in Area 2 will create approximately 10 acres of new marsh when this dredged material stabilizes. This effect more than offsets the short-term negative impacts due to plug construction and placement.

5.2.2 Fish and Wildlife Resources

Short-Term Adverse Impacts

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 canals at each plug or fill site and increased turbidity in waters near the designated dredge and fill sites. Increased turbidity may also be experienced during access dredging operations. These impacts are minor and are limited to the immediate vicinity of activity and only for the duration of construction of the project.

As described in Section 3.3 and shown in Figures 2-4, a total of nine plugs will be installed in three access canals on Point au Fer Island. In area 1A, six plugs will be installed to block two access canals that intersect within the brackish marsh habitat. Four plugs will be installed in Hester canal that will consist of wood pilings stabilized by shell fill on either side. Two plugs (Plugs 3A and 6) will be installed in the Transco

Canal. Plug 3A will be constructed of shell material. Plug 6 will be a reinforced timber structure. In Area 1B, Plug 4 will be constructed of shell material. In Area 1B, Plug 4 will be constructed of shell material. Machinery to install these plugs will be transported and operated in the canals, reducing the potential impacts to adjacent marsh habitat and limiting construction activity to less than 1 acre per plug site.

The shell material will be purchased and barged into place through Four League Bay, Mosquito Bayou, Mosquito Bay, Transco Canal, and Hester Canal. Limited areas of access dredging for the barges are indicated on Figures 2 and 3. Specifications have been outlined to avoid impacts to any oyster leases during the transport of shell to the site. Barges will be loaded with appropriate amounts of shell to insure that damage to the bay bottom does not result from drag.

In Area 2, fill consisting of sand and clay dredged material will be transported from the offshore dredge site by pipeline. As shown in Figure 1, the canal is near the shoreline and can be filled without disturbing inland marsh. The fill will be a minimum of 200 feet from the shoreline along all sections of the Mobil Canal.

Long-Term Adverse Impacts

Minor long-term adverse impacts will occur to resident flora and fauna within the canals or to migratory fauna that use the canals to access inland estuaries. The plugged canals will slowly convert from saline to brackish habitat and will no longer provide corridors for these organisms. These impacts are considered minor as other natural bayous will continue to provide access to these marshes.

Offshore areas used as a source for dredged material will have brief localized impacts due to physical impacts of dredging and localized increases in turbidity. Since these areas will be no closer than approximately one-half mile and will involve less than 20-foot depths, impacts will be minimal. Due to ample sediment loads, the dredged areas will rapidly fill in with natural material. If dredged material from the Atchafalaya Channel is used, impacts will be primarily limited to already existing impacts from those annual maintenance dredging operations.

Long-Term Benefits

The proposed activity will improve long-term fish and wildlife resources by stabilizing and protecting the shoreline and inland marshes from increased deterioration attributed to Transco, Mobil, and Hester Canals. In addition to benefitting fish and wildlife resources, protected inland marsh and elevated shoreline provides critical habitat for a numerous fish and wildlife species during storm events or excessive flooding.

5.2.3 Threatened and Endangered Species

The data reviewed suggest that while there is a potential for the occurrences of Kemp's ridley sea turtles in the project vicinity, it is comparatively low relative to other statistical zones. Therefore, it is anticipated that the probability for death, injury, or other incidental take related to project construction and plan implementation is negligible. Discussions with the Protected Resources Division of NMFS reveal no other potential for significant impacts to threatened or endangered species from this project (McTigue, 1994). Adverse impacts to species for which the United States Fish and Wildlife Service (USFWS) is responsible are also not expected. Interagency consultation to confirm this view has been initiated.

5.3 Cultural Environment

5.3.1 Historical or Archeological Resources

The proposed activity represents a small potential to adversely impact historical or archeological resources. This potential is due to the significant number of shipwrecks that have occurred in the Atchafalaya Bay, the use of the area by Native Americans and the colonization of south Louisiana via gulf waterways. The dredging activity in the gulf and the shoreline restoration could destroy historical artifacts during the construction process. This potential is minor due to the limited area of the proposed activity. By letter of no objection dated March 10, 1995, the project has cleared review by the State Historic Preservation Officer. The U.S. Army Corps of Engineers, New Orleans District is currently coordinating an assessment of cultural resource impacts.

5.3.2 Economics (Employment and Income)

The proposed activity will have no measurable impacts on the economics in the area. Commercial fishing will not be affected by the activity.

Slight access restrictions may occur to fishermen accustomed to frequenting the area; however, other routes are available.

5.3.3 Land Use

Project implementation will not alter or impact existing land use classifications. If successful, the project will prevent further marsh loss and improve the value of the area for the production of those resources for which it is best suited. Maintenance of surface integrity will also safeguard legal rights to subsurface mineral resources. Project implementation will maintain and possibly improve the economic, biological, and aesthetic value of the tract for the landowners.

5.3.4 Recreation

The proposed activity will result in minor impacts to recreational activity. The plugged canals will no longer support boat traffic. The visual and auditory characteristics of the project area will be temporarily impacted by the presence and operation of construction equipment. The sight and smell of recently deposited dredged material and increased turbidity levels may also be aesthetically displeasing. Long-term visual impacts may result from the placement of canal plugs which are more conspicuous within the natural setting. However, such features will not significantly degrade local aesthetic values since similar structures exist in the project vicinity and throughout coastal Louisiana.

5.3.5 Noise

Dredging and structure installation will elevate noise levels in the project area. These increases may disturb sportsmen in pursuit of recreation. Because of the remote location, populated areas will not be impacted by excessive noise levels. It is anticipated that auditory disturbances will be periodic and short-term.

5.4 Infrastructure/Transportation

The proposed activity will prevent boat traffic on all or parts of Hester, Transco and Mobil Canals. No other significant impacts are anticipated.

6.0 CONCLUSIONS

Selected for funding by the CWPPRA Task Force Priority Project process, the Point au Fer Island Hydrologic Restoration Project is being jointly implemented by NMFS and LDNR. This EA finds that no significant adverse environmental impacts are anticipated. This project will result in highly positive direct, secondary and cumulative impacts due to the substantial benefits of marsh protection and barrier island restoration. The design for a 20-year life meets the criteria under CWPPRA. By proceeding with this project the people of Louisiana, as well as the nation, will benefit from the restoration and preservation of the valuable estuarine habitat supportive of our wildlife and fisheries resources.

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8.0 PREPARERS

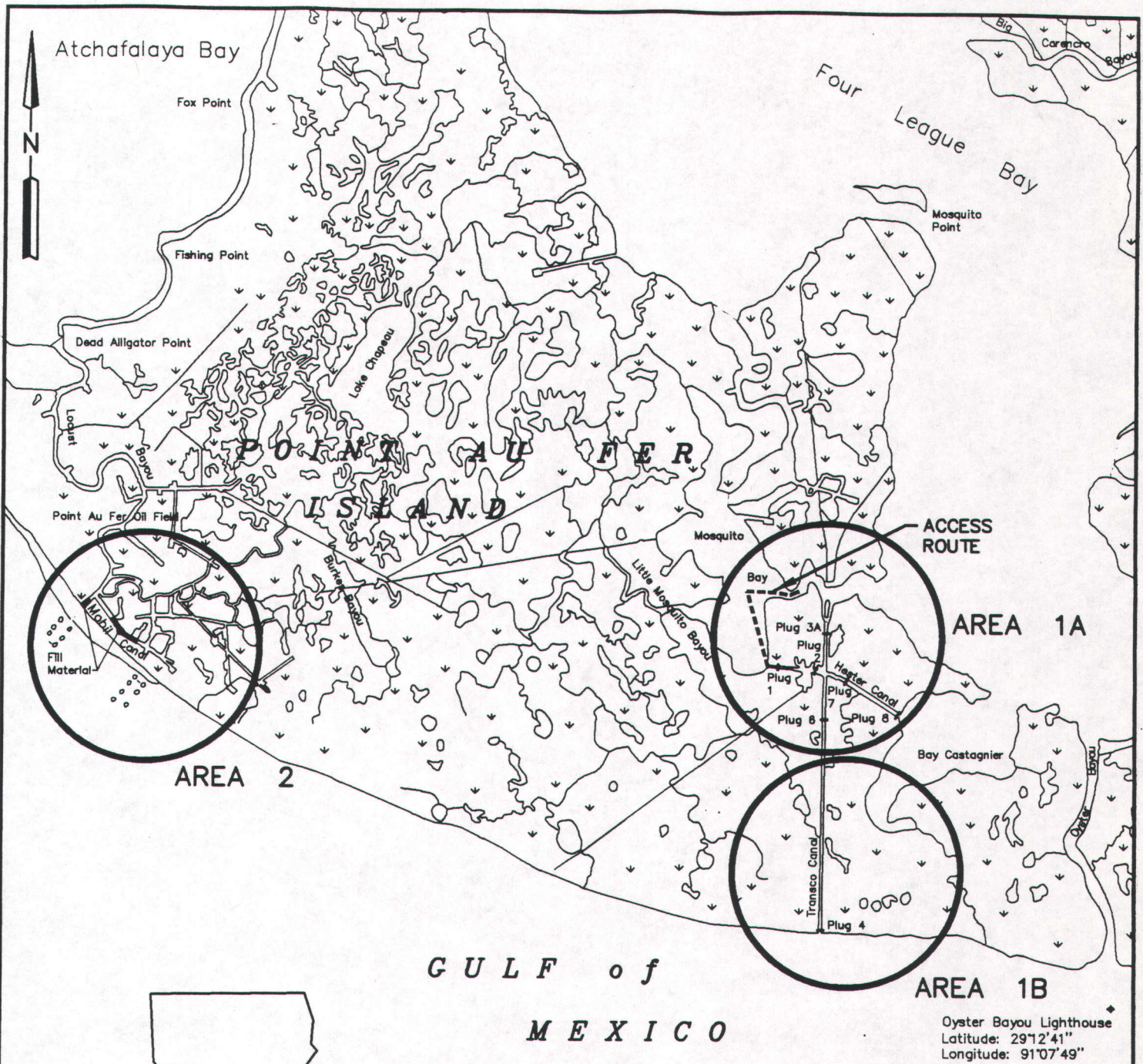
This EA was prepared by C-K Associates under contract to NMFS. Sections were written by Mr. Jeff Heaton, Mr. Scott Nesbit and Ms. Laurie Pierce of C-K Associates under the direction and guidance of Dr. Teresa McTigue of NMFS. In addition to Dr. McTigue, invaluable reference material and guidance were provided by Ms. Peggy Jones, Mr. Rickey Ruebsamen, Dr. Erik Zobrist and Mr. Tim Osborn of NMFS. Information compiled in a previous assessment of Point au Fer Island by Mr. Martin Mayer of the U.S. Army Corps of Engineers, New Orleans District, is also gratefully acknowledged as a major source for this document.

9.0 FINDING OF NO SIGNIFICANT IMPACT

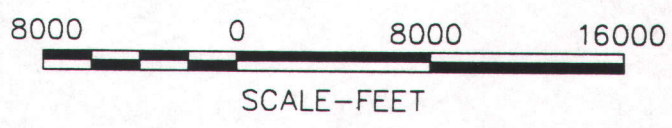
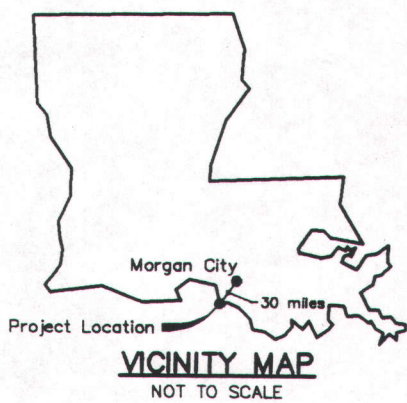
Therefore, based on the conclusions of this document and the available information relative to the proposed action, there will be no significant environmental impacts from this action. Furthermore, preparation of an Environmental Impact Statement on this action is not required by the National Environmental Policy Act or its implementing regulations.

Henry R. Beasley (for)
Rolland A. Schmitt
Assistant Administrator for Fisheries
National Marine Fisheries Service
National Oceanic and Atmospheric Administration

5-8-95
Date



GULF of MEXICO



NOTE:
Base Information Taken From Digitized Quadrangle Maps On Diskette
In Autocad Format Provided By American Digital Cartography, Inc.

FIGURE 1

DATE	BY U.S. DEPARTMENT OF COMMERCE/NOAA NATIONAL MARINE FISHERIES SERVICE SILVER SPRING, MARYLAND			
	POINT AU FER ISLAND HYDROLOGIC RESTORATION PROJECT			
REVISION	LOCATION MAP TERREBONNE PARISH			
	C-K ASSOCIATES, INC. BATON ROUGE, LOUISIANA			
NO.	DRAWN	LZP/ACAD	APPROVED	ARM
	CHECKED	LMP	DATE	AUGUST 4, 1994
	SHEET		DWG. NO.	A39-700-01

03/15/95D

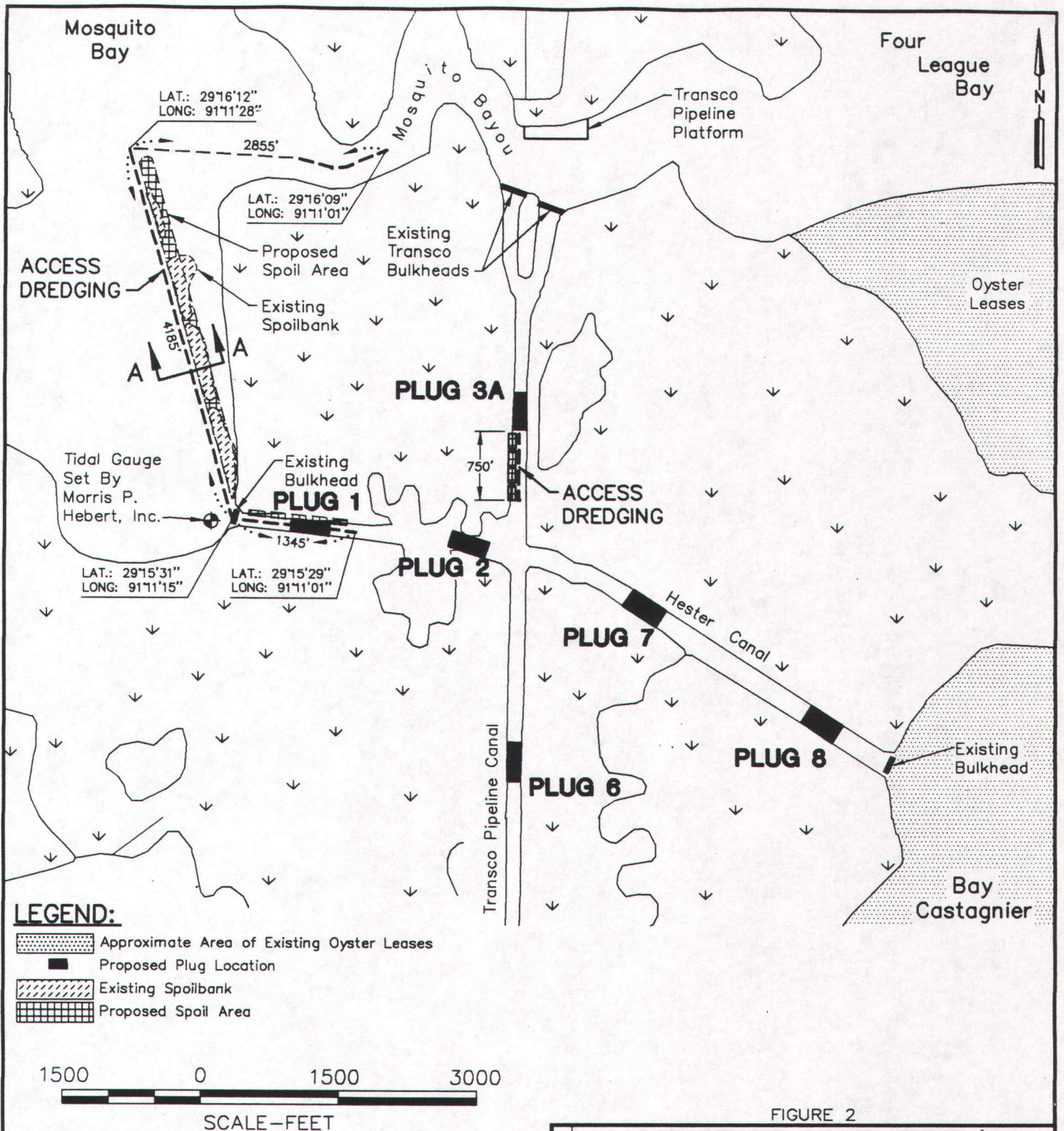
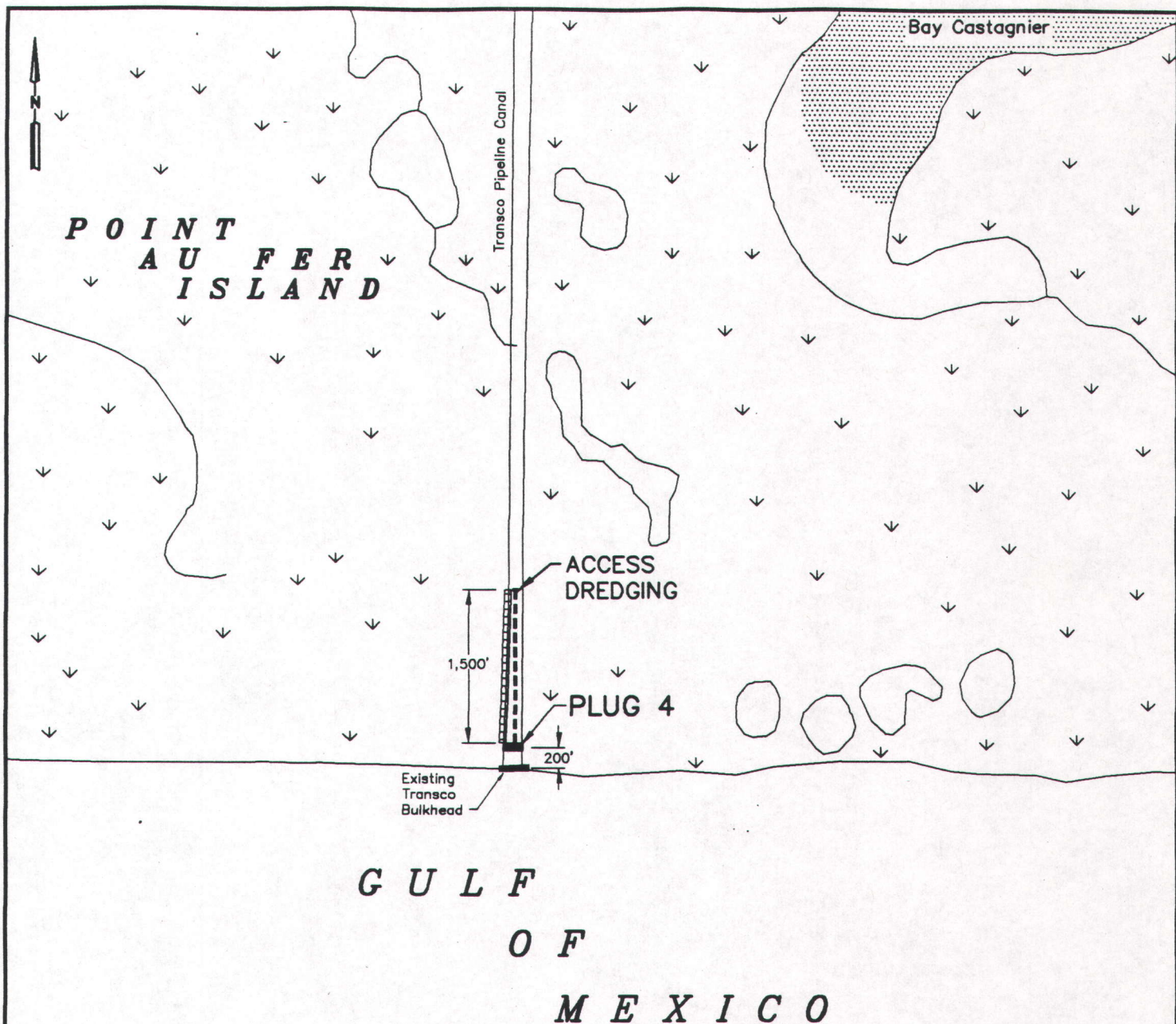





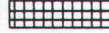
FIGURE 2

DATE	U.S. DEPARTMENT OF COMMERCE/NOAA NATIONAL MARINE FISHERIES SERVICE SILVER SPRING, MARYLAND			
	POINT AU FER ISLAND HYDROLOGIC RESTORATION PROJECT PROJECT SITE PLAN AREA 1A TERREBONNE PARISH			
REVISION	C-K ASSOCIATES, INC. BATON ROUGE, LOUISIANA			
	DRAWN	LZP/ACAD	APPROVED	ARM
NO.	CHECKED	LMP	DATE	AUGUST 4, 1994
	SHEET		DWG. NO.	A39-700-02

03/15/95D



LEGEND:

-  Approximate Area of Existing Oyster Leases
-  Proposed Plug Location
-  Existing Spoilbank
-  Proposed Spoil Area



NOTES:

Base Information Taken From Digitized Quadrangle Maps On Diskette In Autocad Format Provided By American Digital Cartography, Inc.

Dredging Operations to Include Either Propwashing and/or Bucket Dredging.

Oyster Lease Holders Within 1,500 feet of the Proposed Activities Will be Notified Prior to Conducting Operations.

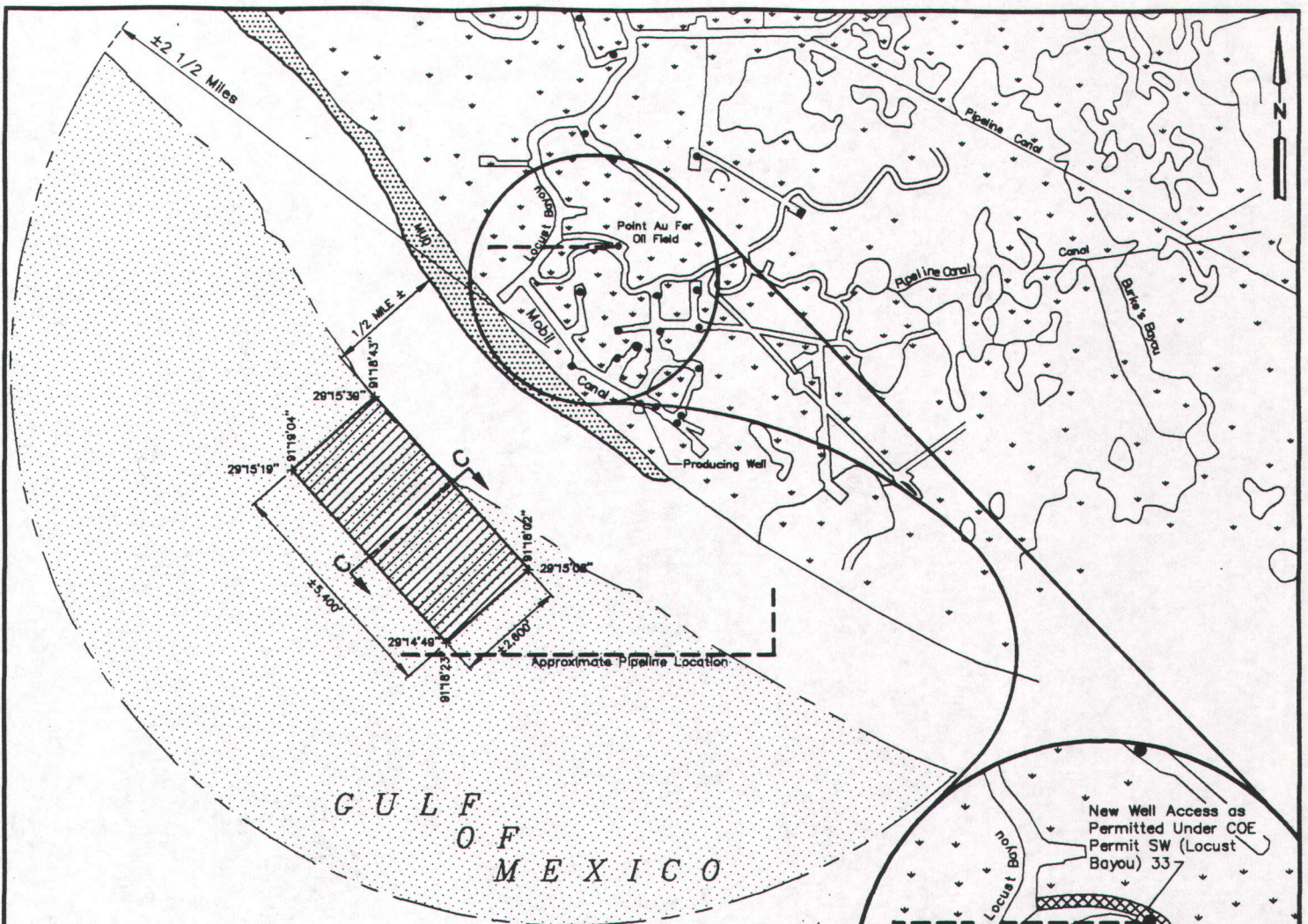
Access Dredging Within Canals Not to Exceed -6.0' Elevation.

Total Distance to be Dredged For Access Route Is Approximately 10,700 Feet Which Equates to Approximately 155,000 Cubic Yards of Dredged Material.

FIGURE 3

NO.	REVISION	U.S. DEPARTMENT OF COMMERCE/NOAA NATIONAL MARINE FISHERIES SERVICE SILVER SPRING, MARYLAND			
		POINT AU FER ISLAND HYDROLOGIC RESTORATION PROJECT PROJECT SITE PLAN AREA 1B TERREBONNE PARISH			
		C-K		ASSOCIATES, INC. BATON ROUGE, LOUISIANA	
		DRAWN	LZP/ACAD	APPROVED	ARM
		CHECKED	LMP	DATE	AUGUST 4, 1994
		SHEET		DWG. NO.	A39-700-08

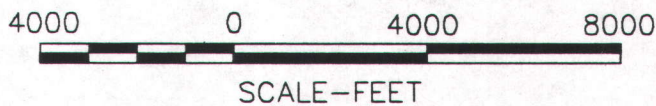
C.T. 1/15/95



GULF OF MEXICO

LEGEND

- ↓ Marsh
- Hydraulically Dredged Fill Material
- Well Head (See Note)
- - - Approximate Location Of Existing Pipelines
- Primary Proposed Dredging Area
- Secondary Proposed Dredging Area



NOTES:

Pipeline Locations are Approximate. Field Verification Required Prior To Construction.

All Wells Are Not Producing Unless Otherwise Noted.

Base Information Taken From Digitized Quadrangle Maps On Diskette In Autocad Format Provided By American Digital Cartography, Inc.

See Sheet 6 of 9 for Cross-Section Details.

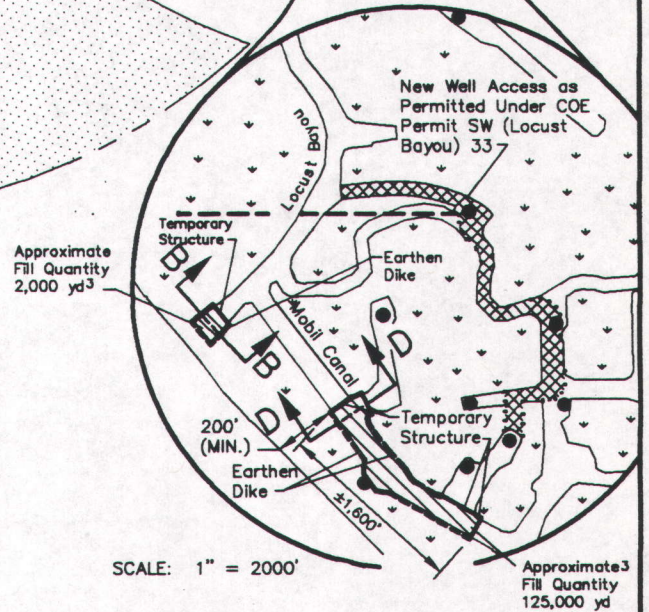
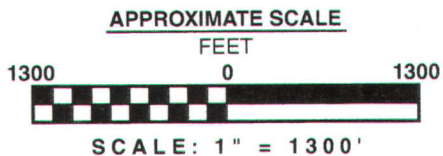


FIGURE 4

BY	U.S. DEPARTMENT OF COMMERCE/NOAA			
	NATIONAL MARINE FISHERIES SERVICE			
DATE	SILVER SPRING, MARYLAND			
	POINT AU FER ISLAND			
REVISION	HYDROLOGIC RESTORATION PROJECT			
	PROJECT SITE PLAN			
NO.	AREA 2			
	TERREBONNE PARISH			
		C-K ASSOCIATES, INC.		
		BATON ROUGE, LOUISIANA		
	DRAWN	LZP/ACAD	APPROVED	ARM
	CHECKED	LMP	DATE	AUGUST 4, 1994
	SHEET		DWG. NO.	A39-700-09



FIGURE 5



SOURCE:

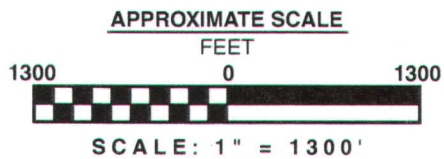
AERIAL PHOTOGRAPH PROVIDED BY U.S.G.S. EARTH SCIENCE INFORMATION CENTER, STENNIS SPACE CENTER, 1990 FLIGHT.

07/15/94B IMAGE: NAIFS SITE 1A

NO.	REVISION	DEPARTMENT OF COMMERCE/NOAA NATIONAL MARINE FISHERIES SERVICE SILVER SPRING, MARYLAND POINT AU FER PLUGS RESTORATION PROJECT 1990 AERIAL PHOTO OF PROJECT AREA 1A TERREBONNE PARISH	
	DATE	C-K ASSOCIATES, INC. BATON ROUGE, LOUISIANA	
	DRAWN	MPC/MAC	APPROVED JSH
	CHECKED	LMP	DATE JULY 14, 1994
	SHEET OF	DWG. NO.	A39-700-05



FIGURE 6



SOURCE:

AERIAL PHOTOGRAPH PROVIDED BY U.S.G.S. EARTH SCIENCE INFORMATION CENTER, STENNIS SPACE CENTER, 1990 FLIGHT.

0715/MB IMAGE: NMFS SITE 1B

BY	DEPARTMENT OF COMMERCE/NOAA NATIONAL MARINE FISHERIES SERVICE SILVER SPRING, MARYLAND		
	POINT AU FER PLUGS RESTORATION PROJECT		
DATE	1990 AERIAL PHOTO OF PROJECT AREA 1B TERREBONNE PARISH		
REVISION	C-K		ASSOCIATES, INC. BATON ROUGE, LOUISIANA
	DRAWN	MPC/MAC	APPROVED JSH
NO.	CHECKED	LMP	DATE JULY 14, 1994
	SHEET	OF	DWG. NO. A39-700-06

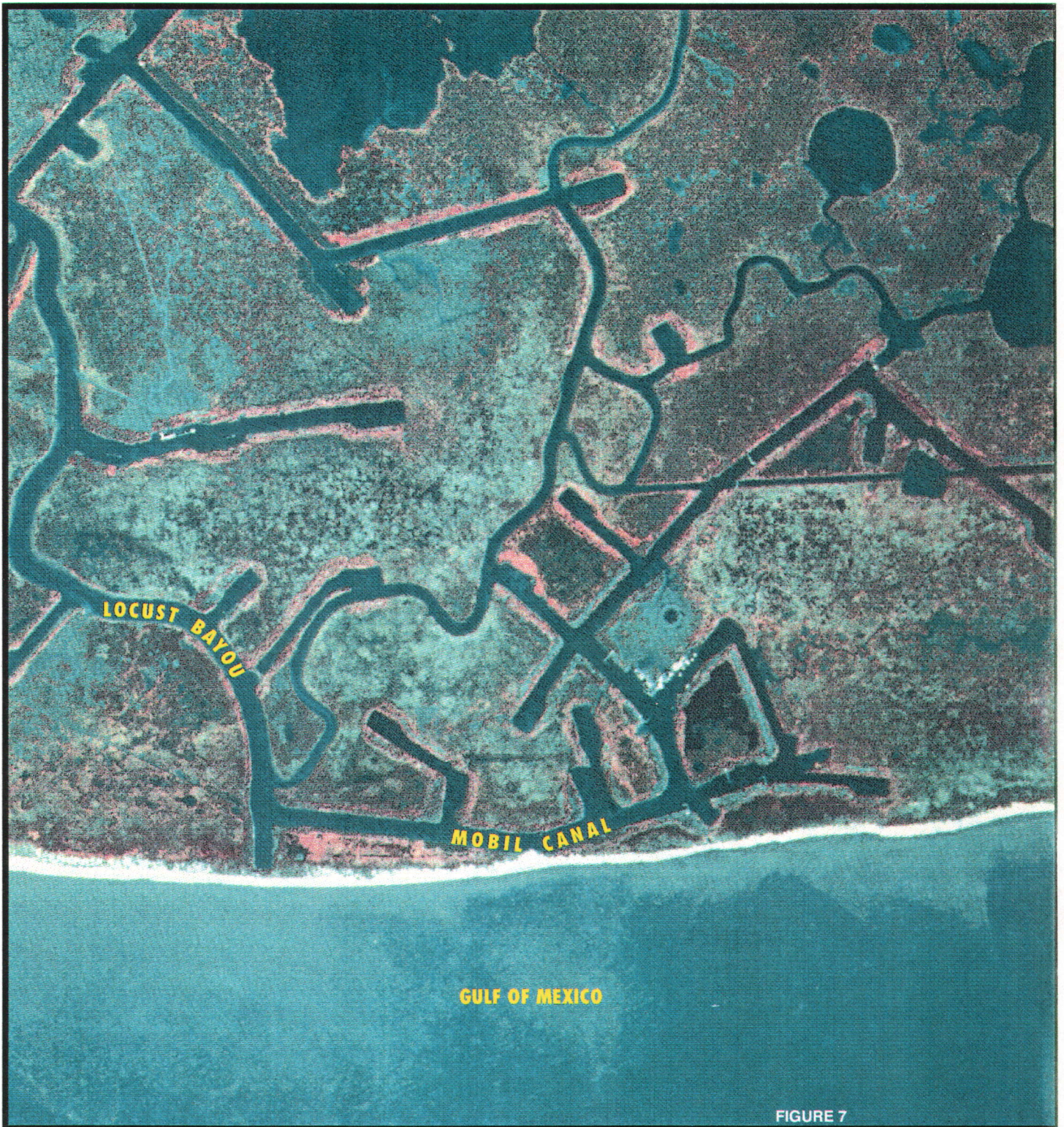
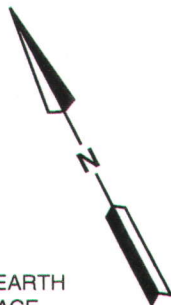
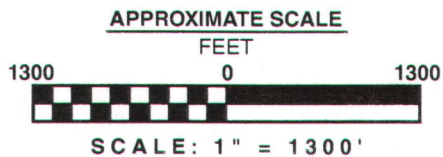


FIGURE 7



SOURCE:

AERIAL PHOTOGRAPH PROVIDED BY U.S.G.S. EARTH SCIENCE INFORMATION CENTER, STENNIS SPACE CENTER, 1990 FLIGHT.

NO. REVISION DATE BY

**DEPARTMENT OF COMMERCE/NOAA
NATIONAL MARINE FISHERIES SERVICE**
SILVER SPRING, MARYLAND

POINT AU FER PLUGS
RESTORATION PROJECT
**1990 AERIAL PHOTO OF
PROJECT AREA 2**

TERREBONNE PARISH

C-K

ASSOCIATES, INC.
BATON ROUGE, LOUISIANA

DRAWN	MPC/MAC	APPROVED	JSH
CHECKED	LMP	DATE	JULY 14, 1994
SHEET	OF	DWG. NO.	A39-700-07

March 23, 1995

National Marine Fisheries Service
Lafayette Office
USL P.O. Box 42451
Lafayette, LA 70504
Attn: Dr. Terry McTigue

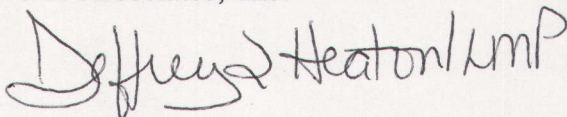
Re: Final Environmental Assessment for the
Point au Fer Island Hydrologic Restoration Project

Dear Dr. McTigue:

Enclosed are final copies of the Environmental Assessment for the Point au Fer Island Hydrologic Restoration Project. As stated in our revised scope of services and cost estimate letter, we are submitting two final copies directly to you along with a 3 1/2" diskette. Unchanged color figures were not re-submitted.

We appreciate having the opportunity to prepare and submit this document to National Marine Fisheries Service. We have enjoyed working with you on this endeavor and look forward to working with you in the future. If you have any questions, please do not hesitate to call.

Very truly yours,
C-K Associates, Inc.



Jeffrey S. Heaton
Vice President

JSH/lmp

Enc: As Stated

Operations and Readiness Division
Western Evaluation Section

SUBJECT: Draft Environmental Assessment
Point au Fer Island Hydrologic Restoration Project

Mr. Tim Osborn
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Restoration Center F/PR 5
1315 East-West Highway
Silver Spring, Maryland 20910

Dear Mr. Osborn:

This responds to your letter dated August 11, 1994, forwarding a copy of the draft environmental assessment (DEA) for the Point au Fer Island Hydrologic Restoration Project in Terrebonne Parish, Louisiana, for review and comment. Accordingly, I wish to proffer the following comments.

1. The CWPPRA Project Number on the cover sheet should be validated. It is given as PTE-24/26, when previous references indicate it as being PTE-22/24.
2. Page 6, Section 2.3 - The second sentence should reference the National Environmental Policy Act of 1969, not 1996.
3. Page 7, Section 3.2 - The reason(s) for eliminating Alternatives 2, 3, and 4 should be clearly presented.
4. Page 8, Section 3.4 - The description of the shell reinforced timber plugs should include the ~~planned crest~~ elevation of the structures.
5. Page 11, Section 4.0 - The date of the report by the U.S. Army Corps of Engineers cited in the second sentence of the first paragraph should be 1993.
6. Page 11, Section 4.0 - The last sentence of the first paragraph should specify where on the island land gain has been determined to have occurred and quantify the acreage.
7. Page 24, Section 5.2.2. - The fourth sentence in the second paragraph indicates that the two plugs in Transco Canal will consist of shell only. Our plans indicate that structure 3A is the only plug which may consist of shell alone. The design of the Transco Canal structures should be verified and appropriate changes incorporated into the document.

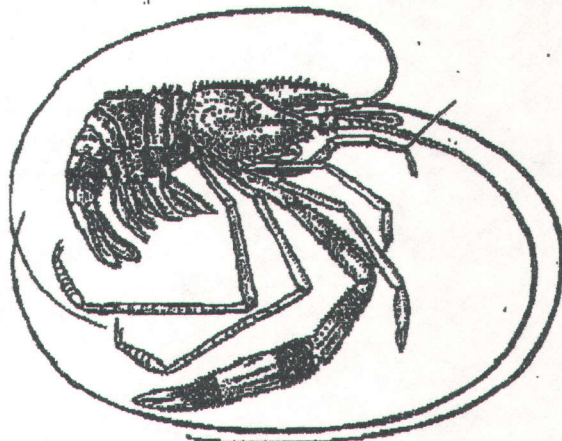
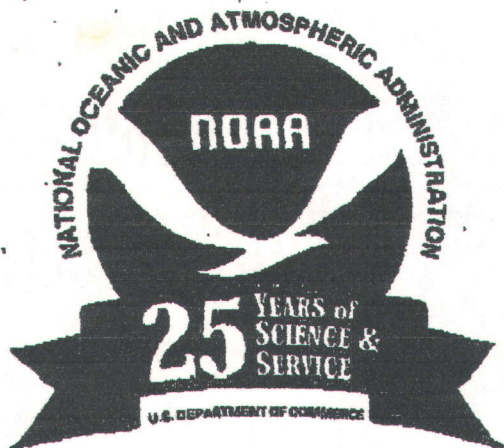
Post-It™ brand fax transmittal memo 7671		# of pages ▶ 2
To	TIM OSBORN	From
Co.		TERRY McTIGUE
Dept.		Phone #
Fax #		Fax #

I appreciate the opportunity to comment on the DEA and am looking forward to receiving a final copy of the document. If you have any questions concerning the above comments, you may call me at (504) 862-2276.

Sincerely,

Martin S. Mayer
Environmental Resources Specialist

TIM OSBORN TERRY M. TIGHE



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Office of Policy and Strategic Planning

UNITED STATES DEPARTMENT OF COMMERCE
 14th and Constitution, N.W., HCHB Room 6117
 Washington, D.C. 20230

PHONE:(202) 482-5181 FAX:(202) 501-3024

TO: Erik Zobrist

FROM: N. Callman

PAGES: 5
 (with cover sheet)

MESSAGE:

NATIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 5

To TERRY M. TIGHE	From ZOBRIST
Dept./Agency NMFS	Phone # 301-713-0124
Fax # 318-482-6630	Fax # 0194

NSN 7540-01 317 7368 5099-101 GENERAL SERVICES ADMINISTRATION

05/19/95 09:36

NO. 250 P002/005



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1936 East-West Highway
Silver Spring, MD 20910
THE DIRECTOR

MAY - 8 1995

MEMORANDUM FOR: Donna Wieting
Acting Director
Ecology and Conservation Office

FROM: *Henry R. Beasley (for)*
Roland J. Schmitt

SUBJECT: Transmittal of the Environmental Assessment for
Point au Fer Island Hydrologic Restoration
Project in Terrebonne Parish, Louisiana

The subject document is forwarded for your concurrence. It is the view of the National Marine Fisheries Service that no significant impact to the human environment will result from the proposed action.

Attachments

THE ASSISTANT ADMINISTRATOR
FOR FISHERIES



05/19/95 09:36

NO. 250 P003/005



UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

MAY 17 1995

MEMORANDUM FOR: Rolland A. Schmitten
Assistant Administrator for Fisheries

FROM: Donna Wieting *Donna Wieting*
Acting Director
Ecology and Conservation Office

SUBJECT: Finding of No Significant Impact Based on the
Environmental Assessment for the Point au Fer
Island Hydrologic Restoration Project in
Terrebonne Parish, Louisiana

Based on the information presented in the subject environmental assessment, I concur with your determination that the action will not have a significant effect on the human environment in accordance with the Council on Environmental Quality's regulations implementing the National Environmental Policy Act. Therefore, a Finding of No Significant Impact is appropriate.

Attachments



05/19/95 09:36

NO.250 P005/005

2

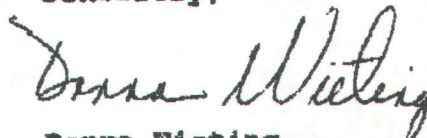
These plugs will re-establish the flow of water across the island and protect approximately 3,500 acres of wetlands. The western area of the island involves dredge-filling 1,900 feet of a oil well access canal which is highly susceptible to salt-water intrusion from the Gulf of Mexico. Dredge-filling this section of the canal will protect approximately 1,900 acres of wetlands by halting water intrusion.

**RESPONSIBLE
OFFICIAL:**

Rolland A. Schmitten
Assistant Administrator for Fisheries
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910
301/713-2239

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the Finding of No Significant Impact including the supporting EA is enclosed for your information. Please submit any written comments to the responsible official named above within 30 calendar days, and to Bill Archambault, Office of Policy and Strategic Planning, Room 6117, U.S. Department of Commerce, Herbert Hoover Building, 14th and Constitution Avenue, N.W., Washington, D.C. 20230

Sincerely,



Donna Wisting
Acting Director
Ecology and Conservation
Office

Enclosure