Project Plan

And

Environmental Assessment

for

South Lake Decade Freshwater Introduction Project

TE-39

Terrebonne Parish, Louisiana

UNITED STATES DEPARTMENT OF AGRICULTURE

NATURAL RESOURCES CONSERVATION SERVICE

June 2001

Project Plan and Environmental Assessment for South Lake Decade Freshwater Introduction Project (TE-39) Terrebonne Parish, Louisiana June 2001

Abstract

This document describes the proposed plan to enhance, maintain and protect wetlands in the South Lake Decade area in Terrebonne Parish, Louisiana. The project will increase the amount of Atchafalaya River freshwater and sediments introduced into marshes south of Lake Decade. The recommended plan consists of installing three multi-gated diversion structures; approximately 8,700 feet of shoreline protection along the south shore of Lake Decade; two low-level rock weirs; one armored plug closure; enlarging approximately 2,500 feet of Lapeyrouse Canal; restoring 2,900 feet of oilfield embankment; and implementing vegetative protection measures.

This document has been prepared under authority of the Coastal Wetlands Planning Protection, and Restoration Act of 28 November 1990, House Document 646, 101st Congress. The document is intended to fulfill the requirements of the National Environmental Policy Act for the project to be funded under the authorization of Public Law 101-646.

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This report should be cited:

United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS). 2001. *Project Plan and Environmental Assessment for South Lake Decade Freshwater Introduction Project (TE-39)*. U.S. Department of Agriculture, Natural Resources Conservation Service. 37pp. plus Appendices.

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SUMMARY OF PLAN/EA

Project Name: South Lake Decade Freshwater Introduction (TE-39)

Parish: Terrebonne Parish

State: Louisiana

Description of Recommended Plan:

The recommended plan will enhance, maintain, and protect existing marshes in the project area by diverting lower salinity water from Lake Decade southward, improve the distribution and retention of diverted water, and maintain the hydrologic integrity of the south shore embankment of Lake Decade.

Resource Information:

Size of Project	Approximately 7,343 Acres
Land Ownership	Private (100 Percent)
Wetlands	Fresh, Intermediate, and Brackish Marsh
Threatened and Endangered Species	Bald Eagles (*Haliaeetus leucocephalus)*
Cultural Resources	Project will have no effect on significant cultural resources.

Problem Identification

Loss of vegetated wetlands and associated functions due to:

Saltwater intrusion
Rapid tidal exchange
Absence of freshwater influence
Shoreline erosion
Subsidence

Alternative Plans Considered:

No Action
Freshwater Introduction

Project Purpose:

Reduce current interior marsh loss rates and increase the occurrence and abundance of submerged aquatic vegetation (SAV).

Project Measures:

Freshwater Diversion Structures on south lake rim (2)
Freshwater Diversion Structure on Lapeyrouse Canal
Foreshore rock dike shoreline protection (8,700')
Enlargement of Lapeyrouse Canal (2,500')
E-W Oilfield canal embankment restoration (2,900')
Low level fixed crested weirs (2)
Armored plug closure
Temporary and permanent vegetative measures

Project Benefits:

Primary:

Prevent the loss of 201 acres of emergent marsh
Decrease the depth of open water areas within the vicinity of the outfall area of the diversions
Increase the occurrence and abundance of submergent aquatic vegetative species within the 7,343 acre project area

Secondary:

Improve wildlife habitat by enhancing emergent marsh vegetation
Shoreline protection along the south shore of Lake Decade will preserve the hydrologic integrity between the lake and interior marshes

Potential Adverse Impacts:

Short-term impacts may include temporary, localized increase in turbidity and suspended solids during the construction period, and localized destruction of some non-mobile benthic organisms and their habitat in the vicinity of the proposed measures.

Long-term impact is expected on approximately four acres of emergent marsh resulting from canal enlargement. Direct impact will occur where material will be excavated from an existing bank of the Lapeyrouse Canal and deposited on adjacent marsh and scrub-shrub/forested spoilbank.

Introduction

The objective of the South Lake Decade Freshwater Introduction Project (TE-39) is to reduce current interior emergent marsh loss rates and increase the occurrence and abundance of submerged aquatic vegetation (SAV's). Project objectives will be accomplished using structural means to divert lower salinity water from Lake Decade into the project area wetlands and provide for effective distribution and retention of such water. The proposed project consists of two (2) multi-gated diversion structures in the south embankment of Lake Decade; approximately 8,700 feet of foreshore rock dike along the southern shoreline of Lake Decade; enlargement of Lapeyrouse Canal from Lake Decade south to interior open water areas and replacement of an existing water control structure; approximately 2,900 feet of oilfield canal embankment restoration; installation of two (2) low-level fixed crested weirs; and one armored plug closure.

Federal funds to be used for planning and implementing projects which create, protect, restore, and enhance wetlands in coastal Louisiana are provided by the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) of 28 November, 1990, House Document 646 101st Congress. The Act calls for formation of the Louisiana Coastal Wetlands Conservation and Restoration Task Force (Task Force) to consist of the Secretary of the Army, the Administrator of the Environmental Protection Agency (EPA), the Governor of Louisiana, the Secretary of Interior, the Secretary of Agriculture, and the Secretary of Commerce. The Louisiana Department of Natural Resources (LDNR) typically serves as the local cost share partner for projects.

The South Lake Decade Freshwater Introduction Project (TE-39) has been approved for planning, engineering, design, and pre-construction monitoring via the Ninth Priority Project List submitted to Congress in April 2000. Once planning, engineering, and design are substantially complete, the project will be submitted to the Task Force for the funding of construction, maintenance, rehabilitation, and post-construction monitoring.

Under CWPPRA specifications, the project must be cost-shared between the federal sponsoring agency and the state of Louisiana. Pursuant to approval of the Louisiana Coastal Wetlands Conservation Plan, the federal government provides 85 percent of the project cost and the state of Louisiana contributes the remaining 15 percent. The United States Department of Agriculture (USDA), through the Natural Resources Conservation Service (NRCS), acts as the federal sponsor for this project and the state of Louisiana has indicated its willingness to cost-share on the proposed action.

This Project Plan/Environmental Assessment (Plan/EA) has been prepared to fulfill the requirements of the National Environmental Policy Act of 1969 (NEPA). This Plan/EA describes problems affecting the area, significant resources, alternatives, the recommended alternative and its impacts, and public participation.

Project Setting

Location

The South Lake Decade project area lies within the Terrebonne Hydrologic Basin in Terrebonne Parish, Louisiana. The project area is located approximately ten miles southwest of the community of Theriot. The project is bordered by the southern bank of Lake Decade and Small Bayou LaPointe ridge on the north, by an unnamed oilfield location canal on the east and south, and undifferentiated marsh, an unnamed north to south oilfield canal, and Bayou Decade on the west. The project encompasses approximately 7,343 acres of emergent marsh and open water (Figure 1).

Climate

The climate in southern Louisiana is influenced by its subtropical latitude and its proximity to the Gulf of Mexico. The project area is characterized by long, hot, humid summers with areas adjacent to the coast frequently being cooled by sea breezes. The average daily maximum temperature is 78.4°F and the average daily minimum temperature is 58.8°F. The winters are mild with only a few cold days. The average frost-free period of 264 days extends from February 22 to November 18.

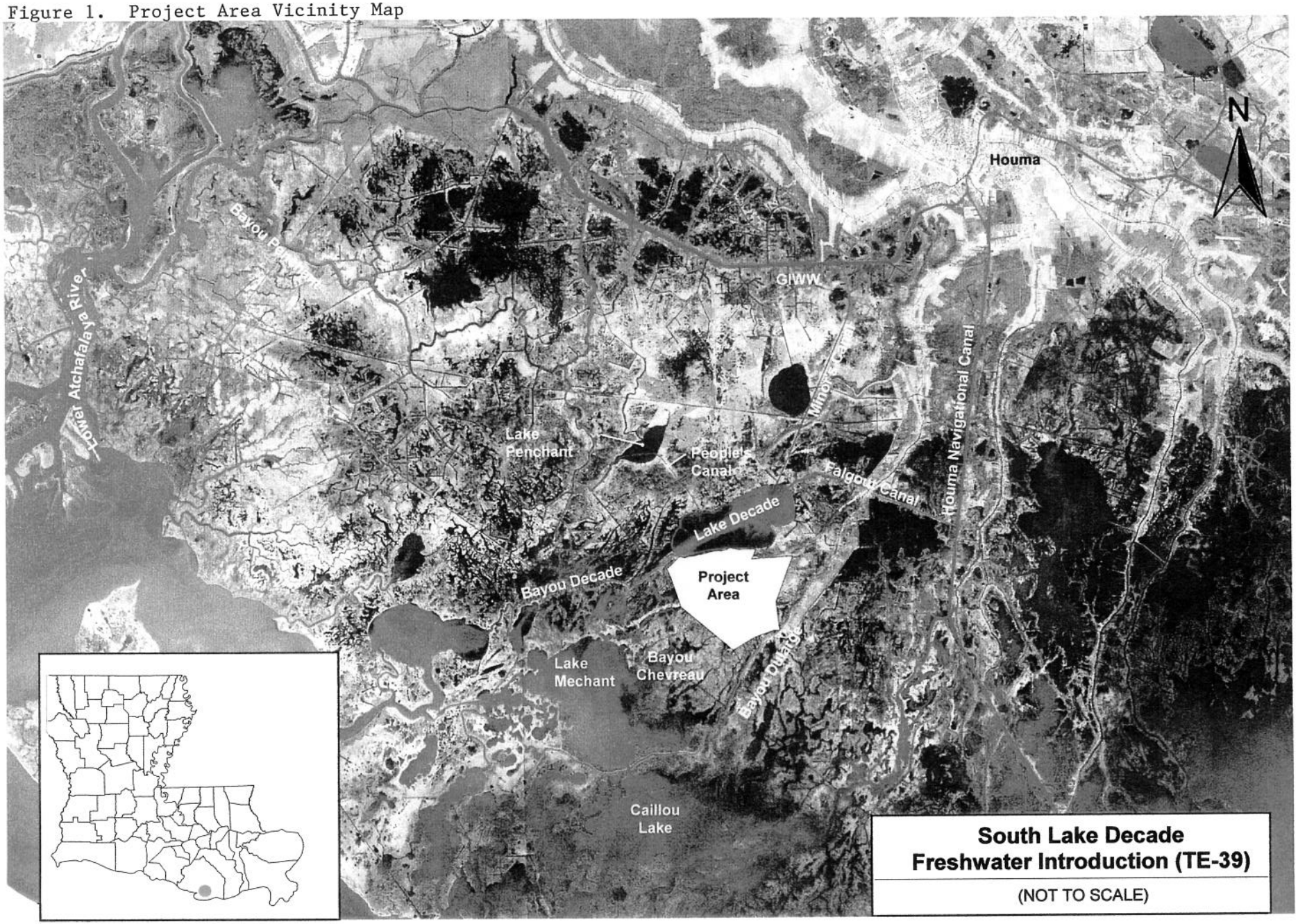
Average rainfall is 62 inches. Even though the rainfall is fairly evenly distributed throughout the year, it is heaviest from June through September.

Geologic Setting

The South Lake Decade Freshwater Introduction project area is located within the Mechant Sub-basin of the Terrebonne deltaic complex in the south-central portion of the Mississippi River Delta Plain. The Lake Mechant basin occupies part of the overlapping area of the successively abandoned lobes of the Teche and Lafourche delta complexes and was formed between approximately 4,500 and 3,000 years before present. The substrate is composed of Holocene deltaic sediments that overlie Pleistocene deposits at different depths of up to 660 feet (Penland et al. 1989). The depth to the Pleistocene in the South Lake Decade Freshwater Introduction Project area ranges from 225 to 275 feet below the surface (May et al. 1984). Compaction of these Holocene sediments, combined with structural movement related to geosynclinal settling and faulting, results in high rates of subsidence. Subsidence is offset only by the accumulation of organic plant materials and the introduction and retention of sediments.

The major physiographic features in the project area are a result of the geologic history and development of the most western portion of the Lafourche distributary systems. The project area is located south of Lake Decade, between the southern shoreline of Lake Decade and Bayou Du Large, and is intersected by the remnant ridge of Small Bayou Lapointe. At one time, distributaries Bayou Du Large and Small Bayou La Pointe supplied the area with freshwater and sediments during annual river floods that offset the adverse effects of relative subsidence. The relatively fluid and clayey sediments that have been deposited along Small Bayou La Pointe and Bayou Du Large, which are continuously saturated and flooded, form the skeletal framework for the fragile project area wetlands occupying the interdistributary basins which are rapidly being converted from wetlands to open water.

Figure 1. Project Area Vicinity Map



At present, the area is no longer adequately nourished by the sediment and water of the Mississippi River. Although the Atchafalaya River, a Mississippi River distributary, annually supplies freshwater and sediments through the Penchant Basin to Lake Decade, the project area lies in the outermost fringe of this influenced area and the remainder of the Mechant Basin receives little or no benefit from this freshwater and sediment (USDA-NRCS, field notes). Therefore, few benefits exist to offset the effects of subsidence and the marine erosional processes causing severe loss of marsh north and east of Lake Mechant. Consequently, the project area has become characterized by marsh erosion and deterioration, allowing increased tidal water exchange to infiltrate further into the project area.

Distribution and Soil Types

Soil types in the project area reflect both the geologic framework of distributary ridges and interdistributary basins, and the salinity variation from fresh to intermediate/brackish. The soils found in the project area have been recently mapped as Allemands, Bancker, Barbary, Clovelly, Kenner, Lafitte, Larose, Schriever, and Timbalier soils (Figure 2) (Appendix A). The Clovelly and Lafitte soils constitute the majority of the soils in the project area. Approximately 50 percent or more of the soils are classified as soils associated with brackish marsh and occur predominantly between Small Bayou La Pointe and Bayou Du Large. The largest area of mineral and fresh soils occurs along Small Bayou La Pointe and consists of Allemands, Barbary, Kenner, and Larose soils (Appendix A). The distribution of soils in the project area clearly indicates the importance of the Small La Pointe Ridge as a historic hydrologic boundary in preventing the northern encroachment of high water salinities.

Allemands Muck, very frequently flooded (AEA)

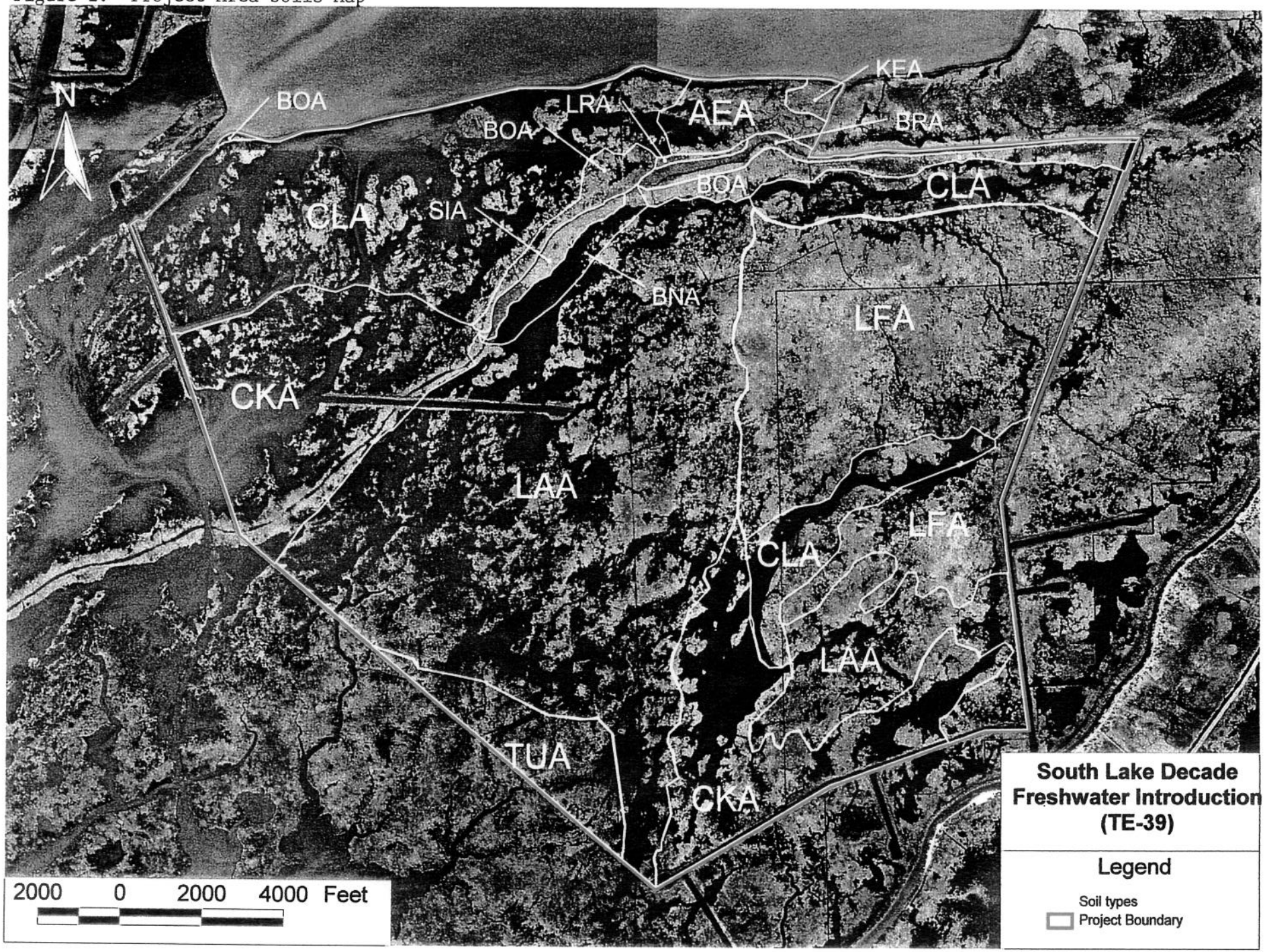
This level, very poorly drained, semifluid, organic soil is generally located in freshwater marshes that are flooded and/or ponded most of the time. This soil formed in moderately thick accumulations of decomposed herbaceous materials and underlying clayey alluvium. Elevation ranges from approximately one (1) foot above sea level to five (5) feet below sea level and slope is less than one-half (0.5) percent. Typically, the surface layer is a very dark muck about ten (10) inches thick. The underlying material extends to a depth of about 72 inches and is a very dark gray muck changing to a dark, greenish gray, very fluid clay.

This soil is flooded by freshwater to depths of six (6) to twelve (12) inches most of the time. During storms, floodwaters are as deep as two feet. The water table is commonly at or above the surface, but during periods of sustained north wind and low gulf tides, the water table is as much as six inches below the soil surface. This soil has a low load bearing capacity. The permeability is rapid in the organic surface layer and very slow in the clayey underlying material. Total subsidence potential is high.

Bancker muck, slightly saline, tidal (BNA)

This level, very poorly drained, very fluid mineral soil is in brackish marshes. The surface layer is dark gray muck. The underlying layer, to a depth of 80 inches, ranges from dark gray mucky clay to a gray, very fluid clay. Many areas are intermittently submerged and occur as small to large lakes. Bancker soils are ponded with several inches of water most of the time. During storms, tidal floodwater from the Gulf of Mexico is as deep as ten (10) feet. This soil is slightly saline. During periods when the soil is not flooded, the water table is about one (1.0) foot to one-half (0.5) foot below the surface. The soil has a low load-supporting capacity. The shrink-swell potential is low because the soil is very fluid. The total subsidence potential is medium.

Figure 2. Project Area Soils Map



Bancker muck, very slightly saline, tidal (BOA)

This soil is similar to a *Bancker muck, slightly saline, tidal (BNA)* soil with the exception that it occurs in intermediate coastal marsh. The surface layer is about 13 inches deep and is very dark grayish brown muck. The underlying layer, to a depth of 94 inches, ranges from dark gray fluid clay to greenish gray fluid clay.

Barbary muck, frequently flooded (BRA)

This mineral soil is level, very poorly drained, and very fluid. It is in broad, ponded, freshwater swamps. Typically, the surface layer is dark brown muck about five (5) inches thick. The underlying material, to a depth of about 65 inches, ranges from dark gray mucky clay to gray mucky clay. This soil is flooded most of the time by freshwater, and it is saturated throughout the year. Most areas are also occasionally flooded by saltwater during storms. During non-flood periods, the seasonal high water table ranges from one (1) foot above the surface to one-half (0.5) foot below the surface. Water and air move though this soil very slowly. This soil has a medium subsidence potential.

Clovelly muck, slightly saline, tidal (CKA)

This level, organic soil is very poorly drained, very fluid, and slightly saline. It is in brackish marshes and is flooded most of the time. Typically, the surface layer is very dark grayish brown muck about 12 inches thick. The underlying material, to a depth of about 75 inches, ranges from very dark grayish brown muck to gray clay. During tidal storms, this soil is covered by as much as five (5) feet of water. Water is above the surface during most of the year, but during periods of sustained north wind and low tides, the water table drops to about one-half (0.5) foot below the surface. This soil has low strength and poor trafficability. Permeability is rapid in the organic surface layer and very slow in the clayey underlying material. The total subsidence potential is high.

Clovelly muck, very slightly saline, tidal (CLA)

This soil is similar to *Clovelly muck, slightly saline, tidal (CKA)* with the exception that it occurs in intermediate coastal marshes. The surface layer is about 24 inches thick and is very dark grayish brown muck. The underlying layers, to a depth of 80 inches, range from very dark gray muck to dark gray very fluid clay.

Kenner muck, very frequently flooded (KEA)

This level, very poorly drained, organic soil generally occurs in freshwater marshes, which are ponded and/or flooded most of the time. Elevations range from sea level to about one (1) or two (2) feet above sea level. Slope is less than 0.5 percent. Typically, the Kenner soil surface layer is a very dark grayish brown, and slightly acid muck to a depth of about 12 inches. The underlying layers, to a depth of about 84 inches, range from very dark grayish brown muck to very dark clay to very fluid clay. During storms, floodwaters are as deep as two (2) feet. During periods when the soil is not flooded, the seasonal high water table ranges from one (1) foot above the surface to one half (0.5) foot below the surface. This soil has low strength and poor trafficability. Permeability is moderately rapid in the organic layers and very slow in the clayey layers. Total subsidence potential is very high.

Lafitte muck, slightly saline, tidal (LAA)

This soil is a level, very poorly drained, semifluid, organic soil and is located in the lowest brackish areas of the coastal marsh. Areas classified as Lafitte Muck are ponded or almost continuously flooded. The elevation ranges from sea level to about one (1) foot above sea level. Typically, this organic soil has two layers. The surface layer ranges in depth from 0 to 24 inches and is dark grayish brown muck. The underlying organic layer, to a depth of 80 inches, ranges from dark grayish brown muck to very dark clay muck. These mucky organic layers have underlying thin bands of fluid clay. Trafficability of this soil is low due to its low strength. The permeability is generally rapid in the organic surface layer and very slow in the lower mineral clayey layers. If the organic surface layers are allowed to dry, the subsidence potential is high with the organic material shrinking to about half of its original thickness with further subsidence occurring as a result of oxidation and compaction.

Lafitte muck, very slightly saline, tidal (LFA)

This soil is similar to *Lafitte muck, slightly saline, tidal (LAA)* with the exception that it occurs in intermediate coastal marshes. The surface layer is about 24 inches thick and is very dark gray muck. The underlying areas are at a depth of 80 inches and range from black muck to dark gray very fluid clay.

Larose muck very frequently flooded (LRA)

This soil type consists of a very poorly drained, very slowly permeable, semifluid, mineral soil that formed in thin, herbaceous muck over clayey alluvium. This soil generally occurs in freshwater marshes that are ponded and/or flooded most of the time. Elevation ranges from sea level to about 1 foot above sea level. Slope is less that 0.2 percent. Typically, the surface layer consists of a dark gray muck about 8 inches thick. The underlying material, to a depth of about 96 inches, is a gray, very fluid clay. This soil is flooded most of the time by freshwater, and it is saturated throughout the year. During non-flooded periods, the seasonal high water table ranges from 1 foot above the surface to 0.5 foot below the surface. Water and air move though this soil very slowly. This soil has a medium subsidence potential.

Schriever clay, 0 to 1 percent slopes, frequently flooded (SIA)

This soil type consists of level to nearly level, very poorly drained, very slowly permeable, deep clay mineral soils. This soil generally occurs in the floodplains of freshwater, back swamps. Areas classified as Schriever clays are frequently flooded. The elevation ranges from sea level to about 1.5 foot above sea level. The surface layer is about four (4) inches thick and is very dark gray clay. The underlying layers, to a depth of about 75 inches, ranges from a dark gray clay with yellowish brown iron accumulations to a greenish gray clay with dark yellowish brown iron accumulations. This soil has a very high shrink-swell potential.

Timbalier muck, tidal (TUA)

This soil consists of level, very poorly drained, rapid permeability, deep muck. This soil generally occurs on the lowest saline areas in the coastal marsh. The elevation ranges from sea level to about 0.5 foot above sea level. Areas classified as Timbalier muck are frequently flooded by saline water. During tidal storms, this soil is covered with as much as 5 feet of water. The surface layer is about 24 inches thick and is very dark grayish brown muck. The underlying layers, to a depth of about 62 inches, ranges from dark brown muck to a very fluid gray clay. This soil has a low shrink-swell potential. The total subsidence potential is very high.

Emergent Marsh Vegetation

In 1949, O'Neil (1949) classified the project area as brackish marsh (Figure 3), with approximately 80% of the area vegetated by floating three-cornered grass (*Scirpus olneyi*) marsh and the remaining 20% along the southwest boundary of the project area as brackish three-cornered grass marsh. O'Neil described the floating three-cornered grass marsh as originating from thick-sodded "brackish tremblant prairie" caused by clay pan subsidence and sea rim shoaling. This setting typically develops where interdistributary basin conditions, such as those found in the project area, result during geologic formation processes.

In 1968, almost the entire project area was again described as brackish marsh with typical emergent vegetation consisting of marshhay cordgrass (*Spartina patens*), three-cornered grass, and coco (*Scirpus robustus*) (Chabreck et al. 1968). The natural ridges of Bayou du Large and to a lessor extent Small Bayou LaPointe and the marsh east and north of Lake Mechant likely protected the project area from the direct impacts of salinity and tidal exchange occurring in the saline marshes to the south around Caillou Lake.

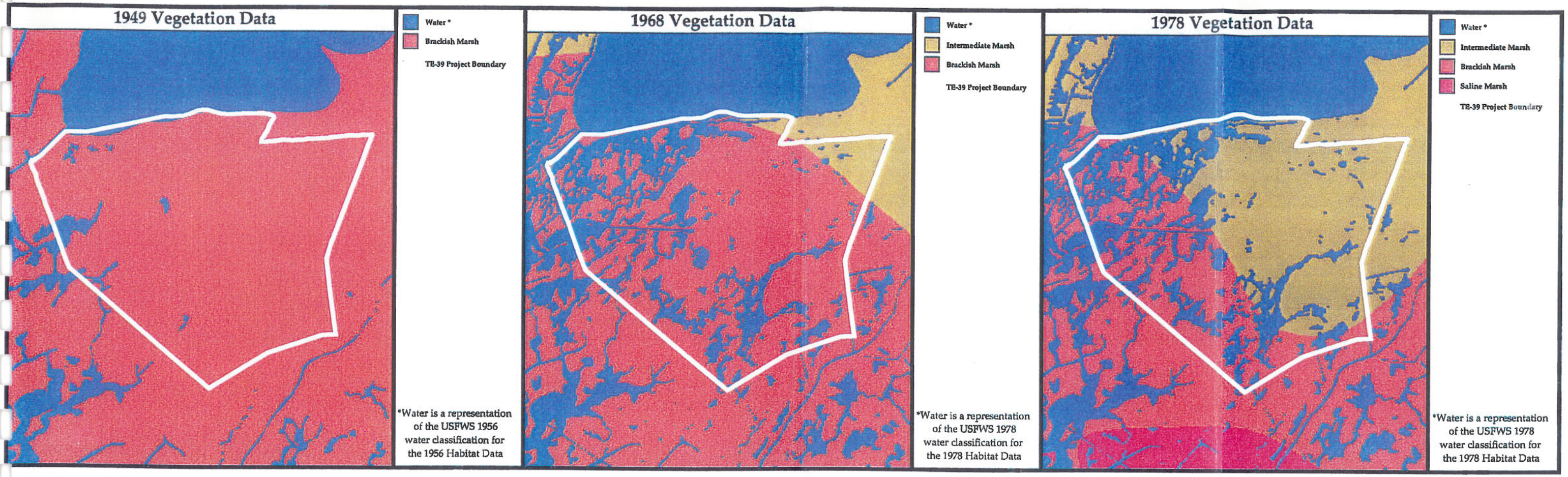
By 1978, the influence of fresh water from the Atchafalaya River through the Penchant Basin and Minors Canal to the Lake Decade vicinity began to be reflected on vegetative type maps. The project area appeared to be in the outermost fringe of this influence as only 43% of the project area was then classified as brackish marsh, which was located in a wide band oriented along the western boundary (Chabreck and Linscombe 1978; USGS and DNR 2000, unpub.). Chabreck and Linscombe classified the remainder of the project area as intermediate marsh with typical vegetation of marshhay cordgrass, deer pea (*Vigna repens*), bulltongue (*Sagittaria lancifolia*), wild millet (*Echinochloa walteri*), California bulrush (*Scirpus californicus*) and Jamaican sawgrass (*Cladium jamaicense*).

Chabreck and Linscombe's 1988 vegetative classification showed no notable change in the proportion of brackish and intermediate marsh acreage (43% and 56% respectively) within the project area. However, the boundary line between brackish and intermediate marsh shifted to a more east-west orientation with the northern half of the project area classified as intermediate marsh and the remaining southern half as brackish. Also, shown located in the northeasternmost corner of the project area, 1% of the marsh was classified as fresh marsh (Chabreck and Linscombe 1988; USGS and DNR 2000, unpub.).

Figure 3 shows that, in 1997, Chabreck and Linscombe's (1997) marsh type classification once again reflected influence of the Atchafalaya River on the project area: the marshes north of and adjacent to Small Bayou la Pointe were classified as fresh and the remainder of the project area was classified as intermediate (21% and 79% of project marsh acreage respectively) (USGS and DNR 2000, unpub.).

In 1999, change in the project area marsh type was again documented. The CWPPRA Environmental Work Group reported in September 1999 fresh/intermediate conditions only in the marshes adjacent to and north of Small Bayou la Pointe, with bulltongue, cattail (*Typha sp.*), marshhay cordgrass (or wiregrass), California bulrush, and gulf spikesedge (*Eleocharis cellulosa*) present as the dominant species. The remaining project area was again recorded as brackish marsh with dominant vegetative species of marshhay cordgrass, three-cornered grass, leafy threesquare (coco), smooth cordgrass (*Spartina alterniflora*) and saltgrass (*Distichlis spicata*).

Figure 3. Project Area Habitat Types, 1949 – 1997.



Data collected during NRCS field investigations in May 2000 showed that generally throughout the entire project area marshhay cordgrass and olney bulrush (*Scirpus olneyi*) were the dominant or co-dominant species. Though very fragmented, the smaller portion of project area north of Small Bayou La Pointe exhibited more diversity with many fresher type species present in small amounts (averaging trace to 5%) within the marshhay-olney communities. These species included cattail, bulltongue, baccharis (*Baccharis halimifolia*), marsh morningglory (*Ipomoea sp.*), iva (*Iva frutescens*), Jamaican sawgrass, pigweed (*Amaranthus sp.*), bushy bluestem (*Andropogon glomeratus*), pennywort (*Hydrocotyle umbellata*), alligator weed (*Alternanthera philoxeroides*), marshmallow (*Hibiscus sp.*), goldenrod (*Solidago sp.*), and black willow (*Salix nigra*). Isolated areas in the vicinity of the Small Bayou La Pointe ridge and in the northeastern portion of the project area were dominated by bulltongue or cattail (greater than 25%). Also wax myrtle *(Myrica cerifera*), California bulrush, buttonbush (*Cephalanthus occidentalis*), and whitetopped sedge (*Dichromena colorata*) were recorded as present in a few isolated sites in the north central project area.

Typical vegetation on the Small Bayou La Pointe remnant ridge in May 2000 consisted of bald cypress (*Taxodium distichum*), palmetto (*Sabal minor*), baccharis, marshmallow, marshhay cordgrass and olney bulrush. As the ridge reorients south-southwest however, its elevation becomes approximately marsh level and the typical vegetation is marshhay cordgrass and olney bulrush. The spoilbanks along Lapeyrouse Canal supported a combination of marsh, scrub-shrub, and tree species, depending on the elevation and width of the banks at various points. The scrub-shrub habitat included baccharis and wax myrtle. Bald cypress, sugarberry (*Celtis laevigata*), red bay (*Persea palustris*) and red maple (*Acer rubrum*), and live oak (*Quercus virginiana*) were the typical species found in the narrow forested strips and as isolated trees along the spoilbank.

In the lower two-thirds of the project area, south of the Small Bayou La Pointe ridge, brackish conditions prevailed in May 2000. The marshhay-olney marsh community was much less species-diverse, and very fragmented in several areas throughout. The other species present were black needlerush (Juncus roemerianus), spikerush and dwarf spikerush (Eleocharis spp.), baccharis, and marsh morningglory. In the extreme southern and southwestern portions of the project area, black needlerush, most notably found in intermittently flooded and exposed brackish and saline marshes, comprised a larger percentage of the community and was even dominant or co-dominant in the more fragmented areas. Smooth cordgrass and saltgrass were also noted to occur along the southwestern boundary. The composition and condition of the vegetative communities found south of the Small Bayou La Pointe ridge were typical of brackish marshes that are gradating into areas experiencing a higher salinity regime and increased tidal influence.

The oscillation of marsh type since 1968 is likely a function of the project area's position in the fluctuating outer reach of fresh water from the Atchafalaya River as it is currently influenced by climatic conditions. The lack of significant change in marsh type between 1978 and 1988 could be interpreted simply as resulting from the extent of the freshening effect having reached a stasis. However, Chabreck and Linscombe's classification of marsh type in 1988 followed three consecutive years of drought and low Atchafalaya River discharge (USACE discharge data for Atchafalaya River at Simmesport, LA), so it's logical that an increased freshening influence was not indicated by the vegetative data collected that year.

There was a very significant freshening shift in marsh type recorded at the end of the 1988-1997 period (Chabreck and Linscombe 1997). This 1997 vegetative data collection followed unusual or unusually prolonged Mississippi/Atchafalaya river discharge events during the

interim. Protracted seasonal flooding events of the rivers occurred during some years in this period (1990, 1991, 1993, and 1997) and, in other years (July 1995 and August 1996) the rivers crested later in the year than usual, coinciding with the annual peak rainfall periods. In addition, this 1988-1997 period culminated with the Mississippi River reaching a 10-year flood stage in the spring of 1997 (USACE discharge data for Atchafalaya River at Simmesport, LA). Since the 1997 Chabreck and Linscombe vegetative data was collected the summer immediately following, indication that intermediate marsh conditions prevailed throughout the project area would not be unexpected.

Conversely, vegetative data collected in 1999 and 2000 indicated that project area marshes were reverting to a brackish regime. This field data was collected during a multi-year drought period. Additionally, in 2000, no Mississippi River/Atchafalaya flood season occurred.

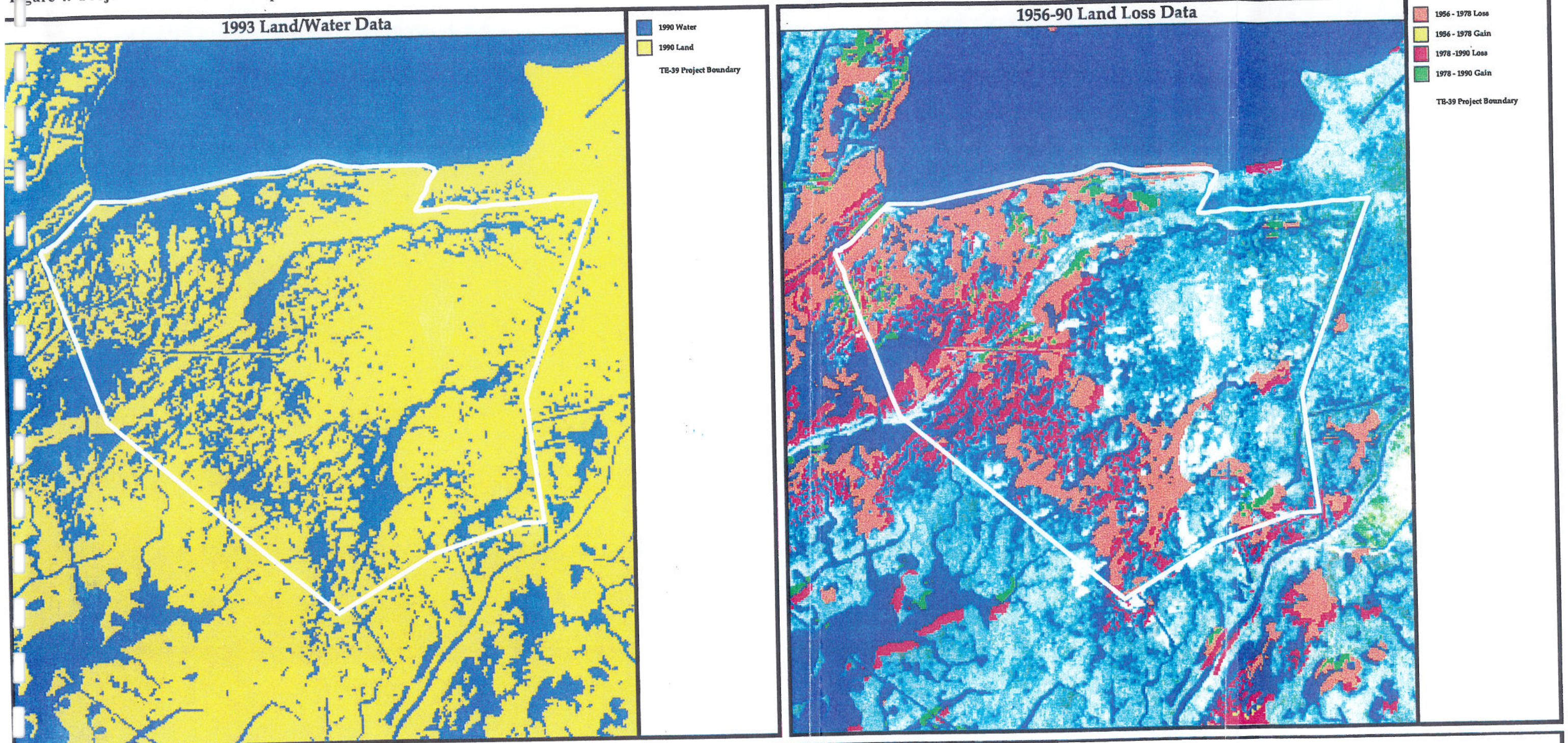
Although the project area changed in marsh type from brackish to intermediate in the period between 1968 and 1997, a progressive increase in marsh loss in the western areas also occurred. Land/water analysis maps (Figure 4) show that breakup and loss of emergent marsh vegetation began to occur in the western half of the project area and in marshes between the project area and Lake Mechant sometime between 1956 and 1978, and continued through the 1978-1990 time period (USGS and DNR 2000, unpub.).

Between 1956 and 1978, the percentage of project area acreage that was open water increased from 3% to greater than 25%. By 1993, almost 34% of the project area was open water (USGS and DNR 2000, unpub.). Further, in ocular comparison of 1991, 1995 and 1998 infrared aerial photography of the project area and western vicinity, it is apparent that marsh fragmentation and conversion to open water in the project area continues and is particularly severe in the western and southern portions of the project area. Disintegration of the once unbroken marshes diminishes its buffering function and can facilitate increased tidal exchange and higher-salinity water from Lake Mechant through newly formed or enlarged connections, such as Bayou Chevreau, further into the project area.

Submerged Aquatic Vegetation

The CWPPRA Environmental Work Group reported in September 1999 that the primary and secondary areas of impact from the project had 70% and 20% submerged aquatic vegetation (SAV) coverage, respectively. In addition, US Fish and Wildlife Service staff have previously observed dense beds of SAV in the shallow open water areas within the project area. The only submerged aquatic species recorded during the May 2000 NRCS field investigation were parrotfeather (*Myriophyllum spicatum*), in the northwestern corner of the project area, and widgeongrass (*Ruppia maritima*), in a few sites along the western project boundary (USDA-NRCS, field notes). These plants were noted to occur mainly along the edges of ponds and broken marsh. No submerged aquatic plants were recorded where increased exposure to wave energy and turbidity occurred in the larger open water areas south of the Small Bayou La Pointe ridge. The unusually high salinities associated with the drought conditions of 1999 and 2000 and the lack of a Mississippi/Atchafalaya Rivers seasonal flood in 2000 are likely the major contributors to the reduction of SAV in May 2000.

Figure 4. Project Area Land Loss Map.



TE-39, PTE-28 South Lake Decade Freshwater Introduction

Data Source:
Department of the Interior
US Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station

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Miles

Product ID: 20001356
Map ID: 2001-4-009
November 3, 2000

Produced By:
USGS National Wetlands Research Center
Coastal Restoration Field Station
and
Louisiana Department of Natural Resources
Baton Rouge, LA

Water Quality

The water contained in Lake Decade is a mixture supplied by various waterways such as Peoples Canal, Minors Canal, Falgout Canal and Bayou Decade. On the northern side of the lake, water which originated from the Gulf Intracoastal Waterway (GIWW) makes its way to the lake via Minors Canal. This water is fresh and carries a moderate sediment load. The water in the GIWW is strongly influenced by hydrologic conditions of the Atchafalaya River. Likewise, Peoples Canal also deposits fresh water into Lake Decade. This water originates in the fresh and intermediate marshes north of the lake and is also influenced by the Atchafalaya River by means of Bayou Penchant. Under certain conditions, higher salinity waters have been known to enter Lake Decade. Such conditions involve prolonged periods of low precipitation and strong southwesterly winds causing higher than normal tides. Most of the influence is confined to the extreme east and west sides of this water body. The two contributors to this condition are Bayou Decade on the west and Falgout Canal (via the Houma Navigational Canal) on the east. An analysis of tide gauge data available in the vicinity of these two channels indicates that tidal amplitude and duration closely parallel each other (Broussard 2000). This in turn creates an equilibrium affect in Lake Decade where the discharge of neither channel dominates flow into the lake thereby keeping average lake salinities well below that of each channel. In the year 2000, salinities in the Terrebonne Basin reached record levels (USDI-FWS 2000). Data obtained with the United States Geological Service from monitoring platforms in the Lake and discreet field samples by the USDI-FWS, Louisiana Department of Environmental Quality and NRCS indicate salinities in the Lake are, at a minimum, 1– 2 ppt lower than salinities recorded in interior open water areas immediately south and west of the lake. NRCS planners are therefore convinced that Lake Decade could provide a viable source of fresher water to adjoining wetland areas to the south.

Air Quality

As required by LAC 33:111.1405B of the Louisiana Department of Environmental Quality Air regulations, an applicability determination was made for current conditions and for the separate items of the proposed project. The applicability determination was based upon direct emissions. Indirect emissions were not considered, since no other Federal actions, such as licensing or subsequent actions relating to construction are anticipated for this project. It was assumed that if any indirect emissions would occur they would be negligible.

Fish and Wildlife Resources

The project area represents a transition zone between freshwater fishery habitats and estuarine fishery habitats. The area's hydrology is dominated by freshwater flows entering Lake Decade from Minors and Peoples Canal and tidal influences from Falgout Canal and the Lake Mechant area. The fisheries of the Lake Penchant area and factors affecting them were studied in 1984 and 1985 (Allen, et al. 1986). The tidal effects in the project area are more pronounced than in Lake Penchant and the fish community is expected to be more estuarine in character.

The most abundant freshwater species in the project area are spotted (*Lepisosteus oculatus*) and longnose (*L. osseus*) gar, yellow bass (*Morone mississippiensis*), skipjack herring (*Alosa chrysochloris*), blue catfish (*Ictalarus furcatus*), channel catfish (*I. Punctatus*), largemouth bass (*Micropterus salmoides*), common carp (*Cyprinus carpio*), and redear sunfish (*Lepomis*

microlophus). Estuarine/marine species include threadfin shad (*Dorosoma petenense*), gizzard shad (*D. cepedianum*), alligator gar (*Lepisosteus spatula*), and gulf menhaden (*Brevoortia patronus*). Project area wetlands also provide habitat for red drum (*Scianops ocellatus*), spotted seatrout (*Cynoscion nebulosus*), flounder (*Paralichthys lethostigma*), blue crab (*Callinectes sapidus*) and shrimp. These wetlands provide nursery habitat for brown (*Penaeus aztecus*) and white shrimp (*P. setiferus*) when water salinities are suitable.

Emergent marshes and marsh ponds in the project area provide habitats for numerous wildlife species including reptiles, amphibians, birds, and mammals. Depending upon seasonal changes, these habitats can provide food, cover, and reproductive needs during various stages of each species' life cycle. Waterfowl, furbearers, and alligators (*Alligator mississippiensis*) are some of the more economically important species.

Waterfowl utilize the fresh and intermediate marshes of coastal Louisiana more than other habitats along the coast (Palmisano 1973, Chabreck et al. 1989). Gadwall (*Anas strepera*), northern pintail (*Anas acuta*), American green-winged teal (*Anas crecca carolinensis*), blue-winged teal (*Anas discors*), and American widgeon (*Anas americana*) winter extensively in habitats found within the project area. Mottled ducks (*Anas fulvigula*) also utilize these areas for breeding during the summer months.

Furbearers common in these habitats include nutria (*Myocastor coypus*) and muskrat (*Ondatra zibethicus*). Fresh marsh supports the highest densities of nutria with densities decreasing as salinities increase (Linscombe and Kinler 1984). Populations of nutria in the area are controlled through trapping and a landowner-regulated shooting program. Large populations of nutria can cause damage to marshes through herbivory, to the extent that marsh surfaces are denuded of vegetation and soil erosion may occur through tidal scour.

Muskrats are most abundant within brackish marshes and populations decrease as salinities decrease (O'Neil 1949, Palmisano 1973). The muskrat population in the project area has declined over time. This decline has been associated with a decrease of Olney bulrush stands, which is a preferred food source. Both are believed to relate to a decrease in salinities and an increase in water levels.

Alligators are common in fresh and intermediate marsh habitats (McNease and Joanen 1978). Populations have been high enough in the project area to support a seasonal harvest since 1979.

Threatened and Endangered Species

Upon request, the United States Department of Interior, Fish and Wildlife Service (USDI-FWS) reviewed project information provided by NRCS and offered comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Correspondence dated 28 November 2000 states a bald eagle nest exists along the Small Bayou LaPointe ridge approximately 2,000 feet east of the proposed diversion structure on Lapeyrouse Canal. While no other threatened or endangered species were listed by USDI-FWS, sea turtles have been reported in the upper reaches of Terrebonne Bay. These are considered rare events and their occurrence are not expected within the project area. Alligators in Louisiana are classified as "threatened due to similarity of appearance" for law enforcement purposes. They are biologically neither endangered nor threatened and regulated harvest is permitted under State law.

Essential Fish Habitat

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, the Gulf of Mexico Fishery Management Council (Council) has identified Essential Fish Habitat (EFH) for those species managed under its fishery management plans (Gulf of Mexico Fishery Management Council, 1998). Project area wetlands provide habitat for a number of managed species – white shrimp juveniles and subadults (year round), brown shrimp juveniles and subadults (year round), and red drum juveniles, subadults, and adults (year round). Additionally, Council-managed species (such as seatrout, gulf menhaden, striped mullet, and blue crab) are also supported by the project area wetlands. The EFH that occur in the project area include estuarine emergent wetlands, marsh edge, seagrass (submerged aquatic vegetation), mud and shell substrates, and estuarine water column. In the project area, the following have been identified by species, life stage, and EFH for that area:

Species	Life Stage	EFH
Brown shrimp	Postlarvae/juvenile	Marsh edge, SAV, tidal creeks, inner marsh
	Subadults	Mud bottoms, marsh edge
White shrimp	Postlarvae/juvenile	Marsh edge, SAV, marsh ponds, inner marsh
	Subadults	Marsh edge, SAV, marsh ponds, inner marsh
Red drum	Postlarvae/juvenile	SAV, estuarine mud bottoms, marsh/water interface (marsh edge)
	Subadults	Mud bottoms
	Adults	Estuarine mud bottoms

Cultural Resources

An investigation of cultural resources for CWPPRA projects is done in a three-phase process. The first phase is an investigation by NRCS of the National Registry of Historic Places and site files at the Division of Archaeology. The second phase is a review by the Louisiana Division of Archaeology to determine potential impacts to any resources; followed, if necessary, by a field investigation conducted by professional archaeologists. In the event any cultural resources are found to be of significant value, then the third phase is implemented which involves modifying the plan to minimize or eliminate potential impacts.

Two sites have been identified within the South Lake Decade project wetlands (State site survey files of Louisiana Department of Culture, Recreation, and Tourism, Division of Archaeology, Baton Rouge, Louisiana). Both of these sites are described as shell middens experiencing deterioration due to many of the same impacts causing marsh loss, i.e. wave wash, scouring, subsidence and physical disturbance from canal dredging. Eligibility of the sites for the National Historic Register is unknown at this time.

Social and Economic Resources

In 1997, Terrebonne Parish was home to approximately 103,000 people with a per capita personal income of $19,043 (BEA 1999). The largest industries in earnings were services (22.9%), mining (20.2%), and transportation and public utilities (10.2%) (BEA 1999). From 1984 to 1995, unemployment in the parish has ranged from 17.8% (1986) to 5.6% (1990).

The most recent estimate (1995) showed an unemployment rate of 6.7% (Louisiana Department of Labor).

Terrebonne Parish contains approximately 325,000 hectares (803,000 acres) of land. However, only a small percentage of this land area is habitable. In 1968, the Louisiana Department of Public Works determined that 28% of Terrebonne Parish was open water and 54% was marsh. The marsh is a major income source for local residents and is the backbone of a culture that is being impacted by the loss of wetlands. From 1932 to 1990, Terrebonne has lost approximately 20% of its wetlands (Dunbar et al. 1992). Current loss rates range from 2,200 ha/yr (4,500 acres/yr) (Dunbar et al. 1992) to 2,600 ha/yr (6,500 acres/yr) (Barras 1994).

In 1998, the commercial fisheries landings in Dulac/Chauvin were worth $38,700,000 (NMFS 1999). The marine fisheries landings in Terrebonne Parish in 1998 consisted primarily of 28,402,388 pounds of shrimp and 7,227,569 pounds of crabs (LEAP 1999). In addition, 607,449 sacks of oysters were harvested in Terrebonne Parish (LEAP 1999). In 1998, Terrebonne Parish freshwater fisheries landings consisted primarily of 58,000 pounds of catfish and 43,000 pounds of crawfish (LEAP 1999). The wildlife harvest consisted of 81,000 fur pelts, 65,000 pounds of fur animal meat, and 40,000 feet of alligator skin (LEAP 1999).

Problems and Opportunities

The project area is experiencing marsh deterioration and land loss due to subsidence, human-induced hydrologic changes and saltwater intrusion. Habitat analysis statistics from 1956 to 1993 have revealed that 30.87 percent of the project area's emergent marsh has converted to open water in that time period (Barras. et al. 1994; USGS NWRC Classified Thematic Mapper Imagery). The Small Bayou LaPointe ridge bisects the area and provides for a hydrologic differentiation between the northern and southern sections of the project area. The northern section has converted to and remains a fresh to intermediate marsh type. However, the southern area has experienced shifts in marsh type due to changing climatic trends. During successive years of high precipitation and/or high Mississippi River/Atchafalaya River discharge, the vegetative characteristics of this area lean towards an intermediate marsh type. In contrast, years of average to low precipitation and/or low river discharge, salinities increase to the point where the area reverts to a more brackish type marsh. This instability of isohalines and changes in marsh vegetation has caused considerable problems in the area and results in the loss of valuable non-salt tolerant emergent wetlands. Other hydrologic changes that have contributed to marsh losses include increased water levels as a result of relative subsidence and sea level rise; and increased rates of tidal exchange associated with pipeline canals, loss of natural bayou banks and the loss of wetlands seaward of and within the project area.

Maintaining a hydrologic division between Lake Decade and interior marshes has become a major endeavor for perimeter landowners (USDA-NRCS, landowner meeting). The 1.4 mile fetch between the north and south shores of Lake Decade generates wind-induced wave action that causes considerable shoreline erosion. The task of periodically re-building those portions of the natural levee around the lake is a costly process and must be systematically repeated year after year to maintain the integrity of the constantly eroding shoreline. Less expensive methods such as buffering the levee with introduced vegetation has failed with each attempt. Maintenance of the shoreline along the southern lake perimeter is of primary importance. This is due to its hydrologic significance in preventing higher saline waters from encroaching into the northern portions of the project area during incoming tides. The

impermeable lake shoreline acts as a cutoff to tidal action and therefore allows a lower salinity regime to be maintained in the northern project area.

Enhancing utilization of water entering Lake Decade via distributaries of the Atchafalaya River within the project area, will increase the supply of freshwater and sediments into the project area south of the lake. The distribution of freshwater and sediment can be accomplished by installing diversion structures in the southern bank of the lake and providing more efficient flow down Lapeyrouse Canal. Armored shoreline protection adjacent to the existing lake embankment will be installed to maintain the integrity and hydrologic significance of the lake shoreline. The planned outfall features of the project will serve to better the distribution and utilization of diverted freshwater flows in project area wetlands.

Scope of the Project Plan/EA

Scoping of Concerns

The public, government agencies, landowners, and land users have expressed concerns about the perpetual loss of emergent marshes in the Terrebonne Basin. Recently, a possible solution to this concern was addressed as a Region 3, Coast 2050 strategy to "increase transfer of Atchafalaya water to Lower Penchant tidal marshes".

The submission of this proposed project, selection for project funding and development of the Plan/EA resulted from the recognition of, and efforts to, address the concerns specific to the "South Lake Decade Freshwater Introduction Project" area. Observations from the two major landowners as to the trends of marsh conversion to open water and increased salinities were important factors used in the analysis to determine causes of land loss. Other concerns determined to be highly significant to decision making are the condition of open water areas, the loss of wildlife habitat, water quality, air quality, preservation of cultural resources, and essential fish habitat. Each of these concerns was addressed in the analysis of all alternatives.

Formulation, Description, and Comparison of Alternatives

Formulation of Alternatives

The South Lake Decade Freshwater Introduction Project was developed by NRCS in cooperation with landowners, the general public and other state and federal agencies. Several important actions take place prior to and during actual development of the plan/EA. One of the most important is an assessment of the project area. An interdisciplinary team comprised of engineers, biologists, soil scientists, vegetative specialists, district and resource conservationists conduct field investigations to inventory existing conditions and resources. Current and historic aerial photographs are researched to determine land loss rates, shoreline regression, possible changes in land use, hydrologic parameters, and a gamut of other important details to be used in the planning process. Project alternatives are developed and landowners, land managers, and resource agencies are consulted to determine which alternatives best suit the project's goals and objectives. Each alternative is also evaluated for completeness, effectiveness, efficiency, and acceptability to landowners and the public.

Synthesis of the above information by NRCS resulted in the formulation of two alternatives: (1) no action, and (2) freshwater introduction. The freshwater introduction alternative conforms to the Region 3, Coast 2050 ecosystem strategy of "increase transfer of Atchafalaya water to Lower Penchant tidal marshes" and mapping unit strategy of "protect bay/lake shorelines" (LA Coastal Wetlands Conservation and Restoration Task Force and Wetlands Conservation and Restoration Authority 1999).

Description of Alternatives

Alternative 1: No Action

This alternative consists of no treatment for the project area. No structural or non-structural measures would be planned, installed, or maintained. Existing measures within the project area include a small fixed crested wooden weir just north of site 3 (Figure 5) on Lapeyrouse Canal and an earthen embankment along the southern perimeter of Lake Decade.

Alternative 2: Freshwater Introduction

Freshwater introduction, in this case, refers to the diversion of lower salinity water from Lake Decade into project area marshes immediately south of the lake. This is to be accomplished with the installation of two diversion structures along the lake shoreline between Bayou DeCade and the Transcontinental Pipeline, replacement of the structure on Lapeyrouse Canal, and the enlargement of Lapeyrouse Canal. The proposed structures at all three sites will be designed to allow the diversion of lake water southward but prevent the possibility of higher saline waters in the outfall area from encroaching northward and causing further damage in lower salinity areas.

A foreshore rock dike is planned along the southern perimeter of Lake Decade to preserve the hydrologic barrier that currently exists between the lake and interior marshes. The rock dike will be placed in continuous alignment adjacent to the existing earthen shoreline embankment in the area where the embankment is very narrow and most susceptible to breaching.

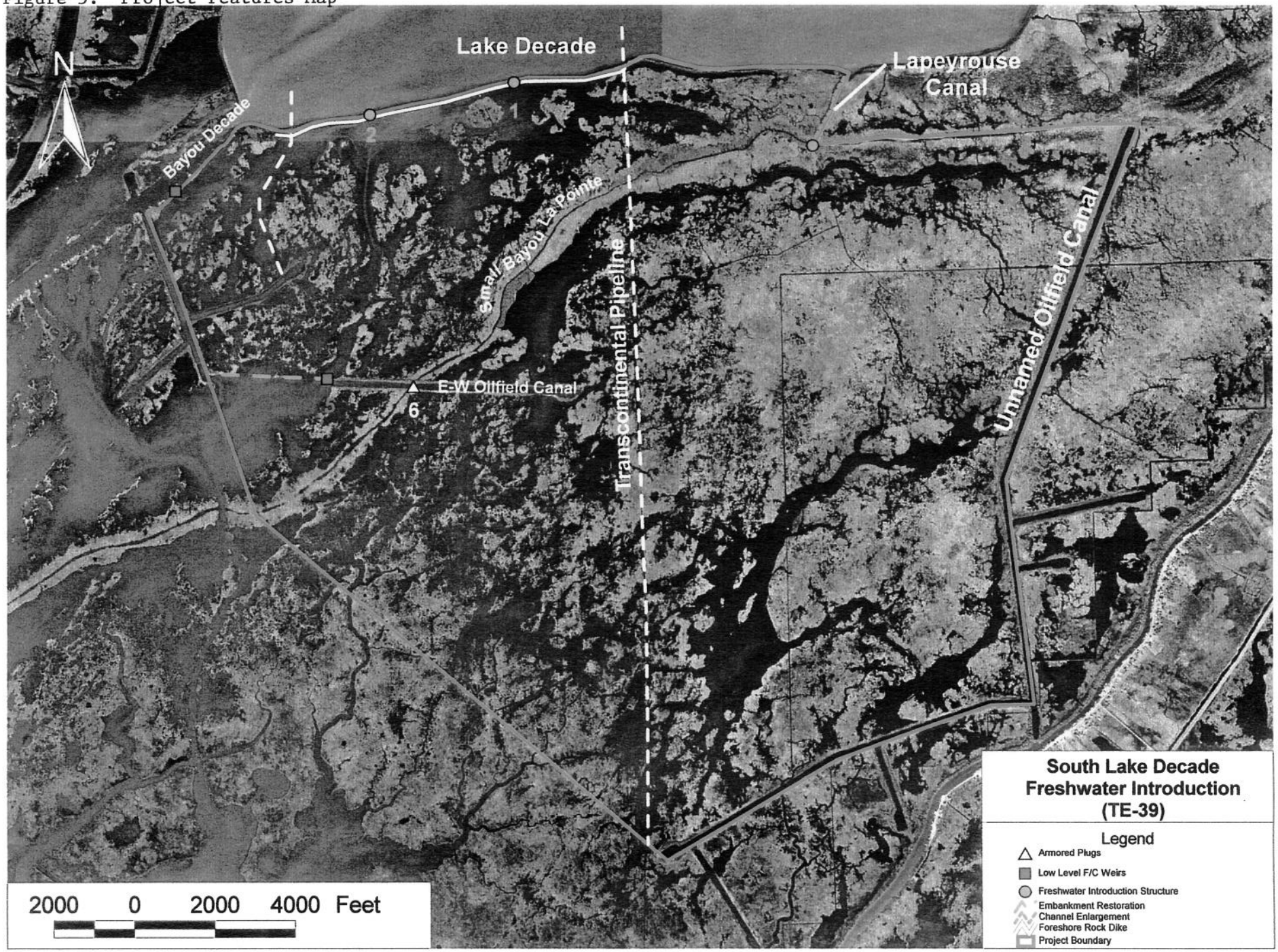
A number of structural features are proposed in the immediate outfall area of the diversions at sites 1 and 2 to prevent diverted flows from channelizing and leaving the area without providing desired benefits and biotic responses to the project area. Such features will improve the distribution and retention of lower saline water from Lake Decade. They include the reestablishment of an oilfield canal embankment, installation of low level weirs, and the installation of an armored earthen plug.

Environmental Effects and Comparison of Alternatives

Emergent Marsh Vegetation

Alternative 1: The Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) Environmental Work Group (1999) estimated that with the current rate of land loss approximately 330 acres of emergent marsh would be lost over the next twenty years. Without project installation, current land loss rates are expected to continue and may even accelerate as the marsh deteriorates into less stable fragments. As a result, the marsh will be

Figure 5. Project Features Map



unable to withstand increased water energy or periods of higher salinity during drought conditions.

Alternative 2: As a result of project implementation, greater freshwater, sediment and nutrient availability to the project area is expected to enhance existing vegetation and thereby reduce the rate of marsh fragmentation and conversion to open water. In addition, a slight reduction of average salinities during the growing season throughout the project area is also predicted by the CWPPRA Environmental Work Group (1999). This may encourage greater species diversity throughout the project area.

Long-term impact is expected on approximately four combined acres of emergent marsh (2.7 acres), scrub-shrub (1 acre), and forested spoilbank habitat (.25 acre) resulting from the enlargement of the Lapeyrouse Canal and associated spoil placement. However, the direct loss of four acres due to construction would be greatly exceeded by the benefits of the project which includes preventing the loss of 201 acres of emergent marsh over the 20-year project life (CWPPRA Environmental Work Group 1999). It is recognized that some loss of the aesthetic value associated with the attractive setting of forested spoilbank is included in this impact. Therefore, design and construction of the project will include measures to avoid or minimize damage to existing trees where possible, and to provide appropriate vegetative plantings to disturbed areas.

Submerged Aquatic Vegetation (SAV)

Alternative 1: With no action, aquatic vegetation is not expected to increase. Tidal exchange is expected to continue to export detached substrate and deepen open water areas at the current rate. Turbidity will increase as fetch lengths are extended across the ponds creating even less conducive conditions for the growth of aquatic vegetation.

Alternative 2: An anticipated project benefit is an increase in the presence of aquatic vegetation throughout the project area. The most dramatic increase is projected to occur in the northern half of the project area over the life of the project (LA Coastal Wetlands Conservation and Restoration Task Force 1999; CWPPRA Environmental Work Group 1999). It is expected that the diversion of fresher water from Lake de Cade will enhance existing beds of SAV and provide some stability by buffering the project area from saltwater intrusion. No short-term or long-term impacts to SAV's are anticipated as a result of project construction.

Water Quality

Alternative 1: The No Action alternative will continue to see the project area experience marsh deterioration and land loss due to saltwater intrusion. Existing shoreline maintenance along the southern bank of Lake Decade does not allow freshwater and sediments in the lake to enter marsh areas south of the lake. Conversely, if shoreline maintenance is discontinued by local landowners, breaching of the shoreline is inevitable and uncontrolled tidal flow between the lake and interior marshes would result. This would allow saline water from Lake Mechant to encroach into fresh and intermediate wetlands north of Small Bayou LaPointe ridge during incoming tides.

Alternative 2: This alternative would allow fresher water to be diverted from the lake thereby providing a buffer to higher salinities entering the project area from the south and west. This in turn will reduce and stabilize average project area salinities. It will also allow for the establishment of a more diverse, robust emergent and submergent vegetative community which is expected to reduce interior marsh loss rates.

The shoreline protection proposed along the south shoreline of Lake Decade will assist in maintaining the hydrologic integrity that currently exists between the lake and interior marshes. This proposed measure will enhance the protection of fresh and intermediate wetlands north of the Small Bayou LaPointe ridge.

Air Quality

Alternative 1: The no action alternative would have no impact on present conditions.

Alternative 2: This alternative would have no long-term adverse impact on present conditions, but could have short-term negative impacts during construction. The analysis for total direct emissions was based upon the estimated construction hours and subsequent horsepower output of equipment used in the construction of this project. Categories of emissions from nitrogen oxides (No_x) and volatile organic compounds (VOC's) were evaluated. The total tons of VOC emissions for this project were calculated to be 1.27 tons, which is significantly lower than the threshold limit applicable to VOC's for parishes where the most stringent requirement (50 tons per year) is in effect. Based on this applicability determination, the emissions for this project are classified as de minimus and no further action is required.

Fish and Wildlife Habitat

Alternative 1: Continued degradation and loss of emergent wetlands will directly affect wildlife populations in the project area in an adverse manner. The decline in productivity of the area for various species of wildlife will likely be continual, until all emergent marsh has been lost. As emergent marsh is lost through conversion to open water, fisheries populations may show a short-term increase due to introduction of detrital material and the resulting increase in food web base. Fisheries production will then decline dramatically as remaining marsh is lost and turbidity increases with increased erosion. Anticipated increases in salinity will also adversely affect fish and wildlife resources. Continued deteriorating habitat of woody shrubs will result in loss of this important resting and refueling area for migratory neotropical species.

Alternative 2: It is anticipated that the loss of emergent marsh would be reduced, thus, the project area will continue to provide suitable habitat for a wide range of fish and wildlife species. Some short-term adverse effects can be expected in areas adjacent to construction sites on very slow-moving and sedentary organisms. However, no adverse long-term effects are expected and conditions should again be suitable for fish and wildlife production shortly after construction is complete. Access for aquatic organisms may be limited by certain structural measures planned in some areas, but should not be detrimental to the population as a whole due to numerous connections with other nearby areas of suitable habitat. Protection of woody habitat will insure the availability of important neotropical habitat which is important during both spring and fall migration.

Threatened and Endangered Species

Alternative 1: Continued degradation and loss of emergent wetlands will have a direct adverse effect on the feeding, hunting and nesting habitat of the bald eagle in the project area.

Alternative 2: Construction will be done within the guidelines set forth by the U.S. Fish and Wildlife Service (Appendix D) to insure protection of critical habitat necessary for the bald eagle. The overall effect of the project will be to protect the resource necessary by maintaining fishing roosts and nesting areas along the length of the ridge and sustaining adequate habitat for prey species within the entire project area. It is the opinion of the NRCS

that no adverse impacts to any threatened or endangered species will result from project implementation.

Essential Fish Habitat (EFH)

Alternative 1: Over time, the No Action Alternative would allow a substantial decrease in the quality of the project area's EFH due to the loss of emergent marsh and submerged aquatics. The project area's ability to support Council-managed species (white shrimp, brown shrimp, and red drum) would therefore be reduced. Furthermore, Alternative 1 would adversely impact estuarine-dependent species (such as spotted seatrout, gulf menhaden, striped mullet, and blue crab) that are preyed upon by other Council-managed species (such as mackerels, red drum, snappers, and groupers) and highly migratory species (such as billfish and sharks).

Alternative 2: By preventing the loss of marsh over 20 years and increasing the amount of submerged aquatics, Alternative 2 will protect the quality of the project area's EFH. The project area will maintain most of its current ability to support Council-managed species (white shrimp, brown shrimp, and red drum), as well as the estuarine-dependent species (such as spotted seatrout, gulf menhaden, striped mullet, and blue crab) that are preyed upon by other Council-managed species (such as mackerels, red drum, snappers, and groupers) and highly migratory species (such as billfish and sharks). The anticipated increase in submerged aquatics will increase the habitat required for juveniles to escape predation and therefore increase quality and habitat.

However, because the project will not completely eliminate the loss of emergent marsh, there will be a decrease in the quality of the project area's EFH over time, albeit at a much slower rate than with Alternative 1. Furthermore, short-term impacts associated with project construction include localized increase in turbidity and suspended solids during construction and localized destruction of some non-mobile benthic organisms and their habitat. No long-term adverse impacts are anticipated.

Cultural Resources

Alternative 1: With no action, the impacts causing deterioration to the sites and contributing to the current rate of land loss are expected to continue.

Alternative 2: No construction activity in the vicinity of the reported sites is planned as a component of the proposed project. Therefore, no adverse impacts to historical properties as a result of project installation are anticipated. However, no protection from impacts currently causing deterioration will be provided by project components since their locations are away from the sites. All work to be performed as part of this project is being coordinated with the State Historic Preservation Office. Should unknown sites be encountered during construction, NRCS will coordinate with the appropriate agencies.

Risk and Uncertainty

There is an intrinsic degree of risk and uncertainty in all coastal wetland restoration projects. Variances in environmental factors, patterns, and conditions are too numerous to allow exact predictability of success. The best guidelines that planners and designers can follow are past successes. Implementation of the proposed measures of this project will not completely eliminate wetland losses. Instead, the project proposes to enhance local vegetative communities and conditions conducive to supporting a sustainable wetland community. A community which in turn provides a multitude of fish and wildlife resources used for the

nourishment and livelihoods of area residents. Southern Louisiana carries the inherent risk of severe weather (e.g. tropical storms, hurricanes, storm tides) which many times causes irrevocable damage to wetlands. The South Lake Decade Project, with it's exposure to Lake Decade and associated high wave energies, carries an additional degree of risk and uncertainty when contemplating the maintenance of a shoreline barrier for the sustainability and longevity of the project.

Rationale for Plan Selection

The goals of the proposed alternatives are to reduce interior marsh loss rates and increase the occurrence and abundance of SAV's. The proposed strategies for achieving these goals are to divert lower salinity water from Lake Decade into project area wetlands, improve the distribution and retention of low salinity waters in the immediate outfall area of the proposed diversion structures, and maintain the integrity of the hydrologic barrier provided by the south shore embankment of Lake Decade. While attempting to attain these strategies, it is important to consider options which minimize potentially negative impacts to natural resources occurring both inside and outside the project area. NRCS, landowners, and participating agencies all concur that freshwater introduction in combination with outfall management and shoreline protection is the most effective means of protecting and enhancing the vital resources within the project area. The Freshwater Introduction Alternative has a high probability of meeting the goals and objectives set forth by the landowners and CWPPRA agencies without causing significant adverse impacts. Therefore, it is the recommended alternative for the South Lake Decade Project.

Consultation and Public Participation

The restoration and protection of coastal wetlands in Louisiana is a leading concern of the state's citizens. Many state, federal, and local agencies and special interest groups have taken an active role in the conservation of Louisiana's wetlands. Public involvement and input in solving the state's coastal land loss problems are crucial to the success of the program.

The South Lake Decade Project (TE-39) was submitted by the public as a candidate project for the CWPPRA Ninth Priority Project List for the Coast 2050 Region 3 Area. The project was then approved by the CWPPRA Task Force for state and federal funding. A public meeting will be held in the region of the project area to receive comments and input on planned structural measures and components of the project. All comments received will be considered in final project planning and design. The project will also undergo additional public reviews in separate phases of project implementation.

This document has been coordinated with appropriate congressional, federal, state, and local interests, as well as other interested parties. The plan/EA and the associated unsigned Finding of No Significant Impact will be sent to:

U.S. Department of Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Department of Army, Corps of Engineers
Advisory Council on Historic Preservation
Governor's Executive Assistant for Coastal Activities
Louisiana Department of Wildlife and Fisheries

Louisiana Department of Natural Resources
Coastal Management Division
Coastal Restoration Division
Louisiana Department of Environmental Quality
Louisiana State Historic Preservation Officer
Louisiana Universities Marine Consortium

Representatives from the Louisiana Department of Natural Resources/Office of Coastal Restoration and Management (LDNR/OCRM) participated in a field investigation of the project area with NRCS personnel on 9 May 2000. The LDNR/OCRM provided technical data and assistance to NRCS. Comments previously received from the Louisiana Coastal Wetlands Conservation Restoration Task Force agencies and landowners have been incorporated into the development of the project plan. In addition, all comments received during the public notice period of the COE 404-permit application will be considered.

Recommended Plan

Purpose and Summary

The primary objectives of the project are to reduce interior marsh loss rates and increase the occurrence and abundance of SAV's. The freshwater introduction alternative is the recommended plan. Project objectives will be accomplished using structural means to divert lower salinity water from Lake Decade into project area wetlands, provide for effective distribution and retention of such water, and protect the south shoreline of Lake Decade. Data currently being collected by LDNR and NRCS will be analyzed during the project's Phase 1 process to determine whether project diversion measures will have the ability to meet project objectives. The two critical parameters being analyzed are mean water level differential and salinity comparisons between Lake Decade and adjacent diversion outfall areas. Higher Lake Decade water levels and lower Lake Decade salinities if shown to occur at strategic times throughout an annual cycle would be potential indicators being sought to determine whether the project could meet it's strategic objectives.

Proposed Measures

Project measures and their locations are identified in Figure 5 (page 20). Current field data has been obtained throughout the project area during several field trips conducted by NRCS personnel. Typical drawings of the proposed structures are included in Appendix B. Structural and non-structural measures planned include the following components:

(A) Three (3) Multi-gated Diversion Structures on and near south perimeter of Lake Decade;

(B) Approximately 8,700 ft. of foreshore rock dike along south shoreline of Lake Decade;

(C) Enlargement of Lapeyrouse Canal from Lake Decade south to interior open water areas;

(D) Approximately 2,900 ft. of oilfield canal embankment restoration, installation of two (2) low-level fixed crested weirs and one (1) armored plug closure.

(E) Vegetative protection.

Structure Descriptions

(A) Three locations along the south shore of Lake Decade have been identified as potential sites for diversion structures. They are (1) south central embankment diversion; (2) southwest embankment diversion and (3) Lapeyrouse Canal. Sites 1 and 2 will consist of multiple 48" orifices with interior (i.e. marshside) flapgates installed in a sheet piling type structure. Site 3 involves the installation of multiple 36" culverts fitted with interior flapgates at the intersection of Small Bayou La Pointe Ridge and Lapeyrouse Canal. There exists a small fixed crested weir (12 ft. crest width set approx. 1 ft. below marsh level) in Lapeyrouse Canal 150 ft. north of the Small Bayou La Pointe Ridge. The weir will be removed and replaced with the site 3 structure.

The purpose of interior flapgates is to prevent water flowing from marsh interiors back into the lake which would reduce the capability of retaining freshwater in the northern project area. Retention of fresher water in this area will assist in abating the encroachment of high salinity water from incoming tides into intermediate marsh areas south of the lake rim and north of Small Bayou LaPointe. The available hydraulic head differential between Lake Decade and interior open water areas will determine the number of orifices and culverts to be installed. A comparative analysis of water stage data from USGS and LDNR recorders located within the vicinity of the project area will determine available head differential and duration.

(B) A foreshore rock dike is planned along the south shoreline of Lake Decade immediately north of the existing earthen embankment. The dike will extend approximately 8,700 ft. from near the mouth of Bayou Decade eastward to the Transcontinental Pipeline Crossing. It will have a crest elevation of (+) 4.0' NAVD88. Shallow geotechnical borings conducted along the southern shoreline of Lake Decade in the vicinity of the proposed rock dike alignment indicates an adequate subsurface soil foundation exists to support the type of structure proposed. The rock dike will serve to maintain the integrity of the hydrologic barrier currently provided by the existing earthen embankment along the south shore of Lake Decade.

(C) Lapeyrouse Canal is a small manmade channel that was constructed in the 1960's to provide access to interior marshes south of Lake Decade. Heavy shoaling frequently occurs at the mouth of the channel at Lake Decade due to the restrictive flow capacity of the channel. Enlargement of the channel is planned so as to increase the availability of freshwater and nutrients to central and eastern portions of the project area south of the Small Bayou La Pointe ridge. Channel enlargement will begin at Lake Decade and continue south along its current path for approximately 2,500 ft. to where the channel connects with interior open water areas. The proposed channel will have an average top width of 40 ft. and depth of 5 feet.

(D) Several structural measures are planned in the immediate outfall area of diversion sites 1 and 2 to improve the retention and distribution of diversion flows. These measures will reduce the possibility of diverted flows from channelizing and leaving the area without providing positive impacts to targeted project areas. The proposed measures include the reestablishment of the north embankment of an east/west oilfield canal, two low-level weirs and an armored plug.

The embankment restoration measure involves the rebuilding of an oilfield canal spoilbank that has deteriorated and become submerged over time as a result of subsidence and erosive wave action from winds and oilfield marine traffic. The new embankment will extend east to west for approximately 2,900 ft. and reconnect to existing oilfield canal levees. The proposed embankment will have a crest elevation of (+) 4.0' NAVD88.

Two low-level weirs are planned in the outfall area to control and maintain the rate of discharge flow leaving targeted project areas. One weir will be located within the alignment of the new oilfield embankment discussed above (site 5) and the other will be located on the south bankline of Bayou Decade (site 4) as shown in Figure 5. The weirs will prevent scouring and enlargement of the two openings where the majority of diversion flow and drainage discharge is expected to occur in the northwestern portion of the project area. The weirs will be designed to allow optimal retention of freshwater within their area of impact but not create elevated backwater conditions that would significantly reduce the capacity of the diversions at sites 1 & 2. The retrieval and analysis of water level data, design capacity of the diversions, and watershed drainage requirements evaluated during the design phase of this project will determine the size opening required for the two structures.

An armored plug (site 6) is planned in the east/west oilfield canal in the vicinity where Small Bayou La Pointe intersects the canal. The purpose of the plug is to prevent diversion flows from entering the canal through existing openings on its eastern end and flowing westward towards Bayou Raccourci instead of southward and remaining within the project area. The type of materials used in the construction of all proposed features listed above will be determined after geotechnical investigations have been conducted.

Non-Structural Descriptions

(E) Installation of proposed work will include temporary and/or permanent vegetative protection measures where applicable. Seeding, springing, transplanting of potted or bareroot plant material, or mulching, or a combination thereof, will be used to stabilize, restore, and/or protect areas of new construction and disturbance.

Permits and Compliance

All necessary permits and approvals will be obtained before project construction commences. Applicable federal statutes are shown in Table 1. The proposed action is not expected to cause adverse environmental impacts requiring environmental mitigation.

Table 1. Environmental Compliance

STATUTE	COMPLIANCE
Archaeological and Historic Preservation Act	Full
Clean Air Act, as amended	Full
Coastal Barrier Resources Act (PL 97-348; 1982)	Full
Coastal Zone Management Act of 1972, as amended	Full*
Endangered Species Act of 1973, as amended	Full
Executive Order 11988, Floodplain Management	Full
Executive Order 11990, Protection of Wetlands	Full
Farmland Protection Policy Act	Full
Federal Water Pollution Control Act	Full*
National Environmental Policy Act of 1969, as amended	Full*
National Historic Preservation Act of 1966, as amended	Full
Magnuson-Stevens Fishery Conservation and Management Act	Full
Subtitle B, Highly Erodible Land Conservation, and Subtitle C, Wetland Conservation, of the Food Security Act of 1985	Full
Wild and Scenic River Act, as amended	Full

* Full compliance and applicable documentation will be completed prior to construction.

Costs, Financing, and Installation

Total project cost was estimated and includes all aspects of planning, engineering, administration, landrights acquisition, construction, inspection, monitoring, and operations and maintenance. Cost information is provided in Appendix C.

Planning, engineering, design, and pre-construction monitoring of the project have been funded under CWPPRA. Once planning, engineering, and design are substantially complete, the project will be submitted for construction, maintenance, and post-construction monitoring funding. If approved, the project will be cost-shared between the federal sponsoring agency (NRCS) and the State of Louisiana (LDNR). Pursuant to the Louisiana Coastal Wetlands Conservation Plan's approval on November 30, 1997, the federal government provides 85% of the project cost and the State of Louisiana provides the remaining 15%.

Project implementation and management will be administered by NRCS in cooperation with LDNR/OCRM.

Operation, Maintenance, and Rehabilitation

If the South Lake Decade Freshwater Introduction Project is approved for construction, funding for post-construction monitoring, operation, maintenance, and rehabilitation would be made available on a 3-year cycle over the 20-year project life. LDNR is responsible for monitoring. Operation, maintenance, and rehabilitation will be administered by LDNR in cooperation with NRCS.

Conclusion

The United States Department of Agriculture, Natural Resources Conservation Service finds no significant long-term adverse impacts to wetlands, water quality, threatened or endangered species, species managed by Gulf of Mexico Fishery Management Council or their essential habitat, other fish and wildlife resources, recreational or socio-economic resources, or cultural resources associated with the South Lake Decade Freshwater Introduction Project (TE-39). Project implementation is expected to make beneficial use of lower salinity water available from Lake Decade to reduce current interior marsh loss rates and increase the occurrence and abundance of SAV's.

List of Preparers

Name	Present Position	Employer
Loland Broussard	Civil Engineer	Natural Resources Conservation Service
Mike Tullos	Resource Conservationist	Natural Resources Conservation Service
Cindy Steyer	Coastal Vegetative Specialist	Natural Resources Conservation Service
Marty Floyd	Biologist	Natural Resources Conservation Service
Tim Landreneau	Program Specialist	Natural Resources Conservation Service
George Townsley	Agricultural Economist	Natural Resources Conservation Service
Larry Trahan	Resource Conservationist	Natural Resources Conservation Service
Gerald Trahan	Soil Scientist	Natural Resources Conservation Service
Lyfon Morris	Soil Scientist	Natural Resources Conservation Service
Adele Swearingen	Office Automation Assistant	Natural Resources Conservation Service
James Buchtel	Engineer Supervisor (Retired)	LDNR/Coastal Restoration Division

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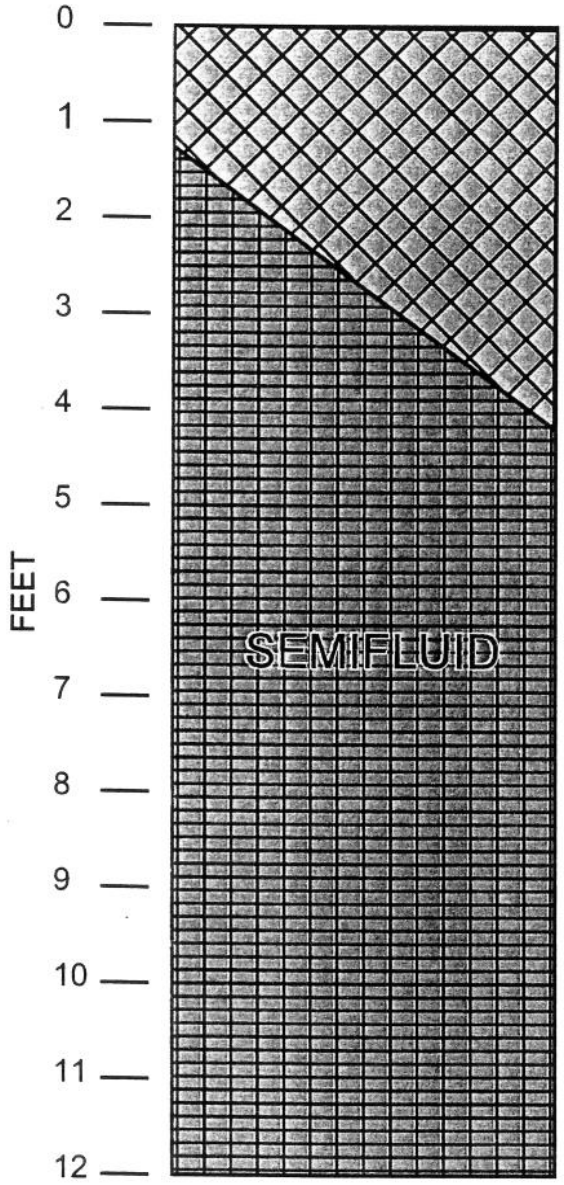
Appendices

Appendix A – Soil Profiles

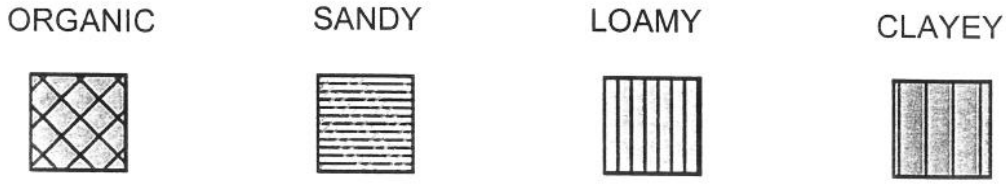
ALLEMANDS MUCK



This level, very poorly drained, organic soil is in freshwater marshes. It is ponded most of the time and is frequebtly flooded. Slope is less than 1 percent. Typically the organic material is very dark grayish brown, very fluid muck about 30 inches thick. The next layer, to a depth of about 37 inches, is black, very fluid mucky clay. The underlying materiial to about 66 is greenish gray and very fluiid. It is clay in the upper part and silty clay loam in the lower part. Small areas of other soils with different properties may be included with this soil.

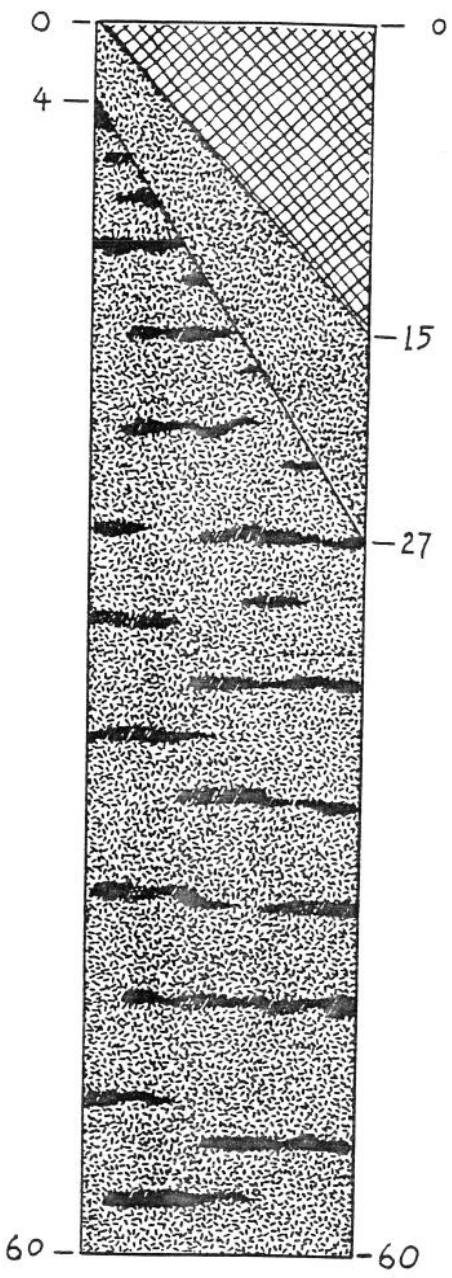
The soil has low strength and poor trafficability. Permeability is rapid in the organic layers and very slow in the clayey layers. Total subsidence potential is high. The shrink-swell potential is low because the soil is saturated and very fluid throughout.

The potential is very poor for all uses other than wildlife due to wetness, flooding, low strength and restricted accessibility.



SOIL PROFILE

BANCKER MUCK



This unprotected, undrained brackish water marsh occupies low elevations. The surface layer is very dark grayish brown muck up to 15 inches thick. The underlying layers are semifluid dark gray or dark greenish gray clay. Small areas of soils with different properties may be included in this soil.

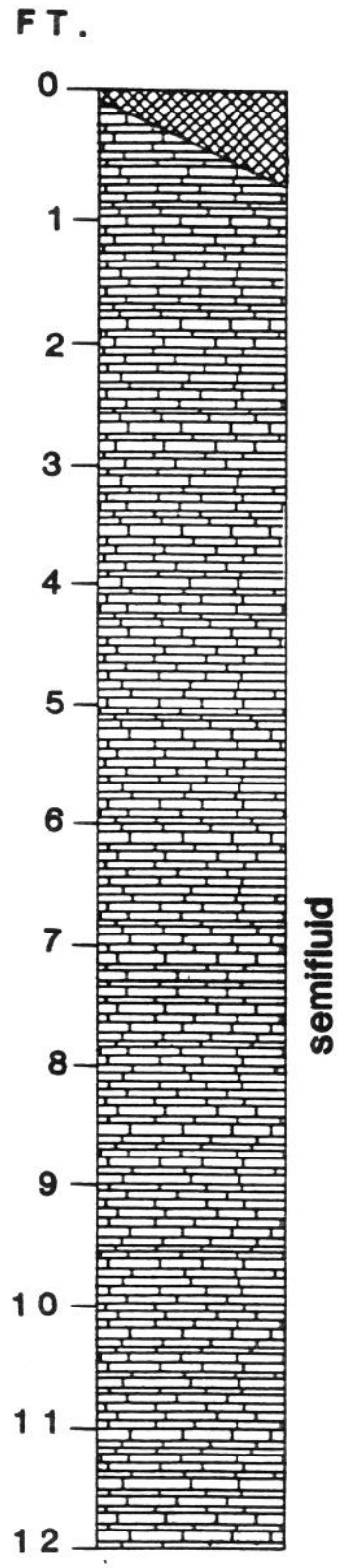
The water level is near or above the soil surface most of the year. Surface runoff is very slow to ponded. Permeability is very slow in the soft mineral layer. This soil will support human and livestock traffic where the surface layers are relatively undisturbed. It has a tendency to liquify when disturbed.

The potential is very poor for nearly all uses other then wildlife and recreation due to wetness, flooding, and low support strength.

ORGANIC CLAYEY LOAMY SANDY

SOIL PROFILE

BARBARY SOILS



This level, semifluid clayey soil typically has a slightly acid, very dark brown muck surface layer about 6 inches thick. The underlying material is slightly alkaline, gray semifluid clay. Small areas of other soils with different properties are included with this soil.

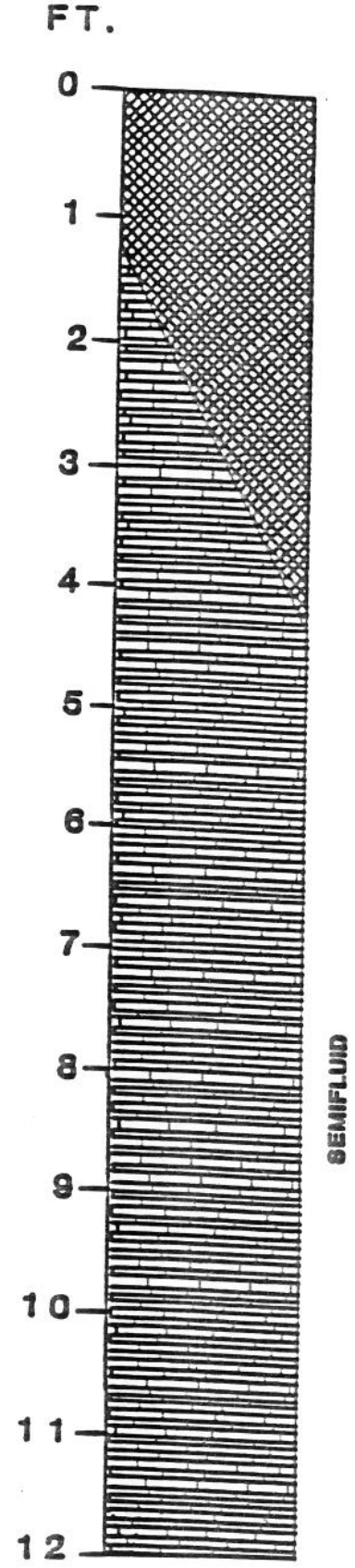
This very poorly drained soil is almost continuously flooded to a depth up to a foot above the surface. Flood waters range to a depth of 3 feet above the surface during the months of December through June.

The potential for cropland and pastureland is very poor because of wetness and flooding.

The potential for hardwood production is moderate. Wetness and flooding very severely restricts use of equipment and causes high mortality of seedlings.

The potential for urban use is very poorly because of wetness, flooding and buried stumps and logs that would interfere with this type document.

CLOVELLY MUCK



This deep, level, very poorly drained brackish marsh soil occupies low elevations along major drainageways. The surface layer is slightly acid, very dark grayish brown organic material about 36 inches thick. The underlying layer is neutral black and gray semifluid clay. Small areas of other soils with different properties may be included with this soil.

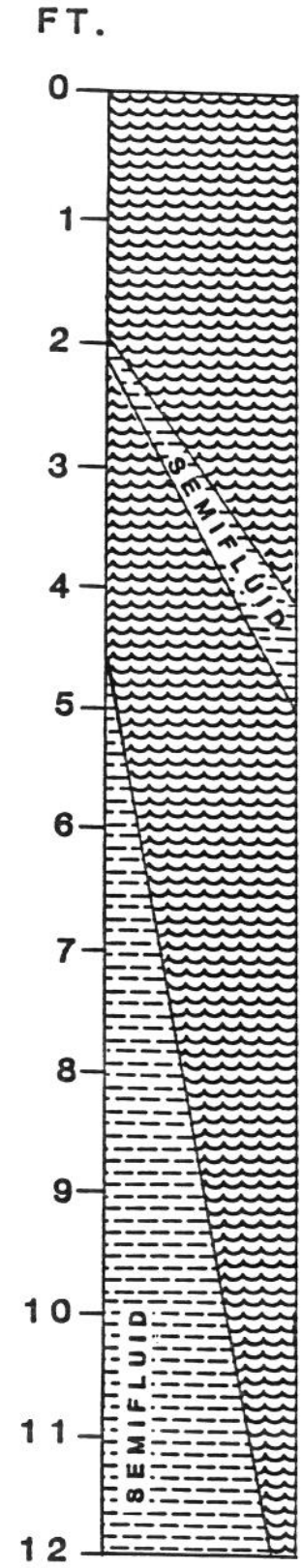
The level of moderately saline water is near or above the soil surface most of the year. During storm tides this soil is covered by as much as 3 feet of water. Surface runoff is slow or none. Permeability is rapid in the organic layers and very slow int he mineral layers. This soil will not support human or livestock traffic. If disturbed the soil tends to liquify.

The potential is very poor for all uses other than wildlife and recreation due to wetness, flooding, salinity, low strength, and poor accessibility.

ORGANIC SANDY LOAMY CLAYE

SOIL PROFILE

KENNER MUCK



This unprotected, undrained soil occupies low elevations in fresh or slightly saline coastal marshes. Typically this soil consists of very poorly drained, organic soils that have more than 51 inches of very dark gray to black, well decomposed organic material stratified with thin semifluid gray clay layers. Small areas of other soils with different properties may be included with this soil.

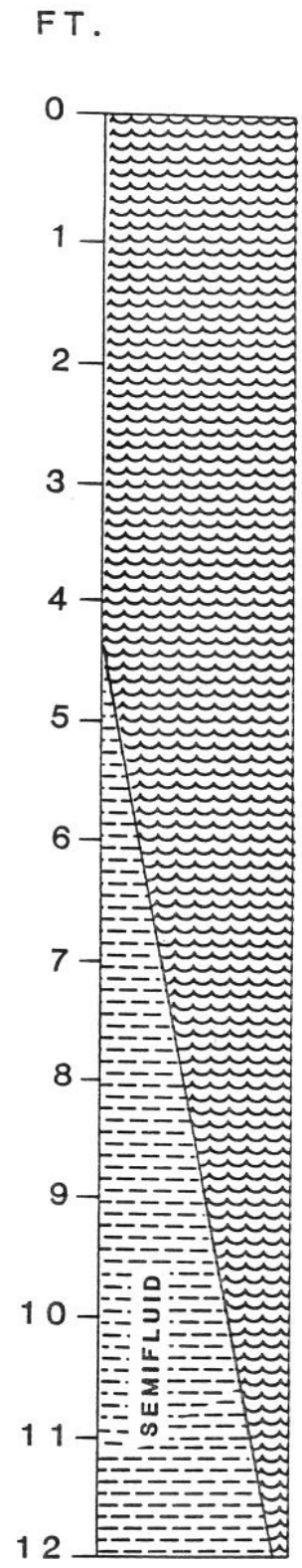
The water table ranges from 1/2 foot below to 1 foot above the soil surface. Surface runoff is very slow. Permeability is rapid in the organic material and very slow in the mineral layers. If disturbed this soil tends to liquefy.

The potential is very poor for all uses other than wildlife and recreation due to wetness, flooding, poor accessibility and low strength.

ORGANIC SANDY LOAMY CLAYEY

SOIL PROFILE

LAFITTE MUCK

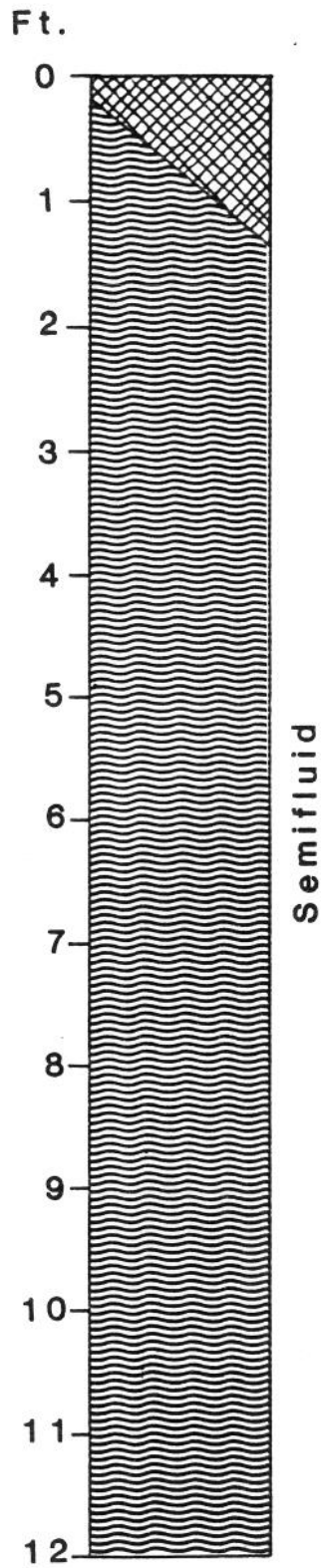


This is a very poorly drained organic soil in the slightly saline tidal marshes. The surface layer is a dense mat of living and partially decomposed herbaceous plant roots. The underlying layers are semi-fluid organic materials. The organic layers are 4 or more than 6 feet thick and underlain by mineral layers that range from silt loam to clay. Small areas of other soils with different properties may be included with this soil.

Permeability is rapid, but there is little movement of air because of the water table is high. There is no internal drainage and runoff is very slow. Trafficability is very poor.

Lafitte soils are suitable for wetland wildlife, open space, and natural scenic or study areas. They are nursery areas for marine organisms. Development for urban use requires major flood protection and drainage by pumps. If drained, the organic layers will consolidate and shrink to about one-half the original volume. They will continue to subside about 1 to 2 inches per year until the water table is again at the surface or until most of the organic material has decomposed. Total potential subsidence as a result of drainage is 4 feet or more.

SOIL PROFILE



LAROSE SERIES

This series consists of very poorly drained, semifluid clayey soils in freshwater coastal marshes. These soils are subject to flooding by runoff from higher areas and tides from freshwater lakes. Slope is less than 0.1 percent. The salinity is less than 1.25 ppt.

Larose soils are geographically associated with the Allemands, Barbary, Kenner, and Sharkey soils. Allemands soils have organic layers thicker than 16 inches. Kenner soils have organic layers thicker than 51 inches. Barbary soils have buried logs and stumps. Sharkey soils are at higher elevations and are firm throughout.

Soil Characteristics

These soils have organic layers 2 to 15 inches thick over semifluid dark gray and gray clay. The reaction of the organic layers range from medium acid to mildly alkaline and the mineral layers range from slightly acid to moderately alkaline. After drainage, the upper 15 inches range to extremely acid and the organic layer will be firmer.

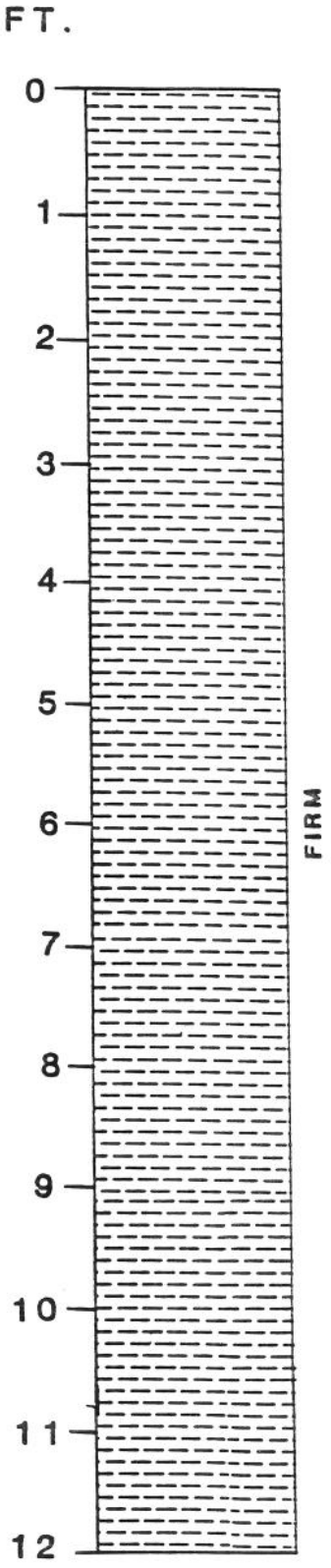
Use and Management

These soils are used mainly for wildlife habitat. They provide feeding and roosting areas for ducks, geese, and other waterfowl. They provide a good food supply for muskrats and nutria. Water-control structures for intensive wildlife management are difficult to construct and maintain because of the instability of the semifluid soil material. Trafficability is poor, and when the surface-root mat is broken, the soil is too soft to support livestock. The typical vegetation includes maidencane, bulltongue, alligatorweed, cattail, giant cutgrass, and swamp smartweed.

The dominant limitations influencing the use and management of the Larose soil are the medium subsidence potential, low bearing strength, and flooding. Most structures require piling due to the low soil strength. These soils will consolidate and shrink when drained.

SOIL PROFILE

SCHRIEVER CLAY, FREQUENTLY FLOODED



This level clayey soil typically has a slightly acid dark grayish brown clay surface layer about 9 inches thick. The subsoil is moderately alkaline, dark gray clay. Small areas of other soils with different properties may be included with this soil.

This poorly drained soil is subject to frequent flooding. Flooding to depth of more than 2 feet occurs mostly during the months of December through June. When not flooded the seasonal high water table fluctuates between a depth of 2.0 feet and the surface during the months of December through April. This soil has a very high shrink-swell potential.

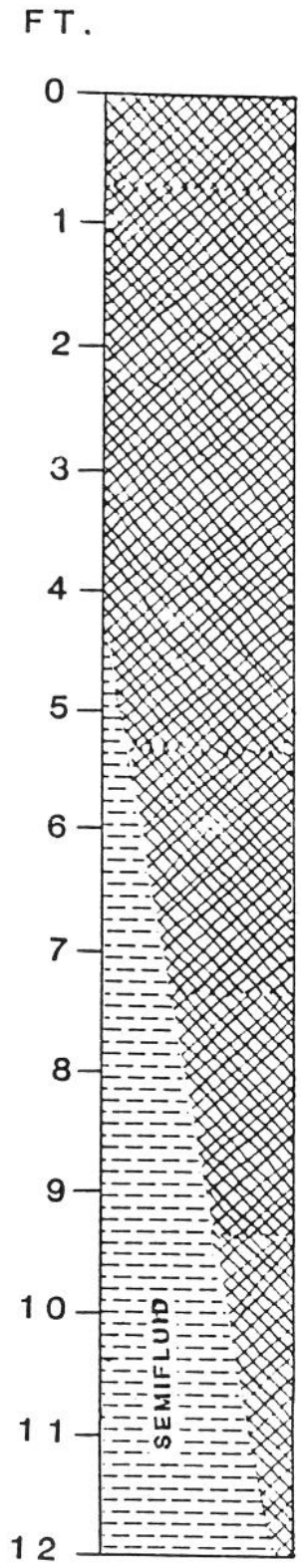
The potential for cropland is very poor. Flooding is too severe for most crops. The potential for pastureland is poor. Flooding restricts choice of plants. Common bermudagrass and bahiagrass can be grown but grazing time has to be restricted during flood periods.

The potential for hardwood production is moderately high; however, wetness and flooding severely restrict the use of equipment.

The potential for urban use is very poor because of flooding.

SOIL PROFILE

TIMBALIER MUCK



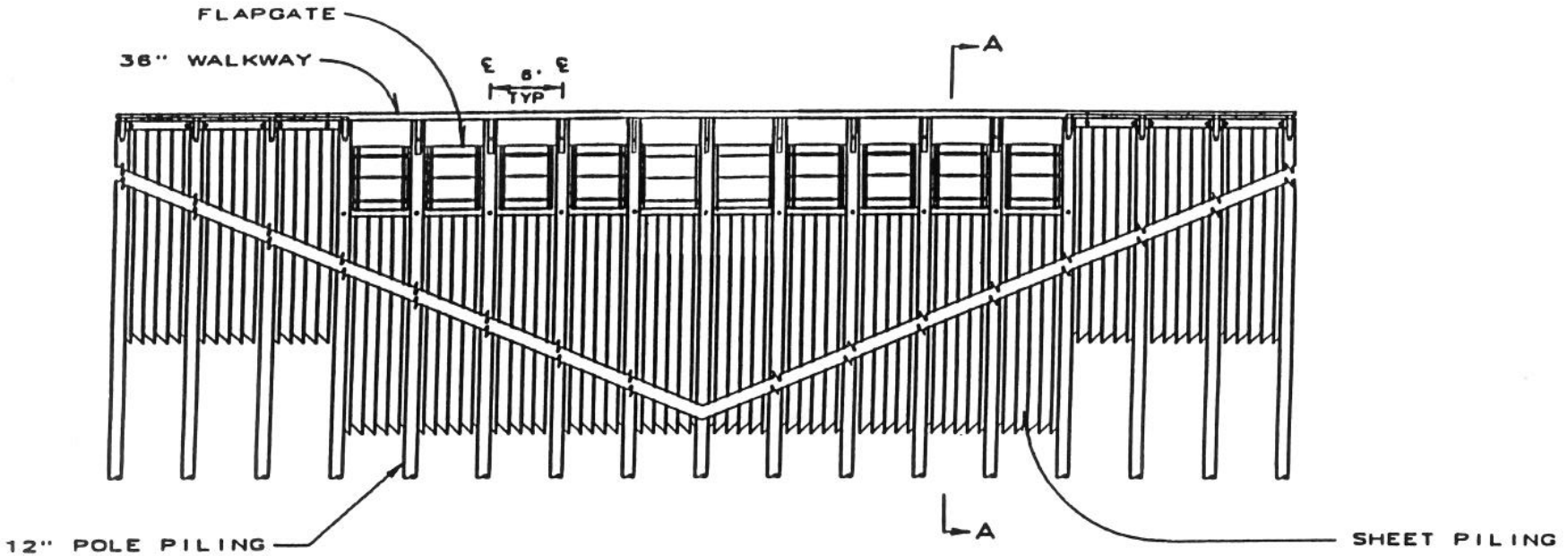
This unprotected, undrained saline marsh soil occupies low elevations. They have a very dark grayish brown to dark brown organic layer about 72 inches thick over dark gray mucky clay and dark greenish gray semifluid clay. Small areas of other soils with different properties may be included with this soil.

The water table level is near or above the soil surface most of the year. Surface runoff is very slow or ponded. Permeability is rapid in the organic layer and very slow in the mineral layers. If disturbed, this soil tends to liquify.

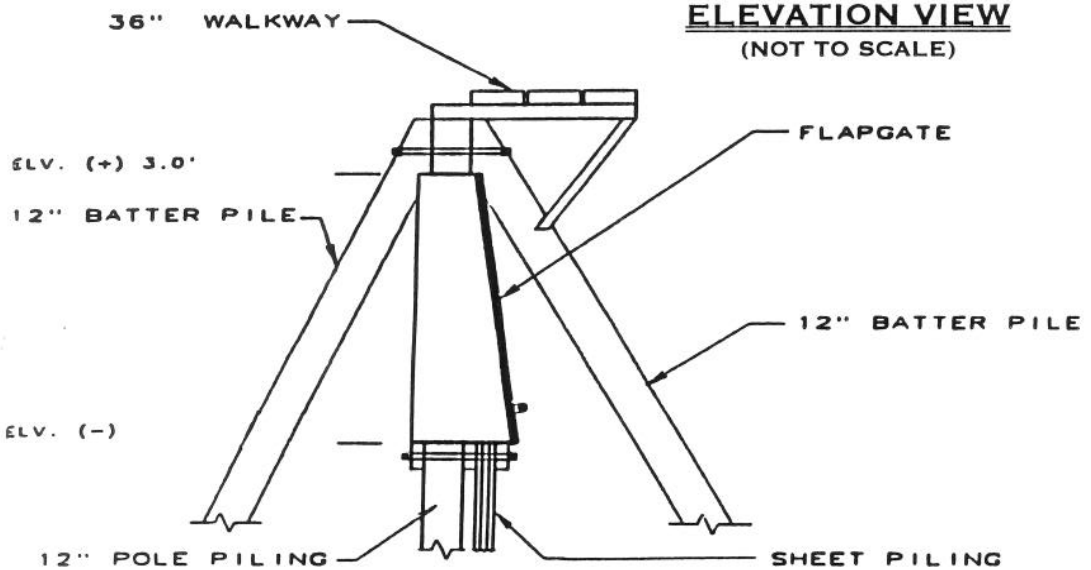
The potential is very poor for all uses other than wildlife and recreation due to the wetness, flooding, salinity, low strength and poor accessibility.

ORGANIC SANDY LOAMY CLAYEY

Appendix B – Typical Structure Drawings



MULTI-GATED DIVERSION STRUCTURE
ELEVATION VIEW
(NOT TO SCALE)



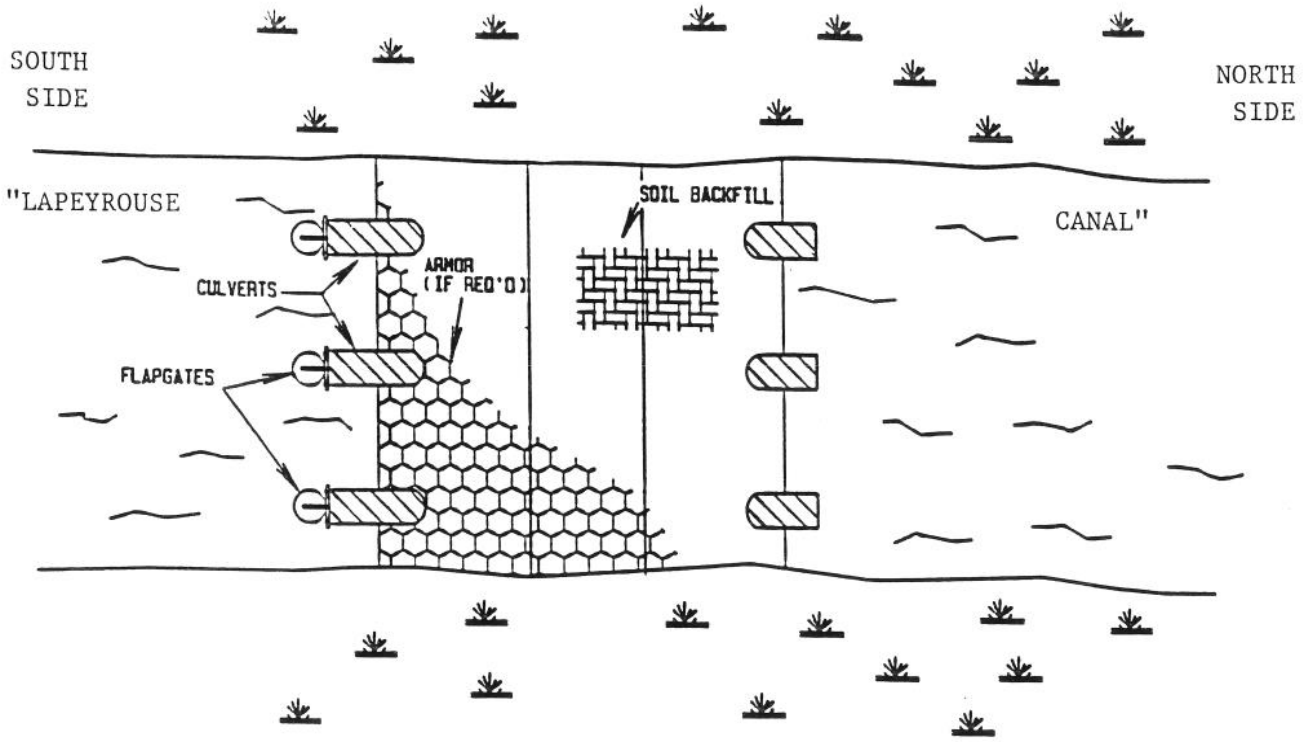
SECTION "A–A"
NOT TO SCALE

NOTE: NUMBER AND SIZE OF GATE OPENINGS WILL BE DETERMINED DURING DESIGN PHASE OF PROJECT.

STRUCTURE SITES 1 & 2

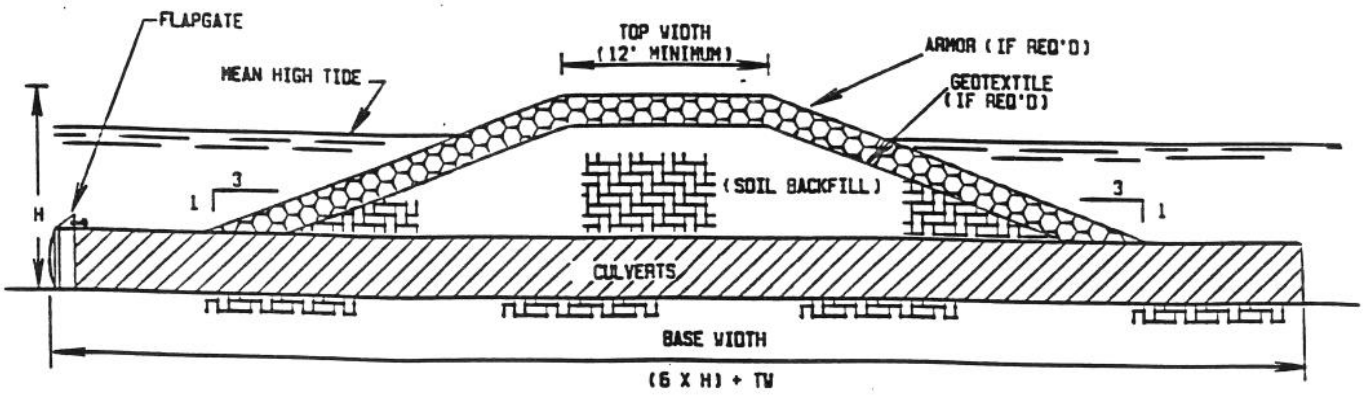
TE-39 SOUTH LAKE DECADE FRESHWATER INTRODUCTION TERREBONNE PARISH, LA

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



NOTE: No. of Culverts may differ from that shown.

PLAN
NOT TO SCALE



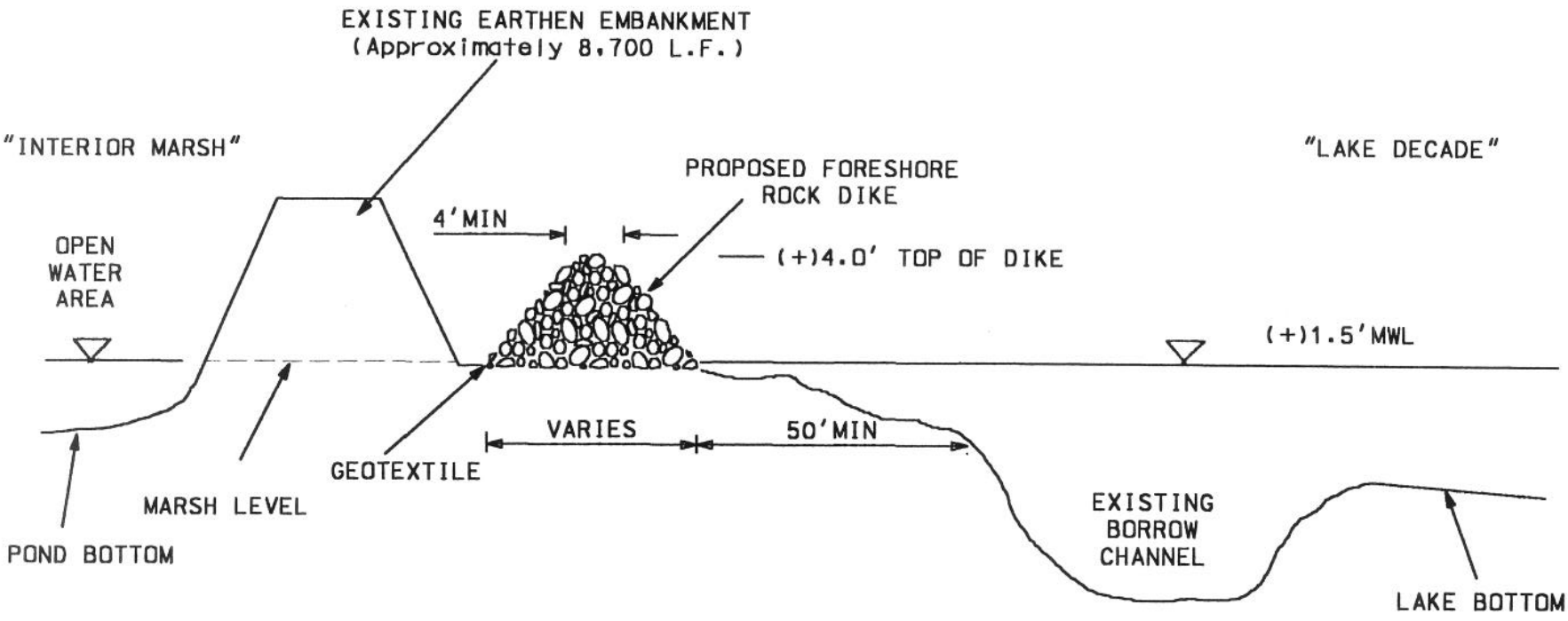
PROFILE
NOT TO SCALE

LAPEYROUSE CANAL STR
(TYPICAL SECTION)

SITE NO. 3

TE-39 SOUTH LAKE DECADE FRESHWATER INTRODUCTION TERREBONNE PARISH, LA

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



FORESHORE ROCK DIKE

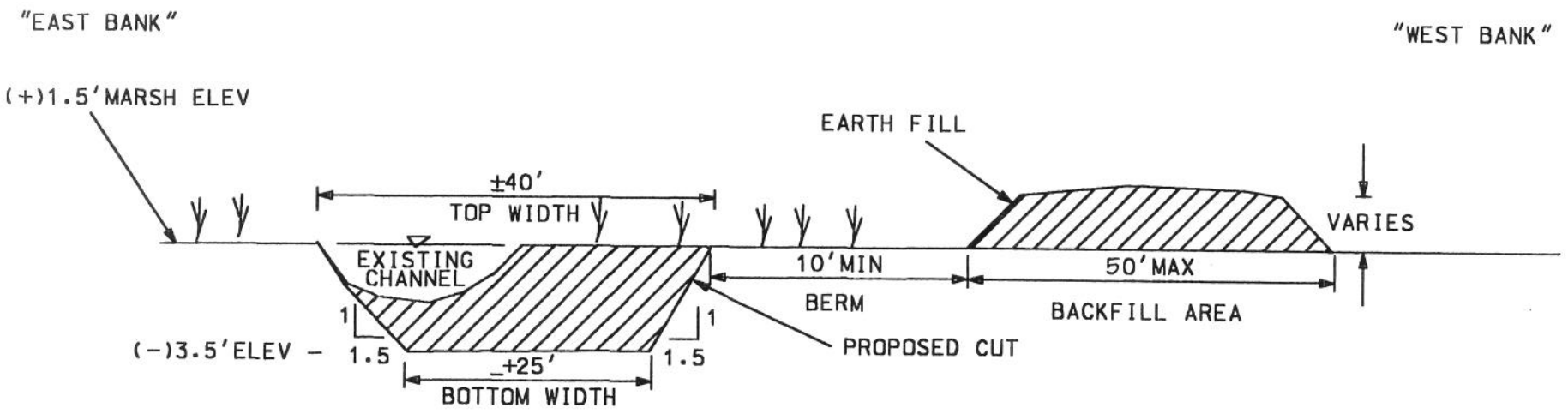
TYPICAL SECTION
(NOT TO SCALE)

ELEVATION DATUM: NAV 88

TE-39 SOUTH LAKE DECADE
FRESHWATER INTRODUCTION
TERREBONNE PARISH, LA

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

lkedaderockdike ms adw 01/01 WRPS



LAPEYROUSE CANAL ENLARGEMENT

TYPICAL SECTION
(NOT TO SCALE)

TOTAL CHANNEL LENGTH = 2500 FT.

AREA OF IMPACT:

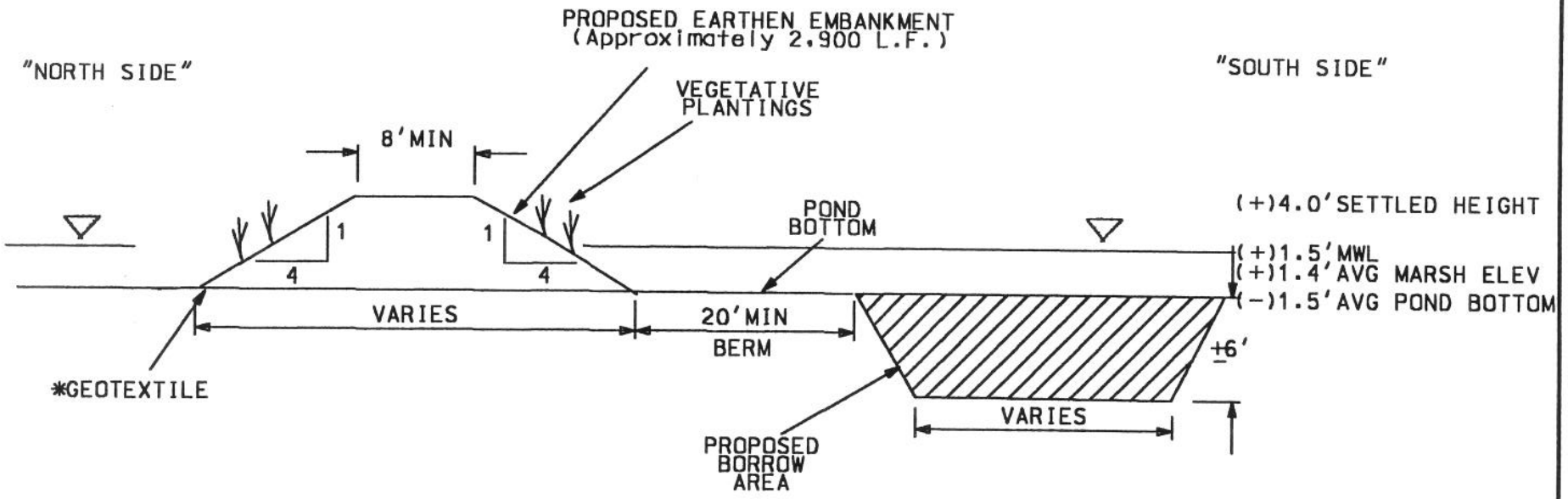
0.25 AC. FORESTED WETLANDS
0.89 AC. SCRUB-SHRUB
2.86 AC. EMERGENT MARSH

ELEVATION DATUM: NAV 88

TE-39 SOUTH LAKE DECADE FRESHWATER INTRODUCTION TERREBONNE PARISH, LA

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

lapeyrouse ms adw 01/01 WRPS



ELEVATION DATUM: NAV 88

OILFIELD CANAL EMBANKMENT RESTORATION

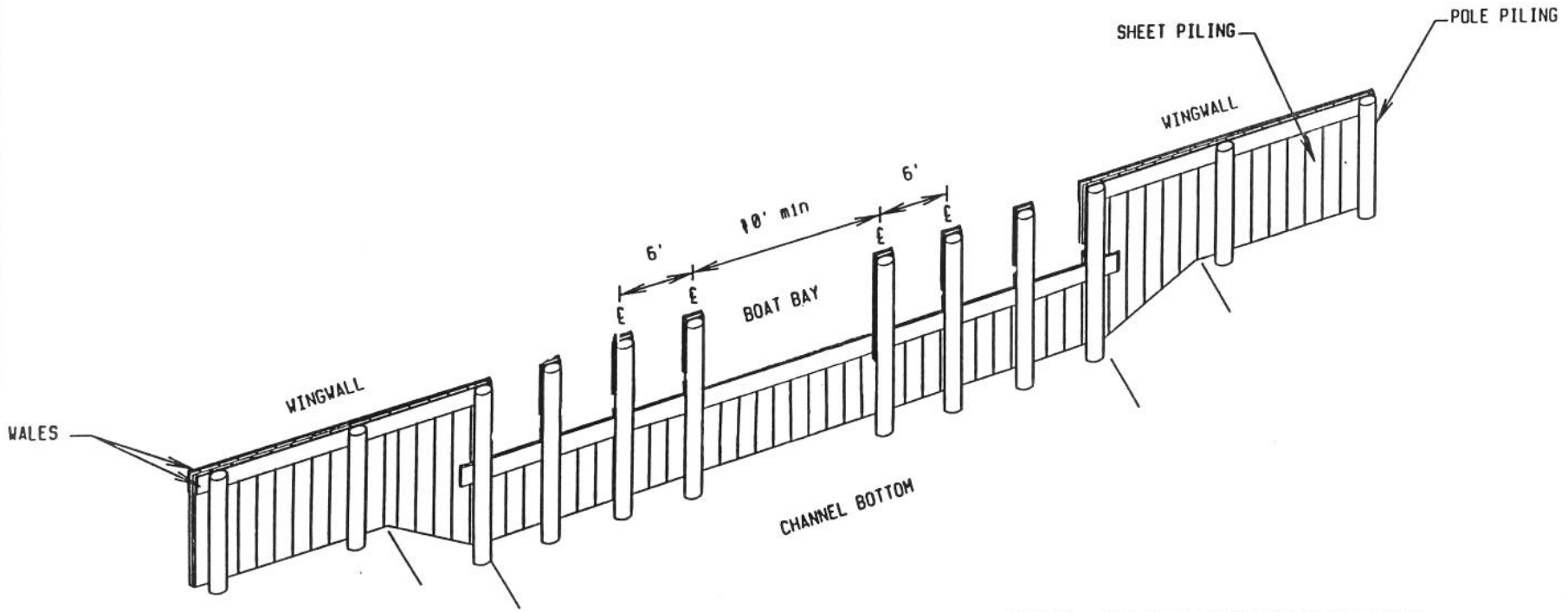
TYPICAL SECTION
(NOT TO SCALE)

*AS REQUIRED

TE-39 SOUTH LAKE DECADE
FRESHWATER INTRODUCTION
TERREBONNE PARISH, LA

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

canalbank ms adw 01/01 WRPS



NOTE: ALTERNATIVE MATERIALS FOR CONSTRUCTION ARE SHEETPILING OR ROCK, DEPENDING ON GEOTECHNICAL BORING ANALYSIS.

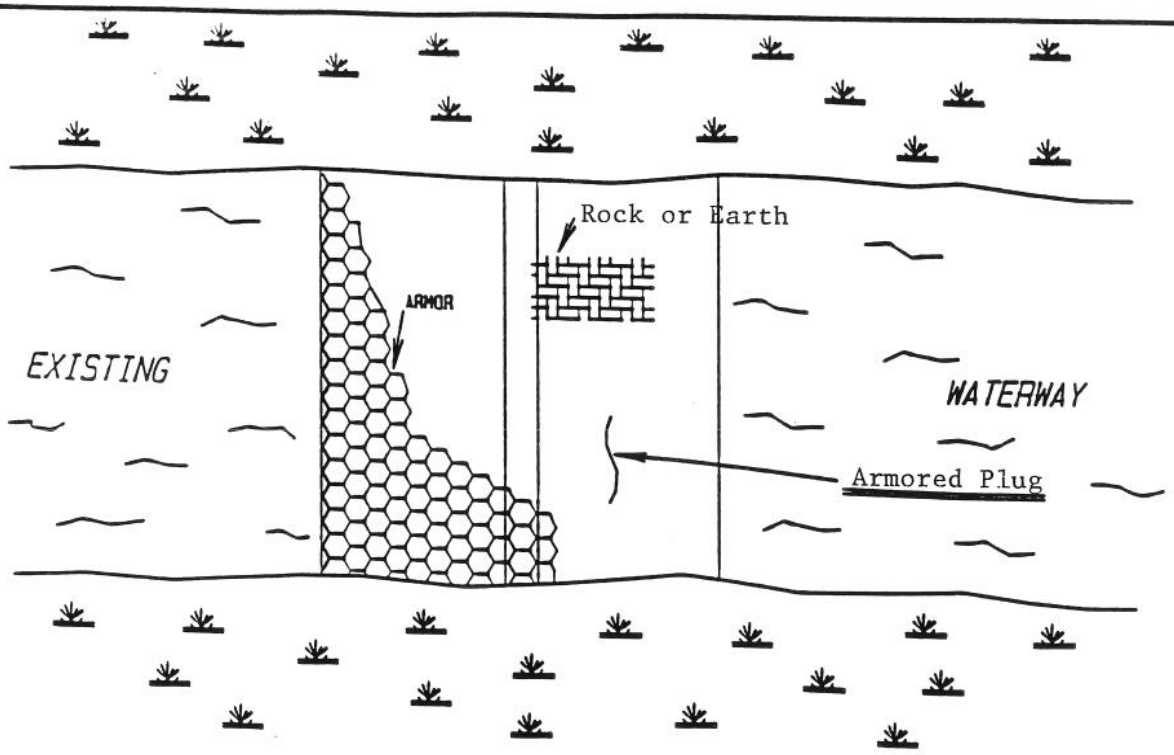
LOW LEVEL FIXED CRESTED WEIR
TYPICAL VIEW

(NOT TO SCALE)

SITE NO. 4 & 5

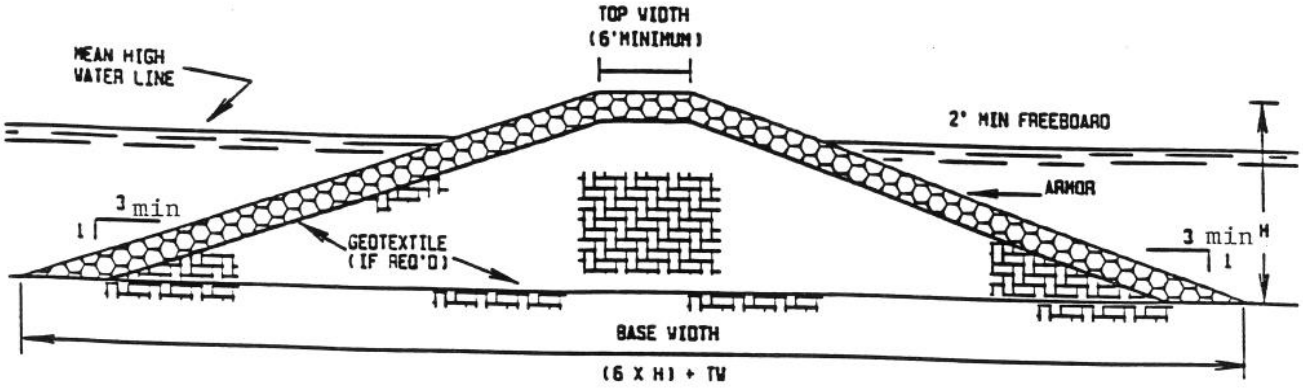
TE-39 SOUTH LAKE DECADE FRESHWATER INTRODUCTION TERREBONNE PARISH, LA

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



PLAN

NOT TO SCALE



PROFILE

NOT TO SCALE

ARMORED PLUG CLOSURE
(NOT TO SCALE)

SITE NO. 6

TE-39 SOUTH LAKE DECADE FRESHWATER INTRODUCTION
TERREBONNE PARISH, LA

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

Appendix C – Cost Information

Coastal Wetlands Conservation and Restoration Plan
Priority Project List IX

South Lake Decade Freshwater Introduction (PTE-28)

Project Construction Years:	3	Total Project Years	23
Interest Rate	6.625%	Amortization Factor	0.0916595
Total First Costs	$2,358,764	Total Fully Funded Costs	$3,968,577

Annual Charges	Present Worth	Average Annual
Interest & Amortization	$2,406,711	$220,598
Monitoring	$352,097	$32,273
O & M Costs	$270,732	$24,815
Other Costs	$6,851	$628
Total	$3,036,400	$278,314
Average Annual Habitat Units		107
Cost Per Habitat Unit		$2,601
Average Annual Acres of Emergent Marsh		NA

C-1

Coastal Wetlands Conservation and Restoration Plan
Priority Project List IX

South Lake Decade Freshwater Introduction (PTE-28)

First Costs and Annual Charges

Year	Fiscal Year	Engineering & Design	Easements & Land Rights	Federal Supervision & Administration	LDNR Supervision & Administration	Corps Project Management	Supervision & Inspection	Contingency	First Cost Construction	Total First Cost
5 Compound		$0	$0	$0	$0	$0	$0	$0	$0	$0
4 Compound		$0	$0	$0	$0	$0	$0	$0	$0	$0
3 Compound	2000	$82,833	$19,444	$18,667	$9,333	$628	$0	$0	$0	$130,906
2 Compound	2001	$130,167	$30,556	$32,000	$16,000	$628	$0	$0	$0	$209,350
1 Compound	2002	$0	$0	$21,333	$10,667	$628	$50,000	$360,500	$1,442,000	$1,885,128
TOTAL		$213,000	$50,000	$72,000	$36,000	$1,884	$50,000	$360,500	$1,442,000	$2,225,384

Year	Fiscal Year	Monitoring Costs	O&M Costs	Other Costs
2 Compound	2001	$42,215	$0	$0
1 Compound	2002	$25,994	$0	$0
0 Base Year		$0	$0	$0
1 Discount	2003	$25,994	$3,645	$628
2 Discount	2004	$25,994	$3,645	$628
3 Discount	2005	$25,994	$3,645	$628
4 Discount	2006	$25,994	$3,645	$628
5 Discount	2007	$25,994	$3,645	$628
6 Discount	2008	$25,994	$3,645	$628
7 Discount	2009	$25,994	$224,538	$628
8 Discount	2010	$25,994	$3,645	$628
9 Discount	2011	$25,994	$3,645	$628
10 Discount	2012	$25,994	$3,645	$628
11 Discount	2013	$25,994	$3,645	$628
12 Discount	2014	$25,994	$3,645	$628
13 Discount	2015	$25,994	$3,645	$628
14 Discount	2016	$25,994	$224,538	$628
15 Discount	2017	$25,994	$3,645	$628
16 Discount	2018	$25,994	$3,645	$628
17 Discount	2019	$25,994	$3,645	$628
18 Discount	2020	$25,994	$3,645	$628
19 Discount	2021	$25,994	$3,645	$628

Coastal Wetlands Conservation and Restoration Plan
Priority Project List IX

South Lake Decade Freshwater Introduction (PTE-28)

Present Valued Costs Total Discounted Costs $3,036,391 Amortized Costs $278,314

Year	Compound Rates	Fiscal Year	Engineering & Design	Easements & Land Rights	Federal Supervision & Administration	LDNR Supervision & Administration	Corps Project Managemet	Supervision & Inspection	Contingency	First Cost Construction	Total First Cost
5	1.378		$0	$0	$0	$0	$0	$0	$0	$0	$0
4	1.293		$0	$0	$0	$0	$0	$0	$0	$0	$0
3	1.212	2000	$100,411	$23,571	$22,628	$11,314	$761	$0	$0	$0	$158,685
2	1.137	2001	$147,985	$34,738	$36,380	$18,190	$714	$0	$0	$0	$238,008
1	1.066	2002	$0	$0	$22,747	$11,373	$670	$53,313	$384,383	$1,537,533	$2,010,018
		Total	$248,396	$58,309	$81,755	$40,877	$2,145	$53,313	$384,383	$1,537,533	$2,406,711

Year	Discount Rates	Fiscal Year	Monitoring Costs	O&M Costs	Other Costs
2	1.137	2001	$47,994	$0	$0
1	1.066	2002	$27,716	$0	$0
0	Base Year		$0	$0	$0
-1	0.938	2003	$24,379	$3,419	$589
-2	0.880	2004	$22,864	$3,206	$552
-3	0.825	2005	$21,444	$3,007	$518
-4	0.774	2006	$20,111	$2,820	$486
-5	0.726	2007	$18,862	$2,645	$456
-6	0.681	2008	$17,690	$2,481	$427
-7	0.638	2009	$16,591	$143,310	$401
-8	0.599	2010	$15,560	$2,182	$376
-9	0.561	2011	$14,593	$2,046	$353
-10	0.527	2012	$13,686	$1,919	$331
-11	0.494	2013	$12,836	$1,800	$310
-12	0.463	2014	$12,038	$1,688	$291
-13	0.434	2015	$11,290	$1,583	$273
-14	0.407	2016	$10,589	$91,467	$256
-15	0.382	2017	$9,931	$1,393	$240
-16	0.358	2018	$9,314	$1,306	$225
-17	0.336	2019	$8,735	$1,225	$211
-18	0.315	2020	$8,192	$1,149	$198
-19	0.296	2021	$7,683	$1,077	$186
-20	0.277	2022	$0	$1,010	$174
		Total	$352,097	$270,732	$6,851

Coastal Wetlands Conservation and Restoration Plan
Priority Project List IX

South Lake Decade Freshwater Introduction (PTE-28)

Fully Funded Costs Total Fully Funded Costs $3,968,577 Amortized Costs $363,758

Year	Inflation Factor	Fiscal Year	Engineering & Design	Easements & Land Rights	Federal Supervision & Administration	LDNR Supervision & Administration	Corps Project Managemet	Supervision & Inspection	Contingency	First Cost Construction	Total First Cost
5			$0	$0	$0	$0	$0	$0	$0	$0	$0
4			$0	$0	$0	$0	$0	$0	$0	$0	$0
3	1.000	2000	$82,833	$19,444	$18,667	$9,333	$628	$0	$0	$0	$130,906
2	1.033	2001	$134,462	$31,564	$33,056	$16,528	$649	$0	$0	$0	$216,259
1	1.067	2002	$0	$0	$22,765	$11,382	$670	$53,354	$384,686	$1,538,742	$2,011,599
		TOTAL	$217,296	$51,008	$74,487	$37,244	$1,947	$53,354	$384,686	$1,538,742	$2,358,764

Year	Inflation Factor	Fiscal Year	Monitoring Costs	O&M Costs	Other Costs
2	1.033	2001	$43,608	$0	$0
1	1.067	2002	$27,738	$0	$0
0	Base Year		$0	$0	$0
-1	1.102	2003	$28,653	$4,018	$692
-2	1.139	2004	$29,599	$4,150	$715
-3	1.176	2005	$30,576	$4,287	$739
-4	1.215	2006	$31,585	$4,429	$763
-5	1.255	2007	$32,627	$4,575	$788
-6	1.297	2008	$33,704	$4,726	$814
-7	1.339	2009	$34,816	$300,741	$841
-8	1.384	2010	$35,965	$5,043	$869
-9	1.429	2011	$37,152	$5,210	$898
-10	1.476	2012	$38,378	$5,381	$927
-11	1.525	2013	$39,644	$5,559	$958
-12	1.575	2014	$40,952	$5,743	$989
-13	1.627	2015	$42,304	$5,932	$1,022
-14	1.681	2016	$43,700	$377,481	$1,056
-15	1.737	2017	$45,142	$6,330	$1,091
-16	1.794	2018	$46,631	$6,539	$1,127
-17	1.853	2019	$48,170	$6,755	$1,164
-18	1.914	2020	$49,760	$6,978	$1,202
-19	1.977	2021	$51,402	$7,208	$1,242
-20	2.043	2022	$0	$7,446	$1,283
		Total	$812,103	$778,531	$19,179

Appendix D – Comments and Responses Concerning the Draft EA

The following pages document the comments on the Draft EA that were received from federal and state agencies, and the response to those comments by the NRCS. Comments are summarized and, with responses, are grouped by agency. Page numbers used in individual agency comments refer to the Draft EA. Page numbers used in NRCS's response to those comments refer to the present document. Copies of agency letters are provided at the end of this Appendix.

UNITED STATES DEPARTMENT OF COMMERCE
National Marine Fisheries Service

GENERAL COMMENT

Comment: We have reviewed the EA and find the document to be well-written and that potential project impacts on resources of concern have been adequately addressed. Therefore, the NMFS has no revisions to recommend to the EA.

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service

SPECIFIC COMMENTS:

Comment: page 2, para. 5, sent. 2 – USFWS encourages NRCS to look for areas where spoil material excavated from Lapeyrouse Canal could be used beneficially, rather than to the detriment of existing of fish and wildlife habitat.

Response: The equipment a contractor will most likely use to enlarge Lapeyrouse Canal will be bucket-type excavation equipment. Such equipment is limited in its capacity to discharge material any significant distance from the work site therefore beneficial placement of the material is not a viable option. No open water areas will be affected by this work therefore existing fish habitat will not be impacted. Also, areas where spoil material will be placed will serve to enhance upland wildlife habitat.

Comment: page 14, para. 1 – The EA should address the discrepancy relative to SAV coverage between the NRCS May 2000 field trip and the EnvWG's Wetland Value Assessment. The EA should also address long-term and short-term construction-related impacts to existing SAV beds.

Response: Text has been revised accordingly

Comment: page 16, para. 1 – The final EA should include a determination by NRCS on whether the project will adversely impact any threatened or endangered species.

Response: Text has been revised accordingly.

LOUISIANA DEPARTMENT OF NATURAL RESOURCES
Office of Coastal Restoration and Management
Coastal Restoration Division

SPECIFIC COMMENTS:

Comment: page 2, Project Benefits, Primary – Relative to the second benefit referencing shallow open water, DNR states this benefit can be accomplished by the subsidence or loss of emergent marsh which would directly impact the first benefit which proposes preventing the loss of emergent marsh. In addition, the second benefit implies that the entire project area will not be affected, thus should the project boundary be adjusted?

Response: The text has been changed to provide a clearer understanding of the statements intention. "*Increase the percent of shallow open water...*" was

meant to imply that diverted water containing resuspended sediments from Lake Decade would settle in open water areas adjacent to the outfall of the diversion and thereby result in shallower conditions. The area of impact from this second benefit is local to the diversion structures, however, other primary and secondary benefits are expected throughout the entire project area thereby constituting the current boundaries.

Comment: page 2, Project Benefits, Primary – Relative to the third benefit referencing SAV species, DNR suggests the word "abundance" be defined more precisely.

Response: Text has been modified accordingly.

Comment: page 3, para. 1, sent. 1 – The stated objective of the project with respect to SAV's is dissimilar to that stated on the previous page.

Response: Text on page 2 has been changed to match the statement on page 3.

Comment: page 6, para. 1, sent 2 – The statement in the sentence needs to have a reference associated with it.

Response: Text has been modified accordingly.

Comment: page 10, para. 3 – The paragraph has conflicting implications relative to marsh type conversion and the increase of saltwater intrusion. Also, the last sentence does not support the change in salinity regime that Figure 3 on page 11 denotes.

Response: Text has been revised accordingly.

Comment: page 11, Figure 3 – The legend needs to have a more detailed description of how the marsh was classified.

Response: References for the vegetative data by year are provided in the Citations section.

Comment: page 12, para. 4 – Specific wetland classifications and percentages, or data numbers, need to be present in the paragraph and an associated graph would be beneficial. Also, a more recent photograph which documents the continued loss would be appropriate.

Response: Text has been revised with USGS Spatial Analysis unpublished data.

Comment: page 14, Water Quality, sent. 7 – Suggested changes to the text.

Response: Text has been modified accordingly.

Comment: page 14, Water Quality, sent. 11 – The statement in the sentence needs to have a reference.

Response: Text has been modified accordingly.

Comment: page 14, Water Quality, sent. 14 – According to data that has been collected by DNR, salinities in the proposed diversion outfall area are approximately 1 ppt higher than those in Lake Decade.

Response: Text has been modified to show the lesser minimum range.

Comment: page 17, Problems and Opportunities, sent. 1 – The sentence has conflicting implications with the data presented in Figure 3 (page 11).

Response: Text has been revised accordingly.

Comment: page 17, Problems and Opportunities, sent. 2 – The word "rate" in this sentence is misleading.

Response: Text has been corrected.

Comment: page 17, Problems and Opportunities, sent. 4 – According to Figure 3, the northern section was originally brackish in the 1949 picture and not fresh to intermediate.

Response: Text has been corrected.

Comment: page 17, Problems and Opportunities, sent. 5 – There may be some truth to the statements that the vegetation shifts according to climatic factors, however, that data has not been presented or referenced in this manuscript.

Response: Text has been revised accordingly.

Comment: page 18, para. 1, sent. 1 – This sentence needs to be referenced even though it may have only been a personal communication.

Response: Text has been modified accordingly.

Comment: page 18, para. 1, sent. 7 – This sentence seems to contradict the whole premise of the project.

Response: The proposed structures will have flapgates fixed to the outflow side of each opening which will preclude bi-directional flow.

Comment: page 18, para. 2, sent. 2 – DNR makes a suggestive word change to the beginning of the sentence.

Response: Text has been modified accordingly.

Comment: page 19, para. 2, sent. 1 – A suggestive change would be "(2) freshwater introduction and management."

Response: The term "management" in some societies of wetland restoration is associated with active manipulation and control of hydrologic regimes. Although the distribution and retention of diverted water is an ancillary goal and important aspect of the project, water management will be achieved through passive means.

Comment: page 19, Description of Alternatives, Alternative 1 – The second sentence sounds as though we will be maintaining the existing features if no action is taken.

Response: Text has been modified to clarify the intent of the sentence.

Comment: page 23, Threatened and Endangered Species, Alternative 1 – Does "…*this species*" at the end of the sentence mean the bald eagle and/or other species?

Response: The term was referencing the bald eagle. Text has been modified accordingly.

Comment: page 24, Risk and Uncertainty, sent. 3 – Sentence should end as follows "…can follow are past successes as well as failures."

Response: Although it can be assumed that the comment did not imply that guidelines should follow failures, NRCS clearly understands that failures are inevitable and valuable lessons can be learned from them.

Comment: page 25, Purpose and Summary, sent. 6 – Additions to the text were suggested.

Response: Text has been modified accordingly.

Comment: page 27, para. 3 – Reference is made to the first sentence and the question asked is "… how many times will this levee have to be repaired for damages done by marine traffic."

Response: The reference to "local marine traffic" cites the prior use of the canal by boat traffic for oilfield related activities. The canal is no longer used for such purposes and therefore impending damage to the proposed embankment from such activities should not occur. Text has been changed to further specify "oilfield marine traffic".

GENERAL COMMENTS:

Comment 1: When the vertical datum NAVD88 was referenced it was typed as NAV88.

Response: Text has been modified to reflect the correct acronym.

Comment 2: The legend on Figure 5 corresponds to Appendix B; however, Figure 5 has sites 4 and 5 listed as rock weirs on the legend and the appendix has the sites as low level fixed crested weirs. Figure 5 has site 6 as an earthen plug and the appendix has an armored plug.

Response: The legend on Figure 5 has been changed to correspond with the titles in Appendix B.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

November 28, 2000

Mr. Loland Broussard
Project Manager
Natural Resources Conservation Service
646 Cajundome Boulevard, Suite 180
Lafayette, Louisiana 70506

Dear Mr. Broussard:

Please reference your November 16, 2000, letter requesting our review of the TE-39 South Lake Decade Freshwater Introduction Project in Terrebonne Parish, Louisiana. The U.S. Fish and Wildlife Service has reviewed the information provided and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

There is a bald eagle nest near one of the proposed water structures (see enclosed map). Bald eagles (*Haliaeetus leucocephalus*), a Federally listed threatened species, nest in Louisiana from October through mid-May. Eagles typically nest in bald cypress trees near fresh to intermediate marshes or open water in the southeastern parishes. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (i.e., organochlorine pesticides and lead). Should the proposed project or associated work activities encroach within 1,500 feet of the eagle nest during the nesting season (October through mid-May) or if any other eagle nests are encountered, further consultation with this office will be necessary. We further caution that the project should not damage any portion of eagle nest trees, including their root systems (i.e., through soil compaction or disturbance).

We appreciate the opportunity to provide comments in the early planning stages of those proposed activities. If you need further assistance, please contact Brigette Decoteau (337/291-3108) of this office.

Sincerely,

David W. Frugé
Field Supervisor

Enclosure

cc: LDWF, Natural Heritage Program, Baton Rouge, LA

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

April 4, 2001 F/SER44/RH:jk
225/389-0508

Mr. Bruce Lehto
Natural Resources Conservation Service
3737 Government Street
Alexandria, Louisiana 71302

Dear Mr. Lehto:

The National Marine Fisheries Service (NMFS) has received the Draft Project Plan and Environmental Assessment (EA) for the South Lake Decade Freshwater Introduction project (TE-39) transmitted by your March 28, 2001, letter. The EA describes the anticipated impacts that would result from the installation of three freshwater introduction structures and two rock weirs, enlarging Lapeyrouse Canal, and constructing 8,700 linear feet of foreshore rock dike. The purpose of the project is improve vegetative health of 7,300 acres of marsh and shallow waterbottoms in Terrebonne Parish, Louisiana. Detailed project planning and construction are funded under the auspices of the Coastal Wetlands Planning, Protection and Restoration Act. The Natural Resources Conservation Service and the Louisiana Department of Natural Resources are the project sponsors.

We have reviewed the EA and find the document to be well-written and that potential project impacts on resources of concern have been adequately addressed. Therefore, the NMFS has no revisions to recommend to the EA.

We appreciate the opportunity to review and comment on this draft EA. If you wish to discuss this project further, please contact Richard Hartman at (225) 389-0508.

Sincerely,

Richard Hartman

for Andreas Mager, Jr.
Assistant Regional Director
Habitat Conservation Division

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

April 20, 2001

Mr. Bruce Lehto
Assistant State Conservationist
Water Resources/Rural Development
Natural Resources Conservation Service
3737 Government Street
Alexandria, Louisiana 71302

Dear Mr. Lehto:

The U.S. Fish and Wildlife Service (Service) has reviewed the draft Environmental Assessment (EA) for the South Lake Decade Freshwater Introduction Project (TE-39). That project would be constructed under the authority of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA). The Service submits the following comments in accordance with the National Environmental Policy Act of 1969, as amended, and the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

General Comments

This EA is well-written and provides an adequate description of fish and wildlife resources in the project area. Because engineering and design of the proposed project features have not been completed, water levels, capacity of diversion structures, and size and elevation of outfall management structures are not known. Benefits of the project are highly dependent on these features. Consequently, project impacts are difficult to evaluate accurately at this time. Specific comments are provided in the following section.

Specific Comments

Page 2, Paragraph 5, Sentence 2 - It is stated that material excavated from Lapeyrouse Canal will be deposited on adjacent marsh and scrub-shrub/forested spoil bank. Although we agree that the loss of 4 acres is minimal compared to the predicted benefits of the project, we would encourage the NRCS to look for areas where the material could be used beneficially, rather than to the detriment of existing fish and wildlife habitat.

Page 14, Paragraph 1 - This paragraph describes the small amount of submerged aquatic vegetation (SAV) seen in the project area during May 2000, a period of unusually high salinities throughout the Louisiana coast. According to the Wetland Value Assessment (WVA) conducted for this project, the primary and secondary areas of impact have 70 percent and 20 percent SAV coverage, respectively. The EA should address this discrepancy. Service staff have observed

dense beds of SAV both in Lake Decade and the shallow open-water areas within the project boundary. The EA should address both the long-term and short-term construction-related impacts to those SAV beds.

Page 16, Paragraph 1 - The final EA should include a determination by your agency on whether the project will adversely impact any threatened or endangered species.

The Service fully supports the goal of this project. Marshes in the project area provide important habitat for numerous Federal trust species including wading birds and migratory waterfowl. Until engineering and design is complete, we cannot accurately evaluate the project's likely impacts on fish and wildlife habitat in the project area.

Thank you for the opportunity to provide comments on this draft EA. If you have any questions regarding our comments, please contact Martha Segura of this office at (337) 291-3110.

Sincerely,

David W. Frugé

David W. Frugé
Field Supervisor

cc: EPA, Baton Rouge, LA
NMFS, Baton Rouge, LA
U.S. Army Corps of Engineers, New Orleans, LA
LA Dept. of Natural Resources (CRD), Baton Rouge, LA
LA Dept. of Wildlife and Fisheries, Baton Rouge, LA

State of Louisiana

M.J. "MIKE" FOSTER, JR.
GOVERNOR

JACK C. CALDWELL
SECRETARY

DEPARTMENT OF NATURAL RESOURCES

May 1, 2001

Loland Broussard, NRCS Project Manager
United States Department of Agriculture
Natural Resources Conservation Service
646 Cajundome Blvd., Suite 180
Lafayette, LA 70506

RE: Comments on the Draft Environmental Assessment for the South Lake Decade Project

Dear Mr. Broussard:

The enclosed three pages contain comments concerning the Environmental Assessment for the South Lake Decade Freshwater Introduction Project. The Louisiana Department of Natural Resources / Coastal Restoration Division would like for these comments to be considered for review towards the final draft.

If you have any questions concerning our comments, please contact Todd Folse or Darin Lee by phone or e-mail. Our phone number is (985) 447-0991 and our e-mail is toddf@dnr.state.la.us or darinl@dnr.state.la.us.

Sincerely,

Todd Folse
LDNR Monitoring Manager

cc: Dan Llewellyn, LDNR Project Manager

COASTAL RESTORATION DIVISION
P.O. Box 2079 • Nicholls State University • Thibodaux Louisiana 70310 • Telephone (504) 447-0991 • Fax (504) 447-0997

Comments for the South Lake Decade Freshwater Introduction Project

pg. 2: Primary:

2. *"Increase the percent of shallow water within the vicinity of the outfall area of the diversions."* This project benefit can be accomplished by the subsidence or loss of emergent marsh which would directly impact the first benefit which is to *"Prevent the loss of 201 acres of emergent marsh."* Secondly, *"...within the vicinity of the outfall area of the diversions,"* this phrase implies that the entire project area will not be affected. Does the project boundaries need to be adjusted if the entire area will not be affected?
3. *"Increase abundance of submergent aquatic vegetative species within the 7,343-acre project area."* The word "abundance" needs to be defined more precisely. Abundance could be interpreted as the "frequence of occurrences" or the amount of "biomass" produced.

pg. 3: Introduction:

"The objective of the South Lake Decade Freshwater Introduction Project (TE-39) is to reduce interior emergent marsh loss rates and ***increase the occurrence and abundance of submerged aquatic vegetation (SAV's).***" Here it is stated that an objective of the project is to increase the occurrence and abundance of SAV's; however, on page 2, only abundance is mentioned.

pg. 6: Sentence 2:

"Although the Atchafalaya River, a Mississippi River distributary, annually supplies..." This statement needs to have a reference associated with it.

pg. 10: Paragraph 3:

The first sentence in this paragraph is unclear. Is the data suggesting that even though the marsh type went from brackish to intermediate there was a net increase in saltwater intrusion? Secondly, despite the three consecutive years of drought and low Atchafalaya River discharges for the 1988 classification, the northern area became less saline according to Figure 3 on page 11.

pg. 11: Figure 3:

The legend needs to have a more detailed description of how the marsh was classified.

pg. 12: Paragraph 4:

Specific classifications (water, marsh, swamp, scrub/shrub, etc.) and percentages or data numbers need to be present in the paragraph. Also, an associated graph would benefit the paragraph. Also, a more recent photograph which documents the continued loss would be appropriate.

pg. 14: Water Quality

Sentence 7: *"If conditions are favorable,..."* should be changed to "Under certain conditions,..."

Sentence 11: *"An analysis of tide gauges..."* this statement needs to have a reference.

Sentence 14: *"Data obtained..."* according to the data that has been collected by LDNR from the data logger deployed in December 2000 the salinities are approximately 1 ppt higher than that at the Data Collection Platform.

pg. 17: Problems and Opportunities

Sentence 1: *"The project area is..."* The last reason for marsh deterioration is saltwater intrusion; however, the vegetation data presented on page 11 figure 3 shows that more area has become fresh marsh and intermediate marsh from 1949 to 1997.

Sentence 2: *"Habitat analysis..."* The word "rate" in this sentence is misleading.

Sentence 4: *"The northern section..."* According to page 11 figure 3, the northern section was originally brackish in the1949 picture and not fresh to intermediate.

Sentence 5: *"However, the southern area..."* There seems to be a shift to a less saline marsh type in the southern area with respect to figure 3. There may be some truth to the statements that the vegetation shifts according to climatic factors; however, that data has not been presented or referenced in this manuscript.

pg. 18: Paragraph 1:

Sentence 1: *"Maintaining a hydrologic..."* This sentence needs to be referenced even though it may have only been a personal communication.

Sentence 7: *"The impermeable lake shoreline..."* This sentence seems to contradict the whole premise of the project. If the lake shoreline is maintaining lower salinities in the northern area of the project, then a structure in the levee would only break the barrier.

pg. 18: Paragraph 2:

Sentence 2: *"This can be accomplished..."* A suggestive word change to the beginning of the sentence would be "The distribution of water and sediment can be accomplished..."

pg. 19: Paragraph 2:

Sentence 1: *"...(2) freshwater introduction."* A suggestive change would be "(2)freshwater introduction and management." This phrase may be more suitable since part of the goal is for an "improved distribution and retention of diverted water."

pg. 19: Description of Alternatives

Alternative 1: The second sentence sounds as though we will be maintaining the existing features if no action is taken. This is not the case.

pg. 23: Threatened and Endangered Species

Alternative 1: The sentence ends with "*...this species.*" Does this mean the bald eagle and/or other species. The specific species should be listed.

pg. 24: Risk and Uncertainty

Sentence 3: Should end as follows "*...can follow are past successes as well as failures.*"

pg. 25: Purpose and Summary

Sentence 6: Should read as follows: "Higher Lake Decade water levels and lower Lake Decade salinities if shown to occur at strategic times throughout an annual cycle would be potential indicators being sought to determine whether the project could meet it's strategic objectives."

pg. 27: Paragraph 3:

The paragraph states "*...an oilfield canal spoilbank that has deteriorated and become submerged over time as a result of subsidence and erosive wave actions from wind and local marine traffic.*" According to the following statement, the levee will be built using earthen material. Over the 20 year life span of the project, how many times will this levee have to be repaired for damages done by marine traffic.

General Comments

1. When the vertical datum NAVD 88 was referenced it was typed as NAV 88.
2. The legend on figure 5 corresponds to appendix B; however, figure 5 has sites 4 and 5 listed as rock weirs on the legend and the appendix has the sites as low level fixed crest weirs. Figure 5 has site 6 as an earthen plug and the appendix has an armored plug.

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SECRETARY

GERRI HOBDY
ASSISTANT SECRETARY

May 24, 2001

Mr. Donald W. Gohmert
Unites States Department of Agriculture
Natural Resources Conservation Service
3737 Government Street
Alexandria, LA 71302

Re: TE-39 South Lake De Cade
Freshwater Introduction Project
Terrebonne Parish, Louisiana

Dear Mr. Gohmert:

Reference is made to your letter dated April 2, 2001, concerning the above. A review of our files indicates that there is one known archaeological site located within the Area of Potential Effects (APE). However, due to the nature of this project we fell that the site will not be affected. Therefore, we have no objections to its implementation.

If we may be of further assistance, please contact Rachel Watson in our Division of Archaeology at (225) 342-8170.

Sincerely,

Gerri Hobdy

GH:RW:s

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