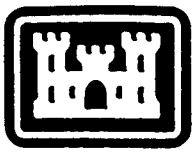

Cultural Resources Series
Report Number: COEMVN/PD-98/07

U.S. Army Corps
of Engineers
New Orleans District

CULTURAL RESOURCES SURVEY OF BAYOU DULARGE DISPOSAL AREAS, TERREBONNE PARISH, LOUISIANA

JUNE 1998

FINAL REPORT

R. Christopher Goodwin & Associates, Inc.
5824 Plauche Street
New Orleans, LA 70123

PREPARED FOR:

U.S. Army Corps of Engineers
New Orleans District
P.O. Box 60267
New Orleans, LA 70160

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This report presents the results of cultural resources survey, inventory, and assessment of two proposed disposal areas located along the west bank of Bayou DuLarge in Terrebonne Parish, Louisiana. Fieldwork was performed by R. Christopher Goodwin & Associates, Inc., in June 1997. Proposed Disposal Site 1 measured 30.48 m (100 ft) by 850 m (2788.71 ft), and encompassed an area of 6.4 ac (2.59 ha). Proposed Disposal Site 2 measured 30.48 m (100 ft) by 900 m (2952.76 ft), encompassing an area of 6.78 ac (2.74 ha). Both of the proposed disposal sites are located on the west bank of Bayou DuLarge, and these sites are located 13.6 km (8.5 mi) and 15.2 km (9.5 mi) south of Theriot, Louisiana respectively. The entire area of both proposed disposal sites was surveyed systematically using both shovel and auger testing. In addition, the bankline along Bayou DuLarge was surveyed. No cultural resources (archeological loci or historic standing structures) were identified as a result of this survey, and therefore, no additional testing of the proposed disposal site areas is recommended.

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DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT. CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF:

June 23, 1998

Planning Division
Environmental Analysis Branch

To the Reader:

This cultural resources effort was designed, funded, and guided by this office, as part of our cultural resources management program. Documented in this report is a cultural resources survey of two proposed disposal areas required for clearing and snagging activities on Bayou DuLarge in Terrebonne Parish, Louisiana. The purpose of the survey was to determine if significant archeological or historical resources are located in the disposal areas.

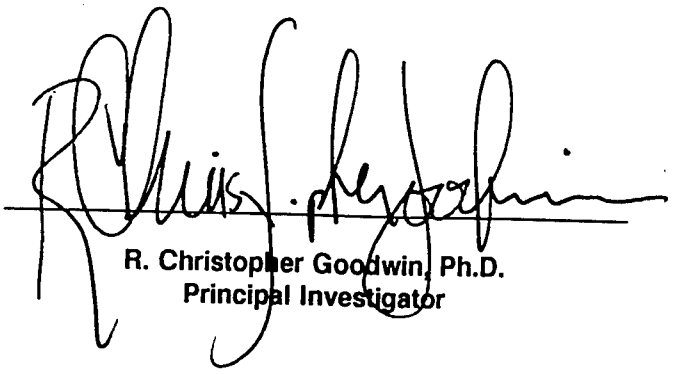
We concur with the contractor's conclusion that the project will not affect significant cultural resources.

Edwin A. Lyon
Contracting Officer's
Representative

for Robert A. Buisson, Jr.
R. H. Schroeder, Jr.
Chief, Planning Division

CULTURAL RESOURCES SURVEY OF BAYOU DULARGE DISPOSAL AREAS, TERREBONNE PARISH, LOUISIANA

FINAL REPORT



R. Christopher Goodwin, Ph.D.
Principal Investigator

By

Glenn Walter, Cinder Griffin Miller, Jeremy Pincoske,
Roger Saucier, Susan Barrett Smith, and David D. Davis

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June 1998

For

U.S. Army Corps of Engineers
New Orleans District
P.O. Box 60267
New Orleans, LA 70160-0267

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CHAPTER I

INTRODUCTION

This document presents the results of a cultural resources survey, assessment, and archeological inventory of the two proposed dredged material disposal sites along Bayou Dularge in Terrebonne Parish, Louisiana. Fieldwork was completed between June 24 and 26, 1997 by R. Christopher Goodwin & Associates, Inc. on behalf of the U.S. Army Corps of Engineers, New Orleans District, pursuant to Contract DACW29-97-D-0018, Delivery Order 05.

Disposal Site 1 measures 30.48 m (100 ft) by 850 m (2788.71 ft) and is located in portions of Sections 3, 4 and 9 of Township 20 S, Range 16 E. Disposal Site 1 encompasses 6.4 ac (2.59 ha). Disposal Site 2 measures 30.48 m (100 ft) by 900 m (2952.76 ft) and is located in portions of Sections 9, 16 and 17 of Township 20 S, Range 16 E (Figure 1 and Figure 2, Sheets 1-2). Disposal Area 2 encompasses 6.78 ac (2.74 ha). A more detailed description of the proposed project areas is presented below:

> Both of the proposed Disposal Site areas are located on the west bank of Bayou DuLarge, approximately 13.6 km (8.5 mi) and 15.2 km (9.5 mi) south of Theriot, Louisiana, respectively. Disposal Site 1, located the furthest north, measures 30.48 m (100 ft) by 850 m (2788.71 ft), encompassing an area of approximately 6.4 ac (2.59 ha). The north end of this Disposal Site, situated at the terminus of Brady Road, is accessible by vehicle. The proposed Disposal Site extends along the bank of the bayou 850 m (2788.71 ft) to the southern end, demarcated by a fallow garden plot bounded by corrugated metal fencing. Disposal Site 2, located approximately 1.6 km (1.0 mi) further south, measures 30.48 m (100 ft) by 900 m (2952.76 ft), encompassing an area of approximately 6.78 ac (2.74 ha). The southern end of Disposal Site 2 is located at the northwest corner of the intersection of a flotation canal and Bayou DuLarge. Disposal Site 2 extends 900 m (2952.76 ft) north along the bank of the bayou, where the northern boundary ends in a planted garden plot.

To ensure complete coverage of the proposed project areas, the entire breadth of both 30.48 m (100 ft) wide disposal sites were surveyed as part of the current cultural resources assessment. In addition, the banklines adjacent to both disposal sites were inventoried as part of the current effort. Finally, areas adjacent to the project areas were examined visually for the presence of cultural resources. The results of those investigations are contained within this report.

Research Design and Objectives

During the cultural resources survey and inventory of the two proposed disposal site areas, the entire length and width of the proposed areas were surveyed for cultural resources. This included intensive pedestrian reconnaissance and systematic subsurface testing within the limits of the proposed project areas. Subsurface probing included the excavation of both shovel and auger tests. Fieldwork also included pedestrian reconnaissance of the bankline of Bayou DuLarge along the entire length of both proposed disposal sites. The specific field methods that were employed in this investigation are described in detail in Chapter VI of this report.

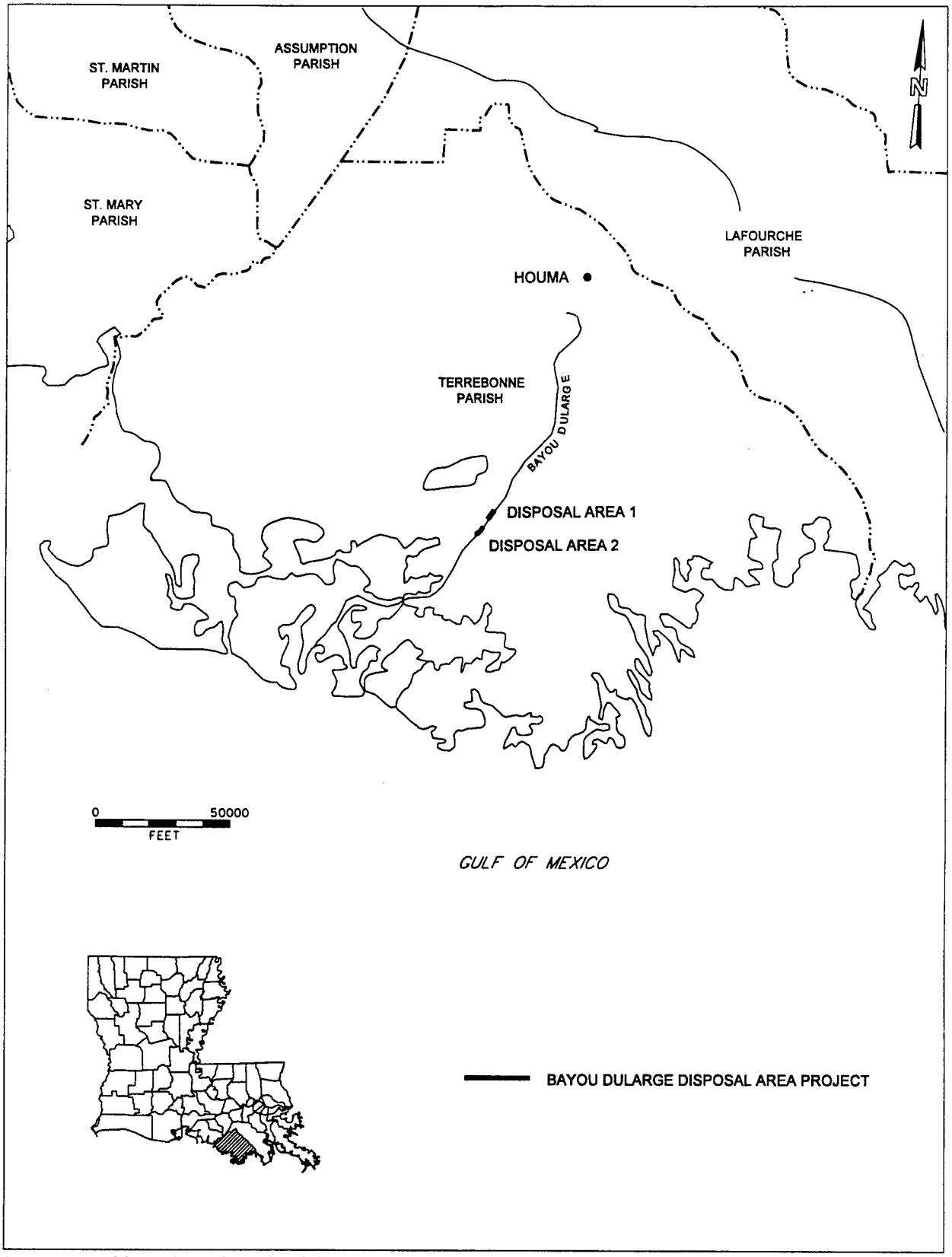

Figure 1. Map of southern Louisiana depicting the proposed Bayou DuLarge Disposal Areas project.

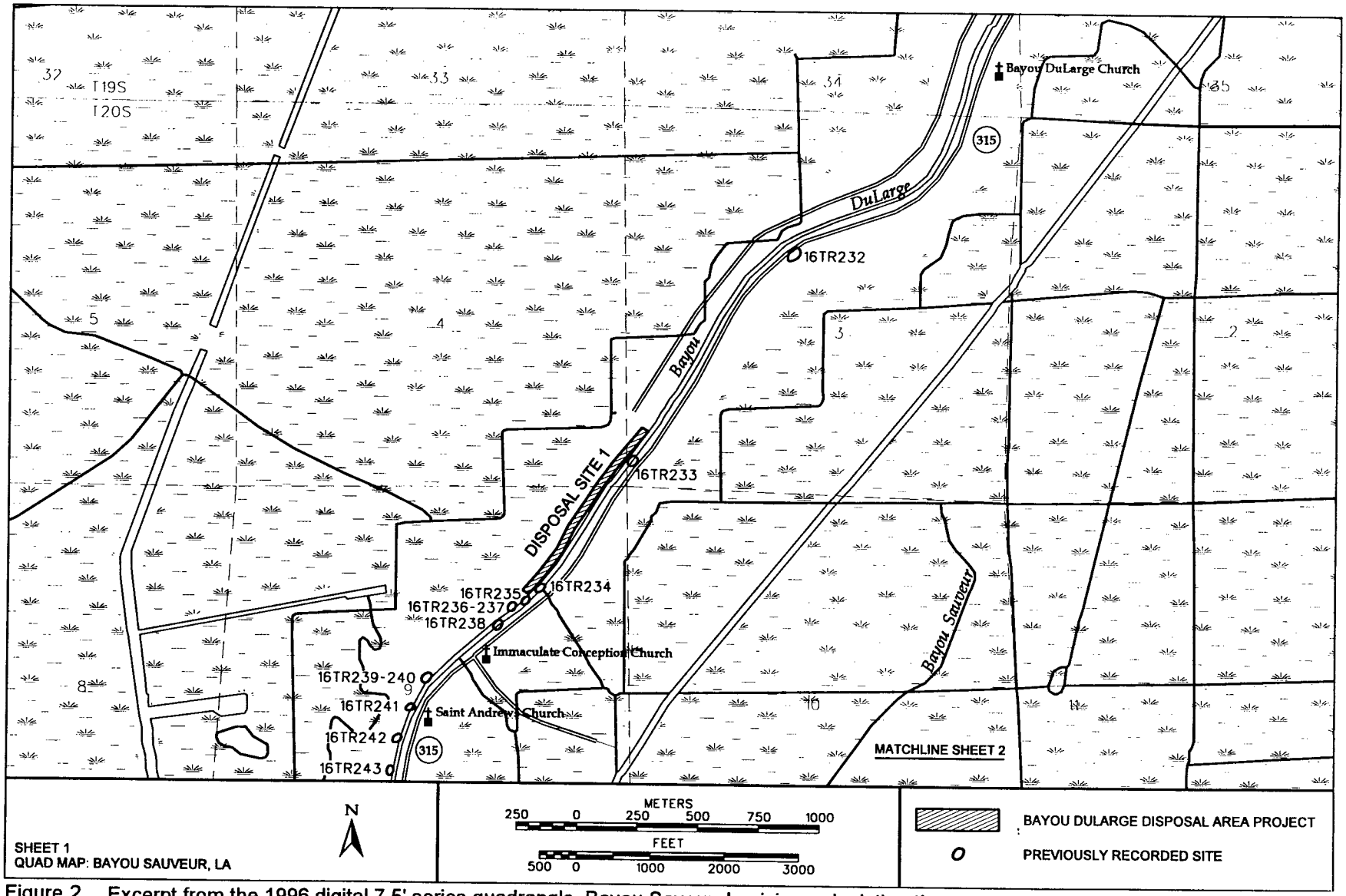

Figure 2. Excerpt from the 1996 digital 7.5' series quadrangle, Bayou Saveur, Louisiana, depicting the proposed Bayou DuLarge Disposal Areas Sheet 1 project, Disposal Site 1, and previously recorded archeological sites.

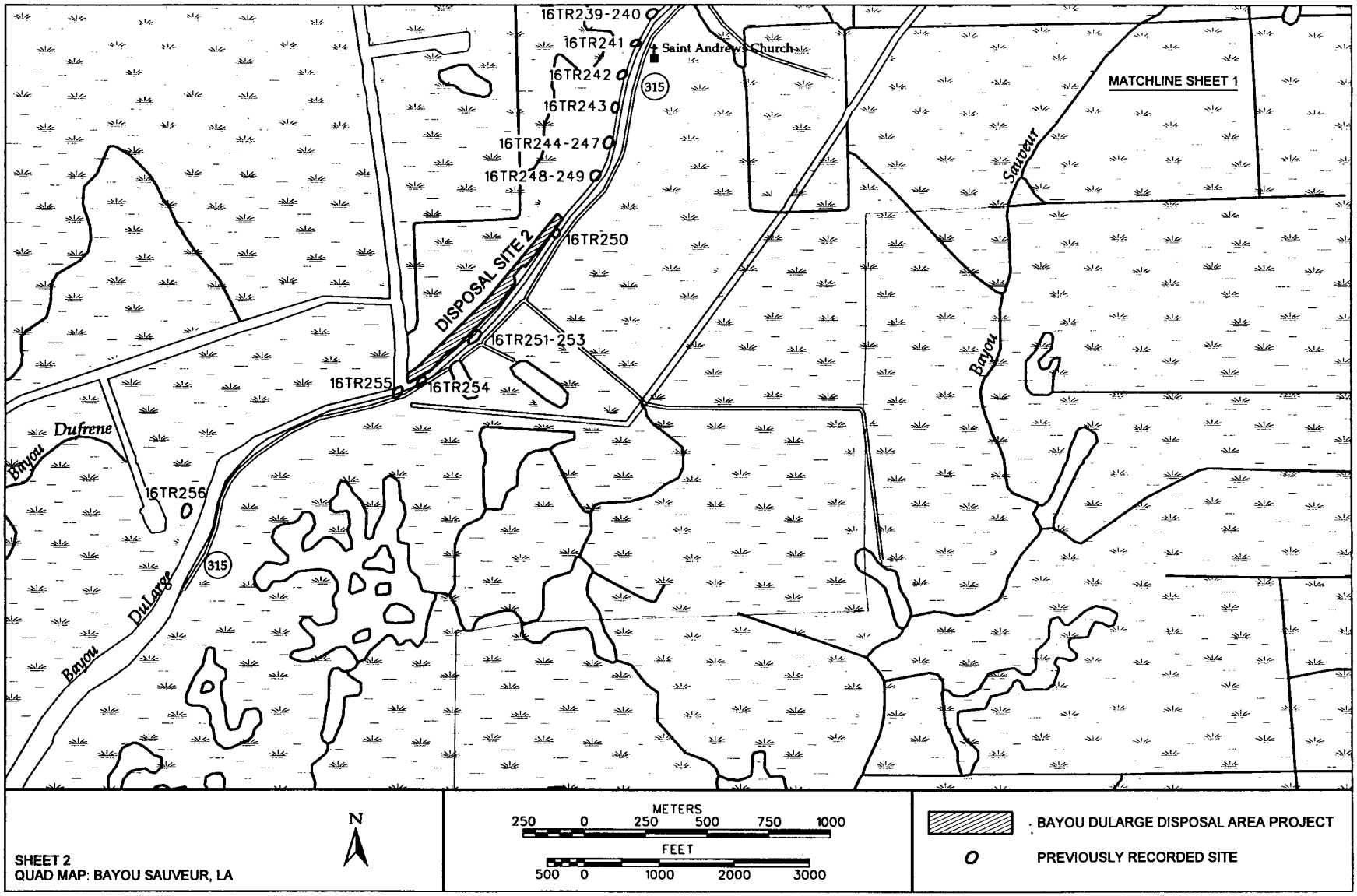

Figure 2. Excerpt from the 1996 digital 7.5' series quadrangle, Bayou Saveur, Louisiana, depicting the proposed Bayou DuLarge Disposal Areas project, Disposal Site 2, and previously recorded archeological sites.
Sheet 2

This archeological inventory was designed to identify, to record, and to assess preliminarily all cultural resources situated within the currently proposed project areas. A two-step approach was utilized to complete this inventory. This included (1) cartographic, archival, and archeological review of data relevant to the project areas; and (2) visual inspection, pedestrian survey, and systematic auger/shovel testing of the entire area of the proposed disposal sites. No archeological sites or cultural resources loci were identified as a result of this endeavor. No additional survey or testing of the proposed Bayou DuLarge disposal sites is recommended.

Dr. R. Christopher Goodwin served as Director of Research. Mr. William Athens, M.A., acted as Principal Investigator for the project. Dr. Cinder G. Miller acted as Project Manager, and was assisted by Mr. Glenn Walter, M.A. who coordinated all aspects of the fieldwork. Dr. Ralph Draughon, Jr. supervised the historical research. Mr. Kevin Hill, B.A., Ms. Julie Crawford, B.A., and Ms. Katherine Willis, B.A., assisted Mr. Walter in completing this investigation.

Organization of the Report

An overview of the natural setting of the project areas is presented in Chapter II, including a description of the geology, geomorphology, and floral and faunal characteristics of the region, as well as a short discussion that describes the climate of the area. This chapter also includes a discussion of the geoarcheology of the region and an analysis of the probability of identifying archeological sites within the proposed project areas. The prehistory of the region is reviewed in Chapter III. The history of the general project area and significant themes relevant to understanding the historical development of the area are chronicled in Chapter IV. A review of relevant cultural resources surveys and previously recorded archeological sites located in the vicinity of the project area is summarized in Chapter V. The research design and methodology used in conducting the Phase I cultural resources survey and inventory of these project areas are described in Chapter VI. Results of the survey and management recommendations are provided in Chapter VII. The Scope of Work is presented in Appendix I.

CHAPTER II

GEOMORPHIC ANALYSIS AND LANDSCAPE CLASSIFICATION

Introduction

The distribution of human habitation across the landscape is influenced in large part by the environment and the usable resources found within it. The area encompassing the proposed project areas is characterized by a number of different, exploitable ecosystems. This chapter identifies those processes that characterized the development of the region surrounding the project area and influenced both the settlement and subsistence strategies characteristic of the prehistoric and historic populations of the region. A brief overview of the natural setting of the project corridor, therefore, will be a useful aid for predicting both the occurrence and nonoccurrence of sites, as well as the possible types, chronologies, and quality of the archeological deposits associated within them. While a close consideration of the natural setting should aid in predictive modeling, it is important to note that this approach only helps to identify trends, and cannot completely serve as a substitute for subsequent surveys and inventories.

Disposal Site 1 measures 30.48 m (100 ft) by 850 m (2788.71 ft) and is located in portions of Sections 3, 4 and 9 of Township 20 S, Range 16 E. Disposal Site 2 measures 30.48 m (100 ft) by 900 m (2952.76 ft) and is located in portions of Sections 9, 16 and 17 of Township 20 S, Range 16 E. Elevations throughout the area are at or slightly above sea level and the project areas exhibit very little vertical relief.

Physiographic and Geologic Setting

Physiographically, the project areas are situated in the Gulf segment of the Coastal Plain Province of North America. The vicinity of the project areas lies west of the current channel of the Mississippi River near where that stream system discharges into the Gulf of Mexico. Therefore, it lies at the distal end of the Lower Mississippi Valley (as defined on the basis of the extent of deposits of Quaternary age), in that segment designated the deltaic plain (as opposed to the alluvial valley segment farther inland) (Saucier 1994).

Geologically, the deltaic plain overlies the northern portion of the east-west trending Gulf Basin, a deep structural trough where the continental crust (consisting of Paleozoic basement rocks) has been depressed and where mostly unconsolidated sediments of fluvial, estuarine, and marine origin have accumulated to a thickness of tens of thousands of meters. The northern flank of the Gulf Basin is characterized not only by prevailing subsidence but also by east-west trending zones of active growth faults and the diapiric intrusion of salt to form piercement-type salt domes (Murray 1961).

More specifically, the Mississippi deltaic plain is the surface manifestation of a relatively thin, seaward thickening prism of Holocene deltaic and shallow marine deposits that overlies Pleistocene deposits of similar origin, and still older ones at greater depths (Kolb and VanLopik 1958). In this region, most of the Holocene prism or veneer varies from about 40 to 100 m thick and, in gross terms, consists of a highly variable mixture of clays, silts, and fine sands that grades downward into mostly silts and sands (May et al. 1984; Dunbar et al. 1994). The youngest Pleistocene deposits that underlie the Holocene sequence occur at increasingly shallow depths to the north and eventually outcrop, forming the northern border of the deltaic plain along a line trending through the Pontchartrain Basin (Figure 3).

The prism of Holocene deltaic deposits represents a series of distinctive onlapping sedimentary cycles initiated by upstream diversions of river flow, each cycle being the correlative of a discrete delta

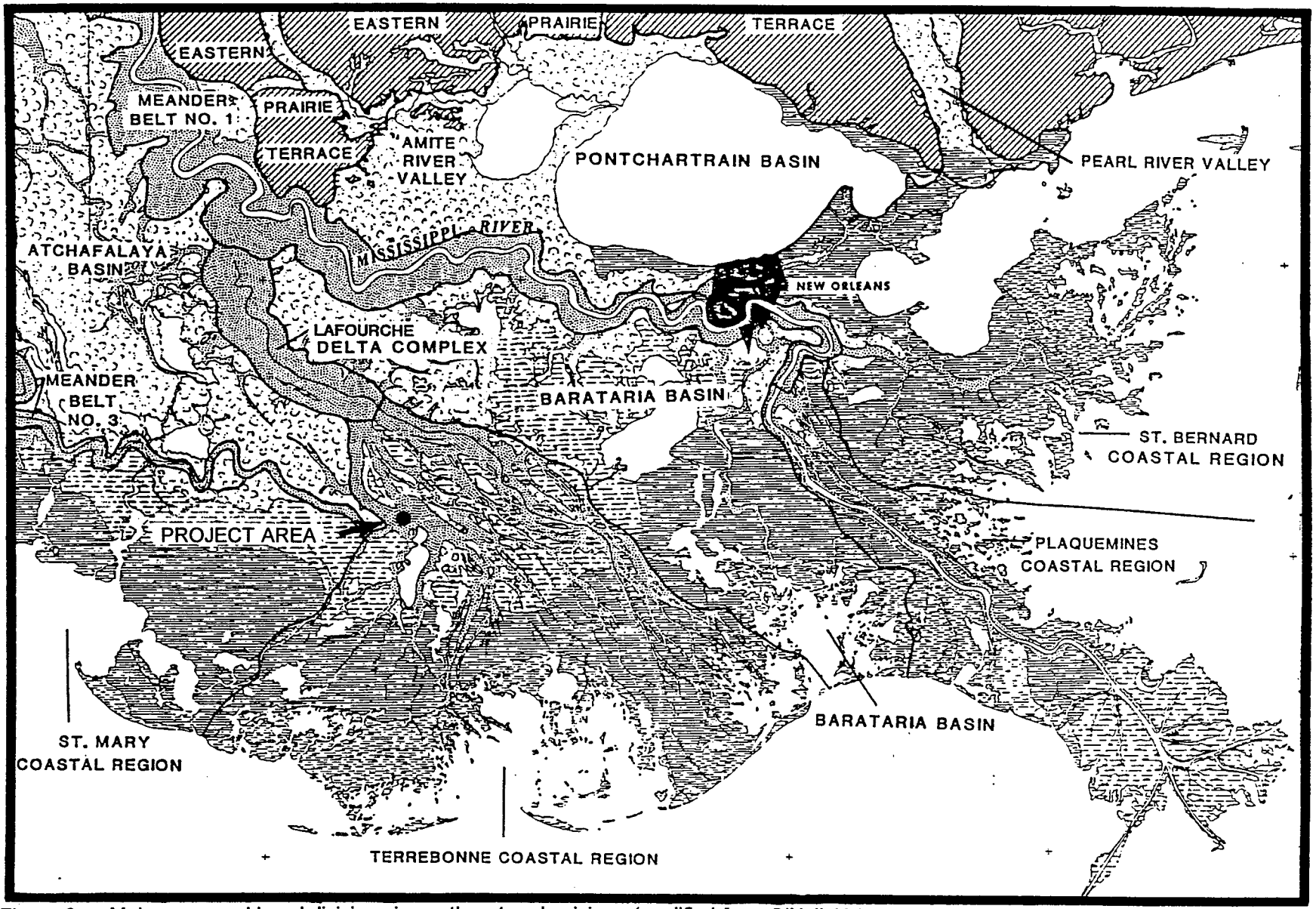

Figure 3. Major geomorphic subdivisions in southeastern Louisiana (modified from O'Neil 1949).

complex. Each cycle involves sediments laid down in multiple environments ranging from freshwater to saline in the dynamic zone of interaction where the river emptied into the Gulf. As illustrated in Figure 4, the cumulative result of multiple cycles has been the net buildup and seaward buildout of the deltaic plain. Each delta complex in turn involves a series of delta lobes, a lobe being defined as that portion of a complex that formed during a relatively short period of time and that can be attributed to a single or discrete set of deltaic distributaries (Saucier 1994). Because of the prevailing influence of subsidence and sea level rise, each lobe typically has experienced a constructional or progradational phase in which fluvial processes dominate, and a subsequent destructional or transgressive phase in which marine processes become progressively more dominant. The particular depositional environments associated with a deltaic lobe and stages in the growth and decay of a deltaic complex are discussed and illustrated later in this report.

The surface expression of each delta complex is a trunk course and a series of radiating and branching distributaries that form a skeletal framework. Each distributary is flanked by a low, narrow natural levee ridge that gradually narrows and lowers in elevation toward the Gulf. The distributaries are separated by broad, flat interdistributary basins characterized by intratidal wetlands. In general, the project area is coincident with the central portion of the Lafourche deltaic complex, one of several named and well-delineated major complexes (Frazier 1967); it involves several lobes which will be discussed later (Figure 3). The Lafourche complex overlies remnants of older complexes and lobes that are buried at shallow depths and have very subtle surface manifestation.

In the region surrounding the project area, natural levee ridges flanking less than a dozen abandoned distributaries constitute the only permanently habitable and arable lands. They decrease in total width from about 1500 to 3000 m in the northern part of the region to zero or only a few tens of meters in the southern part. They decrease in elevation National Geodetic Vertical Datum (NGVD) from barely 3 m in the north to essentially sea level in the south. However narrow they may be, the larger natural levee ridges extend seaward over distances of tens of kilometers. Overall, it is estimated that less than 10% of the total area encompassed by the region is above the level of permanent inundation and daily tidal effects. The remaining 90% of the area is characterized by essentially flat interdistributary basins exhibiting broad expanses of coastal swamps and marshes. Even in the northernmost areas, the interdistributary wetlands lie at elevations a meter or less above sea level. The more interior portions of the basins are fresh to brackish, and support largely uninterrupted vegetated wetlands. Toward the Gulf, open water (brackish to mildly saline) in the form of ponds and shallow lakes becomes more dominant.

Although the distributaries no longer convey Mississippi River discharge, most still are occupied by navigable streams (bayous) and are the focus of present waterborne commerce. However, most of the runoff of precipitation from the area is toward the Gulf via a tortuous network of small streams and lakes within the interdistributary basins. Because of the low relief and elevations, essentially all of the central and southern part of the region is susceptible to hurricane storm surges.

Vegetation and Soils

In the deltaic plain, where relief is so low and outcrops of soils are so few, the vegetation assemblages of landforms and environments are their most visible manifestation. Wooded distributary ridges literally can be seen from miles away across marshes because of their distinctive vegetation. A detailed listing of characteristic plant species is not presented herein. Table 1 serves this purpose and has been extracted from Frazier and Osanik (1965), who compiled the list from several classical ecological studies of the area.

As natural levees initially emerge near distributary mouths, they first are colonized by species such as roseau cane, water millet, and cattail. With increased height and more mature soils, they begin to support black willow, wax myrtle, hackberry, and red gum. Mature natural levees in more inland locations develop

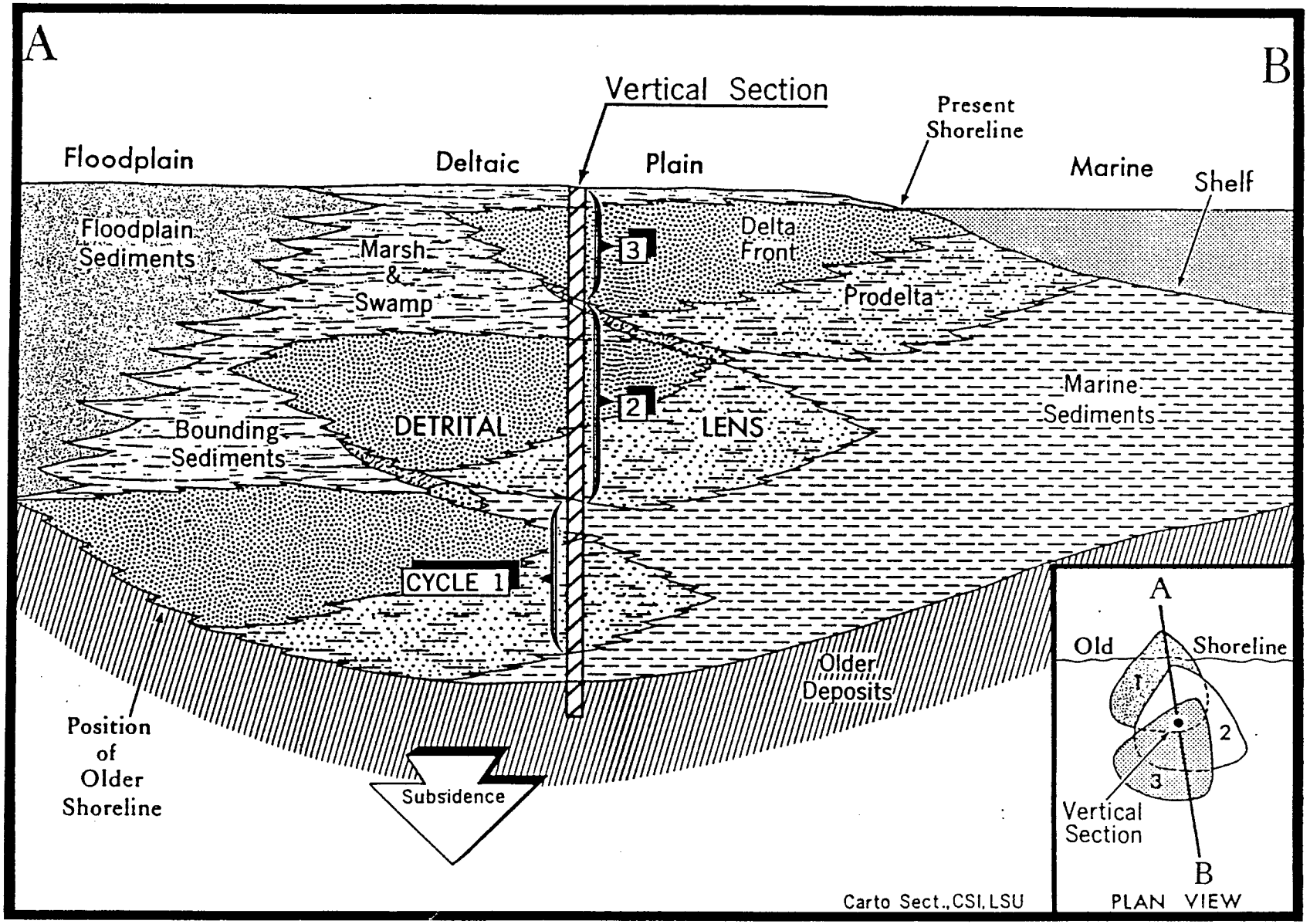

Figure 4. Hypothetical sedimentary sequence resulting from several overlapping deltaic cycles showing environments of deposition (from Coleman and Gagliano 1964).

TABLE 1. CHARACTERISTIC SWAMP AND MARSH VEGETATION

Inland Fresh-water Swamp

Natural Levee Flank	*Central Portion*	*Semi-Wooded Fringe*
Dwarf palmetto	Bald cypress	Black willow
Sabal minor	*Taxodium distichum*	*Salix nigra*
Live oak	Tupelo gum	Bald cypress
Quercus virginiana	*Nyssa aquatica*	*Taxodium distichum*
Overcup oak	Sour gum	Red maple
Quercus lyrata	*Nyssa uniflora*	*Acer drummondi.*
Willow oak	Red maple	Green ash
Quercus phellos	*Acer drummondi*	*Fraxinus pennsylvanica*
Bitter pecan	Green ash	var. *lanceolata*
Carya aquatica	*Fraxinus pennsylvanica*	Possum haw
Red maple	var. *Lanceolata*	*Ilex decidua*
Acer drummondi	Black willow	Wax myrtle
Green ash	*Salix nigra*	*Myrica cerifera*
Fraxinus pennsylvanica	Swamp elder	Buttonbush
var. *Lanceolata*	*Baccharis halminifolia*	*Cephalanthus occidentalis*
Black willow	Bull tongue	Bull tongue
Salix nigra	*Sagittaria lancifolia*	*Sagittaria lancifolia*
Wax myrtle	Arrowhead	Arrowhead
Myrica cerifera	*Sagittaria latifolia*	*Sagittaria latifolia*
Hackberry	Spider lily	Water millet
Celtis laevigata	*Hymenocaulis occidentalis*	*Zizaniopsis milliacea*
Red gum		
Liquidambar styraciflua		

Stream-mouth Fresh-water Marsh

Initial Natural Levee	***Stream-mouth Mud Flat***	***Initial Interdistributary Flood Plain***
Roseau cane	Fresh three-cornered grass	Cattail
Phragmites communis	*Scirpus americanus*	*Typha latifolia*
Water millet	Delta duck potato	Widgeon grass
Zizaniopsis milliacea	*Sagittaria platyphylia*	*Ruppia maritima*
Cattail		Grayduck moss
Typha latifolia		*Potamogeton foliosus*
		Dogtooth grass
		Panicum repens
		Oyster grass
		Spartina alterniflora

TABLE 1. (Continued)

Marshes

Fresh-water	*Brackish*	*Saline*
Paille fine or canouche	Three-cornered grass	Wire grass
Panicum hemitomum	*Scirpus olneyi*	*Spartina patens*
Cattail	Paille fine or canouche	Oyster grass
Typha latifolia	*Panicum hemitomum*	*Spartina alterniflora*
Bulrush	Wire grass	Black rush
Scirpus californicus	*Spartina patens*	*Juncus roemerianus*
Saw grass	Cattail	Salt marsh grass
Cladium jamaicense	*Typha latifolia*	*Distichlis spicata*
Delta duck potato	*Typha angustifolia*	Saltwort
Sagittaria platyphylla	Arrowhead	*Batis maritima*
	Sagittaria latifolia	Glasswort
		Salicornia perrenis
		Salicornia europea
		Sand rush
		Fimbristylis castanea

a forest assemblage typically consisting of several species of oaks, bitter pecan, red maple, and green ash, with an understory of dwarf palmetto.

Along natural levee flanks in freshwater areas, the mixed hardwood species grade laterally into swamp communities mainly consisting of bald cypress, tupelo and sour gum, and red maple. In brackish water areas, the natural levee vegetation is separated from marshes by a narrow fringe involving mostly possum haw, wax myrtle, and buttonbush.

Interdistributary marshes traditionally are classified solely on the basis of vegetation rather than any morphologic or soils properties, although subtle differences do exist (Kolb and VanLopik 1958). The vegetation, in turn, is controlled by the prevailing salinity. Fresh-water marshes typically include cattail, paille fine, bulrush, and saw grass while brackish marshes are dominated by wire grass and three-cornered grass. Saline (or salt) marshes, inland from the immediate Gulf coast, consist mostly of wire grass, oyster grass, black rush, and salt marsh grass.

Interpretations vary according to author, and because of subtle differences in classification, Figure 5 portrays a generally accepted distribution of the three marsh types in the deltaic plain (taken from Fisk 1960). It can be seen that fresh- and brackish-water marshes dominate in the vicinity of the project area. The boundaries between marsh types are irregular and transitional, and this distribution is just a snapshot in time. Major latitudinal changes accompanied the growth and decay of the Lafourche complex lobes, and previous ones as well. In fact, major shifts have been observed within just the last several decades (Garofalo and Burk and Associates 1982), but these have been unusually rapid because of dredging, channelization, and other human influences.

From an engineering geologic point of view, natural levee deposits constitute the only materials competent enough to support most forms of terrestrially-based human activity. They consist of moderate to stiff, well-oxidized, mottled gray and brown silty clays and clays, often with iron and manganese nodules (Kolb and

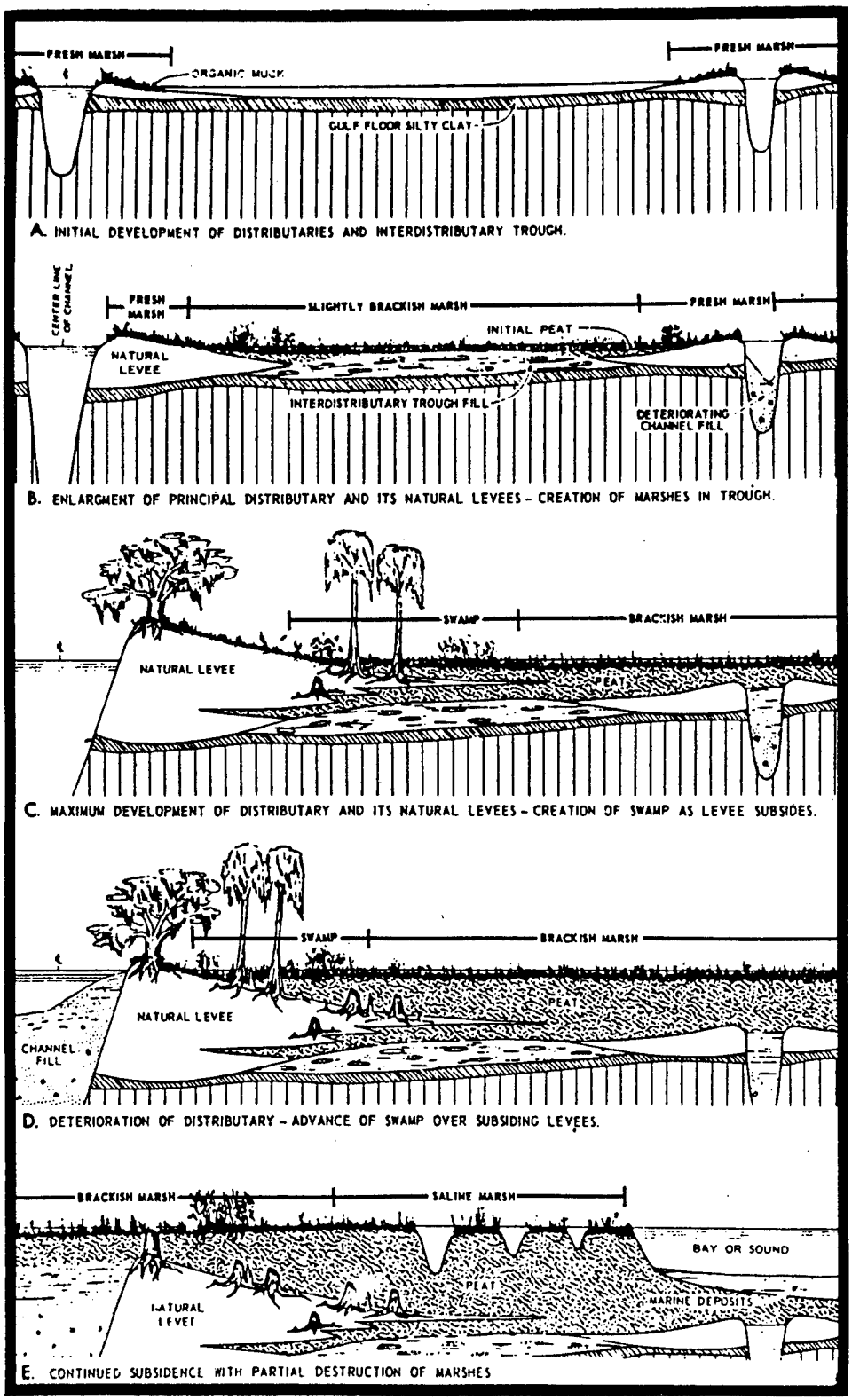

Figure 5. General stages of delta development (from Fisk 1960).

VanLopik 1958). Their physical properties reflect their history of weathering under the influence of seasonal wetting and drying. The materials are slightly coarser upstream and along natural levee crests. Organic matter in the form of scattered wood fragments frequently is present. Maximum thicknesses of the deposits (beneath levee crests) range from 3 to 4 m in the northern part of the area, to 1 m or less at the distal ends of distributaries.

Abandoned distributary channels contain a long, downstream thinning and deepening wedge of mostly loose gray silts and fine sands with layers of soft gray clays. In the northern portions of Terrebonne Parish, the deposits may be over 10 m thick. They either underlie the current underfit stream or a thin veneer of sediments analogous to natural levee deposits where the channel is mostly filled. In the southern part of the Parish, the deposits become progressively softer and finer grained with increasing amounts of organic matter.

Deposits in the interdistributary basins include a coarsening-downward sedimentary sequence about 3 to 5 m thick that reflects the history of the development of a deltaic lobe (Figures 5 and 6). The upper 2 to 3 m of the sequence is composed mainly of very soft to watery, gray to black, highly organic clays, mucks, and peats in both swamp and marsh areas. In general, the organic fraction is smaller in swamp areas and decreases with depth. This is a reflection of the decline in overbank flooding and suspended sediment contribution that took place with the abandonment of the deltaic lobe. The lower 1 to 2 m of the sequence consists mostly of soft gray clays with numerous thin silt lenses and occasional fragments of shell of estuarine organisms. This sequence actually represents depositional environments ranging downward from swamp and marsh through interdistributary into prodelta or bay-sound. It should be noted that in the northern part of the area, where the Lafourche delta complex apparently built seaward across an existing land mass rather than into shallow water, the prodelta deposits are absent and another organic sequence is present. This sequence is discussed more fully in the section on geologic history.

Soils of the region have not been mapped in detail, but their general distribution and character are indicated by the general soil map of Louisiana (Louisiana State Planning Office and the US Department of Agriculture 1978). The highest and best drained loamy deposits of major natural levee ridges in the northern part of the area have soils of the Commerce series, while those at slightly lower elevations have soils of the Mhoon series. Farther south along the smaller distributaries, the natural levees have soils of the Sharkey-Tunica association, the latter occurring at the relatively higher elevations on clayey substrates. Soils of the cypress-tupelo gum swamps are those of the Barbary-Fausse association. The latter are clayey throughout, while the former have a muck surface layer underlain by soft, high-water-content clays.

Soils of the fresh-water marshes do not have series designations but belong to the Hydraquents-Medisaprists, Fresh association. These typically form on soft, saturated substrates that are either organic clays (mineral) or peats (organic). Soils of the Medisaprists-Hydraquents, Moderate Saline association occur in brackish water marshes on both mineral and organic substrates.

Basic Geologic Controls - Subsidence and Sea Level Rise

As early as the nineteenth century, it was observed that Mississippi River deltaic plain landforms, as well as the structures built on them, were sinking at a rapid rate. Geologically, the process has come to be known as subsidence and involves five basic factors or natural processes (Kolb and VanLopik 1958). Subsidence can be defined simply as the relative lowering of the land surface with respect to sea level and may involve a) true or actual sea level rise; b) sinking of the basement (Paleozoic) rocks due to crustal processes; c) consolidation of the thousands of meters of sediments in the Gulf basin; d) local consolidation of near-surface deposits because of desiccation and compaction; and e) tectonic activity such as faulting. All five processes have been active in the project area during the Quaternary period.

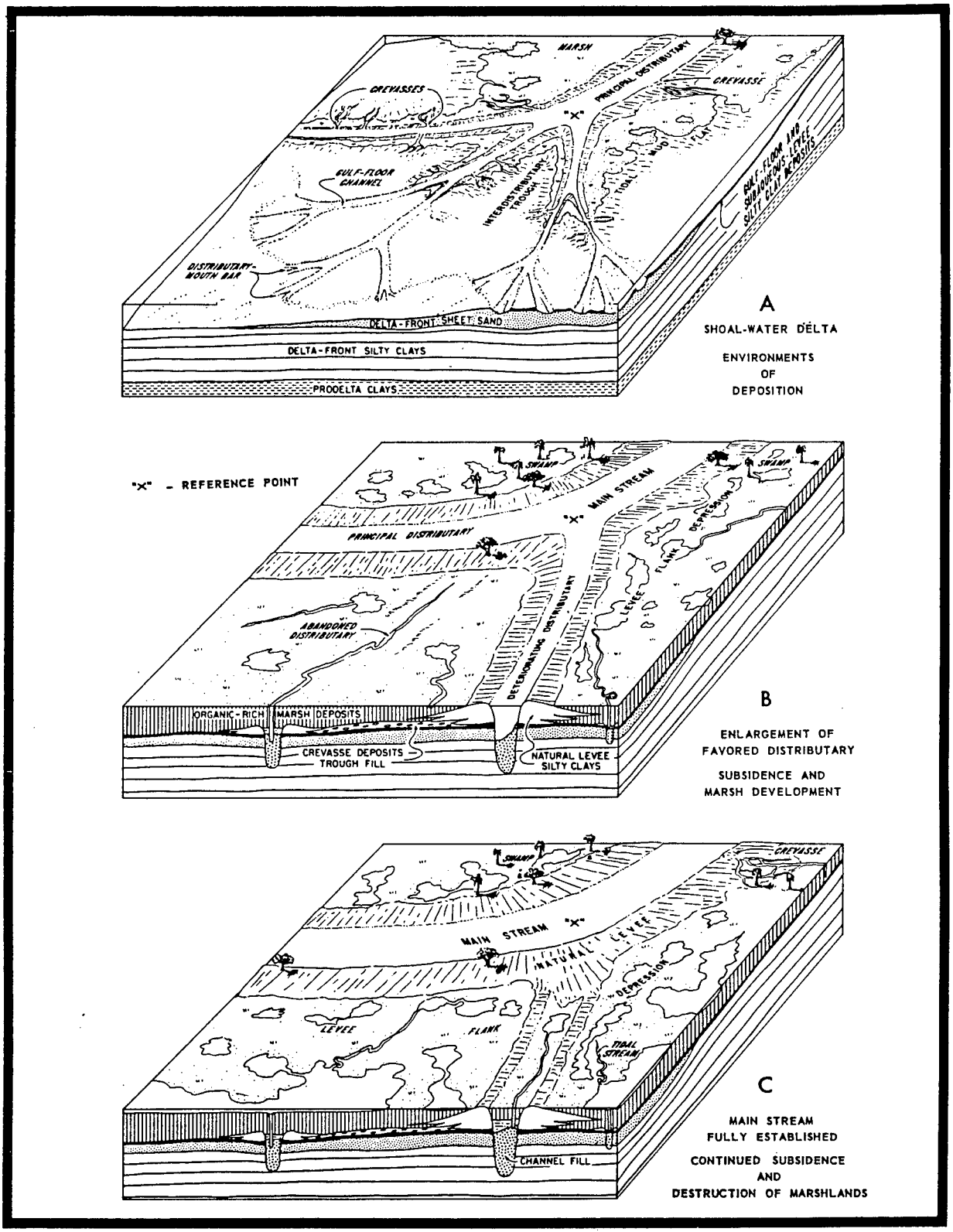

Figure 6. Changing deltaic plain environments and resulting depositional sequences of a prograding delta lobe (from Fisk 1960).

Until the early 1960s, most Gulf Coast geologists believed that the rapid rate of post-glacial sea level rise (the Holocene transgression) slowed abruptly about 5,000 yrs ago when sea level had attained essentially its present level. Since that time, the rate of rise has been relatively slow and not a major component of subsidence. Calculations of subsidence rates have been made in several portions of the deltaic plain using radiocarbon dates and observations of structures (Kolb and VanLopik 1958). These illustrate that primarily because of consolidation within the Gulfward-thickening prism of Holocene deltaic deposits, subsidence rates increase sharply from north to south and reach their maxima in the modern delta. Extrapolating and interpreting from the calculations, it is suggested that subsidence rates in the project area for at least the last few centuries probably vary from about 1.1 to 2.7 mm/yr (Kolb and VanLopik 1958).

Within the last several decades, most geologists have come to realize that sea level did not attain its essentially present level (±1 m) until about 3,500 yrs ago; about 5,000 yrs ago, the level was perhaps as much as 5 m lower than at present. Consequently, the subsidence rates mentioned above are valid for no more than the last 3,500 yrs; prior to that time, a higher rate of the sea level rise component of subsidence would have made the total subsidence rate much higher. The progression of geologic knowledge also has led to the hypothesis, now widely accepted, that the rate of sea level rise during the Holocene has been episodic rather than steady, producing a step shape to a sea level rise curve. For example, it has been postulated by Penland, Suter and McBride (1987) that between 3,000 and 4,000 yrs ago, the rate of sea level rise was about 6.0 mm/yr. This rate would have to be added to that contributed by the other components of subsidence. Prior to that time, Penland, Suter, and McBride (1987) believe that sea level had been relatively stationary for at least 2,000 yrs.

It is apparent that regional subsidence has been a dominant factor in all aspects of the geomorphology of the deltaic plain, contributed to the configuration of landforms, the nature and distribution of depositional environments, the patterns of delta lobe growth and decay, and the architecture of the sedimentary record. In turn, subsidence has indirectly affected where humans have been able to reside and if and how the evidence of their presence has been preserved. Interest in the step-function model of sea level rise reconstruction in mind, it is logical that geologists are attempting to link the timing and formation of each major delta complex to this aspect of subsidence as a forcing variable. One recent postulated scenario of the relation of sea level to deltaic plain development is illustrated in Figure 7 (Goodwin et al. 1991).

Geomorphic Processes and Depositional Environments

Geomorphologically and sedimentologically, the Lafourche deltaic complex is a textbook example of a shoal-water, multiple-channel distributary system formed by a river with a high sediment load as it entered a low-tidal-range receiving water body. The frequent branching of the long and linear (low sinuosity) distributaries has formed what sometimes has been referred to as a "horsetail pattern." Figure 8, taken from Frazier and Osanik (1965), contains a popular sequence of block diagrams that well illustrate the landforms, landscapes, and shallow sedimentary sequences associated with a deltaic lobe of a complex such as the Lafourche at various stages in its cycle of growth (progradation) and decay (abandonment and transgression). In the Mississippi River deltaic plain, each cycle typically has had a duration of about 1,000 to 3,000 years.

A cycle begins with an upstream avulsion, possibly beginning as a major crevasse, in which river flow and fluvial sediment are introduced into a shallow basin between older lobes or complexes (Figure 8A). The initial sedimentation consists of prodelta silty clays that are deposited basinwide from materials carried in suspension during major floods. Off the mouth of a newly formed channel, delta-front silty sands and silty clays accumulate rapidly and the water shoals. As the channel reaches a given point, distributary mouth bars accumulate rapidly and deltaic sediments emerge subaerially in the form of mudflats and bars. These are rapidly vegetated with freshwater marsh. During the following years and decades, the marsh

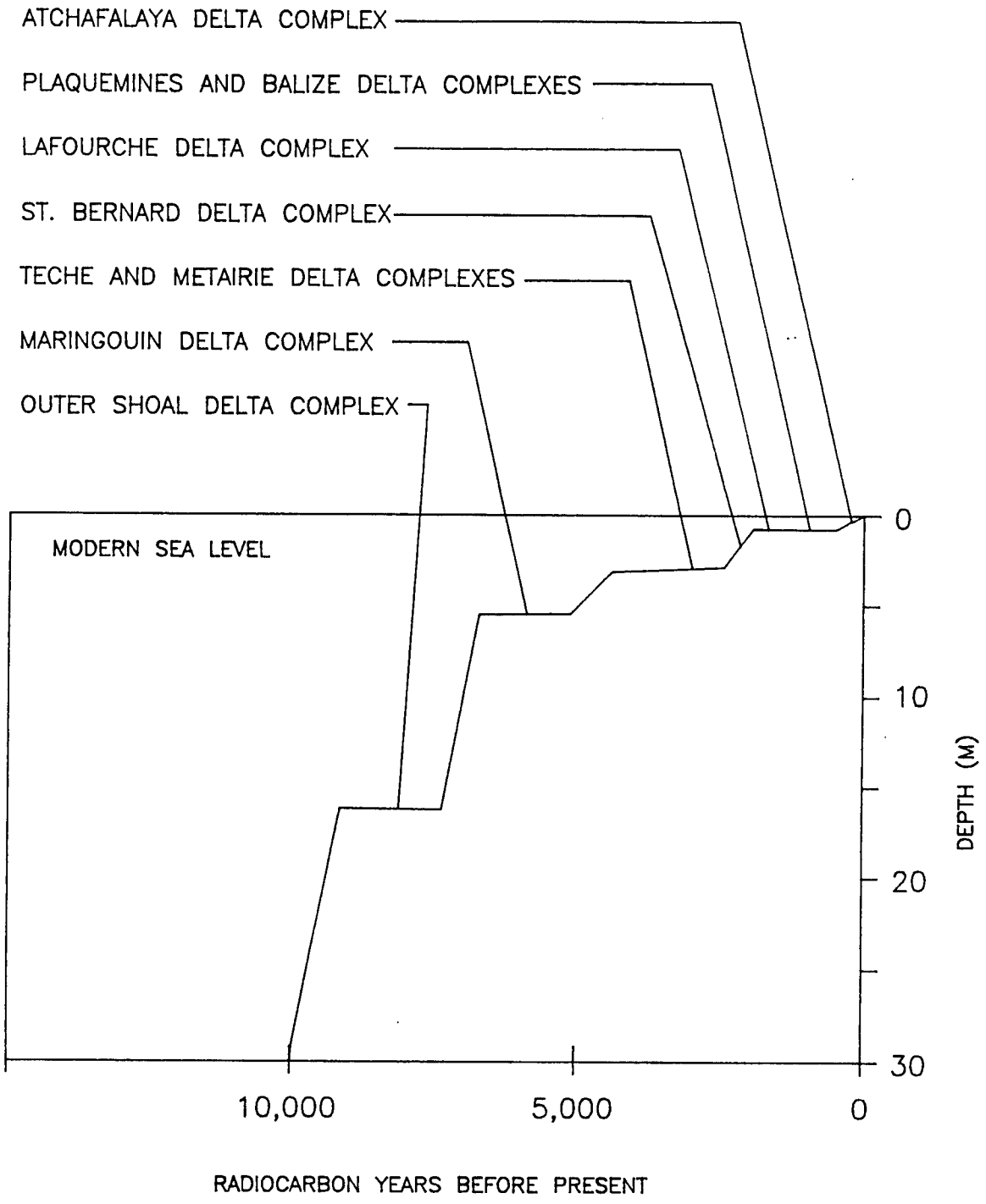

Figure 7. Chronology of delta complexes and relative sea level rise (from Goodwin et al. 1991).

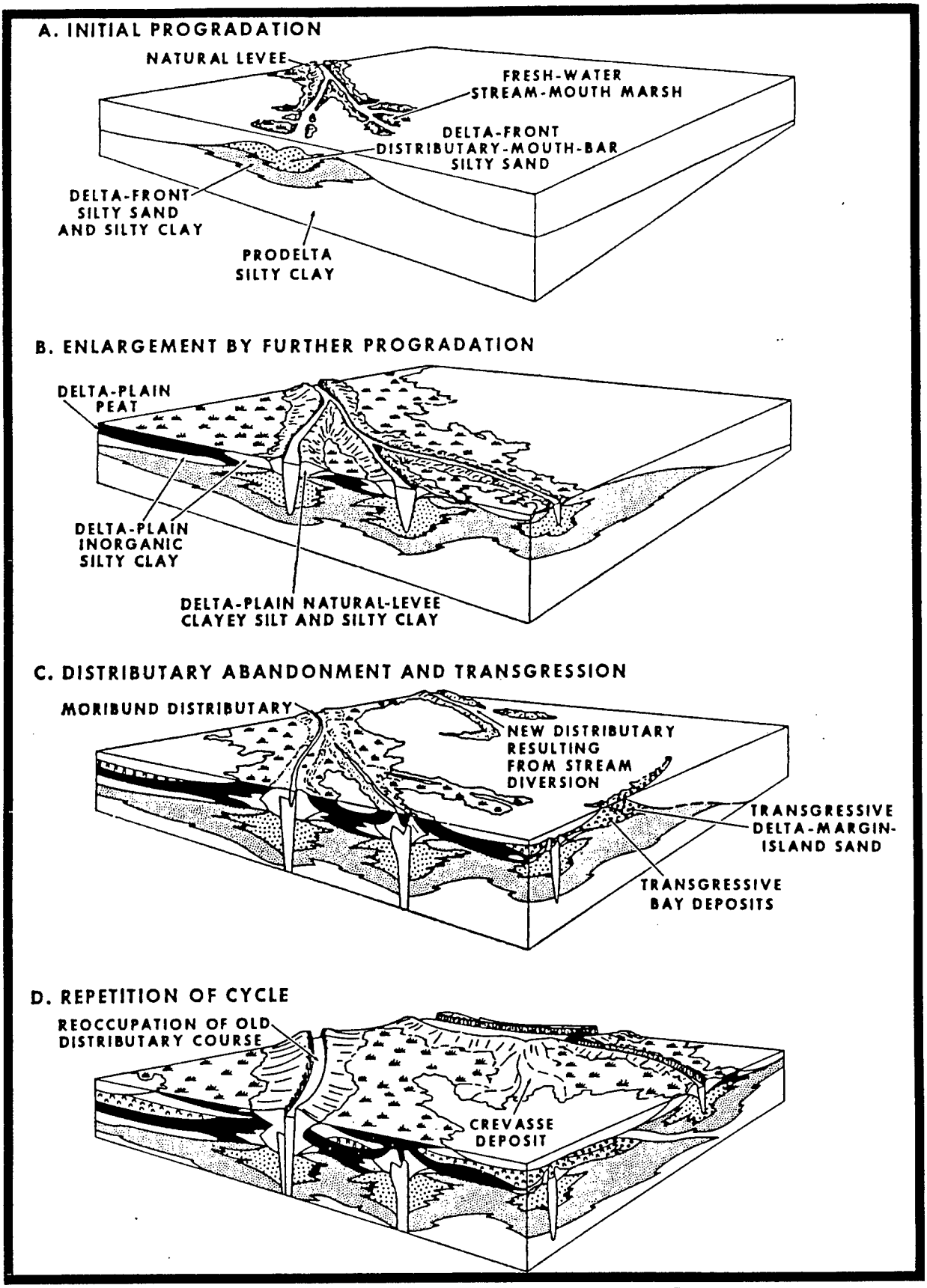

Figure 8. Development of delta sequences (from Frazier and Osanik 1965).

periodically is inundated during floods and the suspended sediment, mostly silts and clays, accumulates along the sides of the active distributary channel, beginning the process of natural levee growth. The mouth of the distributary advances seaward mostly during major floods, when rates of progradation may be on the order of several hundred meters.

During the next stage in the cycle (Figure 8B), as the distributary mouth advances past the given point, the distributary channel grows wider and deeper to accommodate increased discharge. Concurrently, the natural levees subside into the softer underlying deposits but achieve net growth (increased height and width) through the addition of new sediments. The natural levees soon acquire their typical prism or wedge cross-sectional shape that is better illustrated in Figure 5B, another set of diagrams whose original purpose was to illustrate the mechanics of peat formation in the deltaic plain (Fisk 1960). It is during this stage that extensive freshwater marshes essentially replace shallow brackish water in the interdistributary basins, and that peat and highly organic clays begin to accumulate under the influence of progressive slow subsidence. From an archeological perspective, a deltaic lobe early in this stage of formation would have been habitable, but probably only on a seasonal basis. The broad wetlands would have provided lucrative habitats for fish, shellfish, waterfowl, and small mammals, but the natural levee ridges were still too low and narrow to support permanent settlements of any significant size. Shell middens may be present as evidence of exploitation sites, but villages are not to be expected. It should be noted that these observations/opinions pertain to Late Archaic and Formative stage cultures only. They are probably not valid with regard to earlier Archaic and Paleo-Indian-stage preferences and behavior, but this is irrelevant because none of the delta lobes present in the project area are old enough to have been inhabited during those stages.

While the deltaic lobe is still enlarging, natural levee growth is by way of sheet flooding during high water stages and the occasional concentration of flow in small crevasses. Neither Figures 5 nor 8 satisfactorily illustrate the important role of crevassing as a mechanism in natural levee development; Figure 6 has been included for this purpose. As the delta lobe nears maximum enlargement (latter part of stage B, Figure 8) and natural levees approach maximum height, crevasses become much less numerous, but those that form are larger and more persistent (Figure 6). Each crevasse consists of one or more distributary-like channels that radiate from a breach in the natural levee and that divert flood flows from the distributary into the adjacent interdistributary wetlands. If flow is renewed during multiple flood events, the crevasse channels develop their own natural levee ridges. Hence, each crevasse system is in effect a miniature delta lobe. As the crevasse lengthens into the interdistributary basin, the flow follows the most efficient hydrologic route, and it is not unusual for it to occupy a relict abandoned distributary channel from an earlier stage of the delta lobe or from an older lobe.

During this same stage of development, new distributaries typically form as a result of diversions or avulsions from older ones. Often, low-angle bifurcations occur, with one channel eventually becoming dominant and the other rapidly abandoned. No doubt most avulsions begin as crevasses that happen to be in locations and configurations that favor further development. As a consequence of these processes, there are some channel/natural-levee-ridge features present in most delta lobes that are indistinguishable as being either small, short-lived distributaries or rather large, persistent crevasses.

Natural levee ridges throughout the stage of lobe enlargement are large enough to support deciduous hardwood forests in all but the most Gulfward or distal ends of the distributaries where occasional inundation by brackish water allows only salt-tolerant shrub growth. The end of the stage of lobe enlargement (Figures 6B and 6C) marks the maximum extent of freshwater conditions in the interdistributary wetlands. Additionally, because river discharge through the lobe is nearing its maximum, there are appreciable amounts of turbid flood water reaching the interdistributary basins through crevasses and the consequent deposition of appreciable amounts of clays. Because of these factors, the upper parts of the interdistributary basins are able to support cypress swamps. Swamp forest vegetation also occurs toward the central part of the lobes in bands between the distal flanks of the natural levee ridges and the

fresh to brackish marsh toward the centers of the basins (Figures 5C and 6B). In both swamps and marshes, the accumulation of peats and organic matter helps maintain the near-sea-level surface elevation as regional subsidence continues.

The stage of maximum lobe development would have been a favorable but not necessarily optimal time for prehistoric human habitation. Terrain and habitat conditions would have allowed a wide choice for settlement and environmental exploitation; however, the presence of widespread seasonal flooding would have been a deterrent.

After a delta lobe builds seaward over a period of centuries and essentially fills an estuarine area, conditions of stream gradient, channel hydraulic efficiency, and other factors begin to favor an upstream diversion or avulsion. When this eventually takes place, the delta lobe enters a stage of abandonment and deterioration; with declining discharges, sedimentation rates (both organic and inorganic) are no longer able to exceed or even keep pace with subsidence rates. Several important changes in physiography, environments, and geomorphic processes begin to occur, as shown in Figures 5D and 8C.

At the proximal end of the lobe, the most noticeable change is the progressive downstream filling (shallowing and narrowing) of abandoned distributary channels. Over a period ranging from decades to a few centuries, the channels in that area evolve into slackwater streams or in some cases swamp-filled depressions. At the distal end of the lobe, changes are much more dramatic and rapid. Nearshore processes of wave action and longshore currents in the Gulf begin to erode and rework distributary mouths, and the coarser sediments accumulate in beaches and spits that begin to migrate landward. Slightly farther inland, subsidence and salt-water intrusion begin to take their toll. Brackish marsh evolves into saline marsh in interdistributary basins and begins to break up as tidal channels, lakes, and bays enlarge and become more numerous. Along the distributaries, natural levees subside progressively and are encroached upon by the adjacent wetlands (Figure 5D). The hardwood forests of the levees give way to cypress swamp, and swamp areas die out and are replaced by brackish marsh. Longitudinally, at the distal ends of the distributaries, levees eventually disappear beneath sea level and may be discernible for a while only by marsh drainage and slight differences in marsh vegetation types (Figure 5E). Often the presence of a buried natural levee can be inferred only by traces of the abandoned distributary channel that survives as an unusually long and linear bayou. It should be noted that whereas abandoned distributary channels typically narrow and fill upstream as delta lobe decay proceeds, they usually widen (but not deepen) downstream as they function more as tidal channels and experience bank erosion.

Reconstruction of the history of the deltaic plain indicates that delta lobe deterioration can proceed to widely varying degrees before a new cycle is initiated by an upstream river avulsion. Moreover, the next cycle may affect an area adjacent to the old one or in an entirely different part of the deltaic plain. Since subsidence is ubiquitous, eventually the decaying lobe, or the area that it occupied, will be overlapped by a new one.

Because the Lafourche delta lobe is relatively young, it is in an early stage of abandonment. The Gulf margin has not yet transgressed inland as far as the project areas, and extensive wetlands and prominent natural levee ridges are still evident. However, under natural conditions, with time and barring the development of a new delta lobe in the area, the coastline would migrate northward, destroying all subaerial deposits and landforms. This would produce a ravinement surface (transgressive erosional surface) beneath which only some of the basal deposits of the lobe would be preserved in the sedimentary record (Penland, Suter and McBride 1987). It is believed that the deposits of the Lafourche lobe overlie such a ravinement surface that formed as a result of transgression of the preceding Teche lobe. The ravinement extends as far inland as the approximate northern limit of the project area. If this hypothesis is correct, none of the *uppermost* deposits and landforms (e.g., interdistributary wetlands and distributary natural levee ridges) of the preceding lobe will be preserved in the subsurface over most of the region. This is a very important (and complex) issue relating to the geoarcheology of the project area and is discussed in detail in other works (Brown et al. 1997).

Landform/Depositional Environment Mapping Classification

Previous systematic mapping of environments of deposition in the project area (May et al. 1984; Dunbar et al. 1994) involved a classification that recognized four basic units--natural levees, distributary channels, swamps, and interdistributary wetlands. The wetlands were subdivided into the three marsh types described above. A few major crevasses were recognized but were not mapped systematically.

A thorough mapping of the current project areas and the surrounding area is provided in Brown et al. 1997. Cartographic research for that project generated maps intended for an archeological predictive model, and the environment was stratified as finely as was practical (Brown et al. 1997:Sheet 1). The scale of the mapping allowed a ten-fold classification that takes into consideration attributes of the landscape that are perceived as having been influential in prehistoric settlement patterns. Emphasis was placed upon distributary and crevasse natural levee ridges, since these were the only habitable landforms. Considerable attention also was devoted to detecting buried (subsided) natural levee ridges, as the majority of sites on levees with prominent surface expression already have been located. A few sites associated with older, subsided levee systems have been detected, and it is believed that the probability of encountering additional ones is considerable. Figure 9 is a schematic illustration of an idealized deltaic landscape showing the typical relationships and characteristics of the units.

Crests of Distributary Natural Levees (DNL_C)

Analyses of the locations of known archeological sites in similar deltaic plain settings, especially those of villages and mound centers, indicate that favorable locations for settlement were either on the crests of natural levees near distributary channels or on their distal flanks close to adjacent swamp or marsh environments. Where natural levee ridges are less than about 0.5 km wide, the width becomes irrelevant.

Distributary Natural Levees (DNL)

This mapping unit includes the majority of the natural levee ridges in the project area. The delineated zones basically are coincident with the extent of land cleared for agriculture in the 1950s. The zones agree well with the extent of land above frequent or permanent inundation and with arable soils. Since the distal flanks of natural levees usually are not sharply defined even by natural vegetation, this criterion was selected as being the only practical one to use in aerial photo interpretation. The selected date avoids including marginal levee situations where clearing and cultivation recently have been possible only because of extensive artificial levee construction and drainage improvements. The elevations of the natural levees in this unit range between about 1 and 2 m.

Distal Portions of Distributary Natural Levees (DNL_D)

Those portions of natural levee ridges that lie between the extent of cultivation as defined above and either the flanking cypress-gum swamps or higher freshwater marshes are included in this mapping unit. Longitudinally, this unit also includes the distal ends of distributaries where the levees gradually slope downward to prevailing marsh level and are still recognizable, albeit too narrow or too low to support agriculture or urban development. In both cases, this transitional zone without sharp boundaries is delineated subjectively. Elevations generally are less than 1 m. In the northern portion of the project area, most distal natural levees are still in deciduous forest, but agriculture occasionally has been extended into this zone. Distal natural levees include those formerly higher areas that are gradually subsiding beneath

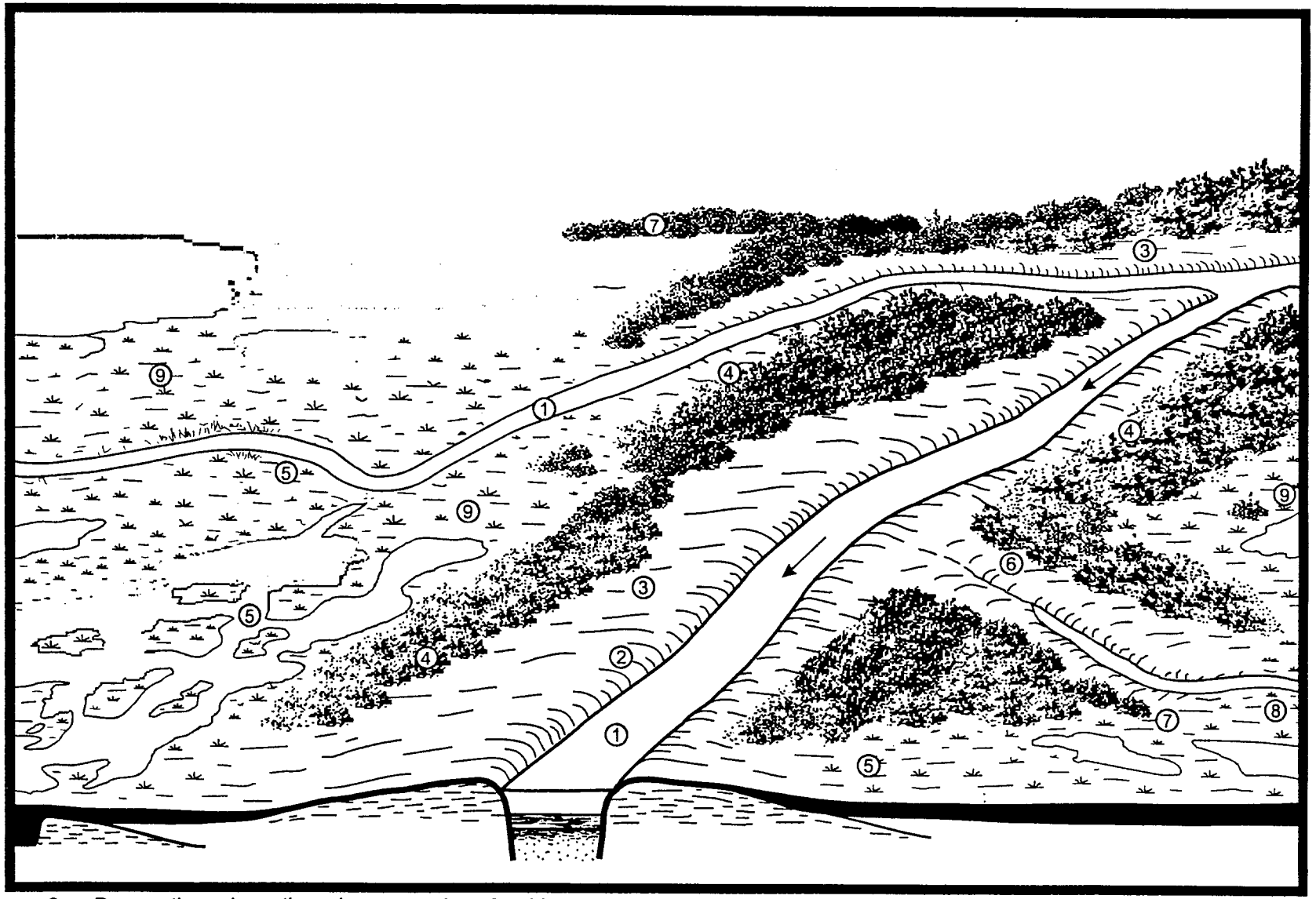

Figure 9. Perspective schematic and cross section of an idealized deltaic landscape showing typical relationships and characteristics of mapping units used in the project area. 1 - abandoned distributary channel (Dch). 2 - distributary natural levee crest (DNL_C). 3 - distributary natural levee (DNL). 4 - distal portion of distributary natural levee (DNL_D). 5 - subsided distributary natural levee (DNL_S). 6 - crevasse natural levee (CNL). 7 - distal portion of crevasse natural levee (CNL_D). 8 - subsided crevasse natural levee (CNL_S). 9 - interdistributary wetland (IW). In cross section, organic interdistributary deposits onlapping and burying natural levees are shown in black. Note that a buried distributary is not shown.

and that are being onlapped by wetlands, but that still maintain natural levee vegetation and soils characteristics.

Subsided Portions of Distributary Natural Levees (DNL_S)

This mapping unit includes narrow bands of present swamp or marsh adjacent (basinward and seaward) to distal natural levees that are underlain at a shallow depth (generally 2 m or less) by subsided natural levees. It also includes similar situations not contiguous with subaerially exposed levees where an entire distributary is buried. In these cases, the outer limits of the natural levee ridges are indeterminable, and bands of arbitrarily determined average and constant width are shown in the mapping.

The present vegetation assemblages usually do not strongly reflect the presence of subsided natural levees, although some species differences may be present. Rather, the presence of buried features typically is manifest by vegetation density (heavy growth) and drainage patterning and density. In more inland locations, marsh areas are often uninterrupted by ponds and lakes, and sometimes there is a central tidal stream that reflects the presence of the former abandoned distributary channel. In more coastal locations where open water is becoming dominant, the only surviving patches of marsh vegetation may be those located above subsided levees.

Distributary Channels (Dh)

In the northern and central parts of the project area, abandoned distributary channels typically are marked by shallow, slackwater, underfit streams that may be as wide as the parent channels, but usually are narrower. The relict banklines of the former parent channels usually are apparent with the post-abandonment filling being lower in elevation than the flanking natural levee crests. In the most advanced stage of filling, however, the channels may be indistinguishable. In the southern part of the area, where distributary natural levee ridges have subsided beneath wetlands, the abandoned channels typically remain detectable by way of linear marsh tidal channels of low sinuosity that widen downstream and that may exceed the widths of the parent channels.

Crevasse Natural Levees (CNL)

These are shorter and narrower analogs of distributary natural levees. They are similar in elevation, soils, and original vegetation, but flank what were originally well-defined crevasse channels that served to convey channelized flood flows from distributaries into adjacent interdistributary basin areas. Because of the mechanics of abandonment, the relict crevasse channels usually are completely filled except in the largest crevasses and not distinguishable.

Distal Portions of Crevasse Natural Levees (CNL_D)

This unit includes zones analogous in origin and morphology to the distal portions of distributary natural levees, but are of limited lateral and longitudinal extent.

Subsided Portions of Crevasse Natural Levees (CNL_S)

As in the above unit, these are essentially smaller analogs of subsided distributary natural levees. However, in all cases, the zones are contiguous to the distal portions of crevasse natural levees--no completely subsided crevasse systems have been recognized, perhaps only because of their small size.

Buried Distributary Natural Levees (DNL_B)

This unit is represented in the mapping by dashed lines. It represents zones where older distributary natural levees (including distal and subsided zones) are buried and masked by younger distributary or crevasse natural levees or by distal natural levees. Burial may be as deep at 3 to 4 m beneath the higher portions of the younger levees. The routes and designated widths of the buried systems are only approximations based on projected trends, since distinctive changes in topography, soils, or drainage usually are absent. Confirmation of their presence and precise location would require subsurface investigations.

Interdistributary Wetlands (IW)

This unit includes the broad expanses of flat, near-sea-level cypress-gum swamp, fresh-water marsh, brackish-water marsh, and small areas of saline marsh between distributary natural levee ridges. Numerous ponds, lakes, and tidal channels are included. Wetland environments (vegetation types) have not been differentiated, in part because they have been changing markedly within the last several decades. In general, all environments are shifting toward more saline conditions.

Geomorphology of the Project Area

A small-scale view of the key geomorphic features in the vicinity of the project area, focusing on the prominent distributaries, but also showing the locations of the larger crevasses and a series of heretofore unnamed subsided distributaries is depicted in Figure 10. It should be noted that whereas the figure presents a holistic view of the prominent distributaries and their natural levee ridges, the full areal extent of some of the crevasses and most of the subsided distributaries is not shown. Hence, the presence of arrows indicates the *direction* but not the route of some systems, and question marks indicate the unknown trends of others. This is because the detailed aerial photo interpretation was either not extended farther than a few kilometers from the waterways, or the routes of the features could not be discerned.

Based on their general locations, sizes, and patterns, the subsided distributaries probably represent two classes, each with a different mode of origin. The first class includes the Bayou Barre, Bully Camp, La Rose, Lake Boudreaux West, and Wonder Lake distributaries. These probably are early branches of the Lafourche distributaries toward which they trend and represent channels that were abandoned early in the process of delta lobe progradation in favor of the existing channels. For example, the Lake Boudreaux West distributary probably represents a bifurcation of the Bayou Grand Caillou distributary, as do the Four Point, Bayou Sale, and Grassy Bayou distributaries. However, the Lake Boudreaux West distributary was abandoned at an early date.

The second class includes the Ashland, Grand Bayou, Lake Boudreaux East, and Theriot distributaries. These are larger and more consequential distributaries that have greater regional extent. They may be related either to an early phase of the Lafourche complex or to the preceding Teche complex. Rather than apparently merging with Lafourche complex distributaries, at least three of them definitely underlie and are buried by the Lafourche distributaries. The largest of the four, the Theriot distributary, either branches from or is overlain by the natural levee ridge of Bayou Black west of Houma, and it trends southward where it is overlain by Marmande Ridge. In turn, Marmande Ridge apparently is an early distributary or major crevasse related to the Bayou du Large distributary (Weinstein and Kelley 1992). Toward the east, a branch of the Grand Bayou distributary unquestionably is overlain by and is younger than the Bayou Pointe au Chien distributary.

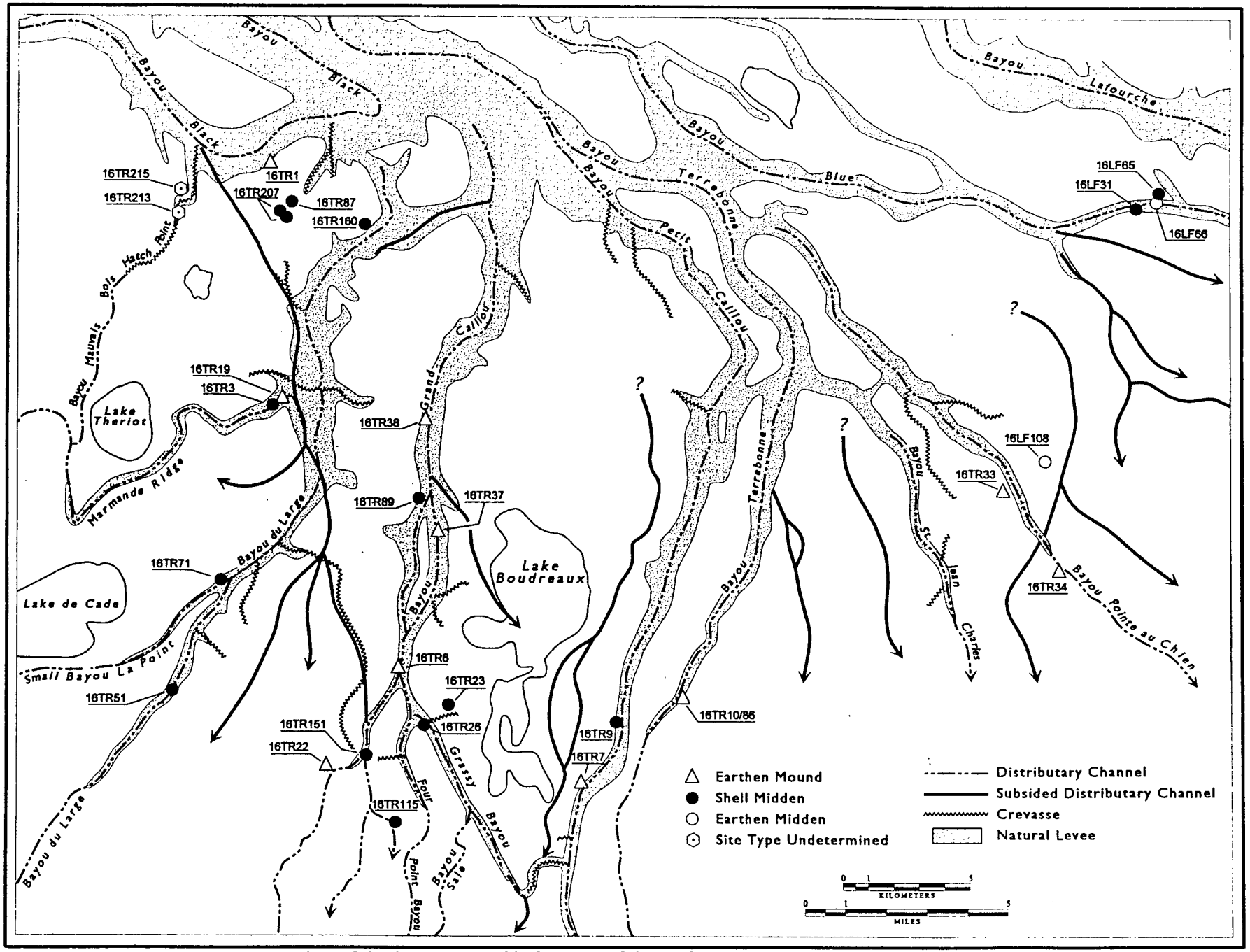

Figure 10. Location map and overview of the key geomorphic features of the project area.

Geoarcheology

The study of past cultures cannot be based solely on the analysis of artifacts. Instead, the archeological process also attempts to examine how past cultures interacted with their natural environments. To understand the interplay between past cultures and their environments, one must first understand the processes that resulted in a given set of environmental conditions. Furthermore, after these cultures abandoned habitation areas, archeologists need to understand the natural processes that affect the resulting cultural deposits. Specifically, geoarcheology considers archeological data in the context of processes related to natural systems and ecosystems.

The following discussion presents a detailed examination of the geoarcheological processes that took place in the vicinity of the proposed project corridor. Modern examples from the Louisiana coast that represent good models of environments and processes found in the vicinity of the proposed project corridor in the past are cited. Likewise, representative archeological sites from other areas of the Louisiana coast are referenced and discussed. While not all geological and environmental processes presented are necessarily found within the vicinity of the proposed project area today, they would have existed within the last few thousand years.

Mississippi Delta Plain

Within the Mississippi River Delta, most if not all, of the archeological deposits are located on elevated landforms such as natural levees, beach ridges, and salt dome islands. Natural levees represent the most commonly occupied landform, probably because they are the most abundant elevated landforms within the delta plain. Archeological deposits also are very common on salt domes and beach and shell ridges, which represent rare elevated landforms within the Mississippi Delta Plain. A small percentage of archeological deposits also have been recorded on the shores of lakes and bays, barrier islands, and swamps (Smith et al. 1986:73-75; Weinstein and Kelley 1989:109). In the following discussion, only the landforms present in the current project area are discussed. These include natural levees and marshes.

Natural Levees

As first observed by Kniffen (1936), the majority of archeological deposits present within the Mississippi Delta Plain are found upon subareal or partially submerged natural levees of major bayous and rivers. Natural levees were the predominant location for human settlement and other activities on delta plains (Britsch and Smith 1989:243-244; Weinstein and Kelley 1989:109-110).

Many factors have been proposed for the preferred utilization of natural levees by the prehistoric inhabitants of southern Louisiana. Some of these speculations are: (1) natural levees provided habitat for terrestrial game that was exploited as a food source; (2) they provided a source of raw materials; (3) their proximity to open water provided access to both subsistence materials and transportation; and (4) they offered a location safe from natural hazards such as flooding and hurricane storm surge (Gagliano 1984; Britsch and Smith 1989:243-244; Weinstein and Kelley 1989:109-110). Unfortunately, few of these natural levees have been specifically tested by archeological research. Natural levees apparently were occupied very heavily because they were the only common, elevated landform located within a deltaic plain on which to dwell comfortably and to exploit a rich deltaic ecosystem.

Also, after agriculture was established, the surface of a natural levee was the only common source of arable land available on a delta plain (Kniffen 1936; Britsch and Smith 1989:243-244; Weinstein and Kelley 1989:109-110). The character of the different kinds of natural levees within the Mississippi Delta Plain, however, significantly restricts the practice of agriculture. The narrow width, clayey soils, and shallow water tables that characterize many of the natural levees of distributaries either severely restrict or prevent

the practice of agriculture. While the distributary was active, annual flooding would have made farming even more impractical. Only the broader and higher natural levees would have possessed the necessary width, coarse-grained soils, and drainage for significant agricultural production. In addition, even when the adjacent river course was active, these natural levees would have been less susceptible to flooding.

Distribution of Sites on Natural Levees

As in the Mississippi Alluvial Plain, sites occur at specific locations along the natural levees of the river course. Sites associated with a river course typically lie near the crests of natural levees, either on the cutbank side of their abandoned meander loops or at the junction of major river distributaries. Sites also are commonly located at the end of a crevasse distributary that extends from the river course (Gagliano et al. 1982:20-22).

Within the Mississippi Coastal Plain, sites are distributed in a typically north-to-south pattern along the natural levees of crevasse channels (Beavers 1977:102-106). This site distribution is pattern-linear, since the available elevated ground consists of linear landforms such as the natural levees of trunk channels and distributaries, as well as a shell ridge of uncertain origin. This pattern has been illustrated by a number of studies, e.g., McIntire (1958), Gagliano et al. (1975; 1979), Neuman (1977), and Wiseman et al. (1979).

Within this overall linear distribution of sites, the major residential site complexes are strategically situated at the confluence of distributary channels with the trunk channel of deltaic complexes (Beavers 1977, 1982). An example of this type of site, the Magnolia Mound Site (16SB49), is illustrated by Gagliano et al. (1982:20-22). This distribution pattern of major residential sites has been documented for Marksville, Coles Creek, Troyville, and Mississippian period sites within the Barataria Basin, and Marksville Magnolia phase sites along the Bayou La Loutre trunk channel of the St. Bernard Coastal Region (Beavers 1982; Wiseman et al. 1979). Within the Terrebonne Coastal Region, major residential sites of the Coles Creek and Mississippian periods occur on the natural levees of the abandoned Teche-Mississippi River course at the confluences of major deltaic distributaries (Weinstein and Kelley 1989).

Comfort, transportation, and subsistence apparently determined the location of major residential sites at these confluences. The confluences might have been selected for reasons of comfort and possibly safety; they tend to have natural levees both higher and wider than normal. Also, the confluence of sluggish channels typically is the locus of freshwater flora and fauna. Finally, confluences provided local residents an easy and commanding access to the distributary system that served as "highways" for their watercraft (Beavers 1982).

Both Beavers (1982) and Gagliano (1984) agree that smaller residential sites occur on the natural levees of distributaries between the major residential sites. From work conducted in the Barataria Basin, Beavers (1982) attributes the location of these smaller sites to a function of social organization. He proposes that the degree to which smaller residential sites cluster around major residential sites or spread out along a natural levee varies according to the degree of social organization. Accordingly, locations of smaller residential sites reflected sociopolitical factors, because biological resources were uniformly distributed along distributaries. This uniform distribution of resources results in the equality of access regardless of site location between confluences. In the Beavers (1982) model, the special function sites, called "extraction locales" by others, were scattered about the smaller residential sites at locations determined by the resource being exploited.

According to Gagliano (1984:23, 37) and Gagliano et al. (1979), landform determined the distribution of the smaller sites located on natural levees between the confluences of tributaries. Accordingly, smaller residential sites occur at the confluence of a distributary with a crevasse splay or other

distributary. In addition, natural levees at the heads of major delta lobes, the mouths of active distributaries, the banks of crevasse channels of individual subdeltas, and accretion ridges at the mouths of distributaries, were preferred locations for prehistoric settlement.

Marshes

Seemingly isolated occurrences of archeological deposits commonly occur within the marshes and swamps of the Mississippi Delta Plain. Many of these sites lie on natural levees buried by the vertical accretion of swamp deposits (Gagliano et al. 1975, 1979; Wiseman et al. 1979). Other sites classified as inland swamp sites, e.g., Site 16SMY30 and Site 16SMY33 (Smith et al. 1986), are buried sites that have been revealed by dredging; they represent sites lying on natural levees or other similar landforms that have been buried completely beneath marsh deposits. Finally, a few of these archeological deposits actually are associated with the marsh and backswamps of the delta plains, e.g., Site 16SMY40 (Smith et al. 1986). An examination of the Louisiana Division of Archaeology files reveals that these archeological deposits typically are located on the banks of either tidal channels or bayous.

Within the Lake Pontchartrain Marginal Basin and the adjacent St. Bernard Coastal Region, construction activities often have uncovered buried archeological deposits within the marshes of the Mississippi Delta Plain. For example, during the 1950s and 1960s, construction associated with the building of navigation canals and highways revealed the presence of three significant Poverty Point sites within the marshes near Lake Pontchartrain. These sites, Bayou Jasmine (16SJB2), Linsey (16OR40), and Garcia (16OR34), in many ways typify buried sites found within the marshes of the Mississippi Delta Plain.

The setting of these sites did not originate within the marsh. Rather, they were all built upon elevated, dry natural levees of distributaries of the Metairie Delta Complex. Since their occupation and abandonment, these sites and the natural levees on which they lie have subsided and have been buried by the vertical accumulation of about 2 to 2.5 m (6.6 to 8.2 ft) of marsh deposits (Saucier 1963; Gagliano et al. 1975). Sites buried within marshes also are difficult to study. At Bayou Jasmine, for example, an elaborate cofferdam was constructed to conduct the excavations (Neuman 1976). Even then, the excavations failed to reach the *in situ* Poverty Point component. This Poverty Point component, as at other buried sites, e.g., the Linsey and Garcia sites, had to be reconstructed from artifacts recovered from the spoil banks created either by bridge construction or by canal dredging. At the Linsey Site, the bucket of the mechanical dredge was large enough so that intact blocks of the site could be examined. From these blocks, well-preserved artifacts and faunal remains could be recovered and stratigraphic bedding as thick as 30 cm (12 in) was recognized.

These three Poverty Point sites illustrate the problems associated with buried sites within the Mississippi Delta Plain. For example, because these shell middens and the distributary levees on which they lie are buried completely under marsh sediments, they generally lack any indications of their presence. Typically, only construction activities, e.g., canal dredging and construction of bridge piers, which deeply disturb marsh deposits and bring spoil to the surface, reveal their presence. Unfortunately, as in the case of the Linsey (16OR40) and Garcia (16OR34) sites, discovery of a buried site often results in the destruction of all or a significant part of it (Saucier 1963; Gagliano et al. 1975).

Climate

The project area, and this region of coastal Louisiana in general, is characterized by a humid, subtropical climate. Summers are long and hot, with southerly winds frequently producing afternoon thunderstorms. Winters are short and mild, with noticeable climatic variation created by the alternating dominance of cold continental air masses and warm tropical air. Temperatures during the summer average

above 28.9° C(75° F) with high humidity, usually over 80%. Temperatures average between 4.4° C (40° F) and 12.8° C (55° F) during December, January and February (Neuman 1977).

On average, precipitation measures 169.77 cm (66.84 in) annually. July is the wettest month, receiving an average of 19.5 cm (7.68 in) of rainfall. October is the driest month, receiving only 8.45 cm (3.33 in) of precipitation. During both the summer and fall months, hurricanes represent the most dangerous climatic threat to the region.

CHAPTER III

CULTURAL SETTING: PREHISTORY

The prehistory of south central Louisiana has been a subject of study since the early nineteenth century. The dynamic cultural and natural environments in this region are interrelated to such an extent that the one cannot be understood without reference to the other. Chapter II examined the broad and specific natural environments encompassed by the current study area. The present chapter provides data regarding the occupation of the project area in prehistory. A brief discussion of important scholarly contributions to the study of the cultural history of the region is followed by a general description of the cultural chronology of the area. Specific data pertaining to known archeological sites within or in close proximity to the project area are provided in Chapter V of this report.

History of Scholarship

Prehistoric sites in the vicinity of the project area were noticed early in the nineteenth century by James Leander Cathcart and John Landreth. The U.S. Navy commissioned Cathcart as an agent and Landreth as a surveyor in an effort to locate stands of live oak and red cedar for shipbuilding (Prichard et al. 1945:735-736; Weinstein and Kelley 1992: 9-17). These men traveled through the region in 1819 and documented their findings in a series of journals. Recorded within these diaries are accounts of visits to numerous archeological sites in the region. A full review of the travels of Cathcart and Landreth is presented in Weinstein and Kelley (1992: 9-17). It is sufficient to note here that these travelers seem to have skirted the western edge of the current project area.

Following Cathcart and Landreth, the region was surveyed in 1842 by the U.S. Army Corps of Topographical Engineers (Weinstein and Kelley 1992:14). Important archeological sites including the Berwick Mounds (16SMY184) and the Gibson Mounds (16TR5), both located west of the proposed project area, were documented by these early mapping projects.

Henry Collins of the U.S. National Museum organized the first true archeological survey of coastal Louisiana, including areas north of the proposed Disposal Sites, in 1926 (Collins 1927). Collins visited a number of mound sites within the vicinity of Houma, Louisiana, and drew numerous conclusions regarding settlement patterns in the region. He observed that "unexpected numbers" of earthen mounds with their associated shell middens were located along lakes and bayous (Collins 1927:201). He also was among the first to recognize the importance of shell middens in coastal Louisiana, noting that *Rangia cuneata* shell found near the mounds represented the basic kitchen refuse of Native Americans living along the waterways. Finally, Collins suggested that the mounds in Louisiana had a direct cultural affiliation with similar settlements found to the east along the Gulf Coast and in Florida. He based his conclusion on the presence of stamped, incised, and punctated pottery types found in both areas (Collins 1927:206).

While the next major archeological study in the vicinity of the project area was conducted some 30 years later by William McIntire (1958), in the interim, the study of Native American occupation of southern Louisiana and of the Lower Mississippi Valley in general had made numerous and significant advances. Among the most important works were those of Kniffen (1936, 1938), Ford (1935, 1936, 1951), Ford and Willey (1940), Ford and Quimby (1945), Phillips et al. (1951), Quimby (1951, 1957), Phillips and Willey (1953), Ford et al. (1955), Ford and Webb (1956), and Willey and Phillips (1958). These investigations were followed by the monumental study by Philip Phillips (1970), a work which provides the major ceramic typologies and chronologies followed throughout much of the Lower Mississippi Valley.

The work of William McIntire (1954, 1958) has left an indelible mark on the study of the cultural history of southern Louisiana. McIntire studied all known sites in southern Louisiana from the Pearl River in the east to the Sabine River in the west. He was the first to document formally many of the sites in the region, and his work greatly aided future study of the area. McIntire stated that his purpose was to learn about prehistoric man in the region in order to study the geology of southern Louisiana. Like Collins (1927), McIntire employed a methodology that integrated geological and archeological data in the study of settlement patterns along the bayous and within the marshes of the region. In addition, the materials collected by McIntire and his students provided the basic data for the creation of ceramic sequences and typologies by later scholars. McIntire classified the sites he found by type (shell midden, shell deposit, beach deposit, earthen mound, and earthen midden), and by culture affiliation. McIntire applied the ceramic chronologies established by Ford and Quimby (1945), and classified sites into six successive periods: Tchefuncte, Marksville, Troyville, Coles Creek, Plaquemine, and Natchez (McIntire 1958:Figure 1).

McIntire mapped and identified over 500 sites in southern Louisiana, including several that were located east of the proposed disposal site areas. A brief discussion of his specific findings at sites in the vicinity of the project area is presented in Chapter V of this report. While the ceramic sequences followed by McIntire are now somewhat outdated, the fundamental principles of "geoarcheology" have been taken into account in virtually every subsequent study of southern Louisiana.

While a comprehensive listing of all cultural resources surveys conducted within 8 km (5 mi) of the current study area is presented in Chapter V, several inventories are of note here because of their major contributions to the study of cultural history in the project area. The most significant studies conducted recently in the vicinity of the current project area are those undertaken by Altschul (1978) and Weinstein and Kelley (1992). These inventories were all conducted under the general rubric of "cultural resources management," and are fairly specific in terms of the study areas examined.

The study undertaken by Altschul (1978) consisted of the documentation and revisitation of numerous sites in Terrebone and Lafourche Parishes. Altschul's field investigations focused upon places that potentially would be impacted by the construction of sewerage systems in these areas. Altschul's findings chiefly were concerned with the Mississippian period. He created a hierarchy among sites based on the types of materials recovered from each locale, and distinguished between Mississippian settlement and Plaquemine settlement on the basis of site types and the position of sites relative to other similar cultural resources located along tributaries in the region.

Weinstein and Kelley undertook a survey of the Terrebone Marsh area on behalf of the U.S. Army Corps of Engineers, New Orleans District, in the early 1990s (1992). Their study focused on correlating archeological sites in the region with specific geologic formations, and their conclusions have influenced the interpretation of the geologic age of several watercourses in the Terrebone Marsh. During the course of their survey, Weinstein and Kelley visited numerous sites in the region and they examined collections made by previous investigators. The culmination of their work was a report documenting the location of sites in the Terrebone Marsh over time and space. They made specific conclusions regarding settlement patterns for each period of occupation documented in their study area.

Culture Chronology

The following brief review of the Native American cultures that inhabited the project area is organized following the general phase names used by Smith et al. (1983), as modified by more recent investigations (especially those reported by Weinstein and Kelley [1992]). However, not all of the phases defined for the region are present within the area currently under consideration. Archeological deposits dating prior to the Poverty Point Period are not anticipated within the project area (Chapter II). Therefore, the periods predating Poverty Point times are summarized only briefly here.

Paleo-Indian Stage (10,000 - 6000 B.C.)

Paleo-Indians, the earliest inhabitants of Louisiana, may have arrived in the region as early as 12,000 B.C. However, the earliest Paleo-Indian remains found in the state date from 10,000 B.C. (Webb et al. 1971; Smith et al. 1983). Information pertaining to Paleo-Indian life is sketchy, but it generally is agreed that they formed highly mobile band level groups that relied on hunting now-extinct Pleistocene megafauna (e.g., mammoth, mastodon, and bison), and on foraging.

The lithic artifacts composing the Paleo-Indian tool inventory reflect this dependence on big game hunting. The tool kit includes large, thin, bifacially-worked fluted lanceolate projectile points, bifacial cleavers, core handaxes, knives, drills, end scrapers, side scrapers, and spokeshaves (Smith et al. 1983). Lithic tools exhibit high quality workmanship, showing evidence of fine flaking, retouching, basal grinding, and thinning (Smith et al. 1983). Paleo-Indian projectile point types recovered from Louisiana include Angostura, Clovis, Dalton, Eden, Pelican, Plainview, San Patrice, Scottsbluff, and Quad.

Near the end of the Pleistocene, the climate warmed and the herds of megafauna declined, forcing aboriginal peoples to adapt to the developing environment of the region. The late Paleo-Indian tool assemblage reflects this adaptation. While the early Paleo-Indian tool assemblage consisted primarily of projectile points manufactured from exotic materials, late Paleo-Indian tools included knives, scrapers, chisels, gravers, drills, and adzes, most of which were made from locally available materials. In addition, overall projectile point size decreased, indicating a greater reliance on smaller game, such as deer. Finally, Late Paleo-Indian sites have been found in greater numbers, suggesting a population increase (Neuman 1984).

Around 8000 B.C., a technological complex known as San Patrice first appeared in northwestern Louisiana, eastern Texas, and southern Arkansas (Webb et al. 1971). The San Patrice complex dates from 8000 to 6000 B.C., and initially was defined on the basis of two projectile point types: one lanceolate (San Patrice *var. Hope*), and one side-notched (San Patrice *var. St. Johns*) (Webb 1946). Unifacial tools such as Albany side scrapers and other side scrapers, end scrapers, gravers, drills, raclettes, scaled pieces, burins, and retouched flakes also occurs in the San Patrice tool inventory (Webb et al. 1971).

San Patrice appears to have been contemporaneous with the Dalton complex that is recognized in adjacent states. Close technological and morphological affinities between the San Patrice and Dalton complexes have led some archeologists to suggest that these sites are related and comprise the Dalton horizon (Ensor 1986).

In Louisiana, Paleo-Indian finds occur most commonly in the Tertiary uplands and the uplands/floodplain bluff areas. Areas within the more recent floodplains of the Atchafalaya, Mississippi, and Red rivers or their tributaries generally are considered to be the least probable areas for locating Paleo-Indian remains, because the deposits comprising the landforms post-date the Paleo-Indian stage (Neitzel and Perry 1977). Most Paleo-Indian projectile points found in Louisiana have been recovered from the surfaces of sites in the northwest portion of the state. However, some Paleo-Indian artifacts have been recovered from coastal Louisiana sites.

The Salt Mine Valley site (16IB23), on Avery Island in Iberia Parish, contains a deeply buried component that appears to be of Paleo-Indian age. In the 1860s, during strip mining of the salt dome, deeply buried lithic tools and basketry fragments reportedly were recovered in association with the remains of extinct fauna, including mastodon, mammoth, horse, bison, and sloth. Limited testing at the site in the early 1960s produced undiagnostic tools and bipolar chipped cores at depths of approximately 6 m (20 ft). While the original analysis of collected data suggests that initial occupation of the site dates from the early Paleo-Indian period (Gagliano 1964), subsequent analysis suggests that the site may not have been occupied until late in the Paleo-Indian Stage (Gagliano 1967).

San Patrice and Dalton sites are more widely distributed than their earlier Paleo-Indian counterparts. San Patrice sites have been found on margins of upland terraces overlooking river valleys, lakes, and streams, and along the small streams that dissect the uplands. South Louisiana sites with San Patrice or Dalton components include the Da Dump site (16SL59), and the Edwin Mott site (16SL42), both in St. Landry Parish (Smith et al. 1983). San Patrice projectile points also have been recovered from Avery Island (Gagliano 1964, 1967). No Paleo-Indian artifacts have been recovered from southeastern coastal Louisiana, where the formation of land surfaces occurred after this time period.

Archaic Stage (6000 - 1500 B.C.)

During the Archaic stage, subsistence systems became more diverse, fostering the development of quasi-permanent settlements (Neitzel and Perry 1977). The size, content, and distribution of Archaic sites suggest that Archaic peoples exploited a home range delimited by the seasonal availability of nuts, fruits, fish, game, and other natural resources (Muller 1983).

Archaic peoples utilized a variety of materials for tool manufacture. They also incorporated new techniques for polishing and grinding granitic rock, sandstone, slate, steatite, and scoria. In addition, shell and bone were used throughout the latter half of the Archaic stage. A wide variety of side-notched, corner-notched, and side-stem projectile points are associated with the Archaic stage.

Early Archaic Period (6000 - 5000 B.C.)

Early Archaic peoples exploited a wider variety of resources than their Paleo-Indian predecessors. They hunted smaller animals such as whitetail deer, raccoon, bear, dog, groundhog, squirrel, fox, beaver, bobcat, skunk, mink, muskrat, porcupine, wild turkey, passenger pigeon, goose, duck, and various aquatic and semiaquatic species (Walthall 1980; Neuman 1984).

Late Paleo-Indian and Early Archaic projectile point styles such as Angostura-like, San Patrice, and Dalton have been found throughout Louisiana; however, very few Early Archaic components have been isolated within the state. Several Early Archaic projectile point types and associated horizons have been defined for areas throughout the Southeastern United States, and these include the Big Sandy, Kirk, and Bifurcate Horizons. Early Archaic cultural manifestations resemble those defined for the terminal Paleo-Indian stage in content and distribution. Terminal Paleo-Indian sites in Louisiana often are identified as basal components on Early Archaic sites, indicating an in situ development for the Early Archaic (Servello 1983).

The Big Sandy Horizon is characterized by a distinctive projectile point type. Big Sandy points have been recovered from Florida to Texas in the Southeast, and from as far north as the Great Lakes. The Big Sandy point is characterized by a steep triangular blade and by serrated edges. Side-notching and utilization of a similar chipped stone tool assemblage suggests continuity with Dalton and San Patrice. Big Sandy sites also exhibit multiple activity areas (Walthall 1980).

The Kirk Horizon is characterized by a wide variety of stone tools and projectile points associated with the forested portions of eastern North America. The projectile point varieties are medium-sized, corner-notched, and deeply serrated; they often exhibit beveling along the blade. The chipped stone tool assemblage of the Kirk Horizon is similar to that of the preceding Big Sandy Horizon. A substantial inventory of wood and bone working tools is associated with the Kirk Horizon sites (Purdy 1973; Waller 1976).

The Bifurcate Horizon is identified by small, bifurcated-stem projectile points that usually have serrated edges. Distribution of these points throughout the eastern United States is similar to the distribution of points of the preceding Kirk Horizon (Walthall 1980). The Bifurcate Horizon generally has not been recognized in Louisiana.

Middle Archaic Period (5000 - 3000 B.C.)

Middle Archaic cultural manifestations generally correspond with the Hypsithermal Interval. During this time, the climate changed gradually from cold and moist to warmer and drier. By 3000 B.C., climatic and environmental conditions were much like those of the present. The scheduling of economic activities in the Southeast shifted at that time to include shellfish (Walthall 1980). A new emphasis on aquatic and riparian resources (shellfish, fish, reptiles, and amphibians) indicates a trend toward maximization of local resources (Smith et al. 1983).

In the Southeast, population estimates show an increase over previous levels; however, these larger groups appear to have been less mobile than earlier populations. Two settlement pattern types have been identified for the Middle Archaic: (1) a centrally-based wandering pattern from both base and satellite camps, and (2) a restricted wandering pattern. In the centrally-based wandering pattern, the central base camp was occupied for both subsistence and maintenance activities; satellite sites were occupied for resource procurement. The restricted wandering pattern involved no base camp; groups moved from one locale to the next as resources became available (Muller 1983).

Middle Archaic artifact assemblages of the southeastern cultural area are characterized by a plethora of stemmed, broad-blade projectile points; these probably were used in conjunction with the *atlatl* (spear thrower). Middle Archaic projectile points recognized from sites in northwestern Louisiana, northeastern Texas, and southwestern Arkansas include Yarbrough, Yantis, Palmillas, Kent, Elam, Keithville, Carrollton, and Morrow Mountain varieties. Heavy grinding and nutting stone tools and tools such as axes, adzes, wedges, and gouges indicate that Middle Archaic peoples were well-adapted to southern hardwood forests. Bone fish hooks, net sinkers, and plummets reflect increasing reliance on aquatic resources.

Middle Archaic manifestations recognized in South Louisiana include the Amite River phase. The Amite River phase was defined in the Amite Basin in the upper deltaic region of Louisiana (Gagliano 1963). It represents an adaptation to the upland woodlands and is characterized by earth middens, camp areas, and may include conical earth mounds. Sites are located on stream valley margins and along beaches and estuaries. Ground stone and bone commonly were used for manufacturing a variety of tools. Local gravels served as a source for chipped stone artifacts (Gagliano 1967). Williams, Shulma, Kent, Wells, Almagre, and Gary projectile point types were common.

Remains of human burials have been observed at various Middle Archaic sites within the Southeastern culture area. Burials are both flexed and extended, with few or no grave goods (Muller 1983). These simple interments and the lack of grave offerings imply an egalitarian social organization.

Floodplain sites containing thick midden deposits represent quasi-permanent or permanent habitations. Small special activity sites are generally located on floodplain, on terraces, and in upland settings along tributary streams (Gagliano 1963). These sites apparently were chosen for their proximity to selected exploitable resources, including game, nuts, and chert.

Late Archaic Period (3000 - 1500 B.C.)

The Late Archaic period is marked by the settlement of previously uninhabited or sparsely populated areas, suggesting an increase in population throughout the Southeast. Macrobands made up of approximately 30 or more people were formed during spring and summer. During the winter, these groups split into microbands to exploit nearby environments (Jenkins and Krause 1986; Muller 1983). Projectile point types recognized from southern Louisiana include various expanding, contracting, and straight stem forms: Yarbrough, Carrollton, Gary, Shulma, Palmillas, Morhiss, Kent, Pontchartrain, Marshall, Webb, Hale, Ellis, Marcos, Wells, Williams, and Frazier. Shell, bone and stone pendants, musical tube pipes, and a variety of other artifacts are associated with the Late Archaic. During the Late Archaic, regional variations intensified, and extensive exchange relationships developed between regions. Subsistence practices were scheduled around the seasonal availability of key species; deer, fish, nuts, and shellfish were of primary importance. Late Archaic peoples probably practiced limited horticulture of such native cultigens as sunflower, marsh elder, and various gourds and squashes.

Archaic-style projectile points commonly are found throughout Louisiana; however, few of the state's discrete, intact archeological deposits dating from the Archaic have been excavated systematically, analyzed, and comprehensively reported (Neuman 1984).

The Banana Bayou Mound (16IB24) at the southern basal edge of Avery Island was tested in 1962. This testing indicated mound construction in two stages. Charcoal recovered from a lens on the surface of the primary mound dated from 2490 B.C. $\pm$ 260 years, nearly a thousand years prior to the estimated beginning of Poverty Point culture. Charcoal also was recorded in lenses within and underlying the primary mound. Its presence suggests the construction of structures on the mound. While few artifacts were located during excavation, a number of amorphous fired clay objects were recovered, which were similar in color and consistency with those recovered from Poverty Point and Tchefuncte sites (Gagliano 1967). It is unclear whether this site actually dates from the Late Archaic period, or from Poverty Point times.

Late Archaic manifestations on the marginal deltaic plain at the vicinity of the mouth of the Pearl River are classified within the Pearl River Phase. Here, oyster shell middens are located along the shorelines and estuaries of the coastal area. This phase may represent the earliest coastal occupation of the region, after sea level approximated its modern stand. Artifacts associated with this phase include various projectile points such as Pontchartrain and Kent, drills, gravers, atlatl weights, boatstones, sandstone saws, and hones, most of which were made from gravels and sandstones collected from nearby Pleistocene outcrops and stream deposits. Shell and bone artifacts such as socketed antler tine points also have been recovered, along with fired clay hearth fragments (Gagliano 1963).

Additionally, Gagliano (1967) proposed a Late Archaic Copell Phase for south-central Louisiana. This phase was based on data collected from the Copell site (16VM102), a prehistoric cemetery site in Vermilion Parish, excavated by Henry Collins in 1926. Numerous interments were recovered at that time, including some which were lying on yellow and red colored pigments (Neuman 1984). Cultural traits from the Copell site subsequently were described by Ford and Quimby (1945). Collins, as well as Ford and Quimby, assigned a Tchefuncte affiliation to the site based on collected artifacts, data, and physical anthropological data from the burials. However, since no ceramic sherds were recovered during the excavations at Copell, Gagliano (1967) suggested a Late Archaic period affiliation. Additional testing is needed in order to date the site accurately, and to determine whether or not the proposed Copell Phase is a legitimate, definable south-central Louisiana cultural phase.

Poverty Point Period (1500 - 500 B.C.)

The transition out of the Archaic Stage in the Lower Mississippi Valley is most clearly recognized at the Poverty Point Site, 16WC5, in northeast Louisiana. The material characteristics of Poverty Point culture in general include massive earthworks, baked clay balls known as Poverty Point objects, the use of exotic and imported stone, and specialized microlithic industries (Ford and Webb 1956; Webb 1977).

Poverty Point represents a transitional culture that originated ca. 2000 B.C., but did not realize its full potential until much later. As a result, the Poverty Point sphere of influence may not have arrived in the coastal region of south central Louisiana until ca. 1500 B.C. (Gibson 1994, 1979; Neuman 1984). Poverty Point culture is best known for exhibiting several fundamental and distinguishing characteristics of a complex society including massive public architecture and long-distance trade, while maintaining a hunting and foraging economy (Jackson 1991; Jeter and Jackson 1994:142; Muller 1978; Neitzel and Perry 1977). Poverty Point culture probably represents the first chiefdom-level society to develop in the eastern United States (Gibson 1985a; Muller 1978).

The Poverty Point site itself is distinguished primarily by its large earthworks and its complex microlithic industry. The earthworks include six segmented ridges, 15 to 46 m (50 to 150 ft) wide, that form five sides of an octagon, and several other Poverty Point mounds scattered throughout the immediate site area. The largest mound, Mound A, may be a large bird effigy (Webb 1982). At the time of its construction, Poverty Point was the largest earthwork in the Americas.

The material culture of Poverty Point society was distinctive. Materials associated with Poverty Point culture include atlatl weights, plummets, beads and pendants, thin micro flints/blades, clay cooking balls, clay figurines/fetishes, as well as food storage and preparation containers. Container types included steatite vessels, basketry, and tempered as well as untempered ceramic materials. Most ceramic vessels were sand tempered, although a minority of grit tempered, clay tempered, fiber tempered ceramics, and untempered sherds and vessels have been recovered. Webb (1982) reported the recovery of seed processing implements, stone hoe blades, nutting stones, and milling stones. Earthen ovens also have been identified.

Brain (1971) identified Poverty Point as a bottomland occurrence, and Webb (1982) suggested that Poverty Point sites typically are found in four locations. These areas include the Quaternary terraces or older land masses that overlook major stream courses, along major river levees of active or relict river channels, at river-lake junctions, and along coastal estuaries or older land surfaces located within a coastal marsh area. These sites appear to be located in areas ideal for exploiting forest-edge resources and for transporting exotic materials. Sites range in size from large ceremonial centers to small hamlets or foraging stations.

Poverty Point culture as expressed in southern Louisiana has been separated into several phases that reflect chronological and geographic distinctions associated with materials recovered from Poverty Point period sites. East of the current study area, the Bayou Jasmine and Garcia Phases, ranging in date from 1500 - 1000 B.C. and 1000 - 500 B.C., respectively, have been identified (Kidder et al. 1995:Figure 7; Weinstein and Kelley 1992:Table 3-4). Sites from each phase generally are characterized as shell middens located along the shoreline of Lake Pontchartrain. Materials recovered from these sites suggest that the inhabitants practiced seasonal and specialized adaptations to marsh environments. Bayou Jasmine phase sites are located on the western shore of the lake, as well as along the natural levee ridges of the Mississippi River distributaries. Garcia Phase sites are located along the eastern shore of Lake Pontchartrain.

The Garcia Site (16OR34), the type site for the Garcia Phase, is located on a buried natural levee adjacent to a former channel of the Mississippi River. This site contained a beach deposit of *Rangia* shells and midden debris. Materials collected from this site have been used to date both the Garcia and Bayou Jasmine Phases of the Poverty Point period in southeastern Louisiana (Gagliano 1963; Gagliano and Saucier 1963). Bayou Jasmine Phase sites, such as the type site located along the western shore of the lake, contain Poverty Point objects, food bones, and bone artifacts, and "an undistinguished stone complex which does not include the typical Poverty Point microlithic assemblage" (Phillips 1970: 874; Duhe 1976). In contrast, Garcia Phase sites, as represented by the Garcia site alone, include no Poverty Point objects, but exhibit a more complex lapidary industry including the presence of polished stone artifacts such as boatstones, celts, and plummets, and a complex microlithic industry (Gagliano and Saucier 1963; Phillips 1970:874). Although Phillips (1970) and others have raised questions regarding the precise chronology of the period, Phillips has noted that the chronological distinctions between the Garcia and Bayou Jasmine Phases were real and that they provided one of the few known breaks in the Poverty Point Culture sequence. Additional radiocarbon dates are necessary in order to clarify the absolute chronology of these phases.

Two other phases of Poverty Point culture have been identified in south central Louisiana. Sites associated with these phases are located near or along Coteau Ridge in Lafayette, St. Landry, and St. Martin parishes (Gibson 1976a:13; Gibson 1979:96-97; Mayer 1991). This region is located generally north and west of the current study area. Phillips (1970: 875) identified a Poverty Point phase in this region that he labeled Rabbit Island. Sites associated with the Rabbit Island Phase are generally similar to Garcia Phase sites in the east, but are situated in the Teche-Mississippi region of coastal Louisiana. Artifacts recovered from the type site include non-local lithic materials, microlithics, and baked clay objects (Gagliano 1963). The Beau Rivage Phase of the Poverty Point culture was established by Gibson in 1974 (Gibson 1974; Weinstein and Kelley 1992). This term was applied to four Poverty Point period sites (16LY5, 16LY6, 16LY13, and 16SL2) investigated by Gibson along the Vermillion River. The now-destroyed type site (16LY5) was located within the Lafayette corporate limits, and was classified as an important regional center for the importation and dispersal of foreign lithic materials (Gibson 1994). Evidence from the site suggested that these foreign lithic materials were acquired in the form of blanks with further reduction prior to exportation to other localities. Sites of the Beau Rivage Phase are located in different geographic settings than those of the Rabbit Island Phase; they are found to the northwest of the previously recorded Rabbit Island sites, and they occupy the edge of the prairie terrace that overlooks the alluvial plain (Gibson 1980). A typical Beau Rivage artifact assemblage includes Poverty Point ceramic objects (clay balls and figurines) and lithic materials, but also includes decorative rectangular or circular ceramic objects that have not yet been recovered at more inland Poverty Point locations. Diagnostic projectile points/knives associated with the Beau Rivage Phase have included, among others, examples of Gary, Wells, Evans, Elam, Sinner, Ellis, Delhi, Marshall, and Palmillas points. These lithic projectile points/knives are characteristically shorter and narrower than those found at other Poverty Point sites.

Bayou Rivage and Rabbit Island Phase sites apparently represent geographically distinct examples of Poverty Point culture in south central Louisiana. Gibson (1975a) dates the Beau Rivage Phase from ca. 1500 - 650 B.C., while Weinstein and Kelley (1992, Table 3-4) suggest a range of 1500 - 500 B.C. for both the Beau Rivage and Rabbit Island Phases.

Other sites exhibiting possible Poverty Point culture occupations identified in the Coastal Zone of south central Louisiana consist of camp locations on Avery Island and Belle Isle (Gagliano 1967:98; Gibson et al. 1978:33-34). In addition, two Poverty Point sites were identified by Coastal Environments, Inc. during survey of the Terrebone Marsh (Weinstein and Kelley 1992). No Poverty Point period sites have been identified within the current study area; however, it is geologically possible that sites of this age are present and have not yet been identified.

Tchula Period (500 B.C. - A.D. 1)

Tchula Period sites in the Lower Mississippi Valley are associated with the Tchefuncte Culture. Scholars do not agree on the distinctive characteristics of Tchefuncte Culture, and consensus does not exist regarding the names and dates associated with these phases. In the most general terms, the defining features of Tchefuncte Culture include the first widespread use of pottery, the integration of food production into daily life, and mound building (Weinstein and Kelley 1992:34; Byrd 1994; Neuman 1984; Shenkel 1981:23).

The Tchefuncte Culture originally was defined by Ford and Quimby (1945) on the basis of work at three separate groups of sites in Southern Louisiana that comprised the culture. The Copell site on Pecan Island defined the first group. No pottery was found at this site; the distinguishing Tchefuncte characteristics were the presence of artifacts with burials and interment within a cemetery. This site later was reevaluated as Later Archaic (Phillips 1970: 881), and is no longer considered a separate Tchefuncte phase. Three sites, the Tchefuncte Site, 1ST1, the Little Woods Site, 16OR1-5, and the Big Oak Site, 16OR7, were categorized as belonging to Ford and Quimby's (1945) second group. These sites were characterized as shell middens with distinct types of bone and shell artifacts and chipped stone projectiles points. These sites now are considered as part of the Pontchartrain Phase of the Tchula Period (Phillips 1970). The third group consisted of two mound sites, the Lafayette Mounds (16SMY17) and the Lake Louis Mound. These sites were differentiated from the other Tchefuncte culture sites by the presence of large circular mounds, specialized projectile points, and the absence of some traits that were present at the other Tchefuncte sites. The Lafayette Mound is now included within the Lafayette Phase, while the Lake Louis Mound is encompassed by the Russell Landing Phase as defined by Phillips (1970).

The common traits used by Ford and Quimby (1945) to link the three groups of sites include the presence of particular types of pottery and pipes, and the style of certain burial traits and bone implements. Ford and Quimby acknowledged that the chronological relationships among the three groups was unclear, but they suggested that building mounds was a late manifestation of the Tchefuncte Culture (1945:88), a point later refuted by Phillips (1970:884). Finally, Ford and Quimby (1945) noted that some of the differences postulated between the three groups could be environmental rather than temporal. The hypothesis that environment played a role in site type in the Tchefuncte Culture was supported by Phillips (1970:883). He noted that mound sites of this period were located in the western part of the Mississippi alluvial valley only. The importance of mound building in Tchefuncte Culture has been the subject of debate in recent years, as the data linking these earthworks with other contemporary sites are limited (Kidder et al. 1995:36). Some scholars have argued that the mound groups near Lafayette are mortuary centers for a generally dispersed population (Gibson and Shenkel 1988; Weinstein 1986:117), but this hypothesis has not been widely accepted.

As originally characterized by Ford and Quimby (1945), the Tchefuncte Culture was a simple hunting and gathering economy that developed techniques for cultivation. The culture was thought to be a local adaptation by an indigenous populace to the Louisiana coast and to the central portion of the Vermilion River in south central Louisiana. Following the initial definition of Tchefuncte Culture and a subsequent revision of ceramic types by Phillips in 1970, Tchefuncte or Tchefuncte-like ceramics now have been found in southeast Missouri, northwest Mississippi, the Yazoo Basin, coastal Alabama, and east Texas (Brookes and Taylor 1986:23-27; Mainfort 1986:54; Neuman 1984; Webb et al. 1969:32-35; Weinstein 1986:102).

Tchefuncte sites generally are classified either as coastal middens, or as inland villages or hamlets. Settlement usually occurred along the slack water environments of slow, secondary streams that drained bottomlands, floodplain lakes, and littoral zones (Neuman 1984; Toth 1988:21-23). From southwest and south central Louisiana, Tchefuncte burials and artifacts suggest an egalitarian social organization. The population probably operated at the band level, with as many as 25 to 50 individuals per band. The

widespread distribution of similar ceramic types and motifs implies a patrilocal residence with exogamous band marriage (Speaker et al. 1986:39). Social organization probably remained focused within macrobands, and hunting, gathering, and fishing remained integral to the Tchefuncte way of life.

Shell midden sites and their associated faunal remains are well known for the Tchefuncte Culture, and document the wide variety of food resources utilized during this period. Recovered faunal remains include deer, opossum, muskrat, raccoon, otter, bear, fox, dog, ocelot, wildcat, alligator, bird, fish, shellfish (freshwater and marine), and turtle (aquatic and terrestrial). Recovered plant remains (all non-domesticated) include squash, gourds, plums, nuts, grapes, and persimmons (Neuman 1984; Smith et al. 1983), but given the dearth of cultivated plant remains recovered from Tchefuncte sites, the role of cultivation in subsistence remains unclear (Weinstein and Kelley 1992: 34).

Examination of faunal and floral remains from Morton Shell Mound (16IB3), a coastal Tchefuncte shell midden in Iberia Parish, suggests that some coastal sites were occupied on a seasonal basis, usually in the summer and autumn, and possibly during the spring (Byrd 1994:103). The preponderance of freshwater fish remains at coastal southeastern Louisiana sites such as Big Oak Island (16OR6) and Little Oak Island (16OR7) indicates a reliance on fishing to exploit aquatic resources (Shenkel and Gibson 1974).

The extensive use of ceramics by the Tchefuncte Culture is what distinguishes the period from the Poverty Point Culture. While there is some evidence for the use of ceramics in Poverty Point Culture (Webb 1982), pottery making was widespread in the Tchula period. Basic Tchefuncte ceramics were temperless or grog-tempered, with small inclusions of sand and vegetable fiber. Tchefuncte ceramics usually are characterized by a soft, chalky paste, and a laminated appearance. They were fired at a low temperature and tempered with either sand or clay (Phillips 1970). Vessel forms consist of bowls, cylindrical and shouldered jars, and globular pots that sometimes exhibit podal supports. Many vessels are plain; however, some are decorated with punctations, incisions, simple stamping, drag and jab, and rocker stamping. Punctate types usually are more numerous than stamped types, but parallel and zoned banding, stippled triangles, chevrons, and nested diamonds also represent popular motifs. During the later portion of the Tchefuncte period, red filming also was used to decorate some vessels (Perrault and Weinstein 1994:46-47; Speaker et al. 1986:38; Phillips 1970).

The types of lithic artifacts recovered from Tchefuncte sites suggest that the stone and bone tool subassemblages remained nearly unchanged from the preceding Poverty Point Culture. One difference, however, is the absence of non-local and exotic lithics at Tchefuncte sites. Stone tools included boat stones, grooved plummets, chipped celts, and sandstone saws; bone tools included awls, fish hooks, socketed antler points, and ornaments. In addition, some tools such as chisels, containers, punches, and ornamental artifacts were manufactured from shell. Projectile points/knives characteristic of the Tchefuncte Culture include Gary, Ellis, Delhi, Motley, Pontchartrain, Macon, and Epps (Ford and Quimby 1945; Smith et al. 1983:163). Bone and antler artifacts, such as points, hooks, awls, and handles, also became increasingly common during this period.

The regional phases of the Tchefuncte Culture have been determined by examining the presence of ceramic decorations and the percentages of these decorations present throughout southern Louisiana (Weinstein 1986). In coastal Louisiana, five phases have been designated for the Tchefuncte Period. From west to east, these are the Sabine Lake Phase bordering Sabine Lake in southeast Texas and southwest Louisiana; the Grand Lake Phase in the Grand Lake and Vermilion Bay area; the Lafayette Phase on the west side of the Atchafalaya basin (west of the Vermilion River); the Beau Mire Phase below Baton Rouge in the Ascension Parish area; and the Pontchartrain Phase encompassing Lake Maurepas and Lake Pontchartrain in the Pontchartrain Basin (Weinstein 1986:108).

Although a date range of ca. 500 B.C. - A.D. 1 for the Tchefuncte period is commonly suggested, research indicates that dates for the period differ quite widely from region to region and occasionally within

the same area (Byrd 1994; Gibson 1976a, 1976b:13; Webb et al. 1969:96; Weinstein 1986; Kidder et al. 1995: 35-36). Most archeologists agree that the Tchefuncte Culture dates from as early as 700 B.C. in the south, and that it diffused to the north, where it is known as Tchula, and terminates ca. A.D. 100 (Gibson and Shenkel 1988:14; Perrault and Weinstein 1994:48-49; Shenkel 1974:47; Toth 1988:19). Coastal Tchefuncte sites may have been occupied until around A.D. 300 (Byrd 1994:23; Neuman 1984:135; Weinstein 1986:118). If these dates are correct, it implies that the last remaining coastal Tchefuncte communities were coeval with late Marksville culture (Toth 1988:27-28).

The Pontchartrain and Beau Mire Phases are most relevant to the current project, though neither phase is known to exist within the study region specifically. The Pontchartrain Phase generally is assumed to have predated the Beau Mire Phase, with proposed date ranges of ca 500 B.C. to ca. 250 B.C. for Pontchartrain and 250 B.C. to A.D. 1 for Beau Mire; however, these dates have not been accepted by all scholars (Kidder et al. 1995:35). No sites dating to the Tchefuncte period have been identified within the current study region.

Marksville Period (A.D. 1 - 40)

Marksville Culture, named for the Marksville Site (16AV1) in Avoyelles Parish, often is viewed as a localized version of the elaborate midwestern Hopewell Culture that filtered down the Mississippi River from Illinois and Ohio (Phillips 1970; Toth 1988:29-73). A more highly organized social structure than their Tchefuncte predecessors is implied by complex geometric earthworks, conical burial mounds for the elite, and unique mortuary ritual systems that characterize Marksville Culture.

As with its predecessors, the Marksville Period has been divided into a series of phases. Early Marksville in southeastern Louisiana is grouped into the Labranche and Smithfield Phases (Weinstein and Kelley 1992), while the contemporary phase in the central portion of the state is known as Jefferson Island. In the western portion of the state, and not near the current study area, this phase has been called Lacassine. Early Marksville sites are characterized by the presence of diagnostic Marksville pottery and conical burial mounds. Burials often have grave goods, and some artifacts are of exotic materials (Neuman 1984; Toth 1988).

Throughout the Lower Mississippi Valley, the later phase of Marksville is often referred to as the Issaquena Culture (Gibson 1977; Phillips 1970). While scholars have recognized several distinct later Marksville phases in southeast Louisiana, including the Magnolia, Mandalay, and Gunboat Landing Phases (Weinstein and Kelley 1992), the Veazey Phase in central Louisiana, and Lake Arthur in southwestern Louisiana, the precise chronology of the period remains unclear (Kidder et al. 1995). These later Marksville cultures seem to be more regionally distinct, and Hopewellian influences seem to have declined, with mortuary practices becoming less complex (Smith et al. 1983; Speaker et al. 1986).

For the purposes of this study, it is particularly important to note that Marksville sites in southern Louisiana are extremely rare, and most of the sites that are known seem to have been mounds (Kidder et al. 1995). Marksville peoples probably used a hunting, fishing, and gathering subsistence strategy much like those associated with earlier periods. Gagliano (1979) suggests that food procurement activities were cyclical/seasonal (transhumance), and revolved around two or more shifting camps. In the southeastern part of the state, shellfish collecting stations on natural levees and lower terraces around Lake Pontchartrain and Lake Maurepas were occupied and utilized during the summer months. During the winter months, semi-permanent hunting/gathering camps on the prairie terrace were occupied. This subsistence technique reflects the fission and fusion that probably originated during the Archaic Stage.

Ceramic decorative motifs such as cross-hatching, U-shaped incised lines, zoned dentate rocker stamping, cord-wrapped stick impressions, stylized birds, and bisected circles were shared by Marksville and Hopewell cultures (Toth 1988:45-50). Some items, such as elaborately decorated ceramics, were manufactured primarily for inclusion in burials. Burial items include pearl beads, carved stone effigy pipes, copper ear spools, copper tubes, galena beads, and carved coal objects. Additional Marksville traits include a chipped stone assemblage of knives, scrapers, celts, drills, ground stone atlatl weights and plummets, bone awls and fishhooks, baked clay balls, and medium to large stemmed projectile points dominated by the Gary type.

A variety of exotic artifacts commonly found at Marksville sites suggests extensive trade networks and possibly a ranked, non-egalitarian society. Some commonly recovered exotic items include imported copper earspools, panpipes, platform pipes, figurines, and beads (Toth 1988:50-73; Neuman 1984). The utilitarian material culture remained essentially unchanged, reflecting an overall continuity in subsistence systems (Toth 1988:211).

Considerable controversy exists in regard to the transition from Tchefuncte culture to that of Marksville. Gibson (1976a:16) notes that the Marksville cultural expression in south central Louisiana is not as clear as in other regions of the state. He suggests that Marksville ceramics from Bayou Tortue (16LY1) possibly could be attributed to "a specialized mortuary complex" during the late Tchefuncte period. Gibson also notes that the shift from Tchefuncte to Marksville traits in the region may have lagged behind other areas of the state due to cultural conservatism. Toth (1988:27-28) apparently agrees with this scenario. According to Toth (1988), the Lafayette Phase in south central Louisiana is more indicative of late Tchefuncte, since burials generally do not have the elaborate grave goods usually associated with Marksville. He also states that these sites probably are late Tchefuncte in origin, but contemporaneous with early Marksville elsewhere; this hypothesis coincides with Gibson's late ending date for the Tchefuncte.

Within the immediate vicinity of the current study area, a number of important Marksville sites, including a handful of type sites, have been identified. A presentation of all of the Marksville sites recorded in southeastern Louisiana is provided by Kidder et al. (1995:37-41), who correlate the evidence obtained from previously conducted surveys with the known radiocarbon dates collected during excavations and assess the reliability of previously conducted work in the region.

Phase distribution of the Marksville culture has been determined largely through a combination of diagnostic ceramic traits and geographic distribution. Early Marksville in southeastern Louisiana is classified as belonging to the Labranche Phase (Phillips 1970: 898). This phase, generally dated from A.D. 1 to 200, was recognized originally by Ford and Quimby (1945) as it was present at the major Tchefuncte sites near Lake Pontchartrain. Phillips noted that Labranche Phase sites have frequencies of Crooks Stamped (now Mabin Stamped *var. Crooks*) that are greater or equal to the quantity of Marksville Stamped pottery. Kidder et al. (1995: 37) noted that the Labranche Phase has been overextended in southern Louisiana. In their summary of early Marksville in the Barataria region, Kidder et al. (1995:40) noted that there is overwhelming evidence for early Marksville, possibly in association with late Tchefuncte, in the Barataria region and that these sites seem to have exploited the newly formed water courses to which they are adjacent.

The Mandalay and Magnolia Phases represent the late Marksville occupation of southern Louisiana. Philip Phillips (1970:899-900) designated the Mandalay Phase for Marksville period sites in the coastal delta of east Louisiana based on McIntire's ceramic descriptions from the Mandalay Plantation Site (16TR1), a site located within the current study area. While Phillips suggested that the phase would soon be superseded, his prediction only recently has reached fruition. He defined the phase as a "collection of sites in the Teche-Mississippi region that have yielded Marksville period sherds in very minor quantities" (Phillips 1970: 899). Specifically, Mandalay Phase sites had higher frequencies of Marksville Incised pottery versus Marksville Stamped potsherds. In addition, Mandalay sites were dated geologically. While some of the

sites were known by Phillips to post-date the Teche-Mississippi river course, he considered it possible that some Mandalay Phase sites predated this diversion. Sites associated by Phillips with the Magnolia Phase of the Marksville period, on the other hand, were all thought to post-date the Teche diversion. The ceramics from the Mandalay Site were restudied recently by Weinstein and Kelley (1992). They determined that much of the material previously attributed to late Marksville phases should actually be classified as early Marksville. In addition, they questioned the foundation of the Mandalay Phase, and they argued that the material normally associated with this phase was more accurately described as belonging to the Jefferson Island Phase (cf., Toth 1977).

The Magnolia Phase was defined by Phillips geologically. The phase consisted of "Marksville period components east of the present Mississippi River on relict natural levees of the Metairie-Mississippi course and its distributaries" (Phillips 1970:898). The Metairie-Mississippi, referred to as the St. Bernard course in this text (Chapter II), is associated with sites extending as far east as the Chandeleur Island (Kidder et al. 1995). Phillips' discussion of the Magnolia Phase, based on his understanding of the work conducted by McIntire (1958), helped to date the geological sequences of the Mississippi lobes in southeastern Louisiana. The phase was named for the type site, 16SB49, located on a crevasse distributary. The site consists of a series of earth and shell mounds that were occupied for a long period of time, extending into at least the Bayou Petre Phase of the Plaquemines Culture. Phillips noted that the dates for the pottery recovered from Magnolia Phase sites agree with the carbon dates taken from the type site, and that the chronological evidence suggested that Magnolia Phase sites should be considered late Marksville. The specific definition of the phase included the presence of specific rim modes and the absence of Crooks Stamped (redefined now as Mabin Stamped, *var. Crooks*), and the presence of late Marksville traits.

Recent investigations in Terrebonne Parish have identified additional Marksville period sites, including mound sites, hamlets, and shell middens (Weinstein and Kelley 1989; Weinstein and Kelley 1992). After reviewing the evidence from recovered ceramic sherds, Weinstein and Kelley (1989:294-295) concluded that early through late Marksville periods were represented. As was mentioned above, they also concluded that the late Marksville Phase should be renamed because a review of the ceramics from Mandalay Plantation (16TR1) indicated an early Marksville association.

The Marksville phases that have been identified in the area west of the current project area include Jefferson Island and Veazey. These phases have been identified in the south central or Petite Anse region of the state, and representative sites typically are situated along the Teche-Mississippi river channel (i.e., the Jefferson saltdome). Jefferson Island Phase sites, discussed by Toth (1977), date from ca. A.D. 1 to 200. Decorated ceramics from this early phase are characterized by curvilinear motifs, rocker stamping, and fabric impression that predates the later Veazey phase (ca. A.D. 200 - 400). This second phase, named for the Veazey site (16VM7) in Vermillion Parish, frequently is associated with a scant presence of Late Marksville/Issaquena ceramic sherds that overlay Tchefuncte period sites of the Grand Lake Phase (Jeter et al. 1989; Phillips 1970). Additionally, two southwest Louisiana phases, Lacassine and Lake Arthur, apparently were contemporaries of the Jefferson Island and the Veazey phases. While the Lacassine phase has been well documented by Bonnin and Weinstein (1978) following excavations at the multicomponent Strohe Site (16JD10), the Lake Arthur Phase has been defined only poorly (Bonnin and Weinstein 1978). According to Phillips (1970), coastal sites from the latter part of the Marksville cultural period may contain Marksville Stamped *var. Troyville*, Yokena Incised, and Churupa Punctate ceramic sherds (Jeter et al. 1989).

Within the current study area, three sites may have Marksville period components. The controversy surrounding Mandalay Plantation (16TR1) has been described above. In addition, sites 16TR3 and 16TR89 have been identified as small shell midden sites with limited ceramic assemblages. Weinstein and Kelley (1992) reviewed the material from Site 16TR3 and noted that it may be as early as Marksville, but that it

could also be representative of a Baytown occupation. Site 16TR89 has been identified only as late Marksville (Weinstein and Kelley 1992).

Baytown Period (A.D. 400 - 700)

In the Lower Mississippi Valley, Phillips (1970) described the Baytown period as the time between the decline of the Marksville period Hopewellian culture and the emergence of the Coles Creek culture. When this transitional period first was recognized in the coastal area of Louisiana by McIntire, it was named Troyville after the cultural unit identified by Ford at the Greenhouse site (16AV2) in Avoyelles Parish (Jeter et al. 1989; Kidder et al. 1995). Kidder et al. (1995) note that Troyville was primarily a pottery complex derived from ceramic types identified in an area further to the north, which made it difficult to separate Troyville components from later Coles Creek components in the coastal area. Due to this inability to differentiate between the two periods, the Baytown period in coastal Louisiana has been referred to as the Troyville-Coles Creek period (Jeter et al. 1989; Kidder et al. 1995).

Phillips (1970) established a single phase, termed Whitehall, to identify the Baytown period in coastal areas of Louisiana (Kidder et al. 1995). Phillips noted that the Whitehall Phase could be better described "as a collection of widely dispersed sites that have yielded a combination of pottery types assumed...to indicate occupation in the period called Troyville" (Phillips 1970:911). These ceramic types, as reported by Phillips (1970), included Larto Red, Woodville Zoned Red, and to a lesser extent, Mulberry Creek Cord Marked. Mulberry Creek Cord Marked ceramic sherds were considered by Phillips (1970) to be the most reliable marker of the Baytown period, but he noted that within the Louisiana Delta sherds of this type were identified in very low frequencies. When these ceramic types were not present, Phillips suggested that the phase could be identified through the presence of Troyville Stamped, Yokena Incised, or Churupa Punctate ceramic sherds and the absence of Marksville Stamped or Marksville Incised ceramic sherds (Phillips 1970). In addition, it was reported that the Whitehall Phase could be assigned to components consisting of Mazique Incised, French Fork Incised, Chevalier Stamped, or Chase Incised ceramic sherds identified without the presence of Coles Creek Incised or Pontchartrain Check Stamped (Phillips 1970). Both Phillips (1970) and Kidder et al. (1995) reported that few excavated sites met the requirements to be assigned the Whitehall Phase.

Recent scholarship has suggested that the Whitehall Phase as defined by Phillips (1970) is better suited to the area of Louisiana north of the Barataria Basin and not the coastal zone (Kidder et al. 1995). Kidder et al. (1995) suggest that the Baytown period in coastal Louisiana should be divided into early and late phases, as this separation would more appropriately describe the existing data and would more consistently mimic the chronologies established to the north. Two phases (Grand Bayou and Des Allemandes), described as "Coastal Troyville culture," were established to represent the Baytown period in coastal Louisiana (Kidder et al. 1995:47).

The Grand Bayou Phase, ranging in date from A.D. 400 to ca. 560, was established as the earlier phase, and was identified by the presence of Marksville Incised *vars. Anglim* and *Vick*, Marksville Stamped *var. Bayou Rouge*, Larto Red, and late varieties of Churupa Punctate ceramic sherds (Kidder et al. 1995). Additional ceramic traits indicative of the Grand Bayou Phase included thick rims, rim and lip notching, and thick coarse grit-grog tempered plain ceramic sherds (Kidder et al. 1995). Kidder et al. (1995) reported that Grand Bayou phase ceramic components had been identified at Sites 16SC42 (Bruly St. Martin), 16SC43 (Shell Beach), 16SC45 (Gibson Mounds), and from the earliest occupation of Site 16JE60 (Isle Bonne). Ceramic types identified with the Grand Bayou phase were reported to be similar to those identified with Troyville culture phases at the Greenhouse site (16AV2) and in the Tensas Basin (Kidder et al. 1995).

The Des Allemandes phase was reported to represent a later phase of the Baytown period in coastal Louisiana (Kidder et al. 1995). It ranged in date from ca. A.D. 560 to 700. Kidder et al. (1995) stated that

it is difficult to separate Des Allemandes Phase ceramic components from those of the early Coles Creek period Bayou Cutler Phase, but they did report on several ceramic types and traits believed to be indicative of the phase (Kidder et al. 1995). During the Des Allemandes Phase, it was noted that Marksville Stamped and Incised ceramic varieties that were evident in earlier Grand Bayou Phase components are no longer present but that the red filming tradition continued (Kidder et al. 1995). Kidder et al. (1995) reported that several ceramic types (Evansville Punctate, Hollyknowe Pinched, and Mazique Incised *var. Bruly*) begin to appear during the Des Allemandes Phase. Ceramic types that may represent Weeden Island Culture influence, such as Woodville Zoned Red and early varieties of French Fork Incised, also increased in frequency in this phase (Kidder et al. 1995). Kidder et al. (1995) reported that the best diagnostic trait of the Des Allemandes Phase is the use of the "six mile" treatment in the decoration of ceramics. The "six mile" treatment can be identified by the presence of punctations on the lip of ceramic vessels (Phillips 1970). An additional characteristic of Des Allemandes Phase is the presence of single and/or double lined varieties of Coles Creek Incised (Kidder et al. 1995). Kidder et al. (1995) note that these Coles Creek Incised varieties developed during the Des Allemandes Phase but occur in to the Coles Creek period and can not be considered solely diagnostic of this phase. Kidder et al. (1995) report that the Isle Bonne Site (16JE60) can be considered the type site for the Des Allemandes Phase.

While the difficulty in differentiating the various phases of Baytown ceramics is the most noted characteristic of the phase, some generalizations can be offered regarding settlement patterns during the period. Baytown period populations along the coast seem to have practiced a different subsistence pattern than did their Troyville counterparts to the north. Along the coast, there is no substantive evidence of settlement hierarchies, burial mounds, or distinctive site plans (Kidder et al. 1995). Baytown period culture along the coast has been described as a basic hunting and gathering society occupying the few habitable niches of the coast (Giardino 1993). In the Des Allemandes Phase, there is some evidence for interaction with eastern cultures, specifically the Weeden Island occupations along the Gulf Coast (Belmont 1967). Scholars note, however, that despite evidence for interaction with groups to the east, the populations in southern Louisiana seem to have developed locally specific adaptations to their habitats (Kidder et al. 1995). By the end of the Baytown period, there is good evidence for intensive exploitation of fish, deer, and muskrat. Evidence regarding seasonal patterns of occupation at sites in this area is limited, but some data suggest spring and summer exploitation of shell fishing camps (Kidder et al. 1995; Weinstein and Kelley 1992). Virtually no evidence exists regarding socio-economic structures during the Baytown period. Kidder et al. (1995) argue that during the Des Allemandes Phase, a society of egalitarian hunter-gatherers occupied the region. This argument seems to be predicated on the absence of evidence, rather than on accumulated data. No sites representative solely of the Baytown period have been identified within the vicinity of the proposed disposal site areas.

Coles Creek Period (A.D. 700 - 1200)

The Coles Creek period encompasses two main phases, Coles Creek (A.D. 700 - 1000), and Transitional Coles Creek (A.D. 1000 - 1200). The period recently has been further subdivided temporally and geographically in the Lower Mississippi Valley (Kidder et al. 1995; Weinstein 1985; Brown 1984; Phillips 1970). Coles Creek culture developed in the area between the mouth of the Red River and the lower Yazoo Basin and was characterized by the construction of small ceremonial centers with platform mounds surrounded by small villages (Brown 1984). The Coles Creek period first was defined by Ford based on excavations at the Greenhouse Site (16AV2) in Avoyelles Parish (Brown 1984). Recent work in southern Louisiana suggests that Coles Creek Culture in this region is distinct from that in the interior (Brown 1984; Weinstein and Kelley 1992; Kidder et al. 1995).

Within the Louisiana coastal zone, the Coles Creek period is marked by an increase in population and by changes in the frequencies and types of ceramics (Kidder et al. 1995). Artifacts recovered from coastal Coles Creek period sites consist primarily of ceramic sherds; lithic material and bone artifacts are

identified less frequently (Brown 1984). In contrast to mound sites identified in north Louisiana, small shell middens located in marsh areas are the most common type of Coles Creek period sites identified in coastal Louisiana (Brown 1984). Subsistence was based on the exploitation of marsh resources such as clams, fish, mammals (muskrat, deer, and raccoon), birds, and reptiles (Brown 1984; Davis 1987). Brown (1984) reports the muskrat, deer, and raccoon were the primary food sources of Louisiana Delta Coles Creek cultures, while shellfish were reported to have made up a small portion of subsistence and may have been consumed in an effort to obtain shell to provide a base on which to settle (Brown 1984). Cultivated foods do not seem to have been an important component of the Coles Creek diet (Kidder et al. 1995).

Within the current project area, two Coles Creek cultural phases have been identified, the Bayou Cutler Phase and the Bayou Ramos Phase (Phillips 1970; Weinstein 1985; Kidder et al. 1995). The Transitional Coles Creek culture within the project area is identified by a single phase, St. Gabriel (Weinstein 1985; Kidder et al. 1995).

The Bayou Cutler phase first was identified by Kniffen in the late 1930s on the basis of excavations conducted at the Bayou Cutler Site located in the Barataria Basin of southeast Louisiana (Kidder et al. 1995). This phase, tentatively dated from ca. A.D. 700 to 850, was defined by Kniffen by the presence of ceramic lugs (ears), which frequently were decorated, rim sherd types, the presence of a line in the rim, the dominance of straight line decoration over other types of body decoration, the frequent use of check stamped decoration, the absence of handles on pots, and the lack of shell temper in ceramics (Phillips 1970). Ceramic types identified with the Bayou Culter Phase include Pontchartrain Check Stamped, Coles Creek Incised, French Fork Incised, Mazique Incised, "Coles Creek rims," Rhinehart Punctate, Chase Incised, Chevalier Stamped, and Beldeau Incised (Phillips 1970:921). Coles Creek rims were described by Phillips (1970) as rims with closely spaced punctations between closely spaced horizontal lines.

The Bayou Ramos Phase (A.D. 850 - 1000) was created by Weinstein et al. in the late 1970s to limit the extent of the Bayou Cutler Phase in the later part of the Coles Creek period (Weinstein 1985; Kidder et al. 1995). The phase was based on ceramic types identified during testing of the Bayou Ramos I site (16SMY133), located at the confluence of Bayou Ramos and Bayou Boeuf in St. Mary Parish, Louisiana (Weinstein and Kelley 1992). Ceramic types associated with the Bayou Ramos phase include Coles Creek Incised *var. Mott*, Mazique Incised *var. Kings Point*, Beldeau Incised *var. Beldeau*, Avoyelles Punctated *var. Avoyelles*, and Pontchartrain Check Stamped *var. Tiger Island* (Weinstein and Kelley 1992). Additionally, in establishing the Bayou Ramos Phase, the ceramic types associated with the Bayou Cutler phase were redefined to include Coles Creek Incised *vars. Coles Creek* and *Athanasio*, Mazique Incised *var. Mazique*, Pontchartrain Check Stamped *var. Pontchartrain*, and unspecified varieties of French Fork Incised (Weinstein and Kelley 1992).

The chronology of the Bayou Ramos Phase has been examined by the collection of radiocarbon dates from several sites in the central portion of the state. Samples collected at the Bayou Ramos I site (16SMY133) provided dates of A.D. 980 $\pm$ 50 and 735 $\pm$ 70 (Weinstein et al. 1987), while samples from the Goat Island site (16SMY1) indicate a date of ca. A.D. 1100 (Goodwin et al. 1985). Significant quantities of diagnostic pottery, however, were not recovered from either site, and the precise chronology of the phase remained open to question (Weinstein and Kelley 1992). The issue in the eastern portion of the state has not been resolved, but excavations in the Petit Anse, central, region of the state at the Morgan Site (16VM9) have provided sound radiocarbon dates for the phase. If cross applicable to the rest of the state, Bayou Ramos and its contemporary Morgan Phase should date from ca. A.D. 875 to 1000 (Brown 1984; Brown 1988; Kidder et al. 1995).

Data on settlement patterns in the Coles Creek period are inconclusive at this time. In the recent study of the Terrebone Marsh, Weinstein and Kelley (1992) developed a model based on a hierarchy of organized settlements. They suggest that major mound sites were surrounded by satellite villages and seasonal camps. They argued that the Gibson Mound complex, dated to the Bayou Cutler Phase, was a

major center in the area. It was observed that villages most often were located along stable levees and at the confluence of distributaries. Finally, Weinstein and Kelley (1992) hypothesize that some villages may have been occupied year round, but the basis of their model involves seasonal movement into the marshes and coastline oriented toward the exploitation of shellfish and coastal habitats. Other scholars have noted that no data exist to support the model of seasonal movement, and that sites in the marsh are common in the Petit Anse region of the state (Brown 1984; Kidder et al. 1995).

Some work has been conducted at Coles Creek period sites east of the current project area, in the vicinity of Bayou Lafourche and the Barataria Basin. A Coles Creek occupation at the Fleming Site (16JE36) is presumed to represent a major center in the Barataria Basin, while the Sims (16SC2), Pump Canal (16SC27), and Bowie (16LF17) Sites represent the period within the basin (Davis and Giardino 1981; Holley and DeMarcay 1977 [in Kidder et al. 1995]; Jackson 1977 [in Kidder et al. 1995]); Kidder et al. 1995). Coles Creek occupations are numerous in this area, and it is evident that this region was a central area of activity.

A total of three Coles Creek period sites have been identified in the current study area. The collection from Site 16TR19, the Marmande Plantation, was restudied by Weinstein and Kelley (1992). They conceded that this mound site had a strong Coles Creek component dated to the Bayou Cutler Phase. Also located within the project area and revisited by Weinstein and Kelley (1992) was Site 16TR215. They noted that this was a midden site with a very limited artifact assemblage. Finally, Site 16TR23, originally recorded by McIntire, was a shell midden with a limited artifact collection. Ceramic materials possibly dated as early as Coles Creek were collected; however, the assemblage from the site also was indicative of an Plaquemine cultural occupation.

Transitional Coles Creek or Emergent Plaquemine Period (A.D. 1000 - 1200)

The Transitional Coles Creek or Emergent Plaquemine Culture (A.D. 1000 - 1200) represents a transitional phase from the Coles Creek Culture to a pure Plaquemine Culture (Weinstein 1985; Jeter et al. 1989). Interaction with the emerging Mississippi cultures of the Middle Mississippi Valley probably exerted enough influence during the latter part of the Coles Creek period to initiate the cultural change that eventually became the Plaquemine culture (Weinstein 1985; Jeter et al. 1989). While much emphasis traditionally has been placed upon the role of northern influence in this transitional phase, recent work has indicated that a series of local changes along the coastal zone constitute an evolutionary pattern, as opposed to a sudden break with the past (Weinstein et al. 1987; Kidder et al. 1995).

Within the current project area, the Emergent Plaquemine Culture is represented by the St. Gabriel Phase. This phase, named after the St. Gabriel Site (16IV128), first was reported in the 1980s (Woodiel 1980; Woodiel 1993; Brown 1985). The site was described as a low mound with a surrounding midden area (Woodiel 1993). Woodiel stated that C^{14} analysis of a burned post and charcoal from a hearth feature recovered from the area of a collapsed structure identified under the mound yielded dates ranging from A.D. 980 - 1020. Woodiel also reported recovering ceramic types and varieties that were indicative of a transitional Coles Creek/emergent Plaquemine Culture, including Addis Plain, Avoyelles Punctate *vars. Dupree* and *Tatum*, Beldeau Incised *var. Beldeau*, Carter Engraved *vars. Carter* and *unspecified*, Coles Creek Incised *vars. Mott* and *Hardy*, Coleman Incised *var. Coleman*, Evansville Punctate *var. Rhinehart*, French Fork Incised *vars. Iberville* and *McNutt*, Harrison Bayou Incised *var. Harrison Bayou*, Mazique Incised *vars. Kings Point* and *Manchac*, Pontchartrain Check Stamped *var. Pontchartrain*, and Plaquemine Brushed *var. Plaquemine* (Woodiel 1993). Based on ceramics recovered and radiocarbon dates obtained, Woodiel (1993) suggested that the St. Gabriel site occupied a transitional time period between the late Coles Creek and early Plaquemine cultures.

Transitional Coles Creek ceramic types also have been identified at the Medora Site, 16WBR1 (a Plaquemine culture type site), the Bayou Goula site, 16IV11 (the type site for the Delta Natchezan phase of the Late Plaquemine culture), and the Kleinpeter site. (Kidder et al. 1995; Weinstein 1985; Quimby 1951 and 1957). Along the coast, transitional Coles Creek has been observed at Mulatto Bayou (16SB12), Thibodaux, 16AS35, and Bergeron School, 16LF33 (Weinstein et al. 1987). Absent from the coastal sites are *Mott* and *Plaquemine* variety ceramic sherds. Kidder et al. (1995) reported that settlement patterns of the earlier Coles Creek period, marked by the construction of mounds, continued through the Transitional Coles Creek phase without much change in the eastern coastal Louisiana area. This hypothesis is supported by the data gathered in the Terrebone Marsh, where settlement patterns remain unchanged from earlier eras (Weinstein and Kelley 1992). Within Lafourche Parish, and near the current study area, the Bowie Site (16LF17) appears to be the largest site in the region during this transitional phase.

Within the current study area, Site 16TR6, a shell midden with a possible associated mound, also may have a component dated as early as the transitional Coles Creek period. Very little information is available regarding this site given the limited nature of the initial collection.

Mississippian Period (A.D. 1200 - 1700)

The Mississippi period represents a cultural climax in population growth and social and political organization for those cultures occupying the southeastern United States (Phillips 1970; Williams and Brain 1983). In the Lower Mississippi Valley, the advent of the Mississippian period is represented at sites along the Lower Mississippi Valley and along the northern Gulf Coast by incorporation of traits such as shell tempered ceramics, triangular arrow points, copper-sheathed wooden earspools, and maize/beans/squash agriculture (Williams and Brain 1983). Formalized site plans consisting of large sub-structure "temple mounds" and plazas have been noted throughout the Southeast at such places as Winterville, Transylvania, Natchez, Moundville, Bottle Creek, and Etowah (Williams and Brain 1983; Hudson 1978; Walthall 1980; Knight 1984). In the current project area, the Mississippi period is characterized by the Early Plaquemine Culture (A.D. 1200 - 1500) and the Late Plaquemine Culture (A.D. 1500 - 1700) (Weinstein 1985; Jeter et al. 1989). The Plaquemine Culture in southern Louisiana, while influenced by external forces, seems to have originated on a local level (Kidder et al. 1995). The division of the Mississippian period into a series of local phases is extremely complex, and varies both chronologically and geographically. Within the current project area, the Mississippian culture is represented by the Medora, Barataria, Delta Natchezan, and Bayou Petre Phases (Jeter et al. 1989; Kidder et al. 1995).

Early Plaquemine Period (A.D. 1200 - 1500)

Between A.D. 1200 - 1500, Plaquemine Culture developed to its fullest in coastal Louisiana (Weinstein 1985; Jeter et al. 1989). Plaquemine peoples continued the settlement patterns, economic organization, and religious practices established during the Coles Creek period; however, sociopolitical structure, and religious ceremonialism intensified, suggesting a complex social hierarchy. Large sites typically are characterized as ceremonial sites, with multiple mounds surrounding a central plaza. Within the southern coastal areas of Louisiana, smaller dispersed villages and hamlets also formed part of the settlement hierarchy (Neuman 1984; Jeter et al. 1989).

Phillips established the early chronology of Plaquemines Culture in the Lower Mississippi Valley (1970). The initial categorization created by Phillips established Bayou Petre and Delta Natchezan as sequential phases, and Medora as a phase unique to southern Louisiana. The Early Plaquemine Culture within the project area has been refined and currently is defined by two phases, Medora (named after the Medora Site located in East Baton Rouge Parish) and the Barataria (Phillips 1970; Weinstein 1985; Jeter

et al. 1989). Bayou Petre is present continuously through the Plaquemine period (Phillips 1970; Weinstein 1985; Jeter et al. 1989).

The Medora Phase was identified on the basis of excavations carried out at the Medora site (16EBR1) between 1939 - 1940 by Louisiana State University and the Works Projects Administration (Quimby 1951; Phillips 1970; Weinstein 1985; Jeter et al. 1989). The site included a 3 m (10 ft) high truncated pyramid mound and a 0.6 m (2 ft) high irregularly shaped mound separated by a plaza area measuring approximately 121.9 m (400 ft) in length (Quimby 1951).

The Medora Phase was identified at the Medora site through the presence of certain Plaquemine ceramic types including Addis Plain, Plaquemine Brushed, Hardy Incised, Manchac Incised, Medora Incised, Dupree Incised, Harrison Bayou Incised, Australia Interior Incised, Evangeline Interior Incised, L'Eau Noire Incised, and Lulu Linear Punctate (Quimby 1951). Phillips (1970) later suggested several rules to be utilized in assigning ceramic assemblages to the Medora phase, which may be summarized as follows. Phillips stated (1) that if a site contained only Plaquemine Brushed, Mazique Incised *var. Manchac*, and Maddox Engraved decorated ceramic sherds, then its phase could be Medora or Delta Natchezan (discussed below), but if L'Eau Noire Incised, Medora Incised, Australia Interior Incised, Evangeline Interior Incised, Coles Creek Incised *var. Hardy*, or Pontchartrain Check Stamped also were present in the assemblage without any Natchezan "markers" (Fatherland and Natchez Incised), then the site could be assigned to the Medora Phase (Phillips 1970:950 - 951). Furthermore, if Fatherland and Natchez Incised ceramic sherds are present with Plaquemine Brushed, Mazique Incised *var. Manchac*, and Maddox Engraved ceramic sherds but no L'Eau Noire Incised, Medora Incised, Australia and Evangeline Interior Incised, Coles Creek Incised *var. Hardy*, or Pontchartrain Check Stamped ceramic sherds are present, then the assemblage could be assigned to the Delta Natchezan phase. Phillips (1970) suggested that if all these ceramic types were identified together, then the site could be considered to contain both Medora and Delta Natchezan phase components.

Within the current project area, the other early Plaquemine culture phase identified in southeast coastal Louisiana is Barataria. Weinstein (1985) reported that the phase was identified by Holley and DeMarcay based on excavations conducted at the Fleming Site (16JE36) in Jefferson Parish by the Louisiana Archaeological Society from 1974 - 1976. Weinstein (1985) described Site 16JE36 as a shell and earth midden with at least one mound located at the confluence of Bayou Barataria and Bayou Villars. The Barataria Phase is present within the eastern coastal zone of Louisiana, while the previously mentioned Medora phase is located in interior areas (Kidder et al. 1995). Ceramic sherds indicative of the Barataria phase included Anna Incised *vars. Anna* and *Evangeline*, L'Eau Noire Incised *vars. L'Eau Noire* and *Bayou Bourbe*, Carter Engraved, Maddox Engraved, and Mazique Incised *var. Manchac* (Weinstein 1985; Kidder et al. 1995). Kidder et al. (1995) reported that Barataria Phase sites can be distinguished from Medora phase sites through the absence of Plaquemine Brushed ceramic sherds and the presence of ceramic sherds decorated with Southern Cult motifs. Weinstein (1985) stated that Barataria Phase sites are located primarily within the Barataria Basin adjacent to Bayou Barataria and Bayou des Familles.

Kidder et al. (1995) reported that the best dated site in the southeastern coastal area of Louisiana is the Bayou Des Familles Site (16JE218). Testing at the site yielded radiocarbon dates between A.D. 1275 - 1650, along with Buras Incised ceramic sherds and a few shell tempered sherds. The only lithic materials identified were a piece of sandstone and a sandstone abrader (Kidder et al. 1995). Kidder et al. (1995) stated that Site 16JE218 was a shell midden occupied for short, possibly seasonal, periods during the later portion of the Barataria Phase into the early Delta Natchezan Phase, as well as the Bayou Petre Phase.

As mentioned above, a pure Mississippian culture, identified as the Bayou Petre Phase, is present throughout the Plaquemine period in southeastern coastal Louisiana (Phillips 1970; Jeter et al. 1989; Weinstein 1987). The Bayou Petre Phase was noted by Kniffen and was established to account for the presence of shell tempered ceramics in the southeastern coastal area of Louisiana (Kidder et al. 1995).

Phillips (1970) criteria for identifying Bayou Petre Phase components by sorting ceramic types is presented below in the discussion of the Delta Natchezan Phase. This Mississippi culture was located in the area of present day St. Bernard Parish but has also been noted in Plaquemines, Lafourche, St. Charles, and Terrebonne parishes, Louisiana. It was thought to have entered the region from the Mobile Bay area where Pensacola complex cultures were present (Jeter et al. 1989; Kidder et al. 1995). Archeological sites in the southeastern coastal area from which shell tempered ceramics were recovered were thought to represent the Bayou Petre phase intrusions into the local Plaquemine culture (Kidder et al. 1995). Jeter et al. (1989) also suggested that close ties were maintained between the Pensacola complex cultures located in the area of Mobile Bay and the Mississippi center at Moundville, Alabama (Knight 1984). Recent work has suggested that the Bayou Petre phase should not be seen as independent of the other Plaquemine culture phases (Kidder et al. 1995). Scholars associated with this view note that shell tempering and the introduction of non-local styles were integrated into local ceramic repertoires. These new innovations are seen as the movement of ideas, not peoples, and therefore do not suggest a large scale movement of cultures (Kidder et al. 1995).

Late Plaquemine Culture (A.D. 1500 - 1700)

The Late Plaquemine culture (A.D. 1500 - 1700) in eastern coastal Louisiana is defined by a single extended phase, the Delta Natchezan (Weinstein 1985:98). The Delta Natchezan phase was established by Phillips (1970) on the basis of excavations at the Bayou Goula Site (16IV11) by Quimby (1957). This phase, which was termed tentative by Phillips, included all Delta archeological sites that have yielded Natchezan ceramics types (Phillips 1970). Phillips also noted that this did not necessarily mean that the people inhabiting these sites were Natchez, only that the overall culture (as seen in the ceramic types) was Natchezan (Phillips 1970; Weinstein 1985).

Principal ceramic types that identify the Delta Natchezan Phase include Fatherland Plain, Fatherland Incised, Bayou Goula Incised, and Natchez Incised (Quimby 1957; Phillips 1970). All these types were described as containing fine grit, clay, and shell temper, and they ranged in chronological position from the Natchezan period to the early eighteenth century (Phillips 1970). Weinstein (1985) further refined these Delta Natchezan ceramic types to include Fatherland Incised, *vars. Fatherland* and *Bayou Goula*, and Addis Plain, *vars. Greenville* and/or *St. Catherine*. Mazique Incised, *var. Manchac* and Plaquemine Brushed ceramic types also were suggested by Weinstein (1985) to represent minor components of the Delta Natchezan phase ceramic assemblage.

Phillips (1970) stated that it was difficult to distinguish between Delta Natchezan Phase and Bayou Petre Phase components. In order to differentiate these components, Phillips utilized the following criteria:

> (1) Any site with Moundville, Fort Walton, or Pensacola Incised (temper specified or not) or limestone tempered Fatherland or Natchez Incised, and-in cases where it jibes with the distribution-limestone tempered plain, is assigned a Bayou Petre component. (2) Sites with Fatherland or Natchez Incised, temper unspecified, plus any of the Plaquemine types that survived into the Natchezan culture, e.g. Plaquemine Brushed, Manchac Incised (Mazique Incised, *var. Manchac*), and Maddox Engraved, are plotted as Delta Natchezan. These Plaquemine types are also present in the Bayou Petre so their presence alone doesn't count one way or the other unless limestone tempering is specified, in which case I have used them as markers for Bayou Petre (Phillips 1970:953).

Phillips (1970) reported that the use of these criteria provides an advantage to the Bayou Petre phase and concluded that there was a zone of contact in the Late Plaquemine culture where Bayou Petre and Delta Natchezan phase components occurred together. This picture is further complicated by the fact

that there is some evidence for the use of Mississippian designs and styles on local ceramic types (Davis and Giardino 1981). Evidence for this intermingling of styles was identified at the Sims Site (16SC2), where ceramics of the Bayou Petre Phase were identified in areas associated with Delta Natchezan occupation as well (Davis 1981; Davis and Giardino 1981). A contemporary occupation also seems to have been identified at the Bowie Site (16LF17), in nearby Lafourche Parish (Jackson 1977 [in Kidder et al. 1995]). In addition, there is evidence that Plaquemine Culture extended into the marshy areas of modern day Plaquemine Parish, as is suggested by occupations at the Buras Mounds, 16PL13, and Bayou Ronquille, 16PL7, sites. Large mound complexes have been identified at both of these sites, suggesting that they were relatively important occupation centers.

Settlement patterns in the Mississippian period are not well understood, but the limited data available suggest that there were no significant changes from the Coles Creek Period (Kidder et al. 1995). Occupations along the current channel of the Mississippi River started as this river course extended new waterways in the region (Kniffen 1936). In addition, with the advent of relatively complex society, the growth of mound sites in the region is not surprising. While mound sites in the region have been fairly well-documented, non-mound sites are not well understood at this time. Those non-mound sites that have been documented are located on elevated natural levees and seem to have focused on the cultivation of crops (Kidder et al. 1995). Weinstein and Kelley (1992) suggest that the settlement pattern for the area consisted of mound communities, small villages, and seasonal resource collecting camps. Altschul (1978) has suggested a different model for life along Bayou Lafourche. While some problems exist with his temporal and ceramic distinctions, the essence of his model is that Plaquemines culture involved seasonal patterns of movement with fall/winter occupations of the interior forested levees, and spring/summer occupations of the marshes and coast line. Altschul notes that there is little evidence for social distinctions among residents living in these communities. Altschul classifies the later phase of occupation as Mississippian. He notes that a different settlement pattern developed at this time. It included large, mound communities occupying levees, and separate villagers dispersed into "homesteads."

Plaquemine diet is best understood from the Sims Site. The faunal assemblage at this site indicates that Plaquemine people were exploiting fewer animals and were not consuming as many marsh species, specifically alligator and muskrat. At the Pump Canal Site, however, marsh-oriented subsistence continued, and evidence for muskrat, deer, raccoon, fish, and amphibians has been identified (Misner and Reitz 1994). This site may represent a transient occupation, and could be indicative of a shift from village life to seasonally occupied camps (Kidder et al. 1995).

The vast majority of known sites located in the vicinity of the proposed disposal site areas are associated with the Plaquemine culture. These sites include 16TR6, 16TR10/86, 16TR19, 16TR22, 16TR34, 16TR37, 16TR38, 16TR61, 16TR115, 16TR151, 16TR213, 16LF31, 16LF108, 16LF65, and 16LF66. The sites range in type from small shell middens (Sites 16TR61, 16TR115, 16TR151, 16TR213, 16LF31, and 16LF108), to possible fishing and hunting stations (16LF65 and 16LF66), to large mound sites (Sites 16TR6, 16TR10/86, 16TR19, 16TR22, 16TR34, 16TR37, and 16TR38). The large number of sites from this period, however, suggests a significant occupation of the region at this time.

Ethnohistory

Early French colonists in southeastern Louisiana encountered a native cultural landscape that was characterized by relatively small tribal groups. Relationships between these groups were dominated by small-scale warfare and unstable, shifting alliances (Davis 1984; Giardino 1984). To the south of modern-day Donaldsonville, there seem to have been no large, permanent centers, but rather a series of villages whose locations shifted as old alliances broke down and new ones were forged. Tribal groups that were reported at one or more locales along Bayou Lafourche between Donaldsonville and the Gulf between 1682 and 1712 include the Washa, Tilapana, Yagnesito, Tchachagoula, Bayagoula-Mugalasha, Chitimacha, and

Houma. Virtually no ethnographic information is available for the first four of these groups, all of which disappeared from the historic record during the early years of French colonization (Swanton 1911; Giardino 1984). Little more is known of the Bayagoula-Mugalasha, a composite tribe that settled near the upper reaches of Bayou Lafourche; Quimby (1957) believed that his excavations at the Bayou Goula site (16IV11) documented the remains of one of the Bayagoula villages (see Chapter VI, this report). However, Giardino (1984) has noted that early cartographic evidence favors a village location at Donaldsonville.

The Tunica, who were Choctaw speakers like the Houma, lived in northwestern Mississippi at the dawn of European exploration in the sixteenth century. However, the passage of two centuries saw a southward movement of the Tunica, until, during the years from 1731-1763, they were settled at the site now known as Trudeau, on the east bank of the Mississippi River just above Baton Rouge. From that locale, they controlled the confluence of the Red and Mississippi Rivers and the nearby Portage of the Cross, and gained considerable economic power through control of the horse trade between Native Americans and the French (Brain 1988). Subsequently, some Tunica moved westward into Texas and Oklahoma, but a small number remained in Louisiana, settling in the vicinity of Marksville near the Red River mouth, where their descendants live today. While the history of Tunica settlement is better understood than that of many small tribal groups in the project vicinity, there is no evidence that the Tunica settled the project area proper.

Unlike their counterparts along Bayou Lafourche, the Chitimacha and Houma survived the colonial period, and their cultural descendants remain in south Louisiana today. The Chitimacha people are currently clustered around Charenton. The contemporary Houma are concentrated around and near Bayou Lafourche, and thus represent the primary Native American group in the project vicinity today. However, communities of both groups moved to a series of locations within southern Louisiana during the historic period. A review of the known locations of the two tribal groups from the time of first European settlement until the present century indicates that archeological sites of prehistoric through protohistoric age in the project area are more likely to have been associated with the Chitimacha than the Houma. The remainder of this chapter includes a summary discussion of the ethnohistory of the Chitimacha, and a more extensive overview of Houma ethnohistory, concluding with a brief account of the socio-economic status of the Houma in the present day.

Ethnohistoric Overview of the Chitimacha

One of the earliest mentions of the Chitimacha nation comes from Jean-Baptiste Bernard de la Harpe, in The Historical Journal of the Establishment of the French in Louisiana (1971:17). According to the Journal, in 1699 a small group of Frenchmen led by M. d'Iberville and M. de Bienville came upon a few pirogues carrying peoples of the Washa nation at "the fork of the Mississippi," identified as Bayou Lafourche. These Washa were returning to their village, thought to be located near those of the Chitimacha and the Yagenecito, also near Bayou Lafourche. Together, these nations were estimated to number 700 -800 men (La Harpe 1971:17). Swanton interprets this number to represent only warriors, and also suggests that the Yagenecito may have merely been another group of Chitimacha who lived on Bayou Teche and Grand Lake, and who were geographically separated from the Chitimacha living on the Mississippi River (Bierer 1980:452; Swanton 1911:342).

It is easy to believe that these tribes may have lived in close proximity. According to Swanton (1911), the material culture of the Chitimacha was similar to that of the other Native Americans along the lower Mississippi, with the exception that more importance was put on food obtained from the water. The earliest historic records indicate that their houses consisted primarily of palmetto leaves over a pole framework, and had a closeable smoke hole. Possibly durable materials used in clothing include shell, stone, and sometimes copper for necklaces, finger rings, bracelets, nose rings, and earrings. Personal adornment included the use of such potentially durable objects as garfish jaws for scarification.

Sometime prior to August of 1702, M. de Saint-Denis, along with a few Canadians and Native Americans, attacked the French-allied Chitimacha without apparent provocation in order to obtain slaves. Although the prehistoric basis of such practices is unknown, the Native Americans themselves sometimes used social ruses to attack each other and capture slaves. De la Harpe (1971:75) cites an instance of members of the Tensas nation inviting several families of the Chitimachas and Yagnecitos to come and eat wheat (Swanton repeats this as "corn") with the Bayagoulas, whom the Tensas themselves had just massacred in their village. When the Chitimacha and Yagenecito arrived, the Tensas captured many of them and sold them as slaves (Swanton 1911:337).

After the altercation led by Saint-Denis, M. de Bienville ordered that the slaves be returned, but his orders were poorly carried out and led to predictable hostilities between the Chitimacha and French (de la Harpe 1971:60). In early 1707, M. de Bienville learned from the visiting vicar-general of Quebec that the Chitimacha had attacked and killed a missionary and three other Frenchmen who were traveling on the Mississippi (de la Harpe 1971:77). Although he expressed disbelief that the Chitimacha could have perpetrated such a crime, he also expressed his doubt of the honor of any Native Americans in the region. In March of 1707, an attacking party of 87 Native Americans and French Canadians led by M. de Saint-Denis destroyed a small village of forty persons and returned to Fort Louis with the man who boasted that he had killed the missionary. In the Native American manner of "eye for an eye," Bienville had this man tomahawked in the square of the fort. According to Penicaut, the destroyed village was located on a lake near Bayou Lafourche; 15 Chitimacha were killed and another 40 taken as prisoners (McWilliams 1953).

Bienville made peace with the Chitimacha in 1718 (Weinstein and Kelley 1992). Accounts of many facets of the peacemaking vary, but they agree that Chitimacha leaders presented themselves to French leaders to make peace and to smoke the calumet. In presenting themselves to the French, members moved to the cadence of rattles which they all carried. According to Swanton (1911:341), the account of Du Pratz claims that the murderer of St. Comte was beheaded, but Swanton suggests that this may have been only the last in a band of murderers. Regardless of the particulars of the process, this peace may have been brought about as a ploy to move the Chitimacha closer to a French concession, managed by M. Paris, located at the old Bayagoula village on the Mississippi River. Penicaut states that they moved to the new location two weeks later, and maps of the period do show a Chitimacha village in that area (Swanton 1911: 341; Giardino 1984:253).

Swanton (1911:342) questioned whether this movement involved the entire tribe or simply one portion of it. As previously mentioned, the Chitimacha may have been divided into two groups -- one living on the Mississippi River, and the other, called the Yagenecito by some sources, living around Bayou Teche and Grand Lake. Likewise, sources of the period lend some doubt to the exact whereabouts of the Chitimacha. In 1722, Charlevoix obviously saw few Chitimacha in his descent of the Mississippi, stating that "the nation of the Chitimachas is almost entirely destroyed; the few that remain are slaves in the colony" (Swanton 1911:342). In 1727, Poisson found them above the concession of M. Paris and some distance inland (Swanton 1911:342). Toward the end of the eighteenth century, Hutchins (1768) reported one Chitimacha village on the upper reaches of Bayou Lafourche near the Mississippi River, and two others on Bayou Teche.

Another factor that may indicate that the Chitimacha in the early eighteenth century were not a single unified tribe is the notable overtone of peace and trust between the Chitimacha and French within a few years after their conflict. One expression of this renewed trust was shown in a 1733 letter from Bienville stating that there was no evidence to implicate the Chitimacha in the recent burning of a French house and the murder of two French citizens near Pointe Coupee. Rather, testimony was taken from a steward of this house, who knew a band of malignant Natchez to have been nearby and waiting for the opportunity to "strike a blow" (Rowland and Sanders 1927:204).

These good relations apparently continued in 1738. During November of that year, M. de Louboey reported that two inhabitants of Pointe Coupee arrived at New Orleans to pass along a Chitimacha warning of alliance between the Avoyelles, Tunicas, Natchitoches, and the nations on the upper part of the Red River, to go and destroy the posts of M. de St. Denis and the Natchez, and also Pointe Coupee (Rowland and Sanders 1984a: 157). This warning was given by the Chitimacha chief himself, who feared assassination by the alliance if his kindness toward the French was discovered. In 1739, a French party commanded by De Nouaille found only small numbers of Chitimacha settled along the Mississippi. They reported that many of the Chitimacha were living elsewhere with the Attakapas (Swanton 1911:343).

Fluctuating alliances and settlements were exemplary of the period, and certainly took a toll on the Chitimacha nation. This is evident in a December 1758 letter by M. de Kerlerec, in which he wrote that the Chitimachas at that time could count only about eighty warriors, characterizing these as "unfortunate remnants of a numerous nation...reduced to this figure by the trade in drink and the close proximity of the French" (Rowland and Sanders 1984b: 213). The tribe itself, he said, was established "about twenty leagues from New Orleans and on the other side of the river" (Rowland and Sanders 1984b:213).

The next significant mention of the Chitimacha people comes from cartographers and survey journals from the late eighteenth and early nineteenth centuries. Thomas Hutchins noted a Chitimacha village located on "Chetimachas" creek (Bayou Lafourche) six leagues from its junction with the Mississippi River (Hutchins 1968:40). Two other settlements, for which Hutchins does not provide a cultural identity but which Weinstein and Kelley (1992) suppose to be Chitimacha, were located on the east shore of Bayou Teche (Hutchins 1968:46). The first of these was situated 10 leagues above the mouth of the bayou and called Mingo Luoac or Fire Chief, while the other village was called Soulier Rouge or Red Shoes and located three and one half leagues farther up (Hutchins 1968:46). Goodwin et al. (1985:207) have placed the first village on the east side of Irish Bend and the second in the vicinity of modern-day Charenton, the present location of the Chitimacha reservation.

The Cathcart and Landreth expedition in 1819 noted several Chitimacha settlements, the most significant of which seems to have been Charenton, within the "Indian Reach" of Bayou Teche (Newton 1985:108). Landreth described the village as a nearly 4.8 km (3 mi) stretch of cabins built 183 m (200 yd) back from the bayou and spaced evenly at approximately 46 to 91 m (50 to 100 yd) from each other. These cabins had a neat and light appearance caused by palmetto coverings (Newton 1985:108). The expedition also recorded a small settlement named Position's Settlement consisting of three huts on Berwick Island on the shore of Six Mile Lake, and also noted a small fishing and hunting village consisting of two huts located on Grand Lake and approximately 2.4 km (1.5 mi) from Charenton (Newton 1985: 52-53; 126-127; Weinstein and Kelley 1992). This settlement was called Peters settlement after the chief, and was reported to sit on a spot of "high prairie with a shell bank to the westward of it" (Prichard et al. 1945:105). Another settlement was reported, but not identified as Chitimacha or any other group (Newton 1985:16; Prichard et al. 1945:109). However, Gibson (1980:3 -10) used land claims data to imply that the occupants were Chitimacha, and also documented a second Chitimacha village on nearby Bayou Jacob (Weinstein and Kelley 1992).

In the 1880s, Gatschet compiled a list, emanating from his ethnographic research among the tribe, of 15 historic Chitimacha sites reported to have existed in 1700 (Gatschet 1883). Swanton added to this list (1911:343-344). Most of these sites were reported to be in close proximity to Charenton -- on Bayou Teche itself, or on the main shore or inlets of Grand Lake, on Butte la Rose, on Grand River, and at the mouth of Bayou Plaquemine.

One important structure known to exist at each large village was the "tribal dance house," similar in function and use to the temples of the Natchez (Swanton 1911:167). This house was used for religious observances and the consummation of important social obligations, and during ceremonies was often visited by large numbers of men, women, and children from all the surrounding settlements. Although the age of

these structures was unknown, Swanton (1911:352) determined that the oldest known during his study was located at Hi'pinimc at the Fausse Pointe in the western part of Grand Lake, but the only description of such a house was given by Gatschet for Co'ktangi-ha'no-hetci'nc, on the shore of Grand Lake (1883:6). He says:

> ...it was about 12 feet square, with a pointed roof, ...surrounded with a picket fence. It contained nothing else but the garments of the dancers and the three kinds of paints used at this ceremony. No idols, stuffed animals, perpetual fire, etc., were to be found in connection with it.

Another important structure in the larger villages was the "bone house," occupied by an official known as the "buzzard picker" (Swanton 1911:350). Gatschet (1883) and Swanton (1911) disagree somewhat on the precise ceremony that was conducted within this structure, but the structure itself would have had a large and continuous fire to be encircled by villagers when a chief had died. One year later, his bones were exhumed and prepared for burial within a specially prepared mound. The bones of the deceased apparently were cleaned, either burned or immediately bundled, and then contained in a basket or mat to be buried in the mound. Of particular interest, Swanton stated that all property of any note or value belonging to the deceased was also buried within this mound, and may account for the absence of ancient objects among the modern Chitimacha (1911:350). The mounds erected over chiefs were said to be 1.2 - 1.5 m (4 - 5 ft) high.

Sweat houses also were common features in early historic Chitimacha villages. These were made without floors and with a cavity in the ground 5 or 6 feet long. A patient would sit, covered in a blanket, on a bed of hot stones cooled by water and with a bed of moss (Swanton 1911:351).

The long and distinguished, though sometimes troubled, history of the Chitimachas was marked by long-term population decrease until the modern day. Kniffen et al. (1987) report an estimated population of 4,000 in 1650 for the combined Chitimacha, Yagenecito, and Attakapas, while Swanton reported an estimate of 2,625 for the Chitimacha alone (Bierer 1980:452). Either figure complements the known reduction in both population and settlement over 200 years; Kniffen et al. (1987:74) report that only 50 Chitimacha remained in 1909, confined to a small tract near Charenton. During the twentieth century, the Chitimacha again have grown in size and today are a proud and important part of the cultural heritage of Louisiana.

Ethnographic Overview of the Houma People of Lafourche and Terrebonne Parishes

Data on the ethnography of the Houma people are sparse, and cogent, primary analyses of extant ethnographic data in historic context are lacking. This is as true for the present as for the immediate and more distant past. For the French Colonial Period (1682-1803), this results from the fact that sixteenth and seventeenth century explorers, administrators, religious, entrepreneurial, and military personnel gathered very little substantive ethnographic data on most Native American groups of the Mississippi Valley. Their interests, quite understandably, lay elsewhere. For the American period (1803 to the present), it is a result of the fact that the Houma have not been recognized officially as an Indian group and consequently have been very little studied (Kehoe 1981:199-200). Even the establishment in 1968 of the United Southeastern Tribes of American Indians, Inc., did not pull the Houma into the fold, for they were not included in the newly formed power-base, organized largely to handle Native American land claims within the confines of the U.S. state and federal legal systems.

In spite of this situation, there have been five brief studies of the Houma as a Native American society: Speck (1943), Parenton and Pellegrin (1950), Roy (1959), Fischer (1968), and Stanton (1971).

None of these investigations can be considered ethnographic, all being devoted almost exclusively to sociological or narrative description of the economic life of present-day Houma communities; moreover, all but Speck's analysis were framed as studies of "racial hybrids." The incomplete sociological data-gathering techniques chosen for these studies and the specific data fields chosen for investigation would be considered grossly inadequate for the gathering of ethnographic data by modern anthropological standards. Only Speck attempted the elicitation of data which might have provided some insight into the possible survival of native American culture traits, and even his data on kinship are sporadic, incomplete, and regrettably inadequate for either descriptive or reconstructive purposes.

Guevin (1983) summarized much of the available information about Houma life during the eighteenth and nineteenth centuries, but did not undertake ethnographic studies of contemporary Houma society. Guevin's aim was to employ ethnohistoric information about material culture, community organization, and subsistence as devices for identifying evidence of the Houma in the archeological record. Guevin also produced an informative review of other authors' views about the possible associations between ceramic traits and ethnic groups in the protohistoric archeological record of southeastern Louisiana. However, he found that "no specific diagnostic pottery trait has been uncovered for the historic Houma [although] the Houma culturally shared with the historic Bayagoula and Natchez a strong indigenous Plaquemine ceramic tradition known as Addis Plain in the southern half of the Lower Mississippi River Valley" (Guevin 1983: 98). It is unfortunately the case that we probably will never be able to reconstruct Houma lifeways in full as they used to be. Even archeological data can provide only limited information on most customs.

As early as 1706, the Houma began a centuries-long migration southward from their homeland along the eastern banks of the Mississippi River at its confluence with the Red River (near the present town of Pinckney, Mississippi) toward the Gulf, settling among other native American groups along the way and intermarrying with members of those societies. By the time the United States purchased the Louisiana Territory from France in 1803, the Houma were no longer a single, cohesive entity, but, rather, creolized Native American society with a blend of both Creole and Cajun French, Bayagoula, Acolapissa, and Atakapa traits thoroughly melded to the original Houma base. The Houma of 1682 had become a unique type of rural Creole community. Even this creolized society has yet to be described in a thorough manner, and articulation of such an ethnographic description with accounts of the Houma historic and archeological past is a task — long, long overdue — which awaits the future.

There are, of course, some remaining clues to the Houma ethnographic past. The name *Houma* itself, for example, is the Choctaw word "red," and the full name of the people was expressed by the phrase *šakĺi homma* (pronounced 'shakchee homma') "Crawfish Red [Town]," mirrored by their totemic emblem, a red crawfish (Dumont de Montigny 1753:1:184; Swanton 1952:185). The fact that *šakĺi homma* was also the name of another documented but now extinct Choctaw-speaking group, the Chakchiuma — located in the late 1600s in central Mississippi at the confluence of the Yalobusha and Yazoo Rivers, south of the Chickasaw and north of the Choctaw — has led to the likely assumption that the Houma were originally part of that group (Swanton 1952:176). We are consequently at least sure that the Houma spoke Choctaw, though the language is not remembered by the Houma people today and probably has not been in use for at least a century and a half.

The long and gradual dispersal of the Houma from their homeland southward downriver toward the Gulf, and the accompanying adoption of non-Houma traits from the groups among whom they settled between 1706 and the mid-1800s, seems not only to have altered Houma language use but to have so diluted other native culture traits (Kehoe 1981:199-200). Intermarriage over this long period, first with speakers of related Muskogean tongues such as the Bayagoula and Acolapissa, then with speakers of Attakapas, and finally with speakers of both Creole and Cajun French, effected native Houma culture. Today, Cajun French is the everyday language — only the younger generation is fluent in English — and general Cajun customs the norm (see Speck 1943; Stanton 1971; Kehoe 1981).

As pointed out earlier, the lack of governmental recognition of the Houma as a Native American entity has compounded the problems both of cultural definition and of social well-being. With a small population throughout their known history, and the long-term absence of an officially sanctioned cultural identity, the Houma have, with far-reaching aftereffects, been discriminated against to one degree or another both socially and economically by neighbors and governmental bureaucracies alike, making mere survival their necessary major goal (Kehoe 1981:200). The situation remains largely unchanged today (Parenton and Pellegrin 1950; Roy 1959; Fischer 1968; Stanton 1971; Kehoe 1981:199-200).

Ethnohistoric Data from the French Colonial Period (1682 - 1803)

The first reference to the Houma comes from the accounts of La Salle's expedition down the Mississippi in 1682 (Cox 1905; Delanglez 1938; Shea 1852, 1861). At that time, they were located in what is now the extreme southwestern corner of the Mississippi border with Louisiana, around the confluence of the Red and Mississippi Rivers, largely on the east side of the Mississippi. Their origins before this time are uncertain, but there is reason to think that the small Choctaw-speaking groups of the Lower Mississippi, such as the Houma, were late arrivals from the Choctaw heartland in central Mississippi to the north and northeast (Swanton 1946:28-29). Frequent movement of peoples and settlements in the Lower Mississippi Valley, particularly downriver from more northerly locales, has been amply documented by archeology from protohistoric times (Davis 1984), and probably was characteristic of the region from even earlier periods. Such a long-term dispersal of Choctaw speakers is therefore neither surprising nor unusual. At the time of French intervention, they were found throughout Mississippi and most of eastern Louisiana, each group given a deceptively distinct name by the French — Choctaw, Chakchiuma, Houma, (A)colapissa, Bayogoula, Okelousa, Quinipissa, Pascagoula — as though each were a separate tribal entity (Swanton 1946:Table 1).

Described in 1685 as the "bravest nation on the river" by the explorer Henri de Tonti (Claiborne 1880:19; Cox 1905), by 1686 the French had formed an alliance with the Houma. This was renewed in 1699 by d'Iberville, who provides a description of the primary Houma town. d'Iberville wrote that the town, in which three chiefs lived, was a fortified village consisting of 140 houses and a population of approximately 600-700, 350 of whom were warriors (French 1875:64-85; Gravier in Thwaites 1896-1901:65:145-150; Margry 1879:4:176-177,184, 265-271; Shea 1861:143-147; Swanton 1946:140).

French settlement in the region and consequent contact with Europeans had an immediate effect on the Houma, for only one year later, in 1700, d'Iberville noted that half of them had died from "an abdominal flux," which probably can be defined as a European-introduced malady. Though the symptoms sound suspiciously like cholera, that dread killer was not introduced to the New World until well after 1700, and it seems more probable that the reported symptoms define either the plague or an extreme form of stomach influenza, both firmly in place in the Americas since the 1500s (Ramenofsky 1987:141, 157-158). Epidemics, particularly smallpox, had begun to ravage the native population to the immediate north in 1698, according to the testimony of a missionary accompanying Henri de Tonti's expedition down the Mississippi (Kellog 1917:359; Ramenofsky 1987:64, 70). In that year, we are told that there were only 70 to 80 houses left in the main Houma town, reinforcing d'Iberville's estimate of the decimation caused by disease (Swanton 1946:140).

In 1706, a group of Tunica were settled with the Houma, but hostilities between the two groups broke out, and a large number of Houma were killed, compelling the survivors to flee permanently from their erstwhile Tunica visitors (Swanton 1952:186). Those Houma who survived moved downriver, apparently in three separate groups (Curry 1979), and settled first on Bayou St. John near New Orleans. They later moved upstream some miles near the present towns of Convent, Union, Donaldsonville, and Darrow in Ascension Parish, where three towns, Grand Oumas village and two Petite Oumas villages, were established (Giardino 1984: map figure 101; McWilliams 1953:129-130; Riis 1936:map 4; Charlevoix 1923; Thwaites 1896-1901:67:297). Between 1739 and 1758, they were joined by what was left of the Bayogoula, already living

in Ascension Parish, and the Acolapissa, who had moved westward from the north shore of Lake Pontchartrain (Claiborne 1880). The three groups, all Choctaw speakers, maintained their own separate leaders, but the masses of the people, according to French accounts, were in the process of fusion into a single social entity (Claiborne 1880; Swanton 1946:139). This melding of peoples and social traits, though-be-it a coming together of three related Western Muskogean groups, certainly began the creolization process that Houma culture was to increasingly and continually undergo for the next two centuries. From a number of accounts, we know that though the bulk of the Houma remained in Ascension Parish until the early to mid 1800s; a significant number moved west to Attakapas lands in the Lake Charles region around 1805. There, intermarriage with the local population added yet another, in this case non-Muskogean, cultural dimension to the Houma social system (De Kerlérec 1907 [1758]; Sibley 1805; Gallatin 1836).

Population estimates for the Houma from 1699 to 1930 indicate a rapidly diminishing population throughout the eighteenth and nineteenth centuries, with gradual recovery and increase beginning about 1900 and continuing through today (Table 2). After 1930, all Louisiana native American groups are lumped by the U. S. Census Bureau simply as "Indian," and consequently it is possible only to give estimates from that date to the present. These population figures are further blurred by the fact that federal and state agencies use different criteria for defining an individual as "Indian," and by the fact that the originally pure-blooded Indian Houma have intermarried with both the local white Cajun and Negro Creole populations of Terrebonne and Lafourche Parishes. The following figures must consequently simply be taken for what they are, all estimates:

Table 2. Houma Population Figures, A.D. 1650 - 1969.

YEAR	POPULATION	WARRIORS	SOURCE
1650	ca. 1,000	?	Mooney 1928; Swanton 1946
1699	600-700	350	Iberville in Thwaites 1896-1901-
1700	ca. 350	?	Gravier in Thwaites 1896-1901-
1718	ca. 300	200	La Harpe 1971 [ca. 1700]
1739	270-300	90-100	Swanton 1946
1758	ca. 200	60	De Kerlérec 1907 [1758]
1784	ca. 150	25	Hutchins 1784
1803	ca. 60	N/A	Jefferson 1823
1836	60-80 men	N/A	Parenton and Pellegrin 1950
1910	125	N/A	U.S. Census Bureau (Swanton 1946)
1920	639	N/A	U.S. Census Bureau (Swanton 1946)
1930	947	N/A	U.S. Census Bureau (Swanton 1946)
1940	ca. 700	N/A	Speck 1943
1969	ca. 3,000	N/A	Stanton 1971

Ethnohistoric Data from the American Period (1803 - Present)

After the Louisiana Purchase in 1803, the U.S. Government reports of John Sibley (1805) and Albert Gallatin (1836) describe the Houma as still resident in Ascension Parish. We know, however, that by 1766 many Houma had begun to move down the Bayou Lafourche from its confluence with the Mississippi near the town of Darrow (Curry 1979). This southward migration continued until, sometime after 1836, the bulk of the Houma were settled in Lafourche and Terrebonne Parishes. The present town of Houma, founded in 1834, was named after the neighboring settlement of these migrants (Parenton and Pellegrin 1950:149). Originally located primarily around Houma city, pressure from increasing numbers of French settlers and from an encroaching sugar plantation system gradually forced the Houma into locations along the bayous

south of the city. There they have remained to the present day, now centered in the six communities of Bayou du Large, Grand Caillou-Dulac, Lower Montegut, Lower Pointe au Chien, Champs Charles, and Lower Bayou Lafourche (Stanton 1971:1-2). The first five settlements are in Terrebonne Parish, and the last is partly in Terrebonne and partly in Lafourche Parish. None of these communities is exclusively Houma, and only Champs Charles has an Indian majority.

Since the late-1800s, the Houma traditionally have gained a livelihood from shrimping and muskrat trapping. Trapping in particular demanded large marshland ranging territories, and most Houma settlements of the late 1800s and early 1900s consisted not of towns but of widely dispersed individual homesteads, apparently often moved, in a semi-nomadic fashion, as new lands were needed (Speck 1943:136-139, 212). Even as late as 1969, the younger people could remember when they were unable to attend school because they were living too far away from the nearest settlement (Stanton 1971:31). Since the end of World War II and the advent of oil exploration and exploitation in Terrebonne and Lafourche Parishes, this type of scattered homestead pattern has given way to permanent settlement within the bayou communities listed above (Stanton 1971:44).

As the shrimping industry has become more mechanized, Houma fishermen have found themselves increasingly unable to compete with their American counterparts, and muskrat trapping in the traditional manner has become equally unrewarding as large American interests purchase or lease large tracts of muskrat swamp (Kehoe 1981:199). Though Houma lands have been found to be oil-producing, the Houma have been unable to demonstrate and support the legality of their land claims in court, and even this vast income potential consequently has been denied them.

Houma Ethnography

The French Colonial Period

In spite of the lack of explicit ethnographic accounts in French colonial sources, a certain amount of very general ethnographic information on the Houma, particularly data on probable socio-political organization, can be recovered or implied from records of that period. We know, for example, that the Houma were organized into three villages, Iberville specifically mentioning the fact that there were three Houma chiefs (French 1875:84; Margry 1879-88:4:184). After the disastrous battle with the Tunica in 1706, the remnants of the Houma are said to have moved downstream in three groups, perhaps village-by-village (Curry 1979). There they eventually also settled in three separate villages, Grand Oumas and the two villages called Petite Oumas by the French (LaHarpe 1971; Giardino 1984: map figure 10.1). Even after the amalgamation with the Bayogoula and Acolapissa between 1739 and 1758, three separate villages remained (Claiborne 1880). Such settlement triads are, interestingly, characteristic of Choctaw towns, for there are references to other such groups, in each instance forming a single larger unit, though the basis and exact nature of such unity is never defined in the sources (Du Roullet 1732; De Villiers 1923:239-241)

While it is impossible to say with certainty what the meaning of this settlement pattern is, it implies a socio-political rationale underlying town residence. There is precedence for this in Muskogean social and political structure in general. Individual family *lineages*, based on actual or fictive ancestors, usually were grouped together into *clans*, themselves based on a common fictive ancestor, most frequently though not always an animal. In instances, as among the Creek, the ancestral clan animal served as a totemic emblem for the clan. We know that clan distinctions were of importance in the life of the Choctaw, the unit in question being referred to as an *iksa*, though totemic clans have not be described for them, and the assumption is that Choctaw clans based their unity on a common fictive human ancestor (Swanton 1911:108, 349; 1946:654-655). Each Choctaw clan additionally belonged to one or another of two larger social structures (*moieties*), one called *Imoklaša* "Their Own People," and the other *Inholahta* "Chiefs" (Swanton 1946:663).

French documentary sources make it evident that the names assigned by the Europeans to Indian groups did not necessarily mirror local usage, and that "tribal" names assigned by the French often did not, in fact, mirror tribal separateness. The consequent socio-political distinctions they imply are too frequently spurious. Thus, the supposed Mugulasha "tribe" consisted of members of the Choctaw *imoklaša* moiety (Giardino 1984:241). The same is true of the Acolapissa "tribe," which was apparently a clan group within the broader Choctaw tribe. The French were, in short, erroneously recognizing sub-tribal differentiations, very real to their native members, as equal-level tribal distinctions.

Paralleling the social system described above, which was applicable to all Choctaw-speaking communities, was a similar political structure, also characteristic of the closely related Western Muskogean Chickasaw and the Eastern Muskogean Creeks (Swanton 1946:663). Choctaw towns were divided into two types: *Peace Towns* and *War Towns*. War towns, which were fortified, were headed by a war-leader and inhabited largely by warriors (Swanton 1946:663). Peace Towns among the Chickasaw and Creek were characterized by the color white, and War Towns were characterized by the color red. In Choctaw, this is *homma*, French *ouma*, *houma* (Gatschet 1884:112; Swanton 1928). That the Houma village visited by Iberville in 1699, and again the following year, was such a "Red" or War Town is clear both from its name, from its fortified nature, and from the fact that half or more, a reported 350, of its 600-700 inhabitants were warriors. Henri de Tonti's characterization of the Houma as "the bravest nation on the river" (Claiborne 1880:19; Cox 1905; Shea 1861; French 1875; Thwaites 1896-1901:67) reinforces this interpretation.

Each "Red Town" seems to have had a totemic emblem. In the case of the Houma, it was the red crawfish (Dumont de Montigny 1973; Swanton 1946:29; 1952:185). The Choctaw-speaking Chakchiuma (*Šakîi Homma*) towns of the Yalobusha and Yazoo Rivers region of east-central Mississippi used the same "Crawfish Red [Town]" name, and the assumption that the Houma had migrated downriver from a source further north and that they were originally a segment of the Chakchiuma is therefore not illogical.

We also know that in Choctaw communities clans and house groups were separated along moiety lines (Swanton 1946:663). Thus if one links the evidence from what is known of Choctaw social and political structures, both the identity and settlement patterns of the Houma communities during French colonial and early modern times begin to take on a logical pattern:

(1) Houma towns were part of the Choctaw War Town system;

(2) The totemic emblem of Houma Red Towns was the crawfish;

(3) The Louisiana Crawfish Red Town people (the Houma) were probably a branch of the Mississippi Crawfish Red Town people (the Chakchiuma);

(4) Houma towns were three in number from colonial through early modern times, mirroring an expected Choctaw settlement pattern in which clan groups belonging to different moieties reside in different locales.

The fact that the Houma, Bayogoula, and Acolapissa merged both residentially and socially after 1739 perhaps mirrors the natural coming together of related clan groups. The cause for such a union would seem to lie in the decimation of the Chakchiuma as a separate socio-political entity during the Natchez Wars of the 1720s and 1730s (Swanton 1946:106).

It is of particular importance to emphasize that not only the Houma but all native American groups of the Lower Mississippi Valley, while sedentary villagers in a broad sense in the seventeenth and eighteenth centuries, nonetheless frequently relocated their towns from at least early proto-historic times well into historic times (Giardino 1984:237, 240). While the socio-political reasons for most such relocations,

coalitions, and mergings are not known, it has been demonstrated from archeological data that such a pattern was typical of the entire region (Davis 1984:216, 231). It probably first became a feature of Lower Mississippi life sometime during the Late Archaic (ca. 2,500 B.C.), if the archeologically demonstrable interchange of economic goods throughout the Valley and along the north Gulf coastal plain through the Poverty Point Trade Nexus is meaningful. Thus, the relocation of the Houma towns from the Red River area south to Ascension Parish and then to Lafourche and Terrebonne Parishes is not necessarily attributable solely to French pressures, European epidemic diseases, and/or intertribal pressures. The phenomenon may simply represent the continuation of an acceptable social pattern, one which, in the case of the Choctaw, enabled them to protect areal interests through the strategic placement of "Red Towns."

The American Period

Notable cultural survivals of the Houma have not been thoroughly explored. Two of these clearly merit research: the system of reciprocal kinship obligations, and the system of reciprocal community membership obligations —the systems, that is, of social and political organization. Stanton (1971:38, 47) and Speck (1943:212-213) both felt that definitions of these two aspects of modern Houma social structure might reveal clues to the Houma Indian past, but unfortunately neither researcher had the field-investigation time to follow up his hunch with the gathering and reporting of data. In addition, patterns of endogamy and of socio-political organization, e.g., matrilineality, matriarchical political organization, etc., also offer potentially fruitful avenues for ethnographic research. Some evidence for the continuing political prominence of women among Houma can be observed easily today. The current chairperson of the United Houma Nation is a woman, as was her predecessor. Woman also are well-represented on the current tribal council. Although this data set of observations is not large, it is suggestive of continuity with the indigenous Muskogean-type social system recorded at contact.

Speck tells us that the kinship bond among the Houma in 1938 was strong and suggests that the entire Houma group constitutes a single extended consanguineous family, but he does not elaborate with a list of obligations and duties, though he provides a minimal set of kin terms (Speck 1943:212-213). Stanton does no better, only letting us know again that "Kinship ties are strong. A prestigious person acts as a leader and spokesman for his relatives" (Stanton 1971:abstract). He further states that "some degree" (undefined) of political power is channeled along lines of kinship and prestige and that within each kin group either a married couple or a "prominent" (also undefined) female may assume day-to-day leadership and decision-making responsibilities (Stanton 1971:4). Informal leadership, he tells us, has its locus within the family or kin group and is found among those individuals who are admired by fellow members of their "group" (= family?, all Houma?) for their conformity to the values of the community, also undefined (Stanton 1971:38-40). The implications of both Stanton's and Speck's comments could be enormous, given the likely matri-orientation of many earlier Lower Mississippi peoples. Stanton summarizes his findings by saying that "'Indianness' will hold a great degree of importance to these people as long as [the] kinship bond remains strong and Indian norms and values are important," (Stanton 1971:47).

Both researchers tell us little, as well, about the actual settlement patterns of the Houma, other than to point out that buildings are essentially in a line nowadays along the bayous (Stanton 1971:32-36). Stanton implies that close relatives live near one another, but this is neither clearly nor definitively stated (Stanton 1971:40). That more data are there to be recovered is unquestioningly the case, for though social systems alter through time, particularly in instances of creolization, they do not simply vanish. Artifact types and technology may, indeed, vanish through time, but the innermost beliefs of a people, with social organization at the heart, do not just wither away (Murdock 1949).

CHAPTER IV

CULTURE SETTING: HISTORIC PERIOD

Introduction

The proposed U.S. Army Corps of Engineers, New Orleans District Bayou DuLarge Disposal Site Project areas along the west bank of Bayou DuLarge, are located in central Terrebonne Parish in southeastern Louisiana. The extensive waterways that weave through the region encompassing the study areas have provided livelihoods to generations of trappers, shrimpers, sugarcane growers, and oil men.

Early Exploration, ca. 1519 - 1682

The Spanish were the first Europeans to claim the Louisiana region. Sources disagree as to who first discovered the mouth of the Mississippi River, Alonso Álvarez de Pineda in 1519, or survivors of the Pánfilo de Narváez expedition in autumn 1528. One of the Narváez survivors, Alvar Núñez Cabeza de Vaca, included a description of the mouth of the Mississippi River and the southern Louisiana coastline in his account of the ill-fated expedition.

The first Europeans to explore the Louisiana interior were members of the expedition of Hernando de Soto. De Soto led his expedition across today's southeastern United States; he and his men crossed the Mississippi River near the present Tennessee/Mississippi state border in the spring of 1541. From that point, the explorers traveled westward, possibly as far as Oklahoma, before returning to the Mississippi, where De Soto died somewhere along the river in May 1542. The expedition survivors unsuccessfully attempted an overland route through Texas to the Spanish settlements in Mexico before finally returning to the Mississippi where they journeyed downriver and then set sail across the Gulf of Mexico, reaching Vera Cruz in September, 1543. Following these unproductive expeditions, Spain took no further action to strengthen her claim to the lower Mississippi Valley, leaving the region undisturbed for almost 140 years (Davis 1971:27-28; McLemore 1973:91-100).

Next to explore the lower Mississippi was a French expedition under the leadership of Réné Robert Cavalier, Sieur de la Salle. La Salle traveled down the Mississippi River from its confluence with the Illinois, reaching its mouth in early April 1682. He and his men made camp roughly three leagues from the mouth of the river; they then explored the various outlets for the next few days. With assurances from the Native American tribes encountered during the journey that the French were in fact the first Europeans to have descended or ascended "the River Colbert [Mississippi]," La Salle claimed all lands drained by the great river for Louis XIV, King of France, on April 9, 1682 (Davis 1971:28-29; French 1875:17-27).

French Colonial Era, 1698 - 1765

The French began colonization efforts in the late seventeenth century, with the expedition of Pierre le Moyne, Sieur d'Iberville, who departed France in 1698 with four ships and approximately 200 settlers. Iberville found the mouth of the Mississippi River in March 1699, but situated his headquarters, Fort Maurepas, to the northeast at Biloxi Bay (Davis 1971:39-41).

Recorded reference was made to Bayou Lafourche as early as 1699. Before returning to France for additional colonists and supplies, Iberville assigned his brother, Jean Baptiste le Moyne, Sieur de

Bienville, command of the Mississippi explorations. During one of the Bienville scouting trips, he traveled to *la Fourche des Chetimachas* (the fork of, or on, the Chetimacha), situated near present-day Donaldsonville in Ascension Parish. A mid-eighteenth century map depicts *la Fourche* in that same location at the head of the *Riviere des Chetimachas* (D'Anville 1752; Davis 1971:41; Devin 1719-1720; Goodwin et al. 1984:20).

The earliest historic settlements along Bayou Lafourche were established near its junction with the Mississippi River. Large land concessions, as well as smaller grants, were offered to colonists of all nationalities. Despite these initial agricultural incentives, the colony failed economically. There was little industry or commerce and, while the agricultural yield increased over the years, French Colonial Louisiana simply never became self-sufficient. Added to the depressed economy were fears of native raids, shortage of proper military support, and lack of promotion from the mother country. Following the French and Indian War, France ceded the struggling colony to Spain in 1762 (Goodwin et al. 1984:20-21).

During the eighteenth century, members of the pantribal Houma agglomerate began migrating down Bayou La Fourche from their settlements on the Mississippi River (Kniffen et al. 1987:78-79). The Native American group made scattered encampments on Bayou Terrebonne, in and around the present site of the city of Houma (Weinstein and Kelley 1992:45-46). The Houma remained in undisturbed possession of the project corridor until French-speaking exiles from Acadia began arriving in Louisiana in 1765.

Spanish Colonial Era, 1765 - 1803

Spain acquired the Louisiana colony west of the Mississippi River through the secret Treaty of Fontainebleau, signed November 3, 1762. The treaty was not until 1769, when the French colonial government was finally superseded and Spanish control was established under the governorship of Alejandro O'Reilly (Davis 1971:70, 105). During the Spanish period, many of the land grants were issued in the vicinity of the present project area.

Acadian colonization of the Lafourche District flourished under Spanish rule. The historic *Lafourche des Chetimachas* settlement was located along the natural levees bordering both sides of upper and central Bayou Lafourche between the present-day communities of Napoleonville (Assumption Parish) and Raceland (northwest of the project area in Lafourche Parish). In 1785, four of the seven Acadian immigrant "expeditions" brought settlers to the Lafourche post. The sparsely populated Lafourche region reportedly was preferred because its isolation permitted the Acadians to maintain their traditional culture in their new land (Brasseaux 1987:97, 109-115; 1985:35). The Acadian immigrants settled along the waterways that flow through the region: the Belanger family on Bayou Terrebonne; the Prevosts on Grand Caillou; and the Shrivins on Petit Caillou (Terrebonne Parish Development Board ca. 1953:7).

The pre-dispersal agricultural pattern of the Acadian immigrants was transformed to adapt to the exigencies of life along the Louisiana bayous. The agricultural regime, centered upon wheat, flax, turnips, and apples, that had served the Acadians in their eastern Canadian homeland was replaced by a new group of cultigens better adapted to Louisiana, including corn, cotton, beans, and figs (Uzee 1985: 38). Domestic architecture also evolved rapidly to suit local conditions. "The *poteaux-en-terre* structures imported to the Lafourche Valley from Nova Scotia soon were gradually replaced by the Creole house-type, a raised structure which incorporated efficient indigenous architectural features" (ibid.).

Although an agrarian people, the Acadian settlers of lower Bayou Lafourche supplemented their farm production with fishing, hunting, and trapping, which were necessities in the marshlands. In the isolated Barataria region, which began along the east bank of Bayou Lafourche, smuggling also became a way of life for some of the inhabitants of the basin. In addition to hideouts, the wooded swamps offered timber resources for the more traditional occupations of shipbuilding and land-based construction. During the last

years of Spanish colonial government, the first primitive canals were cut through the Lafourche marshes to aid these early settlers in their pursuits. Some canals were dredged for farmland drainage, others for trapping use (*traiñasses*), and still others for access to navigable waterways and the port at New Orleans. Many of these early channels eventually became artificial bayous; some have been maintained and improved through the years and remain in use today (Davis 1985:150-152; Goodwin et al. 1984:21-22; Speaker et al. 1986:13-14, 57).

The Acadians replaced the Houma tribe on the bayous. Over time, the Native Americans retreated farther into the swamps or left the region entirely. Friction between the displaced Houma and Acadian settlers was inevitable, and was especially great between the Lafourche Valley Acadians and the Houma (Uzee 1985). The eventual departure of the Houma from the upper portions of the watershed in 1788 reduced both contact and tensions between the two groups (ibid.). By 1803, only about 60 members of the tribe remained in the project area vicinity (Kniffen et al. 1987:78-79).

Territorial Era, 1803 - 1812

As part of the negotiations leading to the 1803 Louisiana Purchase, Spain restored western Louisiana to France, which shortly thereafter conveyed the Louisiana Territory to the United States. On March 26, 1804, that portion of the Louisiana Purchase located below the thirty-third parallel was designated the Territory of Orleans. The following year, Orleans was partitioned into 12 counties, including the county of La Fourche [sic], which was bounded to the north by Acadia (encompassing Donaldsonville and uppermost Bayou Lafourche) and the German Coast counties, to the east by Orleans County, to the west by Attakapas County, and to the south by the Gulf of Mexico. In 1807, the territorial legislature abandoned the county system and reorganized the Territory of Orleans into 19 parishes. La Fourche [sic] County was superseded by the Parish of the La Fourche [sic] Interior, encompassing present-day Lafourche and Terrebonne parishes. Approximately five years later, on April 30, 1812, the State of Louisiana was admitted to the Union (Davis 1971:157-164, 167-169, 176; Ditto 1980:42; Goins and Caldwell 1995:41-42).

The War of 1812

The project vicinity was affected only indirectly by the War of 1812. Capture of the city of New Orleans was vital to the British plan for control of the lower Mississippi River Valley. Both Barataria Bay (considerably to the east of the project area) and Bayou Lafourche were considered to be potential British attack routes to New Orleans (Davis 1971:178-179; Owsley 1981:126). Defensive preparations were made in the event of a British approach along either waterway.

Military records listed Louisiana militia camps at both Barataria and on Bayou Lafourche during late 1814 - early 1815. One camp on Bayou Lafourche was based near its intersection with the Mississippi River in the Donaldsonville vicinity; the other encampment, known as Camp Hopkins, was located farther down the bayou. Manned by Captain Charles R. Hicks and his company from Colonel Alexander DeClouet's Regiment of Louisiana Drafted Militia, this downstream camp served as an outpost to prevent British invasion or supply transport from moving up Bayou Lafourche. Although the precise location of Camp Hopkins has not been recorded, an 1853 map of Louisiana depicts "Gen. Jackson's obstruction" at the junction of Bayou Lafourche and Bayou Catahoula (the latter, a connection to Lake Ouacha, or Salvador). This "obstruction" probably marked the position of the lower militia camp on Bayou Lafourche. The defensive position apparently was located in Township 17S, Range 20E, between the present-day communities of Ludevine and Larose (Figure 11) (Casey 1983:12, 75, 102).

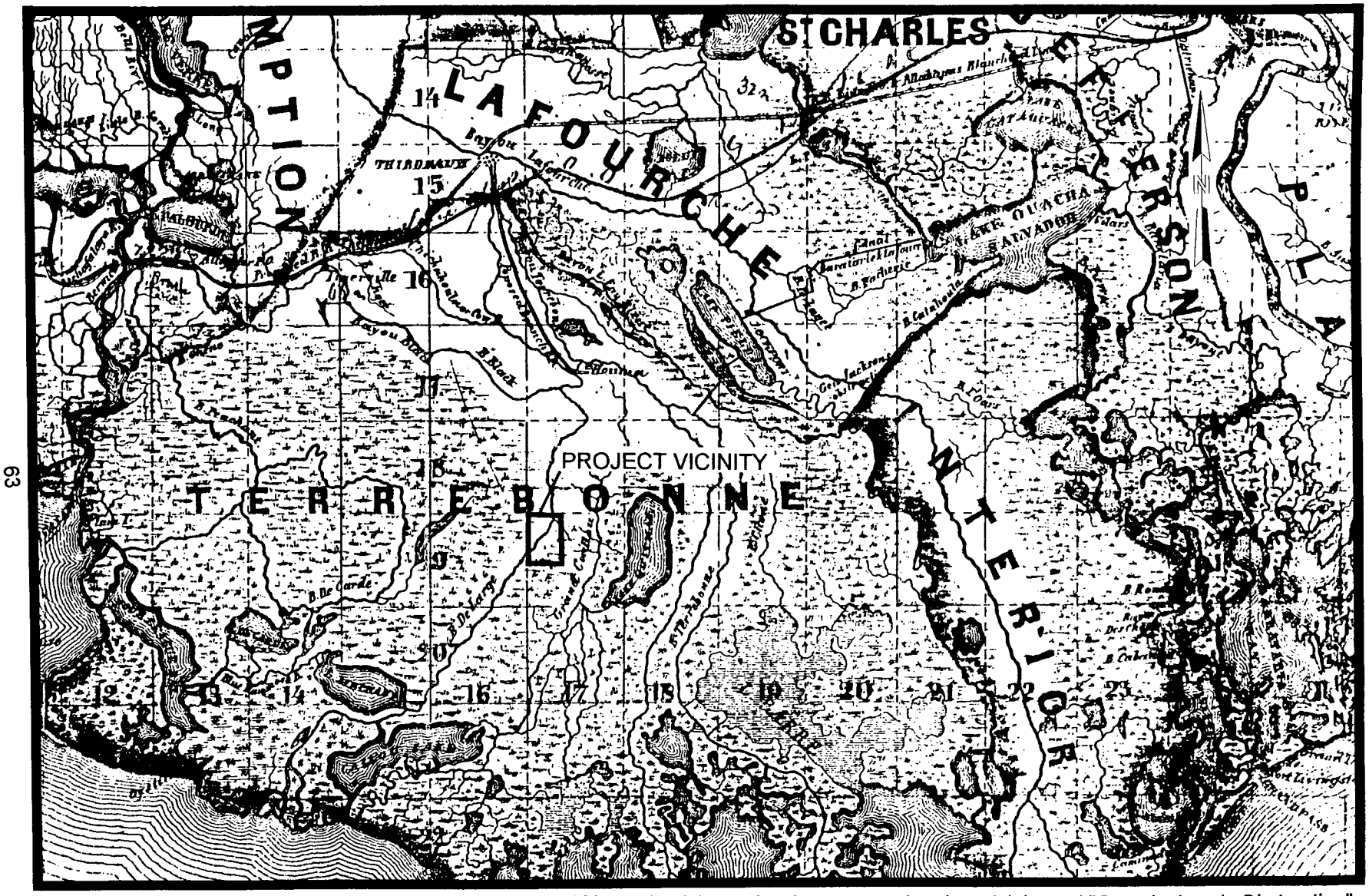

Figure 11. [1853] Excerpt from Bayley's *New and Improved Map of Louisiana,* showing proposed project vicinity and "Gen. Jackson's Obstruction".

Antebellum Era, 1815 - 1850

Many of the original white settlers in the vicinity of the project area were Acadians, who first arrived in Louisiana in the mid 1760s. In the ensuing years, the Acadians implanted their distinctive culture throughout the swamps and bayous of the region. A strong Acadian influence persists in the region to the present day (Brasseaux 1987; Houma Daily Courier 1971).

On March 22, 1822, State Senator Henry Schuyler Thibodaux sponsored legislation to create Terrebonne Parish from a portion of Lafourche Interior. As a result, Thibodaux is called "Father of Terrebonne" (League of Women Voters of Terrebonne Parish 1979). The following three theories have been advanced as to the origin of the name "Terrebonne": 1) the name originated when early French settlers called the land "Bon Terre" or good earth; 2) the name derived from the Derbonne family who were granted land by the Spanish governor of Louisiana, Baron de Carondelet; or, 3) Senator Thibodaux named Terrebonne after a parish in Canada where his father-in-law was born. Whatever its origin, Terrebonne Parish in 1822 became Louisiana's 26th parish. Originally, the parish seat was located at Bayou Cane, but in 1834, the seat of government relocated 4.8 km (3 mi) southwest to Houma. Terrebonne remains the largest parish, in land area, in Louisiana. Houma, the chief municipality near the project area, was incorporated March 16, 1843 (Hansen 1971:257).

When the new parish was created in 1822, the Parish of Lafourche was split along Bayou Blue, with Terrebonne to the west and the Lafourche to the east (Figure 12) (Goins and Caldwell 1995:43; Thorndale and Dollarhide 1985). Much of lower Bayou Lafourche was surveyed by the Office of the U.S. Surveyor General during the 1830s and then resurveyed in the 1850s. No structures were depicted on the researched survey plats, but canals and cultivated fields appear in several land claims. Although each bayou-side tract had a standard French colonial depth of 40 arpents, the fields were located for the most part between the waterway and the natural levee. The remaining private and public acreage often was designated "IMPRACTICABLE TREMBLING PRAIRIE" or "IMPASSABLE TREMBLING & OVERFLOWED PRAIRIE." By 1850, most "public sections" had gone to the State of Louisiana under the U.S. Swamp Land Acts of 1849 and 1850 (Louisiana Surveyor General 1857a, 1857b, 1858; Wicker et al. 1993:6).

Sugar plantations developed along the bayous of Terrebonne Parish in the antebellum era. By the season of 1846, 104 planters were cultivating cane in the parish (Terrebonne Parish Development Board ca. 1953:11).

Indicating upper Terrebonne Parish's attachment to the plantation system of staple crop agriculture and forced labor, African-American slaves made up a majority of the parish population in 1860, on the eve of the Civil War. In Lafourche Parish, however, whites continued to outnumber blacks (Goins and Caldwell 1994:55).

The Civil War

The Civil War had only an indirect impact on the project vicinity. In August or September 1861, under the orders of the Louisiana's Confederate commander, Major General David Twiggs, an "earthen water battery" was constructed on Grand Caillou Bayou, 32 km (20 mi) south of Houma (Figure 13). The fort served dual purposes: to protect blockade runners that sailed into Grand Caillou and to repel enemy raids (Bergeron 1985:198). Originally called Fort Butler, the small Confederate fortification was renamed Fort Quitman around January 1862. The fort was manned by 137 enlisted men and five officers and contained two smoothbore 32-pounders. After a Federal naval force passed the forts and blockades along the Mississippi River and headed towards New Orleans in April 1862, the evacuation of Fort Quitman, as well as all forts located in the state, was ordered (Casey 1983:36, 70, 182; Bergeron 1985:198-206).

Figure 12. [ca. 1838] Excerpt from Boynton's *Louisiana*, showing proposed project vicinity.

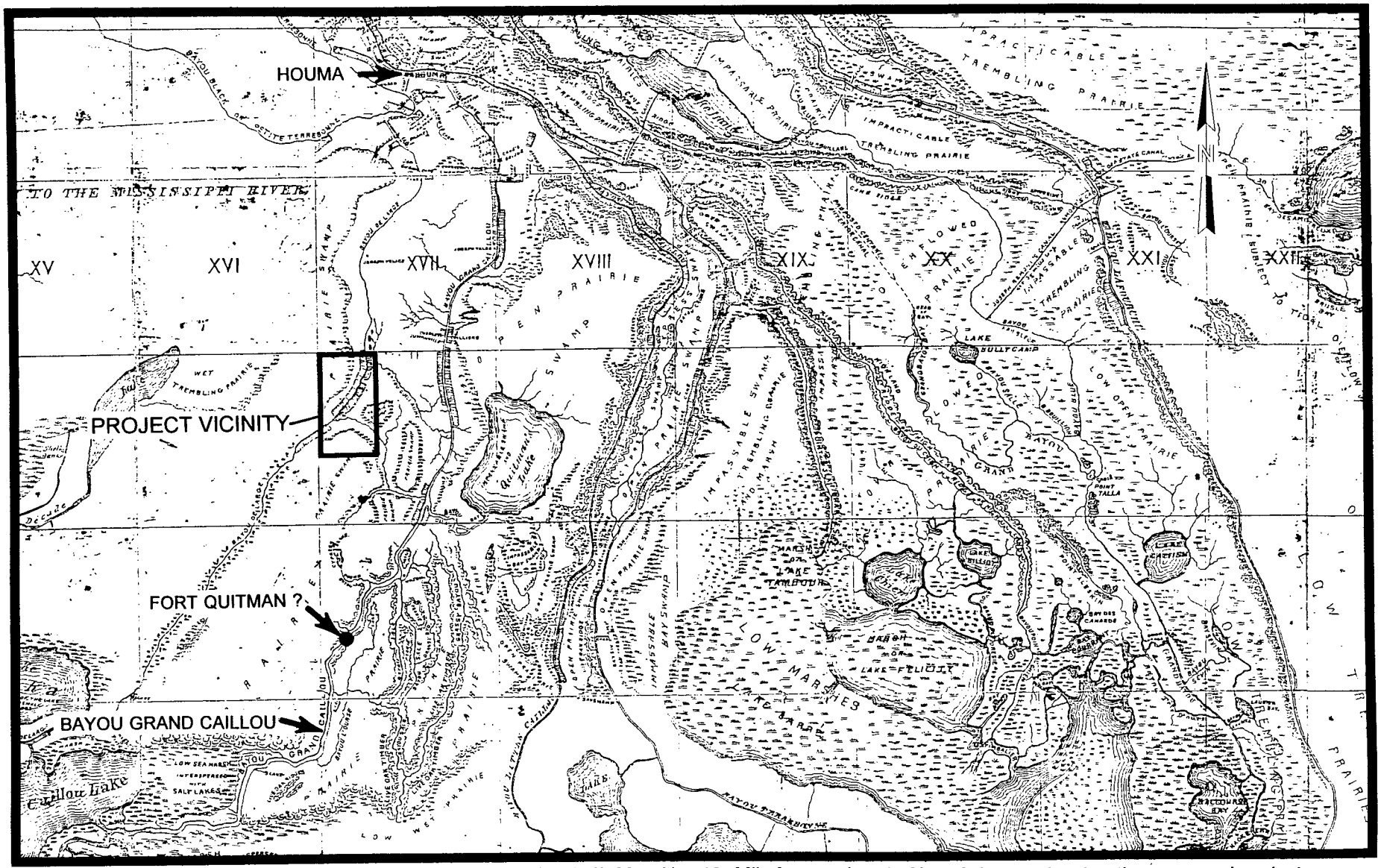

Figure 13. [1863] Excerpt from Houston's *Department of the Gulf, Map No. 10, Mil. Approaches to New Orleans*, showing the proposed project vicinity. Also shown is the estimated location of Fort Quitman on Bayou Grand Caillou.

After New Orleans and Baton Rouge fell in 1862, the Federals first invaded Bayou Teche and later sent an expedition up the Red River. The nearest skirmishes to the project area occurred in 1862 and 1863 at Thibodaux and Lafourche Crossing, both well above the study site. Although the District of the Lafourche (headquarters at Thibodaux) was occupied by Federal troops from 1863 through the end of the war, no military activity occurred in the project vicinity (Bergeron 1985:198-206).

Postbellum Era

The years following the end of the Civil War were difficult for southern Louisiana. The economy throughout the state had been destroyed; plantations and farms, railroads and levees, businesses and homes all had been affected by the war, physically and financially. The postbellum period proved to be an era of recovery for the entire state. Cane plantations that had thrived in the antebellum era converted to a free labor supply and slowly began to manufacture sugar once more.

Plantation Settlement Patterns in the Vicinity of the Project Area

Rehder (1971; 1978) has noted that plantations in southeastern Louisiana may be classified into three groups according to their internal settlement structure. Because the three settlement types vary in the placement of buildings and activities in relation to waterways, Rehder's classification is significant for the development of a predictive model of historic site location in the project area.

The three types of plantation settlement patterns recognized by Rehder are linear, nodal block, and bayou block. The first of these, linear plantations, were associated with early French settlement, and therefore are found chiefly along the relatively high, wide natural levees of the Mississippi River itself, lands that were deemed most attractive by early settlers. Linear plantations are characterized by large, narrow landholdings that extend back from the Mississippi. In this plantation type, mansions were located along the levee crest near the river. Beyond the mansions, the plantations were given their characteristic linearity of settlement by a centralized road that extended from an area behind the mansion toward the backswamp, perpendicular to the Mississippi. Laborers' quarters were situated along the road, while the sugar house and associated outbuildings were located near the road's terminus, typically about halfway between the levee crest and backswamp.

According to Rehder (ibid.), nodal block and bayou block plantations, both associated with Anglo-American settlement, were artifacts of local geography. By the time Anglo-American planters arrived in southeastern Louisiana in the early nineteenth century, the banks of the Mississippi south of Baton Rouge and the levee crests were occupied by plantations already established by the French and Spanish, while the levee crests on the upper reaches of Bayou Lafourche were occupied by smaller French Acadian and Spanish homesteads. Thus, the nodal block pattern is typical of Anglo-American plantation settlement along the upper reaches of Bayou Lafourche, and its frequency decreases as one proceeds downstream toward the Gulf.

The location of these plantations behind the levee crests made a linear arrangement impractical. Instead, mansions would be placed as closely as possible to the levee crests, while the need to make maximal use of the limited remaining high land dictated that the sugar house, outbuildings, and laborers' quarters be clustered together, typically at a distance of 1-3 km (.62-1.86 mi) back from the main residence.

When plantation agriculture spread south and west onto the levee systems of Bayou Teche and Bayou Terrebone in the 1820s and later, previously unoccupied natural levee crests once again were available. However, the lateral extent of the levees of bayous like Terrebonne and Teche was much more restricted than along either Bayou Lafourche or the Mississippi. As a consequence of this limited availability

of dry land, plantations along these smaller bayous generally have broader bayou frontage and less depth than their counterparts along larger streams, and the resulting bayou block settlement pattern is typified by the clustering of all buildings - mansions, laborers' quarters, sugar houses, and outbuildings -along the levee crests.

Sugar Plantations in the Vicinity of the Project Area

Red Star

One of the earliest recorded settlers, Jean Baptiste Robichaux, epitomized daily life in Acadiana. Like most Acadians in the bayou communities, Robichaux harvested the waterways for fish, oysters, and crabs, and set traps for fur-bearing animals. One of his 13 children, Narcisse, was born in 1819. In 1840, Narcisse married Ursula, who had lived farther down the bayou. After establishing their own homestead, the Robichauxs planted sugar cane, and by 1852 had built their own sugar mill. During this year, Robichaux produced 750 pounds of sugar, and by 1890, his mill manufactured 283,000 pounds of sugar. The Robichaux plantation, Red Star, was located at the site of present-day Montegut (Houma Daily Courier 1971).

Hard Scrabble

During the early 1800s, another settler, Thomas Ellender, married Catherine Roddy and established a homestead just above today's Montegut. Ellender was a persistent worker who purchased land at every opportunity; when he acquired a plantation he named it "Hard Scrabble" because he had acquired it the hard way (Houma Daily Courier 1971). The Ellenders reared nine sons and one daughter. One of the sons, Henry, was killed during the Civil War defending the Confederate citadel of Vicksburg; the remaining sons settled on the lands of the plantation. Wallace settled and married on the land, and in 1890 his son Allen J. Ellender was born there. By the age of 13, Allen already was keeping the financial accounts of Hard Scrabble. After earning his law degree at Tulane University in New Orleans, he served as Houma City Attorney and Terrebonne Parish District Attorney. He then was elected to the Louisiana legislature where he actively supported measures advocated by Huey Long. Ellender served in the state House of Representatives for 12 years, including four years as Speaker. In 1936, he was elected U.S. Senator, being re-elected five times to represent the state of Louisiana (Houma Daily Courier 1971).

Ashland Plantation

Two major sugar plantations that operated well into the twentieth century were situated in the vicinity of the project corridor. Located six miles south of Houma on Bayou Grand Caillou, Ashland Plantation is located at today's community of Ashland. The Ashland Plantation in Terrebonne Parish should not be confused with Duncan Kenner's plantation of the same name in Ascension Parish.

Ashland Plantation by the 1920s comprised 14,425 acres. Of this total, 5,000 acres were planted in cane. Its sugar factory had the capacity to grind 1500 tons of cane every 24 hours. The plantation utilized 56 barges and three gasoline towboats for delivery of the cane from the bayous to the mill. Furthermore, a narrow gauge railroad extended 14 miles to connect Ashland with a branch of the Southern Pacific line. After the grinding season of 1927, the plantation extended its local railroad tracks for logging purposes into the heavily wooded area away from the bayou but within the project corridor (Butler 1980:198-199).

Terrebonne Plantation

Another vast sugar establishment, Terrebonne Plantation, developed in the vicinity of the project corridor at today's community of Montegut on Bayou Terrebonne about 18 miles south of Houma. The plantation had the southernmost sugar mill in the state of Louisiana; its location made it less susceptible to freezing temperatures in fall and winter. Like Ashland, Terrebonne Plantation flourished well into the twentieth century. A 36 inch narrow gauge railroad, built in 1891, extended 35 miles through the cane fields. The main line followed Bayou Terrebonne five miles down from the mill; the plantation's local line also extended ten miles up the bayou to Colley [Caillou?] Switch, where it joined a branch line of the Southern Pacific. The plantation railroad was discontinued after the 1951 grinding season. When the mill ceased operation at the end of 1974, the machinery was dismantled and shipped to Guatemala (Butler 1980:211-215).

General Parish Population and Growth

By the late nineteenth century, small communities were emerging along the bayous. By 1887, the towns of Montegut on Bayou Terrebonne and Dulac on Bayou Caillou were established (Mayo map 1887). The lands along the natural levees supported rice fields and orange groves; however, the surrounding swamps provided prime territory for the traditional marshland occupations of fishing, shrimping, and trapping.

The first census of Terrebonne Parish, conducted in 1830, recorded 1,063 white and 25 free blacks. Between 1840 and 1860, however, slaves were the predominant population, far outnumbering the whites. It was not until after the Civil War, when there was a black migration toward more industrious centers and an incursion of Northerners, that the population shifted to more whites than blacks. In 1910 and 1920, a decrease of 2,000 in the black population occurred as more blacks fled rural areas in search of better economic opportunities. During this time, Terrebonne Parish suffered its only decline in population (Department of Public Works Planning Division 1953).

Agricultural, Maritime, and Mineral Productions Around the Project Area

A major economic endeavor of the region was the production of sugar. A crop that was well-suited to the soils and climate, sugar rewarded its growers handsomely. Even its byproduct, bagasse, enriched and revolutionized other industries. Beginning in 1922, the Celotex Corporation turned bagasse into what is known today as insulation board. By 1927, the Celotex Corporation formed the South Coast Company and purchased 26 plantations, including Ashland and Terrebonne. The sugar factory at Ashland was shut down in 1927; Terrebonne ceased its operations after the 1974 grinding season (Butler 1980:199-215). In addition to the sugar crop, the region also produced cotton, hay, potatoes, corn, beans, cattle, and dairy products.

Another vital resource to the project area proved to be the shrimping industry. In 1865, Lee Yim, a Chinese immigrant, introduced a method for drying shrimp to prevent spoilage. This process expanded the economic potential for the industry. Trawling, introduced during the First World War, further enhanced the industry. Eliminating the need to catch shrimp by hand in nets, Harry Bourg of Dulac invented methods that allowed shrimp to be caught by the millions (The Houma Daily Courier & The Terrebonne Press 1972; Terrebonne Parish Development Board 1953).

In 1917, a discovery was made that fostered the financial independence of a region and a state. It turned modest land owners into millionaires and caused regional and state economics to ride a rollercoaster. After several unsuccessful attempts, the first commercial gas well was struck on March 17, 1917, in the Lirette Gas Field near Montegut. Approximately 100 million cubic feet of gas was produced,

making it the largest producer in the world. By 1938, with the proliferation of oil wells throughout the project area, the total annual oil production for Terrebonne Parish reached 8,938,096 barrels, while natural gas production had attained 63,648,000 cubic feet. Crude oil production in the parish during the same year equaled $9,338,000.00. By 1939, natural gas production had skyrocketed to 528,810,000 cubic feet. The petroleum industry had proved that Terrebonne Parish could be one of the most productive areas in the world (The Houma Daily Courier & The Terrebonne Press 1972; Department of Public Works Planning Division 1953).

Education

The educational system during the early days of the Lafourche country was non-existent. Children were taught the practicalities of life, such as fishing, hunting, farming, and trapping. If they learned to read and write, it was because their parents knew how and taught their offspring at home after the day's chores had been completed. In the region of the current project area, the isolation of the families and the hardships of traveling compounded the belief that education was a private responsibility of the family, rather than of the government (The Houma Daily Courier & The Terrebonne Press 1972).

A scattering of schools began to appear during the late nineteenth century. By 1890, Terrebonne Parish reported 46 public schools and nine private schools, with an enrollment of 3,500 students. In the rural area, these public schools usually were located in a private home or a general store. A directory lists some of these schools as Central Public School, located in Montegut; Sanders Public School, located approximately 5 km (3 mi) below Montegut; Laperouge Public School, a distance of approximately 10 km (6 mi) south of Montegut; and Robert Rhodes Public School, 21 km (13 mi) below Montegut. In 1904, Montegut built its first, official school, consisting of one room. In 1912, the community built a larger school, Montegut School, that serviced the Terrebonne area and that currently is listed on the National Register of Historic Places (The Houma Daily Courier & The Terrebonne Press 1972; Department of Public Works Planning Division 1953).

Montegut School provided a symbol for quality education in Terrebonne Parish. This facility replaced the pioneer concept of a one-room school; it boasted four classrooms, a library, an auditorium, an office, and other amenities (The Houma Daily Courier & The Terrebonne Press 1972).

The Waterways of the Region

Canal improvements have continued to be vital to the economy of the lower Lafourche country and Terrebonne Parish through the twentieth century. Small plantation canals have been expanded for flood control, as well as for transportation; new channels have been constructed for land drainage and reclamation, and shallow *traiñasses* continue to be "dragged" through the marshes for the passage of trapping pirogues. In addition to these traditional marsh passages, canals have been cut by the petroleum industry, the newest enterprise in the parish (Davis 1985:150-160).

As of 1953, Terrebonne Parish contained over 161 km (100 mi) of navigable waterways, of which 80 km (50 mi) are within a 16 km (10 mi) radius of Houma. Since the natural flow of the main water routes (Bayous Grand Caillou, Black, Terrebonne, Lafourche, and Little Caillou) was in a north-south direction, into the Gulf of Mexico, it was essential to develop a system of interconnective canals in an east-west direction, thereby linking areas to commercial markets. As early as 1875, U.S. engineers conceived the idea of the Intracoastal Waterway to replace the Barataria and Lafourche Canal, which functioned as a 4 km (2.5 mi) east-west artery from Bayou Black to Bayou Terrebonne. It was not until 1934 that the Intracoastal Waterway opened (Davis 1985:150-160; Department of Public Works Planning Division 1953).

Petroleum canals crisscross the south Lafourche country today. The oil boom hit the parish in 1930, when the first well "came in." Numerous oil and gas fields now blanket the region, although the drilling frenzy has subsided in recent years. The first petroleum canals were cut as service routes to the wells; today, though, pipeline routes appear to dominate the petroleum network in the coastal Lafourche region. Not only do these channels transport domestic petroleum products across lower Lafourche, but, with the development of Port Fourchon (the Louisiana Superport, off the coast below the mouth of Bayou Lafourche), designed to support deepwater tankers, foreign oil also can be conveyed through south Lafourche country to American markets (Ditto 1980:29-30, 70).

Summary

In the eighteenth century, the Acadians settled an isolated region. In an area of marshes and swamps, trapping, shrimping, sugarcane planting, and eventually oil provided a livelihood. The labyrinth of waterways that surround the project area has proven economically vital to Terrebonne parish from the early days of settlement to the present time.

CHAPTER V

PREVIOUS INVESTIGATIONS

A review of the Louisiana site files for the area in the vicinity of the proposed Bayou DuLarge Disposal Site areas identified 3 cultural resource surveys that have been completed since 1989 (Table 3). These investigations resulted in the identification of 25 previously unrecorded archeological sites within 1.6 km (1 mi) of the proposed project areas (Table 4). All of the sites were described as abandoned vessels located at various points along the banks of Bayou DuLarge (Stout 1992).

The discussions presented below, pertaining to the cultural resources surveys, are based on information currently on file at the Louisiana Department of Culture, Recreation and Tourism; Office of Cultural Development; Division of Archaeology; Baton Rouge, Louisiana. Both the quantity and quality of information regarding sites in the vicinity of the proposed route are reflected in this document.

Previous Investigations within 8 km (5 mi) of the Project Area

Although the archeological survey performed by William McIntire and Roger Saucier, geologists then affiliated with Louisiana State University (McIntire 1954, 1958) is not with 8 km (5 mi) of the proposed Disposal Sites, it does add insight into prehistoric settlement patterning along the banks of waterways such as Bayou DuLarge. The survey involved visiting over 500 sites throughout coastal Louisiana. The principal purpose of the research was to examine the correlations between archeological settlement patterns and the different delta complexes of south Louisiana. Using the relative archeological ceramic sequence as it existed at the time, McIntire and Saucier refined the geological sequence of delta complexes and lobes. A secondary benefit of the research was the opportunity to study "the relationship of man to the shifting stream" (McIntire 1958:3), that is, to expand archeological knowledge of the area. McIntire revisited many of the known sites in Louisiana's coastal area and conducted a survey to locate new sites (1958:18). At the sites he visited, he made surface collections, maps, measurements, and borings. Occasionally, small excavations were made at important sites.

McIntire's synthesis of his archeological and geological data was published in two reports, *Trafficability and Navigability of Delta-Type Coasts: Trafficability and Navigability of Louisiana Coastal Marshes, Technical Report No. 5: Correlation of Prehistoric Settlements and Delta Development* (1954), and *Prehistoric Indian Settlements of the Changing Mississippi River Delta, Louisiana State University, Coastal Studies Series No. 1* (1958). These two publications laid the foundation for more recent archeological research in Louisiana's coastal region, incorporating site locations, ceramic analysis, human ecology, settlement pattern theory, and geoarcheological sequences. Included in the reports are maps of coastal Louisiana showing the distribution of sites by functional type and by cultural period, and maps depicting the distribution of predominant ceramic types, as defined at that time.

McIntire's survey methods consisted of reconnaissance by foot, vehicle, and various types of boats. Sites were discovered mainly by two methods: interviewing local informants, and close examination of aerial photographs. The survey was both thorough and extensive. As a result, it is unlikely that major mounds or mound complexes or large surficial shell middens were not observed or investigated. However, the probability is low that all buried or submerged sites, or earth middens, were identified. Thus, the whole settlement distribution, to the degree that it is recoverable, remains elusive.

McIntire made several significant observations about the patterning of sites in the vicinity of the proposed Disposal Site areas. First, he saw that his data supported a relatively early age -- in archeological terms -- for the Teche meander belt, represented in the vicinity of the project area by Bayou Black. This

Table 3. Cultural Resource Surveys Conducted within 8.0 km (5.0 mi) of the Proposed Bayou DuLarge Spoil Disposal Site Project Area.

REPORT DATE	REPORT NUMBER	TITLE/AUTHOR	PROJECT DESCRIPTION	RESULTS AND RECOMMENDATIONS
1989	22-1387	*Archeological Field Investigation Plank Road Harry Bourg #3 Well Site Bayou DuLarge, Terrebone Parish, LA* (Beavers 1989)	Pedestrian survey, shovel testing, excavation units	No cultural resources were identified
1992	22-1597	*A Reconnaissance Survey of Derelict Boats on Bayou DuLarge, Terrebone Parish, Louisiana* (Stout 1992)	Boat survey	37 derelict vessels were documented along Bayou DuLarge. Further survey and boat recordation are recommended.
1995	22-1987	*Documentation of Several Historic Vernacular Watercraft on Bayou DuLarge, Terrebone Parish, Louisiana* (Goodwin et al. 1995)	Detailed recordation, photographs, oral histories	6 abandoned or active vessels were recorded as representative examples of Bayou DuLarge's wooden watercraft.

conclusion agreed with Russell's proposed sequence of delta complexes, which at the time was the accepted sequence. This conclusion was based in part on the Marksville age attributed to the Mandalay Plantation site (now Site 16TR1) (McIntire 1958:64), which Phillips (1970, II:899-900) later made the type site for the Mandalay Phase.

A second observation made by McIntire about the vicinity of the present project area concerned the Marmande Plantation Site (16TR19) at the junction of Marmande Ridge and Bayou DuLarge. McIntire proposed that a major distributary had diverged from the Teche meander belt, trended south just slightly west of the later course of Bayou DuLarge, and then turned west forming Marmande Ridge (McIntire 1958:72-73). The Troyville period date of the Marmande Plantation Site (16TR19) helped confirm that it was too early to be associated with Bayou DuLarge, which was observed to be later. Moreover, coring at the site suggested that the large mound was built on a thick shell midden, which in turn rested upon a buried natural levee, presumably of Teche age.

McIntire acknowledged a lack of agreement among his contemporaries as to the dating of the Lafourche delta complex. He noted that "the pivotal pottery types used for the Troyville and Coles Creek period were not found on distributaries of the Lafourche-Mississippi" (McIntire 1958:93), and for that reason he favored an age of Lafourche lobe formation contemporaneous with the Coles Creek and Plaquemines cultural periods. However, McIntire recognized the possibility that part or all of the complex may have formed at an earlier time, and that Troyville and Coles Creek period sites may be fully buried beneath sediments of later age. A detailed summary of more recent evidence regarding the dating of the Lafourche complex is presented in Chapter II of the present report.

On April 18, 1989, Richard C. Beavers, an archeologist at the University of New Orleans, was called on to investigate a set of odd circular features that were observed during an environmental assessment for the Harry Bourg #3 Well Site. This well site is located in Terrebonne Parish 365 m (1200

Table 4. Previously Recorded Sites Located within 8.0 km (5.0 mi) of the Proposed Bayou DuLarge Spoil Disposal Site Project Area.

SITE NUMBER SITE NAME	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	FIELD METHODOLOGY	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR232	Terrebonne	Bayou Sauveur, La. N3250244 E711838	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR233	Terrebonne	Bayou Sauveur, La. N3249335 E711259	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR234	Terrebonne	Bayou Sauveur, La. N3248793 E710915	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR235	Terrebonne	Bayou Sauveur, La. N3248777 E710838	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR236	Terrebonne	Bayou Sauveur, La. N3248671 E710808	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR237	Terrebonne	Bayou Sauveur, La. N3248671 E710808	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR238	Terrebonne	Bayou Sauveur, La. N3248640 E710716	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR239	Terrebonne	Bayou Sauveur, La. N3248503 E710473	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR240	Terrebonne	Bayou Sauveur, La. N3248503 E710473	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR241	Terrebonne	Bayou Sauveur, La. N3248366 E710412	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR242	Terrebonne	Bayou Sauveur, La. N3248366 E710412	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR243	Terrebonne	Bayou Sauveur, La. N3248046 E710305	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR244	Terrebonne	Bayou Sauveur, La. N3247915 E710290	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR245	Terrebonne	Bayou Sauveur, La. N3247915 E710290	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597

Table 4, continued

SITE NUMBER SITE NAME	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	FIELD METHODOLOGY	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR246	Terrebonne	Bayou Sauveur, La. N3247915 E710290	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR247	Terrebonne	Bayou Sauveur, La. N3247915 E710290	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR248	Terrebonne	Bayou Sauveur, La. N3247747 E710229	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR249	Terrebonne	Bayou Sauveur, La. N3247747 E710229	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR250	Terrebonne	Bayou Sauveur, La. N3247473 E710046	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR251	Terrebonne	Bayou Sauveur, La. N3247137 E709669	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR252	Terrebonne	Bayou Sauveur, La. N3247137 E709669	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR253 Captain Scott	Terrebonne	Bayou Sauveur, La. N3247137 E709669	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR254	Terrebonne	Bayou Sauveur, La. N3246945 E709534	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR255	Terrebonne	Bayou Sauveur, La. N3246823 E709320	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597
16TR256	Terrebonne	Bayou Sauveur, La N3246381 E708564	shipwreck	ca. 1890 - present	reconnaissance	not eligible	Stout 1992: 22-1597

ft) east of Bayou DuLarge, south of the town of Theriot. Workers noticed circular depressions in the path of a proposed plank road and recognized the potential for them to be of cultural origin. These depressions measured 10.7 to 15.4 m (35 to 50 ft) in diameter and ranged from 0.8 to 1.5 m (2.5 to 5.0 ft) in depth. Beavers undertook an area reconnaissance and troweled the ground surface near the depressions. An inspection of the area failed to produce any evidence of prehistoric or historic features that might be related to these depressions. Some organic buildup was observed in the bottom of the depressions. Beavers theorized that these depressions were modern small dirt borrow pits, construction related holes, or small drainage control depressions used by former occupants of the area (1989:9-10).

A study in anticipation of a U.S. Army Corps of Engineers New Orleans District project to remove snags from the channel of Bayou DuLarge produced documentation of 37 derelict vessels along that waterway (Stout 1992). The goals of this survey were to record any such vessels in the project area and to evaluate them for National Register eligibility. This survey took place along a lengthy stretch of Bayou DuLarge, from Falgout Canal to Grand Pass. Of the 37 derelict vessels recorded during the survey, 25 are located within 1.6 km (1 mi) of the current proposed Disposal Sites (16TR232-16TR256) (Table 4).

One of the results of the study conducted by Michael Stout in 1992 was a recommendation to investigate further eight of the vessels that represented some of the last surviving examples of traditional watercraft on Bayou DuLarge (Stout 1992:23). This investigation subsequently was performed by R. Christopher Goodwin & Associates, Inc. in the fall of 1995. After locating the designated eight vessels, it was found that they either had deteriorated badly or disappeared below the water line in the interim years (Seidel and Robinson 1995:3-4). In keeping with the goals of the study to document vernacular watercraft on Bayou DuLarge, a new field survey was conducted, and six vessels were selected to record. This effort included measuring and photographing the selected vessels, as well as obtaining oral histories to place these vessels in historical and cultural context. None of the six vessels recorded during the project are located within 1.6 km (1 mi) of the current proposed project. One small mudboat, one chaland, two small oyster flat boats, and two large oyster/shrimp flat boats were described extensively in this report, and the owners were contacted for information pertaining to vessel utilization, choice of building materials, vessel history, and less objective topics such as their feelings about life as fishermen.

Previously Recorded Archeological Sites within 1.6 km (1 mi) of the Project Area

All 25 of the sites located within 1.6 km (1 mi) of the proposed Disposal Site areas are described as abandoned vessels located along the banks of Bayou DuLarge (16TR232-16TR256) (Stout 1992). The derelict vessels range in size from small Lafitte skiffs to large oyster/shrimp flat boats. The sites are summarized in Table 4. Only 3 of the 25 sites were recorded on the west bank of the bayou, along the portion of bank surveyed for proposed Disposal Site 2 (16TR251, 252, 253). During bankline survey, no evidence of these three vessels was encountered.

CHAPTER VI

RESEARCH DESIGN AND FIELD METHODOLOGY

Introduction

The proposed Bayou DuLarge Disposal Site areas examined during the current investigations are located along the west bank of Bayou DuLarge, in Terrebonne Parish, Louisiana. Disposal Site 1 measures 30.48 m (100 ft) by 850 m (2788.71 ft), encompassing an area of 6.4 ac (2.59 ha). Disposal Site 2 measures 30.48 m (100 ft) by 900 m (2952.76 ft), encompassing an area of 6.78 ac (2.74 ha). The proposed disposal sites are located 13.6 km (8.5 mi) and 15.2 km (9.5 mi) south of Theriot, Louisiana, respectively. The entirety of both project areas has been previously impacted by dredging and spoil deposition along the bank.

To facilitate the cultural resource inventory process a 30.48 m (100 ft) wide corridor was surveyed for cultural resources along the west bank of the bayou in each of the proposed disposal areas. A more detailed description of the proposed project corridor was presented in Chapter I of this volume.

As was noted in Chapter V, a review of the Louisiana State Site Files maintained by the Louisiana Department of Culture, Recreation and Tourism, Office of Cultural Development, Division of Archaeology identified 25 previously recorded archeological sites within 1.6 km (1 mi) of the area of potential effect (APE). All of these sites are described as derelict marine vessels. Additionally, only 2 cultural resources studies have been completed within 8 km (5 mi) of the proposed project areas. A third cultural resources survey conducted beyond the 8 km (5 mi) limit is discussed in Chapter V because of its usefulness in understanding the prehistoric context of the area. Site location data are important because the distribution of sites within the region provides basic information that can be used to formulate a comprehensive site predictive model. Traditionally, environmental factors such as elevation above the surrounding terrain, slope, accessibility to lithic resources, and proximity to and elevation above perennial water sources have been used in developing such models. These models often have been used to stratify a particular project area into high, medium, and low probability areas for containing archeological sites. The implementation of such research designs should result in more efficient archeological surveys, i.e., in the recordation of more archeological sites, since greater attention is given to those areas that exhibit a high probability for containing cultural deposits.

The sampling strategy employed during survey of the proposed Bayou DuLarge Disposal Sites was designed to provide complete and thorough coverage of all portions of the project areas. The entire length and width of the proposed disposal sites were surveyed for cultural resources. Pedestrian survey and subsurface testing was conducted within both of the proposed Disposal Site areas. Fieldwork also included an examination of the bankline along the eastern boundary of the project areas.

Discussion

The geomorphology of the area strongly influences the occurrence and subsequent preservation of the archeological materials initially deposited within the area of potential effect. For this reason, a brief review of the processes that may affect site preservation and human settlement are included in this discussion.

Predictions of Archeologically Significant Areas Based on Geology, Soils, and Geomorphology

The proposed project area is located within the Terrebonne Coastal Region, a submerged delta plain of the Lafourche Delta Complex. As was discussed in Chapter II, within the Mississippi River Delta, almost all, if not all, of the archeological deposits are located on elevated landforms such as natural levees, beach ridges, and/or salt dome islands. Natural levees represent the most commonly occupied landforms, probably because they are the most abundant elevated landforms within the delta plain. Archeological deposits also are very common on salt domes and beach and shell ridges, which represent rare elevated landforms within the Mississippi Delta Plain. A small percentage of archeological deposits also have been recorded on the shores of lakes and bays, barrier islands, and swamps (Smith et al. 1986:73-75; Weinstein and Kelley 1989:109). The currently proposed project areas are located entirely on natural levees and within marsh/swamp environments.

As was first observed by Kniffen (1936), the majority of archeological deposits present within the Mississippi Delta Plain are found upon subaerial or partially submerged natural levees of major bayous and rivers. Natural levees were the predominant location for human settlement and other activities on delta plains (Britsch and Smith 1989:243-244; Weinstein and Kelley 1989:109-110).

Many reasons have been suggested for the preferred utilization of natural levees by the prehistoric inhabitants of southern Louisiana. Some of these speculations are: (1) natural levees provided habitat for terrestrial game that was exploited as a food source; (2) they provided a source of raw materials; (3) their proximity to open water provided access to both subsistence materials and transportation; and (4) they offered a location safe from natural hazards such as flooding and hurricane storm surge (Gagliano 1984; Britsch and Smith 1989:243-244; Weinstein and Kelley 1989:109-110). Unfortunately, relatively few of these natural levees have been specifically tested by archeological research.

Seemingly isolated archeological deposits commonly occur within the marshes and swamps of the Mississippi Delta Plain. Many of these sites lie on natural levees buried by the vertical accretion of swamp deposits (Gagliano et al. 1975, 1979; Wiseman et al. 1979). Other sites classified as inland swamp sites, e.g., Site 16SMY30 and Site 16SMY33 (Smith et al. 1986), are buried sites that have been revealed by dredging; they represent sites lying on natural levees or other similar landforms that have been buried completely beneath marsh deposits. Finally, a few of these archeological deposits actually are associated with the marsh and backswamps of the delta plains, e.g., Site 16SMY40 (Smith et al. 1986). An examination of the Louisiana Division of Archaeology files reveals that these archeological deposits typically are located on the banks of either tidal channels or bayous. Since both soil disposal areas are situated on natural levee/swamp landforms, both locales were assessed as having a high probability for containing intact archeological deposits.

Field Methodology

Phase I cultural resources survey and inventory of the proposed U. S. Army Corps of Engineers, New Orleans District Bayou DuLarge Disposal Sites was designed to identify all prehistoric and historic period cultural resources located within the areas of potential effect. The survey was comprehensive in nature; planning took into account the results of all previously conducted archeological surveys within the region and the distribution of known cultural resources, as well as an assessment of the archeological potential of the proposed disposal sites to contain cultural deposits (Table 5).

Before survey, each of the proposed disposal sites were located using a hand held GPS unit and identified to the survey crew. Each of the proposed disposal sites was traversed by a four-person crew; this crew visually reconnoitered and shovel and auger tested each area for evidence of intact cultural deposits.

Locations of transects and shovel tests, changes in vegetation and topography, and natural, cultural or artificial features were recorded on shovel test and segment/transect record forms.

Table 5. Proposed Disposal Sites Survey.

SITE NUMBER	LENGTH IN METERS	POSITIVE SHOVEL TESTS	NUMBER OF SHOVEL TESTS[1]	LOCI IDENTIFIED
1	850	0	49/56	0
2	900	0	23/60	0
TOTAL	1750	0	72/116	0

[1]Number indicates Auger borings and Shovel tests/Planned test locations.

Architectural Review and Standing Structures Recordation

As a part of this Phase I assessment, survey crews were instructed to record all standing structures encountered during the cultural resources survey and inventory of the project areas. Since the proposed project has the potential to disturb or destroy historic properties, the purpose of architectural recordation was to collect reconnaissance-level architectural survey data for each building older than 50 years located within the area of potential effect; to apply the National Register Criteria for Evaluation to each recorded resource to identify potential historic properties; and, to apply the Advisory Council on Historic Preservation's Criteria of Effect to each historic property to anticipate the effects of each undertaking.

As with the archeological survey, this initial study area was defined as the 30.48 m (100 ft) wide project corridor. Since it was possible that anticipated visual effects might extend beyond the area of physical impact, however, this facet of the study area was expanded by 15.2 m (50 ft) west of the survey corridor, i.e., for a total width of 45.48 m (150 ft), in order to account for any possible viewshed impacts. Architectural investigations were undertaken in accordance with guidelines established in *National Register Bulletin 24: Guidelines for Local Surveys: A Basis for Preservation Planning* (National Park Service 1995). This survey failed to identify any buildings older than 50 years along the proposed disposal areas. Each identified modern structure, along with the approximate meterage referenced from the south end of the respective Disposal Site and UTM coordinate, is presented in Table 6. Additional data, such as the field notes, including photographs, will be curated with the project notebook.

Shovel/Auger Testing

The cultural resources inventory was based upon methodologies that provide for consistency, quality control, and for the precise recordation of all cultural resources located during survey. As previously stated, this inventory consisted of surface reconnaissance along the entire length and width of the Disposal Site areas augmented by a stratified, systematic, subsurface testing regime. Transect survey was utilized to assure complete coverage of the proposed Disposal Sites and to control delineation and recordation of archeological features encountered or exposed during survey. A total of two linear transects was placed within the area required for the proposed project. The first transect was placed 5 m (16.2 ft) west of the

bankline of Bayou DuLarge. The second transect was placed 25 m (82 ft) west of Transect 1. Transect placement was designed to give maximum coverage of the 30.48 m (100 ft) wide project areas.

Table 6. Standing Structures Recorded during Phase I Survey and Architectural Recordation of the Proposed Bayou DuLarge Disposal Sites.

STANDING STRUCTURE NUMBER	DISPOSAL SITE	STRUCTURE TYPE	APPROXIMATE UTM COORDINATES	APPROXIMATE METERAGE
1	1	Modern Cabin	N 3248980 E 710970	240 m
2	1	Modern Cabin	N 3249400 E 711270	750 m
3	1	Modern Cabin	N 3249420 E 711270	770 m
4	1	Modern Cabin	N 3249450 E 711270	800 m
5	1	Mobile Home	N 3249470 E 711270	830 m
6	2	Modern Boat House	N 3247080 E 709620	215 m

A total of 72 of 115 planned shovel tests were excavated successfully during the survey. Shovel tests and auger borings were excavated at 30 m (98.4 ft) intervals along each survey transect. Preliminary examination of the proposed disposal sites suggested that both areas had a medium to high probability of containing cultural resources. During the survey of Disposal Site 1, shovel tests and auger borings were excavated at 30 m (98.4 ft) intervals, with shovel tests on each transect being offset 15 m (49.2 ft). Auger borings were placed at odd number shovel test locations along Transect 1 (i.e. 1,3,5, etc.) in order to systematically assess the depth of spoil deposits within the project areas. A total of 20 auger borings were excavated within the project areas.

Shovel tests were not excavated in areas containing standing water or in areas of planted gardens and/or manicured lawns. Auger testing was concentrated along Transect 1, closest to the bayou to maximize the probability of locating any buried cultural deposits below the spoil material. All odd number shovel test locations (1,3,5,....etc.) were auger tested.

Each shovel test measured approximately 30 cm (11.8 in) in diameter, and was excavated to a minimum depth of 50 cm (20 in), to sterile clay or to clay-like subsoil, or until excessive water was encountered. Auger tests were excavated to a minimum depth of 150 cm (59.1 in). All shovel/auger test fill was screened through 0.64 cm (0.25 in) hardware cloth; extremely wet soils and clay were hand-sifted, trowelled, and examined visually for cultural material. Each of these shovel/auger tests was excavated in 20 cm (8 in) artificial levels within natural strata, and fill from each level was screened separately. Munsell Soil Color Charts were used to record soil color; texture and other identifiable characteristics also were recorded using standard soils nomenclature. All shovel tests were backfilled immediately upon completion of the archeological recordation process.

During the Phase I survey of proposed Disposal Site 1, shovel tests and auger borings were excavated at 30 m (98 ft) intervals. As the survey proceeded, it was determined that the entire 30.48 m (100

ft) wide project corridor was spoil material. Along Transect 1, shovel tests and auger borings were alternated to assess the depth of spoil material. Shovel tests were excavated at all planned locations along Transect 2 (Figure 14). Stratigraphic profiles in shovel tests on both transects were identical and individual piles of spoil were evident throughout the project area. Transect 2, located 30 m (98 ft) from the edge of the bayou appeared to traverse the western edge of the spoil material. The marsh area, demarcated by the transition in vegetation from wet, wooded to marsh grasses was found to be a minimum of 30 m (98 ft) west of Transect 2 (i.e., at least 60 m [196 ft] west of Bayou DuLarge).

Stratigraphic profiles and surface topography in the area of Disposal Site 2 were found to be identical to those in Disposal Site 1. The entire 30.48 m (100 ft) width and 900 m (2952.76 ft) length of Disposal Site 2 was characterized by spoil material (Figure 15). Along transect 1, shovel tests and auger borings were alternated, with excavations only conducted at odd numbered subsurface test locations (i.e., at 1, 3, 5, 7,.....etc.). Transect 2, located 30 m (98 ft) from the edge of the bayou also appeared to traverse the western edge of the spoil material in Disposal Site 2. Shovel tests along Transect 2 were excavated at odd numbered subsurface test locations (i.e., at 1, 3, 5, 7,.....etc.). All of the shovel tests and auger borings confirmed the presence of spoil material within the entire area of Disposal Site 2.

Curation

Following acceptance of the final report, all archeological records, photographs, and field notes will be curated with the Louisiana Division of Archaeology.

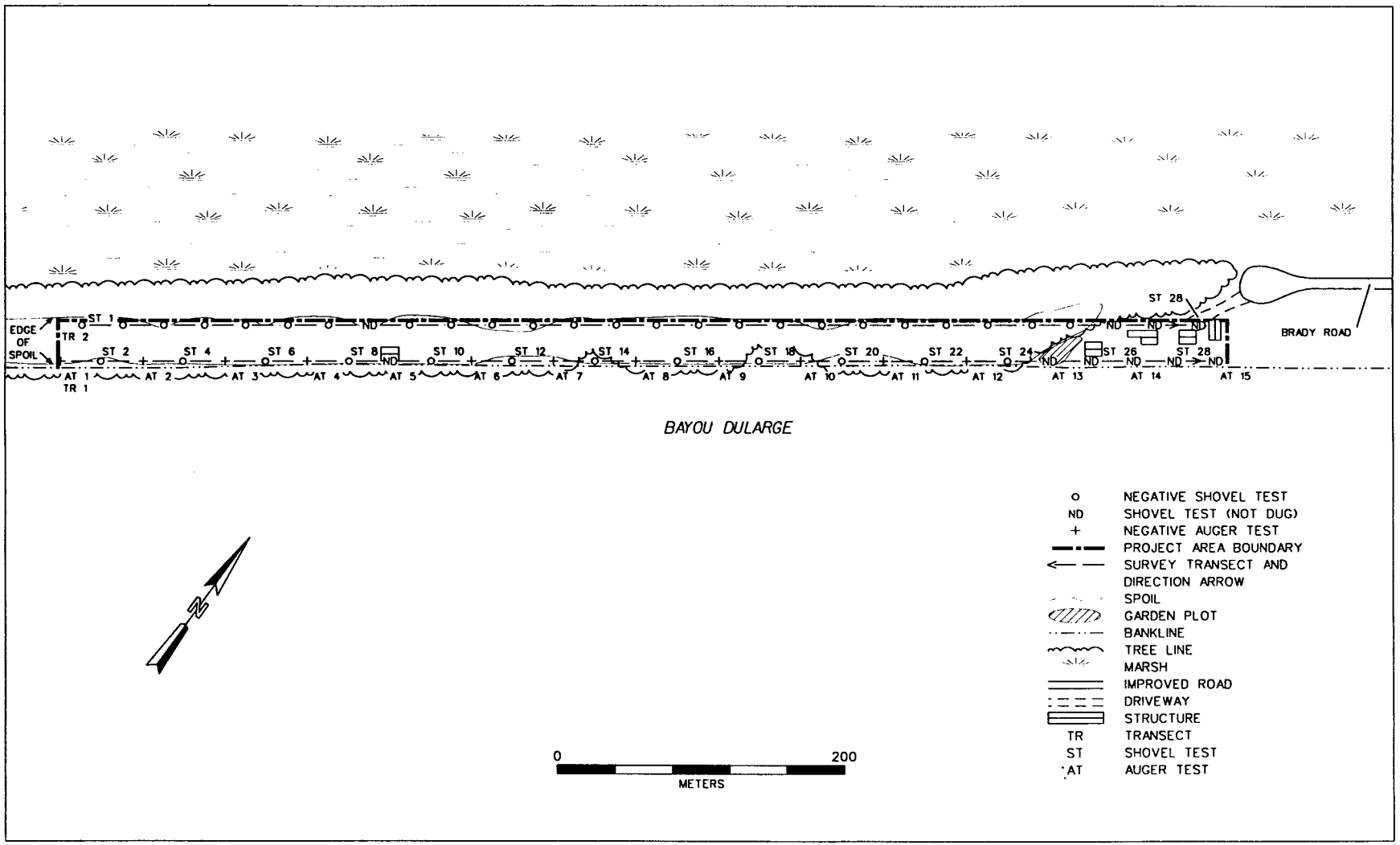

Figure 14. Map of Disposal Area 1 Showing Transect Orientation and Auger/Shovel Test Alternation.

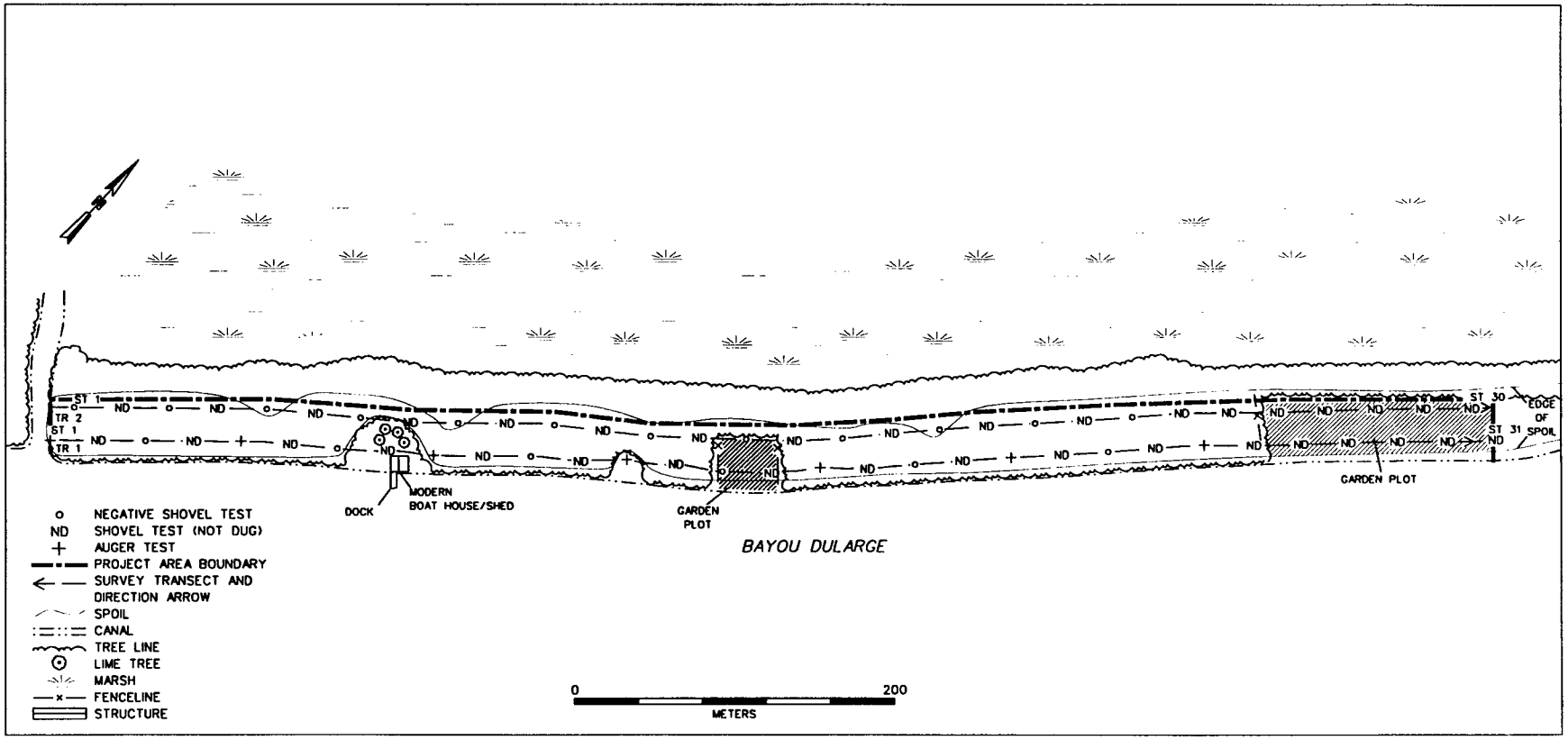

Figure 15. Map of Disposal Area 2 Showing Transect Orientation and Auger/Shovel Test Alternation.

CHAPTER VII

RESULTS AND RECOMMENDATIONS

During cultural resources survey, assessment, and archeological inventory of the two proposed dredged material disposal areas located on the west bank of Bayou DuLarge, the entire project area was intensively surveyed. Field work consisted of pedestrian reconnaissance augmented by systematic subsurface testing along two linear transects positioned within the 30.48 m (100 ft) wide survey corridors. A total of 72 of 115 planned shovel/auger tests were excavated successfully within the proposed project areas. Additionally, field work included an examination of approximately 1750 m (5740 ft) of bankline along the eastern edge of the two proposed disposal areas. The combination of auger boring, shovel testing, and bankline survey failed to produce cultural material or evidence of intact cultural deposits.

Typical shovel tests in Disposal Sites 1 and 2 were characterized by two strata. Stratum I ranged in depth from 10-40 cm (3.9-15.7 in) and varied from a 10YR4/1 dark gray silty clay to a 10YR5/2 grayish brown silty clay. Stratum II ranged in depth from 40-50 cm (15.7-19.6 in) and varied from a 10YR5/1 gray silty clay to a 10YR4/3 brown silty clay. No cultural material was found in any of the shovel tests.

A total of five modern structures were located within the area of Disposal Site 1. At approximately 240 m (787.2 ft) from the south end of the project area an abandoned, modern, wood frame cabin surrounded by a scatter of debris including glass bottles, sheet metal, wood, and appliances was encountered. At the north end of Disposal Site 1, three modern houses and a trailer were encountered. Because these structures currently are occupied, no shovel/auger testing was conducted in the garden areas or surrounding yards. None of the structures located in Disposal Site 1 was recorded in detail, however, all were photographed and noted on the shovel test forms. None of the Structures appears to be over 50 years old, and no further recordation is necessary.

A single modern structure was located in Disposal Site 2. The structure was a boat house situated on the bank of Bayou DuLarge at approximately 215 m (705.2 ft) from the south end of the project area. Located next to the boat house was a 1000 gallon fuel tank. Behind (west of) the structure was a cleared area with four planted lime trees. Further west, in a forested area, was a pile of wood and metal debris. The structure was not recorded in detail; however, it was photographed and noted on the shovel test forms. The structure does not appear to be over 50 years old, and no further recordation is necessary. During reconnaissance survey of Bayou DuLarge in 1992, Stout recorded three abandoned vessels (16TR251-16TR253) next to the boathouse (Stout 1992). During bankline survey for the current proposed project, no evidence of these vessels was observed. Their remains presumably have sunk or have been removed.

This cultural resources survey and assessment failed to identify any cultural resource loci within the limits of the proposed project areas. In addition, no potentially significant historic standing structures were identified within or near the area of potential effect of the proposed undertaking. No additional testing of the proposed disposal sites along the west bank of Bayou DuLarge is recommended.

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APPENDIX I

SCOPE OF WORK

SCOPE OF SERVICES
Cultural Resources Survey of
Bayou DuLarge Disposal Areas,
Terrebonne Parish, Louisiana

1. Introduction. The cultural resources survey to be performed under this delivery order is in support of proposed navigation improvements to Bayou DuLarge. The survey area consists of two proposed disposal sites located on the west bank of Bayou DuLarge. Although no archeological sites are presently recorded in the disposal areas, these areas are moderate to high probability areas for prehistoric and historic cultural resources.

2. Study Area. The study area consists of two proposed disposal areas located along the west bank of Bayou DuLarge (Attachment 1). The study area extends from the bankline of Bayou DuLarge to the natural levee/marsh interface in the two reaches designated as potential disposal areas. The two areas are approximately 6-7 acres in size each for a total study area of 12-14 acres.

3. General Nature of the Work. The study will consist of historical research relative to the study area, intensive cultural resources survey of the disposal areas, and data analysis and report preparation.

4. Study Requirements. The study will be conducted utilizing current professional standards and guidelines including, but not limited to:

- the National Park Service's National Register Bulletin 15 entitled, "How to Apply the National Register Criteria for Evaluation;"
- the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation as published in the Federal Register on September 29, 1983;
- Louisiana's Comprehensive Archeological Plan dated October 1, 1983;
- The Advisory Council on Historic Preservation's regulation 36 CFR Part800 entitled, "Protection of Historic Properties."

The study will be conducted in three phases: Historical Research, Intensive Survey of the Disposal Areas, and Data Analysis and Report Preparation.

A. Phase 1: Historical Research. The study will begin with research of available literature and records necessary to establish the historic setting, predict the nature of the

resource base in the project area, and refine the survey methodology. This background research will include a literature review, review of the geomorphology, and research of historic maps and records.

B. Phase 2: Intensive Survey of the Disposal Areas. Upon completion of phase 1, the Contractor shall initiate the fieldwork. Site conditions in the study area dictate a modified survey approach. The immediate bankline of Bayou DuLarge contains spoil deposits from earlier dredging on the bayou. These deposits extend approximately 50 feet from the bank and vary in depth from negligible to approximately 3-5 feet. Behind these spoil deposits is a corridor of natural levee deposits which slope down into marsh vegetation. This area of relatively undisturbed natural levee is approximately 50 feet wide.

The terrestrial survey will be adapted to these site conditions as described below. The survey will include the following procedures:

(1) careful bankline inspection along Bayou DuLarge;
(2) intensive pedestrian survey with shovel testing of the relatively undisturbed natural levee portions of the study area. This survey will utilize transect lane spacing of 10 meters and a shovel testing interval of 20 meters in an offset pattern. Shovel tests will be approximately 30x30 cm in the horizontal plane and will be excavated to sterile subsoil (approximately 25-50 cm deep). The excavated soil will be screened through 1/4 inch wire mesh, where feasible. Soils which are too wet or clayey for efficient screening will be thoroughly trowel searched for artifact recognition and recovery. This systematic procedure will be supplemented with judgmental shovel testing where the background research indicates a high probability for historic sites; and
(3) auger sampling in areas of spoil deposits along the bank as warranted by the historical research and the results of the bankline inspection and intensive survey of undisturbed portions of the proposed disposal sites. The 3-6 foot deep auger tests will be placed in a grid pattern in areas with a high potential for archeological sites.

All sites located in the survey corridors will be mapped, photographed, and briefly tested using shovel, auger, and limited controlled surface collection to determine depth of deposit, site boundaries, stratigraphy, condition, and cultural association. At a minimum, site maps will show site boundaries, locations of features and artifact scatters, locations of all subsurface testing units, and prominent natural and cultural features in the site area. All shovel/auger tests and excavation units will be immediately backfilled upon completion of archeological recordation.

For all sites discovered during the survey, the contractor will file state site forms with the Louisiana State Archaeologist

and cite the resulting state-assigned site numbers in all draft and final reports. In addition, the contractor will submit site update forms to the State Archeologist for all previously recorded sites. These forms will correct previously filed information where appropriate and summarize the results of the present investigation. All sites located within the project area will be recorded to scale on the appropriate 7.5 minute quadrangle and aerial mosaic project maps. The quadrangle maps will be utilized to illustrate the site forms. One copy of the aerial mosaic project maps, marked with the locations of all sites and historic structures in the project easement, and two unbound copies of each site and site update form will be submitted to the COR with the draft report.

Any standing structures located in the survey area will be identified by function, dated and described in standard terminology of formal and/or vernacular architecture, as appropriate. Each structure predating 1945 or of potential National Register eligibility will be recorded on Louisiana state standing structure forms accompanied by a minimum of three black and white photographs showing front, back and side views of the structure. The contractor will determine whether subsurface features are present. If present, the structure and features will be treated as a site and documented accordingly. The contractor shall assess the significance, i.e. the National Register eligibility, of all standing structures. Two copies of all standing structure forms will be submitted with the draft report.

C. Phase 3: Data Analyses and Report Preparation. All data will be analyzed using currently acceptable scientific methodology. The Contractor shall catalog all artifacts, samples, specimens, photographs, drawings, etc., utilizing the format currently employed by the Louisiana State Archeologist. The catalog system will include site and provenience designations.

All cultural resources located by the survey will be evaluated against the National Register criteria contained in Title 36 CFR Part 60.4 to assess the potential eligibility for inclusion in the National Register. The Contractor will classify each site as either eligible for inclusion in the National Register, potentially eligible, or not eligible. The Contractor shall fully support his recommendations regarding site significance. For those sites considered worthy of additional testing, the Contractor will recommend a specific testing plan. The Contractor shall also recommend appropriate mitigation measures for all sites classified as eligible.

The analyses will be fully documented. Methodologies and assumptions employed will be explained and justified. Inferential statements and conclusions will be supported by statistics where possible. Additional requirements for the draft report are contained in Section 5 of this Scope of Services.

5. Reports. Six copies of the draft report integrating all phases of this investigation will be submitted to the COR for review and comment within 10 weeks after delivery order award. Along with the draft reports, the Contractor shall submit:

(1) One copy of the 7.5 minute quadrangles marked with the locations of all sites and standing structures in the project easement;

(2) two unbound copies of each site, site update, and standing structure form;

(3) three copies of the National Register Registration Forms for each site recommended as eligible for inclusion in the National Register. This documentation will contain all of the data required by National Register Bulletin 16: Guidelines for Completing National Register of Historic Places Forms.

The written report shall follow the format set forth in MIL-STD-847A with the following exceptions: (1) separate, soft, durable, wrap-around covers will be used instead of self covers; (2) page size shall be 8-1/2 x 11 inches with 1-inch margins; (3) the reference format of American Antiquity will be used. Spelling shall be in accordance with the U.S. Government Printing Office Style Manual dated January 1973.

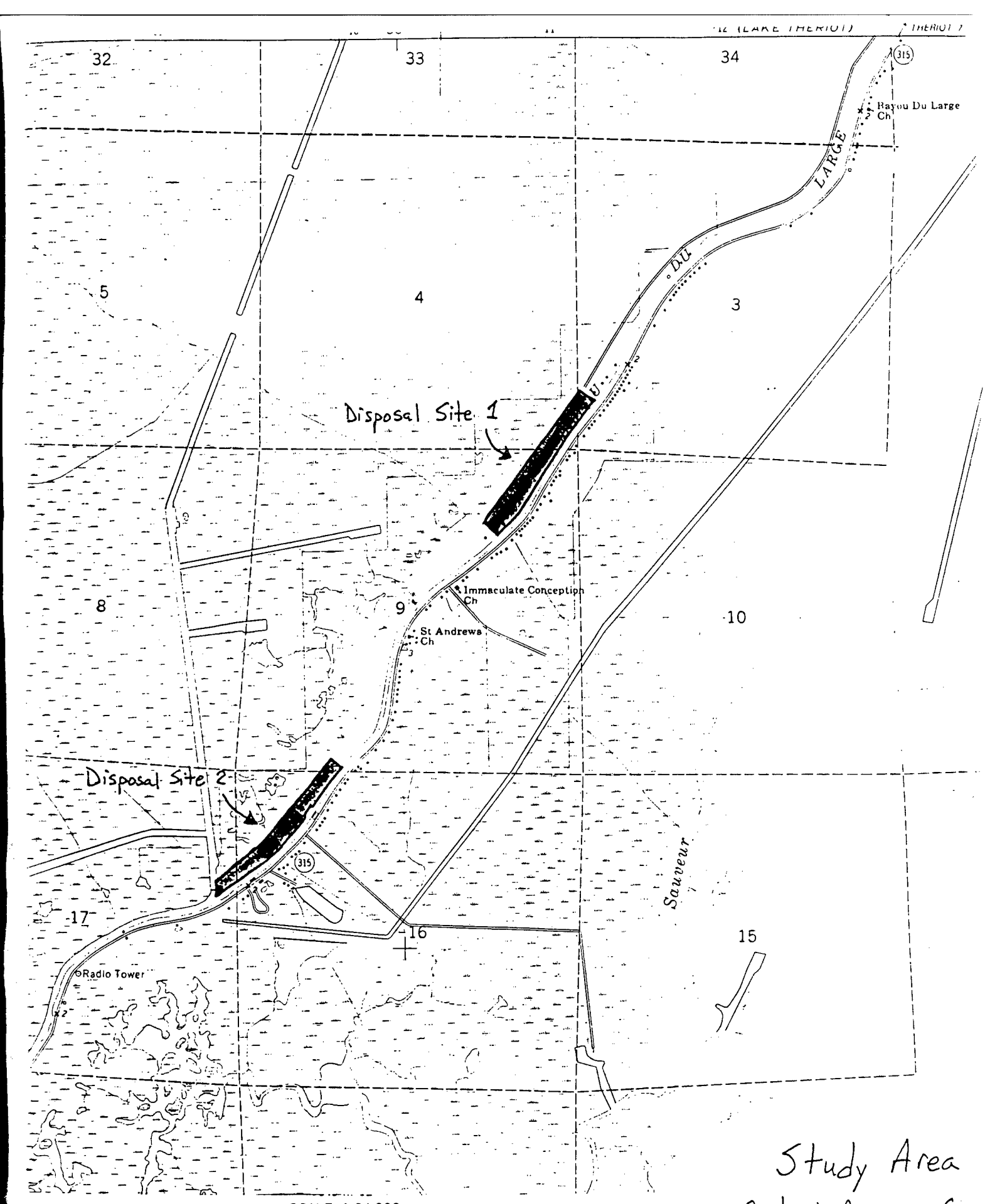
The COR will provide all review comments to the Contractor within 6 weeks after receipt of the draft reports (16 weeks after work item award). Upon receipt of the review comments on the draft report, the Contractor shall incorporate or resolve all comments and submit one preliminary copy of the final report to the COR within 4 weeks (20 weeks after work item award). Upon approval of the preliminary final report by the COR (within 1 week after submittal), the Contractor will submit 40 copies and one reproducible master copy of the final report to the COR within 22 weeks after work item award. The Contractor will also provide computer disk(s) of the text of the final report in Microsoft Word or other approved format.

Included as an appendix to the Final Report will be a complete and accurate listing of cultural material and associated documentation recovered and/or generated. In order to preclude vandalism, the final report shall not contain specific locations of archeological sites. Site specific information, including one set of project maps accurately delineating site locations, site forms, black and white photographs and maps, shall be included in an appendix separate from the main report.

6. Right-of-entry. The New Orleans District has obtained right-of-entry for cultural resource investigations in the study area.

7. Attachments.

1. Map of study area



Study Area

Cultural Resources Survey
~~of~~ Bayou Du Large
Disposal Areas