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New Orleans District

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PHASE 1 CULTURAL RESOURCES INVENTORY OF PUBLIC ACCESS LANDS IN THE ATCHAFALAYA BASIN, VICINITY OF THE SHERBURNE WILDLIFE MANAGEMENT AREA, POINTE COUPEE, ST. MARTIN AND IBERVILLE PARISHES, LOUISIANA

Final Report

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The first stage of a cultural resources inventory of Corps-owned lands in the Atchafalaya Basin Floodway included survey within two parcels (North and South Farms) with a total of 2400 acres. Auger tests to 2 and 4 meters failed to recover artifacts or sites. A plan for archeological investigations was developed for a much larger area, bounded by U.S. Hwy 190, the East Atchafalaya Basin Protection Levee, Interstate-10, and the Atchafalaya River. A review of previous investigations in the Atchafalaya Basin and of geomorphology indicates that sites predating the Coles Creek Period are unlikely. Historical research indicates that most activity occurred between about 1850 to 1880. After that, harvesting of timber occurred on a large-scale, commercial basis. Because of extreme rates of deposition within the larger area, this report recommends that archeological investigations be undertaken only in very restricted areas.

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REPLY TO
ATTENTION OF

April 14, 1994

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 the first phase of the cultural resources inventory of Corps-owned lands in the Atchafalaya Basin Floodway. In addition, these investigations were performed in support of a proposed lease agreement with the Louisiana Department of Wildlife and Fisheries. The lease would involve 2,400 acres of Corps-owned land located in two parcels (North Farm and South Farm).

We concur with the Contractor's conclusion that further archeological investigations are not warranted for the proposed lease of the North and South Farm parcels. Additional phases of the cultural resources inventory of Corps property in the Atchafalaya Basin will be implemented in consideration of the recommendations contained in this report.

Michael E. Stout
Authorized Representative
of the Contracting Officer

R. H. Schroeder, Jr.
Chief, Planning Division

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INTRODUCTION

Work reported in this volume represents the initial phase of a cultural resources inventory of Corps-owned lands in the Atchafalaya Basin Floodway. Also, investigations were conducted in support of a proposed lease agreement with the Louisiana Department of Wildlife and Fisheries. The lease involves two parcels (North Farm and South Farm), together comprising 2,400 acres. The lease will provide for management activities such as reforestation, construction of low levees, water control structures, and wells to enhance duck and other wildlife habitat. Portions of the tracts will remain in agriculture (Scope of Services).

The Scope of Services defined two study areas for this project. First:

> The overall study area is bounded generally by the Atchafalaya River on the west, U.S. Highway 190 on the north, the East Atchafalaya Basin Protection Levee on the east, and Interstate Highway 10 on the south... This area is the location of the Sherburne Wildlife Management Area (state lands) and the Atchafalaya National Wildlife Refuge (USDI lands). On-going Corps purchases of public access lands have been concentrated in this area in an attempt to fill the gaps in public ownership and to enlarge the area available to the public (Scope of Services).

The second definition of the study area for this project referred to the "field survey study area" (Scope of Services). It consisted of the two parcels (North and South Farm) referred to above.

Figure 1, traced from a COE-produced map entitled "Atchafalaya Basin," shows the boundaries of the overall study area and the location of the North and South Farm within the larger area. Figure 2 is an excerpt from the 1970 USGS 15′ Maringouin quadrangle showing the relationship between the North and South Farm parcels with topographic detail. Figures 3 and 4 are excerpts from the USGS Maringouin 7.5′ quadrangles of 1969 and 1993, respectively, showing the North Farm parcel. Figures 5 and 6 are excerpts from the USGS Maringouin 7.5′ quadrangles of 1969 and 1993, respectively, showing the South Farm parcels.

A comparison of Figures 3 and 4 indicates that deposition in the area has resulted in the infilling of most of the channels shown on the earlier map of the North Farm. Also, a road/levee oriented NW-SE has been constructed. Changes are more complex in the South Farm (Figures 5 and 6). Not only have channels been infilled by deposition, but also a considerable amount of construction has occurred. Levees, roads, and ponds have been constructed within the parcel.

The work required by the Scope of Services consisted of historical and literature research relative to the overall study area, an intensive cultural resources survey within the North and South Farm parcels, and a report of the results. A brief Phase One report was required to summarize the results of initial background research, including the geomorphology of the study area with an emphasis on recent sedimentation rates. This research was the basis for a plan for field survey which is discussed further in Chapter 8 of this report. Recommendations concerning future archeological investigations within the overall study area are preserved in Chapter 9.

Because of the relatively thick deposits of recent sediments in the survey area, field techniques emphasized 2-meter and 4-meter auger tests. Two scatters of brick fragments were encountered but neither of these had associated artifacts or features. For this reason, no site numbers were requested from the Louisiana Division of Archeology. The location of 16IV156, adjacent to Alabama Bayou, was visited. A one-foot high, circular area was observed. Its location and diameter are consistent with Moore's (1913) description.

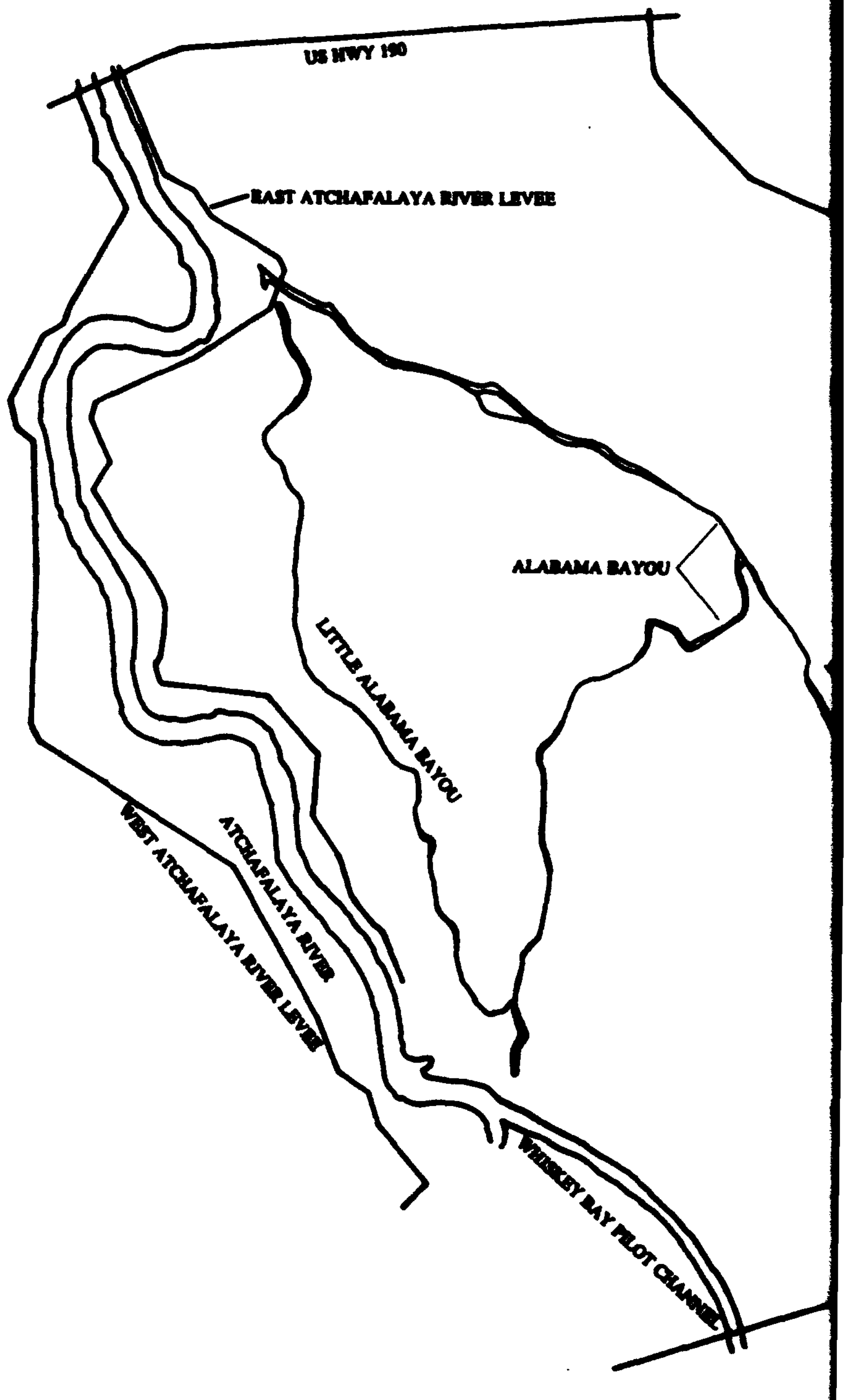

Figure 1. Boundaries of the overall study a
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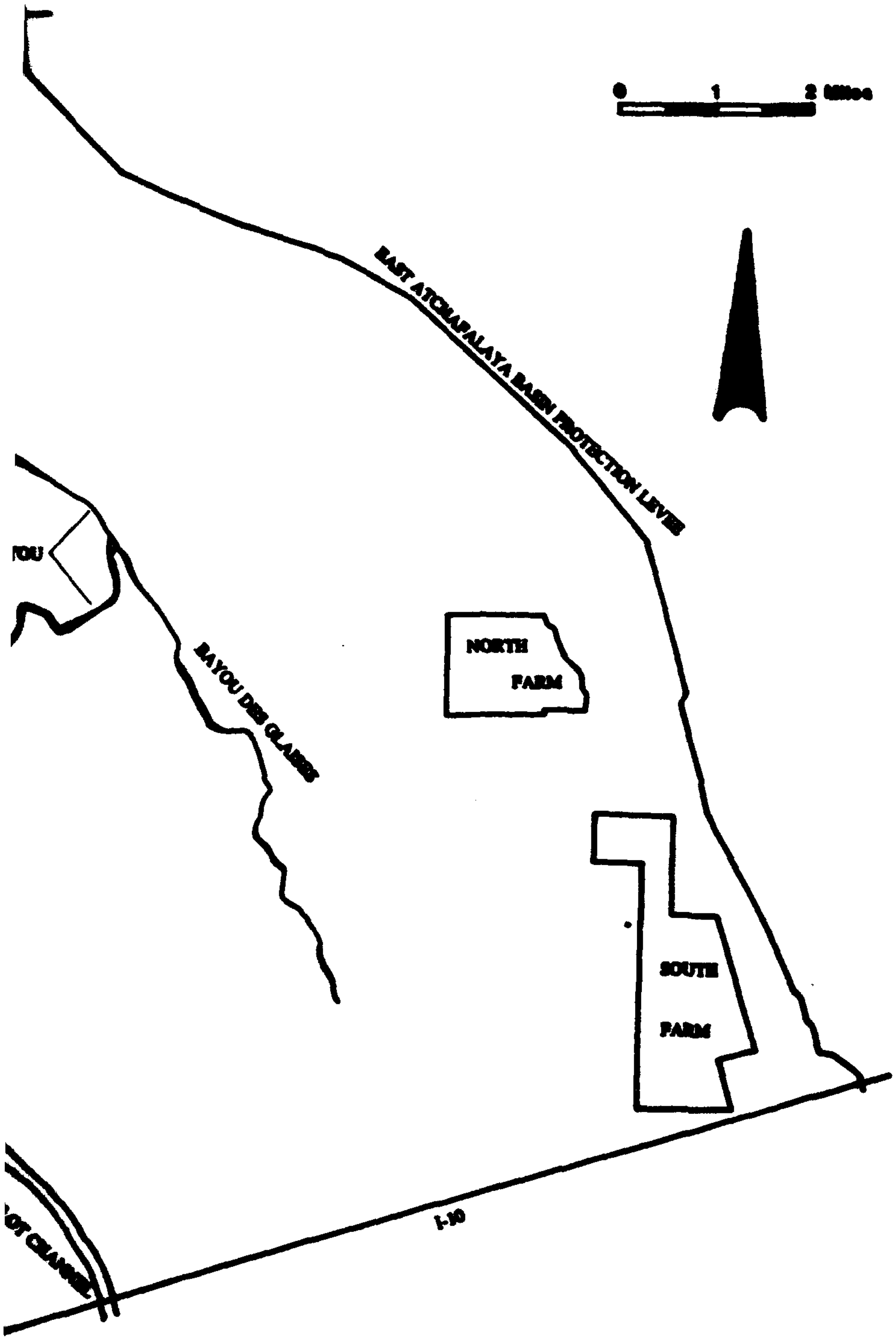


overall study area and of the North and South Farm
OE-produced map entitled "Atchafalaya Basin").

Figure 2. Excerpt from the 1970 USGS Maringouin 15' quadrangle showing the North and South Farm parcels.

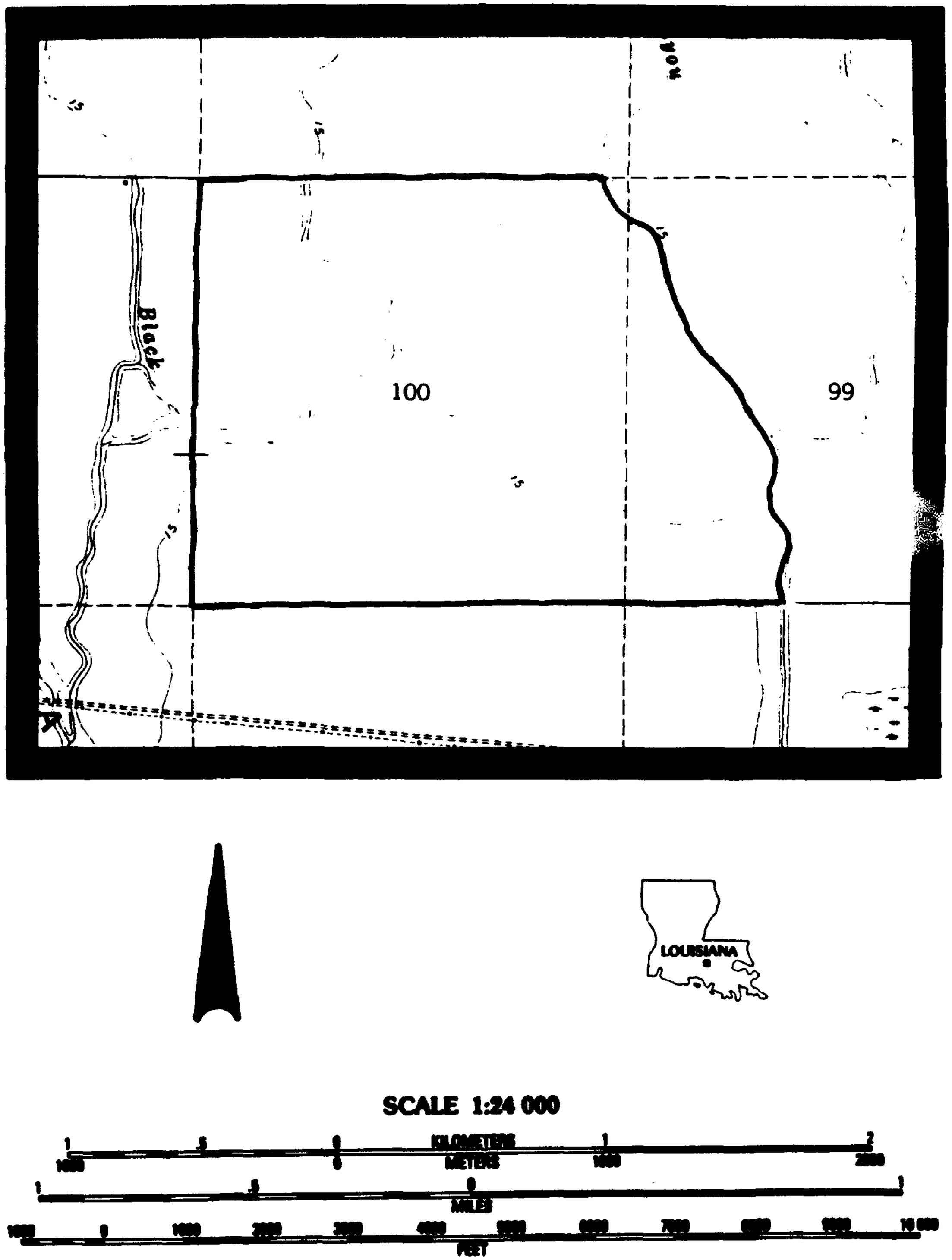


Figure 3. Excerpt from the 1969 USGS Maringouin 7.5' quadrangle showing the North Farm parcel.

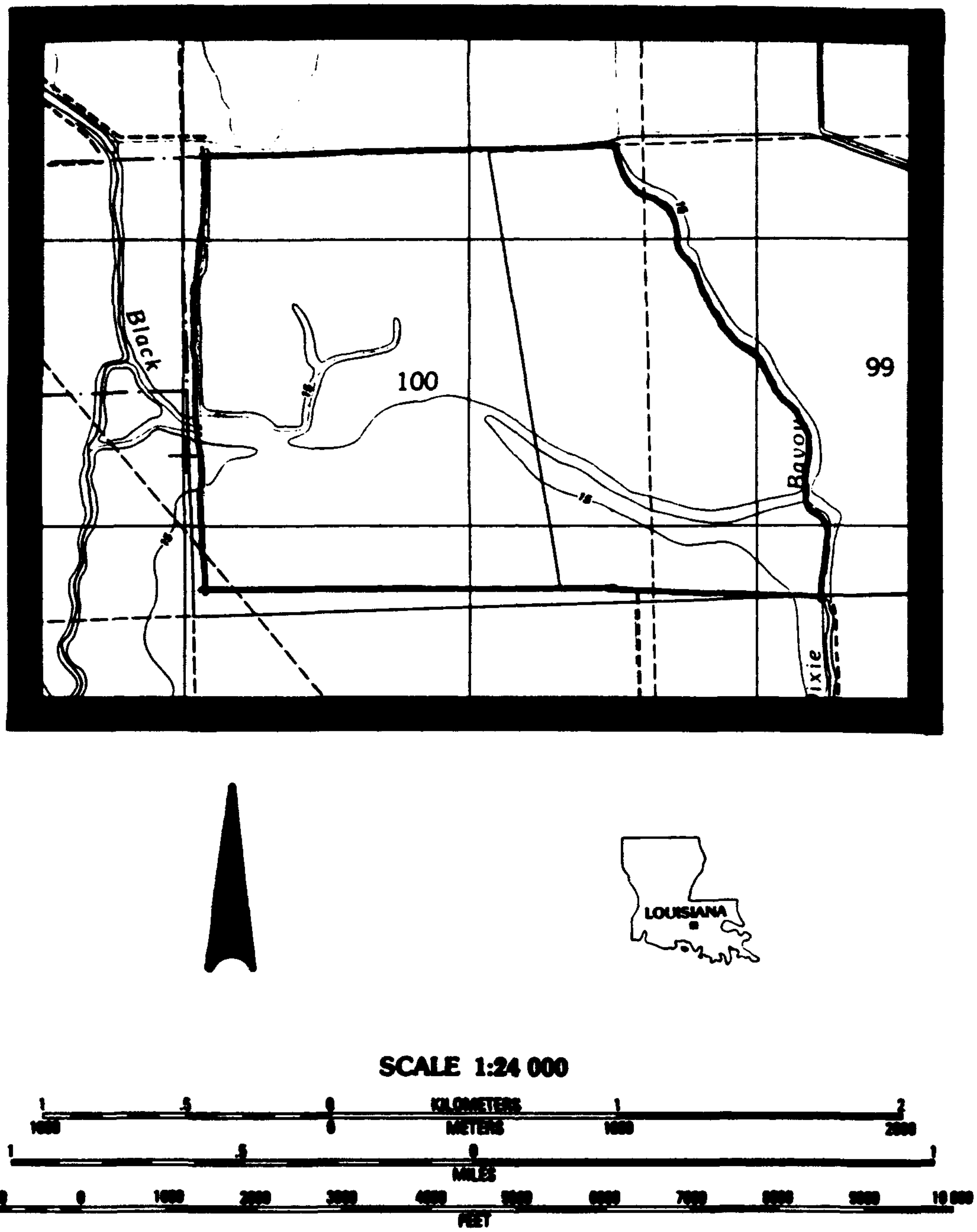


Figure 4. Excerpt from the 1993 USGS Maringouin 7.5' quadrangle showing the North Farm parcel.

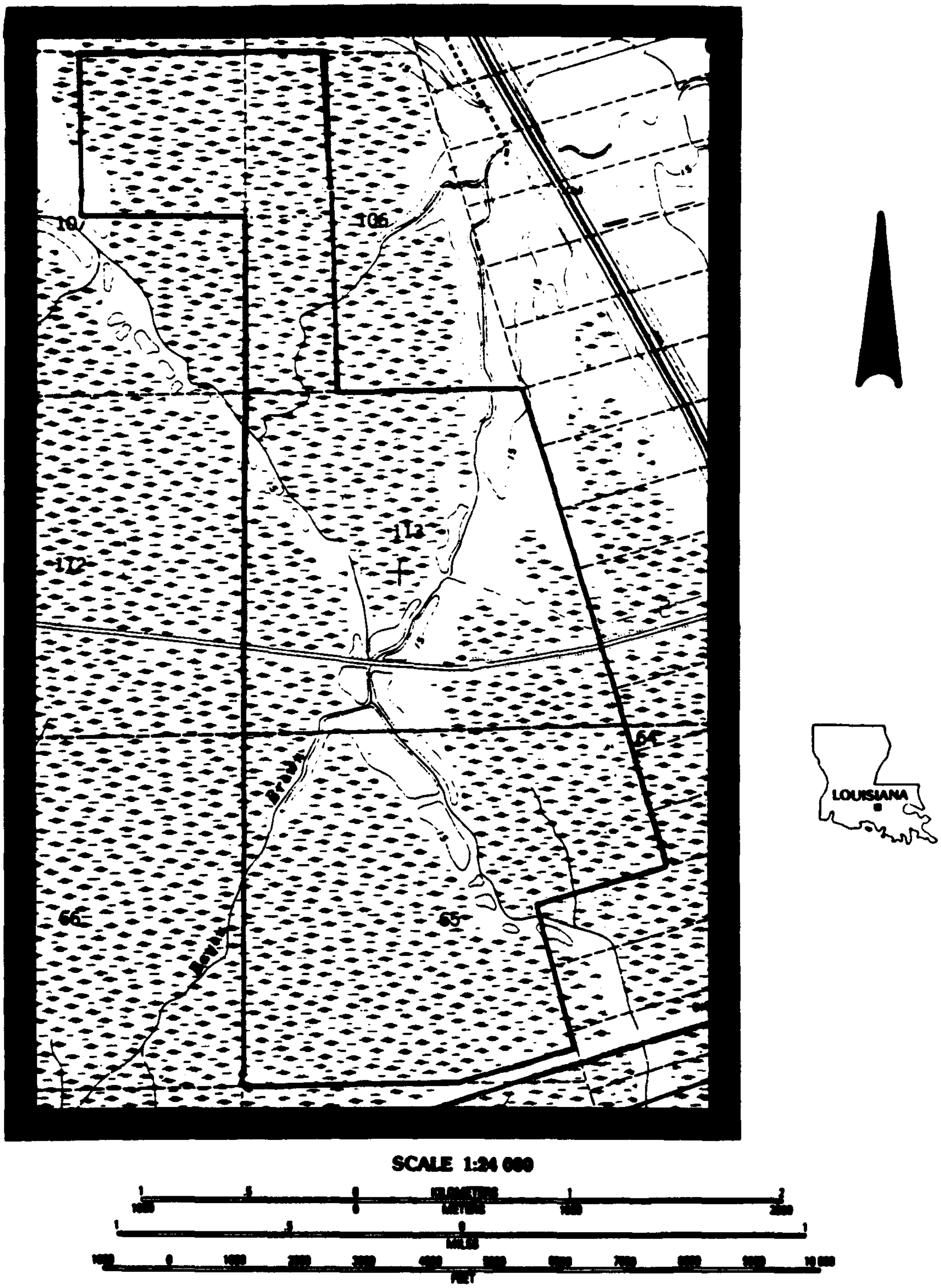


Figure 5. Excerpt from the 1969 USGS Maringouin 7.5' quadrangle showing the South Farm parcel.

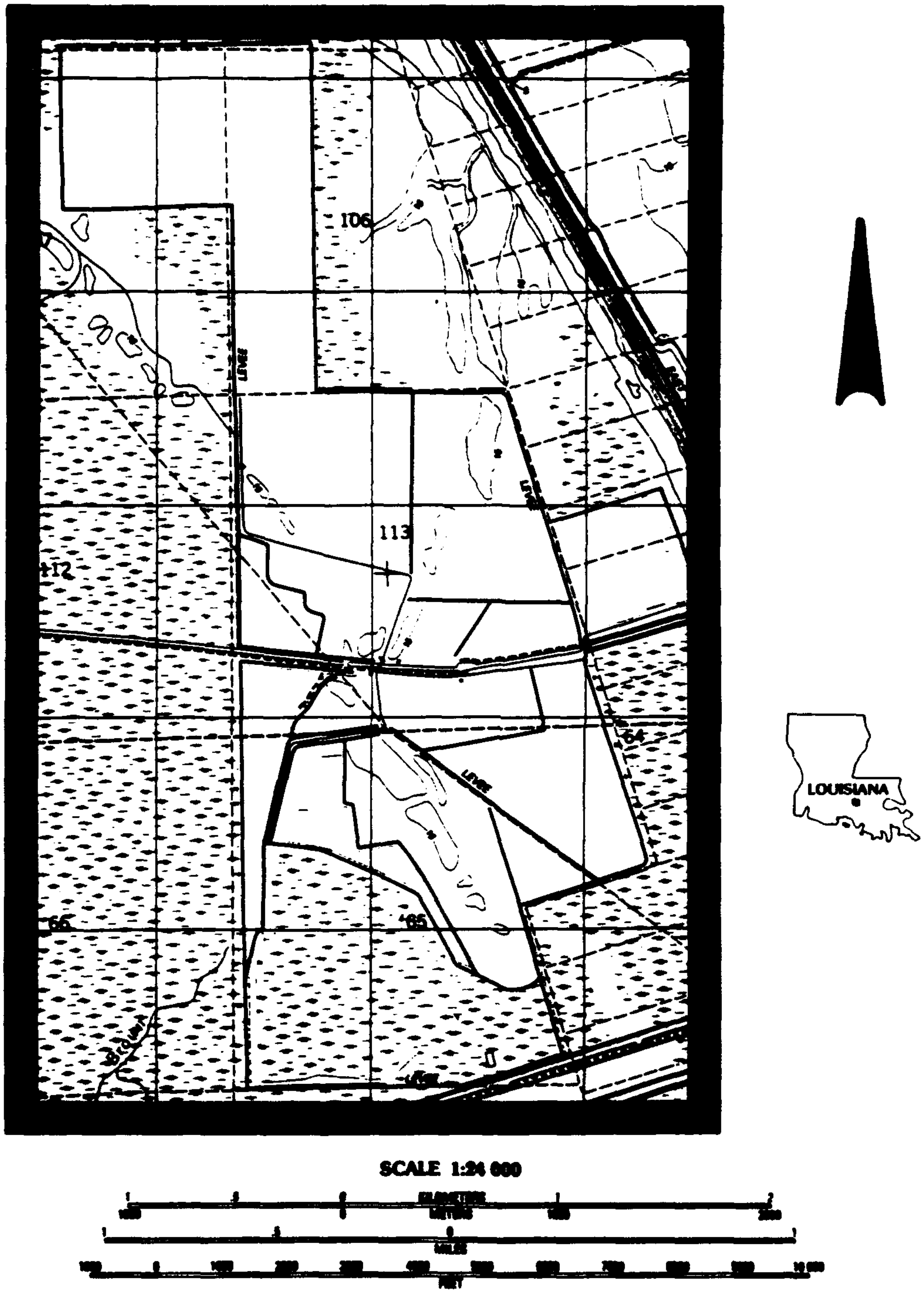


Figure 6. Excerpt from the 1993 USGS Maringouin 7.5' quadrangle showing the South Farm parcel.

CHAPTER 2
GEOMORPHOLOGY
by Paul V. Heinrich

Introduction

Throughout its history, the Atchafalaya Basin has been dominated by the fluvial activity of the Red and Mississippi Rivers. Fluviatile processes and forces have constantly reworked and reshaped the biological and physical environments of the flood basin that comprises the Atchafalaya Basin. Because of its dynamic nature, the inhabitants of this flood basin have had to use either settlement selection strategies or, as in historic and modern times, artificial control structures in order to exploit its resources. As a result, the numerous environmental factors, which influenced the prehistoric settlement and utilization of this flood basin along with the creation, destruction, and preservation of archeological deposits within project area, need to be understood in order to correctly interpret the archeological record. Thus, this chapter identifies and briefly describes those factors that influenced the use of the project area by prehistoric native Americans and later altered the cultural deposits they left behind.

Geomorphology

The alluvial plain of the Mississippi River is a composite geomorphic surface composed of smaller geomorphic surfaces that lie within an incised valley. Within this portion of the Mississippi Alluvial Valley, its alluvial plain consists of two major types of geomorphic surfaces, namely, meander belts and backswamps. Presumably buried beneath the sediments that underlie the backswamps of the Atchafalaya Basin lies a third type of geomorphic surface, namely, a braidplain (Saucier 1974; Autin et al. 1991).

A meander belt is a geomorphic surface that includes all of the area and its associated landforms created by the meandering of a stream or river while occupying a single course. In the case of freely meandering rivers, such as the Mississippi and Arkansas Rivers, topography consisting of alternating arcuate ridges and swales, which are called "ridge and swale" or "accretion" topography, typically comprises most of the meander belt. In some fluvial systems, high rates of overbank sedimentation can quickly obscure, even hide, ridge and swale topography by burial. Within well-developed meander belts, abandoned river channels in various stages of infilling are a prominent feature (Saucier 1974).

The backswamp, also called a "flood basin", is the portion of an alluvial plain associated with meander belts consisting of swamp, lakes, or a combination of both. Typically, they consist of environments that range from infrequently flooded bottomland forests to extensive swamps and scattered lakes that rarely dry up. Generally, backswamp areas of the Mississippi Alluvial Valley have remained predominantly marginal to meander belt activity throughout most, if not all, of the Holocene. They are characterized by the slow, continuous, or nearly continuous aggradation as the result of the periodic addition of silts and clays deposited by frequent or infrequent floods (Saucier 1974).

A braidplain is an alluvial plain that exhibits intricately interconnected channels of braided streams or rivers which created it. During various glaciations, glacial meltwaters flowing down the Mississippi Alluvial Valley filled it with glacial outwash deposits to create braidplains. They once extended from valley wall to valley wall. The braidplains which presumably existed within the Lower Mississippi Alluvial Valley have been either destroyed by the formation of meander belts or buried beneath the aggrading surface of backswamps that lie between meander belts (Saucier 1974, 1987; Autin et al. 1991).

Atchafalaya Basin. The Atchafalaya Basin is a backswamp of extraordinary size that lies within the lower Mississippi Alluvial Valley. This backswamp lies within a large, roughly lens-shaped, shallow depression that is about 175 km (107 miles) long along a north-northwest to southeast trend and 55 km (34 miles) wide at the latitude of Baton Rouge. This depression consists of a basin bounded by the natural levees of active and relict Mississippi River meander belts. The modern Mississippi River meander belt, Meander Belt No. 1 of Autin et al. (1991), forms the northeastern and eastern boundaries of this basin. The natural levees of Meander Belt No. 1 rise as much as 10 m (33 ft) above the backswamps of the Atchafalaya Basin. Major distributary channels, such as Bayou Latenache, Bayou Fordoche, Bayous Grosse Tete and Blue, and others, extend from abandoned channels or the active Mississippi River channel within Meander Belt No. 1 into the Atchafalaya Basin. To the south, the main channel of the Lafourche Delta Complex, Bayou Lafourche, and its distributaries comprise the southeastern boundary of this basin. The western and southern boundaries of the Atchafalaya Basin are defined by an abandoned meander belt of the Mississippi River now occupied by Bayou Teche and designated "Meander Belt No. 3" by Autin et al. (1991). The natural levees of Meander Belt No. 3 are generally 5 to 6 m (16 to 20 ft) higher than the adjacent backswamps of the Atchafalaya Basin as far south as Centerville, Louisiana. A relict Red River meander belt bridges the 25 km (15 mile) space between Meander Belt No. 1 and Meander Belt No. 3 to form the northern boundary of the Atchafalaya Basin (Lenzer 1981; Saucier and Snead 1989; Smith et al. 1986).

By definition, the Atchafalaya Basin, except for the Atchafalaya River and its channel margins, is a large flood basin. A flood basin is a broad depression of low relief that lies between alluvial ridges of meander belts or a meander belt and a valley wall. A large flood basin, such as the Atchafalaya Basin, consists of both permanently to semi-permanently flooded swamps, called "backswamps," and open expanses of water in the form of fresh-water lakes. Both the backswamps and lakes receive large quantities of fine-grained, usually clayey, suspended sediments during floods. Otherwise, because of the high plant productivity of this flood basin and its shallow water table, large amounts of plant debris accumulate as a part of its clayey backswamp and lacustrine sediments.

As is typical of other floodbasins in the Mississippi Alluvial Valley, the upper Atchafalaya Basin is characterized by a distributary drainage network inherited in large part from older drainage systems. Although their associated landforms are buried by gradual alluviation during periodic floods, the original drainage channels often remain open to create a network of distributary channels that act as both distributary and tributary streams during floods. During early flood stages, these streams serve as outlets that distribute floodwaters from main distributary channels into the backswamp basin. When flood stage falls, the floodwaters retreat from the flood basin through many of the same channels which then serve to drain the backswamps. Within the Atchafalaya Basin, the original drainage pattern has developed into an anastomosing pattern in order to better disperse floodwaters throughout the backswamp. These channels usually diverge from the main Atchafalaya River Channel at low angles. The larger distributary channels carry a substantial, perennial base flow that can be as large as 20 to 40 percent of the main flow (Fisk 1947; Smith et al. 1986).

North and South Farms. Both the North and South Farm consist of backswamp. Both areas exhibit an anastomozing channel network typical of alluvial backswamps. The South Farm consists of flat, poorly-drained backswamp less than 4.6 m (15 m) in elevation which is crossed by relict, natural levees of distal crevasse distributaries. The South Farm has been modified by the construction of levees, ditches, and roads for drainage control. The North Farm Study area consists of flat, apparently well-drained backswamp crossed by one crevasse distributary. Another crevasse distributary, Dixie Bayou, forms the eastern border of the North Farm. In both areas, the natural levees of these crevasse distributaries, which rise in places above 4.6 m (15 ft) in elevation, form the only high ground.

Atchafalaya River

At this time, the modern channel of the Atchafalaya River dominates the upper Atchafalaya Basin. It is the modern principle distributary of the Mississippi River. It is a complex river composed of segments. Some of these originated as its own channel and some are channels inherited from other rivers. It encompasses a delta built into a lake through which it flows, and it breaks through the natural levees of Meander Belt No. 3. Discharge flowing down it travels about 217 km (135 miles) from the Old River to the Atchafalaya River Delta. However, discharge down the Atchafalaya River reaches sea level within about 61 km (100 miles) at Grand Lake (Fisk 1952).

Fisk (1952) divided the stretch of Atchafalaya River that defined the western boundary of the project area into different segments that he designated as the "Leveed Atchafalaya River" and the "Atchafalaya Basin Main Channel." The Leveed Atchafalaya River segment extends from the junction of the Red and Old Rivers to River Mile 52 where the levee on the east, left descending, bank ends. The artificial levee on the west, right descending bank, extends another 26 km (16 miles) down the main channel of the Atchafalaya River. Within this segment, the river follows a single, well-defined channel varying in depth from 24 to 55 m (80 to 180 ft). The river channel is relatively straight as it lacks the meander loops that characterize the more mature Mississippi River channel. However, poorly-developed point bars are associated with this segment of the Atchafalaya River.

The Atchafalaya Basin Main Channel segment extends about 71 km (44 miles) downstream from River Mile 52. It consists of a main channel that varies in depth from 12 to 24 m (40 to 80 ft). The Whiskey Bay Pilot Channel is a slightly smaller distributary channel that branches off the main channel. Under natural conditions, this segment of the Atchafalaya River channel consisted of numerous small, shallow distributaries that emptied into Grand Lake and fed numerous lacustrine deltas. However, dredging and other channel improvements created the Atchafalaya Basin Main Channel as the channel that carries most of the discharge of the Atchafalaya River into Grand Lake and Whiskey Bay Pilot Channel as a significant subsidiary channel. During flood stage, a significant proportion of the floodwaters flow down the Whiskey Bay Pilot Channel (Fisk 1952).

Meander Belt No. 3

Immediately west of the project area, Meander Belt No. 3 defines the western boundary of the Atchafalaya Basin. Meander Belt No. 3, as mapped by Saucier (1974) and by Saucier and Snead (1989), consists of two meander belt as demonstrated by Saxon (1986) and Heinrich (1991). The oldest of these meander belts is called the "Lake La Pointe Meander" by Heinrich (1991) and "Pre-Teche-Mississippi Meander Belt" by Saxon (1986). The youngest of these meander belts is called the "Bayou Teche Meander Belt" by Heinrich (1991) and is correlative to Meander Belt No. 3 of Autin et al. (1991) to the north.

The Lake La Pointe Meander Belt consists of fragments of meander belts that can be observed within a strip between Bayou Teche and the Prairie Terrace from Arnaudville, Louisiana to just north of Iberville on the opposite side of Bayou Teche. The Lake La Pointe Meander Belt is distinct from the Bayou Teche Meander Belt in regards to its ridge and swale topography in the Bayou Teche Meander Belt. Also, the meander loops of the Lake La Pointe Meander Belt are extremely complex and well-developed, in contrast to the relatively simple meander loops of the Bayou Teche Meander Belt. The meander loops of the Lake La Pointe Meander Belt are comparable in channel width and radius of curvature to the Mississippi River (Heinrich 1991; Saxton 1986).

The meander loops of the Lake La Pointe Meander Belt that can be mapped are concave towards the Bayou Teche Meander Belt. This pattern indicates that the river course with which they are associated lies buried beneath the Bayou Teche Meander Belt. Because it is highly unlikely that a younger meander belt would build exactly over the abandoned river course of an older meander belt, the Bayou Teche Meander Belt either reoccupied the abandoned course of the Lake La Pointe Meander Belt or formed from the abrupt aggradation of its river course (Heinrich 1991).

At this time, it is uncertain whether Peoria Loess lies between the surface of this meander belt and Holocene alluvium blankets its surface. If it is covered by Peoria Loess than this meander belt predates 12,000 B.P. and, likely, is of Middle Wisconsinan age. If Peoria Loess is not present, this meander belt represents an Early Holocene, Mississippi meander belt, such as, Meander Belt No. 2 of Autin et al. (1991).

The most recent and best preserved of the meander belts within Meander Belt No. 3 is the Bayou Teche Meander Belt. The northern and central segments of the Bayou Teche Meander Belt have a complex natural levee system consisting of as many as three natural levees flanking both sides of Bayou Teche. From the center of Bayou Teche outward, they are informally designated the "inner," "middle," and "outer" natural levee. Respectively, the outer, middle, and inner natural levees represent natural levees formed by sediments deposited sequentially by the Bayou Teche, Teche-Red River, and Teche-Mississippi River (Gould and Morgan 1962).

The outer natural levee is a relict, very broad, and very gently sloping natural levee composed of gray to brown silts and clays. The outer natural levee consists of overbank sediments deposited by the Teche-Mississippi River between 6,000 to 3,800 years B.P. The overbank sediments overlie point bar, channel fill, and backswamp deposits. About 3,800 years B.P., the outer natural levee became a relict landform when the Teche-Mississippi abandoned Bayou Teche as its course (Gould and Morgan 1962; Autin et al. 1991).

Between the inner and outer natural levees, the middle natural levee is a relict, very narrow, and steeply sloping natural levee composed of reddish-colored alluvium. The middle natural levee is underlain by reddish-colored alluvium deposited by the Teche-Red

River between 3,500 to either 2,000 or 1800 B.P. years B.P. The distinctive red color of this alluvium is derived from the Permian redbeds of Oklahoma and northeast Texas. This alluvium was deposited by the Teche-Red River while it was active. About 2,000 years B.P., the middle natural levee became a relict landform when the Teche-Red River abandoned Bayou Teche as its course (Gould and Morgan 1962).

The innermost set of natural levees, called the "inner natural levee," occurs along the narrow channel of the northern segment of Bayou Teche. The inner natural levee is the modern, actively aggrading natural levee of Bayou Teche. Unlike the relict outer and middle natural levees, the inner natural levee occurs only where the abandoned channel of the Teche-Red River has sufficiently filled to form dry land (Gould and Morgan 1962).

Processes

Within the project area and the Atchafalaya Basin generally, three major depositional environments can be defined on the basis of sedimentary processes. They are the flood basin, river channel, and channel margin environments. Each of these environments are dominated by distinct sedimentary processes that result in recognizable sedimentary facies.

Flood Basin

The backswamps consist of low, flat areas periodically covered or saturated with water and support a cover of woody vegetation with or without an undergrowth of shrubs. Within the backswamps of the Atchafalaya Basin two types of swamps, well-drained and poorly-drained, have been recognized by Coleman (1966). Well-drained swamps are swamps characterized by subaerially exposed, but saturated, land during a large part of the year with inundation occurring primarily during periods of high flooding because of slightly higher elevations and efficient drainage channels. Poorly-drained swamps are swamps which are inundated more or less permanently by standing, often stagnant, water. Therefore, reducing and oxidizing conditions alternate during the accumulation of sediments within well-drained swamps, while within poorly-drained swamps, primarily reducing conditions exist. The variations in the oxidizing and reducing conditions found within poorly- and well-drained swamps impart a distinctive character to the sediments that define sedimentary facies characteristic of each type of swamp. Because of the low sedimentation rates and infrequent to frequent subaerial exposure, backswamp sediments are preconsolidated by dewatering to create stiff, but highly fissured clayey deposits (Coleman 1966; Saucier 1974).

The sediments of the well-drained swamp facies consist of light gray to light yellowish brown and dark brown, organically-poor clay with scattered silt lenses. Typically, these sediments are highly mixed by floraturbation and, thus, stratification is lacking or only vaguely discernable. Well-drained swamp deposits are typically highly fissured as a result of periodic desiccation. Faunal remains of any type are rare in well-drained swamp facies as a result of the intense leaching and oxidation to which they are subjected. Well-drained swamp sediments characteristically contain abundant nodules and small geodes of calcium carbonate ($CaCO_3$) and small nodules of iron oxides. Other diagenetic minerals such as pyrite (FeS_2) and vivianite ($FeS_3[PO_4]_2*8H_2O$) are very rare (Coleman 1966; Krinitzsky and Smith 1969).

Poorly-drained swamp facies consist of very organically-rich, black to bluish gray clays with occasional laminations of silt, common laminations of compressed plant remains, and large, frequently occurring, wood fragments. Compressed leaves, twigs, and seeds comprise the organic laminations. Thin beds of woody peat often are also intercalated within the clays. Faunal remains present within poorly-drained swamp sediments consist primarily of pulmonate and fresh-water gastropods. Typically, floraturbation has thoroughly mixed these sediments and, thus, these sediments are commonly massive. Pyrite (FeS_2) and vivianite ($FeS_3[PO_4]_2*8H_2O$) are the characteristic diagenetic minerals present within poorly-drained swamp sediments. Because they are fully saturated, anaerobic micro-organisms remove oxygen from these sediments causing a deficiency of oxygen. As a result, iron and manganese are reduced into soluble forms and bluish, greenish, and grayish sediments called "gleys" are formed (Coleman 1966; Krinitzsky and Smith 1969).

Lacustrine sediments, recognizable as a sedimentary facies separate from backswamp deposits, consist of sediments that have accumulated from suspension within open lakes and as lacustrine sediments that have accumulated within the open lake. Sometimes beds of reddish lacustrine clays, presumably of Red River origin, occur within the upper levels of the Atchafalaya flood basin deposits. These sediments normally possess rare beds containing micro-mollusks and fresh-water pelecypods, e.g. *Rangia* and *Unio*, and gastropods. Sometimes these shells form beds that are a meter or so thick and tens of meters to hundreds of meters in lateral extent. Diagenetic carbonate nodules and laminea of calcium carbonates ($CaCO_3$) and iron carbonates ($FeCO_3$) are abundant, with the iron carbonates, called "siderite," predominating. The lacustrine delta deposits are characterized by a coarsening upward sequence ranging from basal, parallel laminated silty clays to cross-bedded and cross-laminated fine distributary sands (Coleman 1966; Krinitzsky and Smith 1969). The lithology and facies architecture of lacustrine deposits are described in considerable detail by Tye (1986), Tye and Coleman (1989), and Tye and Kosters (1986).

River Channel. Because of its relative youth and the erosion-resistant clayey flood basin sediments into which its course is cutting, the course of the Atchafalaya River has managed only very limited lateral migration. So far, the lateral migration of its channel has only produced a slightly sinuous channel with narrow, discontinuous point bars. The point bar consists of an upward-fining sequence of fluvial sands, which is as thick as the adjacent river channel. The lower part of a point bar is deposited by lateral accretion and the upper few meters accumulates by overbank sedimentation. If left to freely meander, lateral migration of the Atchafalaya channel will, eventually, enlarge the minor bends that currently comprise it course to form well-defined meander loops and a meander belt (Fisk 1952).

The lateral migration of a channel is accomplished by active erosion by river currents of the concave bank, called the "cutbank," of a river channel. Scouring by fluvial currents at the base of a cutbank within a river channel causes it to become oversteepened. Eventually, the cutbank is oversteepened to the point that it caves into the river. When the cutbank caves into the river channel, the channel laterally shifts the cutbank and simultaneously deposits sand and silt on the opposite convex bank, called the "point bar," of the river channel. Backswamp clays slow the process of lateral migration, because they are very resistant to both the channel scouring that produces an oversteepened cutbank and to caving even when an oversteepened bank is produced. In addition, the cohesive clays cave into the river as a single block, a slump block, that protects the bank from erosion, like a natural revetment, until the slump block is scoured away by cutbank erosion (Fisk 1952).

Channel Margin. During flood stage, some bedload and considerable suspended load escapes the banks of an active river channel to create natural levees. If floodwaters uniformly overflow the banks of a channel, they become no longer confined by channel banks, spread out across the floodplain, and, thus, their velocity abruptly decreases. Because of the baffling effect of flood plain vegetation, floodwaters lose additional velocity as they leave the river channel. As a result of their rapid loss of velocity, silt and sand suspended within these floodwaters rapidly settles out of suspension and accumulates along the margin of the river channel. Only the finer suspended clay is transported by unconfined floodwaters into the backswamp of the flood basin. The silt and sand accumulates incrementally with each flood to build low, wedged-shaped ridges, called "natural levees," paralleling the river banks and slowly decreasing in elevation away from the river (Galloway and Hobday 1983).

Natural levees typically consist of fine sandy loams, silts, silt loams, and silty clays. These sediments are typically thickest and coarsest adjacent to the river bank. They thin and gradually decrease in grain size with increasing distance from the river until they interfinger with clayey flood basin sediments. The sediments of older, relict natural levees of river channels typically consist of massive, often iron-stained, stiff to very stiff, mottled brown to grayish brown, fine sandy loams, silts, silt loams, and silty clays. In the case of younger, active natural levees of river and major crevasse distributary channels, these sediments may exhibit internal bedding and sedimentary structures that reflect rapid deposition by multiple, shallow flow events. The natural levees of the smaller crevasse distributaries within the Atchafalaya Basin consist of stiff gray clay containing a small percentage of silt and fine sand. They contain abundant plant roots and are sometimes, but not always, oxidized. Within the Atchafalaya Basin, natural levees are identified on infrared aerial photography by the vegetation which reflects the higher elevation of the natural levee above the adjacent swamp (Galloway and Hobday 1983; Smith et al. 1986; Farrell 1987, 1989).

Except for the most immature natural levee, natural levees are subaerially exposed for long periods of time between the brief periods of high river stages when floodwaters overflow them. When subaerially exposed, natural levee sediments are compacted, oxidized, highly leached, and bioturbated by pedogenic processes and weathering. As a result, natural levees contain massive, buried weathering zones containing iron oxides, carbonate nodules, and iron oxide concretions. These characteristics reflect subaerial weathering and soil formation during subaerial exposure of natural levees between flood events (Fisk 1947; Galloway and Hobday 1983).

Eventually, a natural levee aggrades to a level above the bankfull stage of a river such that it cannot be uniformly overflowed by floodwaters. In such a case, floodwaters escape the river and overflow the natural levee through local breaches, called "crevasses," within the natural levee. Because the flow of floodwaters is concentrated within crevasses, they often further cut and widen crevasses to create well-defined channels, called "crevasse channels," by which floodwaters cross natural levees. Typically, a crevasse channel cuts through a natural levee at right angles and is dry at all times except during flood stage. Crevasse channels provide conduits for floodwaters to transport suspended load and some bed load from the river, through the natural levee, and into the near-channel portion of the adjacent flood basin (Fisk 1947; Galloway and Hobday 1983; Smith et al. 1986; Farrell 1989).

Where they leave a crevasse channel, sediment-laden floodwaters decrease in velocity and, thus, deposit their load of sands and silts as a crevasse splay. A crevasse splay is a delta-like landform with a distinct triangular or elliptical plan with a radial distributary system composed of anastomozing or straight channels. Often during floods, crevasse splays build like a delta by prograding into a flood basin filled with standing water. Also during floods, crevasse splays are aggraded by the accumulation of suspended and bed loads upon their surface as flow velocity of floodwater drops as it spreads across the splay (Galloway and Hobday 1983; Farrell 1987, 1989).

Also, within the backswamp of the Atchafalaya Flood basin, natural levees have been accreting along the channel margins of distributary channels. During floods, floodwaters leave the Atchafalaya River as confined flow carrying significants amounts of fine sand, silt, and clay in suspension. As floodwaters spread out of the distributary channels into the backswamp, they lose velocity, deposit sediment, and thus build natural levees along the distributary channel. As natural levees along a segment of distributary channel aggraded in height, more and more floodwaters are contained within this segment distributary channel and forced further along the distributary into the backswamp before they overflow the channel banks. As a result, the zone of active construction of natural levees along distributaries has moved from adjacent to the Atchafalaya River further into the backswamp with time. However, this orderly process has been disrupted by the construction of artificial levees along the Atchafalaya River and numerous gates, embankments, and other flood control structures across and along the distributaries.

Stratigraphy

Allostratigraphy. By definition, an allostratigraphic unit is a mappable body of sedimentary rock or unconsolidated sediments that is defined and identified on the basis of bounding discontinuities (North American Commission on Stratigraphic Nomenclature 1983). Within an incised valley, such as the Mississippi Alluvial Valley, erosional unconformities and geomorphic surfaces are bounding discontinuities that can be used to define and map allostratigraphic units (Figure 7). Different types of fluvial allostratigraphic units can be recognized depending on the nature of the geomorphic surface (Heinrich 1993).

First, three different bounding unconformities define the fluvial alloformation associated with a fluvial terrace (Figure 7). The first bounding discontinuity is a basal unconformity that consists of a fluvial erosion surface, typically an undulating surface, cut by either the entrenchment, lateral migration, or both of the associated river channel. Most, if not all, of this unconformity is formed contemporaneously with the deposition of the adjacent fluvial sediments. The second bounding discontinuity is the scarp that forms the edge of a fluvial terrace is the exposed edge of a younger erosional surface which truncates the sediments which comprise a fluvial terrace. As a result, this scarp separates geomorphic surfaces and fluvial deposits of differing ages. The difference in age between older fluvial deposits and its fluvial terrace and adjacent, younger fluvial deposits and their geomorphic surfaces is reflected by

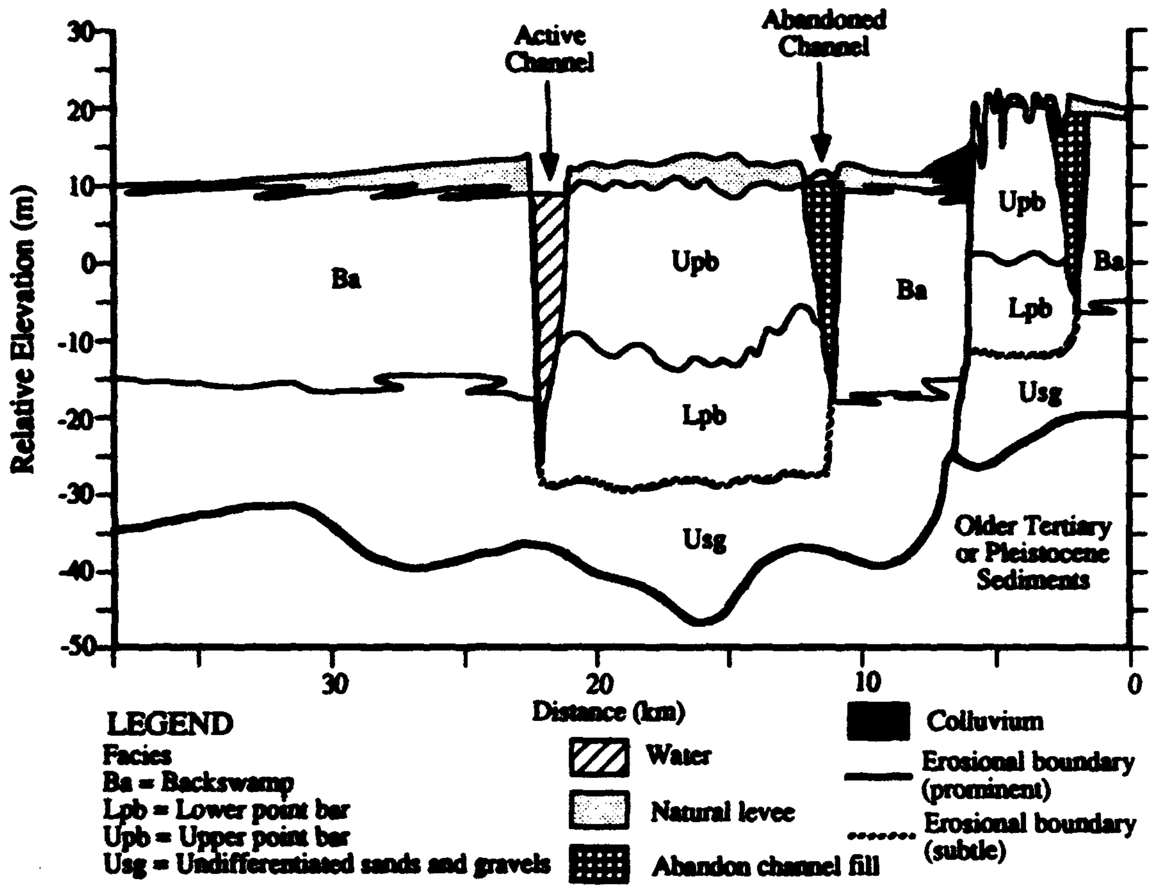


Figure 7. Cross-section across a hypothetical alloformation associated with a meander belt (from Heinrich 1993).

differences in surface morphology, soil development, and thickness of overbank deposits. The final bounding discontinuity, which forms the upper boundary of this allostratigraphic unit, consists of fluvial terrace (Autin 1992; Heinrich 1993).

A second type of allostratigraphic unit present within the Mississippi River Valley has a meander belt, a constructional geomorphic surface, as its surface. This allostratigraphic unit consists of an erosional unconformity, a meander belt surface, and a body of fluvial sediments that lies between the bounding discontinuities (Figure 7). By definition, the upper bounding discontinuity consists of meander belt, which can be either exposed or buried. In the case of a meandering system, the fluvial sediments lying between the unconformities consist of a lower part composed of point bar sands and gravels, overlain by finer-grained and vertically accreted natural levee and overbank sediments. The lower bounding discontinuity is an erosional unconformity formed by scour at the channel bottom and, at the edges, by cutbank erosion. Outside of the meander belt, natural levee deposits extend into and interfinger with the adjacent backswamp sediments (Heinrich 1993).

Finally, in the case of the flood basin, it is more difficult to define allostratigraphic units. Unless regional paleosols, sedimentation units, or unconformities can be mapped within the backswamp and lacustrine sediments underlying the surface of the flood basin, then the differentiation of these deposits into allostratigraphic units may not be practical. In such cases, the base of the flood basin deposits and unconformities of associated fluvial alloformations represent the only usable bounding discontinuities.

After their formation, fluvial alloformations with either terraces or meander belts as their surfaces can be altered by post-depositional processes. Frequently, younger sediments bury fluvial terraces after their formation. These sediments may consist of either overbank deposits, eolian sands, loess, or colluvium. Where buried intact, a fluvial terrace might be detectable by either laterally persistent paleosols or truncated weathering horizons and abrupt changes in sedimentary facies. With prolonged subaerial exposure, erosion of a fluvial terrace can either obliterate or obscure constructional landforms (Heinrich 1993).

Unnamed Fluvial Alloformation No. 1. The poorly-developed meander belt of the Atchafalaya River forms an unnamed fluvial allostratigraphic unit. The surface of the narrow point bars of the Atchafalaya River forms the surface of this allostratigraphic unit. Unnamed Fluvial Alloformation No. 1 consists primarily of narrow, discontinuous point bar deposits which range in width from 0.1 to 0.3 km (0.06 to 0.2 mile) and 0.8 to 1.9 km (0.5 to 1.2 miles) in length. One usually long point bar is about 0.5 km (0.3 mile) wide and 3.2 km (1.9 miles) long. The thickness of point bar deposits present is unknown, but likely approximates the depth of the adjacent Atchafalaya River channel (May 1983; Smith et al. 1986).

Undifferentiated Flood Basin Fill. The sediments underlying the surface of the Atchafalaya Basin consist predominantly of flood basin clays and silty clays (Figure 8). These clayey sediments accumulated within the well- and poorly-drained swamps and lakes that have dominated the upper portion of the Atchafalaya Basin throughout the Holocene Epoch. Linear bodies of coarser grained sediments, e.g. sands and silts, occur within these clayey flood basin deposits. These coarser grained sediments consist of natural levee, point bar, and channel fill facies of abandoned channels of rivers and their crevasse distributaries that lie within these flood basin deposits. These sediments bury the surfaces of meander belt and braided stream deposits (Coleman 1966; Krinitzsky and Smith 1969).

Subsurface cross-sections, e.g. Krinitzsky and Smith (1969), Tye and Kosters (1986), and May (1983) indicate that lacustrine and undifferentiated swamp deposits underlying this portion of the Atchafalaya Basin are complexly interbedded and interfingered with each other. The cross-sections of May (1983) and Tye and Kosters (1986) show that undifferentiated swamp deposits dominate the flood basin deposits underlying the project area. In contrast, the cross-sections of Krinitzsky and Smith (1969) show the presence of significant, laterally continuous beds of lacustrine sediments (Figure 9). Regardless of which cross-sections best portray the subsurface stratigraphy of the flood basin deposits within the project area, the flood basin deposits lack obvious bounding discontinuities.

Thus, at this time, with available subsurface data, regional bounding discontinuities, e.g. erosional unconformities and diadems, neither can be recognized nor mapped within the backswamp and lacustrine

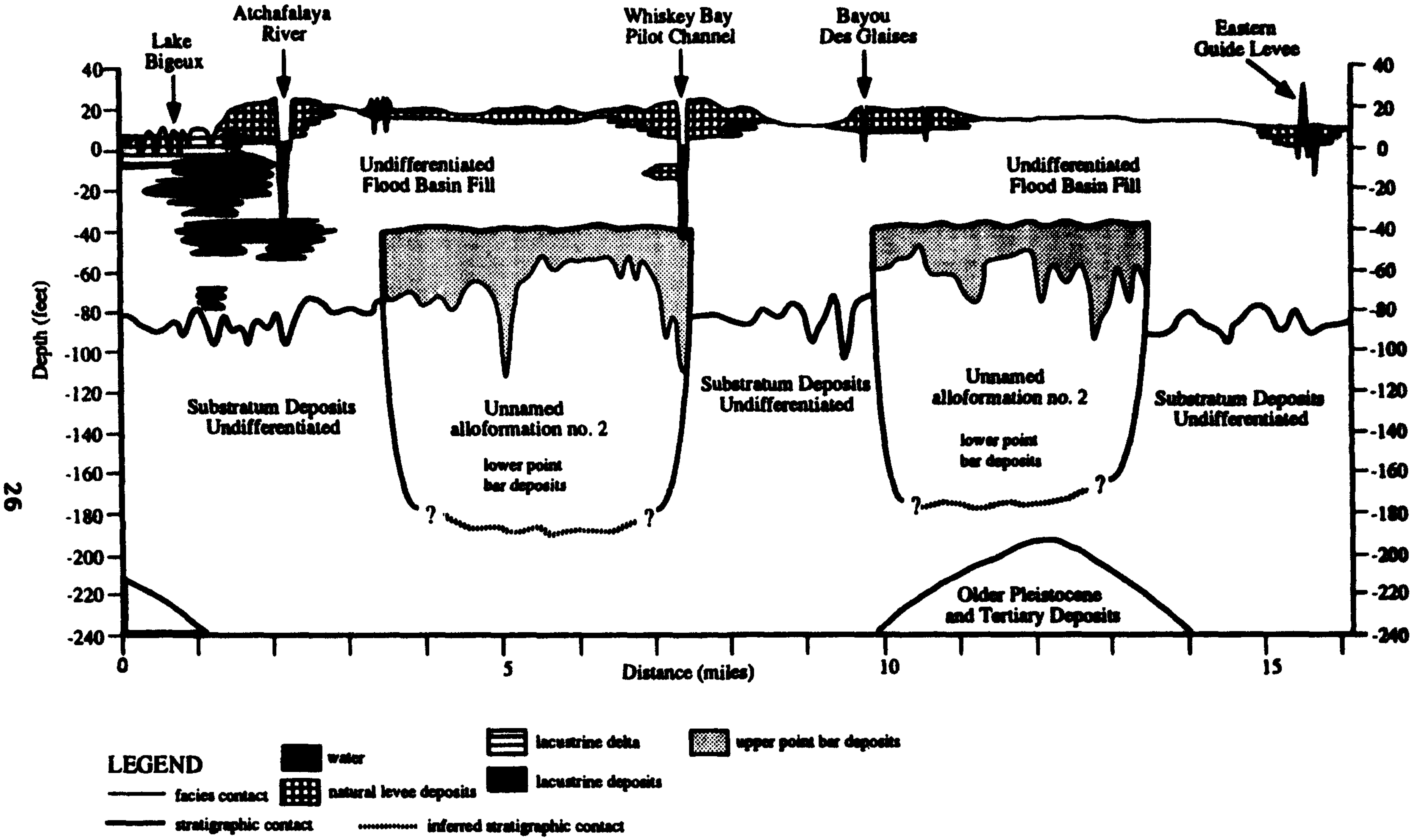


Figure 8. Stratigraphy of the Holocene and Wisconsinan deposit underlying the project region along Interstate 10 (modified from May 1983).

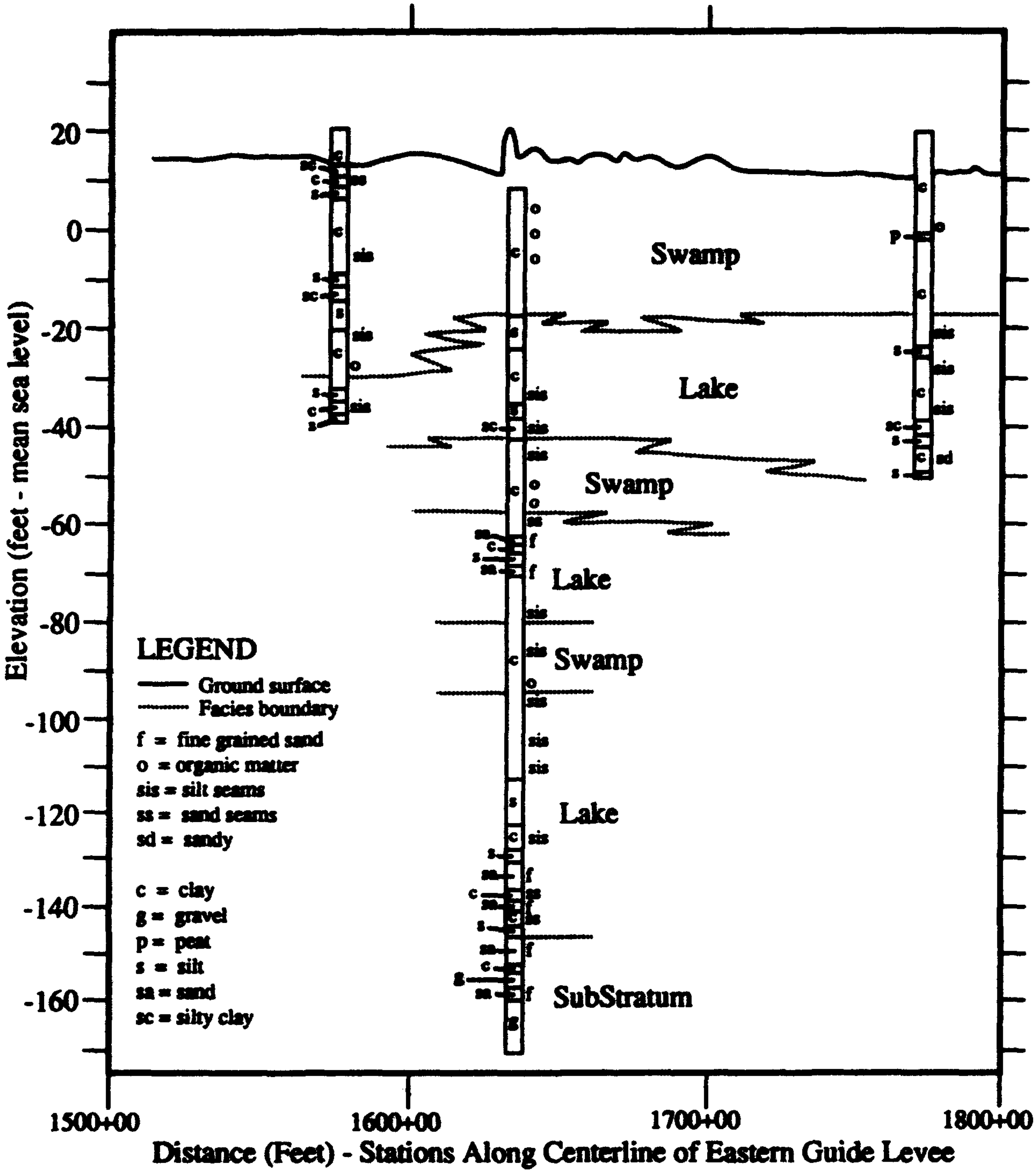


Figure 9. Cross-section of basin fill deposits along Eastern Guide Levee near Ramah, Louisiana (simplified from Krinitsky and Smith 1969).

sediments, which comprise the flood basin deposits of the Atchafalaya Basin. As a result, it is currently impossible to define and map allostratigraphic units within the flood basin deposits that underlie the Atchafalaya Basin. Unfortunately, with the notable exception of Krinitzsky and Smith (1969), the majority of borings, which were drilled primarily for geotechnical purposes, lack the detail needed for stratigraphic studies. Only with carefully described borings can mappable bounding discontinuities consisting of either paleosols, zones of lacustrine-swamp sequences, or discrete beds of Red River sediments be recognized and used to defined the internal stratigraphy of these flood basin deposits.

Unnamed Fluvial Alloformation No. 2. Within the cross-section of May (1983) constructed from Interstate 10 foundation boring data, a buried fluvial allostratigraphic unit, informally called "Unnamed Alloformation No. 2" for this report, is evident (Figure 8). It consists of two narrow belts of point bar deposits overlying "substratum deposits" that lie well above the level of the adjacent contact between undifferentiated flood basin deposits and underlying substratum sands, called "substratum deposits" by May (1983). In the cross-section, the two fragments of Unnamed Alloformation No. 2 encountered are about 5.6 and 6.4 km (3.5 and 4.0 miles) wide. The uppermost 6 to 12 m (20 to 40 ft), in one boring the uppermost 23 m (75 ft), consists of sediments described as "point bar" sediments. The top of the point bar deposits in each of these fluvial packages lies at a depth of about 12 m (40 ft) below sea level (May 1983). With the available data, the bottom of this allostratigraphic unit is uncertain. Whether they represent either separate meander belts, an anastomozing channel system, or a single sinuous meander belt is impossible to tell from the available information. Detailed descriptions concerning the sediments that comprise Unnamed Alloformation No 2. have not been published.

Undifferentiated Fluvial Deposits. Overlain by undifferentiated flood basin sediments and cut into by Unnamed Fluvial Alloformation No. 2 are sand and sandy gravels that fill the remainder of the incised valley occupied by the Atchafalaya Basin, Mississippi River, and its meander belts (Figure 8). At this time, insufficient data exist by which to subdivide these sandy gravels typically designated as "substratum deposits" by various studies, e.g. Fisk (1944) and May (1983). Thus, these sediments are designated as "undifferentiated fluvial sediments" until sufficient data to understand their stratigraphy and origin are available.

Autin et al. (1991) propose that these sandy sediments, which are presumably of fluvial origin, consist not only of Late Wisconsinan and, possibly, Early Holocene fluvial deposits, but also of deposits that accumulated during older periods of valley cutting and aggradation during the Late Pleistocene Epoch. They infer that the last period of valley entrenchment likely failed to completely remove the alluvial fill of previous periods of valley filling and, thus, the "substratum deposits" likely consist of sands of greatly differing ages. Also, their model implies that the unconformity on which these sands lie was not the result of a single period of valley entrenchment during the last sea level low stand. Rather, their model indicates that this unconformity consists of a complex erosion surface created by multiple periods of valley entrenchment and fluvial aggradation (Autin et al. 1991).

Closely spaced foundation borings for Interstate Highway 10 clearly show that the contact between the sands of the undifferentiated fluvial deposits and the overlying clayey flood basin deposits is irregular and undulating (Figure 8). Typically, this contact has as much as 6 m (20 ft) and as much as 12 m (40 ft) of relief on it (May 1983). With the available data, it is impossible to determine whether this contact is either a constructional geomorphic surface, such as a braidplain, or an erosional unconformity created prior to the accumulation of flood basin deposits.

Soils

As summarized by Table 1, the soil-geomorphic relationships within the project region are relatively simple according to parish soil surveys, although complicated by inconsistent mapping between soil surveys. Within the project region, Convent soils or association, both occasionally flooded, are associated with the natural levees of the Atchafalaya and its major crevasse distributaries. In Iberville Parish, the natural levees of the major crevasse distributaries are also mapped, in part, as Convent and Fausse soils. Except for St. Martin Parish, the natural levees of the minor crevasse distributaries and distal ends and lower slopes of natural levees of some major crevasse distributaries are mapped as either Sharkey soils,

Table 1. Relationships Between Soil Series and Landforms.

Parish Landform	Iberville	Pointe Coupee	St. Martin
natural levees of Atchafalaya River	not applicable	Convent soils, occas. flooded	Convent assoc., occas. flooded
batture of Atchafalaya River	not applicable	Robinsonville and Commerce soils	Convent soils, freq. flooded
natural levees of major crevasse distributaries	Convent soils, occas. flooded, and Convent and Fausse soils	Convent soils, occas. flooded	Convent assoc., occas. flooded
natural levees of minor crevasse distributaries	Sharkey soils, occas. flooded	Sharkey soils, occas. flooded	Convent soils, freq. flooded
distal crevasse distributaries and lower natural levees	Sharkey and Fausse soils	Sharkey soils, occas. flooded	Convent soils, freq. flooded
major interdistributary areas	Fausse soils	Fausse soils; Sharkey soils, occas. and freq. flooded; and Commerce soils, freq. flooded	Fausse soils
minor interdistributary areas	Sharkey and Fausse soils	not applicable	not applicable

ABBREVIATIONS:
1. assoc. = association
2. freq. = frequently
3. occas. = ocassionally

occasionally flooded, or Sharkey and Fausse soils. In St. Martin Parish, the same geomorphic positions are mapped as Convent soils, frequently flooded. The interdistributary areas are typically mapped in all parishes as Fausse soils, although areas mapped as Sharkey soils, occasionally and frequently flooded, and Commerce soils, frequently flooded, include large parts of the interdistributary areas of Pointe Coupee Parish (Table 1) (Murphy et al. 1977; Spicer et al. 1977; Powell et al. 1982).

Major inconsistencies occur within the soils mapping between parishes within the project area. As previously mentioned, the natural levees of the minor crevasse distributaries and distal ends and lower slopes of natural levees of some major crevasse distributaries are mapped as Convent soils, frequently flooded within St. Martin Parish, instead of as either Sharkey soils, occasionally flooded, or Sharkey and Fausse soils. Also, a number of soil series, including an anomalous occurrence of Commerce soils, are mapped within the major interdistributary swamps of Pointe Coupee Parish. unlike the major interdistributary swamps of other parishes which are only mapped as Fausse soils. Finally, the batture that lies between the banks of the Atchafalaya River and its adjacent levees is mapped as Convent soils, frequently flooded within St. Martin Parish and as Robinsonville and Commerce soils in Pointe Coupee Parish (Murphy et al. 1977; Spicer et al. 1977; Powell et al. 1982). An examination of the geomorphology of and soils mappings for these areas indicates that these inconsistencies result from soils mapping methodology, including definition of mapping units rather than any real pedological or geomorphological differences.

Convent Series. The Convent series is a significant soil series, because it dominates the natural levees of the Atchafalaya River and its major crevasse distributaries. The Convent series is a somewhat poorly-drained, moderately permeable, slightly acid to moderately alkaline Aeric Fluvaquent. Typically, its sola have a simple A-C horizon sequence developed in silt loam. The A horizon is 13 to 25 cm (5 to 10 inches) thick. Also, buried Ab horizons are sometimes present beneath the C horizon. Within Convent association and soils mapping units, the parent material also consists, in places, of coarser natural levee sediments such as loamy fine sand and fine sandy loam. Except possibly within St. Martin Parish, Convent soils and association are indicative of areas that have been covered by recent accumulations of natural levee silts, sandy loams, and sands (Murphy et al. 1977; Spicer et al. 1977; Powell et al. 1982).

The Convent series is a Fluvaquent, which is a type of Entisol. Entisols are mineral soils that have little or no evidence for the development of horizons within 2 m (80 in) of the surface. They may have an A horizon and either mineral salts or silica at depth, a light-colored surface horizon, or a combination of both, but lack enough alteration of the parent material to have formed any other horizon. The C horizon is parent material that are little affected by pedogenesis. Fluvaquents are permanently saturated Entisols that have developed in fine-grained alluvium. Aeric Fluvaquents are Fluvaquents that have soil coloration indicating that they somewhat better drained than the typical Fluvaquents. The simple profiles that characterize Typic Fluvaquents are the result of insufficient time since the deposition of parent materials for the development of pedogenic horizons and intense bioturbation by plants and burrowing animals (Craddock and Wells 1973; Soil Survey Staff 1975).

Fausse Series. The Fausse series is a significant soil series, because it dominates, if not characterizes, the more-or-less permanently flooded interdistributary areas of the Atchafalaya Basin. The Fausse series is a very poorly-drained, very slowly permeable, slightly acid to mildly alkaline Typic Fluvaquent. A typical Fausse series solum has an A-Bg-Cg horizon sequence that is 64 to 127 cm (25 to 50 inches) thick and developed in silt loam. Fausse series seems to be indicative of those portions of the project area that consist of poorly-drained swamps (Murphy et al. 1977; Spicer et al. 1977; Powell et al. 1982).

The Fausse series is a Typic Fluvaquent. By definition, Typic Fluvaquents are Entisols developed in young, unaltered, clayey, and saturated alluvium. Because they are saturated for most of the year, Typic Fluvaquents are very soft with low bearing capacity. In addition, when a soil is fully saturated, anaerobic micro-organisms remove oxygen from the soil causing a deficiency of oxygen within it. This deficiency of oxygen results in the reduction of iron and manganese into soluble forms and the formaticn of bluish, greenish, and grayish soil colors called "gleys." The suffix "g" that forms parts of the designations for the Bg and Cg horizons indicates that strong gleying has occurred within these horizons. The simple profiles that characterize Typic Fluvaquents are the result of insufficient time since the deposition of parent materials for the development of pedogenic horizons and intense bioturbation by plants and burrowing animals (Craddock and Wells 1973; Soil Survey Staff 1975).

Sharkey Series. The Sharkey series apparently characterizes the frequently, but not permanently, flooded portions of the project area. The Sharkey series is a poorly-drained, very slowly permeable, strongly acid to moderately alkaline Vertic Haplaquept. Typically, the sola of the Sharkey series have an A-Bg-Cg horizon sequence that is 91 to 152 cm (36 to 60 inches) thick and developed entirely within clay. Sometimes a buried Ab horizon is present below the Cg horizon (Spicer et al. 1977; Powell et al. 1982).

The Sharkey series is a Vertic Haplaquept, which is a type of Inceptisol. Inceptisols are relatively young soils that weakly developed pedogenic horizons formed by the removal, redistribution, and weathering of minerals and other materials within the parent material. They lack pedogenic horizons of accumulation other than carbonates, organic matter, or amorphous silica. Haplaquepts are Inceptisols that are permanently saturated soils of the flood and delta plains that have a light-colored and organically-poor surface layer called an orchic "epipedon." As in the Fausse series, the permanent saturation has caused strong gleying of its soil horizons. The suffix "g" that forms parts of the designations for the Bg and Cg horizons indicates the presence of such gleying within these horizons. The modifier "Vertic" indicates that the sola of Vertic Haplaquepts shrink and crack as they dry out at least once a year and swell when they are wetted again. As a result, the sola of Vertic Haplaquepts possess slickenslides and are prone to a limited degree of churning by argilliturbation (Smith et al. 1973; Soil Survey Staff 1975).

Commerce Series. The Commerce series is a minor soil series that is mapped only within that part of the Atchafalaya Basin lying within Pointe Coupee Parish. The Commerce series is a somewhat poorly-drained, neutral to moderately alkaline Aeric Fluvaquent. A typical solum of the Commerce series has a simple A-B horizon sequence that is 51 to 102 cm (20 to 40 inches) thick. Commonly, the A and B horizons of it sola consist of a silt loam surface layer, which overlies silty clay loam (Powell et al. 1982). The characteristics of Aeric Fluvaquents have been previously described for the Convent series. The association of Commerce series with swales within the batture of the Atchafalaya River reflects the ongoing deposition and erosion of alluvium within the batture. The significance of its anomalous occurrence within portions of flood basin is uncertain.

Robinsonville Series. The Robinsonville series is a very minor soil series within the project area. It is associated with low ridges within the batture of the Atchafalaya River. The Robinsonville series is a well-drained, slightly to moderately alkaline Typic Udifluvent. The sola of this series has a simple A-C horizon sequence with an A horizon that is 13 to 25 cm (5 to 10 inches) thick. The parent material of the Robinsonville series generally consists of silt loam overlying either silt loam, sandy loam, or loamy fine sand. Frequently, a buried Ab horizon can be found either at or below a depth of 51 cm (20 inches). The Robinsonville series reflects the active deposition and erosion of alluvium occurring within the batture of the Atchafalaya River (Powell et al. 1982).

The Robinsonville series is a Udifluvent, which is an Entisol. Entisols are mineral soils that have little or no evidence for the development of horizons within 2 m (80 in) of the surface. They may have an A horizon and either mineral salts or silica at depth, a light-colored surface horizon, or a combination of both, but lack enough alteration of the parent material to have formed any other horizon. Fluvents are Entisols with brownish to reddish soil profiles that have formed in recently deposited fluvial sediments. Fluvents occurring within temperate, humid climates, having good to moderately good drainage, and developed in silty to clayey alluvium are called "Typic Udifluvents." The simple profiles that characterize these Fluvents are the result of insufficient time since the deposition of parent materials for the development of horizons by pedogenesis (Craddock and Wells 1973; Soil Survey Staff 1975).

Geological History

Pleistocene Epoch. The modern Mississippi River Alluvial Valley, within which the Atchafalaya Basin lies, is the product of a complex series of repeated periods of fluvial entrenchment and deposition during the Late Pleistocene Epoch, 1.8 million to 10,000 B.P. Terraces of the tributaries of the Mississippi River clearly demonstrate that its alluvial valley and its associated tributaries were established at least by the Early Pleistocene. Since the Early Pleistocene, the Mississippi River deepened its alluvial valley during each of its periodic entrenchments (Figure 10). As a result, younger alluvial valley fill deposits are inset in an incised valley cut into older alluvial valley deposits. Because the Mississippi River shifted its alluvial valley during each period of downcutting, the Mississippi River Alluvial Valley has become wider with time, and in most areas is wide as it has been (Autin, et al. 1991).

Late Wisconsinan. During the Wisconsinan Stage, 35,000 to 10,000 B.P., sea level fluctuated by tens of meters below the modern level. Between about 22,000 to 17,500 B.P., sea level reached it lowest level, about 100 m (330 feet) below modern sea level, for the last 150,000 years. Because of this period of low sea level, the Mississippi River entrenched its valley at least as far north as the latitude of Baton Rouge. In addition, continental glaciation to the north flooded the Mississippi River with large quantities of glacial meltwater and sediment, called "outwash." Further north, the glacial meltwater and outwash constructed extensive braidplains that comprised the alluvial plain from valley wall to valley wall. Presumably, these braidplains extend southward into the southern Mississippi Alluvial Valley and, thus, underlie the backswamp deposits of the Atchafalaya Basin, except where eroded during the formation of Unnamed Alloformation No. 2 (Saucier 1981; Saucier and Smith 1986; Schumm and Brakenridge 1987).

Saucier (1981) and Saucier and Smith (1986) propose that the Mississippi River Alluvial Valley was never completely swept clean of sediments during this low stand of sea level as dramatically illustrated by Fisk (1944). Rather, they hypothesize that the Mississippi Alluvial Valley was always partially filled with layers of fluvial sands and gravels. According to their model, the erosional unconformity which forms the base of the Mississippi Alluvial Valley did not originate as a subaerially exposed valley floor associated with a deeply incised dendritic stream network as advocated by Fisk (1944). Rather, Saucier (1981) and Saucier and Smith (1986) argue that channel scouring at the base of both braided and meandering rivers during the different periodic entrenchments coalesced to create this unconformity. According to this model, the substratum sands and gravels consist of fluvial sediments which accumulated during different, but presumably the latest

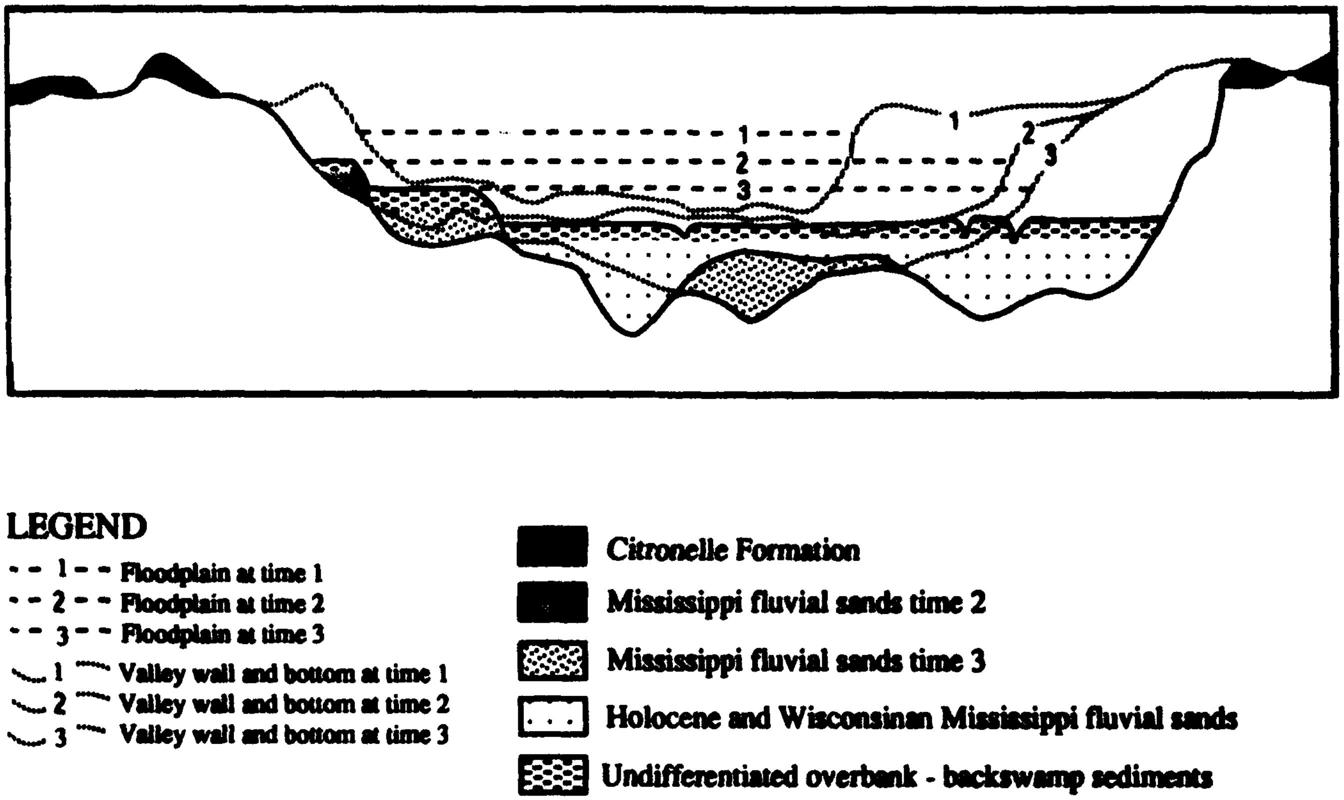


Figure 10. Idealized cross-section illustrating the Pleistocene evolution of the Mississippi Alluvial Valley (modified from Autin et al. 1991).

periods of Mississippi River entrenchment. Because the sediments are of different ages, but of the same lithology, and because of the great depths of these deposits, subdividing the substratum deposits into its component stratigraphic units will be difficult, if not impossible (Figure 10) (Schumm and Brakenridge 1987).

Starting about 17,500 B.P. and continuing into the Holocene, the melting of continental ice sheets caused sea level to rise. Between 17,500 and 10,000 B.P., it rose from over 100 m (330 ft) to about 30 m (98 ft) below modern sea level. Presumably, this rise in sea level was associated with some aggradation of the braidplains within the southern portion of the Mississippi Alluvial Valley and over the area that would eventually evolve into the northern Atchafalaya Basin (Schumm and Brakenridge 1987).

Uneven retreat and dissolution of the continental ice sheets released large quantities of meltwater that flooded the braided stream surfaces within the Mississippi Alluvial Valley. Work by Aharon (1984) demonstrates that massive volumes of glacial meltwater flooded the Mississippi Alluvial Valley about 16,000 B.P., 14,800 B.P., 14,200 B.P., 14,000 B.P., 13,200 B.P., 12,600 B.P., 12,200 B.P., and 12,100 B.P. Undoubtedly, the enormous volume of meltwater involved in these hydrological events significantly altered the alluvial plain of the Mississippi River. Exactly how these meltwater events affected the braidplains within the project area and the rest of the southern Mississippi Alluvial Valley is currently unknown.

These meltwater events occurred during a period of time when the drainage of meltwater was diverting from a route down the Mississippi River drainage to a route through the Great Lakes and the Hudson River and St. Lawrence Valley. After the last of these floods when glacial meltwater flow had shifted to a flow through the Great Lakes, braided-river aggradation may have ceased within the Mississippi Alluvial Valley (Schumm and Brakenridge 1987). In addition, sometime around 12,000 B.P., the Mississippi River at the latitude of Baton Rouge changed from a braided to a meandering river system. The change to a meandering river by the Mississippi River allowed for the accumulation of backswamp deposits upon the braided stream surfaces within the Atchafalaya Basin region (Krinitzsky and Smith 1969; Autin et al. 1991). Thus, the braidplains that form the surface of the substratum deposits within the survey area might be assumed to date from the change in fluvial regime around 12,000 B.P. However, the 6 m to 12 m (20 to 40 ft) of relief on this surface indicates that the surface of this braidplain has been significantly altered, if not destroyed, by a complex series of erosional and depositional events. Therefore, the period during which the contact between the substratum and overlying backswamp deposits formed is very uncertain.

Early and Middle Holocene. By the start of the Holocene Epoch (10,000 B.P.), sea level had risen to 30 m (98 ft) below present sea level. The average rate of eustatic sea level rise was about 8 mm (0.3 inch) per year from 10,500 to 6,400 B.P. and less than 1 mm (0.04 inch) per year from 6,400 B.P. to present within the Gulf of Mexico (Coulombe and Bloom 1983). As a result of rising sea level, the alluvial plains, including the backswamps of the Atchafalaya Basin, within the southern Mississippi Valley aggraded throughout the Early and Middle Holocene (Smith et al. 1986; Autin et al. 1991).

During the Early Holocene, Aharon (1984) gives evidence of three large-scale hydrologic events. His study of sediments within the Gulf of Mexico demonstrates that the Mississippi River dumped massive amounts of fresh water into the Gulf of Mexico about 9,700 B.P., 9,400 B.P., and 9,100 B.P. These hydrologic events undoubtedly influenced the evolution of the Mississippi Alluvial Valley and, possibly, the Atchafalaya Basin. At this time, the character and affects of these events within the Mississippi Alluvial Valley and Atchafalaya Basin are undetermined.

The fluvial deposits of Unnamed Alloformation No. 2 give clear evidence for the presence of an active Early Holocene Mississippi River meander belt trending down the middle of the Atchafalaya Basin. Unfortunately, due to insufficient subsurface data, the extent and age of this meander belt cannot be definitely determined. The estimated elevation of the surface of this meander belt correlates well with the surface of the Maringouin Delta Complex and the position of its main trunk channel illustrated within a cross-section of Frazier (1967). Thus, Unnamed Alloformation No. 2 might be Meander Belt No. 5 of Autin et al. (1991) which fed this delta complex. However, additional data will be needed in order to substantiate such a hypothesis.

After the abandonment of the meander belt represented by Unnamed Alloformation No. 2, the gradual accumulation of backswamp and lacustrine deposits dominated the Atchafalaya Basin during the Holocene until the historic diversion of the Mississippi River into the Atchafalaya River. During this period, the Atchafalaya Basin was a backswamp containing varying proportions of broad, poorly- and well-drained swamps and shallow lakes. Aggradation resulted from the deposition of fine-grained sediments brought in by periodic influxes of floodwaters from adjacent meander belts (Smith et al. 1986).

Because the southern Atchafalaya Basin was open directly to the Gulf of Mexico until the formation of the Lafourche Delta Complex, stillstands during and changes in the rates of sea level rise should have directly influenced the sedimentation styles within the basin. For example, during periods of rapid sea level rise, the Atchafalaya Basin should have been dominated by lacustrine deposits. Whenever the combined rate of sea level rise and subsidence raised the base level significantly to exceed the pace at which sediments accumulated within the Atchafalaya Basin, the swamps within this basin would have been drowned beneath extensive freshwater lakes (Shanley and McCabe 1992).

Between 6,500 to 3,500 B.P., the Mississippi River occupied its Bayou Teche course. However, it only further aggraded an older meander belt that had previously defined the western edge of the Atchafalaya Basin (Heinrich 1991). At this time, it is uncertain whether this older meander belt, the Lake La Pointe meander belt, represents either a Wisconsinan age Mississippi River course or Meander Belt No. 4 of Autin et al. (1991). The Bayou Teche Meander Belt, while active, built several distributaries out into the Atchafalaya Basin. During the Late Holocene, all but the largest of these distributaries were mostly buried by backswamp sedimentation.

Late Holocene. The eastern boundary of the Atchafalaya Basin was created about 4,700 B.P. when a channel avulsion established what would become Meander Belt No. 2. The channel created by this avulsion slowly extended itself along the eastern valley wall of the Mississippi Alluvial Valley. Initially, a nonmeandering channel incised its thalweg into the underlying backswamp deposits and built low, confining levees during the next few hundred years. As discharge flowing within this channel increased, the Mississippi River deepened and widened its channel within the underlying fluvial sediments, and aggraded its natural levees. Eventually, this course developed incipient meander loops as small twists and turns in its channel (Autin et al. 1991; Farrell 1989).

By about 3,900 B.P., Meander Belt No. 3 had been abandoned by the Mississippi River and the present course of the Mississippi River along the eastern side of the Atchafalaya Basin had been established as Meander Belt No. 2 (Saucier and Snead 1989). When the full flow of the Mississippi River was diverted into Meander Belt No. 2, its course developed mature natural levees and meander loops. When diversions upstream created Meander Belt No. 1, the Mississippi River continued to occupy this portion of its river course (Autin et al. 1991; Farrell 1989).

Eventually, this segment of the Mississippi River developed mature, high, and confining natural levees. Because they were high and confining, fully developed natural levees prevented floodwaters from uniformly overflowing and submerging the entire levee. As a result, the adjacent backswamp was flooded through low areas, crevasses, cut by flood waters through the natural levees. With flooding occurring through crevasses rather than from uniform overflow over the crest of the natural levee, most of the natural levee was high and dry during a typical annual flood (Farrell 1989).

Fisk (1952) shows that Bayou Maringouin, one of the Mississippi River distributaries that lies adjacent to the survey area, was a distributary of either the Mississippi River or a hypothetical Yazoo River course throughout the entire Holocene. However, a cross-section illustrated by May (1983) shows that the natural levees of Bayou Maringouin are very thin. The lack of deep natural levee deposits associated with Bayou Maringouin indicates that this distributary was associated only with Meander Belt No. 1 and is of Late Holocene in origin.

Closure of the Atchafalaya Basin. The closure of the southern end of the Atchafalaya Basin by the Lafourche Delta Complex was the first of a chain of Late Holocene, both natural and man-induced, events that produced the modern physiography of the Atchafalaya Basin. Initially, flow began diverting out of the La Loutre (St. Bernard) Delta Complex into the Lafourche Delta Complex about 2,000 B.P. Distributaries of the prograding Lafourche Delta Complex reoccupied distributaries of the older Teche Delta Complex. Eventually, the prograding Lafourche Delta Complex intersected the distal end of Meander Belt No. 3. by a newly created Bayou Black - Bayou du Large distributary network of the Lafourche Delta Complex. However, Weinstein and Gagliano (1985) propose that this closure was accomplished by the reoccupation of preexisting Teche distributaries by Bayou Black and Bayou du Large of the Lafourche Delta Complex (Smith et al. 1986; Weinstein and Gagliano 1985).

The closure of the Atchafalaya Basin created a basin enclosed by the alluvial ridges of Meander Belt Nos. 1 and 3. This ponded surface drainage within the basin and, thereby, created the extensive lake system that occupied the southern portion of the Atchafalaya Basin. This system was further enlarged by subsidence and wind-driven shoreline erosion. Eventually, enlargement of former Teche crevasse channels created outlets to Atchafalaya Bay through Meander Belt No. 3 at Patterson and Morgan City, Louisiana (Smith et al. 1986).

A disagreement exists concerning the maximum size of the extensive lake systems which occupied the Atchafalaya Basin. According to Fisk (1952), the northernmost portion of prehistoric Grand Lake covered the southeast and south-central portion of the northern Atchafalaya Basin, including both the North and South Farm survey areas. In contrast, according to Smith et al. (1986), the maximum northward extent of Grand Lake is defined by the Upper Grand River within the Lake Mongoulis 7.5 Minute Topographic Quadrangle. Because neither Fisk (1952) nor Smith et al. (1986) provide specific information or illustrations concerning the archeological and geomorphic data used to determine the shoreline, it is impractical to evaluate either claim without extensive research.

Formation of the Atchafalaya River. The second major event in the development of the modern physiography of the Atchafalaya Basin was the formation of the Atchafalaya River as a result of the capture of the Red River by the Mississippi River at Turnbull Island. About 500 B.P., the active course of the Mississippi River intercepted an abandoned Mississippi River course consisting of Bayous des Glaises and Lettsworth and occupied by the Red River. As a result of the intersection of this interception, the Mississippi River captured the flow of the Red River from Bayou Lettsworth north of where the Red River emptied into the Mississippi River (Fisk 1952; Lenzer 1981; Smith et al. 1986).

After the capture of the Red River, the Atchafalaya River formed. During Mississippi River floods, backwater flooding of the Mississippi River pushed Mississippi water upstream through Bayou des Glaises. The backwater upstream flood flow of Mississippi River water together with Red River discharge within Bayou des Glaises resulted in the formation of a crevasse channel at Simmsport, Louisiana. Repeated Mississippi River floods further enlarged the crevasse at Simmsport, Louisiana to create the Atchafalaya River. According to a review of historic maps by Fisk (1952), little change occurred within the Red, Mississippi, and Atchafalaya River system between the 1500s and 1831, except for the lateral migration of the Mississippi River channel. In 1831, the cutoff of this meander loop at Shreves cutoff created a Red River - Atchafalaya River system separate from the Mississippi River to the east (Fisk 1952; Lenzer 1981; Smith et al. 1986).

Historical Development

The modern physiography of the Atchafalaya Basin is the result of three major stages of human activity. First, there was the initial occupation of the Atchafalaya Basin and its development for agricultural, fishing, and timber resources. Second, major transportation networks, including navigation channels for steamships and railroad routes, were built within the basin. Finally, the basin was developed for flood control after the disastrous 1927 Mississippi River floods (Fisk 1952; Smith et al. 1986).

Agricultural Development. Initially, private landowners leveed the upper segments of the Atchafalaya Basin to protect against increased flooding as larger volumes of the Red River and Mississippi River flowed into the area. By 1910, these levees extended along both sides of Atchafalaya River to Krotz Springs, Louisiana. The artificial levees had been extended to their present southernmost limits by 1937. Rapid increases in the depth and cross-section of the channel of the Atchafalaya River accompanied each extension of these artificial levees (Fisk 1952; Smith et al. 1986).

During the 1970s, large portions of the upper Atchafalaya Basin, including the North and South Farm survey areas were surrounded by dikes and drained for the production of soybeans. The dikes and channels created for these soybean farms severely disrupted natural drainage systems within the upper Atchafalaya

Basin. Because of the disruption of the natural drainage systems by artificial levees, natural sedimentation patterns have been significantly altered. As a result, sedimentological models can be used to predict neither sedimentation patterns nor sedimentation history of the upper Atchafalaya Basin, including the North and South Farms survey areas. For the pre-1970 sedimentation rates, only general trends can be discerned for the period 1932-1959 for which data from sedimentation survey exists. The data for 1932-1959 indicates that for this period, sedimentation rates are greatest for the natural levees of the major distributaries adjacent to the Atchafalaya River and consistent with flood basin sedimentation models. However, precise sedimentation rates for specific areas cannot be determined with the available data. Prior to 1932, sedimentation rates within the project area cannot be determined because of a lack of data and the variable history of Atchafalaya River discharge.

Transportation Development. Transportation development in the form of dredging and raft removal has significantly modified the Atchafalaya Basin. The upper Atchafalaya Basin was directly affected by two major projects. First, a log raft blocking the Atchafalaya River was removed to accommodate steamship travel between the Atchafalaya and Mississippi Rivers. Also, from 1855 to 1940, the Old River was dredged by private interests and federal and state agencies in order to maintain a navigation channel between the Atchafalaya and Mississippi Rivers (Fisk 1952; Smith et al. 1986).

The removal of a log raft that blocked the mouth of the Atchafalaya River at the Old River significantly changed the hydrology of the upper Atchafalaya Basin. Prior to 1839, 16 km (10 miles) of raft occupied a 32 km (20 mile) long stretch of the Atchafalaya River. Between 1839 and 1861, various efforts by private groups and by the State of Louisiana eventually cleared the log raft, except scattered fragments. Upon removal of the raft, the remaining fragments of the raft were washed away as the Atchafalaya River rapidly deepened and widened its channel. Lands along the Atchafalaya River, which were previously exempt from flooding immediately began to flood annually as a result of the increasing discharge (Fisk 1952; Smith et al. 1986).

From 1855 to 1940, dredging to maintain the Old River channel between the Atchafalaya and Mississippi Rivers and undertaken by private interests and federal and state agencies significantly changed the hydrology of the Atchafalaya River system. As the Atchafalaya River enlarged its channel as a result of raft removal, the Red River was increasingly diverted down it. However, the Old River between the Red - Atchafalaya Rivers and the Mississippi River continually silted up with sediment from both river systems. Had no dredging occurred, the Red River would have eventually flowed down the Mississippi River as a river course separate from the Mississippi River. It was only the extens[illegible] dredging by the State of Louisiana that kept the Old River channel open (Fisk 1952; Smith et al. 1986).

During the very late 1930s, currents within the Old River channel made it self-maintaining. From about 1882 to 1942, the flow within the Old River channel was primarily, except during flood stage, from the Red River to the Mississippi River. After 1942, the flow within the Old River was dominated by the Mississippi River to the Atchafalaya River (Fisk 1952).

Flood Control Development. In 1928, the Atchafalaya Basin was designated as a major floodway by an act of Congress. According to this act, the Atchafalaya was designated to carry slightly less than 50 percent or approximately 41,600 m^3/sec (1,470,000 ft^3/sec) of a projected 86,700 m^3/sec (3,065,000 ft^3/sec) Mississippi River flood. The flood control measures either mandated by this act or resulting from later actions consisted of: 1) the construction of guide levees and navigational structures, which were finished in 1950s, along the east and west flanks of the Atchafalaya Basin from Old River to Morgan City; 2) the dredging of a shorter, more hydraulically efficient channel through the upper and middle basin; 3) the construction of the Morganza Spillway about 20 miles south of Old River; and 4) the dredging of the Wax Lake Outlet to divert flood flow from the Lower Atchafalaya River. The dredging of a new channel through the upper and middle basin resulted in the abandonment of the Upper and Lower Grand Rivers (Fisk 1952; Smith et al. 1986).

In the 1950s, it became obvious that the channel improvements had resulted in increasing percentages of Mississippi River flow being diverted down the Atchafalaya River. The volume of water flowing down the Atchafalaya River as a percentage of the total annual Mississippi River discharge increased from 6 percent in 1900 to 10 percent in 1920 and, finally, to 25 percent in 1950. At this time, it became obvious that a diversion of the complete flow of the Mississippi River down the Atchafalaya River was imminent (Fisk 1952).

To prevent this diversion, the Old River Control Structure was built in 1960. Old River was dammed and a navigational lock was built adjacent to it. Upstream from the plugged Old River, a Low Sill Control Structure was constructed. The Low Sill Structure diverts approximately 30 percent of the discharge of the Mississippi River into the Outflow Channel, which then flows into the Red River and, finally, into the Atchafalaya River (U.S. Army Corps of Engineers 1981).

Sedimentation History

In terms of inferring the location of archeological deposits, an important aspect of the history of the study region is it sedimentation history. Because of the uneven availability of data for various periods of time, it is speculative to discuss how sedimentation rates have varied over particular periods of time. As a result of the variable amount and quality of data, the history of sedimentation rates is divided into three time intervals: 1) prior to 1932, 2) 1932 to 1959, and 3) after 1959.

Prior to 1932. Prior to 1932, the sedimentation history of the project area is speculative because of a lack of pertinent data. The basis for speculation is the historical development of the Atchafalaya River. Prior to the clearing of the raft that plugged the mouth of the Atchafalaya River between 1839 and 1861, sedimentation rates within the entire project were probably extremely low. The low sedimentation rates can be presumed from a general lack of flooding as inferred by the lack of interest in levee construction along the Atchafalaya River. The fact that archeologists from Louisiana State University within the 1930s and 1940s have found within the project region several archeological sites and noted them in their files, suggests low sedimentation rates prior to 1861. Although these sites are now partially or completely buried by recent sedimentation, the sedimentation rates prior to the early twentieth century were insufficient to bury mound sites, and, therefore, were very low.

After the clearing of the raft by 1861, the Atchafalaya River rapidly deepened and widened its channel. Fisk (1952) noted that along the Atchafalaya River, lands which were previously exempt from flooding started to flood annually as a result of the increasing discharge. Presumably, the increase in flooding must have been accompanied by an increase in sedimentation rates within the upper Atchafalaya Basin. From 1900 to 1950, the percentage of annual Mississippi River water flowing down the Atchafalaya River increased progressively. This increase in sediment flowing down the Atchafalaya surely was reflected in increased sedimentation rates. The construction of levees along the Atchafalaya River would only have partially diminished any increases in sedimentation rates associated with the increasing discharge flowing down the Mississippi River during this period.

From about 1882 to 1942, the flow within the Old River channel was primarily from the Red River to the Mississippi River, except during flood stage. As a result, water and sediment from the Red River must have dominated the discharge flowing down it at least during the early part of this period. Thus, early historic sedimentation must have been dominated by characteristically reddish-brown sediments of the Red River during this period. Direct evidence of a predominantly Red River composition for early historic sedimentation is a thick, basal layer of Red River sediment that comprises historic Atchafalaya River deltaic sediments which fill Grand Lake as illustrated by Fisk (1952). Since the Red River sediments accumulated prior to the construction of artificial levees to contain flooding, these sediments might have been spread across a large enough portion of the upper Atchafalaya Basin to have formed a useful marker bed.

1932-1959. For the period 1932 to 1959, both sedimentation surveys and topographic maps demonstrate the occurrence of significant amounts of sedimentation within the project area. According to U.S. Geological Survey (1935, 1939), the project region was characterized by two different types of terrain. Between Bayou des Glaises - Bayou Stiff and the guide levees, the project area, including both the North and South Farm survey areas, consisted of poorly-drained swamp. As shown by both topographic maps, the majority of the swamp was just over 3 m (10 ft) in elevation. The channels of and a small part of this swamp within Sections 29, 30, 95, and 96 of T6 S, R8 E is shown to be below 3 m (10 ft) in elevation. The area between Bayou des Glaises - Bayou Stiff and the Atchafalaya River consists of a number of distributaries, e.g. Alabama Bayou, Bayou Johnson, and others, with well-developed natural levees, which rise just above 6 m (20 ft).

Differences between earlier U.S. Geological Survey (1935, 1939) and later U.S. Geological Survey (1959a, 1959b) quadrangles indicate significant changes within the geomorphology of the upper Atchafalaya Basin region. Within the project area, these maps show that the northern portion of these poorly-drained swamps have been replaced by well-drained swamps along and between minor distributaries, such as, Bayou Black, Brown Bayou, Dixie Bayou, and others, between 1935 and 1959. The area built up by sedimentation consisted of swamp north of, and including, Sections 99, 101, and 102, and the northern half of Section 100. Also, the channels within the remaining poorly-drained swamp are shown to lie above 3 m (10 ft) above sea level. In addition, a large lake formed between Bayou des Glaises and Bayou des Ourses - Iberville and St. Martin Parish lines between 1935 and 1959. Shrinkage in the widths of natural levees, a 1.5 m (5 ft) increase in the elevation of Maringouin, Louisiana, and other obvious mapping artifacts demonstrate that significant errors exist in the mapping, such that specific sedimentation rates cannot be calculated with confidence from the map data. However, the change in the area shown as well-drained versus poorly-drained swamp demonstrates that significant accumulations of sediments occurred within the project area during this period.

Between 1932 to 1953, east-west transects showing ground elevations were repeatedly surveyed across specific ranges within the Atchafalaya Basin in order to determine sedimentation rates. Differences in ground elevation between the different transect surveys reveal the amount of aggradation and erosion which had occurred since the previous survey. One of these east-west ranges, Sedimentation Range 5, crossed the southeastern edge of the study area and ended at Station 1539+00 on the eastern guide levee (U.S. Army Corps of Engineers 1951).

For the period 1932 to 1953, sedimentation surveys by the U.S. Army Corps of Engineers show that the thickest accumulation of sediments occurred adjacent to the Atchafalaya River. Between Alabama Bayou and the Atchafalaya River, the increase in elevation between the 1932 and 1953 surveys varied erratically from 0.6 to 0.9 m (2 to 3 ft) to as much as 1.8 to 3 m (6 to 10 ft). Further east, the ground level rose about 0.6 to 0.9 m (2 to 3 ft) within the interdistributary basin between Alabama Bayou and Bayou des Ourses. The natural levees of Alabama Bayou aggraded during this period by about 0.3 m (1 ft) on its intermediate slopes and by about 0.6

m (2 ft) on its crests. Even further east, the accumulation of sediments within the interdistributary basin between Bayou des Ourses and Bayou des Glaises varied between 0 to 0.6 m (0 to 2 ft) between 1932 and 1953. Where the transect crossed the swamps east of Bayou des Glaises, the changes in elevation between 1932 and 1952 were so small that they could not be detected by the surveys. However, this transect lies well south of the backswamp affected by a wave of sedimentation apparently moving in from the north. The data indicate that this sediment entered the backswamp from the Atchafalaya River along the major distributaries. However, insufficient data exists to determine precisely where and how it is entering these distributaries.

Unfortunately, the sedimentation transects have not been resurveyed since 1953 making it almost impossible to determine sedimentation rates for this region after 1953. However, the resurveying of these transects, even today, could provide significant information concerning sedimentation rates and minimum depths of burial of archeological sites within the project area.

The sedimentation transects indicate that rather typical floodplain sedimentation patterns existed within the upper Atchafalaya Basin during this period. Within a typical floodplain, the coarser-grained sediment (silt) accumulates adjacent to the main river channel as a result of the drop in velocity as the confined river flow becomes an unconfined overbank flow. The north-south trending distributary ridges within this floodbasin limited the movement of suspended sediment within the project area by deflecting sediment-laden flood waters southward. In addition, the heavily vegetated backswamp efficiently removed suspended sediment from any the floodwaters reaching the study areas. As a result, only a small proportion of the suspended sediment discharged from the Atchafalaya River would reached its distal parts. This suspended sediment would be so fine that absolutely still waters would be needed for it to settle and accumulate.

The southward wave of sedimentation apparently shown by changing topographic maps probably represented distributaries, which were channeling sediment further and further south as their natural levees aggraded. As the natural levees of a distributary aggraded, it contained more of the discharge within the distributary channel as channelized flow. As the degree of channelized flow increased, the size and quantity of sediment carried downstream increased. As a result, downstream natural levees were built up, allowing sediment to be transported further downstream.

After 1959. After 1959, little data is available concerning sedimentation within the upper Atchafalaya Basin. According to topographic maps of the upper Atchafalaya Basin, e.g. U.S. Geological Survey (1969a, 1969b) quadrangles, presented in Smith et al. (1986), significant sedimentation occurred within the project area. For example, between 1959 and 1969 the area covered by well-drained swamp had migrated an additional 1.6 to 2.4 km (1 to 1.5 miles) southward to the southern edges of Sections 103, 104, and 105 of T7 S, R9 E. In addition, well-defined natural levees, which had crests as high as 4.6 m (15 ft) in elevation, had almost extended themselves all of the way to Interstate 10 along the distributaries.

The 1973 flood, especially with the use of the Morganza Spillway, undoubtedly dumped significant amounts of sediments within the project area. Unfortunately, insufficient data exist by which to determine where and when sediment was deposited. In addition, agricultural development within the upper Atchafalaya during this period disrupted drainage patterns. As a result, the paths by which sediment was transported within the upper Atchafalaya Basin during this period are uncertain. Presumably, the construction of headgates, dikes, and levees for agricultural development within the North and South Farms severely disrupted the southwardly migrating wave of sedimentation that was affecting the backswamps that comprised the eastern portion of the project area.

CHAPTER 3
NATURAL SETTING

Introduction

The Atchafalaya Basin is a large area within south central Louisiana extending from the mouth of the Red River southward to the Gulf of Mexico. It encompasses a variety of landforms and ecosystems. The northern part of the basin is characterized by upland agricultural land. The basin's middle area is composed of an extensive system of lakes and bayous. The southern part of the basin is characterized by fresh water, salt water, and intermediate marshes. Throughout the basin, the highest areas are the natural levees, while the lower elevations are usually characterized as backswamps.

Climate

The Atchafalaya Basin is characterized by a humid subtropical climate. There is an influx of warm, moist, maritime tropical air from the nearby Gulf of Mexico. This maritime tropical air is displaced frequently during winter and spring by incursions of continental polar air from Canada, which occurs less frequently in autumn and only rarely in summer (Spicer et al. 1975:1-2). The mean temperatures for the basin range from 42^{o} Fahrenheit to 63^{o} Fahrenheit in January and 72^{o} Fahrenheit to 91^{o} Fahrenheit in August (Spicer et al. 1975:1-2). The annual rainfall varies from 36 inches to 100 inches (Murphy et al. 1974:2). Hurricanes and storm surges occur intermittently, and these have profound effects on floral, faunal, and human communities within the Atchafalaya Basin.

Plant Communities

As mentioned earlier, the highest elevations in the basin are on natural levees. Prior to clearing, these natural levees were occupied by upland forests. As the elevation decreases, the upland forests give way to bottomland hardwood forests, then to intermediate backswamp forests. At still lower elevations are the cypress-tupelo swamp forests. Finally, the cypress-tupelo forests yield to the marshes along the coast.

The woody species in an elevated natural levee forest include oaks (*Quercus virginiana, Q. alba, Q. nigra, Q. lyrata*), shagbark hickory (*Carya ovata*), hackberry (*Celtis laevigata*), sweetgum and blackgum

(*Liquidambar styaciflua* and *Nyssa sylvatica*), pecan (*Carya illinoiensis*), magnolia (*Magnolia* spp.), and various pines (Bahr et al. 1983:82). Other species include American elm (*Ulmus americana*), tallowtree (*Sapium sebiferum*), cottonwood (*Populus deltoides*), sycamore (*Platanus occidentalis*), water elm (*Planera aquatica*), boxelder (*Acer negundo*), rough-leaf dogwood (*Cornus drummondii*), mayhaw (*Crataegus opaca*), and waxmyrtle (*Myrica cerifera*) (Gibson 1978:114-115).

The bottomland forests are dominated by the water oak (*Quercus nigra*). Subdominants include the sweet gum (*Liquidambar styaciflua*), hackberry (*Celtis laevigata*), and live oak (*Quercus virginiana*). Other forest species include the box-elder (*Acer negundo*), honey-locust (*Gleditsia triacanthos*), American elm (*Ulmus americana*), Nuttall oak (*Quercus nuttallii*), pawpaw (*Asimina triloba*), persimmon (*Diospyros virginiana*), ashes (*Fraxinus* spp.), and yaupon (*Ilex vomitoria*) (Gibson 1978:96-97; White et al. 1983:103-104). The most common shrub species are palmetto (*Sabal minor*) and green haw (*Crataegus viridis*). Vines are found throughout the bottomland hardwood forest, and few trees are observed without them. The most common of these include poison-ivy (*Rhus toxicodendron* var. vulgaris), Virginia creeper (*Parthenocissus quinquefolia*), supple-jack (*Berchemia scandens*), muscadine (*Vitis rotundifolia*), hemp-weed (*Mikania scandens*), touch-me-not (*Impatiens capensis*), water paspalum (*Paspalum* sp.), and pokeweed (*Phytolacca americana*) (Gibson 1978:97; White et al. 1983:104).

The backswamp occurring between the bottomland hardwood forests and the swamps is found throughout the basin. Swamp red maple, American elms, and water oaks are common here. Palmettos create a dense understory (White et al. 1983:105). Other species found in backswamps include tupelo-gum (*Nyssa aquatica*), bald cypress (*Taxodium distichum*), Virginia willow (*Itea virginica*), alligatorweed (*Alternanthera philoxeroides*), water hyssop (*Bacopa monnieri*), Frogbit (*Limnobium spongia*), swamp lily (*Crinum americanum*), whisk fern (*Psilotum nudom*), and lizard's tail (*Saururus cernuus*) (Gibson 1978:92).

The cypress-tupelo swamp forest, located a greater distance from distributaries, is dominated by bald cypress (*Taxodium distichum*). Water tupelo (*Nyssa aquatica*) is often either a sub- or co-dominant species. Red maple (*Acer rubrum* var. drummondii) and ash trees (*Fraxinus* spp.) represent the other sub-dominants in this community. Shrubs include wax-myrtle (*Myrica* *cerifera*) and button-bush (*Cephalanthus occidentalis*), while vines are cat-briar (*Smilax* spp.), trumpet creeper (*Campsis radicans*), and poison ivy. Herbaceous ground cover includes smart-weed (*Persicaria punctata*), swamp potato (*Sagittaria lancifolia*), and water hyacinth (*Eichhornia crassipes*) (White et al. 1983:105).

The marsh, with soils of peat and muck, has an elevation of less than one meter above mean sea level. Cord grass (*Spartina patens*) is dominant in the brackish or intermediate marsh, while swamp potato (*Sagittaria lancifolia*) predominates in fresh water marsh (White et al. 1983:106-107). Additional brackish marsh species include coast milkweed (*Asclepias lanceolata*), saltwort (*Batis maritima*), bindweed (*Convaluulus* spp.), and dodder (*Cuscuta geonovii*) (Gibson 1978:106). Additional fresh water marsh species include Carolina bacopa (*Bacopa caroliniana*), ammania (*Ammania coccinea*), pink hibiscus (*Rasteletzkya virginica*), and gooseweed (*Sphenoclea zeylandica*) (Gibson 1978:102-103).

Fish

The Atchafalaya Basin hosts a diverse assemblage of fish and other aquatic species. Those found throughout the basin include three species of gar (*Lepisosteus oculatus*, *L. platostomus*, and *L. spatula*); paddlefish (*Polydon spathula*); largemouth and yellow bass (*Micropterus salmoides* and *Morone mississippiensis*); six species of sunfish including bluegill (*Lepomis macrochirus*); bowfin (*Amia calva*); crappie (*Pomoxis* spp.); at least three species of catfish (*Ictalurus furcatus*, *I. melas*, *I. punctatus*); and various other species. Also found are brackish-water clam (*Rangia cuneata*), river crawfish (*Procambrus blandingii*), red swamp crawfish (*P. clarkii*), freshwater snail (*Physa* sp.), and various other species of mussels, snails, and crustaceans (Gibson 1978:85-87; Jones and Shuman 1987:5-6).

Reptiles and Amphibians

The basin hosts a wide assortment of reptiles and amphibians. Most notable among the reptiles are the alligator (*Alligator mississippiensis*), cotton mouth moccasin (*Agkistrodon piscivorus*), copperhead (*Agkistrodon contortrix*), common king snake (*Lampropeltis getulus*), and at least seven species of lizard (Gibson 1978:85; Jones and Shuman 1987:5-6). There are at least thirteen species of turtle including the common snapping turtle (*Chelydra serpentina*), common mud turtle (*Kinosternon subrubrum*), and the box turtle (*Terrapene carolina*) (Gibson 1978:85; Jones and Shuman 1987:5-6). Finally, there are eleven species of salamander and thirteen species of frogs (Jones and Shuman 1987:5-6).

Birds

As might be expected, the basin has a wide variety of birds. Some of the most common birds of prey include the great horned owl (*Bubo virginianus*), barred owl (*Strix platypterus*), marsh hawk (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), and the bald eagle (*Maliaeetus leucocephalus*) (Gibson 1978:90; Jones and Shuman 1987:5). Non-predator birds include six species of heron, two species of egret, ibis, various ducks, woodpeckers, quails, and doves, plus an assortment of smaller birds (Gibson 1978:90; Jones and Shuman 1987:5).

Mammals

The Atchafalaya Basin hosts various herbivores, carnivores, and omnivores. The most notable of the herbivores include white tailed deer (*Odocoileus virginianus*), cotton tail rabbit (*Sylvilagus floridanus*), swamp rabbit (*Sylvilagus aquaticus*), gray squirrel (*Sciurus carolinensis*), and fox squirrel (*Sciurus niger*). The non-native nutria (*Myocastor coypus*) was not present during the prehistoric or early historic times. Some of the carnivores include mink (*Mustela vison*), bobcat (*Lynx rufus*), and the gray fox (*Urocyon cinereoargenteus*). The most common omnivores include skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), and black bear (*Euractos americanus*) (Gibson 1978:100; Jones and Shuman 1987:5).

CHAPTER 4
PREVIOUS INVESTIGATIONS

Clarence B. Moore (1913)

In the fall of 1912 and spring of 1913, the first reported archeological investigation in the Atchafalaya Basin was conducted by Clarence B. Moore. Sponsored by the Academy of Natural Sciences of Philadelphia, Moore visited various lakes and bayous associated with the Atchafalaya River. His study area extended from the Red River south to Morgan City and included the parishes of St. Landry, Iberville, St. Martin, Iberia, and Assumption (Moore 1913:9-10). Moore first sent a scouting team down the Atchafalaya River and associated waterways to locate possible mounds and gain access to the private property where mounds were discovered. Moore himself travelled down the river following the navigable waterways that had been examined initially by his scout team in a "...steamer of light draught as headquarters in which men and material readily can be transported" (Moore 1913:6).

Although this early survey was limited only to the sites seen from the water's edge and would not today be considered a systematic survey, Moore did manage to collect data on fourteen sites within the Atchafalaya Basin and three sites along Bayou Teche. Moore excavated some 'trial holes' in six of these sites of which five yielded burial remains (Moore 1913:10-19).

He provided good written descriptions of mound size and shape, and position of internments if present, for such sites as Bayou Sorrel (16IV4), Schwing Place (16IV13), the mound opposite Bayou Pigeon (16IV15), and Alabama Bayou Mound (16IV156). The former two sites are further discussed in Chapter 5 of this report, and 16IV156 is discussed in Chapter 8. Moore's report was primarily focused on his retrieval of human remains. He provided little information on excavation techniques or general results. One exception to this is his discussion of baked clay objects found at two sites (16IV4 and 16IV13) which he associated with the Poverty Point culture (Moore 1913:13-16).

Fred B. Kniffen (1938)

The next notable archeological research in the Atchafalaya Basin was conducted by Fred B. Kniffen. In 1937, Kniffen visited sites within Iberville Parish and to a lesser extent Pointe Coupee and St. Martin Parishes

(Kniffen 1938:190). He conducted surface collections at known sites including those documented earlier by Moore, sites reported to him by local informants, and in some cases, sites found because "...a constant vigilance along the line of travel was rewarded with the discovery of unreported sites" (Kniffen 1938:190). He mapped 59 sites during his survey, of which 50 were placed into the category of either mound or midden. Kniffen based his ceramic analysis on Ford's chronological sequence for the Lower Mississippi Valley (Kniffen 1938:198-199). This sequence, one of the earlier chronological sequences for the area, is composed of four parts: Historic, Historic/Bayou Cutler, Bayou Cutler, and Bayou Cutler/Marksville. Kniffen analyzed pottery from twelve sites for classification according to a five-class category for ceramics. The sites were then classified according to the four-part chronology (Kniffen 1938:199). He then discussed those 12 sites within a geographic/chronological or "age-area relationship" (Kniffen 1938:202-205). Although Kniffen's report did not fully discuss the techniques used in his 'surface collection', his report was one of the first to attempt chronological sequencing according to ceramic typologies for the Atchafalaya Basin.

William G. McIntire (1958)

The next survey of the Atchafalaya Basin did not occur until 1957, when William G. McIntire surveyed the Louisiana coastline. He surveyed 15,000 square miles of coastline from the Sabine River to the Pearl River and northward to 30° 15' north latitude. Only the lower portion of the Atchafalaya Basin was surveyed, specifically the Grand River Drainage System consisting of Grand Lake, the Lower Grand River, and the Lower Atchafalaya River to Atchafalaya Bay (McIntire 1958:1).

At each site he visited, McIntire took measurements from borings to determine depth and type of material the site was located on (McIntire 1958:18). He also made surface collections wherever possible. From these data (depth of site, soil type, and artifacts collected) McIntire classified each site and its physiographic base as representing one of the following site types: earth mound, shell mound, shell midden, black-earth midden, and beach deposits (McIntire 1958:7-8).

McIntire collected more than 40,000 sherds (McIntire 1958:18). From these sherds, he classified the sites within a chronological sequence which included: Tchefuncte, Marksville, Troyville, Coles

Creek, and Plaquemine. This classification was then transposed onto a coastal map for each time period. For the area within the Atchafalaya Basin, McIntire reported five Marksville sites, six Troyville sites, seven Coles Creek sites, and one Plaquemine site, all located near the Grand River Drainage System and Bayou Teche (McIntire 1958:Plates 4a, 5a, 7a, 8a).

Because McIntire never clearly defined how he conducted his survey beyond saying "...nearly 500 sites were either visited or reported within the area" (McIntire 1958:7), one may assume that he relied upon local informants and known sites for his information concerning site location. McIntire's survey, like those preceding it, would not be considered today to be a systematic search for sites. It was not until the mid-1970s that systematic surveys began to be conducted within the Atchafalaya Basin.

Robert W. Neuman and A. Frank Servello (1976)

Between October 1974 and March 1976, Robert W. Neuman and A. Frank Servello conducted the first major systematic survey within the Atchafalaya Basin. This project was funded by the Corps of Engineers and included Avoyelles, Pointe Coupee, St. Landry, Lafayette, St. Martin, Iberville, Assumption, and St. Mary Parishes. Neuman and Servello surveyed corridors and small blocks adjacent to the basin. The northern and central areas of the basin were sectioned off into quadrants with attempts at 100% coverage, but due to the sediment rates within the basin and time constraints, the survey area was reduced to checking along natural levees of relict and extant bayous (Neuman and Servello 1976:10). In the southern portion of the basin, the survey concentrated on but was not limited to the natural levees of active and relict channels (Neuman and Servello 1976:10).

Neuman and Servello (1976) did extensive archival research which was followed by an extensive field survey. The survey was conducted using a two- to five-person crew, boats, four-wheel-drives, bankline survey in the southern area, and helicopters in the extreme southern area (Neuman and Servello 1976:8). However, sites previously recorded by McIntire and Kniffen were not visited, but were placed on the site map. Neuman and Servello stated that, "All recorded sites for which there was locational and other data, have been incorporated into the report" (Neuman and Servello 1976:8).

Neuman and Servello classified all 133 sites recorded into one of the following categories: shell midden, earthen midden, multiple mounds with associated middens, and isolated mounds (Neuman and Servello 1976:11-13). The 133 sites were located in the Atchafalaya Basin and ancillary survey areas. Of the 133 sites recorded, 77 sites were newly discovered and 56 were previously recorded. Twenty-three of the previously recorded sites were revisited.

Neuman and Servello's systematic survey advanced archeologists' understanding of the prehistory of the basin. A large number of previously unknown sites were recorded. Also, the survey provided a better basis for discussions of such things as settlement patterns, site distribution patterns, and the chronological sequence within the basin. Some of the resulting patterns obtained from their survey included: location of tumuli versus shell middens, earliest age and majority age of sites within the basin, Archaic and Tchefuncte sites on basin's periphery, site location on extant and relict bayou levees and lake shores, and finally, that no sites were located along the Atchafalaya River itself (Neuman and Servello 1976:72-73).

It seems obvious from this survey and those that followed that the 1970s marked the beginning of a more scientific or systematic approach to understanding the archeological record within the Atchafalaya Basin. This shift in archeological procedure can probably be related to the passing of the National Historic Preservation Act of 1974.

Jon L. Gibson (1978)

From March through December of 1977, Jon L. Gibson conducted a survey southeast of Morgan City in St. Mary, Assumption, and Terrebonne Parishes between U.S. Highway 90 and the Gulf of Mexico. Gibson posed a series of theoretical questions which dictated the approaches or goals for the systematic survey of these areas: banks of Bayou Chene from its confluence with Bayou Black through Avoca Island Cutoff to the entrance of the Lower Atchafalaya River; Bayou Shaffer from its source at Bayou Boeuf to the Lower Atchafalaya River; Lower Atchafalaya River from its exit of Berwick Bay to the Atchafalaya Bay; and finally, an overland corridor bounded on the west by the Lower Atchafalaya River; on the east by the line corresponding to the eastern section line of conjoined sections 4, 9, and 16 in T18

S, R12 E; on the north by Avoca Island Cutoff, and on the south by the Atchafalaya Bay (Gibson 1978:1). His stated goals for the systematic survey were to locate cultural resources in order to mitigate adverse project impacts and describe, and to analyze and explain the variability in prehistoric sites within the project area. These goals or approaches were implemented using four separate survey techniques (Gibson 1978:2-4).

The first technique utilized a light-weight airplane for slow, low altitude (60 to 150 feet high) reconnaissance of roads, boat landings, and potential problem areas for pedestrians during on-the-ground-investigations (Gibson 1978:12-13). The second technique involved two three-person teams using a boat to travel to "look points" along Bayou Chene, Avoca Island Cutoff, and Bayou Shaffer. The "look points" were spaced 50 meters apart along the immediate bank lines of the above-mentioned waterways. A ground search at each "look point" was conducted within a 20-meter wide area parallel to the bankline and 20-30 meters wide perpendicular to the bankline. If no surface materials were noted at the "look point", two to three shovel tests less than one meter deep were placed at the water's immediate edge and at spots ten to fifteen meters and twenty to thirty meters away from the water's edge. If a site was found, complete surface collections along with additional shovel tests were conducted to define site extent (Gibson 1978:13).

The third technique was applied along the Lower Atchafalaya River corridor where the spacing between "look points" was increased to 100 meters. However, due to the flanking, inundated marsh, pedestrian investigations perpendicular to the river bank were often impossible. Therefore, all the streams which crossed the corridor were searched via boat up to a distance of one kilometer from the corridor (Gibson 1978:15).

Finally, because of the evidence of considerable subsidence and extensive alluviation, Gibson initiated a regimen of subsurface coring (Gibson 1978:15). A large hydraulic drill mounted on a truck and transported via barge was used to extract solid cores from a number of sites. These were Oak Chenier (16SMY49), Underwater (16TR109), Chene Cutoff (16TR4), Muddy (16TR105), New Oil Location (16SMY62), Bulldozer (16TR110), and Byrd Extension (16SMY63). Additional hand-augering was conducted at Chene 1 (16TR83), Catfisherman (16SMY47), Puff Ball (16SMY65), and Chene-Assumption (16AS37) (Gibson 1978:19).

Gibson found and reported eighteen sites in Assumption Parish, twelve sites in St. Mary Parish, and twelve sites in Terrebonne Parish. In conjunction with his systematic survey of the project area in the lower basin, Gibson also provided in-depth, theory-based discussions of the culture history of the Lower Atchafalaya Basin. The main focus was on chronological sequencing of prehistoric and historic populations (Gibson 1978:30-65) and on the natural environment, geomorphic development, landforms, waterways, elevation and flooding potential, and relief and slope because all of these could have influenced site location and use (Gibson 1978:66-117). Finally, Gibson discussed the analysis of the cores and the reconstruction of sedimentary environments for each site and performed a chi-square statistical analysis for site dispersal within different environmental zones (Gibson 1978:183-260). The results of the tests suggested that aboriginal populations were choosing natural levees instead of swamps and marshes, and that there was a higher frequency of sites in the swamp-marsh ecotone rather than within the interior of either zone (Gibson 1978:230-231).

Jon L. Gibson (1982)

The next survey conducted within the Atchafalaya Basin was completed between July 1979 and September 1980, again by Jon L. Gibson. This large-scale survey covered 295 kilometers in portions of Avoyelles, Pointe Coupee, St. Landry, St. Martin, Iberville, Assumption, and St. Mary Parishes. This survey was for the construction and maintenance of the East and West Atchafalaya Basin Protection Levees which demarcate the Atchafalaya Basin Floodway. The areas surveyed were long linear corridors from Moreauville to a southern terminus near the junction of the Avoca Island Cutoff and the Lower Atchafalaya River below Morgan City (Gibson 1982:31). The survey was conducted in five segments along the east and west protection levees as well as segments of levees west of the Berwick area, west and southwest of Morgan City (Gibson 1982:31-36).

Like those for his previous effort, Gibson's two approaches in this study were designed to provide data to address particular theoretical issues. These issues were "...certain broad settlement-related hypotheses dealing with lowland adaptation and relative site location" (Gibson 1982:325). The first approach was an ethnographic survey, the results of which represent an excellent account of the historic populations in and around the basin.

The second approach was an archeological survey. The methods for the archeological survey were based on geographic parameters (settings) within the survey corridors, and these corridors were 60 meters in width, centered on existing levee crests (Gibson 1982:336). Four different field techniques were utilized. The first technique consisted of pedestrian coverage of one to three longitudinal transects which followed the corridors. These transects were spaced ten to forty meters apart within the corridors. Surface collecting was the primary mode of survey (Gibson 1982:337). The second method was employed when longitudinal transects were prohibited by terrain. In these situations, the corridor was covered by one to three irregular search paths emanating from points of disembarkation systematically spaced at 200 meters (Gibson 1982:337-338). A third technique was applied for the southern extremities: the East Atchafalaya Basin Protection Levee south of Bayou Sorrel, the West Atchafalaya Basin Protection Levee south of Lake Fausse Point, and the levees west of Berwick. In these areas a probing device was incorporated into the survey. The probing device was efficient in delimiting the extent of *Rangia*-dominated sites, but by itself did not lead to the discovery of new sites (Gibson 1982:339). The final technique utilized shovel tests in areas where geological information suggested near-surface sites were likely to be present. The shovel tests measured 50 x 50 x 50 cm. They were confined to geologically older but geomorphologically less active landforms found mostly north of U.S. Highway 190 (Gibson 1982:340).

Gibson's survey recorded two sites in Pointe Coupee Parish, one site in Iberville Parish, six sites in St. Martin Parish, fourteen sites in St. Mary Parish, two sites in Iberia Parish, five sites in St. Landry Parish, and two sites in Avoyelles Parish. Gibson also discussed several sites which he recommended as significant and for which he stated mitigation should precede construction impacts. These sites are: Bayou Sorrel (16IV4), Lost Hill (16SM51), Nutgrass (16SM45), Brick (16SMY130), Bayou Shaffer Waterlocks (16SMY52), Moccasin (16SMY104), Henry Knight (16SMY107), Charenton Beach (16SMY2), Bisland (16SMY166), Bayou Perronet (16SM50), Savage (16AV68), and Dupont Des Glaisses (16AV69).

George J. Castille (1982)

The next survey was conducted in January of 1982 by George J. Castille for the Missouri Pacific Railroad Yard in Iberville Parish. The survey was on the west side of the existing Texas/Pacific Railroad Line near Bayou Maringouin on the east side of the East Atchafalaya Basin Protection Levee. This survey included areas within several plantations: Kenmore (16PC36), El Dorado (16PC37), Vernalia (16PC38), and Woodley (16PC39). Castille used two methods for the survey, the first being a historical documents check and the second being the actual field investigations. However, Castille did not describe methods used for the field investigations. Although this survey was executed outside the protection levees, it is immediately opposite the present project area. Castille documented various buildings from each plantation, and most of these buildings were quarters, main houses, barns, and remains of sugar houses (Castille 1982:12).

Malcolm Shuman (1985)

In 1985, Malcolm Shuman conducted a survey for proposed water works improvements along Bayou Grosse Tete in Iberville Parish. His study area extended from La. Highway 76 south to a point just north of the junction of Bayou Grosse Tete and Bayou Plaquemine. Also, portions of Blue Bayou and Bayou Maringouin were included. Shuman (1985) conducted archival research as well as the actual field investigation. He discussed six methods for this field investigation.

The first method consisted of a windshield survey. Next, pedestrian reconnaissance was undertaken to examine the surface in areas to be directly impacted or in areas of previously recorded sites. Third, interviews were conducted with local informants. Fourth, undescribed "test excavations" and "scrapings" were made in high probability areas. Fifth, at one site, artifacts were collected. Finally, photos were taken of known sites, suspected sites, and certain standing structures (Shuman 1985:14).

Shuman also revisited and described four sites in and around the survey area. These sites are: Reed Mound (16IV5), Mays Place Camp (16IV7), Leroy's Site (16IV19), and Mt. Olive Cemetery (16IV20). Shuman stated that Mt. Olive Cemetery (16IV20) would be the most severely disturbed by the proposed pipeline (Shuman 1985:19).

Michael E. Stout (1985)

A survey was undertaken by Michael E. Stout in May of 1985. The survey was conducted in St. Martin Parish on the east bank of the Atchafalaya River at the Coswell Bayou Levee Setback. Stout's survey was conducted within the present larger project area for which this report is written (Stout 1985:4).

Stout performed archival research which was followed by field investigations consisting of a two-person team performing pedestrian survey. The surveyors maintained a ten to twenty meter distance between them and visually inspected the ground surface for cultural remains along the transect. Additional transects ran perpendicular to the main transect and the existing levee and road. Shovel tests were excavated at 50 meter intervals to a depth of 50-80 cm within the transects. Also, inspections were done of spoil piles and on the cut-banks of the Atchafalaya River. No cultural resources were recorded within the survey area (Stout 1985:14-15).

Dennis Jones and Malcolm Shuman (1987)

In 1986, Dennis Jones and Malcolm Shuman conducted a survey of mounds in Pointe Coupee, Iberville, Assumption, St. James, and West Baton Rouge Parishes. They had already developed a consistent method of producing contour maps, computer-generated graphics, and reports on artifacts gathered at sites visited (Jones and Shuman 1987:11). Also, they created and considered specific research hypotheses during the survey. These hypotheses are centered around such topics as geomorphological associations, mound morphology, cultural affiliation of the mounds, and mound condition (Jones and Shuman 1987:10).

Jones and Shuman (1987:9) were not updating and mapping the 37 previously reported mound sites. However, due to incorrect recording and/or destruction of some of the mounds, 20 of the 37 sites were deemed worthy of visiting and mapping (Jones and Shuman 1987:10). Also, Jones and Shuman visited two sites reported by C.B. Moore in 1913, but which were not recorded in the site files (Jones and Shuman 1987:9). One of these, the "Mound on Alabama Bayou" site (16IV156), lies within the present larger project area.

The main results of this survey were the creation and use of a mound site form and the computer-generated graphics for the mounds. These graphics were done by creating a two-dimensional contour map by the use of standard surveying equipment such as an optical transit, aledade, plane table, and stadia rod. These two-dimensional maps were then run on the SYMAP and ASPEX computer programs at the Louisiana State University miniframe computer (Jones and Shuman 1987:13).

Jones and Shuman (1987) also conducted extensive surface surveys in the vicinity of reported mounds. However, they do not mention how these surface surveys were conducted. There were seventeen sites mapped in Iberville Parish and seven sites mapped in Pointe Coupee Parish. One of the five sites which was not relocated was Mound Alabama Bayou (16IV156), which had been partially excavated by Moore (1913) and which was located within the present larger project area. 16PC3 (Chapter 5) is also important because of its proximity to the present project area. The site is located just north of U.S. Highway 190.

Kathy Manning et al. (1987)

The next survey was conducted by Kathy Manning, Paul C. Armstrong, Eric C. Poplin, and R. Christopher Goodwin of Goodwin and Associates, Inc. In 1986, they surveyed thirteen borrow tracts or pits along Bayou Maringouin for the East Atchafalaya Basin Protection Levee Item E-44 in the east-central portion of Iberville Parish. Manning et al. surveyed a linear corridor extending for eight miles along Bayou Maringouin between levee station 2200 +00 and 2590 + 00, which includes the confluence of Bayou Maringouin with the Upper Grand River near the mid-point of the survey area (Manning et al. 1987:14). Two of the thirteen borrow tracts were located on the west side of Bayou Maringouin, and the remainder were located along the east side of the bayou.

Manning et al. (1987) created a research design to define high probability areas with the use of Lawson M. Smith's geomorphological survey of the basin, aerial photos, topographic maps, and soil charts. To fulfill their research design, Manning et al. (1987) described three field techniques. The first field technique was the intensive, systematic pedestrian survey outside the areas defined as high probability which included five borrow tracts. Five borrow transects were placed at twenty meter intervals and were oriented parallel to the long axis of the borrow area within the low probability areas. Shovel tests, with a depth of 25-50 cm and width of 30 cm, were placed every 50 meters along each transect in an off-set pattern (Manning et al. 1987:53).

The second technique was applied in the high probability areas which were surveyed with transects spaced twenty meters apart and oriented parallel to the long axis of the geomorphic feature investigated (Manning et al. 1987:53). The increment for shovel testing was decreased to 25 meters with additional auger testing on natural levee flanks (Manning et al. 1987:53). The third technique consisted of bankline inspections from a small boat of borrow area exposure at water's edge.

In addition to the above-described work, Manning et al. also visited three nearby sites: Bayou Sorrel (16IV4), Schwing Place (16IV13), and Pigeon Bayou Mound (16IV15). At the location of the sites, surface inspections were conducted in regularly spaced transects over the site area. This was done to locate additional features present near the site and occurrences of surface artifacts. Sketch maps were also drawn for the state site files (Manning et al. 1987:55-56).

Manning et al. (1987:87) reported that no cultural remains were recovered from the thirteen proposed borrow pits. Also, the Pigeon Bayou Mound site (16IV15) could not be relocated. It was first reported by Kniffen in 1938 and then by Neuman and Servello in 1976 (Kniffen 1938; Neuman and Servello 1976; Manning et al. 1987:83).

George J. Castille et al. (1990)

The most recent survey conducted in the Atchafalaya Basin was completed in April and May of 1989. The survey was conducted by George J. Castille and five others of Coastal Environments, Inc. They surveyed three areas of construction for the realignment of the Cross Basin channel. The first area was the Old Atchafalaya River, located at the junction of the Atchafalaya River main channel and the Whiskey Bay Pilot Channel in St. Martin and St. Landry Parishes. The survey was conducted prior to the stabilization of the left descending bank of the Atchafalaya River main channel. The area covered was comprised of 87 acres (Castille et al. 1990:2).

The second zone for survey was the East Freshwater Distribution channel in Iberville and St. Martin Parishes at the junction of the Atchafalaya Blind Tensas Cut and the Upper Grand River (Castille et al. 1990:3).

The area extended from the presently in-filled channel of the Upper Grand River for a distance of 700 meters along the eastern bank of Blind Tensas Cut to the intersection of the Upper Grand River and the Little Tensas Bayou (Castille et al. 1990:3). This area was comprised of 120.5 acres of land survey and 104 acres of riverine remote sensing.

The third area for survey was the West Access Channel area in St. Martin Parish between Bayou Chene/Tarleton Bayou Cut and Bayou Chene. The area surveyed was along the western bank of Bayou Chene Cut (Castille et al. 1990:4-5). Here there was a total of 148.6 acres of land survey and 109.25 acres of riverine remote sensing.

Three field techniques were used. First, a remote sensing survey of several riverine and lake areas was conducted with a magnetometer and fathometer. Also, a pedestrian magnetometer survey was conducted for selected terrestrial areas. The second technique consisted of systematic auger testing at 50 meter intervals to a depth of two meters in selected terrestrial areas. Finally, a surface examination was conducted along visible stream banks and spoil piles (Castille et al. 1990:61).

Castille et al. (1990) reported no cultural remains discovered within the survey areas. However, there were some magnetic anomalies found during the riverine remote sensing survey, but the origins of these anomalies was not determined. Sixteen sites had been previously reported within the project area. However, none of these sites had been relocated during the Neuman and Servello 1976 survey of the Atchafalaya Basin.

Castille et al. (1990) also attempted to locate a documented nineteenth and early-twentieth-century community located on the banks of Bayou Chene in the West Access Channel portion of their survey area. Castille et al. had conducted interviews of four informants who had lived in this community prior to the exodus of the inhabitants due to levee construction by the Army Corps of Engineers in 1936 (Castille et al. 1990:28). They had also used various historical maps dating to the nineteenth century to determine the location of the post office, stores, and homes, including a sugar plantation of the Bayou Chene community. Castille et al. (1990) reported that, "...despite the intensive survey coverage, no evidence of cultural remains were found, other than magnetic anomalies along some of the magnetometer transects" (Castille et al. 1990:78). A transect lane had been placed in the vicinity of the Verret post office, store, and house. However, only two low-deflection magnetic anomalies were recorded. Furthermore, auger testing in the area failed to locate any subsurface cultural remains. Castille et al. (1990) stated that

> ...although no cultural remains were encountered, it is possible that some remains associated with the old Verret post office/store/home exist, but this evidence is now buried beneath two-meters or more of recent alluvium [Castille et al. 1990:78].

CHAPTER 5
PREHISTORY OF THE ATCHAFALAYA BASIN

Introduction

The Atchafalaya Basin is a unique, circumscribed, alluvial floodplain, and as such, settlement patterns differed from those found within the Lower Mississippi River Valley. Understanding settlement within the basin is facilitated by Kniffen's (1938:202; Chapter 4) concept of age-area relationships. Age-area relationships are based on the premise that if the age of a given landscape is known, then the maximum age of all materials (natural and cultural) found in association with that landscape can be determined as well. The age of the landforms within Atchafalaya Basin are fairly well documented (Chapter 2). The next step, then, is to determine if the sites reported in the Atchafalaya Basin have a distribution pattern which shows the interrelationships between sites and the age of the landforms on which those sites are found.

The optimal locations for occupation by prehistoric peoples in and around the Atchafalaya Basin were the natural levees. These areas were preferred because they provided optimum soil drainage, natural resource availability, proximity to transportation routes, and protection from natural hazards (Smith et al. 1986:73). As expected, archeological research to date indicates that these natural levees contain at least 40 percent of the known sites. Smith et al. (1986:73) reported that 22 of 55 sites reported were located on natural levees. This percentage suggests that prehistoric peoples located their settlements on natural levees. However, sites on natural levees also are observed more easily during archeological survey:

> Due to the heavy siltation and increased subsidence within the basin, evidence of prehistoric occupation was usually limited to the natural levees [Neuman and Servello 1976:10].

Thus, it seems likely that the distribution of known sites also has been affected by sample bias. Unfortunately, the heavy siltation that has occurred in the Atchafalaya Basin within the last 50 years has effectively buried sites (Sherburne WFA Officer John Sturgis and Paul V. Heinrich, personal communication 1993). As a result, the remains of pre-Coles Creek cultures are virtually inaccessible unless they occur on the natural levees of older, larger distributaries, like the Bayou Fordoche-Bayou Marinqouin-Bayou Gross Tete distributary systems or on the Bayou Teche distributary systems. This problem was reviewed by Smith et al. (1986:77) who stipulate that, "Sites older than Coles Creek should be absent from all surfaces in the Atchafalaya Basin except the natural levees of larger distributaries." Smith et al. (1986:77) also suggest that, "...sites older than Marksville should be generally absent on the Lafourche distributaries. Based on Smith et al.'s (1986) work, Manning et al. (1987:33) suggest that, "Archeological sites on abandoned distributaries are probably less than 1500 years old, and probably never date before 3000 B.P."

Gibson (1982) proposed models for site patterning within the Atchafalaya Basin that further elucidate age-area relationships. The first model proposes that older sites are situated on the basin's periphery, primarily on the western side, and that younger sites are found on the eastern periphery as well as in the basin's interior (Gibson 1982). In terms of the age-area relationships, the older sites are associated with the Mississippi-Teche meander ridge which was active between 5800 to 3500 years B.P. (Smith et al. 1986:44). This date would allow for the occupation of this area by Archaic populations. This 'peripheral model' predicts where older sites versus younger sites are located, and can be effectively tested by a sample of sites from the basin as a whole.

In addition, populations grow and expand across the landscape over time, and more recent cultures, such as the Coles Creek, will venture into areas which were not formally inhabited. This suggests that recent cultures are not restricted solely to recent landscapes. Chronologically younger cultures can and do inhabit both older and more recent landforms. Thus, the peripheral model by itself is inadequate for describing the relationship of younger cultures to their environments. Instead, a village fission-fusion model appears to be applicable to sites dating to the Coles Creek and later. This model was discussed by Gibson (1982:85-94) and Manning et al. (1987:29). In the northern and middle portions of the basin, Gibson (1982:85) proposed a settlement pattern whereby small residential hamlets of a few families budded off from the larger main village. In the southern portion of the basin, the settlement pattern appears to be that of spring and summer fission, with dispersed marsh/bay settlements, and fall and winter fusion for the occupation of larger inland sites

(Gibson 1982:93-94). This "fission-fusion model" was created to discuss cultures which have complex socio-economic structures and that have settled, larger villages for at least a portion of the yearly cycle.

A representative sample of sites in and around the basin is discussed below. The peripheral model and the fission-fusion model are applied to these sites in an effort to examine the age-area relationships within the Atchafalaya Basin

Geographic Divisions

To facilitate an understanding of the location of sites discussed below, the Atchafalaya Basin has been divided into three areas (Figure 11). The northern area starts at the head of the Atchafalaya River and ends at U.S. Highway 190. The middle area starts on the southern side of Hwy. 190 and continues south to the northern boundary between St. Martin and Iberia Parishes. The southern area starts south of the northern boundary between St. Martin and Iberia Parishes and continues to Morgan City. For the location of all sites discussed in this chapter, refer to Figure 11.

The Paleoindian Period

No Paleoindian sites or artifacts have been reported within the basin proper. However, projectile points have been found on Godeau Hill and Evergreen Island (no site numbers available at the State Division of Archeology) on the western edge of the modern basin. This area is associated with the Lafayette-Mississippi meander belt, which has been totally obliterated from the surface of the basin (Gibson 1982:78). The location of these sites is consistent with the peripheral model, which predicted that the very oldest sites would be located outside of the basin. While Paleoindian peoples were present in Louisiana, probably even in the area which became the basin, Jones and Shuman (1987) predicted that, "Yearly overflows and channel course changes of the Mississippi River have doubtless buried or washed away artifacts or other indications of that time" (Jones and Shuman 1987:7). If a Paleoindian site were discovered, the associated artifacts would date between 10,000 B.C. and 6,000 B.C., which even predates the Mississippi-Teche meander belt, and the site, consisting of a small temporary camp or kill site, would probably be found beside a water source (Neuman and Servello 1976:14).

The Archaic Period

Like the preceding Paleoindian Period, few sites have been reported for the Archaic Period. However, there does appear to be a significant increase, slight as it may be, of sites along the basin's edge, which is predicted by the peripheral model. According to Jones and Shuman (1987:7):

> The succeeding Archaic or Mesoindian era dating from 8,000 B.C. to about 2,000 B.C. is underrepresented. It is probable that the highly exploitable environment of the Lower Mississippi Valley made this a good place to live.

But, according to Gibson (1982:79):

> No Archaic components or sites have been properly identified in the basin proper, but do parallel the swamp margins atop the Mississippi alluvial valley walls themselves.

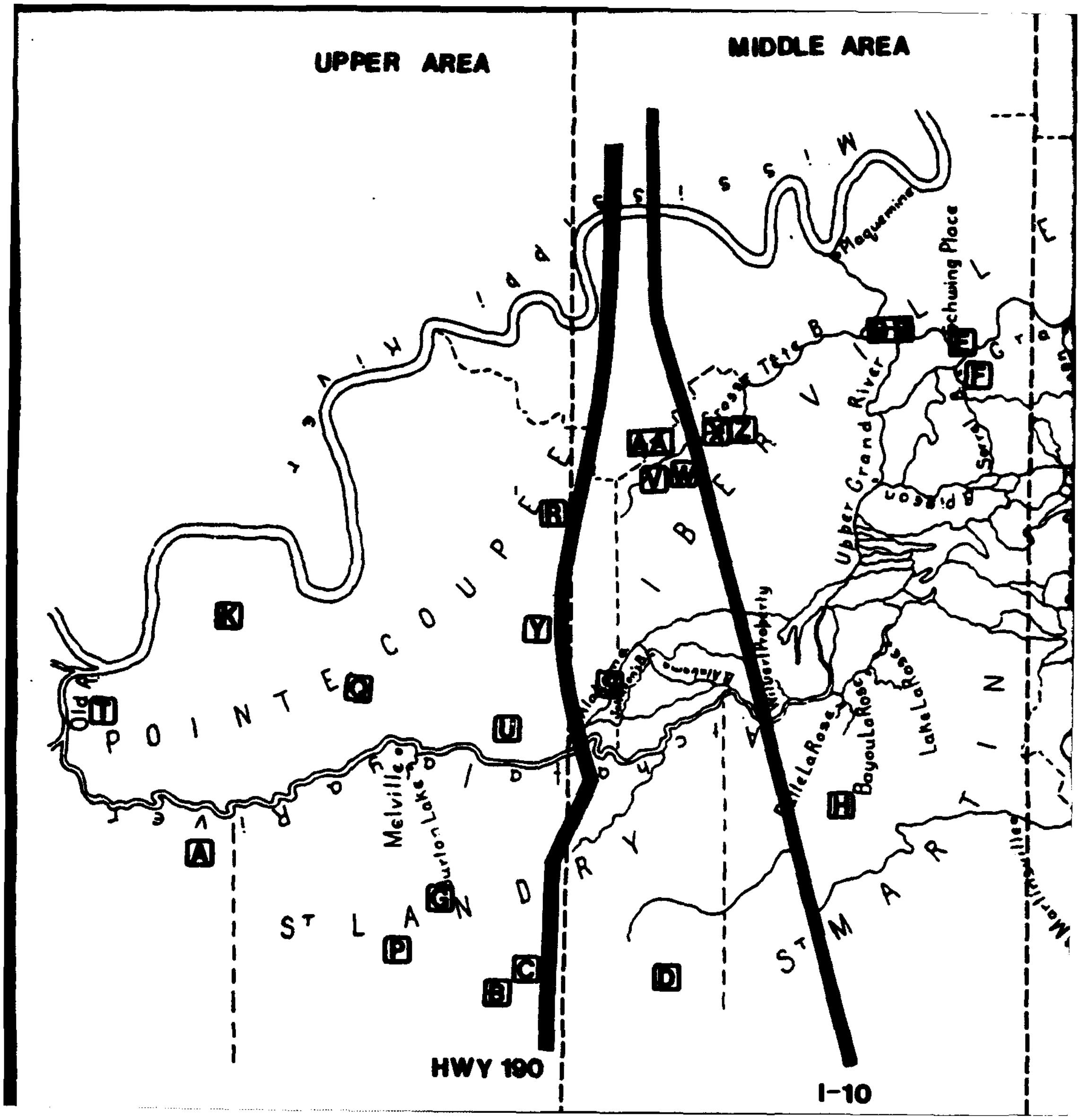
In other words, Archaic people lived on upland margins overlooking the interior but did not live in the lowlands of the basin proper (Gibson 1982:79-80). This might be expected in terms of age-area relationships: an association between old landforms which surround the basin and the occurrence of Archaic sites.

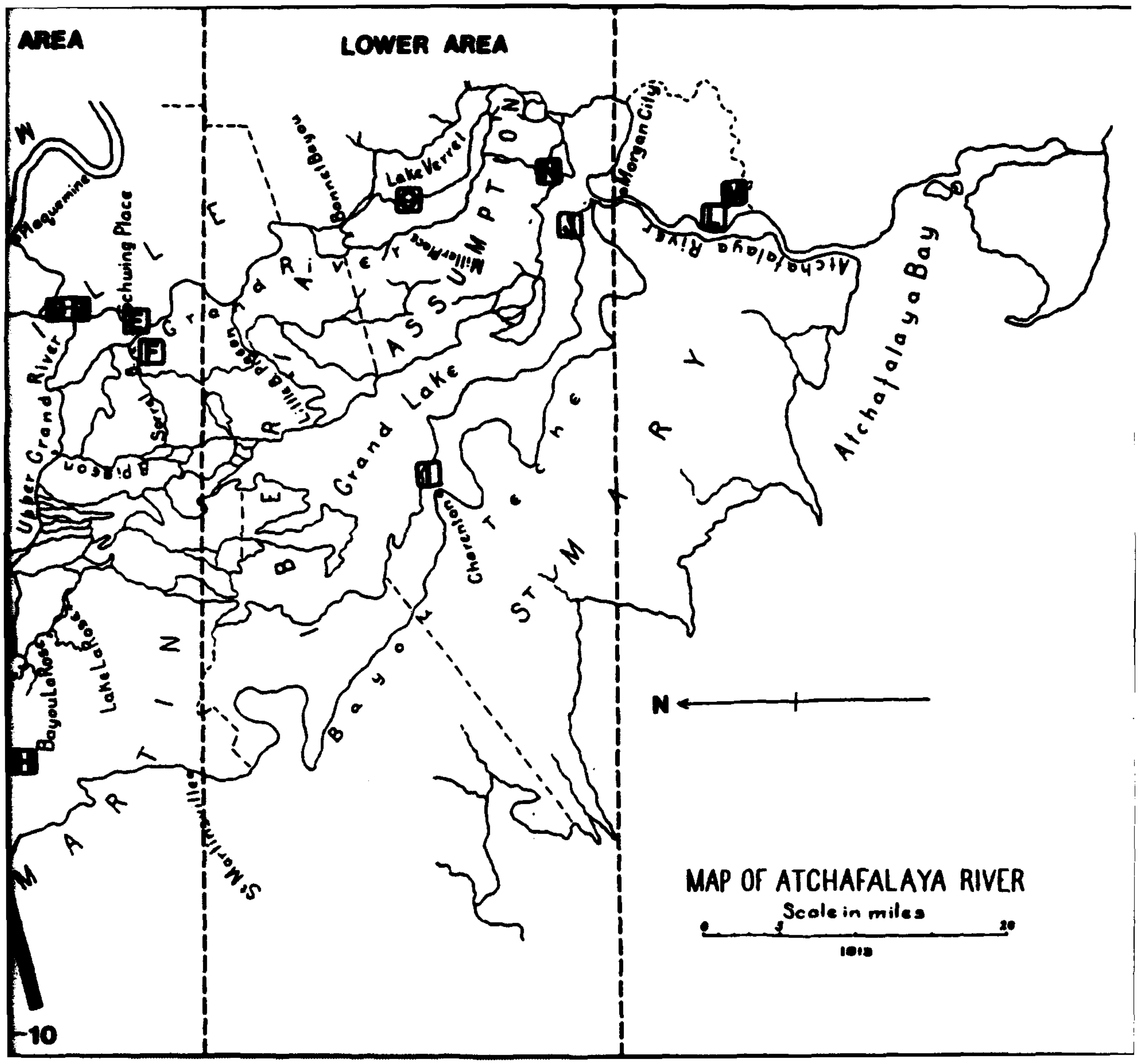
Smith et al. (1986:77) suggest that

> The probability of locating Archaic (middle to late) sites is highest along natural levee crests of the early Teche distributaries in the Area West, Delta, and Western Terrebonne Marsh.

These three areas do represent some of the natural boundaries of the basin during prehistoric times. However, it should be noted that while peripheral sites may represent habitations, sites located within the basin proper might represent only short-term, resource exploitation sites. Nonetheless, no Archaic sites, either long-term or short-term, have been reported within the basin's interior. Furthermore, if Archaic sites did exist in the interior, all evidence for such sites has long been buried.

The Savage site (16AV68) is located along the older, elevated, Bayou Jack segment of the Teche-


UPPER AREA
MIDDLE AREA
HWY 190
I-10
Melville
Upper Grand River
Schwing Place
Bayou La Rose
Lake La Rose
A
B
C
D
E
F
G
H
K
P
Q
R
T
U
V
W
X
Y
Z
AA


AREA
LOWER AREA
Plaquemine
Schwing Place
Upper Grand River
Lake Verret
Bonnet Bayou
Miller Place
ASSUMPTION
Morgan City
Atchafalaya River
Atchafalaya Bay
Grand Lake
Little Pigeon
Bayou Pigeon
IBERVILLE
IBERIA
ST. MARY
ST. MARTIN
Bayou Teche
Charenton
Bayou LaRose
Lake LaRose
St. Martinville
N
MAP OF ATCHAFALAYA RIVER
Scale in miles
1813
10

Mississippi meander belt course on the western edge of the northern area of the basin (Figure 11). Savage may represent a long-term habitation site based on stratified Archaic, Tchefuncte, and Plaquemine components (Gibson 1982:78). Neuman and Servello (1976:22, 43-44) reported two more sites (16SL16 and 16SL19) with Archaic components on the western side of the northern area of the basin, south of the Savage site.

Site 16SL16 is situated within the plow zone along a cultivated ridge on the south side of an improved parish road (Neuman and Servello 1976:43). The precise Archaic affiliation is unknown, as is the overall site size. Numerous projectile points were found during a grab-bag surface collection (State of Louisiana Site Record Form). This may indicate that it is a short-term, resource exploitation site, but the site does fit the peripheral model in terms of its location.

Site 16SL19 is on an old natural levee of Bayou Courtableu. Its precise Archaic affiliation (early, middle, or late) is unknown. The overall size is 100 m in a north-south direction. Debitage was collected in a grab-bag surface collection, but no diagnostics were reported (State of Louisiana Site Record Form), which suggests, again, a temporary camp for the exploitation of natural resources or perhaps a lithic reduction station. Likewise, this site fits the peripheral model, regardless of its precise affiliation and usage.

Slightly east of 16SL16 and 16SL19, along the western edge of the northern area, Gibson (1982:79) reported a dense scatter of Archaic sites on the exposed natural levees of Big Darbonne Bayou (Gibson 1982:79). The bayou was reported to have been a major crevasse system of the Teche-Mississippi system (Gagliano et al. 1978 in Gibson 1982:79). Again, the location of these sites fit the peripheral model. No list of these sites was provided by Gibson (1982).

Another Archaic site (16SL12) was reported on the western edge of the middle area, a location again consistent with the peripheral model (Neuman and Servello 1976:42). The Archaic component may actually represent the Poverty Point Period, based on recovery of baked clay objects (Neuman and Servello 1976:22, 42). Furthermore, Gibson states that "To a lessening degree, sites and assemblages resembling Poverty Point components appear around Lafayette" (Gibson 1982:81), an area which would include 16SL12 and which sits atop the Mississippi-Teche meander ridge.

On the eastern periphery of the basin, the only reported sites with Archaic components appear to represent Poverty Point occupations, a transitional period between the Archaic and succeeding Tchefuncte complexes. This designation is based on the recovery of baked clay objects found by C.B. Moore (1913:15) at two locations (16IV13 and 16IV4 on the southeastern side of the middle area). The Poverty Point Complex is thought to represent the period from about 2,000 B.C. to 1,500 B.C. for the whole of Louisiana (Manning et al. 1987:26; Jones and Shuman 1987:7).

Schwing Place (16IV13) is a mound site located on a natural levee on the southwest bank of Bayou Zeno (Jones and Shuman 1987:106-112). The site contains at least one low mound and possibly a second mound. The orientation of the second mound is problematic, and it may represent a natural anomaly on the ground surface (State of Louisiana Site Record Form; Moore 1913:15; Manning et al. 1987:80; Jones and Shuman 1987:106). Moore found 32 baked clay objects at the site, suggesting an association with the Poverty Point period (Moore 1913:15). However, these objects could be associated with the Tchefuncte component also reported at 16IV13 (Jones and Shuman 1987:107; State of Louisiana Site Record Form).

The Bayou Sorrel Site (16IV4) was located on a natural levee on the left descending bank of Bayou Sorrel (Gibson 1982:359). This site has at least one mound, which was excavated by Moore in 1913. There are reports of a possible second mound (State of Louisiana Site Record Form; Moore 1913:13-15; Manning et al. 1987:75-79). Moore (1913:15) recovered three baked clay objects from the mound. As was the case at 16IV13, these baked clay objects may have been associated with the Tchefuncte component which was reported at this site (Gibson 1982:364; State of Louisiana Site Record Form).

Both the Schwing Place (16IV13) and Bayou Sorrel (16IV4) sites are important because they are associated with the eastern periphery of the basin. This area is associated with post-Teche distributaries (Smith et al. 1986:14), and thus only allows for the occurrence of cultures younger than Archaic. However, these sites are problematic because of the difficulties in distinguishing assemblages of late Poverty Point cultures from those of early Tchefuncte cultures. The landscape for both sites should coincide with the formation of the Mississippi-Lafourche meander belt, which dates from 2,000 to 500 years BP (Smith et al. 1986:39-40). This date would allow for the occupation of the area by either Poverty Point or Tchefuncte cultures.

On the northwestern edge of the basin, Gibson (1982:81) discussed the probability of Poverty Point components, stating that, "It is possible to ascribe Poverty Point components to Atchafalaya edge components, based on emphasis on trade goods and stretching typological criteria." The Stelly Mound group (16SL1) on Bayou Petite Prairie was proposed by Gibson (1982:81) to be a local center during Poverty Point times, but no artifact listing was provided. On the Louisiana State Record Form, the site is reported to consist of three mounds on a natural levee. Various diagnostic points and other artifacts were recovered, including Poverty Point objects (Louisiana State Site Record Form).

Although previous research at the Stelly Mound group indicates that the mounds were occupied during the Poverty Point, Tchefuncte, Coles Creek, or Plaquemine periods, new evidence recovered by Mike Russo and a team of volunteers indicates that construction of the mounds may actually have begun in the Pre-Poverty Point Archaic. Carbon 14 dates were obtained from a hearth in Mound B, and a date of 4720±190 years B.P. was assigned to the hearth. This would place Mound B in the Meso-Indian/Archaic age, making the site one of the oldest ceremonial mounds in North America (Russo 1993:20-21). Artifacts recovered from the Stelly Mound group analyzed by James A. Fogelman (n.d.) support the Carbon 14 dates obtained by Russo (1993). Most of the artifacts recovered date to the Poverty Point and Pre-Poverty Point Archaic. However, a few later artifacts indicate that a brief Coles Creek occupation occurred at the site. Mound B contained no post-Archaic artifacts (Fogelman n.d.:25). Testing on Mound C has since been conducted, but the results were not available at the time of this report.

The Tchefuncte Period

The generally accepted dates for the Tchefuncte Period range from 550 B.C. to A.D. 200 (Jones and Shuman 1987:7; Neuman and Servello 1976:16-17; Manning et al. 1987:26-27). It has been suggested that Tchefuncte sites within the basin can be classified as

> ...inland sites focusing on river terrace and flood plain habitats of the Lower Mississippi Alluvial Valley, and coastal plain sites focusing on utilization of coastal and deltaic ecosystems on the Mississippi River deltas and Gulf Coast [Manning et al. 1987:27].

Like Archaic sites, Tchefuncte sites are usually found on natural levee crests of major river meander belts. None have been reported in the pure swamp area, but they do exist near the upland margins of the basin (Gibson 1982:82). Site location once again appears to be consistent with the basin periphery model, predicting higher densities on the eastern and western edges of the basin. There is an increase in the number of Tchefuncte sites relative to Archaic sites, which suggests an expansion of population and movement of peoples up and down escarpment edges and along conjoined meander belt ridges (Gibson 1982:81).

Sites with Tchefuncte components and which best represent this pattern include 16IV4 (Bayou Sorrel Mounds) and 16IV13 (Schwing Place) in the southeastern part of the middle area, and 16AV68 (Savage) on the western edge of the northern area. Gibson (1982) also noted that the density of Tchefuncte sites along the western edge of the basin in the southern part of the northern area is greater than that in the middle and southern areas. In the middle and southern areas, the density is lower and sites are more scattered. Tchefuncte sites reported in this area include Bayou Perronet (16SM50) in the eastern part of the middle area and Charenton Beach (16SMY2) in the middle part of the southern area (Gibson 1982:79).

Bayou Perronet, or Bumblebee (16SM50), is a small "black earth midden" situated on the right descending bank of Bayou Perronet near Henderson, west of the West Atchafalaya Basin Protection Levee (WABPL) (Gibson 1982:459-473). The site, stretching for 40 meters along the bank, is composed of a stained-earth midden with *in situ* materials (Louisiana State Site Record Form). Gibson (1982:90) believes that "the site is a short term village/camp occupied totally within the Tchefuncte period."

Charenton Beach (16SMY2) is a midden site on the beach of the western shore of Grand Lake, along the eastern flank of the Teche Ridge (Gibson 1982:450-459). The site consists of five shell mounds, some of which are reported to contain burials (State of Louisiana Site

Record Form; Moore 1913). This site appears to represent one of the late Tchefuncte sites discussed by Gibson (1982:81) as being situated on "...landforms lying out in the swamp at some distance from the higher elevations provided by the meander belt ridges and the upland margins." This would suggest that as cultures expanded over time, they slowly moved off the older landforms and out into the bottom lands of the basin itself.

According to Gibson (1982:426), another site that represents occupation of the lowland areas is the Moccasin site (16SMY104). This prehistoric shell midden is just northwest of present-day Morgan City, on a natural levee of Riverside Pass (Gibson 1982:424-437; Neuman and Servello 1976:30, 67). It should be noted that Neuman and Servello (1976:67) make no mention of this site containing a Tchefuncte component. This site is associated with the lake systems in the southern part of the basin, which began forming with the closure of the Atchafalaya Basin by the Lafourche deltaic network approximately 1,500 to 2,000 (Smith et al. 1986:44). Smith et al. (1986:44) estimated that the lake system required at least several hundred years to form, and this would allow the landscape to be populated by the Tchefuncte cultures.

The Deep Pot Site (16SL126) and the nearby Dusty Road Site (16SL125) are buried middens exposed by road cuts and ditches south of Bayou Petite Prairie, in the western portion of the Upper Basin Area. These are the only Tchefuncte sites identified along Bayou Petite Prairie. The midden at the Deep Pot Site is located within Red River Gallion soils, apparently lying between two alluvial events. Eight test units were excavated at the site as a 2 x 4 m excavation area in 1992. The units revealed a Tchefuncte midden running more than two meters northwest-southeast, below 30-40 cm of Red Gallion soils. The midden may run parallel to a relict channel course. Over 1200 Tchefuncte sherds were recovered from the Deep Pot Site, as well as lithics and fishbones (Russo 1992:30-33; Russo 1993:26).

The Baker Site (16SM19) is located on the banks of Bayou Fusilier of the Swamps, near the western edge of the Atchafalaya Basin (in the Middle Area). Considerable confusion exists in the site records as to the identity of this locale, but a review of the evidence by Mike Russo indicates that this was a multi-mound site of which one mound survives. During a survey and testing program conducted by Russo in 1992, dark midden with large amounts of bone, charcoal, and freshwater shell was located at depths of up to 1 m below surface. A 50 x 100 cm test unit was excavated to a depth of 60 cm, and yielded over 2000 Tchefuncte sherds (Russo 1993:37-40).

Tchefuncte sherds constitute the predominant ceramic material at the Hicks Site (16SL4), Keller Lake Site (16SL154), X Site (16SL155), and Magenta West Site (16SM47), described in Russo (1992), and at the Straw Lake West Site (16SL115) described in Russo (1993). Tchefuncte components are present at the Slow Bend Site (16SL124), BC^2 Site (16SL132), Bayou Little Teche Site (16SL139), and the Hamilton Site (16SL140) described by Russo (1992), and at the Olivier Site (16SL12), Talley Mounds (16SM71), probably Indian Hill (16SM77), and the North Bend Site (16SMY132) described by Russo (1993). The North Bend Site includes Tchefuncte shell midden as well as a historic component; it lies along the Intracoastal Waterway outside the Atchafalaya Basin, on a distributary channel of Bayou Teche.

The recovery of buried midden at the Deep Pot Site and elsewhere indicates that other deeply buried Tchefuncte sites may be found within the Atchafalaya Basin, but their discovery largely depends on accidental exposure during nonarcheological excavation. The probability of encountering completely buried Tchefuncte (or earlier) sites during archeological survey is slight. In some areas, such as along Bayou Petite Prairie, it may be possible to predict the association of Tchefuncte sites with geologically identifiable alluvial events.

The Marksville Period

The general time frame for the Marksville period ranges from 100 B.C. to A.D. 400 (Manning et al. 1987:27; Jones and Shuman 1987:7). Few sites representing this period have been reported within the basin. Gibson reported only one ceramic sherd exhibiting a Marksville cross-hatched rim mode. It was recovered from the Bayou Perronet site (16SM50). After his 1982 survey of the basin, Gibson felt that the Marksville period in the Atchafalaya Basin could be

> ...viewed as nonparticipant or attenuated participation by local populations in activities that gave that particular Marksvillian flavor to the material cultural complexes of the day [Gibson 1982:82].

However, the sites 16IV4, 16IV13, and 16SMY2, which were listed as having Archaic and/or Tchefuncte components, were also reported to have yielded artifacts that are representative of Marksville culture (Manning et al. 1987:28; Jones and Shuman 1987:69, 107; Gibson 1982:450-459).

There are also three other sites which yielded Marksville-type artifacts, principally ceramic sherds. The three sites are Monk's Mound (16PC5), located on the eastern side of the northern area; and Bone Point (16SMY39) and Oak Chenier (16SMY49), both of which are located south of Morgan City. These sites fit the peripheral model in that they demonstrate the movement of more recent cultures off the older ridges on the basin's periphery and out into the lowlands of the basin's interior.

The Monk's Mound site (16PC5) is located on a natural levee east of Bayou White Vine, 0.8 miles south of Raccourci Old River in Pointe Coupee Parish in the northern area. It is a typical conical mound with Marksville ceramics in clear association with the mound (Jones and Shuman 1987:7, 145-150; State of Louisiana Site Record Form).

The Bone Point site (16SMY39) is located on a natural levee on the right descending bank of Bayou Shaffer at the former junction of Bayou Shaffer and Bayou Penchant in the southern area. Gibson reported that the cultural materials were not *in situ*, and that the shell midden was a recent development (Gibson 1982:410-412). It should be noted, however, that the state site form indicates a cultural affiliation of Troyville and Coles Creek with no *in situ* materials or mention of Marksville artifacts (State of Louisiana Site Record Form).

Oak Chenier (16SMY49) is a *Rangia*/earth midden located on the right descending side of Bayou Chene on the south shore of Avoca Island Lake in the southern area. This site was recorded by Gibson (1978:127-132), and its assemblage is reported to contain Marksville ceramics. However, the state site form lists the cultural affiliation as Troyville and Coles Creek with no reference to a Marksville component (State of Louisiana Site Record Form).

The review presented here demonstrates that workers in the basin have reported conflicting data concerning the presence or absence of a Marksville occupation in the Atchafalaya Basin. An example of this is the discrepancy between the Bone Point (16SMY39) and Oak Chenier (16SMY49) site forms completed by Gibson and his (1982) survey report for the Atchafalaya Basin. Pending obtaining absolute dates and/or more artifacts from excavated contexts, Gibson's (1982) discussion of the paucity of diagnostic Marksville artifacts is intriguing, especially considering the proximity of the basin to the Marksville type site (16AV1). Perhaps Gibson is correct that the Basin was occupied during this period but that the inhabitants used and produced few diagnostic artifacts. Alternatively, the basin may have been largely abandoned during this period. Regardless of this, it should be noted that these sites are located in areas that are younger than the ridges surrounding the basin, which is consistent with the expectations of the peripheral model.

The Troyville-Baytown Period

Archeologists in southeastern Louisiana have often discussed the difficulty of differentiating "Troyville" from "Baytown" (e.g., Louisiana Archaeology 1982). It seems reasonable to refer to the years from ca. A.D. 300-700 as the "Baytown Period" as is done by researchers affiliated with the Lower Mississippi Valley Survey (e.g., Phillips 1970). In this usage, the "Troyville Culture" is characterized as the culture of peoples occupying an undefined geographic area during the Baytown Period. Gibson (1982), however, raises an additional problem concerning the Atchafalaya Basin. While the terms "Troyville" and "Baytown" can easily be applied within the basin, the forms connote material complexes or artifact assemblages associated with Troyville and Baytown which are not present there nor within conjoined coastal environments. As was the case for the Marksville Period, the apparent paucity of diagnostic Baytown artifacts creates a problem that can be addressed only through additional excavation and by obtaining absolute dates.

There does seem to be a population increase during the period A.D. 400-700 (Gibson 1982:83). Evidence for this increase is the number of sites that were initially occupied during the Troyville-Baytown Period. Also, many of the previously mentioned multi-component sites contain either Troyville or Baytown components. The sites discussed by Gibson as either Baytown or Troyville, based on recovered ceramics, include 16IV4 (Baytown), 16SMY39 (Baytown), 16SMY104 (Troyville), 16SMY49 (Baytown or Troyville), (Gibson 1982:362-374, 410-412, 424-437; and 1978:127-132). Jones and Shuman (1987:106-112) discussed the presence of a Baytown component at 16IV13. Some of the sites which appear to have been first occupied during the Baytown Period are Belle River Landing (16SM6?), Nutgrass (16SM45), Fish Bayou (16SL61), and 16PC17. These sites are located further away from the older ridges surrounding the basin, which is consistent with the peripheral model for site location and age.

The Belle River Landing site (16SM6?) was discovered during the transport of *Rangia* shells for a public boat landing on the Port Allen-Morgan City Intracoastal Canal and on the western berm of the East Atchafalaya Basin Protection Levee (EABPL) in the southern area. Gibson reported this site in his 1982 survey report. However, there were problems determining which of three sites in the area was the origin of the *Rangia*. Therefore, Gibson added a question mark to the site number. Baytown-associated artifacts were found within the *Rangia*, so perhaps one of the sites in the area included a Baytown component (Gibson 1982:379-390).

The Nutgrass site (16SM45) was located on the bank of the Port Allen-Morgan City Intracoastal Canal about 1.9 km south of the Belle River Landing site. This shell midden was first reported by Neuman and Servello in 1976 and then revisited by Gibson in 1982. Neuman and Servello suggested that the site contained Troyville and Coles Creek components (Neuman and Servello 1976:27, 54-55; State of Louisiana Site Record Form). Gibson, however, collected no artifacts and based his observations on the Neuman and Servello report (Gibson 1982:396-399).

The Fish Bayou site (16SL61) was located on a natural levee crest on the south bank of Fish Bayou at the junction of the Bayou des Glaises Diversion Channel on the western side of the northern area. The site was recorded by Gibson in his 1982 survey and was reported to contain Baytown artifacts. However, Gibson (1982:483-489; State of Louisiana Site Record Form) thought this site represented a small Coles Creek hamlet, and that the "Baytown" ceramics may have actually derived from an early Coles Creek component. The fission-fusion model may be applicable for this site. As stipulated by Gibson, the site may represent a hamlet, which may suggest that it was established by a group which broke away from some larger village site in the area. This might be substantiated if a larger village site of a similar date could be documented in the area. At present, though, no such village site has been identified.

16PC17 is a site which was located on a natural levee of Bayou Black at its juncture with Bayou Cross Vine in the northern area. The site was confined to the A-zone soil and had been greatly disturbed. It was recorded and reported by Neuman and Servello (1976:23, 37).

The Coles Creek Period

Population density in the Atchafalaya Basin reached its peak during the Coles Creek Period (Gibson 1982:93). This assertion is based on the large number of sites containing Coles Creek components. This population growth and areal expansion are believed by some (e.g., Manning et al. 1987) to be a possible result of increased reliance on maize agriculture (Manning et al. 1987:29) which in turn suggests an increase in cultural complexity. Manning et al. (1987:29) further propose that "seasonal exploitation of coastal environments supplemented the maize economy of large inland sites and small non-mound farmsteads were present." This fits the fission-fusion model of settlement patterning.

As previously discussed, Gibson (1982) believes that occupants of the upper portion of the Basin engaged in full-fledged horticulture within permanent villages. However, in the middle portion of the basin, horticulture probably never was practiced due to the threat of flooding. In the southern portion, the settlement pattern appears to be one of group fission, with marsh/bay residence in spring and summer. In the fall and winter, the pattern appears to be one of group fusion with occupation of inland sites (Gibson 1982:93-94).

In the upper or northern basin and in the middle area, Gibson discussed a village fission settlement pattern consisting of a large village with smaller residential hamlets of a few families budding off from the main village (Gibson 1982:85). Examples of village sites which fit this model include Bayou Sorrel (16IV4) in the eastern part of the middle area and Charenton Beach (16SMY2) in the western part of the southern area (above). An example of a site representing a hamlet may be Fish Bayou (16SL61; above) in the western part of the northern area (Gibson 1982:94).

Other sites in the northern and southern areas that contain Coles Creek components, and which have been discussed above are 16PC5, 16SM6?, and 16SM45 (Neuman and Servello 1976:22-23; Gibson 1982:379-391, 396-399). It is unclear whether these sites represent the village fission pattern discussed by Gibson (1982). However, these sites do represent the possibility of fission-fusion settlement, and they do fit into the peripheral model as previously discussed.

In the southern portion of the basin, Gibson used the fusion-fission model to illustrate seasonal adaptive settlement patterns (Gibson 1982:85). However, neither Gibson (1982) nor Manning et al. (1987) mention specific sites which represent examples of their model of site distribution and settlement patterning. Sites containing Coles Creek components and which were discussed above include 16SMY39 and 16SMY49 on the east side of the southern area, and 16SMY104 on the west side of the southern area.

Coles Creek sites closer to the project area and which have not been discussed previously include 16PC1, 16PC2, 16PC7, and 16PC8. All of these sites are located in the upper or northern area of the basin within Point Coupe Parish. The Livonia mounds (16PC1) are located on a natural levee on the eastern bank of Bayou Grosse Tete (Jones and Shuman 1987:131-138). The site consists of two or three mounds distributed over a 20-acre area which may have been a large village site, however, this is speculative and not substantiated. Two of the mounds are aligned on an east-west axis (State of Louisiana Site Record Form).

Mound Bayou Mound (16PC2) is a mound site on a natural levee 150 feet west of Mound Bayou. It is one of the few previously reported sites within the present larger study area. The site consists of a single platform mound with a circular shape and a diameter of about 190 feet, and it stands about 4.4 feet high from the base to the summit (Jones and Shuman 1987:138). According to Jones and Shuman (1987:138), "...the mound is presently covered by trees, of which some are sizable and some secondary growth. Also, the western side of the mound appears to have been silted somewhat by an increase of drainage away from the levee along the Atchafalaya toward Mound Bayou." Jones and Shuman (1987:139) recovered "...five aboriginal sherds which corroborate Neuman and Servello's assigning a Coles Creek occupation to the site. No artifacts were found on the surface around the mound to indicate a surrounding midden area." It was also stated by Jones and Shuman (1987:139) that the site seems to be inundated frequently, which probably resulted in a heavy silt deposit that would bury any indications of middens and midden material or artifacts. However, Neuman and Servello (1976:22) reported this site to be composed of an isolated mound with an associated midden. On the Site Record Update Form, Jones and Shuman mention a possible Troyville component as well as the Coles Creek component. It is possible that this "Troyville" component may actually represent an early Coles Creek occupation (Jones and Shuman 1987:138-144; State of Louisiana Site Record Update Form). The location of this Coles Creek site within the interior of the basin is consistent with the expectations of the peripheral model. Also, this site may represent a hamlet because it has only one mound. This is speculative, however, and future excavations of isolated mound sites may help to understand their function.

Lettsworth Bayou (16PC7) is a mound site with associated middens on each side. Neuman and Servello reported its Coles Creek component (Neuman and Servello 1976:22, 34; State of Louisiana Site Record Update Form). Bayou Gerance (Bayou Gerance East or Bayou Gerance I [16PC8]) is a midden site situated on both banks of Bayou Gerance, and it also includes a Coles Creek component. The site is on a natural levee and has no visible midden (State of Louisiana Site Record Form). It was reported by Neuman and Servello (1976:22, 34) to include a Coles Creek component. Its location is consistent with the peripheral model as a more recent manifestation in the basin's interior.

Three sites with Coles Creek components are situated on the natural levee of Bayou Grosse Tete. These sites (16IV1, 16IV2, and 16IV20) are very close to the present survey area. The Rosedale Plantation site (16IV1) is located two miles north of the city of Rosedale. This site includes a platform mound ten feet high atop a natural levee. The cultural deposits were first recorded by Kniffen in 1937, and the deposits have yielded artifacts representative of the Coles Creek through the antebellum period (State of Louisiana Site Record Form; Kniffen 1938:191, 199-201; Jones and Shuman 1987:50-55).

The Peter Hill site (16IV2) is located on a natural levee on the east bank of Bayou Grosse Tete, nine miles south of Slacks. The site was first recorded by Kniffen in 1938. It contains Coles Creek through protohistoric assemblages, and it has two platform mounds (State of Louisiana Site Record Form; Kniffen 1938:191, 199-201; Jones and Shuman 1987:56-68).

Mt. Olive Cemetery (16IV20) is located on a natural levee on the west bank of Bayou Grosse Tete, about 1000 feet south of I-10. The site consists of a single low temple mound with a Coles Creek component as well as a historic/modern cemetery at the foot of the mound (State of Louisiana Site Record Form; Kniffen 1938:191; Jones and Shuman 1987:113-119). Because this site is composed of a single mound like 16PC2, it could represent a small hamlet.

The Mississippi Period/Plaquemine Culture

The Plaquemine Culture, which developed out of Coles Creek in the Lower Mississippi Valley, seems to represent the zenith of the Mississippi Period in Louisiana. The dates are generally considered to be from ca. A.D. 1100 to A.D. 1700 (Neuman and Servello 1976:19). Assemblages from the Atchafalaya Basin do not exhibit "Mississippian" traits, but they are representative of the Plaquemine Culture which characterized southern Louisiana during this period. There are in the basin a wealth of sites and artifacts that have been associated with the Plaquemine Culture. The majority of these sites also include earlier components which have been discussed above.

Those sites previously discussed include 16PC2 (northwest part of the middle area of the basin); 16PC8 (southeast part of the middle area); 16IV1, 16IV2, and 16IV4 (eastern edge of the middle area); 16SMY2 (western edge of the southern area); 16SMY104 (northwest of Morgan City in the southern area); 16SL12 (western edge of the middle area); and finally, 16AV68 (northwest edge of the northern area).

There are three additional Plaquemine sites along the eastern edge of the basin which have not been previously discussed. These sites are 16PC3, 16IV5, and 16IV7. The Bayou Close site (16PC3) is located along the west bank of Bayou Gerance in the southern part of the northern area. The site is on a natural levee, and at one time consisted of a *Rangia* midden and possibly two low mounds. The Site Record Form reported that the site may include both the Coles Creek and Plaquemine components, and it appears to represent a small hamlet or village (State of Louisiana Site Record Form). This site might therefore fit the fission-fusion model of settlement.

The Reed Mounds site (16IV5) is located on a natural levee of Bayou Grosse Tete. The site is reported to consist of one large platform mound and two smaller mounds paralleling the bayou. The cultural components were recorded as Plaquemine and historic (State of Louisiana Site Record Form; Kniffen 1938:196, 202, 204).

The Mays Place Camp site (16IV7) is located on the west bank of Bayou Grosse Tete. The site is situated on the natural levee and consists of a three-foot-high platform mound. The cultural components were recorded as Plaquemine through antebellum (State of Louisiana Site Record Form; Kniffen 1938:191).

Historic Tribes

The understanding of the migration of historical tribes through the Atchafalaya Basin is based primarily on ethnographic documents and reports of the early explorers in the region rather than on archeological research. There were three tribes that were documented as having migrated through and/or having lived within the Atchafalaya Basin. These tribes are the Chitimacha, the Houma (Gibson 1982:88-89), and the Bayougoula (Manning et al. 1987:30).

The Bayougoula, among others, were reported during contact times to be living along the peripheries of the basin, and "Due to the continuing pressure from the European Colonists, they were probably forced to occupy larger areas of the swamp" (Manning et al. 1987:30). In 1699, Pierre Le Moyne, Sieur D'Iberville, and his brother, Jean Baptiste, Sieur De Bienville, made contact with the Bayougoula in the swamps and bayous adjacent to the Mississippi River (Manning et al. 1987:30). On March 14, 1699, they worked out a treaty with the chiefs of the Bayougoula and the Mougoulasha, who were sharing the settlement. Iberville reported that most of the women had died as a result of small pox (Manning et al. 1987:30-31). Apparently, the Bayougoula were massacred after Iberville and his brother went back to France (Manning et al. 1987:31). No archeological evidence of the Bayougoula or the Mougoulasha has been reported within the Atchafalaya Basin.

According to Manning et al. (1987:31), the most prominent tribe in the eastern portion of the basin was the Chitimacha, but "due to their hostility, not much had been documented by European visitors to the region" (Manning et al. 1987:31). Before the 1700s, the Chitimachas moved north from the southern portion of the basin to Bayou Plaquemine (Manning et al. 1987:31). Then they moved across the basin to the western branch of the Chitimacha Lakes (now Grand Lake) and along Bayou Teche (Gibson 1982:86). According to Gibson (1982:86),

> ...There is an east-west water route in the middle of the basin, joining the Grand Lake village sites to villages along Bayou Plaquemine, Grosse Tete, and Jacques, with village sites along the way.

Swanton reported that

> ...The Chitimachas remained at Bayou Goula, in Iberville Parish, through 1721, and in a 1766 census, there were recorded only 22 people living below Plaquemine [Swanton in Manning et al. 1987:31].

Village sites have also been reported at Plaquemine, Indian Village (16IV158), Belle River, and Donaldsonville (Manning et al. 1987:31).

During much of the European contact period, the Houma were residing on the east bank of the Mississippi River in the vicinity of Pointe Coupee (Gibson 1982:89). Due to European intrusions into the area, the Houma migrated south, picking up remnants of the Bayougoula, Acolapissa, Quinipissa, and Mugulasha. They settled in the vicinity of present-day Houma. Unfortunately, few sites representing these various groups have been reported in the Atchafalaya Basin (Gibson 1982:89, 105).

Summary and Conclusions

The chronology contained within this report was primarily based on the archeological data available from the Louisiana Division of Archeology. The data consisted of site reports, survey reports, and artifact (primarily ceramic) typologies. An attempt was made to synthesize this data into a settlement model for the Atchafalaya Basin.

The concept of age-area relationships was utilized to examine site location relation to the landscape in which the site is found. This was accomplished through the application of a peripheral model and a fission-fusion model for settlement patterning. By examining the locations of known sites in light of the above-mentioned models, it was confirmed that the maximum age of a given site can be to some extent predicted by the age of the landscape containing that site.

It was noted that the highest probability areas for archeological sites are located on the natural levees of extinct and extant distributaries in and around the basin. This is due both to a preference for settlement of these areas as well as an artificial bias resulting from heavy sedimentation of the surrounding terrain. Similarly, the probability of discovering pre-Coles Creek sites is lessened due to the high sediment rate within the basin proper. Despite this, it was also noted that the natural levees of older distributaries may contain the gamut of prehistoric occupations, excepting Paleoindian sites.

Neither Archaic nor Tchefuncte sites are very prevalent in the eastern areas of the basin, but they are instead located along the older landforms flanking the west side basin proper. The east side seems to have the highest concentration of Coles Creek and Plaquemine sites. However, the population during these periods was thought to have been the largest ever residing in the basin. Thus, Coles Creek and Plaquemine sites are found dispersed throughout the basin.

The fission-fusion model helped to clarify the relationship of village sites to seasonal exploitation sites in the southern areas of the basin. In the middle and upper basin, this model predicts a pattern of large villages surrounded by smaller hamlets, all of which subsisted on a horticulture-based diet. Based on the fission model, the proximity of large Coles Creek and Plaquemine sites to the present study area may suggest that smaller hamlets were formerly located in this vicinity.

CHAPTER 6
HISTORIC OVERVIEW OF THE LARGER STUDY AREA
by Benjamin Maygarden

The overall study area consists of that portion of the upper Atchafalaya Basin east of the Atchafalaya River north of Interstate 10 and south of U.S. Highway 190. This area shares many historical similarities with the remainder of the basin to the south, but also differs from it in a number of respects. The seminal study of Atchafalaya swamp life by Malcolm Comeaux (1972) and previous cultural resource surveys undertaken in the region that rely on Comeaux's account of the historical development of the area have concentrated on the basin south of Interstate 10. Documentary evidence suggests that historical settlement and land use in the overall study area, while similar to the general pattern described by Comeaux, may be significantly different in a number of aspects.

The Study Area to 1865

At the beginning of the historic period, Native American utilization of the Atchafalaya Basin was sparse, and they only infrequently utilized the hunting and fishing resources available in the basin. Consequently, contact between Native Americans and European explorers in the Atchafalaya Basin was rare, and most commentators on the area in the colonial and early American period emphasized the desolate and foreboding nature of the swamp (Comeaux 1972:7).

The wealth of superior agricultural lands lying to both the east and the west of the Atchafalaya Basin made the lands along the low natural levees within the upper basin (i.e. Alabama Bayou, Little Alabama Bayou, Bayou Des Glaises, and Bayou Des Ourses) relatively less desirable. A map by M. Ludlow (1817) shows an indistinct area of "high land" corresponding roughly to the course of "Bayou Alabama," now known as Alabama Bayou (Figure 12). However, even these higher lands were difficult to reach, and lack of accessibility would have a major impact on the historical development of the area. From the early nineteenth century, a public road existed to the immediate north of the study area; with significant straightening and embanking this road later became U.S. Highway 190. Identified on a map by B. Lafon (1806), the road was little more than an intermittently passable track for much if not all of the antebellum period (Comeaux 1972:9). The Ludlow map (1817) also shows the course of the road.

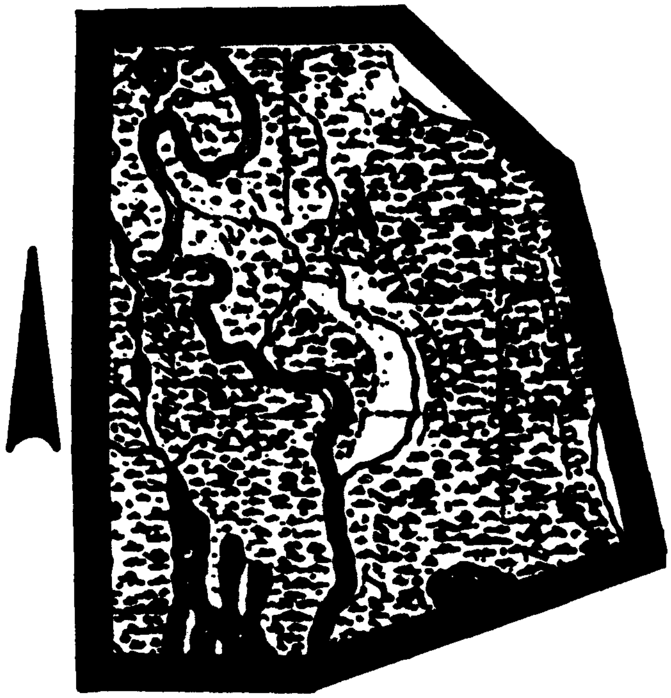


Figure 12. Excerpt from the 1817 Ludlow map showing "high land" along Alabama Bayou and the larger study area (no scale available).

Not surprisingly, waterways were the principal avenues of transportation into the basin and an important factor to settlement and agricultural exploitation. William Darby's (1816) map (Figure 13) identified a "great raft" along a stretch of the Atchafalaya River from lower Pointe Coupee Parish to what was then the upper portion of West Baton Rouge Parish (today St. Martin Parish) along the northwestern side of the study area. Darby stated that the raft had formed in 1778, and by 1820 observers commented that the raft completely blocked the river "and [is] so firm and compact in some places, that cattle and horses are driven over it" (Blowe 1820, quoted in Gibson 1982:136). Darby disputed that the raft was substantial enough to support cattle, but he commented that shrubs and small trees grew on the logjams (Gibson 1982:136). Darby and Ludlow both identified a smaller raft below the "great raft," between the upper and lower mouths of Alabama Bayou. These rafts were serious obstacles to navigation, and were usually impassable. Other smaller conglomerations of branches, trunks, whole trees, and debris, known as drift piles, were frequently encountered along smaller waterways. Some could be rowed through with much expenditure of energy; others were large and solid enough to prevent passage (Coulon 1888:31).

Despite the problems posed to transportation, it was clear that the Atchafalaya River had potential for navigation. Documents in the State Land Office indicate that (probably in anticipation of demand) the interior swamps of the basin within modern Pointe Coupee, Iberville, and St. Martin Parishes were surveyed at the end of the 1820s and the beginning of the 1830s. The French arpent system, with narrow tracts fronting on watercourses, was utilized along Alabama Bayou, Little Alabama Bayou, Bayou Des Glaises, and Bayou Des Ourses. The standard American survey system of one mile square sections was used in those areas of the basin west of the sections fronting on Bayou Maringouin. Efforts began to clear the Atchafalaya rafts in 1840, and the river was clear by 1861 (Gibson 1982:137). Parish conveyance records show that patents began to be issued for tracts within the study area in the early 1850s. Ironically for the purchasers of the Atchafalaya Basin lands, the clearing of the rafts had a number of consequences, including damaging the commercial agricultural potential of the area.

Primary documents consulted for this study provide no indication that prior to the patenting of tracts in

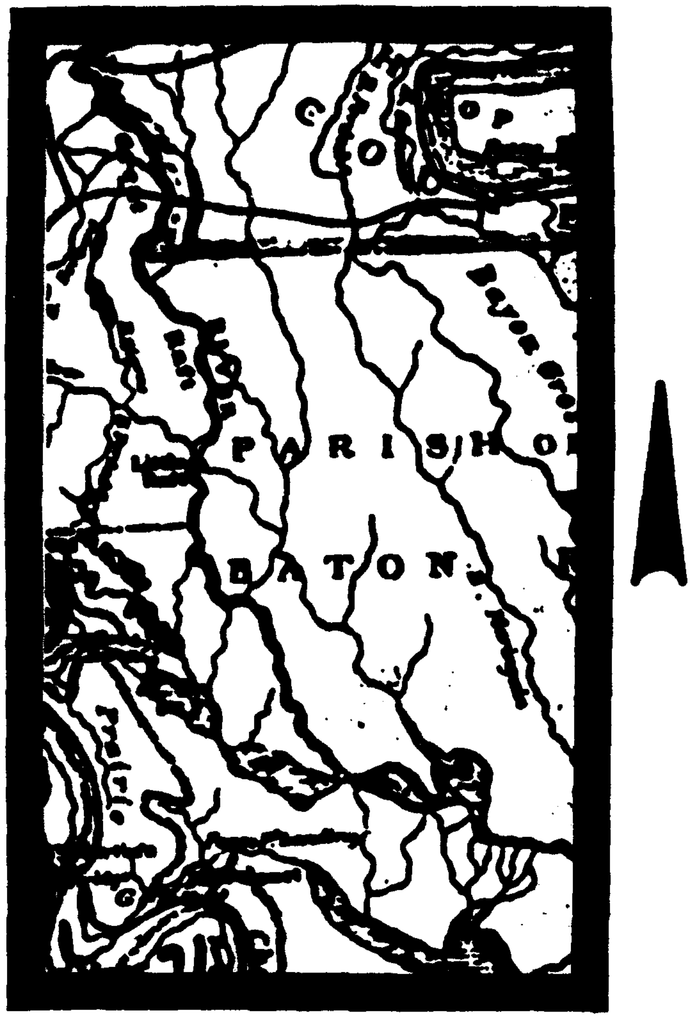


Figure 13. Excerpt from the 1816 Darby map showing the "great raft" (no scale available).

the 1850s, settlement had occurred to any extent within the study area. Elsewhere in the basin, persons of Acadian descent had moved in and pursued subsistence agriculture as market pressures grew greater on superior agricultural lands along the Mississippi River, Bayou Teche, and Bayou Lafourche during the period 1810-1840 (Comeaux 1972:11). This appears not to have been the case within the study area based on the documents examined. However, as in the remainder of the basin, the vast majority of land within the study area was patented by a relatively small number of wealthy partnerships or individuals. Who these purchasers were is treated in more detail below.

Evidently much of the land in the study area was purchased for purely speculative purposes. However, other purchasers were planters who attempted to establish cotton agriculture on their basin tracts. Elsewhere in the eastern basin, slave-based plantations had been established by 1845 (Manning et al. 1987:41). Examination of a limited number of conveyance documents for tracts in the study area demonstrate that some owners were utilizing the natural levee lands along Alabama Bayou and those between the Atchafalaya River and Little Alabama Bayou. Figure 14 indicates those sections where the sample of conveyance documents examined show any specific or general improvements in the antebellum period. Clearly, it is unlikely that these were the only sections where improvements were made prior to the Civil War.

This locus of agricultural activity appears to concur with statements in secondary sources that the vicinity of Alabama Bayou, Little Alabama Bayou, and Bayou Des Glaises had cotton plantations (Comeaux 1972:15). It is not surprising that if any portions of the overall study area were developed in commercial cotton agriculture it would have been the higher lands along the major bayous. However, with the clearing of the Atchafalaya rafts, flooding increased within the basin, boding ill for the plantations established in the study area. By 1860, prior to the final clearing of the Atchafalaya "great raft," several crops were damaged by increasingly severe flooding in the basin (Manning et al. 1987:44).

During the antebellum period, Alabama Bayou, Little Alabama Bayou, and possibly Bayou Des Glaises were navigable for at least portions of the year when water was higher, namely the fall and winter. An 1856 conveyance for a tract with sawmill in the study area, at the confluence of Alabama Bayou and Bayou Johnson, specifically excepted the steamboat "Genny Land" and its machinery (COB 23:#1647, SMP). Unfortunately, no information is available to determine the size and kind of steamboat specified. It is likely that the boat was utilized to transport manufactured equipment, material, and supplies into the basin and agricultural produce out of it (Castille et al. 1990:40-41). From this single 1856 conveyance (COB 23:#1647, SMP), it is also apparent that commercial lumbering had begun in the study area during the antebellum period. It should be noted, however, that the float-logging methods used were traditional and pre-industrial, and unlikely to allow year-round operation of an industrial sawmill (Mancil 1972:69-70).

An examination of the 1860 Louisiana Census Index suggests that none of the landowners listed on an 1859 land ownership map published by Sarony, Major, and Knapp of New York (Figure 15) who appear in the census resided within the study area. Thus, it is likely that residents of the study area on the eve of the Civil War were tenants, slaves, overseers, squatters, and other resident non-owners.

The Civil War had little documented, direct impact on the study area since it was, for the most part, strategically insignificant and difficult to access. Hostilities within the basin as a whole were largely associated with Union General Nathaniel Banks' campaign against Brashear City (Morgan City) to the south of the study area. No large-scale military activity is known to have occurred in the study area. However, the collapse of the cotton economy, the deleterious effects of increasingly severe flooding, and anarchic wartime conditions all contributed to a virtual abandonment of agriculture within the basin during the war (Comeaux 1972:17).

In 1863, Captain Henry L. Abbott of the Corps of Engineers was ordered by General Banks to prepare a map of the Army Department of the Gulf area of operations, including the Atchafalaya Basin. On Abbott's map (Figure 16) no structures or improvements are shown in the study area. However, a map of the Atchafalaya Basin prepared in 1864 by Captain P.C. Hains and Lieutenant H. Prevost of the Corps of Engineers indicates "cane" growing to the south of the "good road" (U.S. Highway 190) at the northern edge of the study area (Figure 17). This would have been in the vicinity of tracts owned by

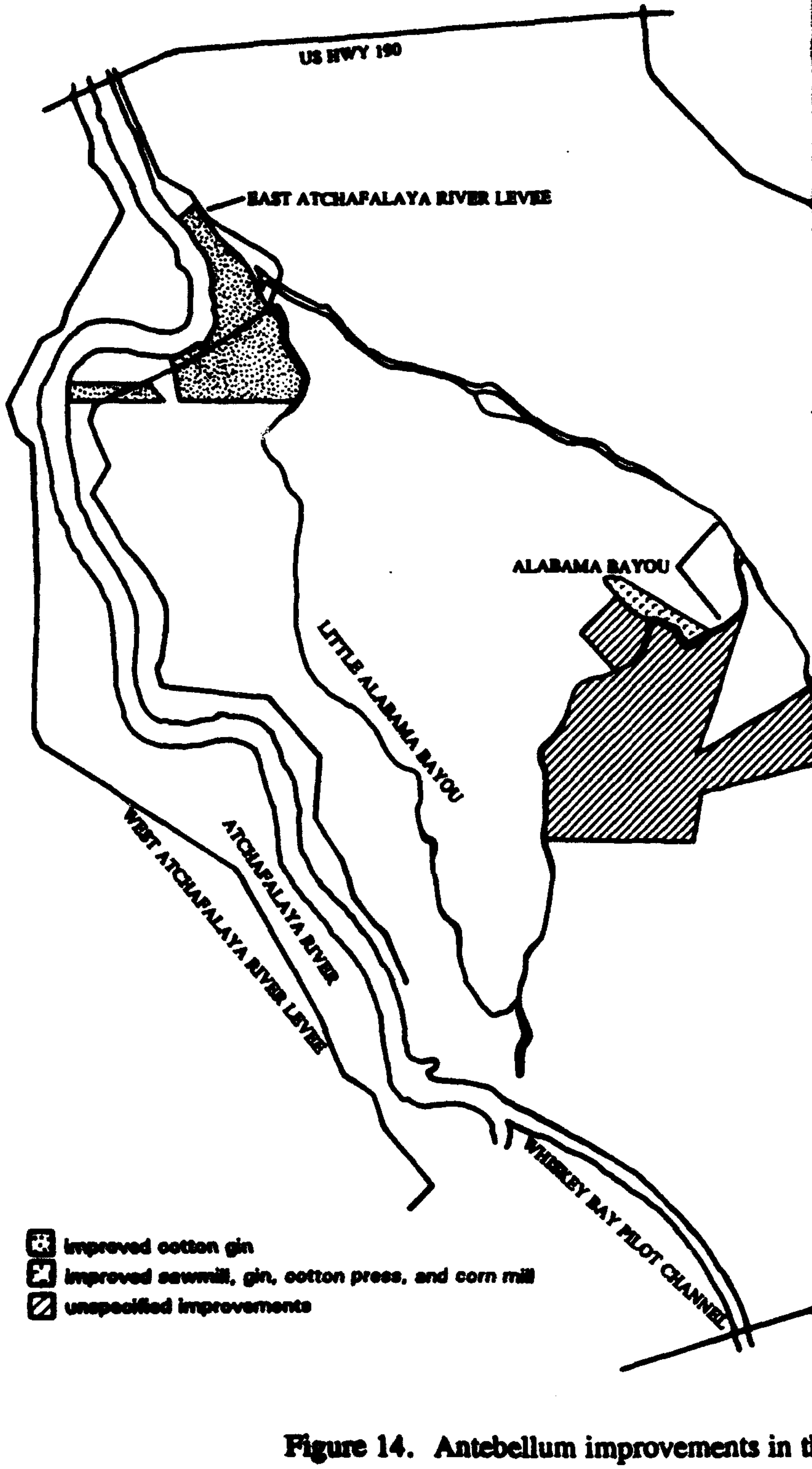
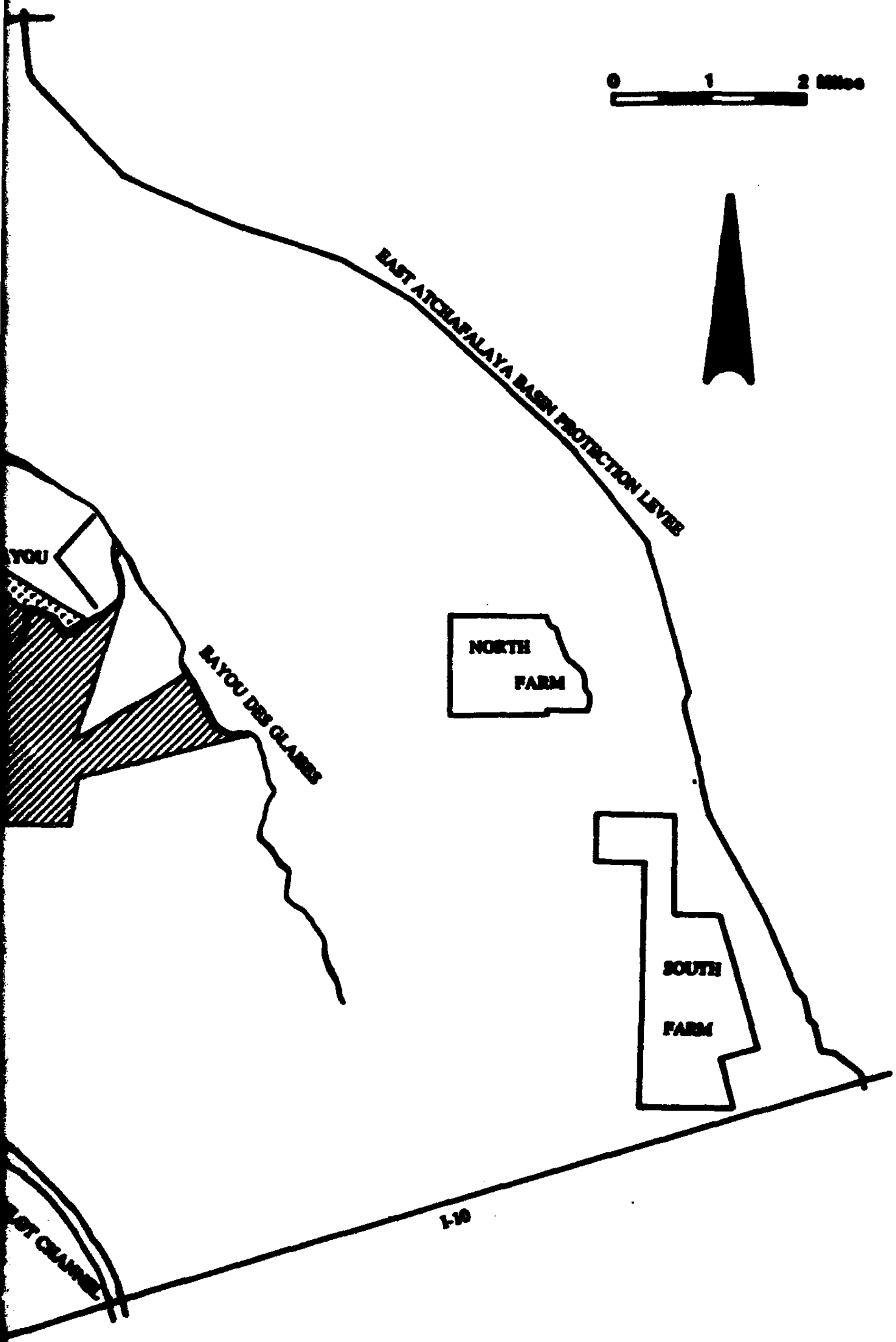


Figure 14. Antebellum improvements in t
conveyances.



rovements in the larger study area documented from

Figure 15. Excerpt from the 1859 Sarony, M
study area (no scale available).

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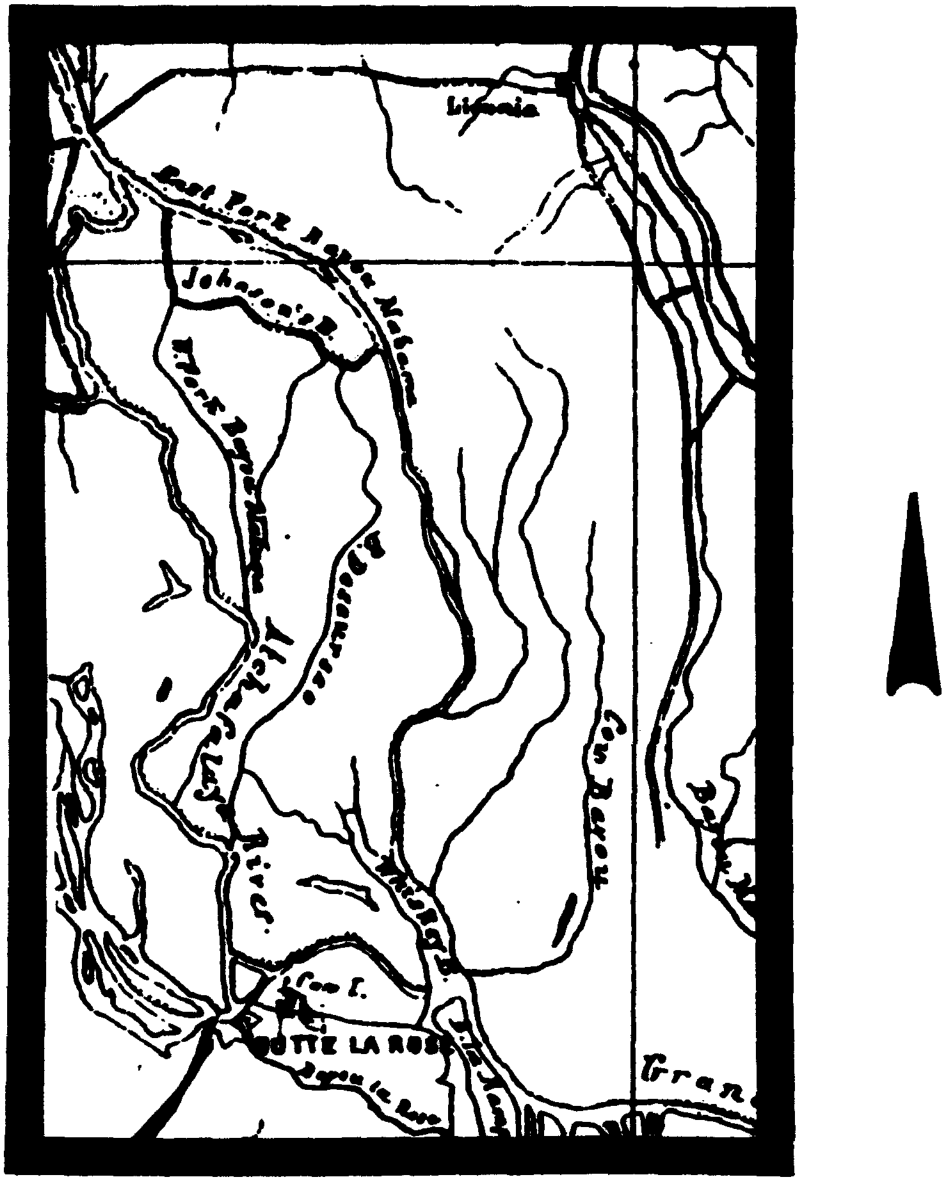


Figure 16. Excerpt from Abbott's 1863 map showing the larger study area (no scale available).

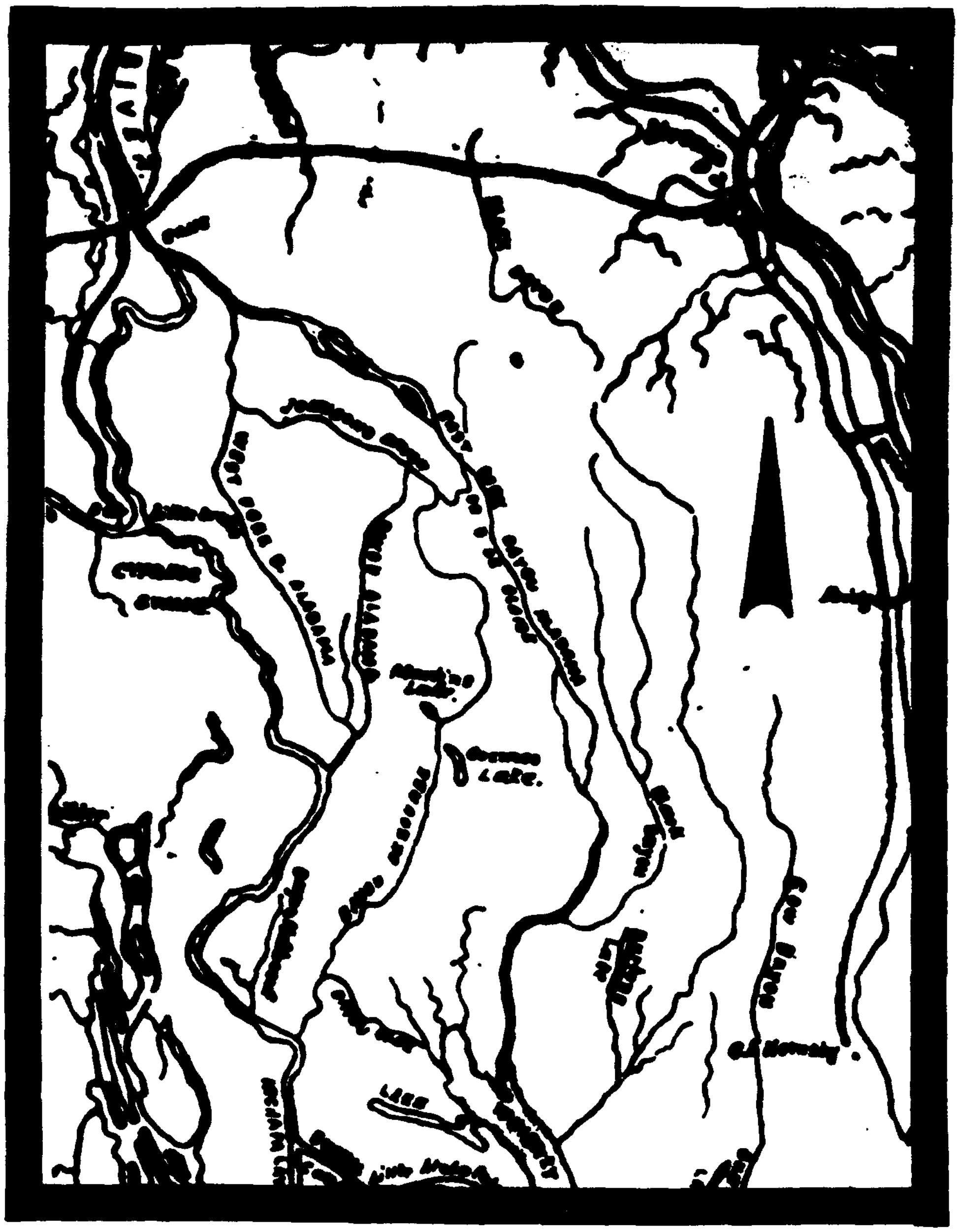


Figure 17. Excerpt from the 1864 Hains and Prevost map showing the larger study area (no scale available).

Reuben Lee, W. Carruth, the public schools, and A.H.C. Carruth on the 1859 Land Ownership map.

Shugg (1939) noted that many Confederate draft-dodgers, deserters, and "hoodlums" sought refuge from authority in lower Louisiana swamps (Shugg 1939:178). Coulon (1888) collected personal reminiscences of Confederate service in the area at the juncture of Pointe Coupee, Iberville, and St. Martin parishes. Confederate troops under the command of a Captain Ratcliffe were located in the area to run the official courier line between New Orleans and Alexandria. These Confederate troops saw no regular action, but ruthless bands of Jayhawkers, "composed of men of the lowest character from the Attakappas" infested the area and interfered with their official functions (Coulon 1888:32).

The Postbellum Period through the Early Twentieth Century

The immediate result of the clearance of the Atchafalaya rafts was a vastly greater flow of water into the basin. The channel was two feet deep at low water at the head of the Atchafalaya in 1845. By 1883, the channel at its head was 122 feet deep (Manning et al. 1987:45). Particularly severe flooding in 1874 may have sounded the death knell for agriculture in much of the basin (Manning et al. 1987:45). The consequences in the basin were the abandonment of fields, mills, gins, barns, and houses, as well as neglect of fences and levees, and the outward migration of population from basin lands (Comeaux 1972:17).

Comeaux (1972) states that in the post-Civil War period, all African-Americans who had been slaves on basin plantations were forced out of the swamp. However, Coulon (1888) documents African-Americans engaging in the unique "swamper" way of life. Mancil (1972:231) also states that a large proportion of swampers during the industrial logging era (1890-1925) were African-Americans. Iberville Parish historian Albert Grace estimated in 1946 that seventy percent of the Iberville Parish swamper population were white, fifteen percent were African-American, and fifteen percent were "redbones", or persons of mixed Native American, African-American, and white descent (Grace 1946:232). This suggests that the historic presence of African-Americans in the Atchafalaya Basin has been under-documented and under-studied.

The Howell Survey Map of the Atchafalaya River (1880) identifies some structures and agricultural lands along the eastern bank. The Atchafalaya has not changed course in the last 100 years as dramatically as the Mississippi and it is possible to extrapolate the approximate location of structures and features on the Howell Map (Figure 18). A structure is shown in Section 16 of T6 S, R7 E. In the adjacent Section 17 was the "Sherman Mill P.O.," suggesting there was contemporaneously a sawmill at this site, or had been one. This locality later became known as East Krotz Springs. At approximately mile 41.5 (Sections 21 and 22 of T6 S, R7 E) was the head of Alabama Bayou. Behind the northwest corner of Alabama Island (later the location of Sherburne) there appears the notation "woods." An "old field" was located about a mile below the head of Alabama Bayou. "Woods" were again noted at approximately mile 45 (opposite the Mouth of Bayou Bigraw) and another building, with "woods" behind it, was another three-quarters of a mile below that. Around mile 46.5 (Sections 10 and 11 of T7 S, R7 E) were two buildings, with the notation "cultivated" behind them. Buildings appeared at approximately miles 47, 47.75, and 51.5 (Sections 22, 23, 26, 27, and 37 of T7 S, R7 E). The mouth of Alabama Bayou was at approximately mile 55.5 (Sections 10, 11, and 12 of T7 S, R7 E). A final building in the study area was shown at about mile 56 (Sections 20 and 21 of T8 S, R7 E). The route of I-10 crosses the Atchafalaya River at approximately mile 59. Notation of "high land" and "old plantation" occurred at mile 62.25, and a "ruin of sugar house" was located near mile 63. Butte LaRose was (and is) at approximately mile 65.

In 1888, George Coulon, a journalist, provided a valuable first-hand account of the study area in that period between the demise of commercial agriculture in the basin and the rise of industrial logging after 1890. Traveling down the Atchafalaya in a skiff with a local guide/oarsman, Coulon entered "Alabama," as Alabama Bayou was called by swampers, after some difficulty with driftwood. Between the head of Alabama Bayou and the fork of Alabama Bayou and Little Alabama Bayou, Coulon and his guide encountered a large drift pile:

> Hundreds upon hundreds of dead logs and branches formed a barricade, extending from one bank to the other, as impenetrable to our boat as the walls of the Chinese Empire are to the darts of an archer [Coulon 1888:28].

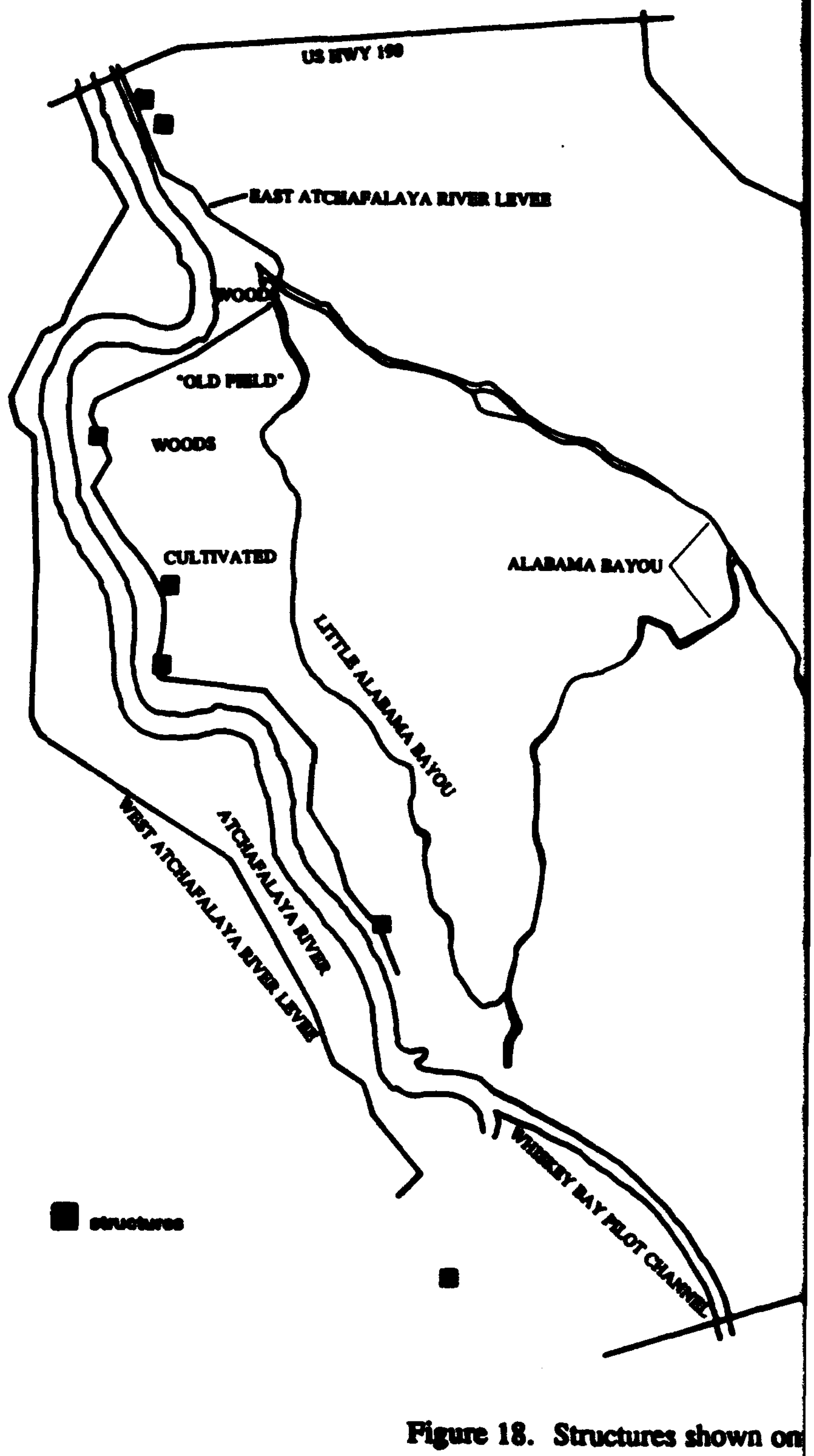
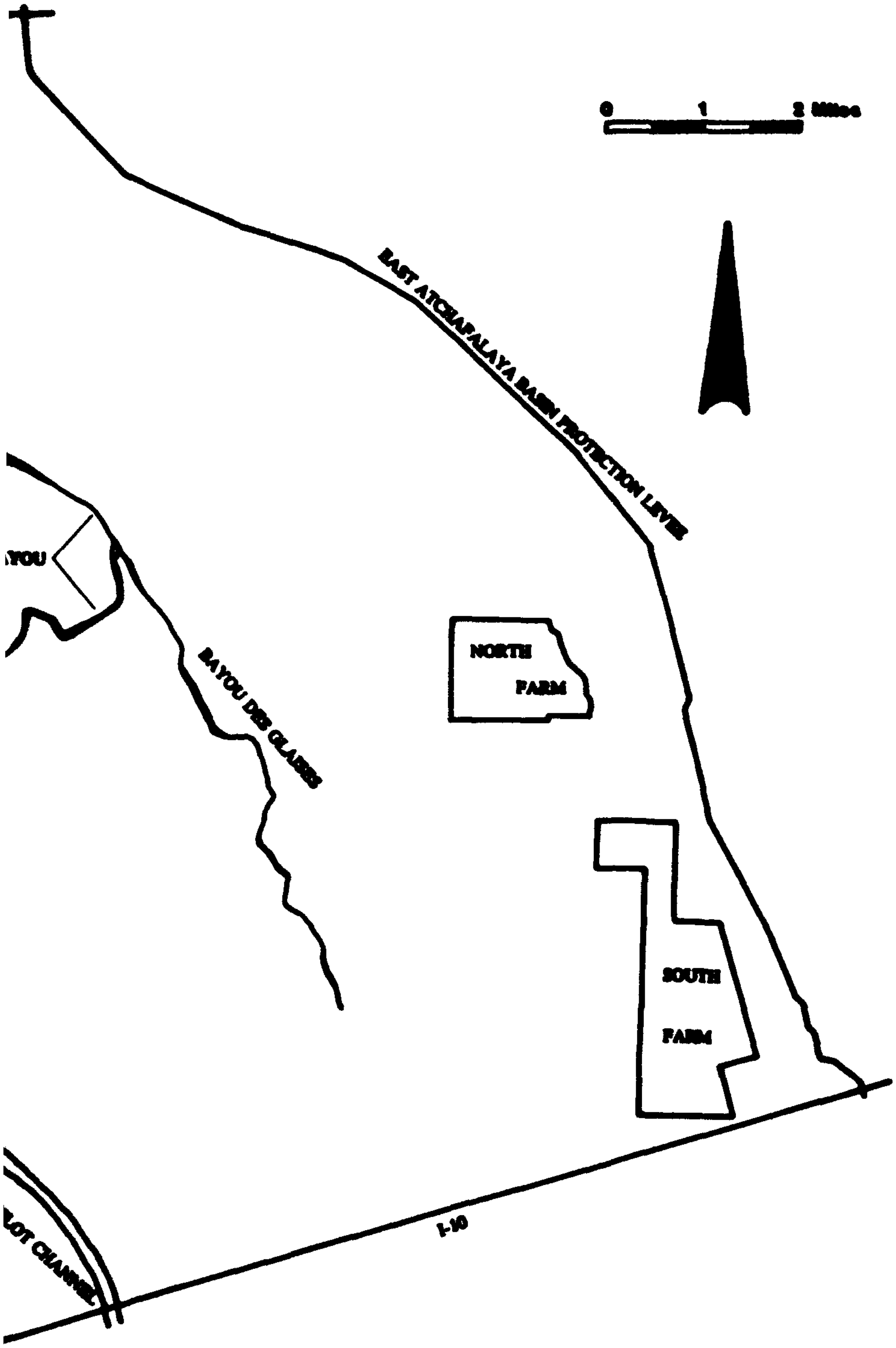


Figure 18. Structures shown on



tures shown on the Howell map (1880).

Despite Coulon's hyperbole he prevailed upon his guide to push through the drift pile with sheer muscle-power. Suggesting that there might be no swamper's shelter below on the main fork of the Alabama, the guide steered the skiff into the Little Alabama, where they soon ran into another drift pile. One-half mile above the St. Martin Pointe Coupee Parish line they passed indications of camp debris. They saw another camp a short distance further on, and the construction of this second camp indicated it was for winter use. Additional drift piles impeded their progress, and finally they were halted by a drift pile with "high vegetable growth upon it." Turning back to the head of Alabama Bayou, Coulon observed a swamper's warehouse about two miles above the fork of Alabama Bayou and Little Alabama Bayou (Coulon 1888:27-31).

The overall impression of conditions in the study area suggested by Howell's (1880) map and reinforced by Coulon (1888) are of general desolation, punctuated by the activities of swampers engaged in preindustrial float logging. Occasionally, floating camps or land structures associated with the swampers were observed by Coulon, but agricultural activities appear to have ceased in the inner portions of the basin by this date. During the interlude between the demise of agriculture and the acceleration of logging, the study area was a quiet place. By 1884, there was a feeling that most accessible cypress had been exploited, but technological developments would open vast new cypress forests to lumbermen beginning about 1890. Coincidentally with the decline of timber resources in the northern United States, new technologies were devised to permit exploitation of swamp cypress. These included the steam-powered skidder in 1883, and more importantly for Louisiana, the pullboat in 1889, and the overhead cableway railroad skidder around 1892. The industrial exploitation of cypress grew suddenly. Forty-five million board feet of cypress were produced in 1879; by 1899, this figure had increased more than five-fold to 248 million board feet. Lumbering peaked at one billion board feet of cypress in 1915. The heyday of cypress lumbering lasted little more than a single generation; by 1925, the major stands of cypress were all depleted (Mancil 1972:76-77, 82-85).

Industrial logging had a number of effects on the landscape and ecosystem of the cypress swamps besides the obvious removal of virgin stands of forest. In areas logged by pullboats, "creeks," "roads," or "trails" were cut if cypress was floated out, and crevasses were cut in natural levees to maintain water levels. Where railroad logging was utilized, spur lines were constructed parallel to main lines at intervals of 1,200 to 1,600 feet; many logging tramways (and logging canals) still existed two decades ago with various environmental effects (Mancil 1972:88, 118, 162). The total environmental impact of lumbering on logged swamp areas is an extremely complex subject and cannot be detailed here.

U.S. Highway 190 is the upper limit of the area utilized for industrial cypress lumbering (Mancil 1972:245), and the study area shared in the heyday of industrial cypress lumbering and its consequences. However, unlike some other localities in the Atchafalaya Basin, the study area evidently did not develop any significant lumber industry-based settlements. Research did produce documentary evidence of logging activity in the study area during the golden age of cypress lumbering (e.g., COB F:#5460, PCP; COB 77:34567, SMP) including, specifically, railroad logging (COB A:#1400, PCP). In addition, aerial photographs of the East and West Protection Levees taken in 1931 reveal railroad logging spurs in the northeast portion of the study area and along Bayou Black in Iberville Parish.

During the period 1890-1925 the study area most likely contained a number of temporary or mobile dormitories and other facilities associated with lumbering, as well as sawmills and other more significant structures. Certainly levees and railway logging spurs were constructed, bayous dredged, canals and ponds cut, and other physical alterations made to the landscape. Unfortunately it is difficult to trace changes of these kinds in the study area as comprehensive documentary evidence is lacking. The physical effects of the cypress lumber industry have been obscured by flooding and deposition as well as subsequent land use. Nor was cypress lumbering the only timber extraction undertaken in the study area; other hardwoods were removed also, presumably after cypress had been exploited (e.g., COB 48:#24661, SMP; COB 32:#246, IP).

The Modern Period

In 1908, the Southern Pacific Railroad Company built a rail line from Lafayette to Baton Rouge that traversed the Atchafalaya Basin along a course parallel to the present route of Interstate 10. With the completion of the railroad, buyers began to purchase fish at the settlement of Atchafalaya, on the eastern bank of the Atchafalaya River where it was crossed by the Southern Pacific tracks. The community grew to about twenty families, and contained its own post office, company stores, school, railway station, and three ice storage facilities for fish. The flood of 1927 caused the railway bridge to be condemned. A ferry operated until 1932, when heavy sedimentation in the region caused the Southern Pacific to remove its tracks. By 1950 most residents had left the town of Atchafalaya, and in 1959 postal service was terminated (Castille 1985:16).

Oil production and processing became Louisiana's major industry during the twentieth century. Before 1925, the petroleum industry had already made an impact on the study area. Oil had been observed in St. Martin Parish as early as 1833, and in 1901, a veritable oil boom was triggered in Louisiana with the discovery of a field near Jennings (French 1986:5-6). In 1937, the Standard Oil Company of Louisiana constructed an oil pipeline from Sunset to Anchorage, Louisiana, crossing the Atchafalaya at Krotz Springs, and running along the route of U.S. Highway 190 (Loos 1959:158). By 1940, test wells had been drilled and extraction begun throughout the Atchafalaya Basin (Manning et al. 1987:48). The Second World War greatly stimulated oil production in Louisiana as well as the enlargement and extension of oil pipelines throughout the study area (Loos 1959:162). The Kenmore Oil and Gas Field had been developed by the time the 1953 Maringouin Quadrangle map was drafted. By 1955, the Krotz Springs Oil Field (known as the Sherburne Oil and Gas Field by 1968) appeared on the Fordoche quadrangle map, and the Happy Town oil field appeared by the time the 1959 Maringouin quad was issued. Inland oil production in south and southwest Louisiana was at its peak in the 1950s and 1960s; onshore drilling was in decline by 1971 as offshore oil extraction became more important (French 1986:8, 34).

The flood of 1927 was particularly severe, and it accelerated outward migration of residents from the Atchafalaya Basin. Most inhabitants of the basin had pursued extractive subsistence activities since the later decades of the nineteenth century (Manning et al. 1987:48), and the construction of the east and west protection levees reinforced the impetus to leave the basin. After the levees were built, virtually all remaining basin residents moved to the communities along the levees or to larger urban centers (Gibson 1982:150).

It is not known if the study area experienced outward migration of a significant number of residents after 1927. However, it is clear that the occupation of most of the study area was very sparse prior to 1927, with the exception of the vicinity of Sherburne.

Henry N. Sherburne (1873-1945) once served as Sheriff of Iberville Parish, and eventually purchased the vast majority of Atchafalaya Basin lands along Alabama Bayou and Little Alabama Bayou in Pointe Coupee Parish. He attempted to develop the eponymous town of Sherburne at the Fork of Alabama Bayou, subdividing and selling some sections, building a railroad spur (visible in 1931 aerial photos) and hotel, and engaging in other developmental efforts. A post office was established at the community of Sherburne in 1925, but the town was unprofitable as an economic venture (Riffel 1983:34). Sherburne's properties became the nucleus for the Sherburne Wildlife Management area, and the town of Sherburne became the locus of extraction facilities in the Sherburne Natural Gas Field.

The town of Sherburne seems to have been centered at what was historically the northwest corner of Alabama Island, where Little Alabama Bayou splits from the main channel of Alabama Bayou, and the adjacent banks of the two bayous. Concentrations of buildings appear on aerial photos and quadrangle maps within Sections 28, 29, 40, and 46 of T6 S, R7 E. Section 46, lying on Alabama Island, was bisected from north to south by the west protection levee. By 1968, a cluster of structures shown in Section 28 were largely vacant. A large building, possibly industrial, was shown with probably associated vacant structures in Section 40. The banks of Alabama Bayou and Little Alabama Bayou still had numerous structures appearing on them on the 1968 Lottie Quad.

CHAPTER 7
LAND USE IN THE LARGER STUDY AREA
by Benjamin Maygarden

Research into land use within the larger study area was conducted. The purpose was to attempt to predict the nature and location of historic archeological resources. Chain of title, as reported in this chapter, was the primary means of collecting the data.

The surveyors of the Atchafalaya Basin used the French pattern of narrow sectional tracts fronting on watercourses for the "swamp lands" along the eastern bank of the Atchafalaya River and for the somewhat higher land along the branches of Alabama Bayou and Bayou des Glaises. Clearly, there was an expectation that settlement and usage along these watercourses would be similar to that on Bayous Teche and Lafourche. The few expanses on the interior of the tracts fronting on watercourses on the western side of the Atchafalaya Basin (in Pointe Coupee and Iberville Parishes) were surveyed in squares or portions of squares.

Today, the St. Martin/Iberville Parish line roughly follows a diagonal course, from the northwest corner to the southeast corner of T7 S, R8 E, approximately parallel to and west of the main branches of Alabama Bayou and Bayou Des Glaises. However, sections in T7 S, R8 E now lying in Iberville Parish are shown on Darby's 1816 map as lying in West Baton Rouge Parish. These were sold by the State of Louisiana as St. Martin Parish lands; conveyances for them were filed in St. Martin Parish through the nineteenth century. Tracts east of the western edge of T7 S, R9 E, including the archeological survey areas (North and South Farms) were surveyed in the regular one-mile square pattern, which extended to the rear of western lines of the tracts fronting on Bayou Maringouin.

The tracts in the larger study area were almost all classified as "swamp lands" when sold by the State of Louisiana. These sales occurred primarily after the beginning of the 1850s. Previous secondary accounts of the Atchafalaya Basin during the antebellum period (e.g., Comeaux 1972:15) have stated that commercial cotton agriculture became characteristic of Alabama Bayou and Bayou Des Glaises prior to the Civil War, and that large tracts of land in the basin were originally patented by wealthy planters and speculators. The latter of these assertions was borne out by an examination of conveyances and other primary sources in the larger study area. Evidence of commercial cotton agriculture was only found to a limited extent. In T6 S, R7 E, within Pointe Coupee Parish, 12 of 19 sections fronting on the Atchafalaya River or on Alabama Bayou were purchased from the State of Louisiana by three vendees. In T6 S, R8 E, 16 of 17 sections fronting on Alabama Bayou were purchased by John Slidell (later a Confederate statesman), who was the single largest purchaser of upper Atchafalaya "swamp lands." In T7 S, R8 E, formerly all in St. Martin Parish, Slidell individually and in partnership with Griffin B. Miller patented at least 45 sections, or more than 1/3 of the total available sections in that township and range. Four individuals or partnerships purchased approximately half of the remaining tracts in T7 S, R8 E. In T7 S, R7 E, two of the partnerships that purchased land in T7 S, R8 E and one other individual patented 34 of 37 available sections.

For the purposes of this study, chain of title for a number of tracts have been examined from the original state land claim to the present. Also, conveyance records and other primary sources have been considered for a larger number of tracts to provide a more generalized perspective on land usage in the upper Atchafalaya. Patterns of conveyance are suggestive of a number of historical conditions in the larger study area, and with other source material, allow characterizations of land usage in the upper Atchafalaya Basin.

Pointe Coupee Parish

The portions of the larger study area lying in Pointe Coupee Parish provide the simplest conveyance records, in terms of tracing ownership. Most of the sections of the Atchafalaya Basin in Pointe Coupee Parish along Alabama Bayou and Little Alabama Bayou were purchased between 1917 and 1927 by Henry N. Sherburne or his corporations. In 1943, Sherburne Industries conveyed 61 sections in Pointe Coupee, Iberville, and St. Martin Parishes to a body of shareholders, Victor J. Kurzweg, et al. These sections, for the most part, were conveyed in parcels traceable to a small number of original patentees.

On April 5, 1854, Cyprien Tremoulet purchased Sections 25 through 31 in T6 S, R7 E from the State of Louisiana (abstract of State Entries, PCP). These sections lay to the north of and fronted on the fork of Alabama Bayou and Little Alabama Bayou. The seven sections totalled 1,118 acres and Tremoulet paid nearly $1.25 per acre for them. This was the standard price for purchases of these "swamp lands" from Louisiana. Tremoulet's heirs sold these seven sections on June 15, 1889, to the partnership of Jacob McWilliams and Edward Shields for only $500.00 (COB 4:#15338, PCP), or 45 cents per acre. Tremoulet's estate was not alone in experiencing plummeting values for their Atchafalaya Basin lands following the Civil War. The clearing of the Atchafalaya River Raft in the 1860s allowed more water to enter the basin annually, significantly increasing the frequency and severity of flooding. Unimproved lands in the basin experienced a serious decline in value, and the loss of capital investments by those who had improved their swamp tracts was even greater.

The succession of Edward Shields conveyed his interest in Sections 25 through 31 on March 1, 1917, to his assignees, Weisinger Hill, Theresa Hill, and Elenora Hill (COB A:#1199, PCP). This conveyance stipulated the surrender of the usufruct of these sections by James E. Dunlap, who may possibly have been attempting to raise crops there. On June 28, 1917, McWilliams and the heirs of Edward Shields sold Sections 25 through 31 to Captain Charles A. Brusle of Iberville Parish for $2,400.00 (COB A:#1494, PCP). Brusle purchased and sold a number of large tracts in the upper Atchafalaya Basin in this period. In the late-nineteenth century and the early portion of the twentieth century, the value of "swamp lands" resuscitated somewhat, partly because technological innovations had made access to and removal of cypress and other trees easier for timber companies. This made unfarmable tracts of land once again attractive to speculators. Brusle owned Sections 25 through 31 for only a week; on July 5, 1917, Brusle sold these sections to the partnership of Charles L. Moon and Henry N. Sherburne for $3,400.00 (COB A:#1495, PCP).

On August 22, 1919, Sherburne and Moon sold Sections 25 through 29 to Eugene H. Barbre (COB C:#3289, PCP); Barbre sold them to the Sherburne Land and Development Company, Inc., on March 25, 1924, for slightly less than $2.00 per acre (COB E:#7715, PCP). On February 23, 1926, Sections 25 through 29 were included in a transfer of property from the Sherburne Land and Development Company to Sherburne Industries, Inc., (COB F:#491, PCP). On March 14, 1927, a railway right-of-way across Sections 21 through 29 was granted by Sherburne Industries to the New Orleans, Texas, and Mexico Railway Co. (COB F:#1887, PCP). On April 10, 1943, Sections 25 through 29 were included in the transfer of the holdings of Sherburne Industries, Inc., in receivership, to Victor J. Kurzweg et al. (COB T:#1122, PCP). The Sherburne Land Company assumed the interest of V.J. Kurzweg et al. in a large number of tracts in Point Coupee and St. Martin Parishes, including Sections 21 through 29, for a consideration of 1,368 shares of stock on December 10, 1974 (COB 119:#193, PCP). On September 13, 1983, Sections 25 through 29 in T6 S, R7 E, were included in a purchase of 10,232 acres by the State of Louisiana Department of Wildlife and Fisheries from Sherburne Land Company, Slaughter Land Company, and George E. Nash, for the sum of $12,279,516.00 (COB 253:#120, PCP).

Sections 21 through 29 in T6 S, R7 E, fronting on the east bank of the Atchafalaya River, were purchased from Louisiana by Thomas G. Davidson on April 5, 1854; Davidson also purchased Sections 37 and 38 in T6 S, R7 E on February 27, 1861 (abstract of State Entries, PCP). Mary E. Daniel patented the southern half of Section 40 and all of Section 41 on February 23, 1853 (abstract of State Entries, PCP). Daniel sold this section and a half to Davidson on April 27, 1854, by which time these tracts evidently contained unidentified improvements (Acts Book 1854 v.2:#3080, PCP). No conveyance could be found listing Davidson as vendor of these tracts. On January 1, 1919, the Atchafalaya Land Company, Ltd., sold Sections 21 through 24, containing 653 acres, to Henry N. Sherburne and Victor J. Kurzweg for $3,266.35 (COB B:#2696, PCP).

Sections 37 and 38 were part of a conveyance of 22.75 total sections in T6 S, R7 E, sold on September 30, 1919, by the O.G. Leach Hardwood Lumber Company to the Louisiana Central Land Company, Inc. (COB F:#5460, PCP). Subsequent conveyance for Sections 37 and 38 could not be located, but on February 25, 1927, the Baist Lumber and Shingle Company, Inc., sold Sections 37 and 38 to Sherburne Industries for $17,000 (COB F:#1695, PCP). At this time there was still timber on these sections, since the Baist Co. reserved the right to cut and remove all of the merchantable timber for a term of five years. Sections 40 and 41 were eventually conveyed with other Sherburne properties to V.J. Kurzweg et al. and then Sherburne Industries. The State of Louisiana purchased Sections 21, 22, 23, 24, 37, 38, 40, and 41 in the September 13, 1983 conveyance previously mentioned (COB 253:#120, PCP).

Sections 39, 42, 43, and 45 through 47 in T6 S, R7 E, were patented in 1853 by J.A. and C.G. McHatton (abstract of State Entries, PCP), a partnership of brothers who also purchased more than half of the swamp land tracts east of the Atchafalaya River in T7 S, R7 E. Sections 39, 42, 43, and 45 through 47 in T6 S, R7 E were located between the Atchafalaya River and Little Alabama Bayou, in an area known as Alabama Island. It may be assume from the conveyance prices that these sections were more desirable as agricultural lands than was typical within the Atchafalaya Basin.

The McHattons undertook an exchange of land with Mary E. Daniel on November 12, 1857 (Acts Book 1859 v.3:#5247, PCP), and on May 7, 1858, sold Sections 39 through 41, 44, 45, and the southern half of Section 43 in T6 S, R7 E, to Robert Perry for $10 per acre (Acts Book 1858 v.3 #5249, PCP). This suggests that these tracts may have already been significantly improved. On December 27, 1858, the succession of Robert Perry sold a total of 1,418 acres on Alabama Island to Mordecai Powell for $27,000.00. Improvements to the land included "a new gin which has just been erected" (Acts Book 1859 v.1:#5469, PCP). This is one of few antebellum conveyance records of the large number examined for the upper Atchafalaya Basin that provides any specific information of substantial improvements, and that affirms the contention that commercial cotton agriculture was being pursued within the basin. It seems likely that prior to construction of the west protection levee it would have been possible to navigate at least portions of Alabama Bayou (and possibly Bayou Des Glaises) by steamboat, a virtual necessity for commercial agriculture before the introduction of railroads to the area. Mordecai Powell sold "all buildings and improvements and fixtures, together with all the cattle, hogs, farming utensils, the oxen, wagons, and carts on said plantation... lying... at the head of Alabama Island, containing 1,418 acres" to Johnny Mills et al. on May 3, 1860, for the consideration of $42,540.00 (Acts Book 1860 v.4:#6478, PCP).

Unfortunately, conveyances for Mills et al. as vendors of Sections 39 through 41, 44, and 45 could not be found. As a result nothing can be said about the use of these tracts until August 22, 1921, when Charles A. Brusle sold these sections to Henry Sherburne for $79.58 (COB D:#5301, PCP). It is possible that the decrease in value of these tracts was related to the frequency of flooding in the Atchafalaya Basin after the clearing of the Atchafalaya River Raft in 1861. It is also possible that most or all of the marketable timber had been removed from these sections by 1921. Conveyance records for Pointe Coupee, Iberville, and St. Martin Parishes all indicate that expanses of the upper Atchafalaya Basin were seized by the State of Louisiana in the early decades of the twentieth century when even large timber companies fell delinquent in paying taxes on swamp tracts, presumably after clear-cutting them.

John Slidell patented Sections 1 through 5 on the east bank of Alabama Bayou on June 7, 1854, and he claimed the small island constituting Section 17 in T6 S, R8 E on January 2, 1855 (abstract of State Entries, PCP). Although it is not clear in the Abstract Book, Slidell evidently patented these tracts jointly with Griffin B. Miller, a planter residing in St. Martin Parish. On June 17, 1857, Slidell and Miller partitioned these tracts in T6 S, R8 E, and Miller received Sections 9 through 15 (COB 2:#13290, PCP). No conveyance listing Miller as vendor of these sections could be located. Sections 1 through 15 in T6 S, R8 E, were included in the conveyance of May 11, 1917, from the Atchafalaya Timber Co. to the O.G. Leach Hardwood Lumber Co. Included in the conveyance were "the logging outfit and equipment, situated in the parish of Pointe Coupee... all rails now being used... all cross ties; all track accessories, such as tools etc. of blacksmith department; all oils and repair material belonging to the logging equipment; all log cars; one log loader; one overhead "Lidgerwood" skidder; all locomotives; all chains; gear harness; water tanks and all other parts and accessories belonging to and forming part and said logging outfit" (COB A:#1400, PCP). The subsequent conveyance history of Sections 1 through 15 in T6 S, R8 E, follows that of Sections 35 through 38 in T7 S, R7 E, as described above. Sections 1 through 15 were included in the 1983 purchase of tracts in T6 S, R7 E, and T6 S, R8 E, by the State of Louisiana (COB 253:#120, PCP).

Among the development schemes of Sherburne and his associate Kurzweg for the town of Sherburne was the construction of the Crystal Ice Products Company, Inc., manufacturing plant in 1926 (COB F:#1149, PCP). The lot sold by Sherburne Industries to the Crystal Ice Products Company (Victor J. Kurzweg, vice-president) was located adjacent to a spur railroad track of the Gulf Coast Railway Co. and the "dehydrating plant of vendor," possibly a lumber-drying facility. Also, beginning in 1929, Sherburne Industries began to issue oil, gas, and mineral leases for their Atchafalaya properties, first to the Humble Oil and Refining Co. of Houston, Texas (COB G:#1158, PCP) and subsequently to Shell Oil and a number of other petroleum concerns (COB I:#2694, #3042; COB J:#164, #408, PCP).

St. Martin Parish

The St. Martin Parish portion of the upper Atchafalaya Basin lying within the larger study area consists of sections in T7 S, R7 E; T7 S, R8 E; and T8 S, R8 E. The basin lands in St. Martin Parish lie to the east of the Atchafalaya River and are topographically lower than lands lying to the west of the river. From the evidence of the Atchafalaya River survey performed by C.N. Howell in 1883, it is evident that the western bank of the Atchafalaya River was more developed at this date than the eastern bank. T7 S, R8 E, is bisected by Alabama Bayou and Bayou Des Glaises, which appear to have been the centers of the short-lived development of commercial agriculture in the upper Atchafalaya Basin in the nineteenth century. Evidence suggests that Alabama Bayou and Bayou Des Glaises were both large enough to be navigable by steamboat at least at some times of the year during the antebellum period. These waterways were likely greatly affected by the clearing of the Atchafalaya River Raft in 1861 and later by the construction of the West Protection Levee. The former increased the flow of water into the Atchafalaya Basin, and the latter greatly reduced it; specifically, Alabama Bayou became sealed off from direct access to the Atchafalaya River.

A small number of planters and speculators initially purchased the vast majority of St. Martin Parish swamp lands from the State of Louisiana, as was the case in Pointe Coupee and Iberville Parishes. Thirty-two of thirty-seven sections of St. Martin in T7 S, R7 E, were patented by four partners or individuals. Ninety-three of the 125 sections in T7 S, R8 E, were purchased by five partnerships or individuals, including John Slidell, who by himself and in partnership with Griffin G. Miller purchased one-third of the available sections from the state. Chain of title for the St. Martin Parish swamp lands is difficult for a number of reasons. In the later decades of the nineteenth century and in the early twentieth century most swamp tracts became virtually worthless, particularly if their "merchantable timber" had been removed. Many sections were seized by the State of Louisiana for tax delinquency and remained unsold for years. Large tracts were repurchased by Louisiana to form the Sherburne

Wildlife Management Area; others were eventually purchased or otherwise acquired by the United States. Also, numerous conveyance documents are missing or damaged in the St. Martin Parish archives, particularly documents concerning the large multi-tract tax seizures and sales by the State of Louisiana. All of these factors make it difficult to trace individual sections utilizing vendor/vendee indices, as the majority of conveyances contain no vendor acquisition information. However, an examination of conveyance documents for tracts in St. Martin Parish does provide information on historic land use in the larger study area, and was undertaken for the major partnerships or individual purchasers that acquired Atchafalaya Basin lands in this Parish.

J. C. Miller and John McKowen together patented a total of six sections in T7 S, R7 E, and twelve sections in T7 S, R8 E. On October 14, 1854 Miller and McKowen purchased Sections 1 through 6 in T7 S, R7 E, fronting on the eastern bank of Little Alabama Bayou; Sections 77 through 84 in T7 S, R8 E, fronting on the main branch of Alabama Bayou; and Lot 2 of Section 123 and all of Section 124 in T7 S, R8 E, which were interior tracts situated between sections fronting on Little Alabama Bayou and Alabama Bayou (Abstract Book 1, SMP). Miller and McKowen paid the standard price of $1.25 per acre for these tracts. One month later, on November 21, 1854, Miller and McKowen purchased from the state of Louisiana additional tracts in T7 S, R8 E, namely Sections 85 and 86 on the eastern bank of Alabama Bayou and the facing Sections 108 and 109 on the western bank (Abstract Book 1, SMP). John C. Miller independently purchased from Griffin B. Miller a one-half interest in Sections 72, 75, and 76 in T7 S, R8 E, also fronting on Alabama Bayou, on May 12, 1858 (COB 27:#3131, SMP). John C. Miller also purchased Sections 73 and 74 in T7 S, R8 E at an unknown date prior to March 9, 1859, when he used these two sections as security on a $4,500.00 loan from Mrs. Marie Oppenheimer (COB 27:#3271, SMP). Mrs. Oppenheimer may have been satisfied with a few hundred acres of swamp as security for a loan of this size if there were unspecified improvements on them. However, this is conjecture.

Miller and McKowen may have partitioned their swamp tracts, and on July 13, 1861, J.C. Miller sold an unspecified tract of swamp land to Robert B. Carmack. This is demonstrated by a subsequent conveyance on July 16, 1861, whereby Miller and McKowen exchanged a number of tracts. McKowen received Sections 77 through 81 in

T7 S, R8 E, in compensation for his interest in the sections sold by Miller (COB 35:#8693, SMP). Apparently John McKowen sold Sections 72 through 81 to William W. Munson on November 14, 1861, because on October 2, 1863, Munson sold these sections to John C. Miller for $5,872.23 (COB 30:#6072, SMP). The size of this consideration suggests that there were improvements of some kind on these tracts.

The precipitous decline in value of these swamp lands following the Civil War is clear from the conveyance records. On June 21, 1869, John McKowen sold his one-half interest in his swamp tracts to William R. McKowen (COB 33:#7334, SMP). Conveyed were lot no. 2 of Section 123; all of Section 124; Sections 82 through 86, and Sections 108 and 109 in T7 S, R8 E; Sections 1 through 6 in T7 S, R7 E; lots no. 1 and no. 8 of Section 62; lots 1, 5, 6, 7, and 8 of Section 63; and Section 65 of T8 S, R8 E. The consideration for this total of 3,704.51 acres was $1,000.00. J.C. Miller and W.R. McKowen, like many other owners of swamp land tracts, failed to pay state taxes during the Reconstruction era. Tax seizures and sales would remain prevalent in the upper Atchafalaya Basin throughout the later-nineteenth and early-twentieth centuries. On November 11, 1871, Sections 75 and 76 in T7 S, R7 E were seized from John C. Miller and sold to Dupuy, Guidry, and Martin for $84.00 (COB 34 1/2:#8222-#8225, SMP).

On September 17, 1873, the state seized most of the swamp property owned by Miller and McKowen. Sections 1 through 6 in T7 S, R7 E, and Sections 77 through 86 and 108 through 110 in T7 S, R8 E, for $313.75 1/2 in delinquent taxes (Mortgage Book V:#8551, SMP). Evidently a subdivision plan had been surveyed, creating 75 lots in these sections, but the intent is unclear. Jerome Taylor purchased these sections, totaling 3,397.52 acres, on April 2, 1881, for a consideration of $25.00 (COB 38:#16360, SMP).

However, Sections 77 through 86 and 108 through 110 in T7 S, R8 E, totaling 1,885 acres were seized from Taylor by the State of Louisiana for tax delinquency and sold to the partnership of John N. Pharr and Frank B. Williams on June 22, 1887, for $51.25 (COB 43:#19053, SMP). Clearly, the swamp lands were almost worthless. Pharr and Williams purchased additional sections adjacent to those listed above, and on March 28, 1892, Pharr sold Williams his one-half interest in Sections 72 through 86 and 106 through 110 in T7 S, R8 E, for an unspecified consideration (COB 47:#23002, SMP). Within two years, Williams sold Sections 73 through 86 in T7 S, R8 E; Joseph Norgess purchased them on December 13, 1894, for $1.00 per acre (COB 48:#24862, SMP). Norgess operated a timber company, and for a time it owned the South Farm parcel in Iberville Parish, having purchased it in 1901 (COB 34:#11, IP). It is likely that Norgess purchased the St. Martin tracts with the intention of logging them. Sections 73 through 86 in T7 S, R8 E, were seized from Norgess by the State of Louisiana in 1896 for tax delinquency and unsuccessfully placed on sale, assessed at a value of $2,000 (COB 50:#25518, SMP).

Sections 1, 2, and 3, in T7 S, R7 E, were seized from Miller and McKowen by the state on June 18, 1892 (COB 47:#23065, SMP) and sold on March 27, 1893, to Charles Savoie for $31.80 (COB 47:#24285, SMP). Savoie was a planter in St. Martin Parish, and in the 1880s, 1890s, and early-twentieth century, he bought and sold numerous tracts of swamp land in the Atchafalaya Basin. He was a major vendee of swamp lands sold by the heirs of John Slidell. Savoie entered into an agreement with Scott Kelso on March 2, 1887, in which Kelso agreed to

> cut, raft, and float timber out of the swamps of Mr. Charles Savoie....Mr. Kelso is to take in payment for his work, one half of all the timber thus cut, rafted, and floated down to the place where a steam boat can take and tow it... the timber thus floated is to be sold to Mr. Hebert and son, provided said parties pay for that timber the highest market price, and are ready on short notice to come up with a boat to tow said timber. Should they refuse to pay the highest market price or should they delay to come up and tow said timber immediately... Mr. Scott Kelso reserves to himself the right of taking his share of the timber in kind and to dispose of it as he may think proper... [COB 43:#18912, SMP].

Other conveyances with Savoie as vendor will be discussed below.

Although Sections 108 and 109 in T7 S, R8 E, were seized from Miller and McKowen for tax delinquency in 1873, by 1909 these two sections were in the possession of William R. McKowen. On September 28, 1909, McKowen conveyed Section 108 to Robert Martin (COB 67:#34580, SMP), a lawyer and notary public in St. Martin Parish. Martin bought or sold literally hundreds of tracts of land in St. Martin Parish alone in the late nineteenth and early twentieth centuries. Martin received title to Section 108 in lieu of payment for his professional services. Confusingly, on October 1, 1909, McKowen granted to the partnership of George Knight and E. Davis "the right to cut and float all timber that may be on Sections 108 and 109 of T7 S, R8 E for a term of three years" (COB 71:#34567, SMP). Knight and Davis were to pay a flat rate of $1.00 per acre, or $360.00, for the timber rights. The conveyance stipulates that Martin, as "agent" for McKowen, was to receive one-half of the price received for the sale of the timber.

William R. McKowen's real properties in East Feliciana Parish, East Baton Rouge Parish, West Feliciana Parish, St. Martin Parish, and St. Paul, Minnesota, were conveyed to his heirs by his succession on September 17, 1912 (COB 75:#36548, SMP). In a partition of McKowen's estate among his daughters on November 11, 1919, May McKowen Taylor received Section 109 in T7 S, R8 E, of 176.8 acres, valued at $200.00 (COB B85:#41697, SMP). Section 109 was divided in the succession of May McKowen Taylor; on January 31, 1981, Williams, Inc., received the northern one-half of Section 109 and John McKowen Taylor et al. received the southern one-half of Section 109 (COB 831:#197072, SMP). Section 109 remains presently divided between these owners; lands of the State of Louisiana lie opposite Section 109 on the west bank of Little Alabama Bayou, and lands of the state and the United States lie opposite Section 109 on the east bank of Alabama Bayou. Section 109 in T7 S, R8 E, has a more complete chain of title than can be recovered for many other tracts.

Griffin B. Miller, a planter of Pointe Coupee Parish, purchased Section 51 in T7 S, R8 E, fronting on both Alabama Bayou and Bayou Johnson, from William Henry Thorne on January 8, 1856. Surprisingly, included in the conveyance was "the sawmill which is situated on that... land, and the moveables, stock, hogs, and logs belonging to said Mill. The lumber on the yard and the machinery and fixtures of steamboat Genny Land are not sold" (COB 23:#1647, SMP). The 178 acres of Section 51, including the sawmill, cost Miller $8,850.00. This conveyance is remarkable for specifying the existence of such an establishment on a section in the interior of the basin at this date. Large tracts of swamp land were still being patented in St. Martin Parish as late as July 1858. In general, few nineteenth century conveyances reflect any improvements in these swamp lands at all, with the exception of the area around upper Alabama Bayou. Due to the limitations of cypress lumbering prior to the invention of the pullboat (Chapter 6), it is unlikely that the mill on Section 51 was able to operate year-round. The presence of a steamboat at this section on Alabama Bayou affirms that steamboats could navigate at least some reaches of the interior watercourses of the Atchafalaya Basin at this date, a necessity for the development of commercial scale cotton agriculture.

One day after purchasing Section 51 and the sawmill, Griffin B. Miller purchased Section 52 from its original patentee, Lewis Harvey, on January 9, 1856, for $800 (COB 23:#1645, SMP). Since this price was considerably higher than was typical for unimproved swamp land, it is possible that Section 52 was also improved. Miller had patented a large number of tracts in St. Martin and Iberville Parishes jointly with John Slidell. On June 20, 1857, Miller and Slidell received Sections 9 through 15 of T6 S, R8 E (in Pointe Coupee Parish); Sections 36 through 43, 56 through 58, and 100 through 105 in T7 S, R8 E; lots 1 through 4 of Section 29, and lots 1 through 7 of Section 30 in T7 S, R8 E (COB 43:#19083, SMP).

As mentioned previously, Griffin B. Miller sold a one-half interest in Sections 72, 75, and 76 in T7 S, R8 E, totaling 480 acres to John C. Miller on May 12, 1858, for $600.00 (COB 27:#3131, SMP). Griffin Miller evidently died in late 1860, since on January 4, 1861, his estate sold Sections 56 through 58 to the partnership of Warren and Patrick Sullivan and Section 51 to Lewis Harvey (COB 28:#4275, SMP). Sections 56 through 58, with no specified improvements and containing 489 acres, was sold for a consideration of $4,890.00. Section 51 included "the sawmill and all other improvements thereon, excepting the gin and stand, the cotton press, the corn mill and all the sawed lumber in the yard," and was conveyed to Harvey for $6,000.00, surprisingly some $2,850.00 less than Miller had purchased it for in 1856. Unfortunately, no conveyance could be located with Harvey as vendor of Section 51, and therefore, the fate of this cotton plantation and lumbering operation is unknown. The tract may have been seized by the state from Harvey on August 22, 1896 (COB 50:#25518, SMP), or March 27, 1900 (COB 53:#27460, SMP) but the relevant pages are missing from both of these multi-tract tax seizure documents. Sections 51 and 52 were included in a sale to Charles Savoie on September 29, 1906, as discussed below (COB 65:#32769, SMP).

Another major original purchaser from the State of Louisiana was James Denegre, who patented tracts in T7 S, R8 E, in March 1854, December 1855, January 1856, and July 1858; in T8 S, R8 E, in December 1855; and T7 S, R7 E, in July 1858, totaling at least 32 sections (Abstract Book 1, SMP). Denegre formed a partnership with Andrew J. Powell, but on August 26, 1873, the State of Louisiana seized Sections 3 through 9 and 87 through 92 in T7 S, R8 E, and portions of Sections 31 and 32 in T8 S, R8 E, totaling 2,914.73 acres (Mortgage Book V:#770, SMP). On April 5, 1881, Denegre sold Sections 122 and 125 in T7 S, R8 E, totaling 1137.41 acres, to Romain Francez and Jean Girac for $20.00 (COB 38 1/2:#16463, SMP). Denegre apparently had other business dealings with Francez and Girac. Dickinson's 1883 map shows Francez and Girac claiming a number of sections of Estate James Denegre and Estate Denegre and Powell in T7 S, R7 E, and T7 S, R8 E, as well as owning a number of other sections on their own. This made Francez and Girac the largest landholders in these townships and ranges at this time. Whatever the nature of Francez and Girac's dealings with Denegre, a suit was brought by Denegre's heirs against the partnership, and by court decision of August 27, 1883 the tax seizure of August 26, 1873 was cancelled (Mortgage Book V:#770, SMP). On November 30, 1881, the heirs of James Denegre had sold 17 sections and 5 partial sections in T7 S, R7 E; T7 S, R8 E; and T7 S, R8 E, to Walter D. Denegre of New Orleans for $1,000.00 (COB 157:#64835, SMP). These tracts, fronting on Little Alabama Bayou, Alabama Bayou, and Bayou Des Glaises, seem to have shared in the prevalent decline in value characterizing most of the upper Atchafalaya Basin swamp lands in the decades after the Civil War.

Francez and Girac had evidently purchased Sections 100 through 105 in T7 S, R8 E, from Griffin B. Miller; on January 22, 1886, they sold these sections, with Sections 111, 115, and 116 in T7 S, R8 E, to the partnership of Milmo and Stokoe (COB 42:#18413, SMP). Milmo, Stokoe, and Co. were a lumber concern, and had most of these sections seized from them by the state on July 11, 1887 (COB 43:#19086, SMP). Milmo, Stokoe, and Co. still appeared in conveyances in St. Martin Parish as late as 1965.

As has been mentioned, John Slidell bought from Louisiana swamp tracts throughout the upper Atchafalaya Basin in January 1854, June 1854, and May 1858 (Abstract Book 1, SMP). After partitioning his St. Martin Parish tracts with Griffin B. Miller on June 20, 1857 (COB

43:#19083, SMP), Slidell seems to have kept most of his tracts in his possession, unimproved, until 1865, when he began to sell off tracts. After Slidell's death in 1871, tax sales began on the property of his estate, continuing until 1891. His heirs sold numerous tracts to other parties from 1887 to 1915. Charles Savoie was a vendee from Alfred Slidell et al. (heirs from John Slidell) on a number of occasions. Among them was the May 8, 1889, purchase of Sections 112 through 114 in T7 S, R8 E, for 50 cents per acre (COB 44:#19913, SMP). Savoie bought tracts, for a time, with relative frequency; on June 3, 1889, he purchased lots 1 through 5 of Sections 106 and 107 in T7 S, R8 E, containing 212-1/2 acres, at a tax sale of the property of Edward Simon, for $30.49 1/2 (COB 45:#20057, SMP). In March 1893 Savoie purchased Sections 1-3 of T7 S, R7 E, seized from Miller and McKowen (COB 47:#24285). On August 1, 1904, Savoie purchased lots 73 and 74 in T7 S, R8 E, from the South Louisiana Land Co. on terms of "friendship and $50.00" (COB 71:#34334, SMP).

Three years previous to this sale to Savoie, the South Louisiana Land Co., Ltd., had sold to Schwing Lumber and Shingle Co. "all of the merchantable cypress timber contained on the lands owned by the South Louisiana Land Co. in the Parishes of Iberville, St. Martin, and Iberia...". Payment of $1.50 per thousand feet of lumber or per 10,000 shingles was to be made to the South Louisiana Land Co., with 15% of earnings to be set aside for taxes, and for a ten-year term (COB 12:#28606, SMP).

Savoie continued to buy a large number of tracts in the first decade of the twentieth century. In partnership with Charley Miller, Savoie purchased Sections 46, 47, 51, and 52 in T7 S, R8 E, on September 29, 1906, for $166.17 (COB 65:#32769, SMP). Sections 51 and 52, scene of a cotton plantation and sawmill in the antebellum period, had experienced devaluation typical of other swamp tracts. Savoie purchased Sections 93 and 94 of T7 S, R8 E at a tax sale on October 29, 1906, for $82.57 (COB 68:#33192, SMP). Savoie and Miller partitioned their joint property on August 29, 1908. Miller received Sections 51 and 46 and Savoie received Sections 52 and 47 in T7 S, R8 E (COB 70:#33703, SMP). On September 4, 1909 Savoie bought Sections 53 and 72 in T7 S, R8 E, from lawyer/speculator Robert Martin (COB 67:#34525, SMP), giving Savoie a consolidated holding in the vicinity of the confluence of Alabama Bayou and Bayou Des Glaises. The reversal of Savoie's fortunes had begun when Sections 72, 73, and 74 in T7 S, R8 E, were seized by the State of Louisiana for tax delinquency on May 28, 1910 (COB 67:#35097, #35098, SMP). Although Savoie had bought these tracts at prices ranging from approximately 15 cents to 20 cents per acre, they were assessed at a standard rate of about $1.00 per acre by the state for tax purposes. It appears that these swamp lands, if unimproved and previously logged, were simply not worth paying taxes on. However, one month after having the state seize Sections 73 and 74, Savoie on June 18, 1910, sold Section 75 and "that part of Section 73 and 74 lying between Bayou Alabama Bayou des Ours (sic)" in T7 S, R8 E, containing buildings and improvements to Marie Johnson for $413.00 (COB 67:#35098, SMP). At the time of his death in 1918, Savoie was able to leave his wife a number of properties in St. Martin Parish, including Sections 1 through 3 in T7 S, R7 E, and Sections 47, 52, and 93 in T7 S, R8 E. In Savoie's succession, these tracts were valued at approximately 28 cents to 46 cents per acre. Unfortunately, conveyances with Savoie's widow as vendor of these tracts could not be located.

Alexander Promewski (T7 S, R8 E) and L.F. Generes and the partnership of J. and C. McHatton (T7 S, R7 E and T7 S, R8 E) were original purchases from Louisiana of substantial portions of lands in the upper Atchafalaya Basin (Abstract Book 1, SMP). Promewski purchased tracts bisected by Bayou Burron on the western side of T7 S, R8 E, in May 1858, but no conveyances with him as vendor could be found. Neither could conveyances be located for L. F. Generes as vendor of the four sections fronting on the east bank of the Atchafalaya in St. Martin Parish that he purchased from the state.

J. and C. McHatton patented twenty sections in the northwest corner of St. Martin Parish lying between the Atchafalaya River and Little Alabama Bayou in T7 S, R7 E, and T7 S, R8 E, during 1852, 1853, and 1854 (Abstract Book 1, SMP). The McHattons may have held their swamp tracts longer than any original purchases in the upper Atchafalaya Basin. On September 29, 1891, the McHattons deeded in trust Sections 20 through 24 in T7 S, R8 E, Sections 33 through 37, Sections 18 through 20, the lower part of Section 11, and Sections 12, 15, and 17 in T7 S, R7 E, to Thomas P. Martin for the Merchants National Bank of Fort Worth (COB 46:#22768, SMP). The Merchants National Bank of Ft. Worth, as trustee, sold "all the merchantable cypress timber... also all merchantable ash, cottonwood, and gum" on Sections 11, 12, 15, 17 through 25, and 32 through 37 in T7 S, R7 E, to the partnership of E.B. McCorkle and E. Joffrion on

January 30, 1893 (COB 48:#24661, SMP). McCorkle and Joffrion were to pay "$1.00 per thousand feet one-inch board measure of cypress," to pay the market price of non-cypress timber, and to report promptly to the bank when the timber was floated. On April 8, 1893, the Merchants National Bank bought a one-half interest in the McHatton tracts for $770.00 cash, "2/3 of appraised value" (COB 47:#24239, SMP); the Bank bought the remaining one-half interest in the McHatton tracts on July 6, 1893 (1,516.05 acres) for $83.60 (COB 47:#24345, SMP).

Sections 9 and 10 in T7 S, R7 E, had been purchased by the McHattons from the State of Louisiana but were excepted from the sales to the Merchants National Bank of Ft. Worth. On July 1, 1893, Sections 9 and 10 were seized by the state but were at least temporarily unsold (COB 47:#24334, SMP). On August 22, 1896 (with logging presumably over), at least some portion of the Merchants National Bank properties in the St. Martin Parish were seized by the state; the relevant folio of the original seizure and sale document is missing (COB 50:#25518, SMP) and the subsequent disposition of the McHatton tracts was not pursued.

North And South Farms

The parcels comprising the field survey area lie in six sections, five of them in T7 S, R9 E, and one in T8 S, R9 E. The "North Farm" consists of all of Section 100 and the portion of Section 99 west of Dixie Bayou in T7 S, R9 E. The "South Farm" consists of two complete sections, Section 65 in T8 S, R9 E, and Section 113 in T7 S, R9 E, and portions of two sections, the northeast quarter of Section 107 and the western one-half of the western one-half of Section 106 in T7 S, R9 E. Figures 19 and 20 are schematic illustrations of land ownership as discussed below.

All of the sections and partial sections making up the South Farm tract were originally "swamp lands" purchased from Louisiana by James Denegre. The three western portions of Section 106, the northeast quarter of Section 107, and all of Section 113 were patented by Denegre on June 26, 1852; Section 65 was patented by Denegre on June 17, 1856 (State Land Claims Book, IP).

Denegre was a wealthy planter who purchased large tracts of land throughout the upper Atchafalaya Basin, probably for speculative purposes. Eventually, the swamp tracts adjacent to sections fronting on Bayou

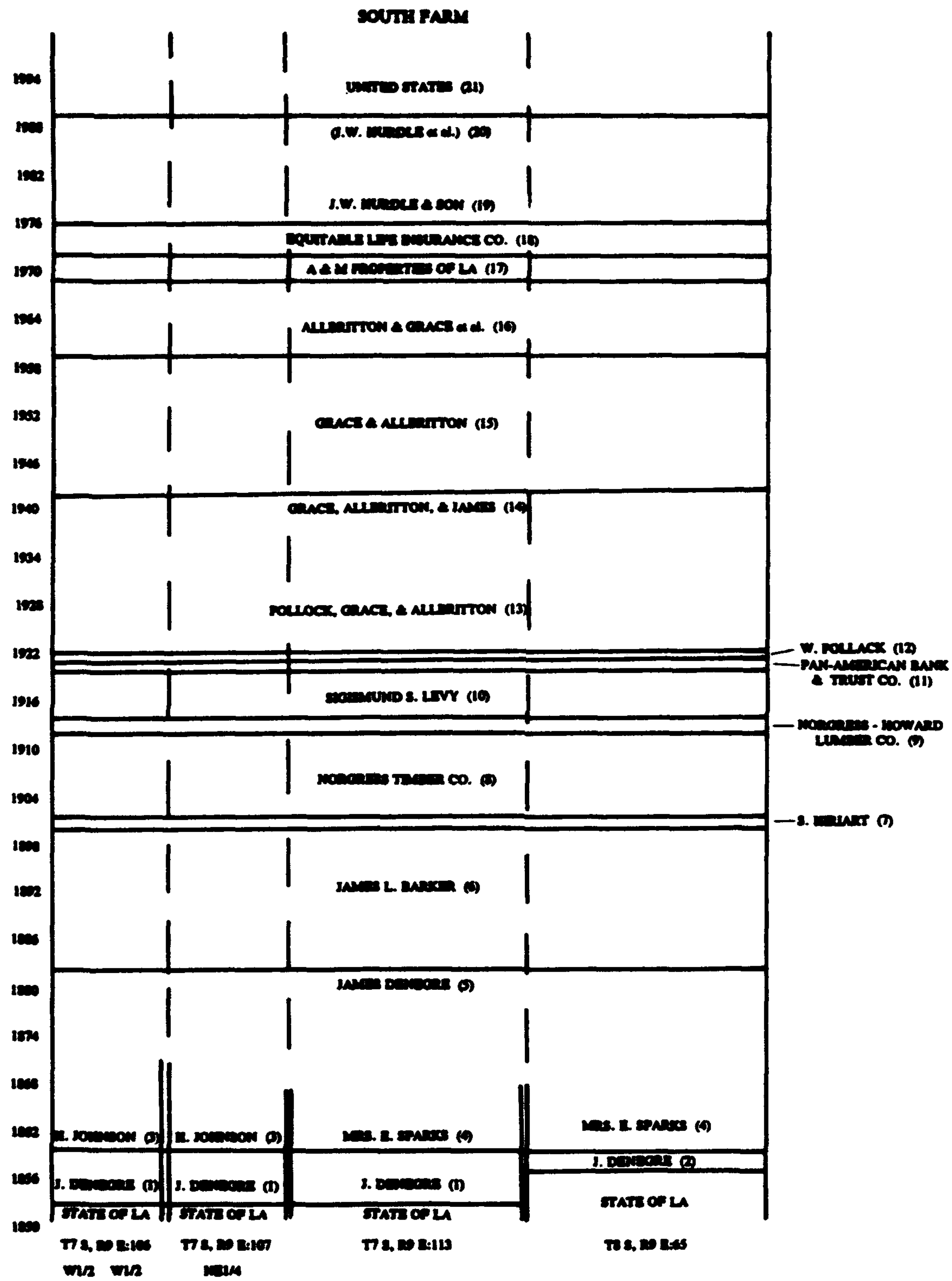


Figure 19. Schematic representation of chain of title for the South Farm.

Key to Figure 19
South Farm

1. Patented by James Denegre on June 26, 1852 (State Land Claims Book, IP).

2. Patented by James Denegre on June 17, 1856 (State Land Claims Book, IP).

3. Purchased by Henry Johnson from James Denegre on March 15, 1859 (COB 7:#329 IP).

4. Purchased by Mrs. Emily Sparks from James Denegre on December 6, 1859 (COB 7:#328 IP).

5. Acquired by James Denegre prior to May 21, 1881.

6. Purchased by James L. Barker from James Denegre on May 21, 1881 (COB 15:#156 IP).

7. Purchased by S. Hiriart from James L. Barker on May 29, 1899 (COB 31:#35 IP).

8. Purchased by the Norgress Timber Co. from S. Hiriart on September 27, 1901 (COB 34:#11 IP).

9. Transferred to the Norgress-Howard Lumber Cc. from the Norgress Timber Co. on June 17, 1911 (COB 41:#304 IP).

10. Purchased at sheriff's sale by Sigismund S. Levy on July 5, 1913 (COB 42:#117 IP).

11. Purchased at sheriff's sale by the Pan American Bark & Trust Co. on November 29, 1919 (COB 45:#314 IP).

12. Purchased by W.M. Pollock from the Pan American Bank & Trust Co. on April 16, 1920 (COB 45:#678 IP).

13. One-third interest purchased by Alvin R. Albritton from W.M. Pollock and Frederick J. Grace on May 4, 1921 (COB 46:#681 IP).

14. One-third interest purchased by N.B. James from W.M. Pollock prior to September 25, 1942.

15. One-third interest purchased by Alvin R. Albritton from N.B. James on September 25, 1942 (COB 73:#436 IP).

16. Two-thirds interest acquired by William Lewis Albritton et al. in succession of Alvin R. Albritton on October 20, 1959 (COB 150:#182).

17. Purchased by A & M Properties of Louisiana, Inc., from William L. Albritton et al. and heirs Frederick J. Grace on December 29, 1969 (COB 186:#186 IP).

18. Purchased at sheriff's sale by the Equitable Life Insurance Co. of Iowa on August 9, 1972 (COB 196:#171 IP).

19. Purchased by J.W. Hurdle & Son, Inc., from the Equitable Life Insurance Co. on April 1, 1976 (COB 241:#61 IP).

20. Transferred to J.W. Hurdle et al. from J.W. Hurdle & Son, Inc., on April 4, 1990 (COB 241:#61 IP).

21. Purchased by the United States from J.W. Hurdle et al. on December 18, 1990 (COB 438:#212 IP).

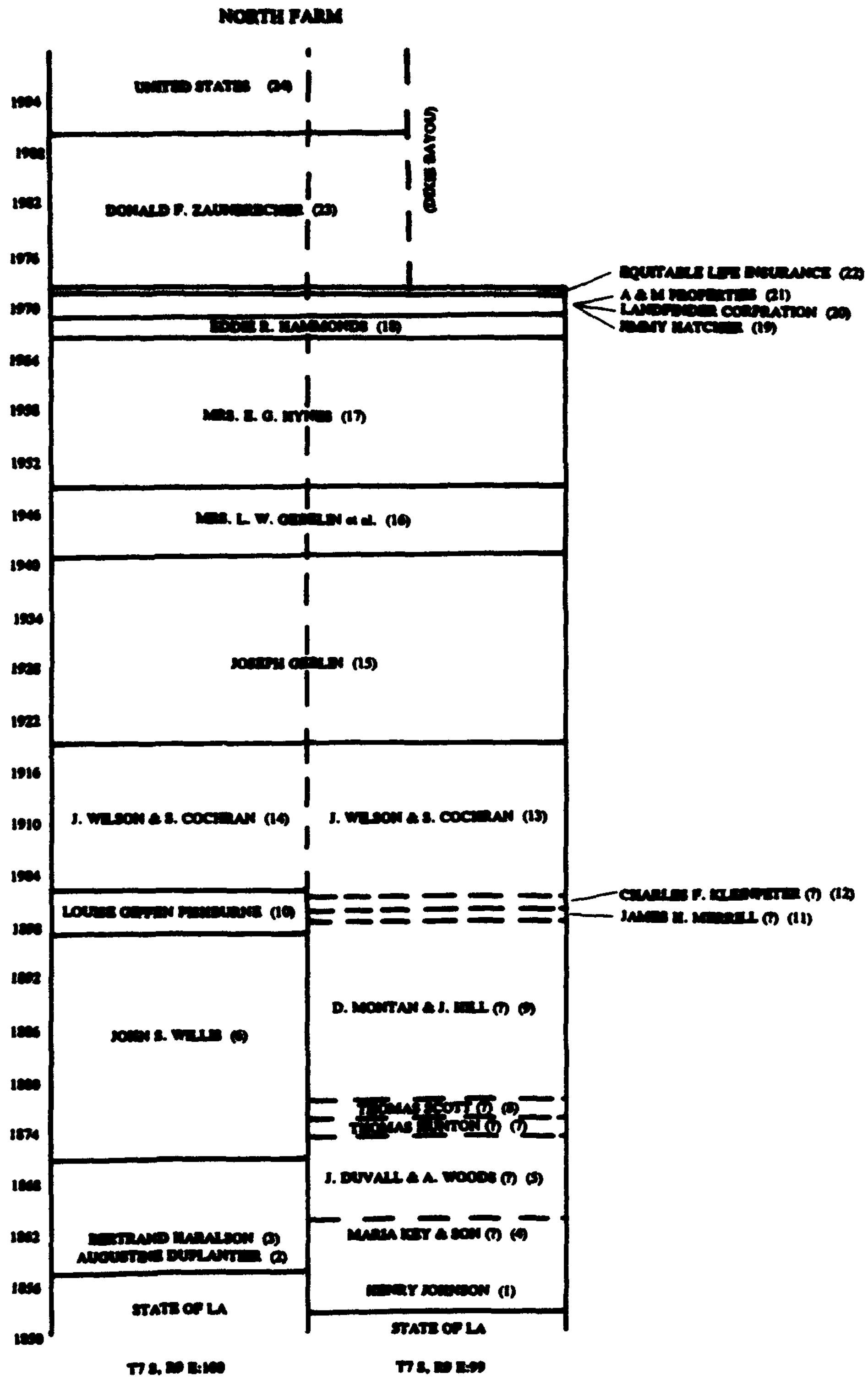


Figure 20. Schematic representation of chain of title for the North Farm.

Key to Figure 20
North Farm

1. Patent by Henry Johnson, June 18, 1852 (State Land Claims Book, IP).

2. Patent by Augustine Duplantier, May 30, 1857 (State Land Claims Book, IP).

3. Purchased by B. Haralson prior to 1859 (Sarony, Major, and Knapp 1859).

4. Possibly purchased by Philip Key or Maria Key & Son prior to 1863.

5. Possibly purchased by James Duvall and Andrew C. Woods from Maria Key & Son on October 3, 1863 (COB 8:#111 and #112 IP).

6. Purchased by John S. Willis from Bertrand Haralson on March 4, 1871 (COB 10:#312 IP).

7. Possibly purchased by Thomas Hunton from estates James Duvall and Andrew C. Woods on June 18, 1873 (COB 12:#59 IP).

8. Possibly purchased by Thomas Scott from Thomas Hunton on January 7, 1875 (COB 12:#204 IP).

9. Possibly purchased by D.C. Montan and John Hill at sheriff's sale on November 30, 1877 (COB 13:#266 IP).

10. Purchased by Miss Louise Giffen from John S. Willis on March 17, 1897 (COB 28:#125 IP).

11. Possibly purchased by James H. Merrill from John Hill and Widow D. Montan on January 10, 1898 (COB 29:#46 IP).

12. Possibly purchased by Charles F. Kleinpeter from James H. Merrill on January 11, 1900 (COB 31:#286 IP).

13. Possibly purchased by J.M. Wilson and Sam D. Cochran from Charles F. Kleinpeter on February 22, 1902 (COB 34:#283 IP).

14. Purchased by J.M. Wilson and Sam D. Cochran from Louise Giffen Fishburne on May 30, 1902 (COB 35:#42 IP).

15. Purchased by Joseph Gebelin from J.M. Wilson and Sam D. Cochran on September 10, 1919 (COB 45:#150 IP).

16. Acquired by Mrs. Lizzie Walsh Gebelin et al. in succession of Joseph Gebelin on December 19, 1941 (COB 80:#332 IP).

17. Acquired by Mrs. Elizabeth Gebelin Hynes in donation from Mrs. Lizzie Walsh Gegelin on August 27, 1949 (COB 94:#306 IP).

18. Purchased by Eddie R. Hammonds from Mrs. Elizabeth G. Hynes on February 14, 1967 (COB 175:#75 IP).

19. Purchased by Jimmy Hatcher from Eddie R. Hammonds on January 31, 1969 (COB 183:#50 IP).

20. Transfered to the Landfinder Corporation from Jimmy Hatcher on May 6, 1969 (COB 184:#209 IP).

21. Purchased by A & M Properties, Inc., from Landfinders Corporation on November 18, 1969 (COB 186:#49 IP).

22. Purchased by the Equitable Life Insurance Co. of Iowa from A & M Properties on August 9, 1972 (COB 196:#171).

23. Purchased by Donald L. Zaunbrecher from the Equitable Life Insurance Co. on September 29, 1972 (COB 197:#168 IP).

24. Purchased by the United States from Donald L. Zaunbrecher on April 10, 1990 (COB 432:#144).

Maringouin became associated with the plantations that developed along that bayou. The eastern portion of Section 106, and Section 105 above and adjacent to it, were patented on June 18, 1852, by Henry Johnson of Pointe Coupee, another wealthy planter, who also speculated in these interior swamp lands. Johnson owned a 33 arpent-front sugar plantation on Bayou Maringouin, adjacent to Section 105, which he sold on January 21, 1854, to the partnership of Charles H. Davis and J.A. Duralde, planters from West Baton Rouge Parish (COB 3:#291, IP). However, Davis and Duralde were unable to meet the terms of the sale, and Henry Johnson purchased the plantation and its rear tract at a sheriff's sale on June 8, 1857 (COB 5:#71, IP). However, by March 5, 1859, Duralde, with a partner named Castle, had reassumed the ownership of the plantation adjacent to Section 105, because on that date Johnson sold part of his swamp tracts in Sections 106 and 105 to Mrs. Maria L. Key and Philip B. Key Jr. (COB 6:#103, IP).

Mrs. Key was the widow of Philip B. Key, Sr., who on April 8, 1856, had purchased from William Matthews a sugar plantation of 20 arpents front on Bayou Maringouin consisting of Sections 76, 77, 78, and 79 (COB 4:#207, IP). Eventually, the North Farm tracts became associated with "the Key Place" while the South Farm tracts became associated with the plantation of Duralde and Castle, known as "Maringo Plantation."

On March 15, 1859, James Denegre sold his portion of Section 106 (lots 2 and 3) and the northeast corner of Section 107 to Henry Johnson (COB 7:#329, IP). At this point these "swamp lands" were apparently still valuable as speculative ventures; Johnson paid $1913.64 for the 319 acres sold by Denegre. The proximity of these tracts to operating plantations must have been a significant factor in their market value, since many swamp lands in the northeastern Atchafalaya Basin, even tracts fronting on Bayous Alabama and Bayou Des Glaises, were much less valuable.

Denegre sold his remaining interior tracts in this area, Section 65 in T8 S, R9 E, and Section 113 in T7 S, R9 E, to Mrs. Emily Sparks on December 6, 1859, for $9.00 an acre (COB 7:#328, IP). Sparks was the widow of Austin Woolfolk, a major landowner in Iberville Parish. However, as will be discussed below, these tracts reverted at an unknown date to Denegre.

On October 3, 1863, Maria Key and her son sold the 800 superficial arpent Key Plantation to the partnership of James R. Duvall and Andrew C. Woods for $68,300; on the same day Duvall and Woods also purchased Key's portions of Sections 106 and 105, totaling 1,256 superficial arpents, for a consideration of $46,000 (COB 8:#111, #112, IP). Duvall and Woods were operating the former Woolfolk Plantation adjacent to and below Maringo Plantation (then owned by the partnership of Duralde and Bogan) on Bayou Maringouin.

Duralde and Bogan, operators of Maringo Plantation, clearly suffered a reversal of fortune as a result of the economic disruption caused by the Civil War. On July 3, 1869, Maringo was siezed from the Widow J. Bogan, then sole proprietor, by the Citizen's Bank of Louisiana (COB 9:#355, IP). On May 5, 1870, the Maringo Plantation was purchased by Douglas C. Montan of Baton Rouge (COB 10:#187, IP). In 1877, Montan purchased the Key Plantation, to which the North Farm parcel would eventually become attached.

The South Farm tracts, having reverted to James Denegre, were sold by his heirs to James L. Barker on May 21, 1881 (COB 15:#156, IP). The 2,078 total acres of the tracts were conveyed for a consideration of $1,058.10, demonstrating the decline in swamp tract values since the antebellum period. Barker is shown as the owner of the South Farm tracts on the Dickenson map of 1883 (Figure 21). Barker sold a larger acreage containing the South Farm parcel on May 29, 1899,to S. Hiriart for $1,849.00 (COB 31:#35, IP). Hiriart in turn sold the South Farm tracts plus the 1280 acres of Sections 96 and 97, purchased from Barker, on September 27, 1901, to the Norgress Timber Co. of St. Mary Parish for the sum of $8,000, producing a substantial profit for the vendor (COB 34:#11, IP). This may indicate that the growth of the timber industry in the Atchafalaya Basin may have increased the value of lands that had been devalued because of their poor potential for agriculture.

Joseph Norgress and W.S. Howard were partners in the Norgress-Howard Lumber Co., to which Norgress transferred ownership of the South Farm parcel on June 17, 1911 (COB 41:#304, IP). The conveyance stated that at this time there were buildings and improvements, horses, mules, cattle, hogs, and other stock on either the South Farm parcel or on the other parcels conveyed with this instrument. Norgress received $70,000 in stock for the real estate. However, on July 5, 1913, the sections and partial sections conveyed on June 17, 1911 (including the South Farm Parcel) were sold at a

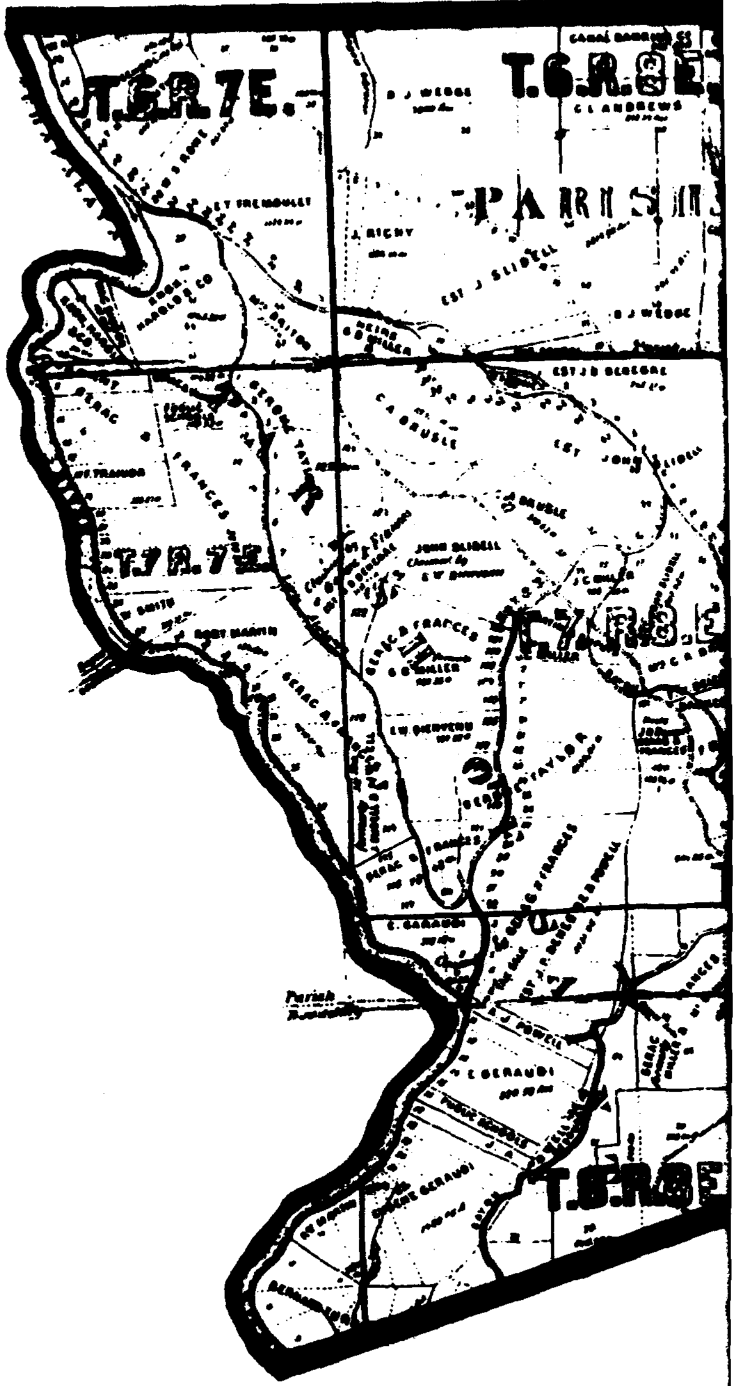
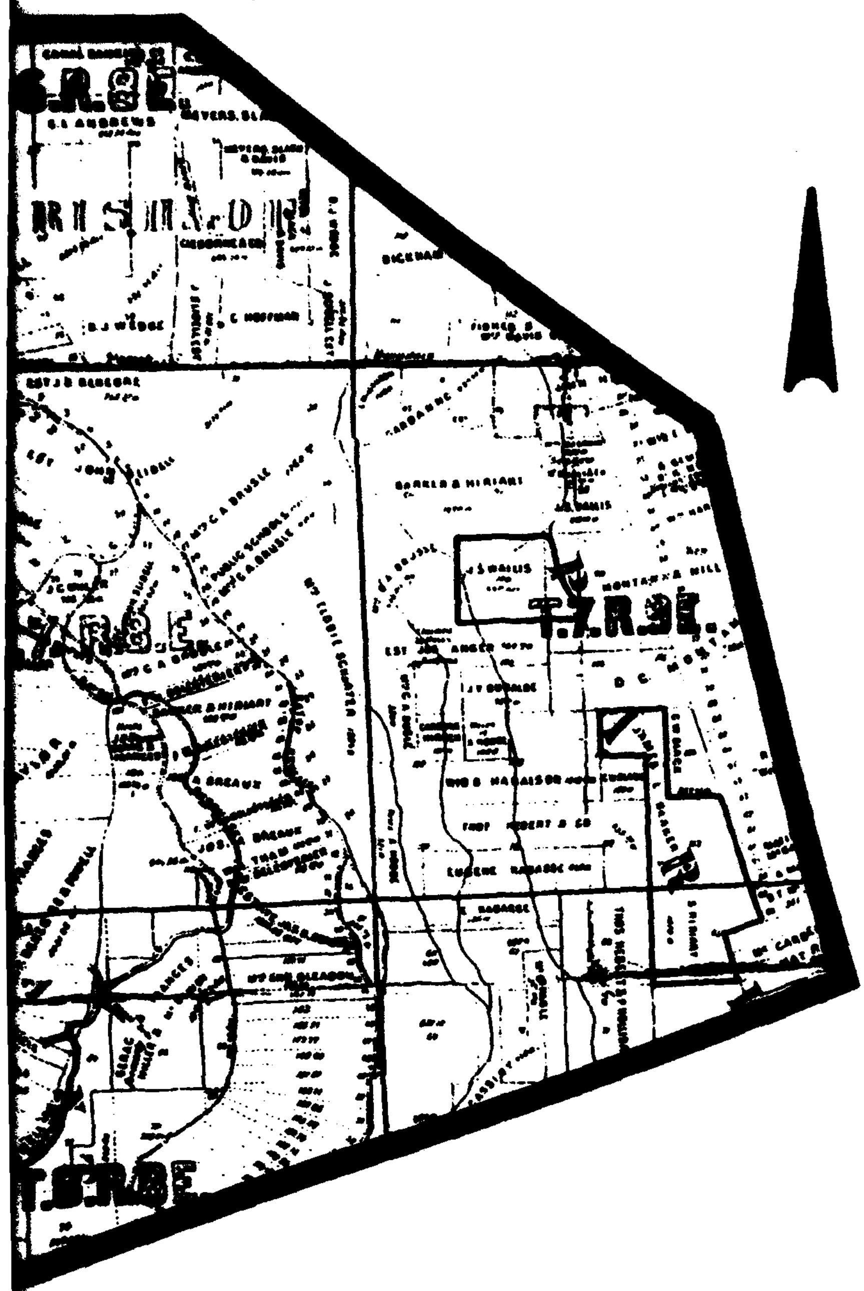


Figure 21. Excerpt from the 1883 Dickins
scale available).



1883 Dickinson map showing the larger study area (no

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sheriff's sale to Sigismund S. Levy for a mere $7,500.00 (COB 42:#117, IP). Significantly, during Norgress' ownership of the South Farm parcel, a one and one-eighth mile long railway right-of-way had been granted to Morgan's Louisiana and Texas Rail Road and Steamship Co., which had a line running from New Orleans to Lafayette. The spur track was located in the southeastern corner of Section 65. It is possible that Norgress and Howard simply lost interest in the tracts once the marketable timber had been removed, since a similar pattern of purchase by lumber companies, followed by seizure for failure to pay taxes, occurred throughout the upper Atchafalaya basin.

The tracts purchased by Levy were sold at a sheriff's sale on November 29, 1919, to the Pan American Bank and Trust Co. for $1,000.00 (COB 45:#314, IP). This was possibly the nadir of prices for these particular swamp lands. The Pan American Bank and Trust Co. managed to sell this same set of tracts on April 16, 1920, to W.M. Pollock for $12,181.20 (COB 45:#678, IP), an inexplicable profit. Pollock and his partner, Frederick J. Grace, sold a one-third interest in the South Farm parcel and other property on May 4, 1921 to Alvin R. Albritton (COB 46:#681, IP).

Aerial photographs of the East Atchafalaya Basin Protection Levee were taken in 1931. They indicate that a road bisected the South Farm parcel diagonally from northeast to southwest through Sections 65 and 113, roughly paralleling the course of Bayou Brown. Along the road and Bayou Brown was an approximately rectangular area of what appears to have been pasture. The spur railroad track built for Morgan's Louisiana & Texas Railroad between 1901 and 1913 is also visible in the southeast corner of the parcel.

Albritton bought another one-third interest in these tracts (apparently what had been the remaining interest of W.M. Pollock) from N.B. James on September 25, 1942 (COB 73:#436, IP). By the time the 1953 Maringouin quadrangle map was drafted, a canal had been cut across Section 113, and in 1956, an oil pipeline was constructed running northwest to southeast through Sections 65 and 113. In the succession of Alvin R. Albritton, the South Farm parcel was conveyed to William Lewis Albritton et al. (the heirs of Alvin R. Albritton) on October 20, 1959 (COB 150:#182, IP).

Aerial photographs taken in 1966 indicate that a pair of well heads had been built in Section 113 by that date. They may have been associated with the Musson Gas Field, which was centered southwest of the town of Musson on the eastern side of the East Atchafalaya Basin Protection levee.

The heirs of Alvin R. Albritton and the heirs of Frederick J. Grace sold the South Farm parcel plus Sections 96 and 97 to A & M Properties of Louisiana, Inc., on December 29, 1969 (COB 186:#186, IP). By this time, A & M properties had become the owners of the North Farm parcel also (see below). In a sheriff's sale, the Equitable Life Insurance Co. of Iowa purchased the South Farm parcel and other property on August 9, 1972 (COB 196:#171, IP). Aerial photographs taken in 1973 show a well pad on the western edge of Section 65 near Bayou Brown, associated with the Klondike Oil Field.

The Equitable Life Insurance Co. of Iowa entered into a lease of real estate with option to purchase for the South Farm parcel on November 27, 1973, with J.W. Hurdle and Son, Inc. (COB 208:#37, IP). The terms of the lease included a provision that Hurdle "shall immediately undertake the development of said property for agricultural purposes, by encircling it with levees to inhibit flooding and the flow of surface waters thereon; by installing pumps and constructing canals for drainage; and... shall clear said property of all trees and underbrush in a manner to adequately prepare property for the cultivation of agricultural crops." The lessee was put under a number of technical stipulations and a time schedule for the performance of the improvements. These agricultural improvements were probably the most dramatic alterations in the South Farm parcel since it was commercially logged. The 1993 Maringouin USGS Quadrangle shows the levees constructed by the Hurdles in Sections 107, 106, 113, and 65.

J.W. Hurdle & Son, Inc., exercised their option to buy the South Farm parcel on April 1, 1976, purchasing it for $257,600.00 from the Equitable Life Insurance Co. (COB 241:#61, IP). On April 4, 1990, the corporation of J.W. Hurdle & Son, Inc., sold the South Farm parcel to J.W. Hurdle, Sr., his wife, and J.W. Hurdle, Jr. (COB 432:#180, IP). Finally, on December 18 of that year, the U.S. District Court issued a Notice of *Lis Pendens* whereby the United States assumed ownership of the South Farm parcel from the Hurdles for $1,255,000.00 (COB 438:#212, IP).

Because of a number of gaps in the chain of title, the ownership history of the North Farm parcel, consisting of Section 100 and the portion of Section 99 west of Dixie Bayou in T7 S, R9 E, is less clear. Henry Johnson claimed all of Section 99 on June 18, 1852, and Augustine Duplantier claimed all of Section 100 on May 30, 1857 (State Land Claims Book, IP). Johnson still owned Section 99 on an 1859 map of property ownership; Section 100 by this date was owned by B. Haralson (Figure 15). No conveyance record could be located for Duplantier as vendor of Section 100. However, on March 4, 1871, Section 100 and other properties were purchased at a mortgage sale by John S. Willis of New Orleans, from Bertrand Haralson (COB 10:#312, IP). Willis sold Section 100 on March 17, 1897, to Miss Louise Giffen (COB 28:#125, IP). Miss Giffen married Randolph E. Fishburne of Chicago, and on May 30, 1902, sold Section 100 and the southern half of Section 98 to the partnership of J.M. Wilson and Sam D. Cochran of Pointe Coupee (COB 35:#42, IP). In February of that year, Wilson and Cochran had become owners of the Key Plantation fronting on Bayou Maringouin, as well as Section 99, part of Section 104, and part of Section 105 (COB 34:#283, IP).

Section 99 and part of Section 105 may have been owned by L. Millaudon prior to 1863, but conveyance records are incomplete. No specific conveyances can be located to indicate how and when title for Section 99 was passed from Henry Johnson, the original claimant, to Wilson and Cochran, who owned Section 99 by 1919. Dickinson's 1883 land ownership map shows J.S. Wallis [sic] as the owner of Section 100, and the partnership of Montan and Hill (see below) as owners of Section 99 (Figure 21). In 1919, Wilson and Cochran sold the Key Plantation, including Section 99 and other property, to Joseph Gebelin (COB 45:#150, IP).

It may be that Section 99 was part of a 1,236 superficial-arpent tract of "swamp lands" that were sold on October 3, 1863, by Maria Key and her son to James Duvall and Andrew C. Woods at the same time that they purchased the Key Plantation lands fronting on Bayou Maringouin for a total price of $114,300.00 (COB 8:#111, #112, IP). This and subsequent conveyances for the Key Place prior to 1919 include a rear land tract, but do not specify the section or sections in which it was located. On June 18, 1873, the Key Place and its adjoining rear tract was purchased by Thomas Hunton of New Orleans at the bankruptcy sale of the estates of Woods and Duvall, for a consideration of $1,800.00 (COB

12:#59, IP), demonstrating the utter collapse of real estate values in this area. Hunton sold the plantation and rear tract to Thomas Scott on January 7, 1875, for $6,000.00 (COB 12:#204, IP). These lands were sold at a sheriff's sale on November 30, 1877, to D.C. Montan and John Hill for $2,000.00, or "two-thirds of appraised value" (COB 13:#266, IP). Hill and Widow Montan sold the plantation and rear tract on January 10, 1898, to James H. Merrill for $6,000.00 (COB 29:#46, IP). Merrill sold the tracts to Charles F. Kleinpeter on January 11, 1900, for $5,000.00 (COB 31:#286, IP). Kleinpeter entered into a contract on July 18 of that year with the firm of McDonald Brothers & Wilson to allow their removal of "all the merchantable cottonwood trees" on the Key Plantation and its rear tract (COB 32:#246, IP).

Wilson and Cochran purchased the Key Place and rear tract from Kleinpeter on February 22, 1902, for $13,101.00 (COB 34:#283, IP). As was mentioned above, Wilson and Cochran purchased Section 100 from Louise G. Fishburne on May 30, 1902; subsequently, Wilson and Cochran sold the Key Place, and additional lands, including Sections 99 and 100, to Joseph Gebelin on September 10, 1919 (COB 45:#150, IP). In this conveyance Wilson and Cochran reserved "all the merchantable timber," allowing three years for its removal.

On December 19, 1941, the succession of Joseph Gebelin conveyed Section 76 (excepting 65 acres), Sections 77, 78, and 79, "Lot 2 and north portion of lot 3 of Section 105," "lot 1 off Section 105," the northern third of Section 104, Section 99, the southern half of Section 98, and Section 100, all in T7 S, R9 E, to Mrs. Lizzie Walsh Gebelin et. al. (COB 80:#332, IP). In August of the following year the heirs of Joseph Gebelin sold "all of the timber" on the Key Plantation to Leonard Edward Dawsey (COB 73:#439, IP). On August 27, 1949, Mrs. Lizzie Walsh Gebelin donated her interest in the Key Plantation properties to her daughter, Mrs. Elizabeth G. Hynes (COB 94:#306, IP). Mrs. Hynes sold the greater part of the Key Plantation, including Sections 99 and 100, to Eddie R. Hammonds on February 14, 1967 (COB 175:#75, IP). Hammonds sold the tracts on January 31, 1969, to Jimmy Hatcher (COB 183:#50, IP); Hatcher was president of the Landfinder Corporation, and he transferred the properties to the corporation on May 6, 1969 (COB 184:#209, IP). In November of the same year, the Key Plantation tracts were sold by Landfinder Corporation to A & M Properties, Inc. (COB 186:#49, IP), who purchased the South Farm parcel from the heirs of Alvin Albritton and the heirs of Frederick Grace in December 1969, as discussed above. The Key Plantation and other properties including the South Farm parcel were transferred to A & M Properties of Louisiana, Inc., on December 26, 1969 (COB 186:#183, IP). The Equitable Life Insurance Co. of Iowa purchased the tracts from A & M Properties of Louisiana on August 9, 1972 (COB 196:#171, IP). A portion of these tracts, namely "in Sections 97, 99, and 100," were sold to Donald L. Zaunbrecher on September 29, 1972 (COB 197:#168, IP). Aerial photos dated 1973 show a well pad in the northwest quarter of Section 100, perhaps associated with the Kenmore Oil and Gas Field. Zaunbrecher sold "tract #26," the North Farm parcel, consisting of Section 100 and the portion of Section 99 west of Dixie Bayou, to the United States on April 10, 1990, for $615,000.00 (COB 432:#144, IP).

CHAPTER 8
FIELD INVESTIGATIONS

Introduction

The initial Scope of Services stipulated pedestrian survey utilizing lane spacing of 20 m and shovel testing intervals of 50 m within the North and South Farms. However, after the required Phase I field visit and consultation with a geomorphologist, it was determined that a different methodology would be needed because the recent deposits of sediment were thicker than previously thought. This was clarified by communications with John Sturgis, Sherburne Wildlife Management Officer, during the initial field visit.

The revised Phase I report suggested using 2-meter auger tests at 100-meter intervals with lane spacing of 100 m in the North Farm. Additional tests at 50-meter intervals were to be excavated along selected distributaries in both the North and South Farms, and some judgmentally placed 2-meter auger tests were to be excavated in the South Farm. This suggestion was accepted by the COR, and field work ensued.

After three weeks of field work, consideration was given to excavation of 4-meter auger tests in selected areas to enhance the probability of finding sites and to provide a better understanding of sedimentation in this part of the Atchafalaya Basin. This consideration was also due, in part, to the inundation of water in the western area of the North Farm (Figure 22) which made augering in most of the area unfeasible. This plan was approved by the COR and field work continued.

North Farm

Division of the North Farm. The North Farm was divided into three areas (Figure 22). Area 1 is the western side of Dixie Bayou. Dixie Bayou's approximate one-mile length here represents the eastern boundary of the parcel. The second area consists of approximately 300 acres of agricultural land which was not planted at the time of survey. This section extends from Dixie Bayou to the north/south access road located approximately 450 to 1100 m to the west. The north/south access road angles to the southeast. The third area consists of the area west of the N/S access road. In this area, field work focused on the course of a relict distributary channel through waterfowl management units and on a secondary off-shoot channel.

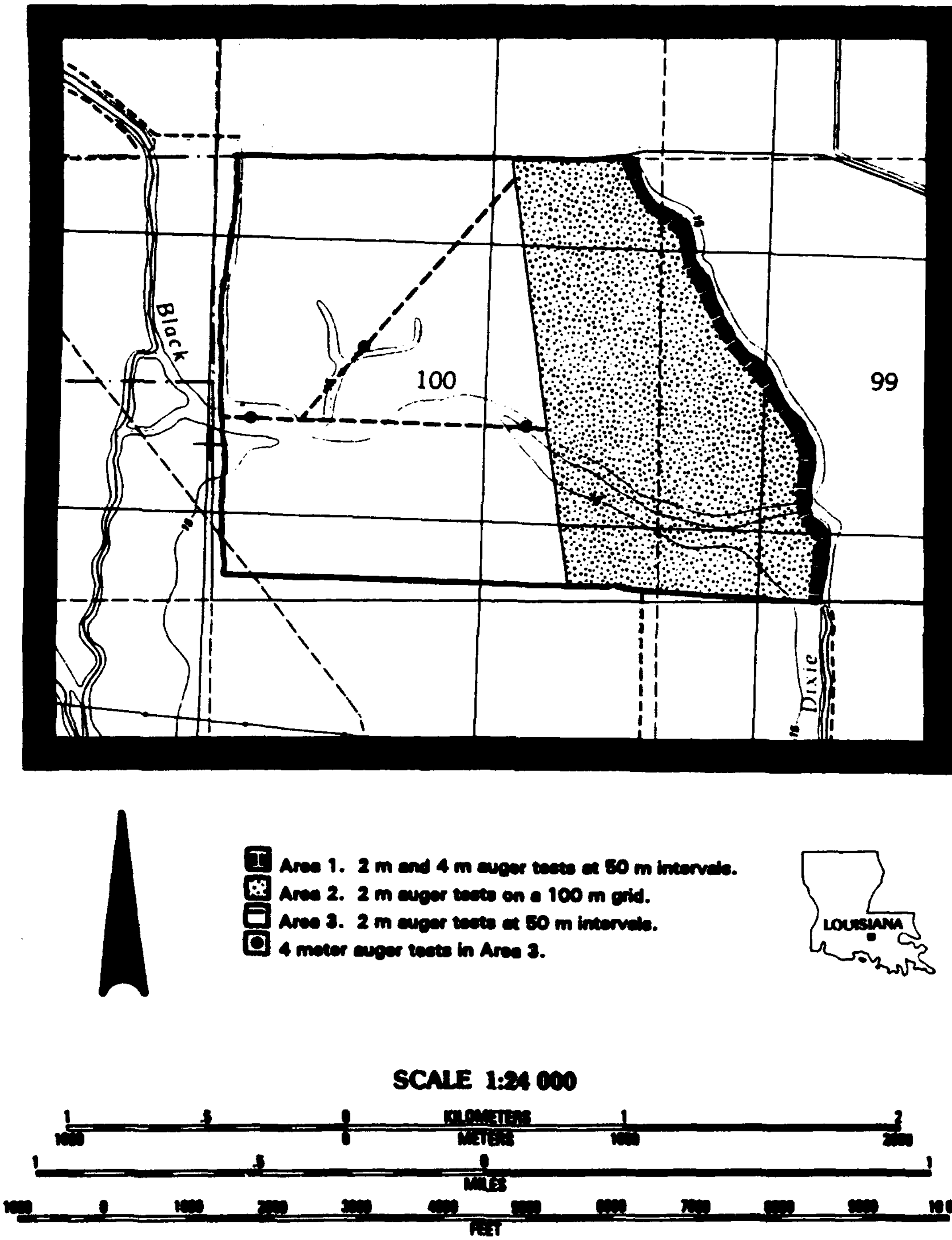

Figure 22. Map of the North Farm showing archeological survey areas.

The extent of the main channel was less than 1300 m, and the extent of the secondary off-shoot channel was less than 800 m.

Dixie Bayou. Field work in the North Farm began with the excavation of auger tests to a depth of 2 m at 50-meter intervals along the west side of Dixie Bayou. The survey team consisted of two groups of two with one person augering and one person screening the dirt through a 1/4-inch-mesh screen. Adjacent to the western edge of the bayou was a natural levee and roadway area which gently sloped eastward towards the water and westward towards the agricultural field. As was noted above, this field was not planted at the time of survey. This natural levee/roadway appears to represent a tractor "turn around" area rather than an actual road. The width of this levee/road is approximately 10 to 15 m with a central apex approximately 50 to 70 cm in height above the field. The auger tests were placed on the crest of the roadway and closer to the bayou in the less elevated area in an alternating fashion. The tests were placed so that the distance from Dixie Bayou varied from 1 to 4 m in the low area and 4 to 10 m in the high area.

The first test was placed approximately 4 m south of the northeast corner of the parcel. A total of 40 tests were excavated at 50-meter intervals. The tests along Dixie Bayou were designated by their number and distance southward from the starting point (e.g., A.T. 1, 00 m S; A.T. 2, 50 m S; A.T. 3, 100 m S; etc.). Between the thirty-ninth and fortieth auger tests, a land bridge had been constructed to redirect the water flow westward 10 to 15 m, then southward 10 to 15 m through culvert pipes for irrigation canals. The water was then directed eastward back to the bayou channel approximately 3 m south of the fortieth auger test, and westward across the entire parcel with a man-made levee on the southern side of the channel. This rerouting of water created a horseshoe- or U-shaped landmass, surrounded by water, in which the fortieth test was placed.

Because brick had been found in the first 75 cm of Auger Test 40, site definition was conducted. Due to the proximity of the redirected waterway, an additional auger test could only be placed 5 m west of the fortieth test. Stratigraphy was recorded for this auger test. No additional tests were excavated because the test was sterile. Auger test results are presented in Table 2.

Table 2. Stratigraphy in Supplemental Auger Test at Brick Scatter in Area 1 of the North Farm.

0-0.4 m	10YR 5/1 (gray) to N4 (dark gray) silt with 7.5YR 4/6 (strong brown) and 10YR 5/3 (brown) mottling; at 0-0.2 m 3 brick fragments (smaller than 1/4")
0.4-0.8 m	10YR 5/3 (brown) silt with 10YR 5/1 (gray), 5B 6/1 (bluish gray), and 7.5YR 4/6 (strong brown) mottling; by 0.7 m 5Y 6/1 (light gray/gray) mottling decreasing
0.8-0.96 m	10YR 5/3 (brown) and 10YR 5/1 (gray) silt with minimal clay content; 7.5YR 4/6 (strong brown) and 5B 6/1 (bluish gray) mottling
0.96-1.47 m	10YR 5/1 (gray) clayey silt with 10YR 5/3 (brown), 7.5YR 4/6 (strong brown), and 5B 6/1 (bluish gray) mottling
1.47-2.04 m	10YR 5/3 (brown) and 5Y 6/1 (light gray/gray) clayey silt with 10YR 5/1 (gray), 7.5YR 4/6 (strong brown), and 7.5YR 5/6 (strong brown) mottling

As was noted above, a second set of auger tests along the western side of Dixie Bayou was excavated, this time to a depth of 4 m. This second set of tests, utilizing 100-meter intervals, was conducted along the less elevated area of the levee/road immediately adjacent to the channel. The surveying team was composed of one 2-person group and one 3-person group, with the third person recording stratigraphy at 20-centimeter intervals. The first 4-meter test was placed 25 m south of the first 2-meter test along Dixie Bayou. This placed the 4-meter auger tests between the alternating 2-meter tests. Paul V. Heinrich, the project geomorphologist, visited the North Farm on the first day of excavation of the 4-meter auger tests to assist in the recording of stratigraphy.

There were a total of 20 4-meter auger tests with stratigraphy recorded for 10 of these. The tests were designated by their number and distance southward from the initial 2-meter test along Dixie Bayou (e.g., A.T. 1, 25 m S; A.T. 2, 125 m S; A.T. 3, 225 m S; etc.). At the request of the geomorphologist, the depth of two soil types, possibly representing back swamp and Red River deposition, were recorded on the other ten tests. Results and stratigraphy are presented in Table 3.

Area 2. Smith et al. (1986) indicated that the entire North Farm Parcel could be characterized as natural levee. Initially, it was planned that 2-meter auger tests would be excavated at 100-meter intervals utilizing 100-meter lane spacing. However, due to the flooding of the western area of the parcel, this plan was executed only in Area 2 as shown in Figure 22. Transect lanes were oriented east-west. At the eastern end of each transect lane, the surveying team would pace 100 m south, and then, using a compass, would turn east to start the return transect lane. Within the transect lanes, the auger tests were placed at 100-meter intervals. The surveying team consisted of two to four groups of two persons each and followed the augering/screening format mentioned above.

There were a total of 18 transect lanes. The first lane was labelled as Transect Lane 00 South and the last lane as Transect Lane 1700 South. A total of 140 auger tests were excavated in this portion of the North Farm parcel (Figure 22). The tests were designated by the transect lane and were assigned a sequential number. For example, within Transect Lane 00 South, tests were designated as: A.T. 1, 100 m W; A.T. 2, 200 m W; A.T. 3, 300 m W.

Table 3. Stratigraphy in 4-meter Auger Tests in Area 1 of the North Farm.

A.T. 1 - South 25 m, West approximately 3 m

0-1.0 m	10YR 5/1 (gray) silt; minimal clay content but it increases with depth; 10YR 5/3 (brown), 10YR 6/3 (pale brown), and 7.5YR 4/6 (strong brown) mottling
1.0-1.95 m	10YR 5/1 (gray) and 10YR 5/3 (brown) silt with increasing clay content; 7.5YR 4/6 (strong brown), 5YR 3/3 (dark reddish brown), and 5B 6/1 (bluish gray) mottling
1.95-2.45 m	5B 6/1 (bluish gray) silty clay with 10YR 5/1 (gray) and 5YR 3/3 (dark reddish brown) mottling
2.45-2.8 m	5B 5/1 (bluish gray) and 5B 4/1 (dark bluish gray) clay (possible backswamp)
2.8-3.15 m	5B 5/1 (bluish gray) clay decreasing to absent at 3.15 m and 5YR 4/3 (reddish brown) to 2.5YR 3/6 (dark red) clay; 2.95-3.15 m 5YR 4/3 (reddish brown) to 5YR 4/4 (reddish brown) clay with 2.5YR 3/6 (dark red) mottling
3.15-4.0 m	5YR 4/4 (reddish brown) solid clay with 2.5YR 3/6 (dark red) mottling; probably represents Red River sediment
end-4.0 m	5B 5/1 (bluish gray) clay

A.T. 2 - 125 m South, approximately 3 m West

0-0.2 m	10YR 4/1 (dark gray) silt with 10YR 4/3 (brown/dark brown) mottling
0.3-1.15 m	10YR 5/1 (gray) silt with 7.5YR 4/6 (strong brown), 10YR 5/3 (brown), and 5B 6/1 (bluish gray) mottling
1.15-1.9 m	10YR 5/1 (gray) and 5B 6/1 (bluish gray) sandy silt with minimal clay content; 10YR 5/3 (brown) mottling

1.9-2.0 m	5B 6/1 (bluish gray) to 5B 5/1 (bluish gray) clayey silt with 10YR 5/1 (gray) very slight mottling
2.0-3.5 m	5B 5/1 (bluish gray) and 5B 4/1 (dark bluish gray) sandy clayey silt to silty clay with 5B 6/1 (bluish gray) slight mottling
3.5 m	Water table: soil could not be removed with auger

A.T. 3 - 225 m South, approximately 2.5 m West

0-1.8 m	10YR 5/1 (gray) to 10YR 5/3 (brown) silt with some clay content; 7.5YR 4/6 (strong brown), 10YR 4/3 (brown/dark brown) and 5B 6/1 (bluish gray) mottling; water at 1.0 m
1.8-2.2 m	5B 6/1 (bluish gray) to 5B 5/1 (bluish gray) clayey silt with 7.5YR 4/6 (strong brown) and 10YR 5/4 (yellowish brown) mottling
2.2-2.4 m	5B 5/1 (bluish gray) and 5B 4/1 (dark bluish gray) silty clay with 2.5YR 4/6 (red) iron oxide mottling
2.4-3.4 m	no record
3.4-3.5 m	5YR 4/4 (reddish brown) clay with 2.5YR 3/6 (dark red) mottling
3.5	Dirt could not be removed

A.T. 4 - 325 m South, approximately 3 m West

0-1.0 m	10YR 5/1 (gray) and 10YR 5/3 (brown) silt to 0.7 m with 7.5YR 4/6 (strong brown) and 5B 6/1 (bluish gray) mottling; at 0.35-0.4 m one brick fragment larger than 1/4" diameter
1.0-2.25 m	5B 6/1 (bluish gray) to 5B 5/1 (bluish gray) clayey silt with 10YR 5/1 (gray), 10YR 5/3 (brown), and 7.5 YR 4/6 (strong brown) mottling; at 1.7 m 5YR 3/3 (dark reddish brown)/2.5Y 2/0 (black) manganese oxidation and 7.5YR 4/6 (strong brown) and 2.5YR 4/6 (red) iron oxidation;
2.25-3.00 m	5B 5/1 (bluish gray) to 5B 6/1 (bluish gray) silty clay with 5YR 3/3 (dark reddish brown) to 2.5Y 2/0 (black) manganese, and 7.5YR 4/6 (strong brown) to 2.5YR 4/6 (red) iron.
3.0-3.25 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) clay
3.25 m	Water table prevented further augering

A.T. 5 - 425 m South, approximately 3 m West

0-0.4 m	10YR 5/1 (gray) silt with 7.5YR 4/6 (strong brown) and 10YR 5/3 (brown) mottling
0.4-1.4 m	10YR 6/1 (light gray/gray) silt with minute sand content; 10YR 5/1 (gray), 10YR 5/3 (brown), and 7.5YR 4/6 (strong brown) mottling; some water at 1.0 m
1.4-2.2 m	5B 6/1 (bluish gray) to 10YR 5/1 (gray) clayey silt intermixed with 7.5YR 4/6 (strong brown) to 2.5YR 4/6 (red) iron oxidation and 5YR 3/3 (dark reddish brown) to 2.5Y 2/0 (black) manganese oxidation; at 1.8 m manganese decreases

2.2-2.6 m	5B 5/1 (bluish gray) clayey silt with 7.5YR 4/6 (strong brown)/2.5YR 4/6 (red) iron oxidation and 5YR 3/3 (dark reddish brown)/2.5Y 2/0 (black) manganese oxidation in very small amounts; at 2.6 m 5B 6/1 (bluish gray) clay slight mottling
2.6-2.8 m	5B 5/1 (bluish gray) silty clay
2.8-3.6 m	Unable to remove soil

A.T. 6 - 525 m South, approximately 5 m West

at 2.5 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) clay

A.T. 7 - 625 m South, approximately 3 m West

0-0.1 m	10YR 5/1 (gray) to 10YR 6/1 (light gray/gray) silt with 7.5YR 4/6 (strong brown), 7.5YR 4/4 (brown/dark brown), and 10YR 4/3 (brown/dark brown) mottling
0.1-0.2 m	10YR 5/1 (gray) and 10YR 4/3 (brown/dark brown) grainy silt with 7.5YR 4/6 (strong brown), 7.5YR 4/4 (brown/dark brown), and 10YR 6/1 (light gray/gray) mottling
0.2-1.4 m	10YR 5/1 (gray) and 10YR 5/3 (brown) and 10YR 5/2 (grayish brown) sandy silt; at 1.1 m 7.5YR 4/6 (strong brown) mottling appears
1.4-1.8 m	10YR 5/1 (gray) silt with very slight clay content
1.8-2.1 m	5B 5/1 (bluish gray) to 5B 6/1 (bluish gray) clayey silt; 7.5YR 4/6 (strong brown), 2.5YR 4/6 (red), 5YR 3/3 (dark reddish brown), 2.5Y 2/0 (black) oxidation
2.1-2.7 m	5B 5/1 (bluish gray) silty clay with 7.5YR 4/6 (strong brown), 2.5YR 4/6 (red), and 5YR 3/3 (dark reddish brown) mottling

2.7-2.9 m	5B 4/1 (dark bluish gray) clay with no oxidation by 2.9 m
2.9-3.7 m	Unable to retrieve soil

A.T. 8 - 725 m South, approximately 3 m West

2.5 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) clay
3.8 m	2.5YR 3/6 (dark red) clay

A.T. 9 - 825 m South, approximately 3 m West

0-0.9 m	10YR 5/1 (gray), 10YR 5/3 (brown), and 10YR 5/2 (grayish brown) silt with 7.5YR 4/6 (strong brown) mottling
0.9-1.2 m	Water content too high to get Munsell reading
1.2-1.9 m	10YR 5/1 (gray) silt with 7.5YR 4/6 (strong brown), 7.5YR 4/4 (brown/dark brown), and 10YR 5/3 (brown) mottling
1.9-2.3 m	5B 5/1 (bluish gray) clayey silt with 7.5YR 4/6 (strong brown) to 2.5YR 4/6 to (red) to 2.5Y 2/0 (black)/5YR 3/3 (dark reddish brown) oxidation
2.3-2.65 m	5B 5/1 (bluish gray) silty clay with 10YR 5/1 (gray), 7.5YR 4/6 (strong brown), and 7.5YR 4/4 (brown/dark brown) mottling
2.65-3.0 m	5B 4/1 (dark bluish gray) clay
3.0-3.65 m	5B 4/1 (dark bluish gray) clay; small pockets of 5YR 3/3 (dark reddish brown) and 5YR 4/4 (reddish brown)
3.65-3.7 m	5B 4/1 (dark bluish gray) clay decreasing to absent
3.7-3.8 m	5YR 4/4 (reddish brown) and 2.5YR 3/6 (dark red) clay

3.8-4.0 m	5YR 4/4 (reddish brown) and 2.5YR 3/6 (dark red) clay with 5YR 4/3 (reddish brown), 5B 7/1 (light bluish gray), 5B 4/1 (dark bluish gray), and 10YR 5/1 (gray) mottling

A.T. 10 - 925 m South, approximately 5 m West

2.5 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) blue clay
3.8 m	2.5YR 3/6 (dark red) clay

A.T. 11 - 1025 m South, 2.5 m West

0-0.35 m	10YR 5/1 (gray) to 10YR 4/3 (brown/dark brown) silt with 10YR 5/3 (brown) and 7.5YR 4/6 (strong brown) mottling
0.35-0.75 m	7.5YR 4/0 (dark gray) silt with 10YR 5/1 (gray) and 7.5YR 4/6 (strong brown) mottling
0.75-0.8 m	5B 6/1 (bluish gray) clay with 7.5YR 4/6 (strong brown) mottling
0.8-1.5 m	5B 6/1 (bluish gray) to 10YR 5/1 (gray) clayey silt with 7.5YR 4/6 (strong brown) mottling
1.5-1.6 m	5B 6/1 (bluish gray) 10YR 5/1 (gray) silt
1.6-2.3 m	5B 5/1 (bluish gray) to 5B 6/1 (bluish gray) sandy silt with 5YR 3/3 (dark reddish brown), 2.5Y 2/0 (black), and 7.5YR 4/6 (strong brown)/2.5YR 4/6 (red) oxidation and mottling; water encountered at 1.9 m
2.3-2.9 m	5B 5/1 (bluish gray) to 5B 6/1 (bluish gray) to 10YR 5/1 (gray) clayey silt with 7.5YR 4/6 (strong brown) to 2.5YR 4/6 (red) oxidation and 5YR 3/3 (dark reddish brown) to 2.5Y 2/0 (black) oxidation
2.9-3.2 m	5B 4/1 (dark bluish gray) to 5B 5/1 (bluish gray) clay

A.T. 12 - 1125 m South, approximately 5 m West

2.5 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) clay
4 m	2.5YR 3/6 (dark red) to 5YR 4/4 (reddish brown) clay

A.T. 13 - 1225 m South, approximately 3 m West

0-0.3 m	10YR 5/1 (gray) to N4 (dark gray) silt with 7.5YR 4/6 (strong brown) and 5B 6/1 (bluish gray) mottling
0.3-1.0 m	10YR 5/1 (gray) and 10YR 5/3 (brown) silt with 7.5YR 4/6 (strong brown) and 10YR 6/1 (light gray/gray)/5B 6/1 (bluish gray) mottling
1.0-1.2 m	10YR 5/1 (gray) to 5B 6/1 (bluish gray) clayey silt with 7.5YR 4/6 (strong brown), 2.5YR 4/6 (red), and 5YR 3/3 (dark reddish brown)/2.5Y 2/0 (black) oxidation and mottling
1.2-1.6 m	5B 6/1 (bluish gray) clayey silt with 7.5YR 4/6 (strong brown), 2.5YR 4/6 (red), 5YR 3/3 (dark reddish brown), and 2.5Y 2/0 (black) oxidation
1.6-2.0 m	5B 6/1 (bluish gray) clayey silt with 7.5YR 4/6 (strong brown) and 2.5YR 4/6 (red) oxidation and with 5YR 3/3 (dark reddish brown) and 2.5Y 2/0 (black) mottling
2.0-2.85 m	5B 5/1 (bluish gray) clayey silt to silty clay with some 10YR 5/1 (gray) to 5B 6/1 (bluish gray) silt; 7.5YR 4/6 (strong brown), 2.5YR 4/6 (red), 5YR 3/3 (dark reddish brown), and 2.5Y 2/0 (black) mottling/oxidation
2.85-3.2 m	5B 4/1 (dark bluish gray) silty clay
3.2-3.4 m	5B 6/1 (bluish gray) clay with 10YR 4/3 (brown/dark brown) mottling; some wood

3.4-3.5 m	5YR 5/3 (reddish brown) and 5B 6/1 (bluish gray) clay; some 5YR 4/4 (reddish brown) clay
3.5-3.7 m	5YR 4/4 (reddish brown) and 2.5YR 3/6 (dark red) clay
3.7-4.0 m	5YR 4/4 (reddish brown) and 2.5YR 3/6 (dark red) clay; some 5B 6/1 (bluish gray) mottling

A.T. 14 - 1325 m South, approximately 5 m West

2.9 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) clay
3.6 m	2.5YR 3/6 (dark red) and 5YR 4/4 (reddish brown) clay

A.T. 15 - 1425 m South, approximately 3 m West

0-0.5 m	10YR 5/1 (gray) dry silt with 10YR 5/3 (brown), 10YR 6/1 (light gray/gray), and 7.5YR 5/8 (strong brown) mottling
0.5-0.7 m	10YR 5/1 (gray) silt with 10YR 6/1 (light gray/gray), 7.5YR 4/6 (strong brown), and 7.5YR 5/8 (strong brown) mottling
0.7-1.1 m	10YR 6/1 (light gray/gray) silt with 10YR 5/1 (gray) and 7.5YR 4/6 (strong brown) mottling
1.1-1.3 m	5B 6/1 (bluish gray) to 10YR 5/1 (gray) silt with 7.5YR 4/6 (strong brown) mottling; water at 1.1 m
1.3-1.7 m	5B 6/1 (bluish gray) clayey silt with 7.5YR 4/6 (strong brown), 2.5YR 4/6 (red), 5YR 3/3 (dark reddish brown), and 2.5Y 2/0 (black) iron/manganese oxidation and mottling
1.7-3.18 m	5B 6/1 (bluish gray) clayey silt, with 5YR 3/3 (dark reddish brown) with 2.5Y 2/0 (black) and 7.5YR 4/6 (strong brown) to 2.5YR 4/6 (red) mottling

3.18-3.4 m	5YR 4/4 (reddish brown) to 5YR 4/3 (reddish brown) clay with 5B 7/1 (light bluish gray), 5B 6/1 (bluish gray), 10YR 5/1 (gray), and 2.5Y 2/0 (black) mottling

A.T. 16 - 1525 m South, approximately 3 m West

1.9 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) clay
3.1 m	2.5YR 3/6 (dark red) clay

A.T. 17 - 1625 m South, approximately 4 m West

0-0.2 m	10YR 4/3 (brown/dark brown) silt with 10YR 5/1 (gray), 10YR 5/3 (brown), and 7.5YR 4/6 (strong brown) mottling
0.2-0.4 m	10YR 5/1 (gray) and N4 (dark gray) silt with 7.5YR 4/6 (strong brown), 5YR 5/8 (yellowish red), and 10YR 6/1 (light gray/gray) mottling
0.4-0.6 m	10YR 5/1 (gray) and 10YR 6/1 (light gray/gray) silt with 7.5YR 4/6 (strong brown) mottling
0.6-0.9 m	10YR 5/3 (brown) silt with 10YR 5/1 (gray), 10YR 6/1 (light gray/gray), and 7.5YR 4/6 (strong brown) mottling
0.9-2.1 m	10YR 5/3 (brown) clayey silt with 10YR 5/1 (gray), 10YR 6/1 (light gray/gray), 7.5YR 4/6 (strong brown), and 2.5Y 2/0 (black) mottling
2.1-2.7 m	5B 6/1 (bluish gray), 5B 5/1 (bluish gray) to N6 (light gray/gray) clayey silt and silty clay with 7.5YR 4/6 (strong brown) to 2.5YR 4/6 (red) oxidation/mottling
2.7-2.95 m	5B 6/1 (bluish gray) and 5B 5/1 (bluish gray) silty clay with no mottling; roots
2.95-3.1 m	5YR 4/4 (reddish brown) to 5YR 4/3 (reddish brown) clay with 5B 6/1 (bluish gray) mottling

3.1-4.0 m	2.5YR 3/6 (dark red) clay with 5B 6/1 (bluish gray) mottling

A.T. 18 - 1725 m South, approximately 2 m West

at 2.8 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) blue clay
at 4.0 m	2.5YR 3/6 (dark red) clay

A.T. 19 - 1825 m South, approximately 2.5 m West

0-0.8 m	10YR 6/1 (light gray/gray) and 10YR 5/3 (brown) silt with 7.5YR 4/6 (strong brown) mottling
0.8-1.1 m	10YR 5/1 (gray) to N6 (light gray/gray) silt with 10YR 5/3 (brown) and 7.5YR 4/6 (strong brown) mottling
1.1-1.7 m	N6 (light gray/gray) to 10YR 5/1 (gray) clayey silt with 10YR 5/3 (brown) and 7.5YR 4/6 (strong brown) mottling
1.7-2.55 m	5B 6/1 (bluish gray) and 10YR 5/2 (grayish brown) and 5Y 6/1 (light gray/gray) clayey silt with 2.5Y 2/0 (black) and 5YR 3/3 (dark reddish brown) oxidation/mottling
2.55-3.75 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) clay with roots
3.75-3.8 m	5YR 4/4 (reddish brown) to 5YR 4/3 (reddish brown) clay with 5B 4/1 (dark bluish gray) to 5B 5/1 (bluish gray)
3.8-4.0 m	2.5YR 3/6 (dark red) to 5YR 4/4 (reddish clay with 5B 6/1 (bluish gray), 5B 5/1 (bluish gray), and 5B 4/1 (dark bluish gray) slight mottling

A.T. 20 - 1925 m South, 2 m West

at 1.1 m	5B 5/1 (bluish gray) to 5B 4/1 (dark bluish gray) clay
at 3.0 m	wood, unable to continue

On the final transect (Lane 1700 South), approximately 300 to 330 m west from Dixie Bayou, an area measuring approximately 30 m X 40 m with a light brick scatter was discovered. Because brick fragments were present on the plowed surface, shovel tests rather than auger tests were used to define the extent of the scatter and to determine whether additional artifacts were present. This shovel-tested area was bounded on the western side by a N/S irrigation canal with a 348° bearing. An initial shovel test was placed in the densest part of the scatter 13 m east on bearing 80° from the N/S canal and 5 m north of the 1700 South transect lane. This shovel test revealed the presence of brick fragments in the uppermost ten centimeters. However, no other artifacts were recovered. This shovel test became the datum for N/S and E/W oriented lines of shovel tests.

The N/S lane was laid in with a tape, and pin flags were placed at 10-meter intervals for shovel tests. There was one shovel test south of datum and three shovel tests north of datum. The E/W lane was laid in the same fashion with one shovel test to the west of datum and two shovel tests to the east of datum. All shovel tests were devoid of diagnostic artifacts, but all of the shovel tests did contain brick fragments to an attenuated degree, i.e. less than one handful of brick fragments and decreasing, compared to the two handfuls of brick recovered in the initial shovel test. Because only brick fragments were recovered in this area, no site number was requested.

There was an additional light brick scatter on the western side of the N/S irrigation canal (348°) about 200 m north of above-mentioned brick scatter. Although one shovel test was placed at 200 m north, no dense concentration was observable. Furthermore, the one shovel test was devoid of any indication of features, cultural deposits, or other artifacts. Like the above-described brick scatter, this low-density brick scatter was not considered to represent an archeological site.

Area 3. As mentioned earlier, the third area of the North Farm Parcel was a low-lying area containing waterfowl management units. It was inundated during much of the study. The vegetation was thick, resulting in poor ground visibility. Ponds of water were present in the southern two-thirds of the area. The southern one-third of this area was devoid of vegetation due to the near-complete inundation. The man-made levees encircling the area hold in rain water (John Sturgis, personal communication 1993). John Sturgis had said that this area was the lowest within the North Farm, and this was evident by the amount of standing water. The irrigation canals that crisscross the entire North Farm parcel do contain water; however, ponds and extensive inundation are found only in Area 3, with the majority of water concentrated in the southern one-third of that area. Area 3 has not been cultivated for a number of years, based on the density of secondary vegetation and the extensive ponding.

In response to the topography and flooding within the area, it was determined that an attempt at full pedestrian coverage of this area was not practical. However, a relict distributary channel which was shown on the 1969 USGS Maringouin 7.5 minute quadrangle (Figure 3) and in Smith et al. (1986:Plate 9) represented an area of high probability. Therefore, after the area was drained by the opening of culverts, the main channel (mentioned above) and a branch of that channel were surveyed (Figure 22).

The main channel had a bearing of 270°, extending from the N/S access road to the western boundary of the North Farm. This transect lane, designated as Transect Lane 1, followed the channel. The lane began on the N/S access road 0.3 of a mile north of the southern end of the N/S access road and continued for 900 m west.

Auger tests were excavated at 100-meter intervals along this transect lane. The first auger test was a 4-meter test with recorded stratigraphy labeled as A.T. 1 (100 m West), Transect Lane 1, Area 3 (Table 4). The next eight tests were 2-meter auger tests labeled as A.T. 2 (200 m West) to A.T. 9 (900 m West), Transect Lane 1, Area 3.

At 900 m west on bearing 270° (A.T. No. 9), the relict distributary channel could actually be discerned because of topographic evidence. The evidence consisted of a small, partially infilled channel surrounded by trees, beginning 100 m NW on a bearing of 298° from A.T. No. 9. The channel entered a NE/SW flowing irrigation canal at the 100-meter mark and continued westward to the edge of the parcel. The channel meandered only to a maximum of five degrees. Auger test No. 10 was placed on the western side of the intersection of the infilled channel and the irrigation canal.

At A.T. No. 10, the bearing for the remainder of the transect lane was changed to 276° to maintain a

Table 4. Stratigraphy in 4-meter Auger Tests in Area 3 of the North Farm.

Transect Lane One (1200 m 270° West)

A.T. 1 - 100 m West 270°

0-1.0 m	10YR 6/1 (light gray/gray) clayey silt with an N6 (light gray/gray) tint that increases with depth; 7.5YR 4/6 (strong brown) mottling
1.0-2.0 m	10YR 5/1 (gray) to N6 (light gray/gray) clayey silt with 5YR 4/6 (yellowish red) and 2.5Y 2/0 (black) mottling; roots
2.0-2.3 m	N6 (light gray/gray), (N5 [gray])/5B 6/1 (bluish gray), 5B 5/1 (bluish gray), and 10YR 5/1 (gray) clayey silt with 7.5YR 5/8 (strong brown), 5YR 4/6 (yellowish red), 2.5YR 4/6 (red), and 2.5Y 2/0 (black) mottling
2.3-3.15 m	2.5YR 4/6 (red) silty clay with 7.5YR 5/8 (strong brown), 7.5YR 4/6 (strong brown), 2.5YR 6/2 (pale red), 2.5YR 4/6 (red), and 2.5Y 2/0 (black) mottling
3.15-3.4 m	5B 5/1 (bluish gray) to N6 (light gray/gray) silt with 5Y 4/1 (dark gray) slight, mottling
3.4-3.8 m	5B 6/1 (bluish gray) clayey silt with 7.5YR 4/6 (strong brown) mottling
3.8-4.0 m	5B 6/1 (bluish gray) to 5B 4/1 (dark bluish gray) silty clay with 5YR 4/6 (yellowish red), 2.5Y 2/0 (black), and 7.5YR 4/6 (strong brown) mottling

A.T. 12 - 200 m West [illegible]6°

0-0.6 m	10YR 6/1 (light gray/gray) clayey silt with 7.5YR 4/6 (strong brown) mottling
0.6-1.55 m	N6 (light gray/gray) clayey silt with 7.5YR 4/6 (strong brown) mottling
1.55-1.9 m	2.5YR 4/6 (red) silty clay with 5B 6/1 (bluish gray) mottling

1.9-2.0 m	10YR 5/1 (gray), 10YR 6/1 (light gray/gray), 7.5YR 5/8 (strong brown), 2.5Y 2/0 (black), and 5B 5/1 (bluish gray) all equally blended in silty clay
2.0-2.4 m	N6 (light gray/gray) and 10YR 6/1 (light gray/gray) clay with 5YR 4/6 (yellowish red), 7.5YR 4/6 (strong brown), and 2.5YR 4/6 (red) mottling
2.4-3.4 m	10YR 6/1 (light gray/gray) clayey, sandy silt with N6 (light gray/gray), 5B 6/1 (bluish gray), 10YR 7/1 (light gray), 5YR 4/6 (yellowish red), 7.5YR 4/6) strong brown), 2.5Y 2/0 (black), and 2.5YR 4/6 (red) mottling
3.4-4.0 m	10YR 6/1 (light gray/gray) to 10YR 7/1 (light gray) silt with slight amounts of sand, and 7.5YR 4/6 (strong brown), 5YR 4/6 (yellowish red), 2.5Y 2/0 (black), and 10YR 6/3 (pale brown) mottling

Transect Lane Two (220° SW)

A.T. 6 - 600 m SW, 220°

0-0.2 m	10YR 4/1 (dark gray) to 10YR 5/1 (gray) silt with 7.5YR 4/6 (strong brown) mottling
0.2-1.2 m	10YR 6/1 (light gray/gray) clayey silt with 7.5YR 4/6 (strong brown) mottling
1.2-2.15 m	N6 (light gray/gray) to 5B 5/1 (bluish gray) silty clay with 5B 6/1 (bluish gray), 5YR 4/6 (yellowish red), and 2.5Y 2/0 (black) mottling
2.15-3.3 m	2.5YR 4/6 (red) clay with 2.5YR 6/2 (pale red), 5B 6/1 (bluish gray), and 2.5Y 2/0 (black) mottling
3.3-4.0 m	N6 (light gray/gray) to 5B 5/1 (bluish gray) silty clay with 7.5YR 4/6 (strong brown) and 5YR 4/6 (yellowish red) slight mottling

distance of 8 to 10 m from the infilled channel. Two additional auger tests were completed on this lane before the boundary of the parcel was reached. Auger Test No. 11 was a 2-meter test, and Auger Test No. 12 was a 4-meter test for which the stratigraphy was recorded (Table 4).

The secondary branch had a NE/SW orientation, with a bearing of 220°. Auger tests along what was designated as Transect Lane Two followed this channel beginning at the NE end. This lane began on the N/S access road 168 m south from the northern end of the access road. The first auger test was placed 100 m SW on compass bearing 220° from the N/S access road. Auger test intervals were 100 m. A total of seven tests were completed before this secondary branch intersected the main channel to the SW. There were six 2-meter tests (No. 1 through 5, and No. 7) and one 4-meter test with recorded stratigraphy (No. 6). The auger test results are presented in Table 4.

South Farm

Introduction. The South Farm was divided into four areas (Figure 23). The first of these areas is associated with Bayou Brown. According to John Sturgis (personal communication 1993), Bayou Brown is only visible for three weeks of the year. This visibility is the result of new vegetation growth in the infilled channel. At the time of the survey, this vegetative difference was no longer apparent. The bearing for Bayou Brown is 18°, as is shown on the 1969 USGS Maringouin 7.5 minute quadrangle (Figure 4). The area surveyed along Bayou Brown began at the intersection of a N/S access road and an E/W wellhead access canal (both shown on the 1969 and 1993 USGS Maringouin 7.5 minute quadrangles, Figures 4 and 23) and continued on the 18° bearing to the parcel boundary. The total distance was less than 950 m.

Area 2 was an unnamed relict distributary running NW/SE on a 328° bearing (taken from the 1969 USGS Maringouin 7.5 minute quadrangle, Figure 4). The channel began at the same point as Area 1, mentioned above, and continued on the 328° bearing to the western edge of the parcel, a distance of less than 1250 m. Area 3 is a secondary channel, beginning at the western end of Area 2. This channel maintained a 24° bearing in a NE direction to the eastern edge of the parcel. The distance of this section was less than 800 m.

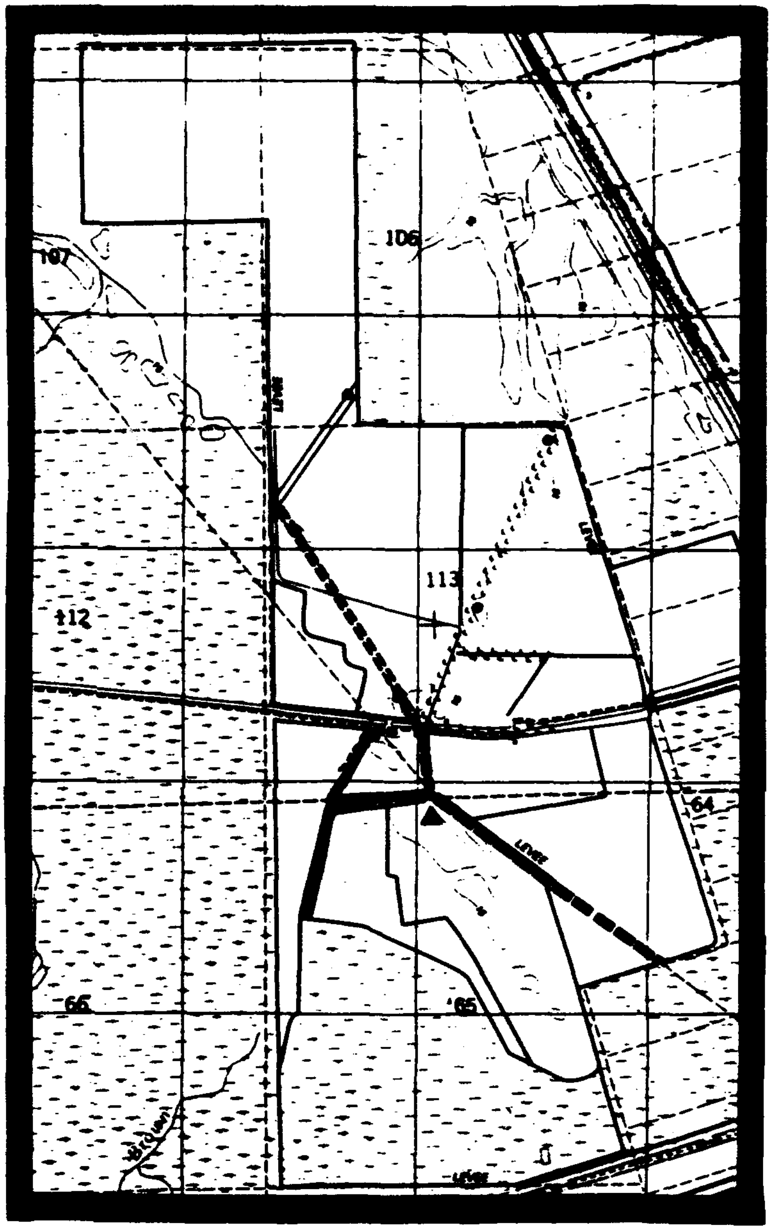

Figure 23. Map of the South Farm sho

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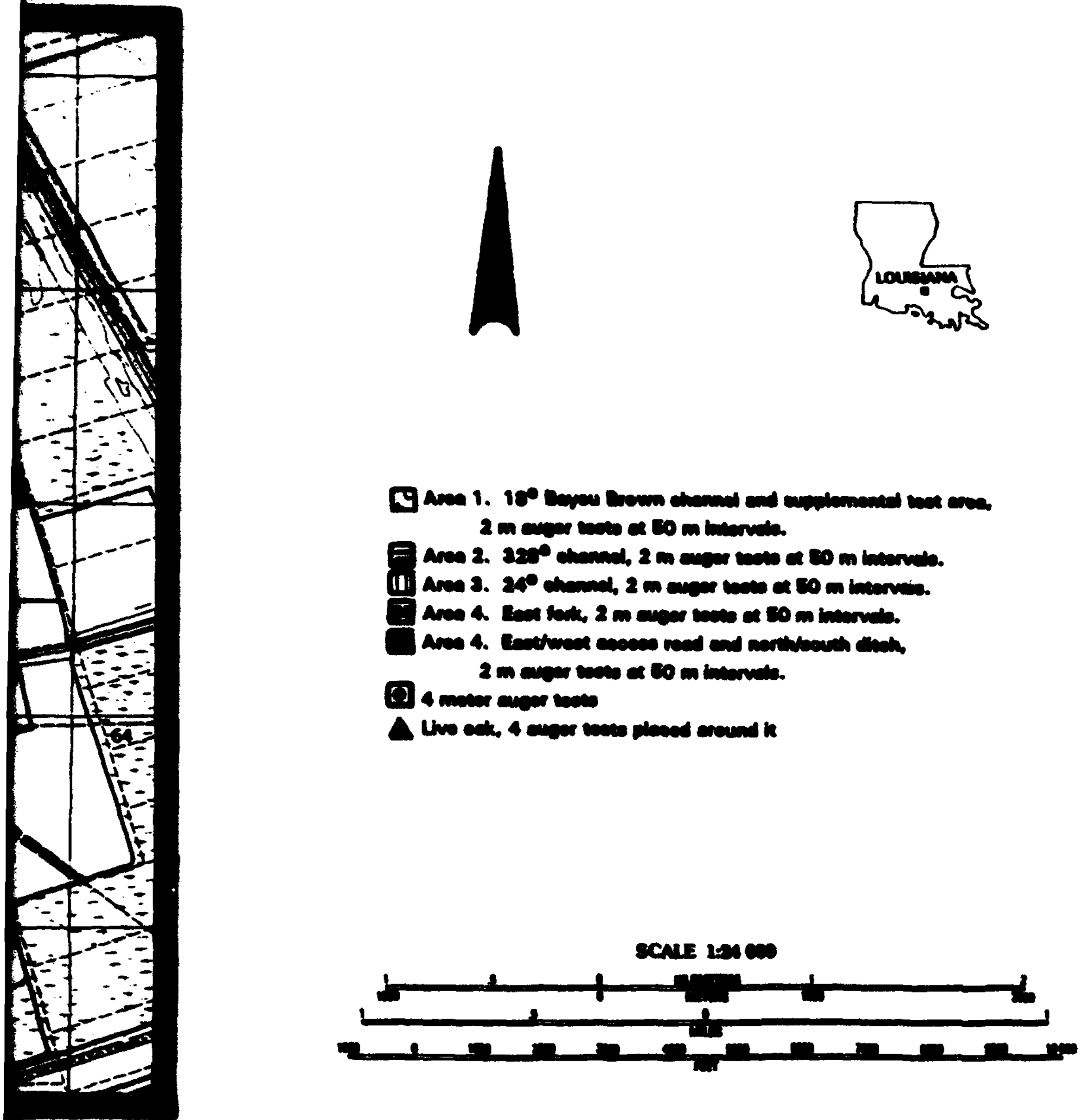

p of the South Farm showing archeological survey areas.

Area 4 was located in the southern section of the parcel (south of the east-west wellhead access canal), and portions of the northern section. These areas were composed of judgmentally placed tests along roads, levees, and canals. In the northern section, the north and south sides of a 500 m segment of the east-west wellhead access canal was judgmentally tested. Also, an east-west irrigation canal starting from the Bayou Brown infilled channel approximately 500 m north of the east-west wellhead access canal was judgmentally tested on the north and south sides (Figure 23).

Area 1. The survey of Area 1 was conducted utilizing two transect lanes spaced 15 m apart. These lanes followed the 18° bearing of the Bayou Brown channel mentioned above. These two transect lanes covered the east and west sides of Bayou Brown, which now is only a relict, infilled channel.

The survey team consisted of three 2-person groups with one person augering and one person screening. Again, the 4-meter tests were conducted by a 2-person group. The auger tests were placed at 50-meter intervals on both transect lanes. There was a combined total of 56 auger tests on the two transect lanes for Area 1 (Bayou Brown). Of the 56 tests, two tests were excavated to a depth of 4 m while the remaining tests were excavated to a depth of 2 m. The 4-meter tests were A.T. 11 on the east side and A.T. 1 on the west side. The tests were designated by transect lane, number, and location within that lane. Results of these auger tests are presented in Table 5.

Area 2. Area 2 was surveyed following the same procedure as Area 1. There were two transect lanes, one on the east and one on the west side of the relict distributary channel. As stated above, the beginning point for the initial transect lane was at the intersection of the N/S access road and the E/W wellhead access canal. This lane was designated as Transect Lane 1, and the return transect lane on the west side of the channel was designated as Transect Lane 2. The first auger test was placed 50 m NW of the starting point on Transect Lane 1. The last auger test (No. 24) for each transect lane was a 4-meter test with recorded stratigraphy (Table 6).

Auger tests were excavated at 50-meter intervals in each lane. The surveying team consisted of three two-person groups, following the same augering procedure as was mentioned earlier. There was a combined total of 48

Table 5. Stratigraphy in 4-meter Auger Tests in Area 1 of the South Farm.

Transect Lane One (Bayou Brown)

A.T. 1(11) + 50 m NE 18° Bearing

0-0.6 m	10YR 6/1 (light gray/gray) silt with 10YR 5/1 (gray), 10YR 5/3 (brown), and 7.5YR 4/6 (strong brown) mottling
0.6-0.7 m	10YR 6/1 (light gray/gray) and 10YR 6/3 (pale brown) silt
0.7-1.0 m	10YR 6/1 (light gray/gray) silt with 7.5YR 4/6 (strong brown) mottling
1.0-1.9 m	10YR 5/1 (gray) silt with 7.5YR 4/6 (strong brown) and 5YR 4/6 (yellowish red) mottling
1.9-2.0 m	5B 5/1 (bluish gray) clayey silt with N5 (gray) and 7.5YR 4/6 (strong brown) mottling
3.0-2.7	no dirt retrieved
2.7	impenetrable roots

Transect Lane Two (Bayou Brown)

A.T. 1 - 00 m 18° SW

0-0.9 m	10YR 5/1 (gray) silt, with 7.5YR 4/6 (strong brown) and 10YR 6/1 (light gray/gray) mottling
0.9-2.2 m	10YR 6/1 (light gray/gray) sandy silt with 7.5YR 4/6 (strong brown) mottling
2.2-2.6 m	10YR 5/1 (gray) sandy silt with 10YR 4/6 (dark yellowish brown) mottling
2.6-3.0 m	5B 4/1 (dark bluish gray) sandy silt with minimal clay; 10YR 4/6 (dark yellowish brown) and 5Y 4/1 (dark gray) mottling
3.0-3.5 m	3 pulls, no dirt; hole backfilling upon itself

Table 6. Stratigraphy in 4-meter Auger Tests in Area 2 of the South Farm.

Transect Lane One

A.T. 24 - 1200 m NW

0-1.0 m	10YR 5/1 (gray) silty clay with 2.5Y 2/0 (black) and 10YR 5/6 (yellowish brown) mottling
1.0-1.2 m	10YR 5/1 (gray) to 7.5YR 5/0 (gray) silty sand with 10YR 6/1 (light gray/gray) and 10YR 5/6 (yellowish brown) mottling
1.2-2.2 m	5YR 6/4 (light reddish brown), 5YR 5/8 (yellowish red), and 5YR 4/6 (yellowish red) silty sand with 10YR 5/1 (gray) and 10YR 6/1 (light gray/gray) mottling
2.2-2.9 m	5YR 5/8 (yellowish red) to 2.5YR 4/6 (red) sandy silty clay with 5B 6/1 (bluish gray) and 2.5Y 2/0 (black) mottling
2.9-3.2 m	5YR 4/3 (reddish brown) sandy silty clay with 5YR 5/3 (reddish brown), N6 (light gray/gray), and 10YR 5/1 (gray) mottling
3.2-4.1 m	10YR 6/1 (light gray/gray) and 10YR 5/1 (gray) silty sand with 2.5Y 2/0 (black) mottling

Transect Lane Two

A.T. 24 - 1170 m SE 328°

0-0.5 m	10YR 5/1 (gray) silt with 10YR 6/1 (light gray/gray), 7.5YR 4/6 (strong brown), and 10YR 5/3 (brown) mottling
0.5-1.0 m	10YR 6/1 (light gray/gray) silt with 10YR 5/3 (brown) and 7.5YR 4/6 (strong brown) mottling
1.0-1.6 m	10YR 6/1 (light gray/gray) silt with 5YR 3/3 (dark reddish brown) and 7.5YR 4/6 (strong brown) mottling

1.6-1.8 m	10YR 6/1 (light gray/gray) silty sand with 7.5YR 5/8 (strong brown) mottling
1.8-2.4 m	5YR 5/8 (yellowish red) silty sand with 5YR 4/6 (yellowish red), then 5YR 6/4 (light reddish brown) and 5B 6/1 (bluish gray) mottling
2.4-2.8 m	5YR 5/8 (yellowish red) to 5YR 4/6 (yellowish red) silty sand with less mottling
2.8-3.2 m	5YR 4/6 (yellowish red) to 5YR 3/4 (dark reddish brown) silty sand with 10YR 6/1 (light gray/gray), 10YR 5/1 (gray), and 5B 6/1 (bluish gray) blended mottling
3.2-3.4 m	10YR 6/1 (light gray/gray) to 10YR 5/1 (gray) to 5B 6/1 (bluish gray) silty clayey sand with 5YR 3/4 (dark reddish brown) to 5YR 4/4 (reddish brown) mottling
3.4-3.6 m	5B 6/1 (bluish gray) to 5B 5/1 (bluish gray) to N5 (gray) sandy silty clay with 10YR 5/3 (brown) mottling
3.6-4.0 m	5B 4/1 (dark bluish gray) silty clay with 5B 5/1 (bluish gray) and 5Y 4/1 (dark gray) mottling

auger tests for the two transect lanes. Two of these 48 tests were 4-meter tests with the remainder being 2-meter tests. The tests were designated by transect lane, number, and location within that lane.

Area 3. Area 3 was surveyed utilizing the same methods as were applied in Areas 1 and 2. There was one transect lane on each side of the secondary relict channel. Transect Lane 1 was on the east side of the channel, with a bearing of 24°. Transect Lane 2 was on the west side of the channel. The beginning point for Transect Lane 1 was at the very end of Transect Lane 1 of Area 2. This was on the N/S access road which is the western boundary of the parcel (Figure 23). The first auger test was 50 m NE of the starting point of Transect Lane 1. The first auger test of Transect Lane 2 was a 4-meter test with recorded stratigraphy (Table 7).

The survey for Area 3 also consisted of auger tests at 50-meter intervals. The survey team consisted of three 2-person groups. There was a combined total of 29 tests. Transect Lane 1 had 15 tests and Transect Lane 2 had 14 tests with one being a 4-meter test. The tests were designated by transect lane, number, and location within that lane.

Area 4. Survey of Area 4, as stated earlier, consisted of judgmentally placed auger tests (Figure 23). The tests followed the east and west side of a N/S access road, starting approximately 50 to 75 m south of the starting points for Areas 1 and 2. This road became a road/levee with water on the west side, and was designated as the East Fork. The survey of this section utilized 100-meter intervals between auger tests. There were 12 auger tests on the east side of the road and these were designated Nos. 1 through 12 South, East Fork. Likewise, there were twelve tests on the west side of the road and these were designated Nos. 1 through 12 North, East Fork. The distance for the East Fork was less than 1300 m.

At the location of A.T. 10 North, the initial NS access road turned to the west and then ran to the western edge of the parcel. The distance was less than 600 m. This portion of the road was tested on the north and south side at 100-meter intervals. These tests were designated South Side Westward Access Road A.T. 1 through 5 (with distances) and North Side Westward Access Road A.T. 1 through 4 (with distances).

Table 7. Stratigraphy in 4-meter Auger Tests in Area 3 of the South Farm.

Transect Lane Two

A.T. 1 - 00 m SW

0-0.2 m	10YR 5/1 (gray) silt with minimal clay with 7.5YR 5/8 (strong brown) mottling
0.2-1.5 m	N6 (light gray/gray) to 5B 6/1 (bluish gray) silt; minimal clay content; 10YR 5/1 (gray) and 7.5YR 5/8 (strong brown) mottling
1.5-1.7 m	5B 6/1 (bluish gray) clayey silt with 5B 5/1 (bluish gray), 7.5YR 4/6 (strong brown), and 2.5Y 2/0 (black) (slight) mottling
1.7-2.15 m	5B 6/1 (bluish gray) to N5 (gray) clay with 7.5YR 4/6 (strong brown) mottling
2.15-2.3 m	5YR 4/6 (yellowish red) to 2.5YR 4/8 (red) silty clay with 5B 6/1 (bluish gray) mottling
2.3-3.0 m	2.5YR 4/8 (red) and 5YR 4/6 (yellowish red) silty clay with 5B 6/1 (bluish gray) mottling
3.0-3.5 m	5YR 5/8 (yellowish red), 5YR 5/6 (yellowish red), and 5YR 4/6 (yellowish red) sandy clayey silt with 5B 6/1 (bluish gray) mottling
3.5-3.7 m	5YR 4/6 (yellowish red) sand
3.7-4.0 m	5YR 4/6 (yellowish red), 5YR 5/8 (yellowish red), and 5YR 6/4 (light reddish brown) silty clay or clayey silt with 5B 6/1 (bluish gray) mottling

At the western boundary, the road became a road/levee/ditch oriented in a southern direction with a swamp on the west side of the road and water in the ditch on the east side. The distance of this section was less than 400 m. Three auger tests were placed on the east side of the ditch at 100-meter intervals. These tests were designated as A.T. 1 through 3 East Side-Southward Ditch, with distances.

To the north of the EW access road was a levee/ditch with three auger tests placed on the east side. These tests were designated as A.T. 1 through 3 East Side, Northward Ditch with distances. Again, these tests were placed at 100-meter intervals. The distance for this section was approximately 390 m.

Judgmentally Placed Auger Tests, South Farm

The judgmentally placed auger tests in the northern section of the South Farm were excavated in two areas. The first area followed both the north and south sides of the east-west wellhead access canal. Testing began at the same point as Areas 1 and 2 and proceeded in an eastward direction (Figure 23). The auger tests were placed at 50-meter intervals and excavated to a depth of 2 m. There were 12 auger tests on each side of the wellhead access canal. The second area followed both the north and south side of an irrigation canal located on the east side of Bayou Brown, approximately 500 m north from the starting point of Area 1 (Figure 23). The canal running east/west was tested at 50-meter intervals, to a depth of 2 m, with 12 auger tests on each side (north/south) of the irrigation canal.

The last judgmentally placed tests in the southern section were placed around a lone live oak. This tree was located approximately 130 to 140 m SE on a 178° compass bearing from A.T. 1 Southside Westward Access Road. Four tests were placed 3 to 7 m away from the base of the tree in each of the cardinal directions. These tests were designated by their direction and proximity to the tree, e.g., A.T. 1, 4 m N; A.T. 2, 5 m W; etc.

Sites 16IV156, 16IV157, and 16PC2

As noted in Chapter 4, Clarence B. Moore visited a mound on Alabama Bayou in 1913. This mound was later assigned the site number 16IV156. Moore (1913:18) described the mound as being located about 200 feet from Alabama Bayou opposite the mouth of Johnson Bayou. The mound had an irregular circular base with a diameter of 60 feet and a height of about 4.5 feet. Moore (1913:18) also stated that the mound had been used as a refuge for hogs, which had resulted in erosion on its sides. Moore (1913:18) observed that the mound was composed of clay and showed no signs of containing burials.

Moore (1913:18) also reported that a second mound was located roughly seventy paces to the south of the first mound. This second mound had a height of about 2 feet and a diameter of 50 feet. This second mound was obscured by the roots of a water oak, whose circumference was 18 feet at a height of 5 feet above the ground (Moore 1913:18).

Moore's (1913) account of 16IV156 offered descriptions of its size but no indication of its cultural affiliation. An attempt was made to relocate the site as part of the present project. A slight rise in elevation in the correct position relative to Alabama Bayou and the mouth of Johnson Bayou was noted. This rise appeared to have an irregular or semi-circular shape (Figure 24). However, only the north-to-northwest side and the east-to-southwest sides were observable because of thick ground cover, which tended to obscure the topography.

The elevated area had an approximate diameter of 16 m (53 feet), which is very close to the size (60 feet) of the mound reported by Moore (1913:18). The elevation of the probable mound was approximately 0.3 m (1 foot), which suggests that if this is the same mound observed by Moore, there has been about 0.9 m of deposition on the site since 1913. If this is the case, then the second mound observed by Moore (1913:18) would be completely buried. No evidence of a second mound was found, but dense vegetation made observations on the topography of the area difficult.

The highest landform in the area was a berm located to the west of the mound which ran parallel to Alabama Bayou. The height of this berm was at least ten feet. Its origin is uncertain, but it was probably associated with the camps located in the vicinity (John Sturgis, Sherburne Wildlife Management Office, personal communication to Yakubik 1994). Also observed in the general area were various bottles, beer cans, miscellaneous debris, and a fenced-in pen.

An attempt was also made to visit the reported location of 16IV157. The Louisiana Site Record Form

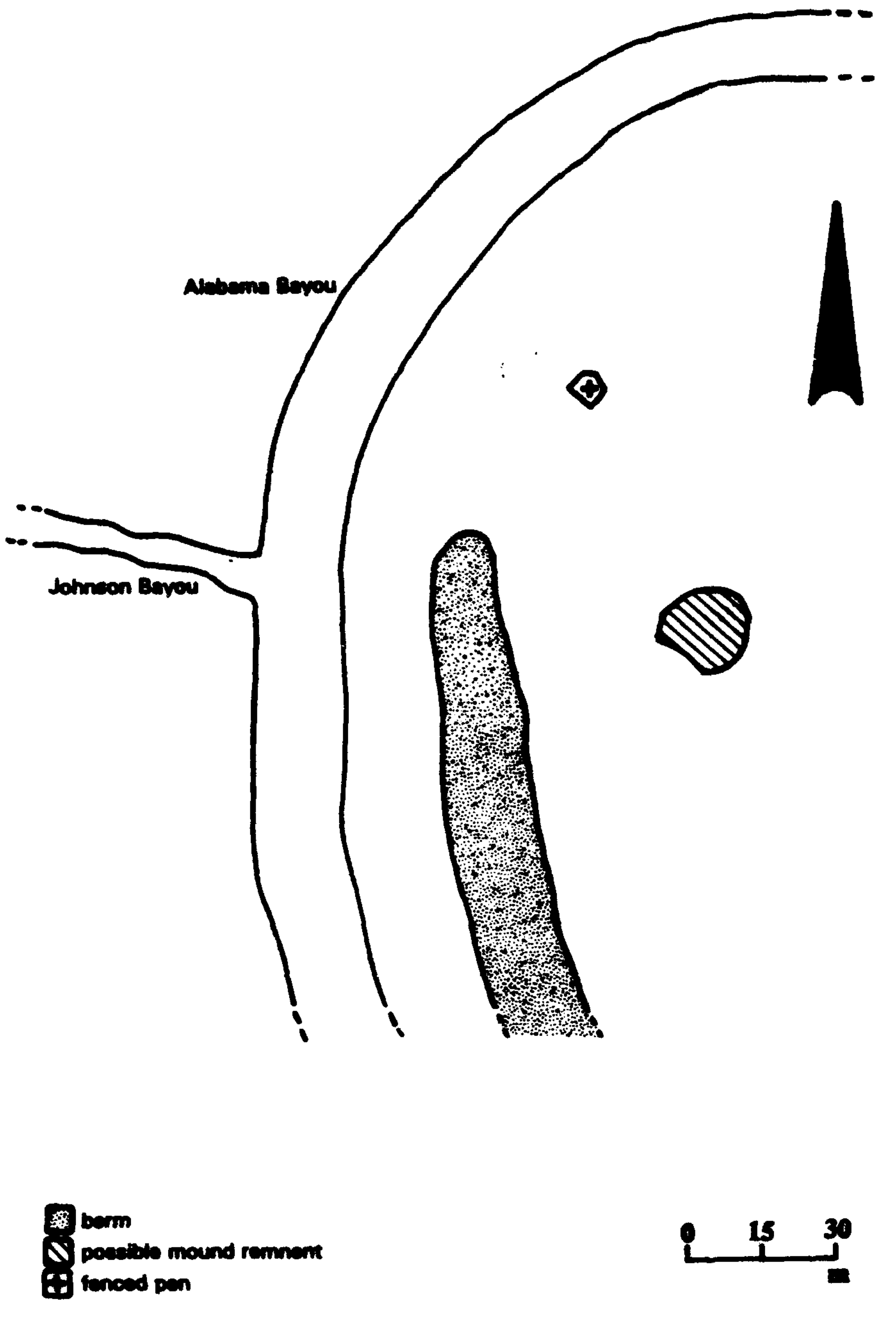

Figure 24. Site map of 16IV156.

provided no information concerning the site except for its location. Mr. Duke Rivet of the Louisiana Division of Archeology and Mr. Robert Neuman of Louisiana State University were unable to provide additional information concerning the site (personal communication to Vigander 1993). A post-site-visit map check and discussion with the staff at Sherburne Wildlife Management Office indicated that the crew failed to reach the correct location.

As noted in Chapter 5, Mound Bayou Mound (16PC2) is also one of the few previously reported sites in the larger study area. This site was not revisited during this project because it was updated as recently as 1987 by Jones and Shuman (1987). A single, circular platform mound approximately 4.4 feet in height is located at the site. The individual leasing the land reported to Jones and Shuman (1987:138) that about 2 feet was removed off the top of the mound during lumbering of the parcel. The diameter of the mound is approximately 190 feet. At the time of Jones and Shuman's (1987:138) visit, the mound was covered with trees and showed evidence of disturbance by animal burrowing and/or by pot hunting. The western side of the mound seemed to have received silt deposition as a result of "an increase in the drainage away from the levee along the Atchafalaya toward Mound Bayou" (Jones and Shuman 1987:138). This deposition would have buried any evidence of midden surrounding the mound (Jones and Shuman 1987:139).

Five prehistoric sherds were collected by Jones and Shuman (1987:139), and these appeared to confirm a Coles Creek occupation at the site. However, on the Site Record Update Form, Jones and Shuman mentioned a possible Troyville component at the site. As noted in Chapter 5, it is possible that this "Troyville" component may in fact represent an early Coles Creek occupation (Jones and Shuman 1987:138-144; State of Louisiana Site Record Update Form).

Observations on Auger Test Stratigraphy
(by Paul V. Heinrich)

Field work. Auger testing revealed three depositional units within the North and South Farm survey areas. First, the uppermost unit, which forms the modern ground surface consists predominantly of soft, light brownish gray to dark yellowish brown silts and clayey silts. These sediments represent sediments that accumulated within this part of the Atchafalaya Basin during historic times. Second, these silty sediments are underlain by relatively stiff bluish to bluish-green clays containing roots, wood fragments, and other organic matter. These deposits clearly represent sediments which have accumulated within a poorly drained swamp. Finally, within the North Farm, reddish brown clays and silty clays were found underlying the backswamp deposits. The color of these sediments clearly indicate that they are undiluted Red River sediments.

The auger testing encountered all three units within the North Farm area. This testing along Dixie Bayou encountered gleyed poorly-drained swamp deposits at depths varying from 1.8 to 2.9 m (5.9 to 9.5 ft) below the current surface. Also, along Dixie Bayou the Red River sediments were encountered within some, but not all holes, at depths varying from 3.9 to 4 m (12.8 to 13.1 ft). Elsewhere in the North Farm area, the auger holes failed to encounter any backswamp or Red River sediments.

Except for one auger hole, auger tests within the South Farm survey area only encountered the recent silty sediments. At a depth of 3.4 m (11.1 ft), an auger hole penetrated gleyed poorly-drained swamp deposits along an unnamed distributary of Bayou Brown within Section 113 of the South Farm area. None of the auger holes penetrated any Red River deposits.

Unfortunately, very little at this time can be said about the age of the backswamp deposits. It is unknown precisely at what time during the historic period that the accumulation of silty overbank sediments sufficiently filled in local backswamps such that poorly drained swamp sediments ceased to accumulate. As discussed elsewhere in detail, topographic mapping indicates that the poorly drained swamps within the North Farm survey area likely ceased to exist sometime between 1935 and 1959. Within the South Farm area, the poorly-drained swamps likely ceased to exist after 1959. However, the data needed to precisely determine the age of the top of the backswamp deposits are lacking.

Also, the age of the Red River sediments within the North Farm survey area is uncertain because they could have accumulated during one of three periods during which undiluted sediments were dumped into the Atchafalaya Basin. First, these sediments could represent a period of time when the Red River course followed Bayou Pettie Prairie into the Atchafalaya Basin. Second, a crevasse channel, Bayou Courtableau, later dumped Red River sediments into the Atchafalaya Basin while Bayou Teche was occupied by the Red River between 3800 to 1800 B.P. (Russ 1975). Finally, the Red River sediments might have been deposited sometime between 1861 and 1942, when the Red River provided most of the discharge flowing down the Atchafalaya River. At this time, insufficient evidence exists concerning the age of the Red River sediments seen within the auger holes of the North Farm survey area.

Summary of Results

Auger tests were excavated in areas shown on Figures 22 and 23 and discussed in the sections above. All of these were devoid of cultural materials with the exception of those in a few areas where brick fragments were recovered at relatively shallow depths. Supplemental auger and shovel tests at these areas did not yield associated artifacts, so no site numbers were requested from the Louisiana Division of Archeology.

CHAPTER 9
CONCLUSIONS AND RECOMMENDATIONS

North and South Farm Parcels

Extensive augering within the North and South Farm parcels failed to recover any cultural materials with the exception of brick fragments not associated with other artifacts and not assigned a state site number. Therefore, it is recommended that construction within that area be allowed to proceed without further archeological investigations. When such construction involves excavations to depths greater than two meters, however, it is recommended that workers be instructed to report artifacts or unusual features that might be cultural in origin.

Assessment of Site Locations and Probabilities for the Various Culture Periods in the Overall Study Area

The geomorphic history along with the archeological record provide the primary data for assessing site locations and probabilities for the various culture periods in the Atchafalaya Basin. Knowledge of the fluviatile processes and forces which have continually reworked and reshaped the biological and physical environments of the Atchafalaya Basin furnish a means of interpreting the landforms prehistoric peoples inhabited. Understanding these processes allows for the utilization of interpretive models such as the age-area relationship discussed in Chapter 5. The age-area relationship is a model for predicting the age and location of prehistoric sites. An additional method of interpretation is derived from the employment of the peripheral model. The peripheral model suggests that older sites are situated on the basin's periphery, primarily on the western side, and that younger sites are found on the eastern periphery as well as in the basin's interior (Gibson 1982). This interpretation of settlement patterns is consistent with the known archeological record of the Atchafalaya Basin.

The probable location of sites within the study area is along the natural levees of the larger bayous. The natural levees are the optimal location for prehistoric people. The levees provide soil drainage, natural resources, proximity to transportation routes, and protection from natural disasters (Smith et al. 1986:73). Within the study area, Bayou des Oures, Bayou des Glaises, Alabama Bayou, and Bayou Stiff are the major bayous whose natural levees may contain prehistoric resources. Some minor bayous which may contain prehistoric sites are Bayou Black, Bayou Brown, Johnson Bayou, Little Alabama Bayou, and Bayou Manuel. The lowland areas between the bayous are characterized as poorly drained backswamp with frequent flooding. With the year round threat of flooding, these lowlying areas were probably not inhabited by prehistoric peoples.

The probability of locating sites dating to the Paleoindian period in the study area and throughout the basin is nonexistent. Although evidence suggests that Paleoindian people did in fact live in what is now Louisiana, the fluctuating meander belts and associated distributaries of the Mississippi River Alluvial Valley have obliterated all evidence of Paleoindian sites. Furthermore, the dates for this culture period predate the oldest landform (Meanderbelt No. 3) associated with the Atchafalaya Basin. No Paleoindian sites have been documented in the study area or the rest of the basin.

Applying the peripheral model to the Archaic and Tchefuncte Cultural Periods suggests an unlikely probability of such sites occurring within the study area. The archeological evidence, as shown in Chapter 5, suggests that Archaic and Tchefuncte cultural remains are restricted to the western edge of the basin along the Teche Ridge. As evidenced by Smith et al. (1986:77), the possibility of Archaic sites is highest along the natural levees of early Teche distributaries. This locale for site occurrence seems to hold true for the Tchefuncte Period as well. At present, no Archaic or Tchefuncte sites have been recorded on the eastern periphery of the basin. Furthermore, no Archaic or Tchefuncte sites have been discovered in the basin's interior. If such sites ever existed in the interior or within the study area, they are probably deeply buried beneath recent alluvium. The location of recorded sites on the western periphery and the paucity of sites on the eastern periphery indicate that no Archaic or Tchefuncte sites are located in the study area.

As discussed in Chapter 5, there is a paucity of Marksville artifacts and sites for the basin as a whole. The occurrence of the few Marksville period resources is consistent with the peripheral model. The location of the few Marksville sites in the basin demonstrates the migration of populations from the older ridges onto the basin's lowland interior. Therefore, the probability of a Marksville site in the study area exists because the area is part of the basin's lowland interior. The existence of one Marksville site (16PC5) approximately 25 miles north of the study area, suggests additional Marksville occurrences in the northeast or upper portion of the basin. Conversely, the region south of the study area does not contain a Marksville component site, suggesting that it is unlikely that such a site would be located in the study area. This statement is based on the premise that the probability of site occurrence is relative to the quantity of cultural resources present in a given area. Therefore, the probability of site occurrence for the study area is lessened because the areas closely surrounding the study area do not contain Marksville deposits. As was the case for the earlier culture periods, if Marksville sites exist in the study area, they would be deeply buried and unaccessible.

Like the preceding period, the Troyville-Baytown Period occupations suggest a population increase and migration. This implies a moderate possibility of site occurrence in the study area. Sites dating to this period were established in a broader range of environmental areas, including the southeastern boundary of the basin. This distribution of sites into different niches is predicted by the peripheral model. Given the widespread dispersal of these sites throughout the Lower Mississippi Valley, an increase of Troyville-Baytown sites was anticipated for the Atchafalaya Basin as well. This was not the case. There appeared to be an underrepresentation of Troyville-Baytown sites for the Atchafalaya Basin. Gibson (1982) even suggested that the material complexes and artifacts associated with either Troyville or Baytown were not present in the Atchafalaya Basin and conjoined coastal environments. However, the probability of resource occurrence for the study area is higher than for previous periods due to the relative proximity of two sites associated with the Troyville-Baytown Period, 16IV4 and 16PC17 (approximately 17 miles south and 12 miles north of the study area, respectively). Again, as in the case of the earlier periods, the documented rate of sedimentation indicates that Troyville-Baytown sites, if present, are likely inaccessible in the study area. Based on the low numbers of recorded sites for the entire basin, the probability of Troyville-Baytown site occurrence within study area is moderate to low.

The highest probability of site occurrence exists Coles Creek and Plaquemine Period sites. Such site in the study area would be located along the natural levees of the above-mentioned bayous. As suggested by the peripheral model, these relatively recent cultures saw population increases and migrations unmatched by any other period. The presence of 16PC2 within the study area as well as nine sites in the vicinity of the study area suggest an increase in the probability of Coles Creek and Plaquemine site occurrence. Coles Creek and Plaquemine sites also fit into a village fission-fusion model. Application of this model to the nine sites suggests a high probability of hamlet sites or resource extraction sites occurring within the study area. Although the heavy sedimentation has made site detection problematic within the study area, the Coles Creek and Plaquemine sites have the highest chance of occurring and being discovered along the natural levees of the above-mentioned bayous.

According to the ethnographic data reported by Gibson (1982) and Manning et al. (1987), there were three documented historic tribes in the vicinity of the Atchafalaya Basin. The Houma, Chitimacha, and the Bayougoula have been reported as inhabiting areas adjacent to and within the basin. However, there is no written or archeological evidence suggesting that members of these tribes ever crossed the study area. As discussed in Chapter 5, the Houma were residing on the east bank of the Mississippi River in Pointe Coupee Parish during much of the contact period. A possible migration route for the Houma may have crossed the eastern edge of the basin. However, the exact location of this migration route is incomplete. The Chitimacha were to have created an east/west water route connecting sites along Grand Lake to sites along Bayou Plaquemine, Grosse Tete, and Jacques (Gibson 1982). This east/west water route is approximately ten to fifteen miles south of the study area. The location of this route increases the possibility of historic Chitimacha sites existing in the study area. To date there is no ethnographic or archeological evidence with which to substantiate this claim. Although the probability of a historic village site in the study area is almost non-existent, the possibility of a historical resource exploitation site is slightly higher. Unfortunately, if a historic site existed in the study area, it probably would be deeply buried beneath recent alluvium.

Within the study area, the evidence suggests that it is highly probable that sites would be deeply deposited and unaccessible. However, all indications intimate that Coles Creek and Plaquemine sites have the highest probability of occurrence within the study area. The historic sites of the Chitimacha and the Houma have the second highest probability for occurrence in the study area. The archeological evidence suggests that the remaining culture groups did not likely occupy the study area. Finally, the geomorphic data along with the field survey confirms that the probability of finding or impacting any archeological material in the study area is extremely low due to high sedimentation.

Assessment of Site Burial Due to Sedimentation

Sedimentation surveys and topographic maps from the period 1932-1959 confirm the presence of significant amounts of sedimentation within the project area. Within Chapter 2, five areas of sedimentation variability extending from the East Atchafalaya Basin Protection Levee to the Atchafalaya River were defined. The sediment rates provided in Chapter 2 and below are based on data from Sedimentation Range 5, which is located in the southeastern portion of the study area. This range was surveyed repeatedly during the period from 1932 to 1953.

The most dense accumulation of sediments is adjacent to the Atchafalaya River. The elevation increased between the 1932 on 1953 surveys up to 1.8 to 3 m within the area between the Atchafalaya River and Alabama Bayou. Within the interdistributary basin between Alabama Bayou and Bayou des Ourses, the ground level rises about 0.6 to 0.9 m. The accumulation of sediments here varies from 0 to 0.6 m within the interdistributary basin between Bayou des Ourses and Bayou des Glaises. The final area, which contains the North and South farm parcels, lies east of Bayou des Glaises. Here, the changes in elevation between the 1932 and 1953 surveys were too small to be detected.

Unfortunately, little data on sedimentation within the study area is available subsequent to 1959. Comparison of USGS topographic maps, however, indicates that well-drained swamps extended 1.6 to 2.4 km farther south over poorly-drained swamps in 1969 than in 1959. Well-defined natural levees with crests as high as 4.6 m along the distributaries extended almost all of the way to Interstate 10 during this period. In addition, the 1973 flood deposited large, but unmeasured amounts of sediment in the study area. In addition, the disruption of natural drainage patterns by agriculture further complicate the estimation of sedimentation.

Archeological investigations within the North and South Farm parcels indicate that recent alluvium extends in excess of 2 m depth. Thus, even historic sites are likely to be deeply buried within the study area. There are, however, particular landforms within the larger study area where sites may not be so deeply buried. An examination of Figure 8 of this report provides examples of such areas. The figure shows very high natural levees adjacent to major channels such as the Atchafalaya River, Whiskey Bay Pilot Channel, and Bayou Des Glaises. Only the most extreme floods would overtop the highest portion of such natural levees. Crevasses on such levees would result in the flow of water into areas labelled on Figure 8 as "Undifferentiated Flood Basin Fill", but would not result in deposition on the areas of the natural levee well above such flood basin areas. Theoretically, the result might be that sites on the downslope of natural levees high enough to prevent overbank floods would not be subject to extreme deposition.

The discussion of 16IV156 in Chapter 8 indicates that in fact there are site locations that fit the theoretical setting described above. Clarence Moore (1913) indicated that this mound was approximately 4.5 feet high. The feature reported in Chapter 8 is approximately 1 foot high. This would indicate only about 3 feet of alluvium since the site was reported by Moore in 1913. If the feature does in fact represent Moore's mound, then auger tests in the area could penetrate to the base of recent alluvium.

Site Sensitivity To Land Management Activities

Most land management activities are expected to have little effect on any cultural resources that may be present within the study area. Although the probability of the occurrence of Coles Creek or later sites is good within the study area, sedimentation within the basin has effectively created a buffer between buried sites and land surface management activities. Activities resulting in disturbance exceeding approximately 2-3 m present a greater risk of site damage. In cases where disturbance to these depths are expected in high-probability areas for site location, archeological investigations consisting of mechanical trench excavation prior to construction and/or archeological construction monitoring should be undertaken.

Recommendations for Future Surveys

Geomorphological studies, such as Smith et al. (1986) and Chapter 2 of this report, indicate that several meters of recent alluvium overlie prehistoric land surfaces within most of the overall study area. Chapter 8 demonstrates that auger tests as deep as four meters probably do not reach the base of this alluvium in some portions of the study area. For this reason, the application of traditional archeological survey techniques such as shovel tests and auger tests will not result in the discovery of prehistoric sites. Also, much of the area is covered with standing water during most if not all of the year. Such areas are not amenable to archeological survey.

Although it is not within the present overall study area, the work by Castille et al. (1990; see also Chapter 4) at the former location of the Bayou Chene community indicates that even historic sites can be very deeply buried. Use of historic maps in combination with auger tests did not yield artifacts or evidence of cultural features. Castille et al. (1990:78) indicate that their results are evidence of at least two meters of alluvium overlying a community occupied during part of the twentieth century. As was the case for prehistoric sites, even historic sites located in areas subject to such high levels of sedimentation are unlikely to be discovered through the use of traditional archeological survey techniques such as auger tests and shovel tests.

Based on the information presented above, it is recommended that archeological investigations not be undertaken prior to construction in most of the overall study area. Workers should be requested to report any artifacts or possible cultural features which they might encounter. This is especially important when disturbance is likely to reach or exceed 2 m depth.

The exception to this recommendation is that a corridor adjacent to certain channels and approximately 150 m in width should be surveyed if construction is to occur. These channels are those which are shown on the most recent USGS quadrangles as carrying water year-round. The justification for this characteristic is that these channels are not being infilled, so it is less likely that adjacent areas are receiving large amounts of sediment. The other characteristic for areas that should be surveyed is that the most recent USGS quadrangle should show at least one contour line immediately adjacent to the channel. This geographic feature is likely to be indicative of a relatively high, steep natural levee.

Obviously, the use of shovel tests is inappropriate for survey in this environment. Instead, auger tests, mechanical excavation, remote sensing or a combination of these techniques should be employed. Castille et al. (1990) employed remote sensing (Chapter 4), but encountered difficulties in determining the origin of magnetic anomalies using auger tests. In such instances, and particularly in areas where documentary evidence for a site exists, mechanical trenching might prove to be the most productive site discovery technique.

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APPENDIX I

REVISED SCOPE OF SERVICES

CELMN-PD-RN May 6, 1993

Revised*
Scope of Services
Phase 1 Cultural Resources Inventory
of Public Access Lands in the Atchafalaya Basin,
Vicinity of the Sherburne Wildlife Management Area,
Pointe Coupee, St. Martin and Iberville Parishes, Louisiana

1. **Introduction**. The work to be performed under this delivery order is the first phase of the cultural resources inventory of Corps-owned lands in the Atchafalaya Basin Floodway. In addition, these investigations are in support of a proposed lease agreement with the Louisiana Department of Wildlife and Fisheries. The lease would involve 2,400 acres of Corps-owned land located in two parcels. If granted, the lease would provide for management activities to enhance duck and other wildlife habitat. Planned management activities include reforestation and construction of low levees, water control structures, and wells. Portions of the tracts would remain in agriculture.

At present, no cultural resources are recorded in the proposed project areas. The geomorphic environment in the affected parcels is predominantly backswamp which has a low density of archeological sites. However, several relict distributary channels, with their associated natural levee ridges, pass through both the north and south farm parcels. These elevated ridges have a moderate to high potential for the occurrence of prehistoric archeological sites. In the vicinity of the project areas, several prehistoric archeological sites are recorded along similar relict distributaries.

2. **Study Area**. Two definitions of the study area are required for this project:

a. The overall study area is bounded generally by the Atchafalaya River on the west, U.S. Highway 190 on the north, the East Atchafalaya Basin Protection Levee on the east, and Interstate Highway 10 on the south. The overall study area is shown on the attached map entitled "Atchafalaya Basin" and dated 7 January 1993. This area is the location of the Sherburne Wildlife Management Area (state lands) and the Atchafalaya National Wildlife Refuge (USDI lands). On-going Corps purchases of public access lands have been concentrated in this area in an attempt to fill the gaps in public ownership and to enlarge the area available to the public.

* *Revisions are shown in Italics*

b. The field survey study area is limited to the two parcels included in the proposed lease with the Louisiana Department of Wildlife and Fisheries. These parcels, known as North Farm and South Farm, are shown on the attached map entitled "Sherburne WMA Wetlands Restoration Project" and dated March 1993. They are identified as parcels 26 and 42 on the overall study area map.

3. **General Nature of the Work.** The study will consist of historical and literature research relative to the overall study area, intensive cultural resources survey of the proposed 2,400 acre lease 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 draft standards entitled, "How to Apply the National Register Criteria for Evaluation," dated June 1, 1982;

- 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; and

- The Advisory Council on Historic Preservation's regulation 36 CFR Part 800 entitled, "Protection of Historic Properties."

The study will be conducted in three phases: Historical and Literature Research, Field Survey, and Data Analysis and Report Preparation.

A. Phase 1: Historical and Literature Research. The study will begin with research of archeological, historical and geological literature, maps and records necessary to establish the natural and historic setting and predict the nature of the cultural resources in the overall study area. The status of archeological research and the nature of the resource base in the study area will be assessed through the review of pertinent literature and the records of the Louisiana Division of Archaeology.

Historical research will include literature review, research of title records and review of other written, cartographic and aerial photography records sufficient to reconstruct the historic use of the study area. The geological research will include review of available published and unpublished data to assess landscape geomorphology. Special attention will be given to the issue of recent sedimentation rates and depths throughout the study area.

In addition to literature and record reviews, the Contractor shall consult individuals who are knowledgeable about the study area. These persons will include Sherburne WMA personnel, Corps real estate consultants, and local landowners and farmers. Near the conclusion of phase 1, the project archeologist and geomorphologist will perform a brief field reconnaissance of the overall study area with focus on the proposed lease areas. At least one week in advance of the planned reconnaissance, the Contractor will coordinate his schedule with Sherburne WMA personnel and the COR. The COR may accompany the Contractor personnel.

At the conclusion of this phase, the Contractor shall submit for COR approval a brief letter report which describes the implementation of the field survey methods. This report shall include a large scale (1:24,000 scale or better) map with proposed survey transects and subsurface test locations identified. The report will also address any recommended changes to the field methodology as described below and in the Contractor's proposal for this delivery order. Suggested modifications will be described and justified in detail.

B. Phase 2: Field Survey. Upon approval of the phase 1 report, the Contractor shall initiate the fieldwork in the two proposed lease parcels. Terrestrial survey as described below is the required procedure with the exception of changes approved by the COR at the completion of phase 1. The intensive pedestrian survey will utilize lane spacing of 20 meters and a shovel testing interval of 50 meters in an offset pattern. Shovel tests will be approximately 30 x 30 cm in the horizontal plane and will be excavated to sterile subsoil (a minimum of 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.*

Survey transects will be concentrated along the natural levees of abandoned distributaries in the lease parcels. Portions of the lease area are not amenable to standard terrestrial survey due to backswamp environmental conditions. Survey in these areas will necessarily be limited to disturbed areas where subsurface materials have been deposited and exposed on the surface.

Upon completion of the field survey, a maximum of 10 sites located in the survey corridors will be mapped, photographed, and briefly tested using shovel, auger, and limited controlled surface collection to assess depth of deposit, site boundaries, stratigraphy, condition, and cultural association. *If more than 10 sites are identified during the survey, the Contractor will consult the COR prior to site definition activities to prioritize the limited field time available.* At a minimum, site maps will show site boundaries, locations of site datum, features and artifact scatters, locations of all subsurface testing units, and prominent natural and cultural features in the site area. Although x,y coordinates or tie-ins to benchmarks are not required, all site maps will contain adequate information to tie site data to permanent landmarks in the lease areas. Such landmarks include property corners, junctions of field road/levees, etc. 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 Archeologist 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 survey area will be recorded to scale on the appropriate 7.5 minute quadrangle maps. The quadrangle maps will be utilized to illustrate the site forms. One copy of each site and site update form will be submitted to the COR with the draft report.

Any unexpended balance of field time will be utilized to perform site visits of the three previously recorded archeological sites (16PC2, 16IV156, and 16IV157) within the overall study area. Visits to these sites, as well as any other potential sites reported by local informants, shall be fully coordinated with Sherburne WMA personnel and the COR.

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 their 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 provide a specific and detailed testing plan. This plan will include field and laboratory methods, as well as appropriate research questions. The Contractor shall also recommend detailed mitigation measures for all sites classified as eligible.

The Contractor will synthesize the archeological, historical, and geological information obtained during phase 1 with the results and observations of the field survey (phase 2) to assess the nature of the resource base in the overall study area. This analysis will include an assessment of site locations and probabilities for the various cultural periods throughout the study area, *and* an assessment of site burial due to sedimentation which appears to be highly variable in the overall study area. *The Contractor will also provide a brief* assessment of site sensitivity to various land management activities, and recommendations for field methods for future cultural resource surveys in the study area.

The synthesis of the overall study area will be graphically displayed in the report. The COR will provide the Contractor with a Intergraph system base map which contains the information shown on attachment 1. The Contractor will produce Intergraph .dgn reference files (overlays) which display, at a minimum, the following resource data:

(1) surface geomorphic features (allostratigraphy);
(2) known archeological site locations;
(3) site probability maps for various culture periods;
(4) locations of historic period structures and activities (from historic maps and aerial photos);
(5) present land uses;
(6) depths of recent (20th century) sediments;
(7) cultural resources survey coverage;
(8) sensitivity zoning.

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:

a. Phase 1 Letter Report. One copy of the phase 1 letter report will be provided to the COR within 4 weeks of delivery order award. Any problems with the report will be resolved by the COR within 1 week of its receipt.

b. Draft Reports (Phase 1-3). Six copies of the draft report integrating all phases of this investigation will be submitted to the COR for review and comment within *16* weeks after delivery order award. *This schedule assumes that Atchafalaya*

River stages as well as local rainfall conditions will not hinder conduct of field operations. For each week that the survey areas are inundated during the fieldwork phase of the project (approximately weeks 5 through 12 after delivery order award), the schedule for draft report submission will be adjusted 1 week. The Contractor must fully coordinate any problems with high water levels in the survey areas with the COR.

Along with the draft reports, the Contractor shall submit:

(1) One copy of 7.5 minute quadrangle maps marked with the locations of all sites and standing structures in the survey area;
(2) one copy 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 NPS 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.

c. Final Reports. The COR will provide all review comments to the Contractor within 8 weeks after receipt of the draft reports (*24* 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 (*30* weeks after work item award). Upon approval of the preliminary final report by the COR (within 1 week after submittal), the Contractor will submit 30 copies and one reproducible master copy of the final report to the COR within *30* 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. Attachments:

1. Overall Study Area
2. Field Survey Study Area