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MORGANZA TO THE GULF FEASIBILITY STUDY: CULTURAL RESOURCES LITERATURE AND RECORDS REVIEW, TERREBONNE AND LAFOURCHE PARISHES, LOUISIANA

VOLUME I OF II

**FINAL REPORT
NOVEMBER 2000**

PREPARED FOR:

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

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13. ABSTRACT (Maximum 200 words) This volume presents the results of a cultural resources literature and records review for a feasibility study of two proposed levee alignments and associated water control structures in Lafourche and Terrebonne Parishes, Louisiana. This investigation was undertaken by R. Christopher Goodwin & Associates, Inc., on behalf of the U.S. Army Corps of Engineers, New Orleans, District, pursuant to Contract No. DACW29-94-D-0019. The cultural resources portion of the feasibility study is a planning effort intended to assist the Corps of Engineers in carrying out its obligations under the National Historic Preservation Act (NHPA) and National Environmental Policy Act (NEPA) to take into account the effect of its undertakings upon cultural resources within the project area. Although this study initially was completed in 1997, it has been revised and reprinted in conjunction with a Phase I cultural resources survey and archeological inventory of a 405 ha (1,000 ac) sample of the levee alignment corridors (see Volume II). This new edition incorporates minor changes in the proposed Morganza to the Gulf Feasibility Study levee alignment corridors. In keeping with the Scope of Work, the study reported here was conducted with the following objectives: (1) to provide an overview of regional prehistory, history, and previous cultural resource investigations; (2) to identify and describe previously recorded cultural resource sites within the project area based upon available documentation; (3) to describe the local geology and environment, especially as they relate to the identification and interpretation of cultural resources; (4) using an appropriate methodology, the develop a predictive model of culture resource site location for the project area; (5) to provide an ethnohistoric/socio-economic overview of Houma Indian communities in the project area; and (6) to create and provide a series of 1:24,000 scale maps illustrating the locations of all previously recorded cultural resources, high and low potential areas for cultural resources, and the locations of Houma Indian communities identified within the ethnohistoric/socioeconomic overview. Following the Scope of Work, this investigation also included formal consultation with the United Houma Nation; no other Native American nations were consulted. In developing the overview of regional prehistory, history, and previous cultural resources investigations, R. Christopher Goodwin & Associates, Inc., reviewed published works and available unpublished reports on the regional prehistory and history of the lower Mississippi River valley, with particular attention to the delta region, as well as archeological and cultural resources investigations in the project area and vicinity. Specific note was made of the nature and contents of previously reported archeological and historic sites in and within 500 m of the project area. State archeological site files in the Louisiana Division of Archeology and Historic Preservation were consulted to obtain further information about recorded archeological sites in and near the project area, and the records of the Division's Standing Structures Survey were reviewed for information concerning houses, schools, commercial establishments, and other buildings that may have historical significance, including properties already listed on the National Register of Historic Places. In addition, efforts were made to contact avocational archeologists and collectors to identify the locations of otherwise unrecorded cultural resources. The chair and vice-chair of the United Houma Nation, the tribal entity recognized by the State of Louisiana, were contacted to aid in the preparation of the ethnohistoric profile. They also were consulted regarding their cultural resources concerns. These consultations and related correspondence led to a meeting with the tribal council and passage of a resolution concerning the consultation process. Development of a predictive model of culture resource site occurrence in the project area required an understanding of settlement patterns and subsistence and economic practices of the various cultural groups that occupied the region in the past. Equally important, however, was an appreciation of the specific geomorphic history of the area. Accordingly, it was necessary to map the surficial deltaic landforms in and around the project area, identify possible buried landforms, and estimate the probable ages of significant landforms in the area. With this information in hand, it was then necessary to apply an understanding of the geomorphic processes responsible for landscape formation to create a ranking of the landscape elements as to their probability of containing archeological sites. This information was then conjoined with data about the cultural patterns of past inhabitants in designing the predictive model.					
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REPLY TO
ATTENTION OF:

12 October 2000

Planning, Programs, and
Project Management Division
Environmental Planning and
Compliance Branch

To The Reader:

This cultural resource effort was designed and guided by the U.S. Army Corps of Engineers, New Orleans District, as part of our cultural resource management program. The report documents the results of a cultural resource literature review and sample survey for the proposed Morganza to the Gulf feasibility study, Terrebonne and Lafourche Parishes, Louisiana. We concur with the authors' recommendations regarding future cultural resources investigations. The Louisiana State Historic Preservation Officer also concurs with the authors' recommendations

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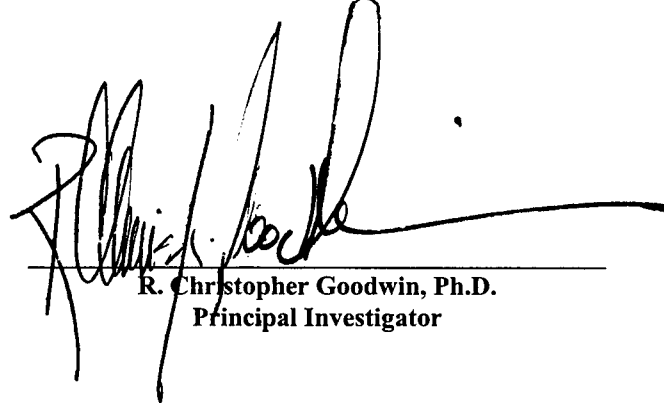
Edwin Lyon
Contracting Officer's
Representative

A handwritten signature in cursive script, reading "David Carney", is written over a horizontal line.

David Carney
Chief, Environmental
Planning and Compliance
Branch

**MORGANZA TO THE GULF FEASIBILITY STUDY: CULTURAL
RESOURCES LITERATURE AND RECORDS REVIEW,
TERREBONNE AND LAFOURCHE PARISHES,
LOUISIANA (VOLUME I OF II)**

FINAL REPORT



A large, stylized handwritten signature in black ink, likely belonging to R. Christopher Goodwin, is positioned above a horizontal line.

**R. Christopher Goodwin, Ph.D.
Principal Investigator**

By

**Clifford T. Brown, Lynn A. Berg, Julian Granberry, Christine Herman,
Cinder Griffin Miller, Jeremy Pincoske, Roger Saucier,
Susan Barrett Smith, Dave D. Davis, Patrick P. Robblee, and R. Christopher Goodwin**

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November 2000

For

**U.S. Army Corps of Engineers
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PREFACE

This report originally was published in 1997. This new edition has been revised slightly to incorporate minor changes in the proposed Morganza to the Gulf Feasibility Study levee alignment corridors. This new edition has been reproduced in conjunction with a Phase I cultural resources survey and archeological inventory of a 404.7 ha (1,000 ac) sample of the currently proposed levee alignment corridors (Robblee et al. 2000). The reprint is intended to serve as a companion to that volume.

CHAPTER I

INTRODUCTION

Project Description

This volume presents the results of a cultural resources literature and records review for a feasibility study of two proposed levee alignments (the Highway 57 and Recon 500 alignments) and associated water control structures in the vicinity of Houma, Bayou Grand Caillou, and Bayou du Large, Louisiana (Figure 1). This investigation was undertaken by R. Christopher Goodwin & Associates, Inc., on behalf of the U.S. Army Corps of Engineers, New Orleans District, pursuant to Contract No. DACW29-94-D-0019. The cultural resources portion of the feasibility study is a planning effort that is intended to assist the Corps of Engineers in carrying out its obligations under the National Historic Preservation Act (NHPA) and National Environmental Policy Act (NEPA) to take into account the effect of its undertakings upon cultural resources within the project area. Although this study initially was completed in 1997, it has been revised and reprinted in conjunction with a Phase I cultural resources survey and archeological inventory of a 404.7 ha (1,000 ac) sample of the proposed levee alignment corridors (see Volume II). This new edition incorporates minor changes in the proposed Morganza to the Gulf Feasibility Study levee alignment corridors.

Research Objectives and Design

A substantial number of previously reported archeological sites are known to exist within and near the proposed project area; archeological field investigations have been conducted at some of these sites, while others have not been examined or assessed previously by professional archeolo-

gists. Moreover, the general area was occupied by several Native American groups during the early historic period, and it is inhabited today by members of the Houma.

Another consequential factor for cultural resources management is the location of the project area within the geologically dynamic Mississippi River delta. Cyclical processes of delta formation have created the lands that made possible human settlement of the area during prehistoric and historic times, and in some cases these have obscured the visibility of archeological sites through sedimentation and subsidence. An understanding of the relationship between this geomorphic history and the archeological record is an essential element of planning for the identification and assessment of potentially significant cultural resources.

With these objectives and factors in mind, and in keeping with the Scope of Work, the study reported here was conducted with the following objectives: (1) to provide an overview of regional prehistory, history, and previous cultural resources investigations; (2) to identify and describe previously recorded cultural resources sites within the project area based upon available documentation; (3) to describe the local geology and environment, especially as they relate to the identification and interpretation of cultural resources; (4) to develop a predictive model of culture resource site location for the project area; (5) to provide an ethnohistoric/socio-economic overview of Houma communities in the project area; and, (6) to create and provide a series of 1:24,000 scale maps illustrating the locations of all previously recorded cultural resources and high and low probability areas. Following the

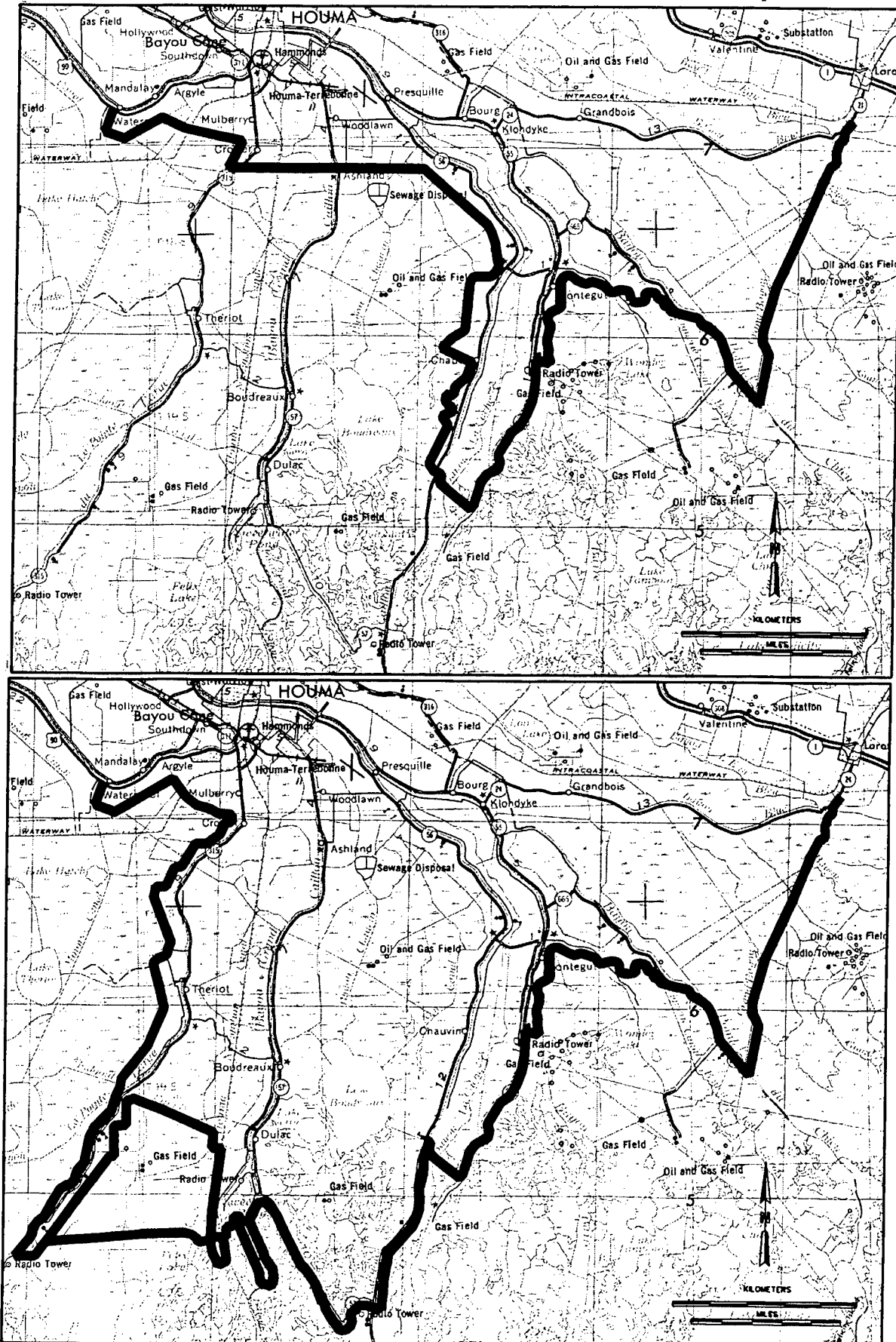


Figure 1. Excerpt from the USGS 1:250,000 New Orleans quadrangle map showing the proposed Morganza to the Gulf project areas. The Recon 500 Year Plan (above). The Highway 57 500 Year Future Plan (below).

Scope of Work, this investigation also included consultation with the United Houma Nation; no other Native American Nations were consulted.

In developing the overview of regional prehistory, history, and previous cultural resources investigations, R. Christopher Goodwin & Associates, Inc., reviewed published works and available unpublished reports on the prehistory and history of the lower Mississippi River valley, with particular attention to the delta region, as well as archeological and cultural resources investigations in the project area and vicinity. Specific note was made of the nature and contents of previously reported archeological and historic sites in and within 500 m (1,640 ft) of the project area. State archeological site files in the Louisiana Divisions of Archaeology and Historic Preservation were consulted to obtain further information about recorded archeological sites in and near the project area, and the records of the Division's Standing Structures Survey were reviewed for information concerning houses, schools, commercial establishments, and other buildings that may have historical significance, including properties already listed in the National Register of Historic Places. In addition, efforts were made to contact avocational archeologists and collectors, in order to identify the locations of otherwise unrecorded cultural resources.

The chair and vice-chair of the United Houma Nation, the tribal entity recognized by the State of Louisiana, were contacted to aid in the preparation of the ethnohistoric profile. They also were consulted regarding their cultural resources concerns. These consultations and related correspondence led to a meeting with the tribal council, and passage of a resolution concerning the consultation process.

The development of a predictive model of cultural resources site occurrence in the project area requires an understanding of settlement patterns and subsistence and economic practices of the various cultural groups that occupied the region in the past. Equally important, however, is an appreciation of the specific geomorphic history of the area. Accordingly, it was necessary to map the surficial deltaic landforms in and around the project area, to identify possible buried landforms, and estimate the probable ages of significant landforms in the area. With this information in hand, it was necessary to apply an understand-

ing of the geomorphic processes responsible for landscape formation in order to create a ranking of the landscape elements as to their probability of containing archeological sites. This information then was conjoined with information about the cultural patterns of past inhabitants in designing the predictive model.

Project Personnel

R. Christopher Goodwin, Ph.D., served as Principal Investigator for this predictive modeling effort. He was assisted by Clifford Brown, M.A., A.B.D., who acted as Project Manager and senior author of this volume. Roger Saucier, Ph.D., worked as the project geomorphologist. Susan Barrett Smith, B.A., served as the project historian. Lynn A Berg, B.A., Julian Granberry, Ph.D., Christine Herman, B.A., Cinder Griffin Miller, Ph.D., Jeremy Pincoske, B.A., and Patrick P. Robblee, M.A., R.P.A., served as contributing authors. Dave D. Davis, Ph.D., edited a draft of this volume. Lastly, Heidi R. Post, B.A., and Chad Farnum, B.A., produced this volume.

Organization of the Report

The present chapter has presented a brief description of the project, its aims and objectives, and the approach taken to achieving them. Chapter II provides a detailed discussion of the geomorphic history and processes that have dominated landscape formation in the project area. This discussion also includes a re-evaluation of evidence related to the dating of those landforms, and concludes with a ranking of different landform types and dimensions according to the likelihood of occurrence of cultural resources. Chapters III and V provide an overview of the sequences of prehistoric and historic human occupation of the project vicinity. Chapter IV bridges the two surrounding chapters, by providing a discussion of the ethnohistory of Native American peoples in the area from early colonial times until the present. Particular attention is paid to the Houma, some of whom live in the project vicinity today.

A summary of all previous cultural resources investigations that have been conducted in the project vicinity, and a discussion of the principal issues addressed and conclusions reached by the investigators, are presented in Chapter VI. The results of all the investigations are integrated in

Chapter VII, to produce a predictive model of cultural resources site occurrence in the project area. Development and presentation of the model is a central feature of Chapter VII, which concludes with several recommendations for treat-

ment of properties and additional testing of the project area. Attachment I contains a series of 1:24,000 scale digital quadrangle maps representing the project area and various related classes of data.

CHAPTER II

GEOMORPHIC ANALYSIS AND LANDSCAPE CLASSIFICATION

Purpose and Scope

The U.S. Army Corps of Engineer's feasibility study involves approximately 1,651.9 ha (4,081.8 ac) of flood control levees and several proposed/existing floodgates and water control structures in Terrebonne and Lafourche Parishes, Louisiana. As an initial step, consideration must be given to the impact of the engineering works on historical and cultural resources. In addition to considering known resources, and preliminary to conducting field site surveys, a predictive model is being developed to help identify the areas with the highest probabilities of containing prehistoric archeological sites. Since it has been well established that in a deltaic landscape like south Louisiana a causal and predictable relationship exists between prehistoric habitation and the physical environment (landforms), this portion of the study is concerned with a detailed geomorphic analysis for input into a model.

The specific objectives of the analysis were to classify and map the surficial deltaic landforms, to identify possible buried landforms, to discuss the geomorphic processes responsible for the formation of the landscape, to estimate the ages of significant landforms, to reconstruct the geologic history of the area, and to rank the landscape elements as to their probability of containing archeological sites.

Existing literature and geologic mapping formed the basis for the analysis. Detailed mapping, conducted at a scale of 1:24,000, was accomplished using topographic quadrangle maps, 1:24,000-scale controlled black and white aerial

photo mosaics made by Edgar Tobin Aerial Surveys in 1958, 1:62,500-scale false color infrared imagery made by the National Aeronautics and Space Administration in 1974, and photo index mosaics of various dates and scales made by the U.S. Department of Agriculture. Recent systematic geologic mapping at a scale of 1:62,500 by the U.S. Army Engineer Waterways Experiment Station (WES) (see next section) was used as a guide, but the mapping contained herein basically represents both a reinterpretation necessitated by the need for greater detail and a product tailored to the specific needs of the model.

Logs of borings made by the U.S. Army Engineer District, New Orleans, as part of this and other engineering investigations were examined to assist in interpreting landforms and environments of deposition in the shallow surface. In addition, information on known archeological sites obtained from state site files and other sources was considered in interpreting detailed site/landform relations and extrapolating to other situations. No field reconnaissance of geological features was conducted, since none was needed at this stage of interpretation. Results of radiocarbon (^{14}C) assays reflected in this section were obtained from the literature, and no new dates were obtained.

The Knowledge Base

The deltaic plain of the Mississippi River is a region where aquatic (lacustrine and estuarine) and paludal environments predominate areally over terrestrial environments. In this region of extensive intratidal marshes and swamps, land

suitable for human occupation is limited and was the focus of settlement in both prehistoric and historic times. It is not surprising, therefore, that the association of Native American villages, mounds, and middens with narrow natural levee ridges that occasionally interrupt the coastal marshes and swamps has been known and written about since the early part of the century (Moore 1913). However, *the* pioneering study in understanding the relationships (and scientific potential) between humans and the physical landscape in the deltaic plain was that of Kniffen (1936). In a study of the eastern part of the deltaic plain, he pointed out for the first time not only how mounds and middens could be used as indicators of regional subsidence (as a geologic process), but also how archeological sites could be used as chronological indicators in reconstructing the history of this dynamic area. His work influenced one of his students to follow up with a more extensive and intensive investigation, providing the initial holistic correlation of prehistoric settlements with delta development over the entire plain (McIntire 1954). In that study, McIntire identified about 20 archeological sites along or close to the project area, and related them to deltaic distributaries.

Concurrently with these archeological applications, basic knowledge of deltaic geologic structure, sedimentology, and fluvial geomorphic processes increased greatly, and was documented in works such as those of Fisk (1944), Fisk and McFarlan (1955), Coleman and Gagliano (1964), and Gagliano and VanBeek (1970). Fisk (1944) provided the initial (and now classic) geologic synthesis of the entire deltaic plain, designed as applied geology for engineering applications, and this was followed 14 years later by a major revision and elaboration with a new chronological model (Kolb and VanLopik 1958). Nine years after that, Frazier (1967) published the first comprehensive chronological model of the deltaic plain, using over 150 radiocarbon dates. That work generally is still accepted as the most authoritative chronological reconstruction. It should be noted that none of the chronologies mentioned above took archeological evidence into consideration to any significant extent.

Portions of the deltaic plain have been the focus of regional geologic studies (e.g., VanLopik 1955); however, the first systematic large-scale

mapping was not begun until the decade of the 1980s. A long-range program of 1:62,500-scale quadrangle mapping of environments of deposition, both surface and subsurface, was initiated by WES and is now essentially complete (May et al. 1984; Dunbar et al. 1994). This extensive database of geological information recently has been compiled and synthesized into an atlas at a scale of 1:250,000 (Saucier 1994). This same publication also contains a revised deltaic plain chronology which consists of a merging of Frazier's model with some archeological evidence.

The last decade also witnessed the development of still another chronological model—one that places special emphasis on the role of post-glacial sea level rise in cyclic delta complex formation and destruction (Penland, Suter, and McBride 1987; Penland et al. 1991). Although aspects of this model may be in conflict with archeological evidence (Saucier 1994), it has important implications with regard to the project area and is discussed in later sections.

After a brief lull in the 1960s and the early 1970s, archeological surveys and site investigations became more numerous as government and industry began complying with legislative requirements concerning historic properties and cultural resources. Surveys and mitigation of significant resources became routine for public works projects, and have vastly increased the body of archeological knowledge. Mostly surveys of small areas have been conducted in the vicinity of the project area (e.g., highway and pipeline corridors); however, one survey of large areal extent recently was accomplished immediately west of the project area and the results are directly relevant to the current project and this portion of the study (Weinstein and Kelley 1992). Fortunately, the U.S. Army Corps of Engineers, New Orleans District, the sponsor of the study, was able to fund a supplemental geomorphic investigation and large-scale mapping project of the area by WES (Smith, Dunbar and Britsch 1986). The results of the two investigations provide an excellent overview and guide to the geoarcheological considerations and conditions in the central Mississippi River deltaic plain area.

Physiographic and Geologic Setting

Physiographically, the project area is situated in the Gulf segment of the Coastal Plain

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

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

More specifically, the Mississippi deltaic plain is the surface manifestation of a relatively thin, seaward thickening prism of Holocene deltaic and shallow marine deposits that overlies Pleistocene deposits of similar origin and still older ones with depth (Kolb and VanLopik 1958). In the project area, the Holocene prism or veneer varies from about 40 to 100 m (12.19 to 30.48 ft) thick and, in gross terms, consists of a highly variable mixture of clays, silts, and fine sands that grades downward into mostly silts and sands (May et al. 1984; Dunbar et al. 1994). The youngest Pleistocene deposits that underlie the Holocene sequence occur at increasingly shallow depths to the north and eventually outcrop, forming the northern border of the deltaic plain along a line trending through the Pontchartrain Basin (Figure 2).

The prism of Holocene deltaic deposits represents a series of distinctive onlapping sedimentary cycles initiated by upstream diversions of river flow, each cycle being the correlative of a discrete delta complex. Each cycle involves sediments laid down in multiple environments ranging from freshwater to saline in the dynamic zone of interaction where the river emptied into the Gulf. As illustrated in Figure 3, the cumulative result of multiple cycles has been the net buildup and seaward buildout of the deltaic plain.

Each delta complex in turn involves a series of delta lobes, a lobe being defined as that portion of a complex that formed during a relatively short period of time and that can be attributed to a single or discrete set of deltaic distributaries (Saucier 1994). Because of the prevailing influence of subsidence and sea level rise, each lobe typically has experienced a constructional or progradational phase in which fluvial processes dominate, and a subsequent destructional or transgressive phase in which marine processes become progressively more dominant. The particular depositional environments associated with a deltaic lobe and stages in the growth and decay of a deltaic complex are discussed and illustrated later in this chapter.

The surface expression of each delta complex is a trunk course and a series of radiating and branching distributaries that form a skeletal framework. Each distributary is flanked by a low, narrow natural levee ridge that gradually narrows and lowers in elevation toward the Gulf. The distributaries are separated by broad, flat interdistributary basins characterized by intratidal wetlands. In general, the project area is coincident with the central portion of the Lafourche deltaic complex, one of several named and well-delineated major complexes (Frazier 1967); it involves several lobes as will be discussed later (Figure 2). The Lafourche complex overlies remnants of older complexes and lobes that are buried at shallow depths and have very subtle surface manifestation.

In the project vicinity, natural levee ridges flanking less than a dozen abandoned distributaries constitute the only permanently habitable and arable lands. They decrease in total width from about 1,500 to 3,000 m (457.2 to 914.4 ft) in the northern part of the area to zero or only a few tens of meters (tens to hundreds of feet) in the southern part. They decrease in elevation (NGVD) from barely 3 m (0.91 ft) in the north to essentially sea level in the south. However narrow they may be, the larger natural levee ridges extend seaward over distances of tens of kilometers (tens of miles). Overall, it is estimated that less than 10 percent of the total area encompassed by the project is above the level of permanent inundation and daily tidal effects. The remaining 90 percent of the area is characterized by essentially flat interdistributary basins exhibiting broad expanses

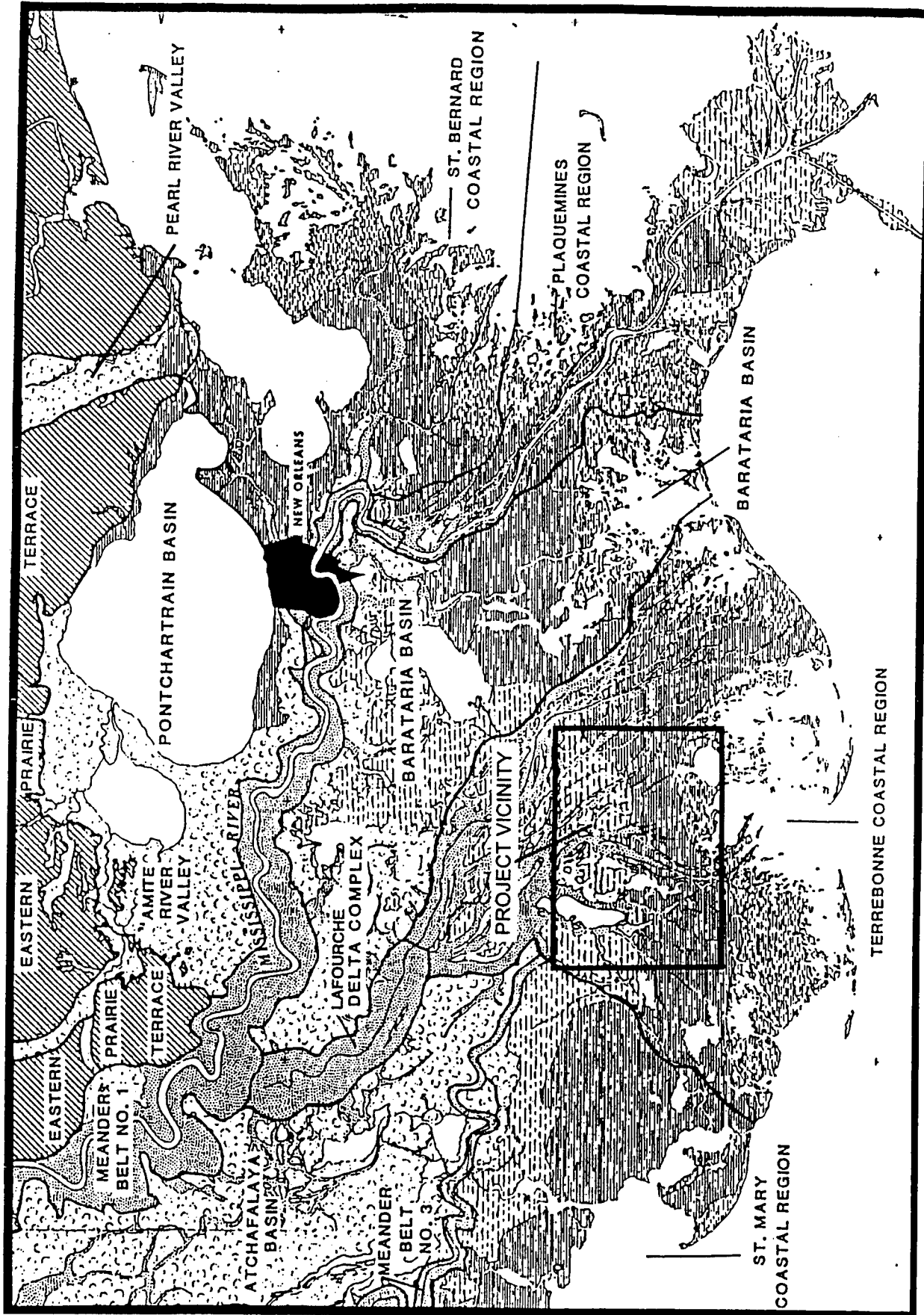


Figure 2. Geomorphic map of the Mississippi River deltaic plain (modified from O'Neil 1949).

Table 1. Characteristic swamp and marsh vegetation.

INLAND FRESH-WATER SWAMP

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

STREAM-MOUTH FRESH-WATER MARSH

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

MARSHES

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

Abandoned distributary channels contain a long, downstream thinning and deepening wedge of mostly loose gray silts and fine sands with layers of soft gray clays. In the northern portions of the project area, the deposits may be over 10 m (32.8 ft) thick. They either underlie the current underfit stream or a thin veneer of sediments analogous to natural levee deposits where the channel is mostly filled. In the southern part of the project area, the deposits get progressively softer and finer grained with increasing amounts of organic matter.

Deposits in the interdistributary basins include a coarsening-downward sedimentary sequence about 3 to 5 m (9.84 to 16.4 ft) thick that reflects the history of the development of a deltaic lobe (see Figures 4 and 5). The upper 2 to 3 m (6.56 to 9.84 ft) of the sequence is composed mainly of very soft to watery, gray to black, highly organic clays, mucks, and peats in both swamp and marsh areas. In general, the organic fraction is smaller in swamp areas and decreases with depth. As will be discussed later, this is a reflection of the decline in overbank flooding and suspended sediment contribution that took place with the abandonment of the deltaic lobe. The lower 1 to 2 m (3.28 to 6.56 ft) of the sequence is mostly soft gray clays with numerous thin silt lenses and occasional fragments of shell of estuarine organisms. This sequence actually represents depositional environments ranging downward from swamp and marsh through interdistributary into prodelta or bay-sound. It should be noted that in the northern part of the area, where the Lafourche delta complex apparently built seaward across an existing land mass rather than into shallow water, the prodelta deposits are absent and another organic sequence is present. This is discussed more fully in the section on geologic history.

Soils of the project area have not been mapped in detail, but their general distribution and character are indicated by the general soil map of Louisiana (Louisiana State Planning Office and the US Department of Agriculture 1978). The highest and best drained loamy deposits of major natural levee ridges in the northern part of the area have soils of the Commerce series, while those at slightly lower elevations have soils of the Mhoon series. Farther south along the smaller distributaries, the natural levees have soils of the Sharkey-Tunica association, the latter occurring at the relatively higher elevations on clayey sub-

strates. Soils of the cypress-tupelo gum swamps are those of the Barbary-Fausse association. The latter are clayey throughout, while the former have a muck surface layer underlain by soft, high-water-content clays.

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

Basic Geologic Controls - Subsidence and Sea Level Rise

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

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

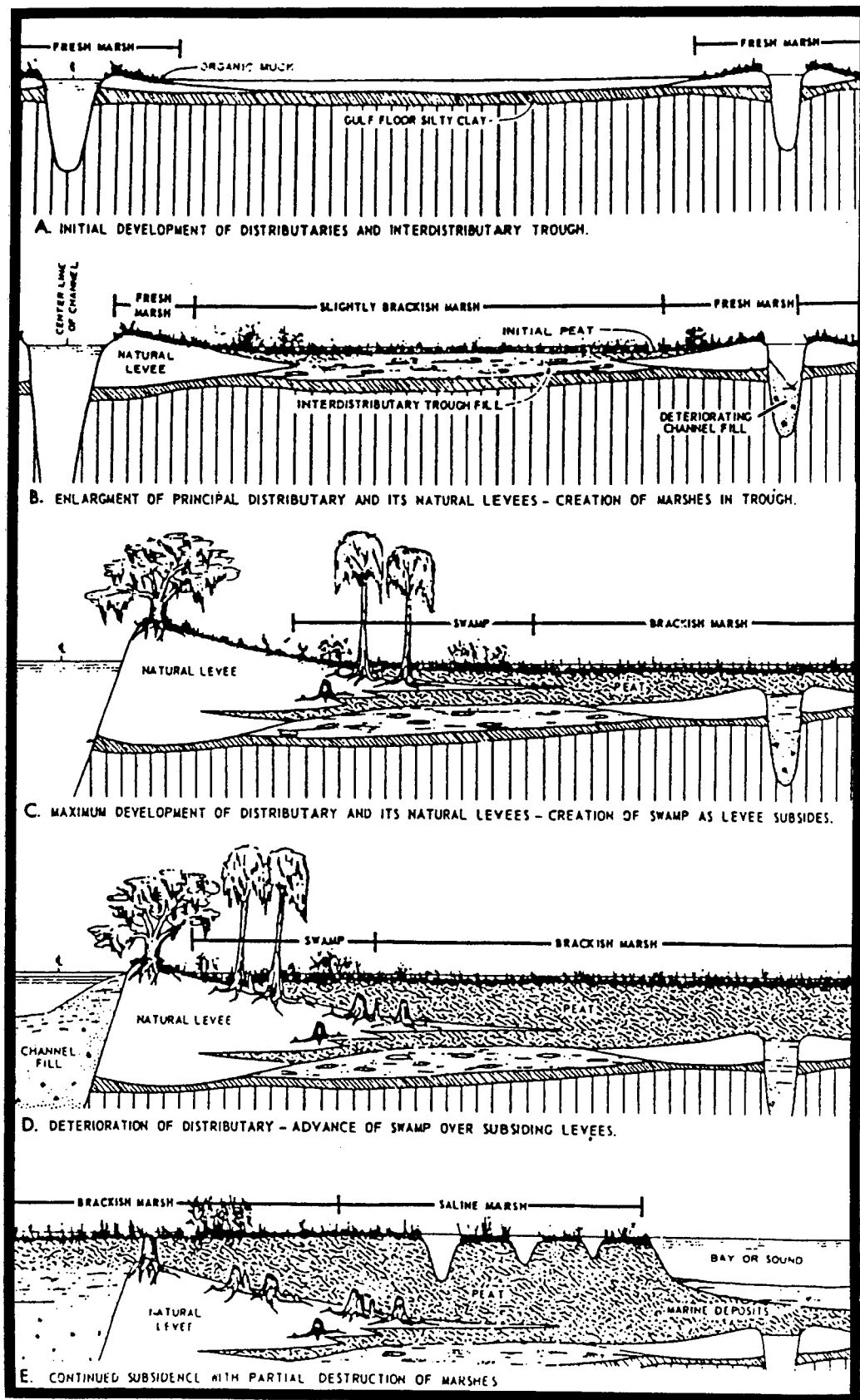


Figure 4. General stages of delta development (from Fisk 1960).

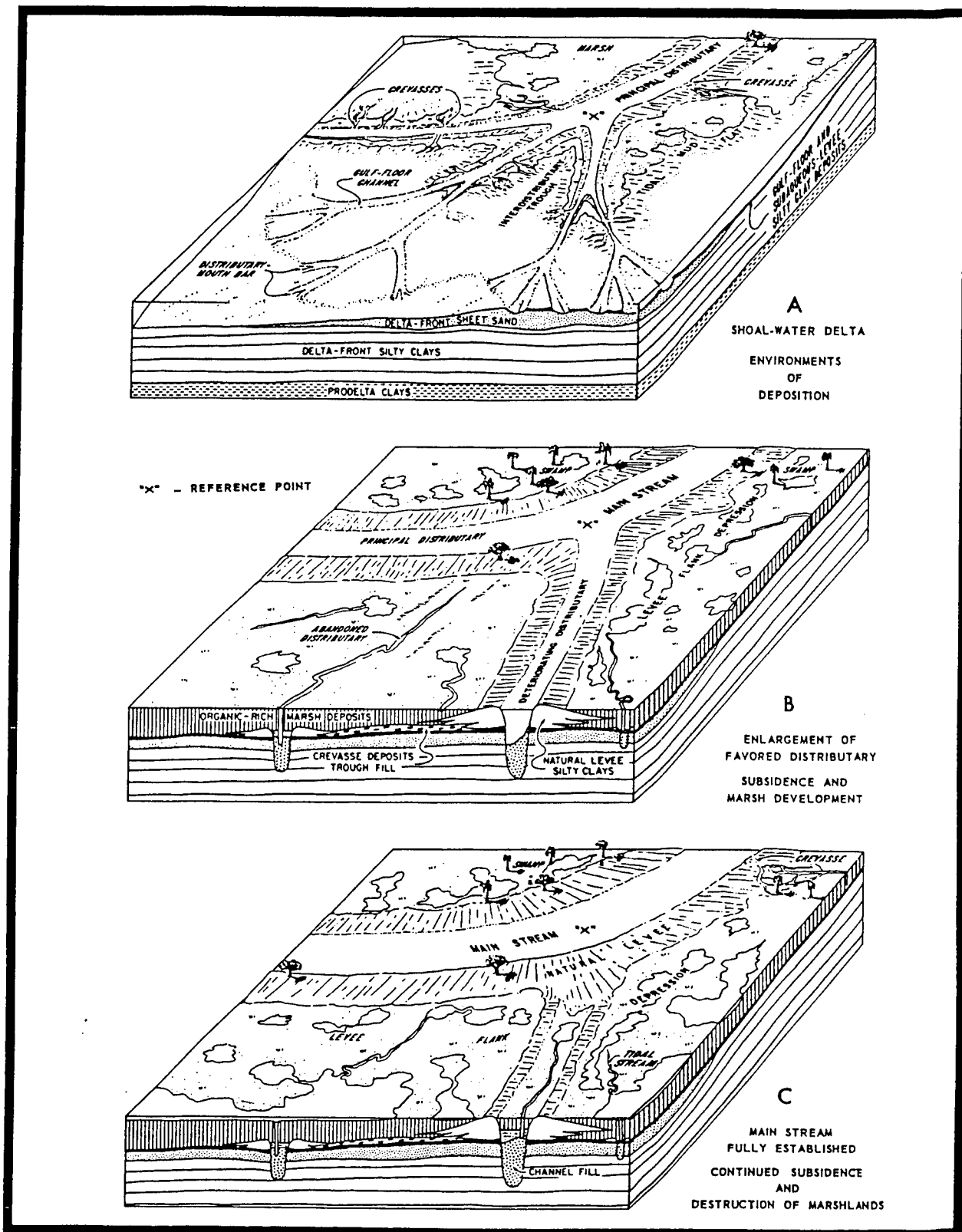


Figure 5. Changing deltaic plain environments and resulting depositional sequences of a prograding delta lobe (from Fisk 1960).

dence rates in the project area for at least the last few centuries probably vary from about 1.1 to 2.7 mm/yr.

Within the last several decades, most geologists have come to realize that sea level did not attain its essentially present level (± 1 m [± 3.28 ft]) until about 3,500 years ago, and about 5,000 years ago, the level was perhaps as much as 5 m lower than at present. Consequently, the subsidence rates mentioned above are valid for no more than the last 3,500 years; prior to that time, a higher rate of the sea level rise component of subsidence would have made the total subsidence rate much higher. The progression of geologic knowledge and concepts also has led to the now-widely-accepted hypothesis that the rate of sea level rise during the Holocene has been episodic rather than steady, producing a step shape to a sea level rise curve (Penland, Suter, and McBride 1987). For example, it has been postulated by the above authors that between 3,000 and 4,000 years ago, the rate of sea level rise was about 6.0 mm/yr. This amount would have to be added to that contributed by the other components of subsidence. Prior to that time, the authors feel that sea level had been relatively stationary for at least 2,000 years.

It is quite apparent that regional subsidence has been a dominant factor in all aspects of the geomorphology of the deltaic plain. It has contributed to the configuration of landforms, the nature and distribution of depositional environments, the patterns of delta lobe growth and decay, and the architecture of the sedimentary record. In turn, it has indirectly affected where humans have been able to reside and if and how the evidence of their presence has been preserved. With the now popular step-function sea level rise scenario in mind, it is logical that geologists are attempting to link the timing and formation of each major delta complex to this aspect of subsidence as a forcing variable. One recent postulated scenario of the relation of sea level to deltaic plain development is illustrated in Figure 6 (Goodwin et al. 1991).

Geomorphic Processes and Depositional Environments

Geomorphologically and sedimentologically, the Lafourche deltaic complex is a textbook example of a shoal-water, multiple-channel dis-

tributary system formed by a river with a high sediment load as it entered a low-tidal-range receiving water body. The frequent branching of the long and linear (low sinuosity) distributaries has formed what sometimes has been referred to as a "horsetail pattern." Figure 7, taken from Frazier and Osanik 1965) contains a popular sequence of block diagrams that well illustrate the landforms, landscapes, and shallow sedimentary sequences associated with a deltaic lobe of a complex such as the Lafourche at various stages in its cycle of growth (progradation) and decay (abandonment and transgression). In the Mississippi River deltaic plain, each cycle typically has had a duration of about 1,000 to 3,000 years.

A cycle begins with an upstream avulsion, possibly initially as a major crevasse, in which river flow and fluvial sediment is introduced into a shallow basin between older lobes or complexes (Figure 7A). The initial sedimentation consists of prodelta silty clays that are deposited basinwide from materials carried in suspension during major floods. Off the mouth of a newly formed channel, delta-front silty sands and silty clays accumulate rapidly and the water shoals. As the channel reaches a given point, distributary mouth bars accumulate rapidly and deltaic sediments become emergent in the form of mudflats and bars. These are rapidly vegetated with freshwater marsh. During the following years and decades, the marsh is periodically inundated during floods and the suspended sediment, mostly silts and clays, accumulates along the sides of the active distributary channel, beginning the process of natural levee growth. The mouth of the distributary advances seaward mostly during major floods, when rates of progradation may be on the order of several hundred meters.

During the next stage in the cycle (Figure 7B), as the distributary mouth advances past the given point, the distributary channel grows wider and deeper to accommodate increased discharge. Concurrently, the natural levees subside into the softer underlying deposits but achieve net growth (increased height and width) through the addition of new sediments. The natural levees soon acquire their typical prism or wedge cross-sectional shape that is better illustrated in Figure 4B, another set of diagrams whose original purpose was to illustrate the mechanics of peat formation in the deltaic plain (Fisk 1960). It is during this

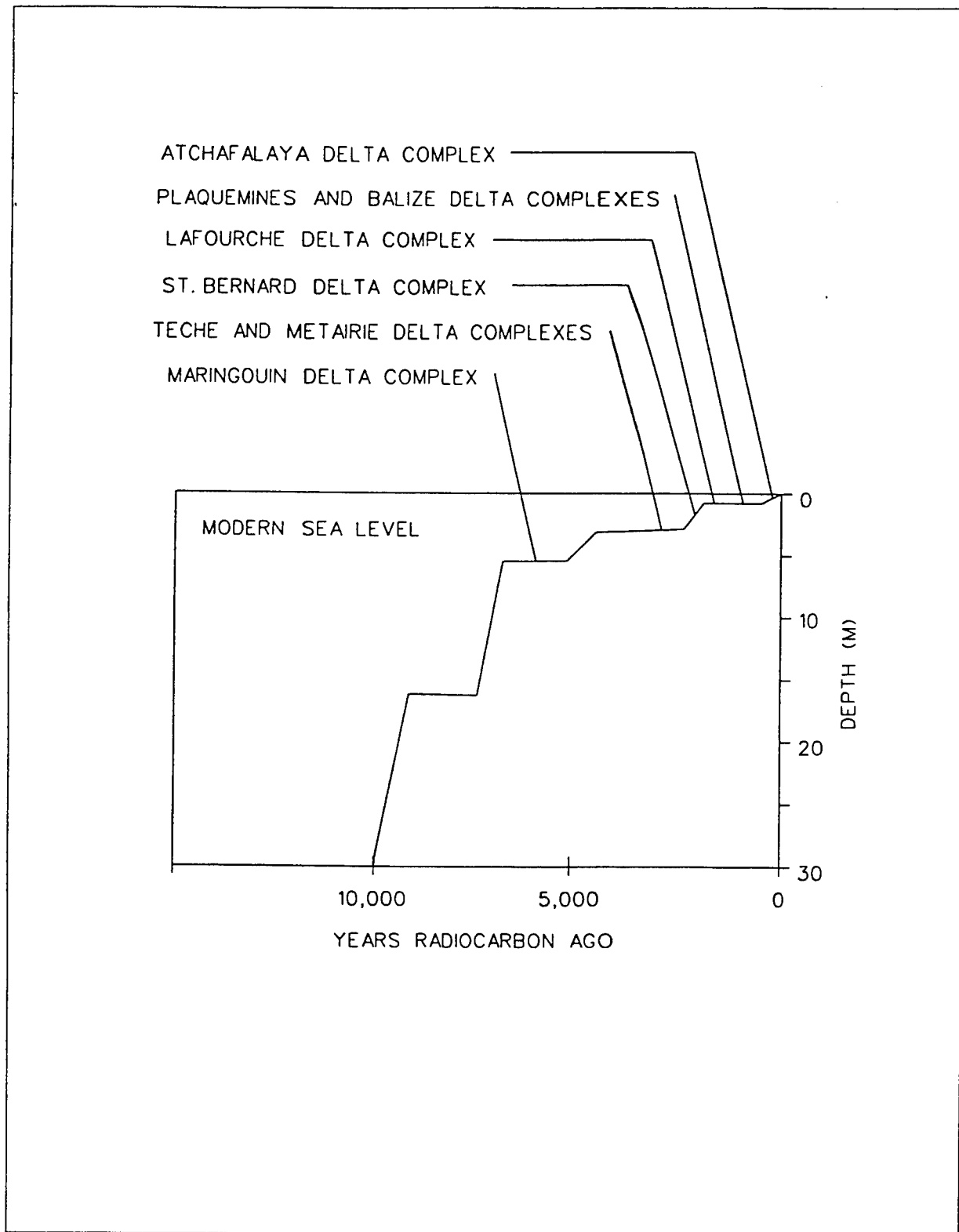


Figure 6. Chronology of delta complexes and relative sea level rise (from Goodwin et al 1991).

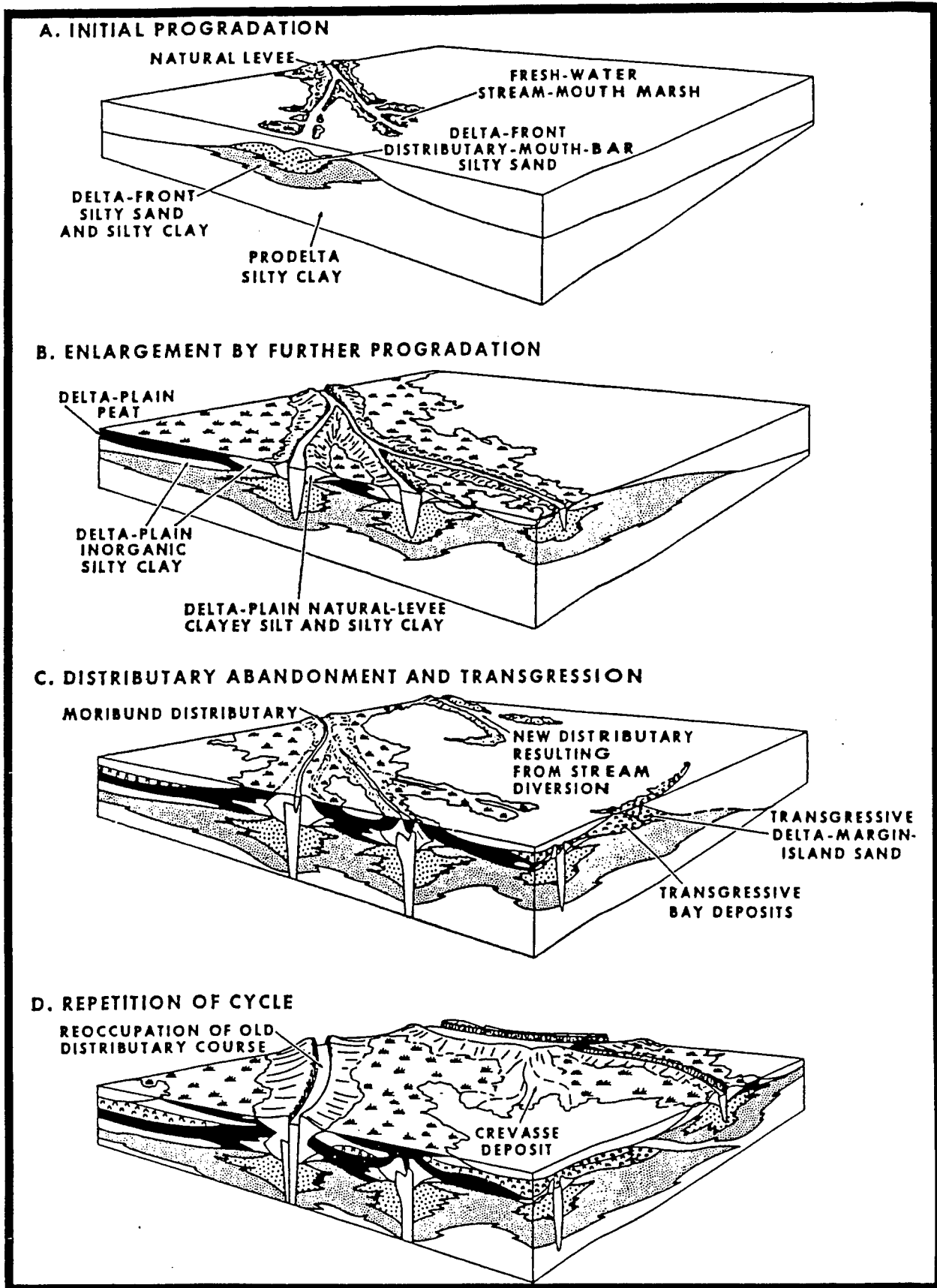


Figure 7. Development of delta sequences (from Frazier and Osanik 1965).

stage that extensive freshwater marshes essentially replace shallow brackish water in the inter-distributary basins, and that peat and highly organic clays begin to accumulate under the influence of progressive slow subsidence.

From an archeological perspective, a deltaic lobe early in this stage of formation would have been habitable but probably only on a seasonal basis. The broad wetlands would have provided lucrative habitats for fish, shellfish, waterfowl, and small mammals, but the natural levee ridges were still too low and narrow to support permanent settlements of any significant size. Shell middens may be present as evidence of exploitation sites, but villages are not to be expected. It should be noted that these observations/opinions pertain to Late Archaic and Formative stage cultures only. They are probably not valid with regard to earlier Archaic and Paleo-Indian-stage preferences and behavior, but this is irrelevant because none of the delta lobes present in the project area are old enough to have been inhabited during those stages.

While the deltaic lobe is still enlarging, natural levee growth is by way of sheet flooding during high water stages and the occasional concentration of flow in small crevasses. Neither Figures 4 nor 7 satisfactorily illustrate the important role of crevassing as a mechanism in natural levee development; Figure 5 has been included for this purpose. As the delta lobe nears maximum enlargement (latter part of stage B, Figure 7) and natural levees approach maximum height, crevasses become much less numerous but those that form are larger and more persistent (Figure 5). Each crevasse consists of one or more distributary-like channels that radiate from a breach in the natural levee and that divert flood flows from the distributary into the adjacent interdistributary wetlands. If flow is renewed during multiple flood events, the crevasse channels develop their own natural levee ridges. Hence, each crevasse system is in effect a miniature delta lobe. As the crevasse lengthens into the interdistributary basin, the flow follows the most efficient hydrologic route, and it is not unusual for it to occupy a relict abandoned distributary channel from an earlier stage of the delta lobe or from an older lobe.

During this same stage of development, new distributaries typically form as a result of diversions or avulsions from older ones. Often low-

angle bifurcations occur with one channel eventually becoming dominant and the other rapidly abandoned. No doubt most avulsions begin as a crevasse that happens to be in a location and configuration as to favor further development. As a consequence of these processes, there are some channel/natural-levee-ridge features present in most delta lobes that are indistinguishable as being either small, short-lived distributaries or rather large, persistent crevasses. In the mapping classification for this project (discussed below), an arbitrary, judgmental line had to be drawn between the two in several cases.

Natural levee ridges throughout the stage of lobe enlargement are large enough to support deciduous hardwood forests in all but the most Gulfward or distal ends of the distributaries where occasional inundation by brackish water allows only salt-tolerant shrub growth. The end of the stage of lobe enlargement (Figures 5B and 5C) marks the maximum extent of freshwater conditions in the interdistributary wetlands. Additionally, because river discharge through the lobe is nearing its maximum, there are appreciable amounts of turbid flood water reaching the interdistributary basins through crevasses and the consequent deposition of appreciable amounts of clays. Because of these factors, the upper parts of the interdistributary basins are able to support cypress swamps. Swamp forest vegetation also occurs toward the central part of the lobes in bands between the distal flanks of the natural levee ridges and the fresh to brackish marsh toward the centers of the basins (Figures 4C and 5B). In both swamps and marshes, the accumulation of peats and organic matter helps maintain the near-sea-level surface elevation as regional subsidence continues.

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

After a delta lobe builds seaward over a period of centuries and essentially fills an estuarine area, conditions of stream gradient, channel hydraulic efficiency, and other factors begin to favor an upstream diversion or avulsion. When this

eventually takes place, the delta lobe enters a stage of abandonment and deterioration; with declining discharges, sedimentation rates (both organic and inorganic) are no longer able to exceed or even keep pace with subsidence rates. Several important changes in physiography, environments, and geomorphic processes begin to occur, as shown in Figures 4D and 7C.

At the proximal end of the lobe, the most noticeable change is the progressive downstream filling (shallowing and narrowing) of abandoned distributary channels. Over a time frame measured in decades to a few centuries, the channels in that area evolve into slackwater streams or in some cases swamp-filled depressions. At the distal end of the lobe, changes are much more dramatic and rapid. Nearshore processes of wave action and longshore currents in the Gulf begin to erode and rework distributary mouths, and the coarser sediments accumulate in beaches and spits that begin to migrate landward. Slightly farther inland, subsidence and salt-water intrusion begin to take their toll. Brackish marsh evolves into saline marsh in interdistributary basins and begins to break up as tidal channels, lakes, and bays enlarge and become more numerous. Along the distributaries, natural levees subside progressively and are encroached upon by the adjacent wetlands (Figure 4D). The hardwood forests of the levees give way to cypress swamp, and swamp areas die out and are replaced by brackish marsh. Longitudinally, at the distal ends of the distributaries, levees eventually disappear beneath sea level and may be discernible for a while only by marsh drainage and slight differences in marsh vegetation types (Figure 4E). Often the presence of a buried natural levee can be inferred only by traces of the abandoned distributary channel that survives as an unusually long and linear bayou. It should be noted that whereas abandoned distributary channels typically narrow and fill upstream as delta lobe decay proceeds, they usually widen (but not deepen) downstream as they function more as tidal channels and experience bank erosion.

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

of the deltaic plain. Since subsidence is ubiquitous, eventually the decaying lobe, or the area that it occupied, will be overlapped by a new one.

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

Landform/Depositional Environment Mapping Classification

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

With the input of the present mapping intended for an archeological predictive model, the environment needed to be stratified as finely as practical. The scale of the mapping allowed a tenfold classification that takes into consideration attributes of the landscape that are perceived as having been influential in prehistoric settlement patterns. Emphasis logically was on distributary

and crevasse natural levee ridges, since these were the only habitable landforms. Considerable attention also was devoted to detecting buried (subsided) natural levee ridges from the viewpoint that the majority of sites on levees with prominent surface expression already have been located. A few sites associated with older, subsided levee systems have been detected and it is believed that the probability of encountering additional ones is considerable.

Descriptions of the mapping units are presented below and the results of the mapping are portrayed in Attachment I. Figure 8 is a schematic illustration of an idealized deltaic landscape showing the typical relationships and characteristics of the units.

Crests of Distributary Natural Levees (DNL_C)

Analyses of the locations of known archaeological sites in similar deltaic plain settings, especially those of villages and mound centers, indicate that favorable locations for settlement were either on the crests of natural levees near distributary channels or on their distal flanks close to adjacent swamp or marsh environments. Where natural levee ridges are less than about 0.5 km (0.31 mi) wide (as they are throughout most of the project area), the width becomes irrelevant. However, on wider ridges where elevations usually exceed 2 m (6.56 ft), the crests have been delineated arbitrarily. These occur only in the northernmost part of the project area and include lands that are completely in cultivation.

Distributary Natural Levees (DNL)

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

natural levees in this unit range between about 1 and 2 m (3.28 and 6.56 ft).

Distal Portions of Distributary Natural Levees (DNL_D)

Those portions of natural levee ridges that lie between the extent of cultivation as defined above and either the flanking cypress-gum swamps or higher freshwater marshes are included in this mapping unit. Longitudinally, this unit also includes the distal ends of distributaries where the levees gradually slope downward to prevailing marsh level and are still recognizable, albeit too narrow or too low to support agriculture or urban development. In both cases, this transitional zone without sharp boundaries is delineated subjectively. Elevations generally are less than 1 m (3.28 ft). In the northern portion of the project area, most distal natural levees are still in deciduous forest, but agriculture occasionally has been extended into this zone.

Distal natural levees include those formerly higher areas that are gradually subsiding beneath and that are being overlapped by wetlands, but that still maintain natural levee vegetation and soils characteristics.

Subsided Portions of Distributary Natural Levees (DNL_S)

This mapping unit includes narrow bands of present swamp or marsh adjacent (basinward and seaward) to distal natural levees that are underlain at a shallow depth (generally 2 m [6.56 ft] or less) by subsided natural levees. It also includes similar situations not contiguous with subaerially exposed levees where an entire distributary is buried. In these cases, the outer limits of the natural levee ridges are indeterminable, and bands of arbitrarily determined average and constant width are shown in the mapping.

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

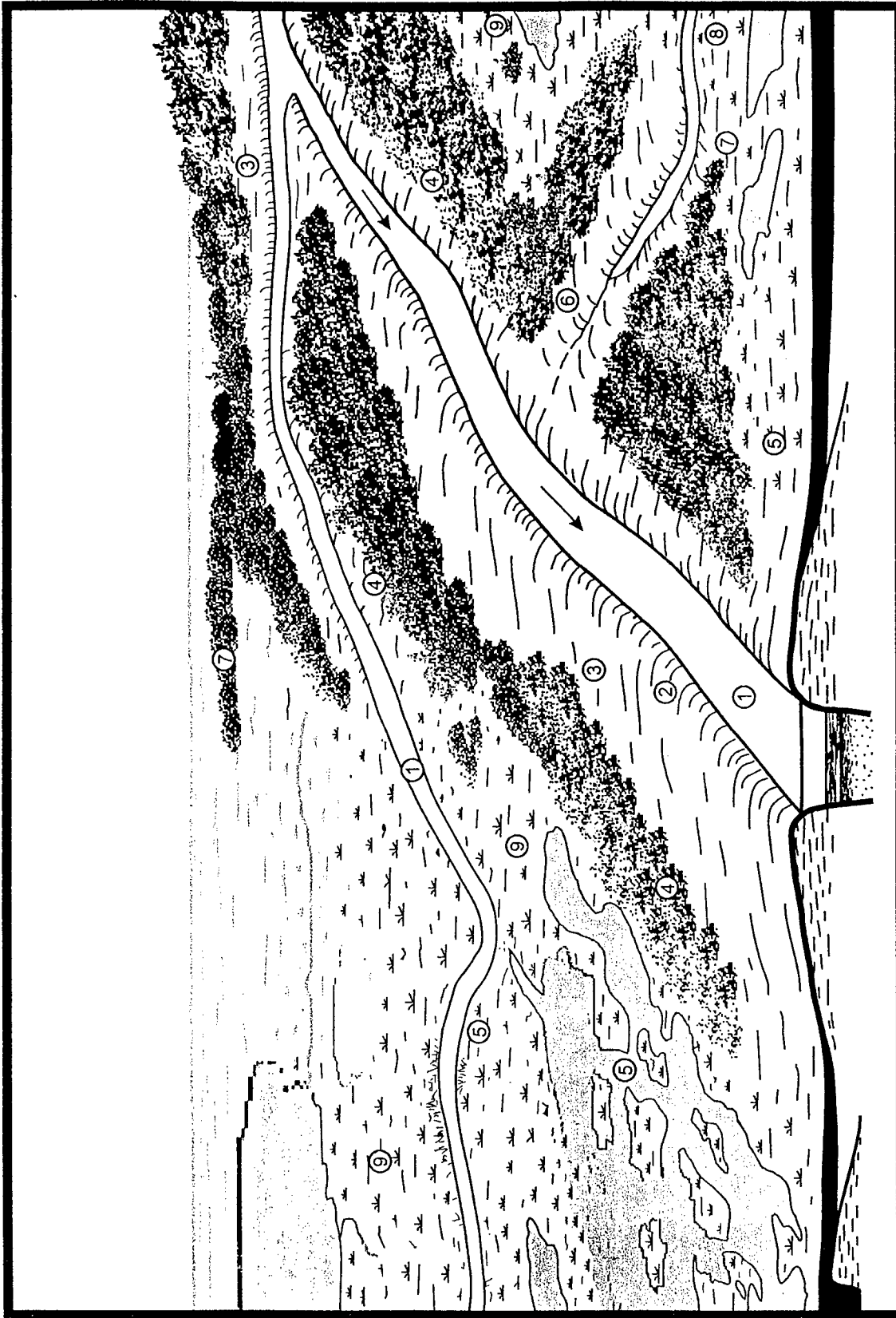


Figure 8.

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

open water is becoming dominant, the only surviving patches of marsh vegetation may be those located above subsided levees.

Distributary Channels (Dh)

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

Crevasse Natural Levees (CNL)

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

Distal Portions of Crevasse Natural Levees (CNL_D)

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

Subsided Portions of Crevasse Natural Levees (CNL_S)

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

Buried Distributary Natural Levees (DNL_B)

This unit is represented in the mapping by dashed lines. It represents zones where older distributary natural levees (including distal and subsided zones) are buried and masked by younger distributary or crevasse natural levees or distal natural levees. Burial may be as deep at 3 to 4 m (9.84 to 13.12 ft) beneath the higher portions of the younger levees. The routes and designated widths of the buried systems are only approximations based on projected trends, since distinctive changes in topography, soils, or drainage usually are absent. Confirmation of their presence and precise location would require subsurface investigations.

Interdistributary Wetlands (IW)

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

Geomorphology of the Project Area

A small-scale view of the key geomorphic features of the project area, focusing on the prominent distributaries but also showing the locations of the larger crevasses and a series of heretofore unnamed subsided distributaries is depicted in Figure 9. It should be noted that whereas the figure presents a holistic view of the prominent distributaries and their natural levee ridges, the full areal extent of some of the crevasses and most of the subsided distributaries is not shown. Hence, the presence of arrows indicate the *direction* but not route of some systems, and question marks indicate the unknown trends of others. This is because the detailed aerial photo interpretation was either not extended farther than a few kilometers from the project corridor, or the routes of the features could not be discerned.

Over most of the project area, the proposed flood protection levees follow routes along the flanks of six principal distributaries of the La-

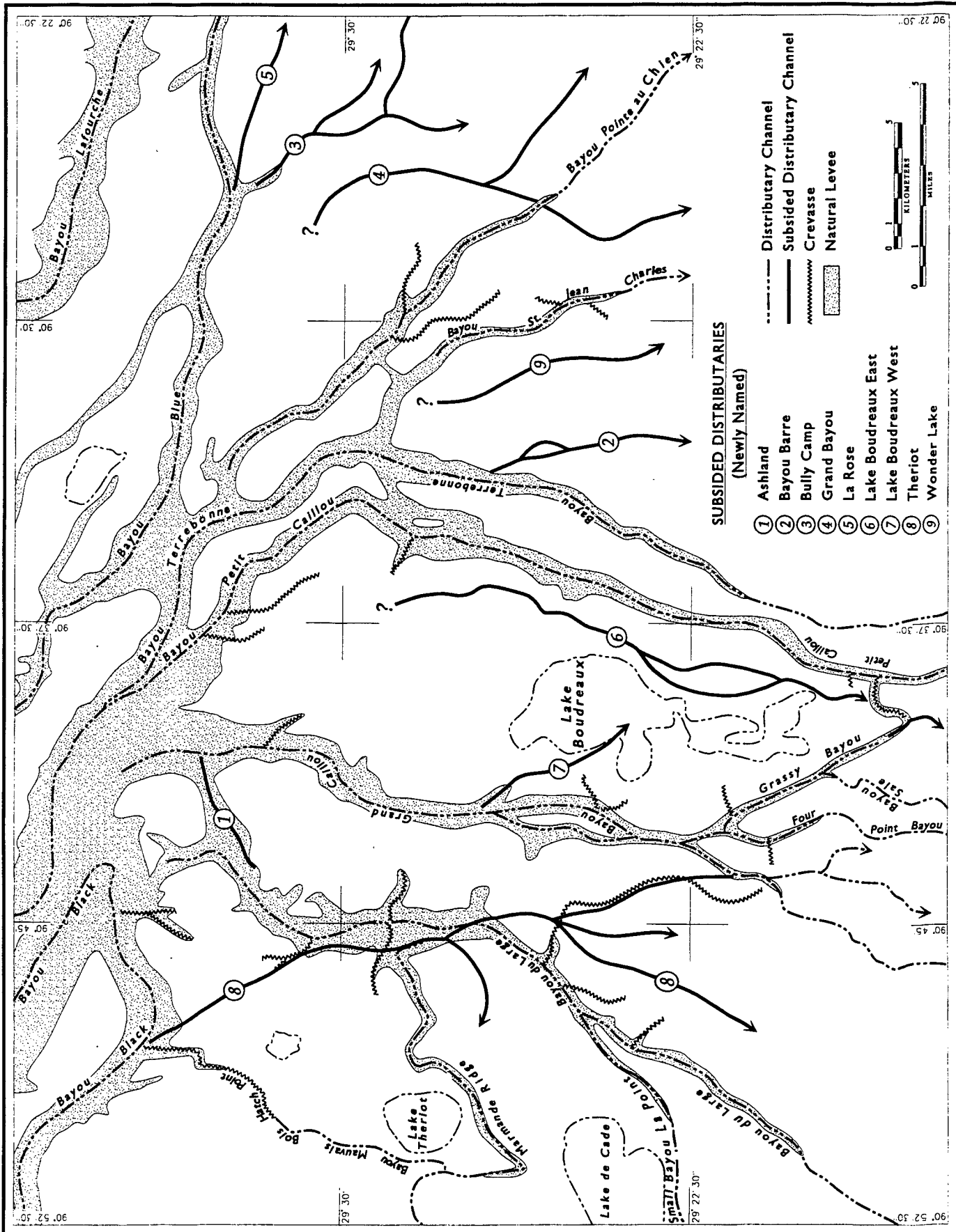


Figure 9. Location map and overview of the key geomorphic features of the project area.

fourche complex that radiate seaward from the vicinity of Houma, Louisiana. From west to east, these include Bayou du Large, Bayou Grand Caillou (and Grassy Bayou), Bayou Petit Caillou, Bayou Terrebonne, Bayou St. Jean Charles, and Bayou Pointe au Chien. Since the intent of the artificial levees is to provide flood protection from storm surges to agricultural and urbanized areas, their routes principally lie in the distal or subsided natural levee zones or within proximal interdistributary wetlands. Over the remainder of the project area, the levee routes or corridors cut across interdistributary wetland areas from one distributary natural levee ridge to another. At the project's northwest and northeast limits, the proposed levee routes tie in with the prominent natural levees along the Bayou Black and Bayou Blue distributaries, respectively.

Within the interdistributary wetlands, the artificial levee routes cross nine major subsided distributaries and their natural levee ridges at more than a dozen locations. As indicated previously, subsided distributaries are known to contain archeological sites, and these features are little known and investigated. Accordingly, emphasis is placed on them herein, and names have been given to these distributaries to facilitate the following discussions (Figure 9) based on nearby natural or cultural locations.

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

The second class includes the Ashland, Grand Bayou, Lake Boudreaux East, and Theriot distributaries. These are larger and more consequential distributaries that have greater regional extent. They may be related either to an early phase of the Lafourche complex or to the preceding Teche complex (see next section). Rather

than apparently merging with Lafourche complex distributaries, at least three of them definitely underlie and are buried by the Lafourche distributaries. The largest of the four, the Theriot distributary, either branches from or is overlain by the natural levee ridge of Bayou Black west of Houma, and it trends southward where it is overlain by Marmande Ridge. In turn, Marmande Ridge apparently is an early distributary or major crevasse related to the Bayou du Large distributary (Weinstein and Kelley 1992). Toward the east, a branch of the Grand Bayou distributary is unquestionably overlain by and is younger than the Bayou Pointe au Chien distributary.

Chronology and Geologic History

Preliminary to discussing the geologic history of the project area and developing a sequential scenario of events, a brief overview of the basic evolution of the deltaic plain is in order. Of the several reconstructions available, the one of Frazier (1967) is used as the basic reference because it is the most detailed and generally accepted (Figure 10).

Since the 1950s, the Maringouin delta complex has been regarded as the earliest to have formed during the Holocene transgression, possibly as a result of a relative sea level stillstand at about 6 m (19.68 ft) below present (Goodwin et al. 1991). The complex is believed to have covered a broad area offshore from central Louisiana, and the trunk river course was along the western side of the Mississippi alluvial valley. As shown in Figure 11, various workers disagree on when it began forming, but it is generally believed that it was abandoned by at least 6,000 years ago. Recently, Penland et al. (1988) have suggested the presence of an earlier complex farther offshore that they called the Outer Shoal complex. Sea level is postulated as having been about 16 m (52.48 ft) lower than at present at that time. In any event, both of the complexes were destroyed by marine processes during subsequent sea level rise.

Further sea level rise after 6,000 years ago allowed the Teche complex to form at a slightly higher elevation and to override the inland parts of the Maringouin complex. The trunk course is marked by the location of present Bayou Teche, and several distributaries of the system, such as Bayous Salé and Cypremort, still have surface

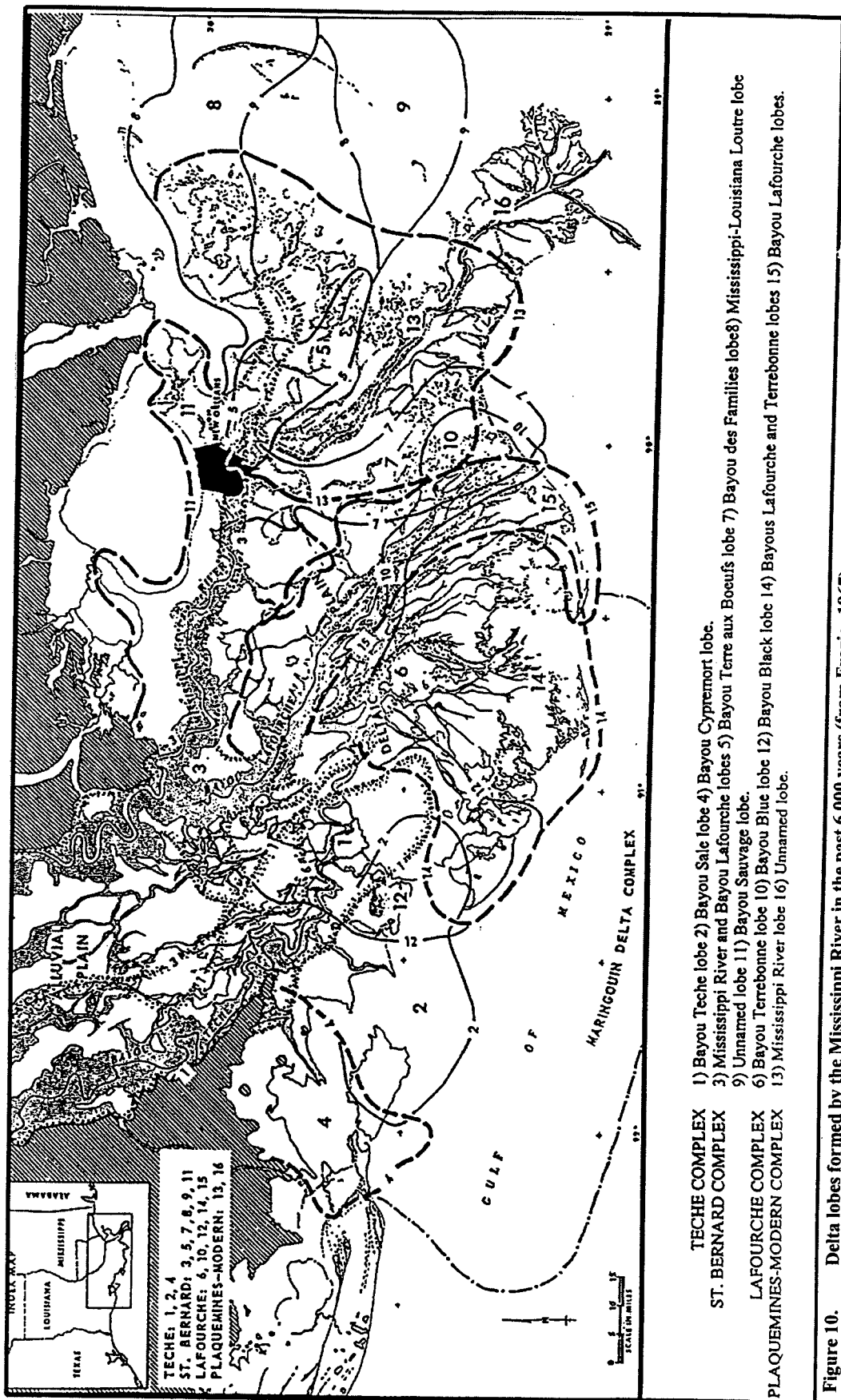


Figure 10. Delta lobes formed by the Mississippi River in the past 6,000 years (from Frazier 1967).

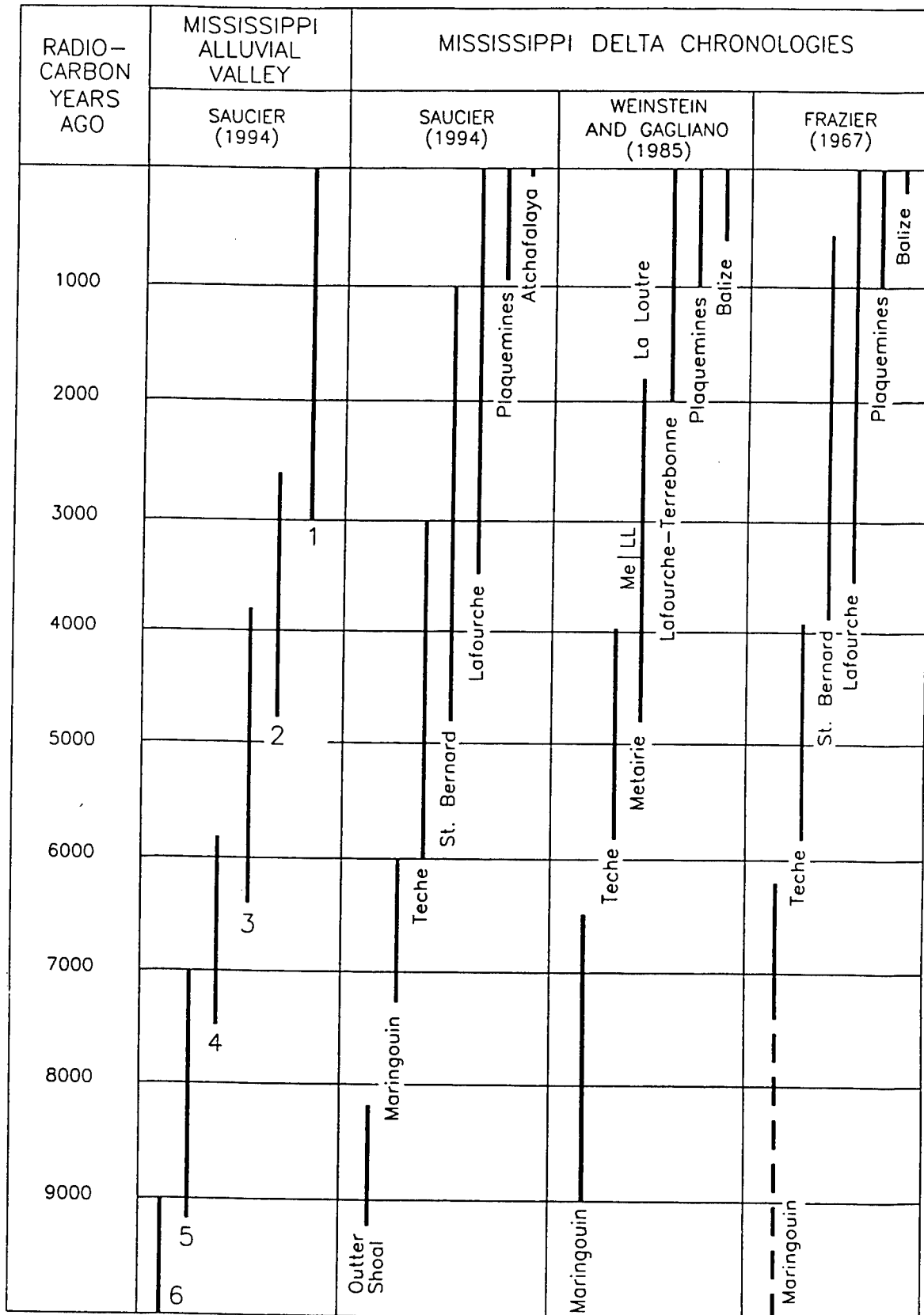


Figure 11. Comparative estimates of the ages of Mississippi River meander belts and delta cycles (from Goodwin et al 1991).

expression as do others just west of the project area (Smith, Dunbar and Britsch 1986). Estimates of the abandonment of the Teche complex range from about 3,000 to 4,000 years ago (Figure 11).

Locations of the eastern and southern limits of the Teche complex remain areas of disagreement. The controversy continues since neither detailed stratigraphic studies nor definitive radio-carbon dates have been obtained. With regard to the eastern limits, compounding the situation is the fact that the downstream end of the eastward-flowing Teche trunk course in the vicinity of Houma was reoccupied by the westward-flowing Bayou Black distributary, which is generally regarded as part of the Lafourche complex. As discussed by Weinstein and Kelley (1992), some investigators have placed the eastern margin of the complex as far as 48 km (29.82 mi) east of Houma and believe that Bayou du Large, Bayou Mauvais Bois, and Small Bayou La Pointe distributaries initially were formed in the Teche complex. Other investigations, notably Smith, Dunbar and Britsch (1986), assign those distributaries to the Lafourche complex.

Concerning the southern limit of the complex, Penland, Suter and McBride (1987) believe that whatever distributaries were present were truncated by the Teche ravinement as far north as an east-northeast by west-southwest trending line drawn roughly from the vicinity of Lake Theriot to the northeast corner of Figure 9. Several writers, including Weinstein and Kelley (1992) and McIntire (1954) have noted a long, mostly subsided shell beach ridge and scattered middens (or perhaps all middens) trending southwest from the Lake Theriot area which have been interpreted as evidence for the truncated margin of the Teche complex. Unfortunately, the mapping in the area by Smith, Dunbar, and Britsch (1986) is nondefinitive and contains anomalies regarding the relationship between the possible beach ridge and Teche distributaries in the area.

During the most recent archeological survey in the region, Weinstein and Kelley (1992) discovered two buried shell middens with Poverty Point-period components (Sites 16TR211 and 16TR212) on a small southwest trending distributary named Turtle Bayou. This stream lies southwest of Lake de Cade several kilometers west of the limits of Figure 9. The sites are located about 5 km (3.1 mi) south of the possible

beach ridge described above. Based on the probable age of the sites (a maximum of about 2,500 years), these workers feel that Turtle Bayou, which probably predates Bayou du Large and which is stratigraphically older than Marmande Ridge, is a Teche complex distributary. If this is correct, the beach ridge mentioned above cannot be the truncated southern margin of the Teche complex.

An alternative scenario can be offered which differs in several major respects from previous concepts. To understand this new hypothesis, it is necessary to consider an upstream avulsion of major consequence. Approximately 4,800 years ago, the Mississippi River began diverting flow to a new course in east-central Louisiana and began for the first time in the Holocene to build a meander belt along the eastern side of its valley. This episode marked the beginning of declining flow in the Teche trunk course and its delta complex, and the extension of a trunk course past Baton Rouge, Louisiana, and on to the southeast into the upper deltaic plain.

There is considerable uncertainty and difference of opinion as to the sequence of events that took place shortly after this time. It appears certain, however, that as a consequence of the newly formed eastern trunk course and meander belt, a delta lobe extended rapidly eastward into and beyond the New Orleans, Louisiana, area, marking the beginning of the St. Bernard delta complex (Saucier 1963; Frazier 1967). Most workers, including Kolb and VanLopik (1958), believe that as flow declined in the Teche system over a period of several hundred years, full flow developed in the eastern trunk course, leading to the progressive formation of St. Bernard delta complex lobes such as the Bayou Terre aux Boeufs [No. 5], Bayou des Familles [No. 7], Bayou La Loutre [No. 8], and Bayou Sauvage lobes [No. 11] (Figure 10). It was assumed that there was no delta lobe formation or significant sedimentation event in the broad basin area that existed between the Teche lobes west of Houma and the Barataria area to the east (Bayou des Familles lobe [No. 7], Figure 10) until the Lafourche complex began developing about 2,000 years ago. To our knowledge, Frazier (1967) has been the only one to cite evidence for the development of a delta lobe in the upper part of that basin concurrent with the progradation of the St. Bernard complex. Frazier

indicates that the lobe (Mississippi River and Bayou Lafourche [No. 3]) initially formed where those two streams currently join and subsequently extended southward with Bayou Terrebonne marking the location of the principal distributary [No. 6]. The main development of this lobe, an early phase of the Lafourche complex, is estimated to have been between about 3,500 and 2,000 years ago.

The alternative scenario offered here is close to the views of Frazier (1967) and Smith, Dunbar, and Britsch (1986), and assigns distributaries such as Marmande Ridge, Small Bayou La Point, Turtle Bayou, and Bayou Terrebonne to an early phase of the Lafourche complex, rather than to the Teche complex as favored by Weinstein and Kelley (1992). Moreover, and of special significance to this project, it assigns the Theriot, Lake Boudreaux East, and Grand Bayou subsided distributaries to the same phase (Figure 9). As shown in Figure 12, Sheet 2, which is one of a series of simplified paleogeographic diagrams, this writer believes that between 4,000 and 3,500 years ago the distal margin of the abandoned Teche complex was eroded back to approximately the position advocated by Penland, Suter, and McBride (1987). By 3,500 years ago, deltaic progradation in the vicinity of Bayou Lafourche extended to this former coastline, and soon thereafter distributaries prograded seaward into shallow Gulf waters. It is postulated that the period of progradation lasted until at least 3,000 years ago (Figure 12, Sheet 3) and was followed by 500 to 1,000 years of slow delta lobe deterioration when all or most of the Mississippi River discharge was being directed into the St. Bernard delta complex (Figure 12, Sheet 4).

By about 2,000 years ago, the Mississippi River was still discharging into the Gulf through distributaries in the St. Bernard complex, but near that time an avulsion occurred that once again diverted significant flow into the area of the earlier Lafourche lobe. This marked the beginning of the late phase of the Lafourche complex and, according to Frazier's (1967) scenario (Figure 10), sequentially involved the formation of the Bayou Blue [No. 10], Bayou Black [No. 12], and Bayous Lafourche and Terrebonne [No. 14] lobes (Figure 12, Sheet 5). Judging from the small magnitude of the St. Bernard complex lobes that were active during this time, a very large percentage of the

river's discharge must have been into the Lafourche distributaries between about 1,500 and 1,000 years ago. However, evidence from the New Orleans area (Saucier 1963) indicates that near full-flow conditions had returned eastward into that area at about 1,000 years ago, with only enough flow entering the Lafourche complex to form the Bayou Lafourche [No. 15] distributary after about 400 years ago (Figure 12, Sheet 6).

Within the two phases and five major lobes of the Lafourche complex discussed above, there are nearly two dozen named distributaries. Despite the large number of radiocarbon dates available to Frazier (1967), the ages of most of distributaries are either completely unknown or questionable. Nevertheless, the types of branching or forking situations and cross cutting relationships described earlier provide a means (the only means at this time) of establishing at least a rudimentary relative chronology. This chronology, presented in Table 2, is based on Frazier's delta lobe identification and age estimates. Within each lobe, we have given our interpretation of the *relative* ages of the distributaries, including the ones named in this report. It should be noted that where multiple distributaries are bracketed, no relative age determinations are possible and it is likely that they are of essentially the same age. This listing must be considered as very tentative and as a working model since some of the branching and cross-cutting relationships are inconclusive and subject to multiple interpretations.

It can be seen from the table that there are very few radiocarbon dates from either geological or archeological contexts that can be used to "calibrate" the relative chronology. There are only 11 known dates in or close to the project area that are from deposits of the Teche or Lafourche complexes and these are listed in Table 3. Of that number, only four are considered to be meaningful (see Notes, Table 3) and are listed in Table 2. They are consistent with Frazier's estimates since they were used by him in his interpretations. The only dates from archeological contexts are from two sites on Bayou Grand Caillou, and they only establish minimum dates for the distributary since the sites were not occupied until after the distributary was abandoned.

Numerical age estimates based on interpretations of the cultural affiliation of the oldest artifact assemblages from sites are also pre-

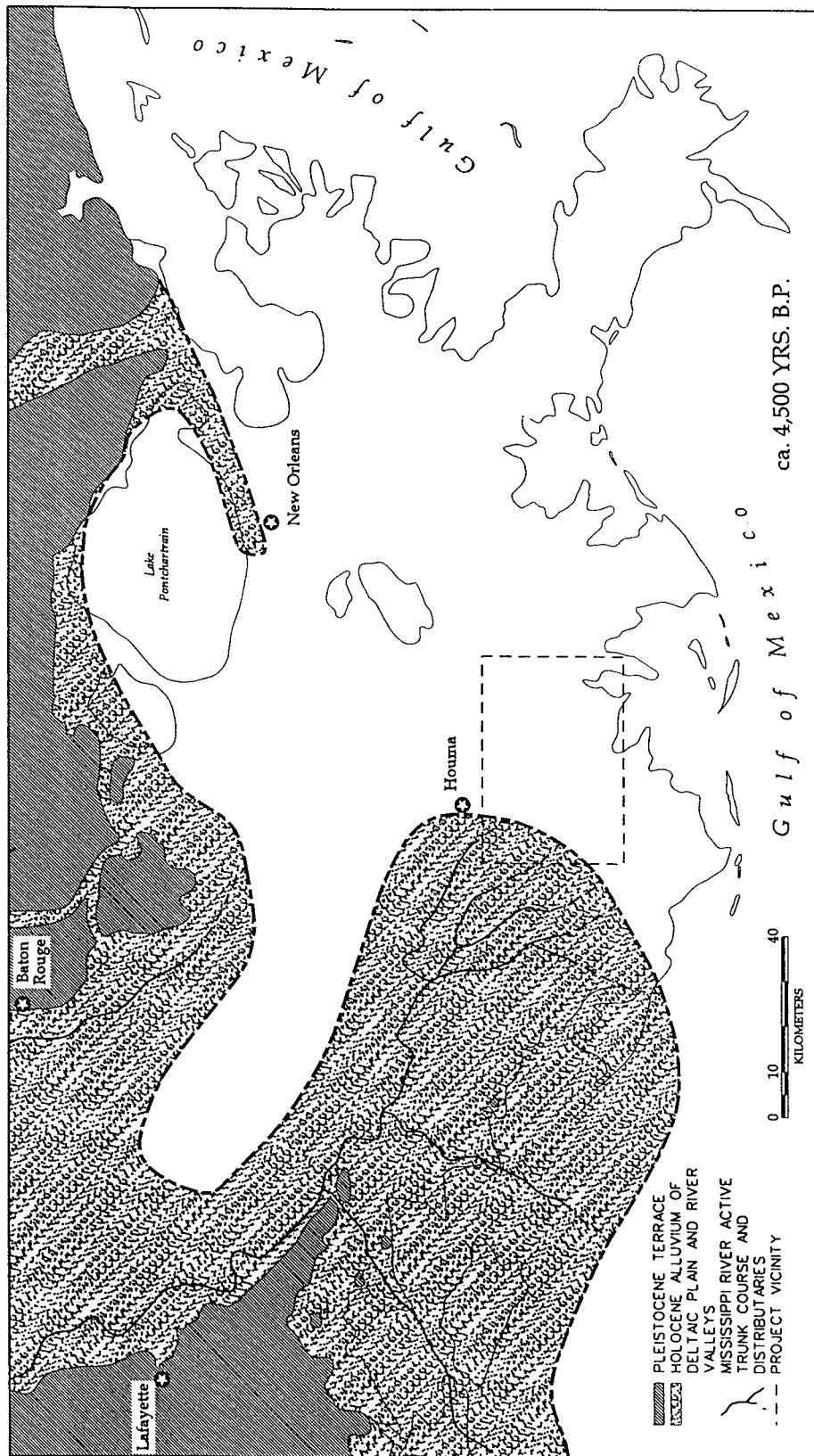


Figure 12. Simplified paleogeographic model of the project area illustrating interpreted geomorphic settings at 4,500 years B.P.
Sheet 1

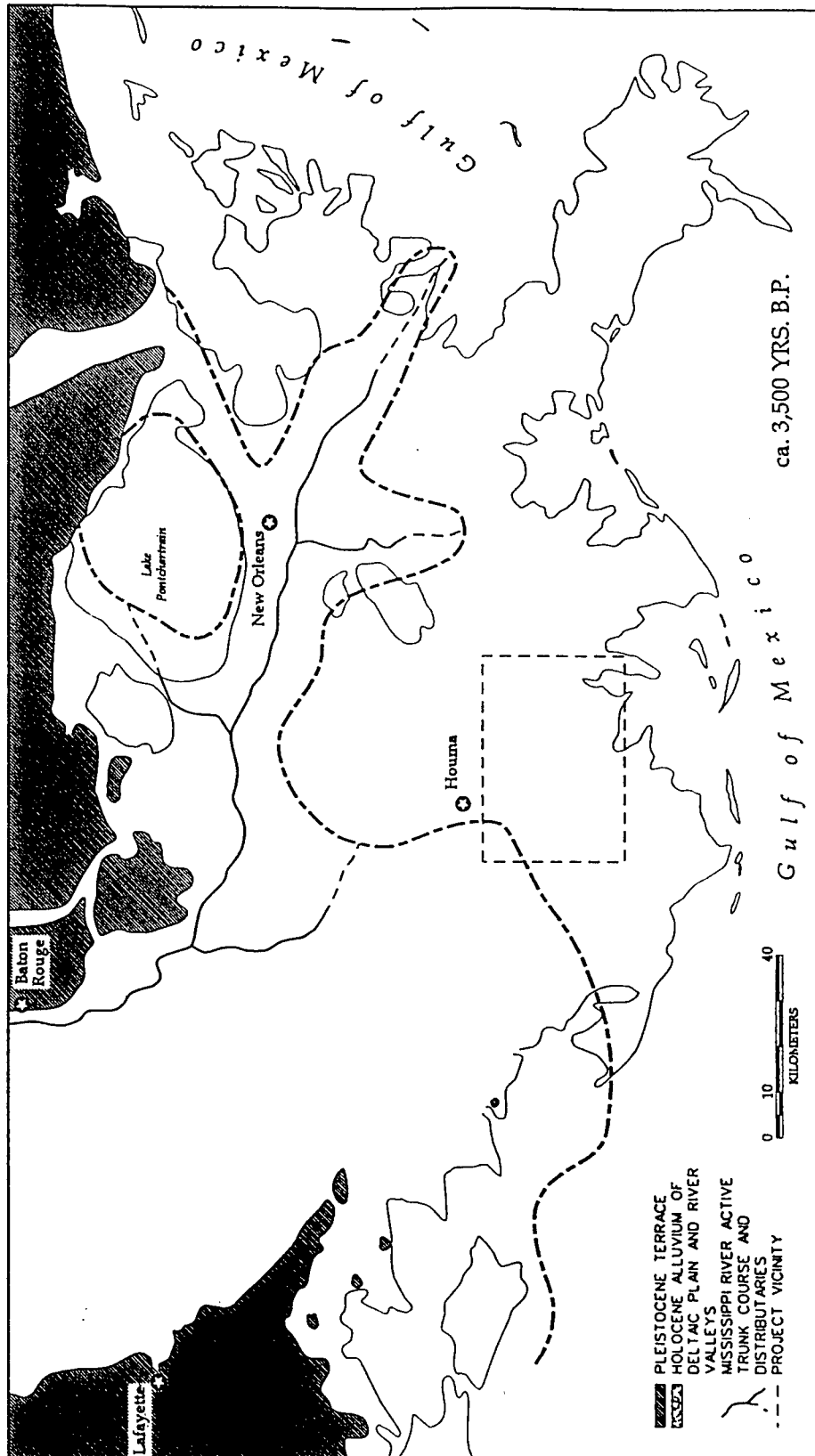


Figure 12. Simplified paleogeographic model of the project area illustrating interpreted geomorphic settings at 3,500 years B.P.
Sheet 2

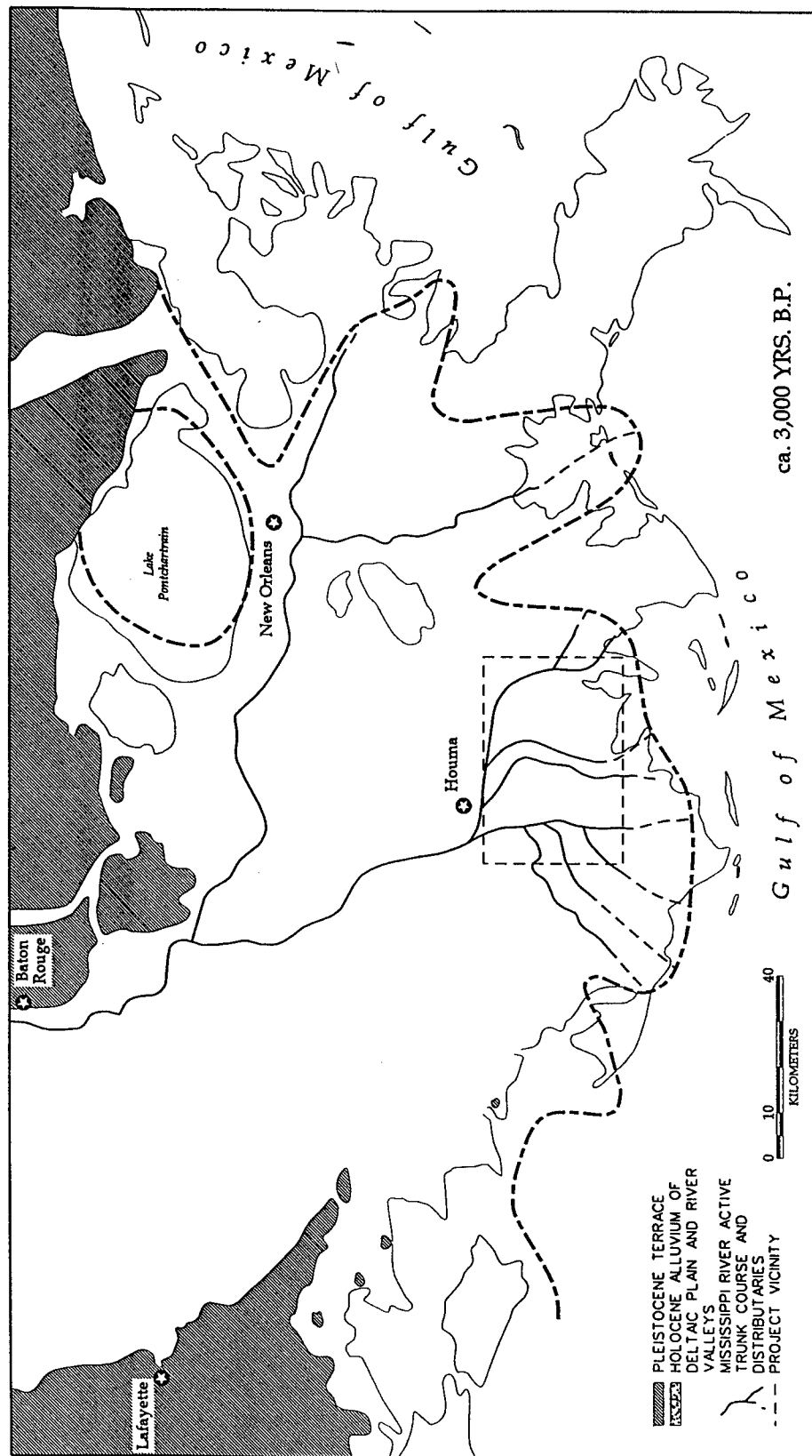


Figure 12. Simplified paleogeographic model of the project area illustrating interpreted geomorphic settings at 3,000 years B.P.
Sheet 3

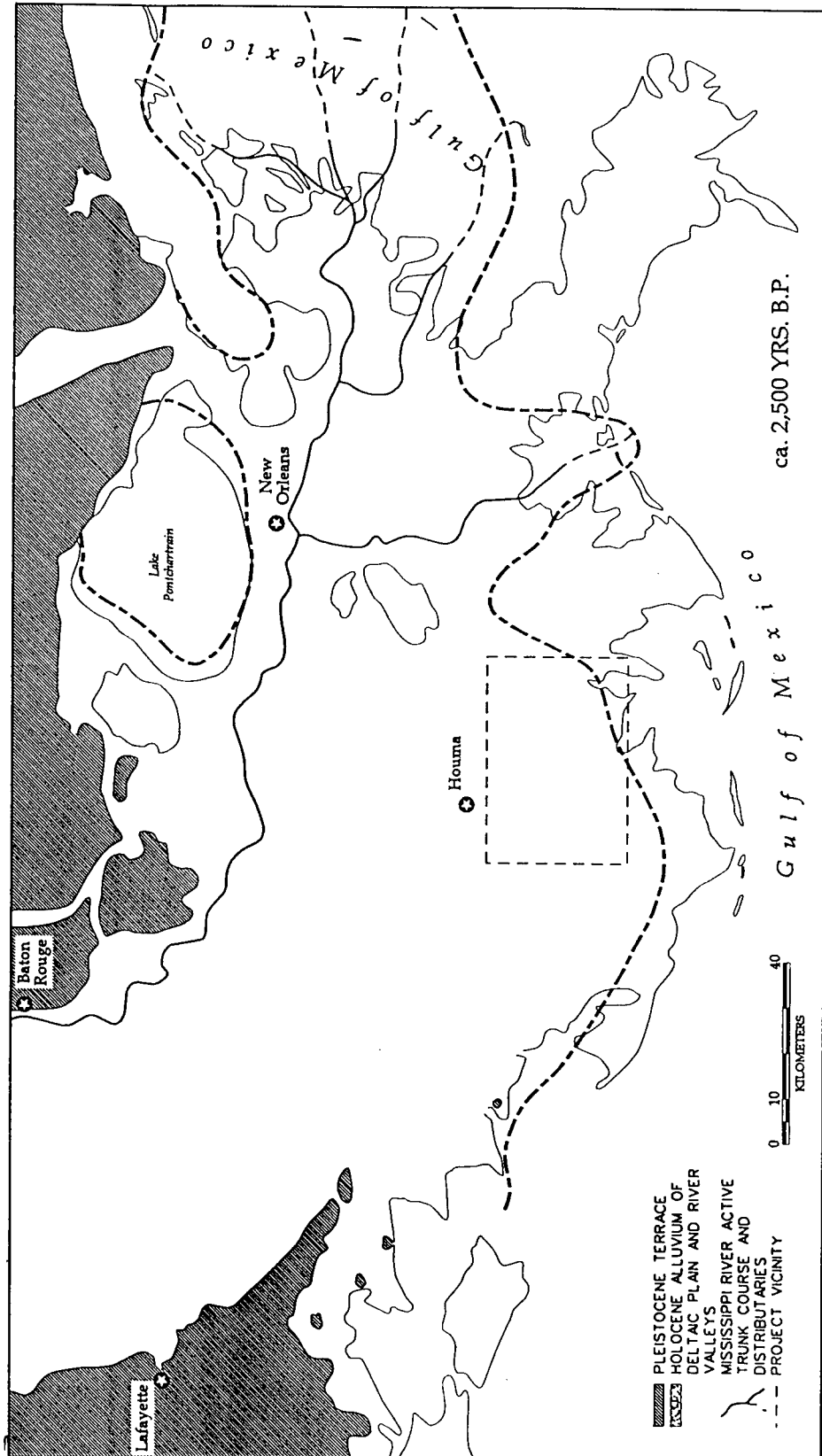


Figure 12. Simplified paleogeographic model of the project area illustrating interpreted geomorphic settings at 2,500 years B.P.
Sheet 4

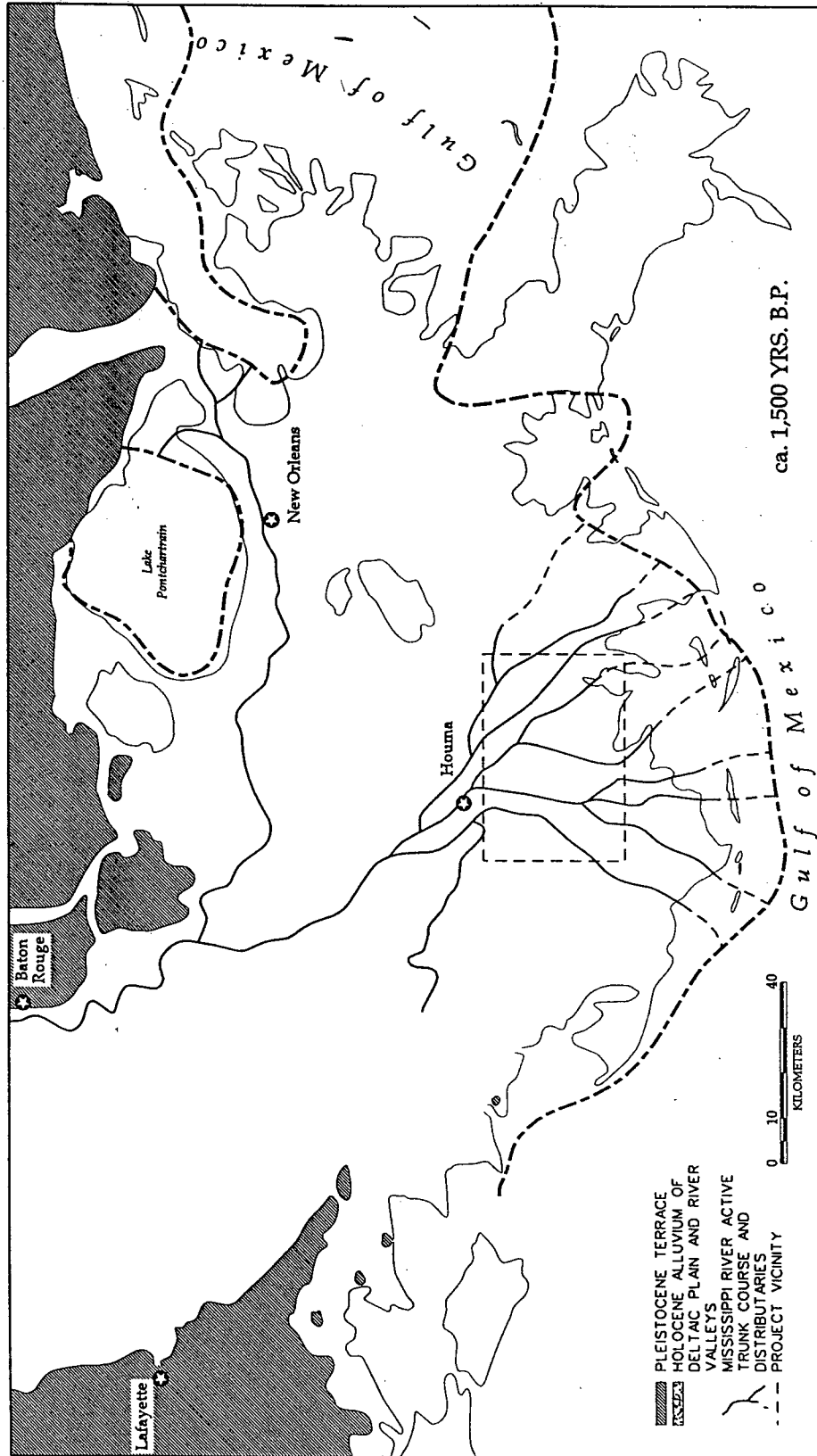


Figure 12. Simplified paleogeographic model of the project area illustrating interpreted geomorphic settings at 1,500 years B.P.
Sheet 5

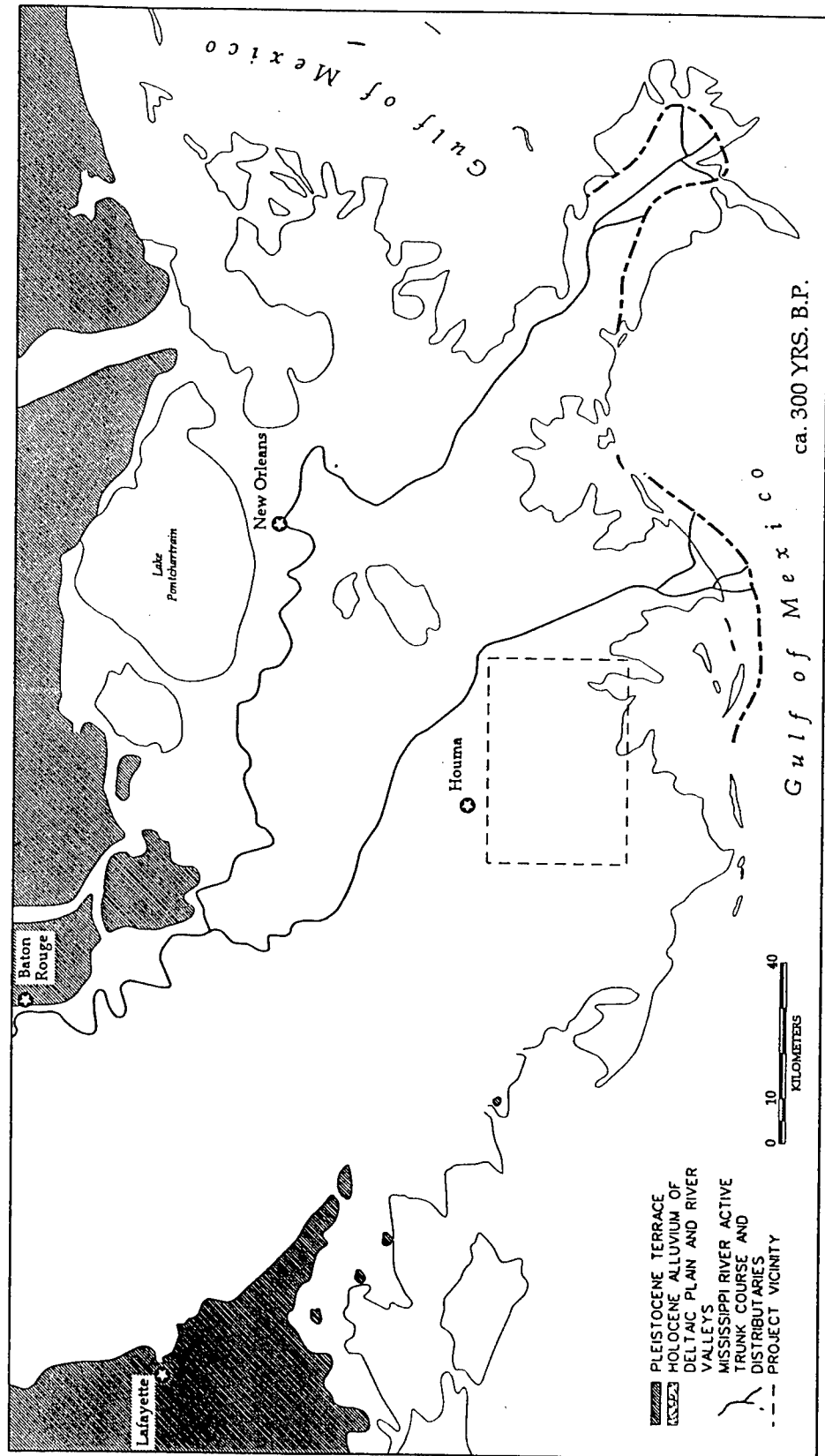


Figure 12. Simplified paleogeographic model of the project area illustrating interpreted geomorphic settings at 300 years B.P.
Sheet 6

Table 2. Age estimates of distributaries.

Lafourche and Older Delta Complexes				
Relative Ages of Lobes/Distributaries	Est. Age (Frazier 1967)	Geol. ¹⁴ C Dates	Arch. ¹⁴ C Dates	Site Cultural Affil.
Bayou Lafourche	0 - 250			
Bayou Terrebonne (late phase)	0 - 800	? - 750 ¹		
[Bayou Barre*				
Bayou Pointe au Chien				
Grand Bayou*				
[Bayou St. Jean Charles				
Wonder Lake*				
Bayou Petit Caillou				>800 - ?
Lake Boudreaux East*				
Bayou Grand Caillou			>1170 ² - ?	>1800 - ?
[Bayou Sale				
Four Point Bayou				
[Grassy Bayou				>1300 - ?
Lake Boudreaux West*				
Ashland*				
Bayou Black	1100 - 1800			
Bayou du Large		700 ³ - 1750 ⁴		
Small Bayou La Pointe				
Marmande Ridge				>1600 - ?
Theriot*				
Bayou Blue	1900 - 2000			>800 - ?
Bully Camp*				
La Rose*				
Bayou Terrebonne (early phase)	2100 - 3500			
Bayou Teche				>1800 - ?

* Denotes newly named distributary.

¹See Lab No. O-94, Table 3.

²See Lab No. Beta-74542, Table 3. This is older to two dates from two sites.

³See Lab No. O-106, Table 3.

⁴See Lab No. O-797, Table 3.

Distributaries listed in order from youngest to oldest.

Major lobes designated in bold type.

Indented item is relatively older than preceding item within a given lobe.

Brackets denote distributaries of essentially same relative age.

All numerical ages given in years B.P. Radiocarbon dates are uncorrected and uncalibrated.

Ages denote beginning and end of significant Mississippi River discharge.

Table 3. Radiocarbon dates on Lafourche delta complex deposits.

Lab No.	Coordinates		Material	Depth (m)	Date (Uncalibr.)
	N. Lat.	W. Long.			
O-94 ¹	29°37.9'	90°45.7'	Peat	1.2 - 1.5	750±100
O-106 ²	29°32.3'	90°42.7'	Woody peat	1.8 - 3.7	700±100
O-113 ³	29°22.6'	90°43.1'	Charcoal	1.1	260±110
O-797 ⁴	29°19.8	90°57.1'	Clayey, woody peat	2.4 - 3.0	750±170
O-2067 ⁵	29°20.3'	90°39.3'	Peat	0.6 - 0.7	425±105
O-2085 ⁶	29°20.3'	90°39.6'	Peat	1.5 - 1.9	800±100
O-2093 ⁶	29°20.4'	90°40.1'	Peat	0.6 - 0.9	425±105
O-2098 ⁶	29°20.5'	90°40.3'	Clayey peat	1.4 - 1.7	1050±100
O-2207 ⁷	29°29.8'	90°42.7'	Clayey, woody peat	4.1 - 4.5	1175±105
O-2208 ⁸	29°29.8'	90°42.7'	Clayey peat	5.9 - 8.4	2625±115
Beta-74542 ⁹	29°20.5'	90°44.7'	<i>Rangia</i> shell	1.0	1170±60

Interpretive Notes

¹Organics from beneath natural levee of Bayou Terrebonne north of project area.

²Date probably approximates time of abandonment of Bayou du Large. Overlies subsided flank of natural levee ridge.

³Provides date on Plaquemines period shell midden (16TR6) on natural levee ridge of Bayou Grand Caillou.

⁴Date on organics from directly beneath natural levee of Bayou du Large. Approximates time of distributary formation in project area.

⁵From interdistributary deposits west of Bayou Petit Caillou. Postdates time of distributary abandonment and is not considered diagnostic.

⁶Dates on interdistributary deposits from between Bayou Petit Caillou and Grassy Bayou. Postdate distributary abandonment and are not considered diagnostic.

⁷Probably stratigraphically underlies natural levee of Bayou Grand Caillou, but relationship not established with certainty.

⁸Appears to date deposits from early phase of Lafourche complex, but vertical range of sample is quite large. Date is not considered diagnostic.

⁹Provides date on Coles Creek period shell midden (16TR22) on natural levee ridge of Bayou Grand Caillou.

sented in Table 2. Information pertaining to artifact identifications was derived from state site files and published sources, and age estimates of the culture periods were taken from the cultural chronology of Louisiana as interpreted by Weinstein and Kelley (1992). In general, the numerical data in Table 2 do not contribute significantly to refining the relative chronology, and in some cases there are apparent conflicts between them and Frazier's estimated distributary ages. For example, the presence of ceramics of the Baytown and late Marksville periods from sites on Bayou Grand Caillou (16TR37 and 16TR89), suggesting a minimum age of 1,800 years B.P., is not consistent with Frazier's age estimate of 0-800 years B.P. for distributaries of the Bayou Terrebonne (late phase) lobe. Several explanations are possible. First, the ceramic identifications may not be correct. Second, the stratigraphic and/or cross-cutting relationships may have been misinterpreted, and Bayou Grand Caillou may be part of the early phase of the Bayou Terrebonne lobe rather than the late phase. Third, Frazier's age estimates may be considerably too conservative. At this time, the matter can not be resolved, but it emphasizes how tenuous is any attempt at a chronology considering the current state of knowledge.

Geoarcheological Considerations for Model Input

The 10 units of the mapping classification described above and delineated in Attachment I are listed below in decreasing order of probability that archeological sites exist. The numbers preceding the unit names represent subjectively derived weighting values based on a scale in which 10 is the highest probability unit and 1 is the lowest.

- 10 - Distributary Natural Levees (DNL)
- 9 - Distal Portions of Distributary Natural Levees (DNL_D)
- 8 - Crevasse Natural Levees (CNL)
- 5 - Distal Portions of Crevasse Natural Levees (CNL_D)
- 4 - Subsided Portions of Distributary Natural Levees (DNL_S)
- 2 - Crests of Distributary Natural Levees (DNL_C)
- 2 - Buried Distributary Natural Levees (DNL_B)

- 1 - Subsided Portions of Crevasse Natural Levees (CNL_S)
- 1 - Interdistributary Wetlands (IW)
- 1 - Distributary Channels (Dch)

This rating is based largely on the landform associations of known sites in the vicinity of the project corridor. Note that no unit has been given a 0 value. None can be completely excluded from consideration because of uncertainties in mapping and the possibility that unsuspected landforms may exist.

There does not appear to be any significant regional variation in the probability of encountering sites within any given unit. This is largely because of the relatively small size of the project area in terms of the total area of the deltaic plain. Additionally, there does not appear to be any significant regional variation in site type (e.g., mound, village, midden) or cultural affiliation. For example, middens of the Coles Creek period have the same probability of occurring on distributary natural levees (of comparable age) in the northern part of the area as in the southern part. However, within the midden site type, those that consist primarily of the brackish-water clam *Rangia cuneata* should be more numerous toward the south since the clam's habitat (brackish-water lakes and bays) has been more abundant toward the distal portions of the delta lobes.

The only factor that appears to interrupt the otherwise uniform areal site probabilities within given units is a particular spatial relationship of landforms. From observations of the site/landform contexts of recorded sites, it is apparent that an unusually high percentage of sites is located where distributaries bifurcated or at the heads of crevasses that extended into interdistributary wetlands and encountered (merged with or crossed) adjacent natural levee ridges. Twenty-five locations that exhibit these characteristics have been identified along the project corridor and have been designated by 1-km-radius circles. These are intended to delineate zones wherein, for any given mapping unit, a higher probability exists that sites will occur. They occur throughout the project area, but a cluster of seven exists at the southernmost extent of the project area along Bayou Grand Caillou, Grassy Bayou, and Bayou Petit Caillou.

It is apparent that the circled locations exhibit a slightly greater areal expanse of continuous natural levee ridge; however, another reason for the larger percentage of sites is favored. Just as they have in historic times, these are strategic locations at the ends of "land bridges" that afford convenient connections between ridges or that provide access into remote wetland areas. They suggest that land movements of Native Americans latitudinally within the deltaic plain may have been as important as longitudinal movements along distributaries by either land or water. It is conceivable that the strategic locations functioned as terminals, gateways, or control points in the transportation/communication networks.

Acknowledging the limitations of the proposed relative chronology for the project area and the few seemingly valid radiocarbon dates, it is unlikely that sites older than the Marksville period will be present on any late-phase Lafourche complex distributaries. Those of the Baytown and younger periods will be most numerous and widespread. This takes into consideration the observation that prehistoric occupation of a deltaic lobe did not begin until natural levees were well formed and frequent flooding had abated, i.e., the lobe was in the very early stages of abandonment. With regard to distributaries of the early phase, especially the newly named subsided ones, it appears that they are old enough to contain sites as old as the Poverty Point period and possibly even the Late Archaic. These observations are entirely

consistent with the ages of sites already recorded in the central deltaic plain area (Weinstein and Kelley 1992). Sites older than the Late Archaic (i.e., >3,000 years old) would be associated only with possibly surviving distributaries of the Teche complex, would be limited to the extreme northwestern part of the project area north of the Teche ravinement beach ridge previously discussed, and would be deeply buried (greater than 5 m [16.4 ft]).

It is cautioned that factors other than site/landform relations must be considered when using the probabilities listed above as a guide to future site surveys. Considering the limited areal extent of cleared land and the rather large historic population densities, it is unlikely that there are many, if any, large sites with mounds on distributary or crevasse natural levees that have not already been recorded. Further, the frequent cultivation of these areas makes for ideal surface collecting conditions and the probability is high that sites with surface or nearsurface deposits have been detected. Sites buried within natural levee ridges (with no surface expression) are not expected for reasons discussed above. Consequently, although the survey conditions are more difficult, the likelihood of finding unknown sites is actually higher in zones like the distal or subsided portions of natural levees. In future investigations, emphasis should be placed on survey techniques likely to discern buried sites on subsided landforms.

CHAPTER III

CULTURAL SETTING: PREHISTORY

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

History of Scholarship

Prehistoric sites in the vicinity of the project area were noticed early in the nineteenth century by James Leander Cathcart and John Landreth. The U.S. Navy commissioned Cathcart as an agent and Landreth as a surveyor in an effort to locate stands of live oak and red cedar for ship-building (Prichard et al. 1945:735-736; Weinstein and Kelley 1992: 9-17). These men traveled through the region in 1819 and documented their findings in a series of journals. Recorded within these diaries are accounts of visits to numerous archeological sites in the region. A full review of the travels of these men is not necessary here, as this information is well presented in Weinstein and Kelley (1992: 9-17). It is sufficient to note that these travelers seem to have skirted the western edge of the current project area.

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

Henry Collins of the U.S. National Museum organized perhaps the first true archeological survey of coastal Louisiana, including parts of the current project area, in 1926 (Collins 1927). Collins visited a number of mound sites within the vicinity of Houma, Louisiana, and drew numerous conclusions regarding settlement patterns in the region. He observed that "unexpected numbers" of earthen mounds with their associated shell middens were located along lakes and bayous (Collins 1927:201). He provided one of the earliest definitions of the shell midden when he noted that *Rangia cuneata* shell found near the mounds represented the basic kitchen refuse of Native Americans living along the waterways. Finally, Collins suggested that the mounds in Louisiana had a direct cultural affiliation with similar settlements found to the east along the Gulf Coast and in Florida. He based his conclusion on the presence of stamped, incised, and punctate pottery types found in both areas (Collins 1927:206).

While the next major archeological study in the project area was conducted some 30 years later by William McIntire (1958), in the interim, the study of Native American occupation of southern Louisiana and of the Lower Mississippi Valley in general had made numerous and sig-

nificant advances. While few studies encompassed the current study area directly, the influence of several key scholars shaped the methods employed in later surveys of the region. Among the most important works were those of Kniffen (1936, 1938), Ford (1935, 1936, 1951), Ford and Willey (1940), Ford and Quimby (1945), Phillips et al. (1951), Quimby (1951, 1957), Phillips and Willey (1953), Ford et al. (1955), Ford and Webb (1956), and Willey and Phillips (1958). Following slightly later was the monumental study by Philip Phillips (1970), a work which provides the major ceramic typologies and chronologies followed throughout much of the Lower Mississippi Valley. The contributions of these scholars are general; they relate to the development of chronologies and sequences of events in the region. These scholars will be referred to specifically in the discussion of the chronology of the region later in this chapter.

The work of William McIntire (1954, 1958) has left an indelible mark on the study of the cultural history of southern Louisiana. McIntire studied all known sites in southern Louisiana from the Pearl River in the east to the Sabine River in the west. He was the first to document formally many of the sites in the region, and he greatly aided future study of the area by submitting State of Louisiana Site Forms for many of the sites that he visited. McIntire stated that his purpose was to learn about prehistoric man in the region in order to study the geology of southern Louisiana. The intermingling of the fields of geology and archeology provided a valuable methodological framework for gathering data on settlement patterns along the bayous and within the marshes of the region. The landmark study by McIntire stressed the importance of the natural environment in prehistoric settlement practices (McIntire 1958:8). In addition, the materials collected by McIntire and his students provided the fundamental data for the creation of ceramic sequences and typologies by later scholars. McIntire classified the sites he found by type (shell midden, shell deposit, beach deposit, earthen mound, and earthen midden), and by culture affiliation. McIntire relied on the ceramic chronologies established by Ford and Quimby (1945), and he classified sites into six periods. The sequence used by McIntire ran, from oldest to youngest: Tchefuncte, Marksville, Troyville, Co-

les Creek, Plaquemine, and Natchez (McIntire 1958:Figure 1).

McIntire mapped and identified over 500 sites in southern Louisiana, including several located within the current study area. A brief discussion of his specific findings at sites within the project area is presented in Chapter VI of this report. From the more general perspective, the work of McIntire is relevant to this study as it represents the earliest attempt to explain the relationship between human settlement and the natural environment. While the ceramic sequences followed by McIntire are now somewhat outdated, the fundamental principals of "geoarcheology" have been taken into account in virtually every subsequent study of southern Louisiana.

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

The study undertaken by Altschul (1978) consisted of the documentation and revisitation of numerous sites in Terrebonne and Lafourche Parishes. The geographic area examined by Altschul was confined to places that potentially would be impacted by the construction of sewerage systems in these areas. In his discussion of sites in the area, Altschul focused his conclusions and summary on those sites dated to the Mississippi period. He created a hierarchy among sites based on the types of materials recovered from each locale. Altschul distinguished between Mississippi settlement and Plaquemine settlement on the basis of site type and the position of sites relative to other similar cultural resources located along tributaries in the region.

Weinstein and Kelley undertook a survey of the Terrebonne Marsh area on behalf of the U.S. Army Corps of Engineers, New Orleans District, in the early 1990s (1992). Their study focused on correlating archeological sites in the region with specific geologic formations, and their conclu-

sions have effected the interpretation of the geologic age of several watercourses in the Terrebonne Marsh. During the course of their survey, they visited numerous sites in the region. In addition, they examined collections made by previous investigators in an effort to correlate all known finds in the region. The culmination of their work was a report documenting the location of sites in the Turbine Marsh over time and space. They made specific conclusions regarding settlement patterns for each period of occupation documented in their study area.

One of the most noteworthy observations to stem from the work of Weinstein and Kelley (1992) was the recognition of two Poverty Point period sites (16TR211 and 16TR212) identified along natural levees in their study area. While they could not specify the nature of the relationship of these sites with Beau Rivage or Rabbit Island phase sites in south central Louisiana, their documentation of the resources is important. They noted that Tchefuncte period sites in the region were located in ecozones similar to those occupied by Poverty Point period peoples, and that sites from both of these periods seemed to be focused on the exploitation of aquatic resources, particularly *Rangia*. Geologically significant in these early periods was the low flow of the local distributaries and the probability that the communities identified in the marsh must have been relatively small, given the limited possibility of collecting significant quantities of food.

Significant geological changes in the Marksville period resulted in considerable variations in settlement patterns (Weinstein and Kelley 1992). Specifically, large sites, including Mandalay Plantation (16TR1), were located near major crevasse splays and a hierarchy of site types seems to have developed. Large mound sites with permanent settlements were located along the major waterways, while smaller seasonal extraction sites were spread throughout the marsh. Weinstein and Kelley (1992) noted that this pattern seems to have continued into the Baytown period.

The development of Coles Creek culture in the region brought forth increased numbers of large mound sites along with smaller extraction centers in the marsh. Weinstein and Kelley (1992) noted that the collection sites seem to have been tied directly to the mound sites, however,

the precise relationship of the mound sites to the smaller extraction locations was not clear. They suggested that Gibson Mounds must have been the major center of the region with its multiple mounds and year round occupation. Closer to the project area, the Bergeron site (16LF33) seems also to have been a major control center, with several mounds and an associated village complex. Weinstein and Kelley (1992) argued that each major mound complex had a chief. Radiating out from these mound sites and associated with them were villages that were occupied seasonally. Each mound controlled a specific levee system, and therefore dominated its associated watercourse. They suggested that the extraction locations associated with each mound complex probably were visited on multiple occasions over many years and were sites used for hunting and fishing as well as for the collection of shellfish.

Into the Mississippi period, Weinstein and Kelley (1992) noted a small decrease in the total number of sites in the region. They argued that Berwick mounds, in Terrebonne Parish, was by far the largest single center in the region, and that this central place controlled many subordinate villages. The pattern of large mounds surrounded by small extraction sites continued into this period. Finally, they suggest that these sites form the probable centers for the Chitimacha society.

Culture Chronology

The following brief review of the Native American cultures that inhabited the project area is organized following the general phase names established by Smith et al. (1983). This system is utilized because the majority of recent scholarship on coastal Louisiana discusses the cultural chronology in these terms. In addition, the phases described by Smith et al. (1983) can be applied more consistently and specifically to the current project area. It should be noted that the cultural groups listed in Smith et al. (1983) were not created by the authors; rather, these phases and cultures had been identified previously. Smith et al. (1983) applied the terminology definitively to the State of Louisiana. Many scholars have refined and updated the cultural chronology through the addition of regionally or chronologically defined phases. Perhaps the single most important work to establish phase names and chronologies was Phillips (1970). This seminal work identified the

specific ceramic assemblages associated with each culture and phase; scholars working in the region more recently have relied upon his initial groupings, while refining and supplementing his classifications. It is important to note, however, that many of the types and varieties presented by Phillips cannot be applied consistently to materials recovered in Coastal Louisiana. As a result, much recent scholarship has focused on refining local types and chronologies.

The most recent redefinition of many of the culture sequences in the immediate vicinity of the study region is presented in Weinstein and Kelley (1992, Figures 3 - 4). Not all of the phases defined for the region are present within the area currently under consideration. Archeological deposits dating prior to the Poverty Point period are not anticipated within the project area (Chapter II). Therefore, the periods predating Poverty Point times are only summarized briefly here.

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

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

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

Near the end of the Pleistocene, the climate warmed and the herds of megafauna declined, forcing aboriginal peoples to adapt to the developing environment of the region. The late Paleo-Indian tool assemblage reflects this adaptation.

While the early Paleo-Indian tool assemblage consisted primarily of projectile points manufactured from exotic materials, late Paleo-Indian tools included knives, scrapers, chisels, graters, drills, and adzes, most of which were made from locally available materials. In addition, overall projectile point size decreased, indicating a greater reliance on smaller game, such as deer. Finally, Late Paleo-Indian sites have been found in greater numbers, suggesting a population increase (Neuman 1984).

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

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

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

The Salt Mine Valley site (16IB23), on Avery Island in Iberia Parish, contains an apparent deeply buried Paleo-Indian component. In the 1860s, during strip mining of the salt dome,

deeply buried lithic tools and basketry fragments purportedly were recovered in association with the remains of extinct fauna, including mastodon, mammoth, horse, bison, and sloth. Limited testing at the site in the early 1960s produced undiagnostic tools and bipolar chipped cores at depths of approximately 6 m (20 ft). While the original analysis of collected data suggests that initial occupation of the site dates from the early Paleo-Indian period (Gagliano 1964), subsequent analysis suggests that the site may not have been occupied until late in the Paleo-Indian stage (Gagliano 1967).

San Patrice and Dalton sites are more widely distributed than their earlier Paleo-Indian counterparts. San Patrice sites have been found on the margins of upland terraces overlooking river valleys, lakes, and streams, and along the small streams that dissect the uplands. South Louisiana sites with San Patrice or Dalton components include the Da Dump site (16SL59), and the Edwin Mott site (16SL42), both in St. Landry Parish (Smith et al. 1983). San Patrice projectile points also have been recovered from Avery Island (Gagliano 1964, 1967). No Paleo-Indian artifacts have been recovered from southeastern coastal Louisiana, not surprising since the formation of that area occurred after this time period.

Archaic Stage (6000 - 1500 B.C.)

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

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

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

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

Late Paleo-Indian and Early Archaic projectile point styles such as Angostura-like, San Patrice, and Dalton have been found throughout Louisiana; however, very few Early Archaic components have been isolated within the state. Several Early Archaic projectile point types and associated horizons have been defined for areas throughout the Southeastern United States, and these include the Big Sandy, Kirk, and Bifurcate horizons.

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

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

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

Early Archaic cultural manifestations resemble those defined for the terminal Paleo-Indian stage in content and distribution. Terminal Paleo-Indian sites in Louisiana often are identified as basal components on Early Archaic sites, indicating an in situ development for the Early Archaic (Servello 1983).

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

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

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

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

and plummetts reflect increasing reliance on aquatic resources.

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

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

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

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

The Late Archaic period is marked by the settlement of previously uninhabited or sparsely populated areas, suggesting an increase in population throughout the Southeast. Macrobands made up of approximately 30 or more people were formed during spring and summer. During the winter, these groups split into microbands to exploit nearby environments (Jenkins and Krause 1986; Muller 1983). Projectile point types recognized from southern Louisiana include various expanding, contracting, and straight stem forms: Yarbrough, Carrollton, Gary, Shulma, Palmillas, Morhiss, Kent, Pontchartrain, Marshall, Webb, Hale, Ellis, Marcos, Wells, Williams, and Frazier. Shell, bone and stone pendants, musical tube pipes, and a variety of other artifacts are associ-

ated with the Late Archaic. During the Late Archaic, regional variations intensified, and extensive exchange relationships developed between regions. Subsistence practices were scheduled around the seasonal availability of key species; deer, fish, nuts, and shellfish were of primary importance. Late Archaic peoples probably practiced limited horticulture of such native cultigens as sunflower, marsh elder, and various gourds and squashes.

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

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

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

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

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

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

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

The Poverty Point site itself is distinguished primarily by its large earthworks and its complex

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

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

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

Poverty Point culture as expressed in southern Louisiana has been separated into several phases that reflect chronological and geographic distinctions associated with materials recovered from Poverty Point period sites. East of the current study area, the Bayou Jasmine and Garcia phases, ranging in date from 1500 - 1000 B.C. and 1000 - 500 B.C., respectively, have been identified (Kidder et al. 1995:Figure 7; Weinstein and Kelley 1992:Table 3-4). Sites from each phase generally are characterized as shell middens located along the shoreline of Lake Pontchartrain. Materials recovered from these sites suggest that the inhabitants practiced sea-

sonal and specialized adaptations to marsh environments. Bayou Jasmine phase sites are located on the western shore of the lake, as well as along the natural levee ridges of the Mississippi River distributaries. Garcia phase sites are located along the eastern shore of Lake Pontchartrain.

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

Two other phases of Poverty Point culture have been identified in south central Louisiana. Sites associated with these phases are located near or along Coteau Ridge in Lafayette, St. Landry, and St. Martin parishes (Gibson 1976a:13; Gibson 1979:96-97; Mayer 1991). This region is located generally north and west of the current study area. Phillips (1970: 875) identified a Poverty Point phase in this region that he labeled Rabbit Island. Sites associated with the Rabbit Island phase are generally similar to Garcia phase sites in the east, but are situated in the Teche-Mississippi region of coastal Louisiana. Artifacts recovered from the type site include non-local

lithic materials, microlithics, and baked clay objects (Gagliano 1963). The Beau Rivage phase of the Poverty Point culture was established by Gibson in 1974 (Gibson 1974; Weinstein and Kelley 1992). This term was applied to four Poverty Point period sites (16LY5, 16LY6, 16LY13, and 16SL2) investigated by Gibson along the Vermilion River. The now destroyed type site (16LY5) was located within the Lafayette corporate limits, and was classified as an important regional center for the importation and dispersal of foreign lithic materials (Gibson 1994). Evidence from the site suggested that these foreign lithic materials were acquired in the form of blanks with further reduction prior to exportation to other localities. Sites of the Beau Rivage phase are located in different geographic settings than those of the Rabbit Island phase; they are found to the northwest of the previously recorded Rabbit Island sites, and they occupy the edge of the prairie terrace that overlooks the alluvial plain (Gibson 1980). A typical Beau Rivage artifact assemblage includes Poverty Point ceramic objects (clay balls and figurines) and lithic materials, but also includes decorative rectangular or circular ceramic objects that have not yet been recovered at more inland Poverty Point locations. Diagnostic projectile points/knives associated with the Beau Rivage phase have included, among others, examples of Gary, Wells, Evans, Elam, Sinner, Ellis, Delhi, Marshall, and Palmillas points. These lithic projectile points/knives are characteristically shorter and narrower than those found at other Poverty Point sites.

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

Other sites exhibiting possible Poverty Point culture occupations identified in the Coastal Zone of south central Louisiana consist of camp locations on Avery Island and Belle Isle (Gagliano 1967:98; Gibson et al. 1978:33-34). In addition, two Poverty Point sites were identified by Coastal Environments, Inc., during survey of the Terrebonne Marsh (Weinstein and Kelley 1992). No Poverty Point period sites have been identified

within the current study area; however, it is geologically possible that sites of this age are present and have not yet been identified.

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

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

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

The common traits used by Ford and Quimby to link the three groups of sites include the presence of particular types of pottery and pipes, and the style of certain burial traits and bone implements. Ford and Quimby acknowl-

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

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

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

with exogamous band marriage (Speaker et al. 1986:39). Social organization probably remained focused within macrobands, and hunting, gathering, and fishing remained integral to the Tchefuncte way of life.

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

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

The extensive use of ceramics by the Tchefuncte culture is what distinguishes the period from the Poverty Point culture. While there is some evidence for the use of ceramics in Poverty Point culture (Webb 1982), pottery making was widespread in the Tchula period. Basic Tchefuncte ceramics were temperless or grog-tempered, with small inclusions of sand and vegetable fiber. Tchefuncte ceramics usually are characterized by a soft, chalky paste, and a laminated appearance. They were fired at a low temperature and tempered with either sand or clay (Phillips 1970). Vessel forms consist of bowls, cylindrical and shouldered jars, and globular pots that sometimes exhibit podal supports. Many vessels are plain; however, some are decorated with punctations, incisions, simple stamping, drag and jab, and rocker stamping. Punctate types usually are more numerous than stamped types, but par-

allel and zoned banding, stippled triangles, chevrons, and nested diamonds also represent popular motifs. During the later portion of the Tchefuncte period, red filming also was used to decorate some vessels (Perrault and Weinstein 1994:46-47; Speaker et al. 1986:38; Phillips 1970).

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

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

Although a date range of ca. 500 B.C. - A.D. 1 for the Tchefuncte period is commonly suggested, research indicates that dates for the period differ quite widely from region to region and occasionally within the same area (Byrd 1994; Gibson 1976a, 1976b:13; Webb et al. 1969:96; Weinstein 1986; Kidder et al. 1995:35-36). Most archeologists agree that the Tchefuncte culture dates from as early as 700 B.C. in the south, and

that it diffused to the north, where it is known as Tchula, and terminates ca. A.D. 100 (Gibson and Shenkel 1988:14; Perrault and Weinstein 1994:48-49; Shenkel 1974:47; Toth 1988:19). Coastal Tchefuncte sites may have been occupied until around A.D. 300 (Byrd 1994:23; Neuman 1984:135; Weinstein 1986:118). If these dates are correct, it implies that the last remaining coastal Tchefuncte communities were coeval with Marksville culture (Toth 1988:27-28).

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

Marksville Period (A.D. 1 - 400)

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

As with its predecessors, the Marksville period has been divided into a series of phases. While there is no absolute agreement regarding the sequence of events, most scholars agree that an early Marksville phase can be distinguished from the later Marksville culture. In southern Louisiana, early and late Marksville have been further subdivided chronologically and geographically. Early Marksville in southeastern Louisiana is grouped into the Labranche and Smithfield phases (Weinstein and Kelley 1992), while the contemporary phase in the central portion of the state is known as Jefferson Island. In the western portion of the state, away from the current study area, this phase has been called Lacassine. These early phases are most often associ-

ated with the Hopewellian Sphere in the north (Kidder et al. 1995). Early Marksville sites are characterized by the presence of diagnostic Marksville pottery and conical burial mounds. Burials often have grave goods, and some artifacts are of exotic materials (Neuman 1984; Toth 1988).

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

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

Ceramic decorative motifs such as cross-hatching, U-shaped incised lines, zoned dentate rocker stamping, cord-wrapped stick impressions, stylized birds, and bisected circles were shared by Marksville and Hopewell cultures (Toth 1988:45-50). Some items, such as elaborately decorated ceramics, were manufactured primarily for inclusion in burials. Burial items included pearl beads, carved stone effigy pipes, copper ear spools, cop-

per tubes, galena beads, and carved coal objects. Additional Marksville traits included a chipped stone assemblage of knives, scrapers, celts, drills, ground stone *atlatl* weights and plummet, bone awls and fishhooks, baked clay balls, and medium to large stemmed projectile points dominated by the Gary type.

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

The development of Marksville culture across southern Louisiana was not even. Many scholars disagree about the beginning and end dates for the various phases, and numerous geographic distinctions have been discerned.

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

Within the immediate vicinity of the current study area, a number of important Marksville sites, including a handful of type sites, have been identified. A presentation of all of the Marksville sites recorded in southeastern Louisiana is provided in Kidder et al. (1995:37-41). The report by Kidder correlates the evidence obtained from

previously conducted surveys with the known radiocarbon dates collected during excavations; it also interprets the reliability of previously conducted work in the region. No need exists to repeat the information presented in that document; rather, this discussion focuses on those sites that are more relevant to the current study area.

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

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

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

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

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

review of the ceramics from Mandalay Plantation (16TR1) indicated an early Marksville association.

The Marksville phases that have been identified in the area west of the current project area include Jefferson Island and Veazey. These phases have been identified in the south central or Petite Anse region of the state, and representative sites typically are situated along the Teche-Mississippi river channel (i.e., the Jefferson salt-dome). Jefferson Island phase sites, discussed by Toth (1977), date from ca. A.D. 1 to 200. Decorated ceramics from this early phase are characterized by curvilinear motifs, rocker stamping, and fabric impression that predates the later Veazey phase (ca. A.D. 200 - 400). This second phase, named for the Veazey site (16VM7) in Vermillion Parish, frequently is associated with a scant presence of Late Marksville/Issaquena ceramic sherds that overlay Tchefuncte period sites of the Grand Lake phase (Jeter et al. 1989; Phillips 1970). Additionally, two southwest Louisiana phases, Lacassine and Lake Arthur, apparently were contemporaries of the Jefferson Island and the Veazey phases. While the Lacassine phase has been well documented by Bonnin and Weinstein (1975 and 1978) following excavations at the multicomponent Strohe site (16JD10), the Lake Arthur phase has been defined only poorly (Bonnin and Weinstein 1978). According to Phillips (1970), coastal sites from the latter part of the Marksville cultural period may contain Marksville Stamped *var. Troyville*, Yokena Incised, and Churupa Punctate ceramic sherds (Jeter et al. 1989).

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

Baytown Period (A.D. 400 - 700)

In the Lower Mississippi Valley, Phillips (1970) described the Baytown period as the time

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

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

Recent scholarship has argued that the Whitehall phase as defined by Phillips (1970) is

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

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

The Des Allemandes phase was reported to represent a later phase of the Baytown period in coastal Louisiana (Kidder et al. 1995). It ranged in date from ca. A.D. 560 to 700. Kidder et al. (1995) stated that it is difficult to separate Des Allemandes phase ceramic components from those of the early Coles Creek period Bayou Cutler phase, but they did report on several ceramic types and traits believed to be indicative of the phase (Kidder et al. 1995). During the Des Allemandes phase, it was noted that Marksville Stamped and Incised ceramic varieties that were evident in earlier Grand Bayou phase components are no longer present but that the red filming tradition continued (Kidder et al. 1995). Kidder et al. (1995) reported that several ceramic types (Evansville Punctate, Hollyknowe Pinched, and

Mazique Incised *var. Bruly*) begin to be identified during the Des Allemandes phase. Ceramic types that may represent Weeden Island culture influence, such as Woodville Zoned Red and early varieties of French Fork Incised, also increased in frequency in this phase (Kidder et al. 1995). Kidder et al. (1995) reported that the best diagnostic trait of the Des Allemandes phase is the use of the "six mile" treatment in the decoration of ceramics. The "six mile" treatment can be identified by the presence of punctations on the lip of ceramic vessels (Phillips 1970). An additional characteristic of Des Allemandes phase is the presence of single and/or double lined varieties of Coles Creek incised (Kidder et al. 1995). Kidder et al. (1995) note that these Coles Creek Incised varieties developed during the Des Allemandes phase but occur in to the Coles Creek period and can not be considered solely diagnostic of this phase. Kidder et al. (1995) report that the Isle Bonne site (16JE60) can be considered the type site for the Des Allemandes phase.

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

evidence exists regarding socio-economic structures during the Baytown period. Kidder et al. (1995) argue that during the Des Allemandes phase, a society of egalitarian hunter-gatherers occupied the region. This argument seems to be predicated on the absence of evidence, rather than on accumulated data. No sites representative solely of the Baytown period have been identified within the current study area.

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

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

Within the Louisiana coastal zone, the Coles Creek period is marked by an increase in population and by changes in the frequencies and types of ceramics (Kidder et al. 1995). Artifacts recovered from coastal Coles Creek period sites consist primarily of ceramic sherds; lithic material and bone artifacts are identified less frequently (Brown 1984). In contrast to mound sites identified in north Louisiana, small shell middens located in marsh areas are the most common type of Coles Creek period sites identified in coastal Louisiana (Brown 1984). Subsistence was based on the exploitation of marsh resources such as clams, fish, mammals (muskrat, deer, and raccoon), birds, and reptiles (Brown 1984; Davis 1987). Brown (1984) reports that the muskrat, deer, and raccoon were the primary food sources of Louisiana Delta Coles Creek cultures, while shellfish were reported to have made up a small portion of subsistence and may have been consumed in an effort to obtain shell to provide a

base on which to settle (Brown 1984). Cultivated foods do not seem to have been an important component of the Coles Creek diet (Kidder et al. 1995).

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

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

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

with the Bayou Cutler phase were redefined to include Coles Creek Incised *vars.* *Coles Creek* and *Athanasio*, Mazique Incised *var.* *Mazique*, Pontchartrain Check Stamped *var.* *Pontchartrain*, and unspecified varieties of French Fork Incised (Weinstein and Kelley 1992).

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

Data on settlement patterns in the Coles Creek period are inconclusive at this time. In the recent study of the Terrebonne Marsh, Weinstein and Kelley (1992) developed a model based on a hierarchy of organized settlements. They suggested that major mound sites were surrounded by satellite villages and seasonal camps. They argued that the Gibson Mound complex, dated to the Bayou Cutler phase, was a major center in the area. It was observed that villages most often were located along stable levees and at the confluence of distributaries. Finally, Weinstein and Kelley (1992) hypothesize that some villages may have been occupied year round, but the basis of their model involves seasonal movement into the marshes and coastline oriented toward the exploitation of shellfish and coastal habitats. Other scholars have noted that no data exist to support the model of seasonal movement, and that sites in the marsh are common in the Petit Anse region of the state (Brown 1984; Kidder et al. 1995).

Some work has been conducted at Coles Creek period sites east of the current project area,

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

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

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

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

Within the current project area, the Emergent Plaquemine culture is represented by the St. Gabriel phase. This phase, named after the St.

Gabriel site (16IV128), first was reported in the 1980s (Woodiel 1980; Woodiel 1993; Brown 1985). The site was described as a low mound with a surrounding midden area (Woodiel 1993). Woodiel stated that C¹⁴ analysis of a burned post and charcoal from a hearth feature recovered from the area of a collapsed structure identified under the mound yielded dates ranging from A.D. 980 - 1020. Woodiel also reported recovering ceramic types and varieties that were indicative of a transitional Coles Creek/emergent Plaquemine culture, including Addis Plain, Avoyelles Punctate *vars.* *Dupree* and *Tatum*, Beldeau Incised *var.* *Beldeau*, Carter Engraved *vars.* *Carter* and *unspecified*, Coles Creek Incised *vars.* *Mott* and *Hardy*, Coleman Incised *var.* *Coleman*, Evansville Punctuate *var.* *Rhinehart*, French Fork Incised *vars.* *Iberville* and *McNutt*, Harrison Bayou Incised *var.* *Harrison Bayou*, Mazique Incised *vars.* *Kings Point* and *Manchac*, Pontchartrain Check Stamped *var.* *Pontchartrain*, and Plaquemine Brushed *var.* *Plaquemine* (Woodiel 1993). Based on ceramics recovered and radiocarbon dates obtained, Woodiel (1993) suggested that the St. Gabriel site occupied a transitional time period between the late Coles Creek and early Plaquemine cultures.

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

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

Mississippi Period (A.D. 1200 - 1700)

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

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

Between A.D. 1200 - 1500, Plaquemine culture developed to its fullest in coastal Louisiana (Weinstein 1985; Jeter et al. 1989). Plaquemine peoples continued the settlement patterns, economic organization, and religious practices established during the Coles Creek period; however, sociopolitical structure, and religious ceremonialism intensified, suggesting a complex social hierarchy. Large sites typically

are characterized as ceremonial sites, with multiple mounds surrounding a central plaza. Within the southern coastal areas of Louisiana, smaller dispersed villages and hamlets also formed part of the settlement hierarchy (Neuman 1984; Jeter et al. 1989).

Phillips established the early chronology of Plaquemine culture in the Lower Mississippi Valley (1970). The initial categorization created by Phillips established Bayou Petre and Delta Natchezan as sequential phases, and Medora as a phase unique to southern Louisiana. The Early Plaquemine culture within the project area has been refined and currently is defined by two phases, the Medora (named after the Medora site located in East Baton Rouge Parish) and the Barataria (Phillips 1970; Weinstein 1985; Jeter et al. 1989). Bayou Petre is present continuously through the Plaquemine culture period (Phillips 1970; Weinstein 1985; Jeter et al. 1989).

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

The Medora phase was identified at the Medora site through the presence of certain Plaquemine ceramic types including Addis Plain, Plaquemine Brushed, Hardy Incised, Manchac Incised, Medora Incised, Dupree Incised, Harrison Bayou Incised, Australia Interior Incised, Evangeline Interior Incised, L'Eau Noire Incised, and Lulu Linear Punctate (Quimby 1951). Phillips (1970) later suggested several rules to be utilized in assigning ceramic assemblages to the Medora phase, which may be summarized as follows. Phillips stated (1) that if a site contained only Plaquemine Brushed, Mazique Incised *var. Manchac*, and Maddox Engraved decorated ceramic sherds, then its phase could be Medora or Delta Natchezan (discussed below), but if L'Eau Noire Incised, Medora Incised, Australia Interior Incised, Evangeline Interior Incised, Coles Creek Incised *var. Hardy*, or Pontchartrain Check Stamped also were present in the assemblage without any Natchezan "markers" (Father-

land and Natchez Incised), then the site could be assigned to the Medora phase (Phillips 1970:950 - 951). Furthermore, if Fatherland and Natchez Incised ceramic sherds are present with Plaquemine Brushed, Mazique Incised *var. Manchac*, and Maddox Engraved ceramic sherds but no L'Eau Noire Incised, Medora Incised, Australia and Evangeline Interior Incised, Coles Creek Incised *var. Hardy*, or Pontchartrain Check Stamped ceramic sherds are present, then the assemblage could be assigned to the Delta Natchezan phase. Phillips (1970) suggested that if all these ceramic types were identified together, then the site could be considered to contain both Medora and Delta Natchezan phase components.

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

Kidder et al. (1995) reported that the best dated site in the southeastern coastal area of Louisiana is the Bayou Des Familles site (16JE218). Testing at the site yielded radiocarbon dates between A.D. 1275 - 1650, along with Buras Incised ceramic sherds and a few shell tempered sherds. The only lithic materials identified were a

piece of sandstone and a sandstone abrader (Kidder et al. 1995). Kidder et al. (1995) stated that Site 16JE218 was a shell midden occupied for short, possibly seasonal, periods during the later portion of the Barataria phase into the early Delta Natchezan phase, as well as the Bayou Petre phase.

As mentioned above, a pure Mississippi culture, identified as the Bayou Petre phase, is present throughout the Plaquemine period in southeastern coastal Louisiana (Phillips 1970; Jeter et al. 1989; Weinstein 1987). The Bayou Petre phase was noted by Kniffen and was established to account for the presence of shell tempered ceramics in the southeastern coastal area of Louisiana (Kidder et al. 1995). Phillips (1970) criteria for identifying Bayou Petre phase components by sorting ceramic types is presented below in the discussion of the Delta Natchezan phase. This Mississippi culture was located in the area of present day St. Bernard Parish but has also been noted in Plaquemines, Lafourche, St. Charles, and Terrebonne parishes, Louisiana. It was thought to have entered the region from the Mobile Bay area where Pensacola complex cultures were present (Jeter et al. 1989; Kidder et al. 1995). Archaeological sites in the southeastern coastal area from which shell tempered ceramics were recovered were thought to represent the Bayou Petre phase intrusions in to the local Plaquemine culture (Kidder et al. 1995). Jeter et al. (1989) also suggested that close ties were maintained between the Pensacola complex cultures located in the area of Mobile Bay and the Mississippi center at Moundville, Alabama (Knight 1984). Recent work has suggested that the Bayou Petre phase should not be seen as independent of the other Plaquemine culture phases (Kidder et al. 1995). Scholars associated with this view note that shell tempering and the introduction of non-local styles were integrated into local ceramic repertoires. These new innovations are seen as the movement of ideas, not peoples, and therefore do not suggest a large scale movement of cultures (Kidder et al. 1995).

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

The Late Plaquemine culture (A.D. 1500 - 1700) in eastern coastal Louisiana is defined by a single extended phase, the Delta Natchezan

(Weinstein 1985:98). The Delta Natchezan phase was established by Phillips (1970) based on excavations conducted at the Bayou Goula site (16IV11) by Quimby (1957). This phase, which was termed tentative by Phillips, included all Delta archeological sites that have yielded Natchezan ceramics types (Phillips 1970). Phillips also noted that this did not necessarily mean that the people inhabiting these sites were Natchez, only that the overall culture (as seen in the ceramic types) was Natchezan (Phillips 1970; Weinstein 1985).

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

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

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

Phillips (1970) reported that the use of these criteria provides an advantage to the Bayou Petre phase and concluded that there was a zone of contact in the Late Plaquemine culture where Bayou Petre and Delta Natchezan phase components occurred together. This picture is further complicated by the fact that there is some evidence for the use of Mississippian designs and styles on local ceramic types (Davis and Giardino 1981). Evidence for this intermingling of styles was identified at the Sims site (16SC2), where ceramics of the Bayou Petre phase were identified in areas associated with Delta Natchezan occupation, as well (Davis 1981; Davis and Giardino 1981). A contemporary occupation also seems to have been identified at the Bowie site (16LF17) in nearby Lafourche Parish (Jackson 1977 [in Kidder et al. 1995]). In addition, there is evidence that Plaquemine culture extended into the marshy areas of modern day Plaquemine Parish, as is suggested by occupations at the Buras Mounds (16PL13) and Bayou Ronquille (16PL7) sites. Large mound complexes have been identified at both of these sites, suggesting that they were relatively important occupation centers.

Settlement patterns in the Mississippi period are not well understood, but the limited data available suggest that there were no significant changes from the Coles Creek period (Kidder et al. 1995). Occupations along the current channel of the Mississippi River started as this river course extended new waterways in the region (Kniffen 1936). In addition, with the advent of relatively complex society, the growth of mound sites in the region is not surprising. While mound sites in the region have been fairly well-documented, non-mound sites are not well understood at this time. Those non-mound sites that have been documented are located on elevated natural levees and seem to have focused on the cultivation of crops (Kidder et al. 1995). Weinstein and Kelley (1992) suggest that the settlement pattern for the area consisted of mound communities, small villages, and seasonal re-

source collecting camps. Altschul (1978) has suggested a different model for life along Bayou Lafourche. While some problems exist with his temporal and ceramic distinctions, the essence of his model is that Plaquemines culture involved seasonal patterns of movement with fall/winter occupations of the interior forested levees, and spring/summer occupations of the marshes and coast line. Altschul notes that there is little evidence for social distinctions among residents living in these communities. Altschul classifies the later phase of occupation as Mississippian. He notes that a different settlement pattern developed at this time with large, mound communities occupying levees, and separate villagers dispersed into "homesteads."

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

The vast majority of known sites located within the current project area are associated with the Plaquemine culture. These sites include 16TR6, 16TR10/86, 16TR19, 16TR22, 16TR34, 16TR37, 16TR38, 16TR61, 16TR115, 16TR151, 16TR213, 16LF31, 16LF108, 16LF65, and 16LF66. The sites range in type from small shell middens (Sites 16TR61, 16TR115, 16TR151, 16TR213, 16LF31, and 16LF108) to burial sites, (16LF66), to large mound sites (Sites 16TR6, 16TR10/86, 16TR19, 16TR22, 16TR34, 16TR37, and 16TR38). Each of these sites is described fully in Chapter VI, and that discussion will not be repeated here. The large number of sites from this period, however, suggests a significant occupation of the region at this time.

ETHNOHISTORY OF THE PROJECT AREA

Early French colonists in southeastern Louisiana encountered a native cultural landscape that was characterized by relatively small tribal groups. Relationships between these groups were dominated by small-scale warfare and unstable, shifting alliances (Davis 1984; Giardino 1984). To the south of modern-day Donaldsonville, there seems to have been no large, permanent centers, but rather a series of villages whose locations shifted as old alliances broke down and new ones were forged. Tribal groups that were reported at one or more locales along Bayou Lafourche between Donaldsonville and the Gulf between 1682 and 1712 include the Washa, Tilapana, Yagnesito, Tchachagoula, Bayagoula-Mugalasha, Chitimacha, and Houma. Virtually no ethnographic information is available for the first four of these groups, all of which disappeared from the historic record during the early years of French colonization (Swanton 1911; Giardino 1984). Little more is known of the Bayagoula-Mugalasha, a composite tribe that settled near the upper reaches of Bayou Lafourche; Quimby (1957) believed that his excavations at the Bayou Goula site (16IV11) documented the remains of one of the Bayagoula villages (see Chapter VI, this report). However, Giardino (1984) noted that early cartographic evidence favors a village location at Donaldsonville.

The Tunica, who were Choctaw speakers like the Houma, lived in northwestern Mississippi at the dawn of European exploration in the sixteenth century. However, the passage of two centuries saw a southward movement of the Tunica, until, during the years from 1731-1763, they were settled at the site now known as Trudeau (16WF25), on the east bank of the Mississippi

River just above Donaldsonville. From that locale, they controlled the confluence of the Red and Mississippi rivers and the nearby Portage of the Cross, and they gained considerable economic power through control of the horse trade between Native Americans and the French (Brain 1988). Subsequently, some Tunica moved westward into Texas and Oklahoma, but a small number remained in Louisiana, settling in the vicinity of Marksville near the mouth of the Red River, where their descendants live today. While the history of Tunica settlement is better understood than that of many of the smaller tribal groups in the project vicinity, there is no evidence that the Tunica settled the project area proper.

Unlike their counterparts along Bayou Lafourche, the Chitimacha survived the colonial period, and their cultural descendants remain in south Louisiana today, where they currently are clustered around Charenton. Throughout most of the twentieth century, anthropologists generally agree that the Houma also survived, and that their descendants are the contemporary Houma, who are concentrated around and near Bayou Lafourche. This assumption has been challenged by the Bureau of Acknowledgment (BAR) of the U.S. Department of the Interior, Bureau of Indian Affairs. After a study of genealogical records related to members of the modern-day United Houma Nation, Inc. (UHN), which includes over 17,000 people who regard themselves as Houma, the BAR "found no evidence linking the UHN to the historic Houma tribe, genealogically, politically, or socially" (BAR 1994, Anthropological Report, page 11). Evaluation of this issue, however, is beyond the scope of this study; in the present report, "Houma" refers both to the Houma Indians

of the Colonial and early federal periods, and to the twentieth century people who regard themselves as Houma. This investigation does not take a position about the existence or absence of a genealogical or historical relationship between the two. Whatever their origins, it is widely agreed that at the time of first European contact the Houma Indians lived along the Mississippi River, and that the ancestors of the modern Houma did not enter the project area until sometime around or after the turn of the nineteenth century. Archeological sites of prehistoric or protohistoric age in the project area therefore are more likely to have been associated with the Chitimacha rather than with the Houma.

The remainder of this chapter includes a summary discussion of the ethnohistory of the Chitimacha, and a more extensive overview of Houma ethnohistory, concluding with a brief account of the socio-economic status of the present-day Houma.

Ethnohistoric Overview of the Chitimacha

One of the earliest mentions of the Chitimacha nation comes from Jean-Baptiste Bernard de la Harpe, in *The Historical Journal of the Establishment of the French in Louisiana* (1971:17). According to the Journal, in 1699 a small group of Frenchmen led by M. Iberville and M. de Bienville came upon a few pirogues carrying peoples of the Washa nation at "the fork of the Mississippi," identified as Bayou Lafourche. These Washa were returning to their village, thought to be located near those of the Chitimacha and the Yagenecito, also near Bayou Lafourche. Together, these nations were estimated to number 700-800 men (ibid.). Swanton interprets this number to represent only warriors, and also suggests that the Yagenecito may have been a related group of Chitimacha who lived on Bayou Teche and Grand Lake, and who were geographically separated from the Chitimacha living on the Mississippi River (Bierer 1978:452; Swanton 1911:342).

It is easy to believe that these tribes may have lived in close proximity. According to Swanton (1911), the material culture of the Chitimacha was similar to that of the other Native Americans along the lower Mississippi, with the exception that more importance was placed on aquatic food resources. The earliest historic rec-

ords indicate that their houses consisted primarily of palmetto leaves over a pole framework, and each had a closeable smoke hole. Durable materials used in clothing include shell, stone, and sometimes copper for necklaces, finger rings, bracelets, nose rings, and earrings. Personal adornment included the use of such potentially durable objects as garfish jaws for scarification.

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

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

Such punishment of Native Americans was not the norm among the French in Louisiana. Be-

fore the Natchez war of the early 1730s, the circumstances of punishment for a crime conformed to those observed in France. During the war, however, whites first felt fear and then hatred, which damaged relations with all Native Americans. Colonial administrators in New Orleans meted out harsh punishments to Native Americans who were accused of crimes or aggression against the French. Native American people often were required to deliver such discipline against other indigenous people. The Chitimachas may have played a role in dealing out these punishments, as the previous hostilities had brought about much enslavement, turning the Chitimachas into a significant ethnic component in the early slave population of lower Louisiana (Usner 1992).

Bienville made peace with the Chitimacha in 1718 (Weinstein and Kelley 1992). Accounts of many facets of the peacemaking vary, but they agree that Chitimacha leaders presented themselves to French leaders to make peace and to smoke the calumet, finally bringing a resolution to tensions that had existed since the murder of the French missionary St. Cosme at the hands of the Chitimacha in 1706 (Swanton 1979:120). In presenting themselves to the French, members moved to the cadence of rattles which they all carried. This peace may have been brought about as a ploy to move the Chitimacha closer to a French concession, managed by M. Paris, located at the old Bayagoula village on the Mississippi River. Penicaut states that they moved to the new location two weeks later, and maps of the period do show a Chitimacha village in that area (*ibid.*; Giardino 1984:253).

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

tance inland (*ibid.*). Between 1723 and 1731, the Chitimachas, Houmas, and Tunicas were scattered in the area between New Orleans and Pointe Coupee, but it is unclear how many villages were occupied (Giraud 1974). Nevertheless, it is known that because of troubles with the Natchez nation, the number of French settlers within this same area had dwindled greatly. According to Giraud (1974), there were approximately 30 settlers - living with both the Chitimacha and the Houma - left in this vast tract during the time of the Natchez war. It may be plausible to assume that greater numbers would have remained if the number and size of villages was large enough to provide a greater level of safety. Regardless, the sources do lend some doubt to a single concentration of the entire Chitimacha nation.

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

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

Fluctuating alliances and settlements were exemplary of the period, and certainly took a toll

on the Chitimacha nation. This is evident in a December 1758 letter by M. de Kerlerrec, in which he wrote that the Chitimacha at that time could count only about 80 warriors, characterizing these as "unfortunate remnants of a numerous nation...reduced to this figure by the trade in drink and the close proximity of the French" (Rowland and Sanders 1984b:213). The tribe itself, he said, was established "about twenty leagues from New Orleans and on the other side of the river" (ibid.:213).

The next significant mention of the Chitimacha people comes from cartographers and survey journals from the late eighteenth and early nineteenth centuries. Thomas Hutchins noted a Chitimacha village located on "Chetimachas" creek (Bayou Lafourche) six leagues from its junction with the Mississippi River (Hutchins 1784:40). Two other settlements, for which Hutchins does not provide a cultural identity but which Weinstein and Kelley (1992) suppose to be Chitimacha, were located on the eastern shore of Bayou Teche (Hutchins 1968:46). The first of these was situated 10 leagues above the mouth of the bayou and called Mingo Luoac or Fire Chief, while the other village was called Soulier Rouge or Red Shoes and located three and one half leagues farther up (ibid.). Goodwin et al. (1985:207) place the first village on the east side of Irish Bend and the second in the vicinity of modern-day Charenton, the present location of the Chitimacha reservation.

The Cathcart and Landreth expedition in 1819 noted several Chitimacha settlements, the most significant of which seems to have been at Charenton, within the "Indian Reach" of Bayou Teche (Newton 1985:108). Landreth described the village as a nearly 4.8 km (3 mi) stretch of cabins built 183 m (200 yd) back from the bayou and spaced evenly at a distance of approximately 46 to 91 m (50 to 100 yd) from each other. These cabins had a neat and light appearance caused by palmetto coverings (ibid.). The expedition also recorded a small settlement named Position's Settlement consisting of three huts on Berwick Island on the shore of Six Mile Lake, and also noted a small fishing and hunting village consisting of two huts located on Grand Lake and approximately 2.4 km (1.5 mi) from Charenton (Newton 1985: 52-53; 126-127; Weinstein and Kelley 1992). This settlement was called Peters

settlement after the chief, and was reported to sit on a spot of "high prairie with a shell bank to the westward of it" (Prichard et al. 1945:105). Another settlement was reported, but not identified as Chitimacha or any other group (Newton 1985:16; Prichard et al. 1945:109). However, Gibson (1980:3-10) used land claims data to imply that the occupants were Chitimacha, and he also documented a second Chitimacha village on nearby Bayou Jacob (Weinstein and Kelley 1992).

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

One important structure known to exist at each large village was the "tribal dance house," similar in function and use to the temples of the Natchez (Swanton 1911:167). This house was used for religious observances and the consummation of important social obligations, and during ceremonies was often visited by large numbers of men, women, and children from all the surrounding settlements. Although the age of these structures was unknown, Swanton (1911:352) determined that the oldest known during his study was located at Hi'pinimc at the Fausse Pointe in the western part of Grand Lake, but the only description of such a house was given by Gatschet for Co'ktangi-ha'no-hetci'nc, on the shore of Grand Lake (1883:6). He says:

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

Another important structure in the larger villages was the "bone house," occupied by an official known as the "buzzard picker" (Swanton 1911:350). Gatschet (1883) and Swanton (1911) disagree somewhat on the precise ceremony that was conducted within this structure, but the

structure itself would have had a large and continuous fire to be encircled by villagers when a chief had died and, one year later, had his bones exhumed and again prepared for burial within a specially prepared mound. The bones of the deceased apparently were cleaned, either burned or immediately bundled, and then contained in a basket or mat to be buried in the mound. Of particular interest, Swanton stated that all property of any note or value belonging to the deceased was also buried within this mound, and this may account for the absence of ancient objects among the modern Chitimacha (1911:350). The mounds erected over chiefs were said to be 1.2 - 1.5 m (4 - 5 ft) high.

Sweat houses also were common features of early historic Chitimacha villages. These were made without floors and with a cavity in the ground 1.52 or 1.83 m (5 or 6 ft) long. A patient would sit, covered in a blanket, on a bed of hot stones cooled by water and with a bed of moss (Swanton 1911:351).

The long and distinguished, though sometimes troubled, history of the Chitimachas was marked by long-term population decrease until the modern day. Kniffen et al. (1987) report an estimated population of 4,000 in 1650 for the combined Chitimacha, Yagencito, and Attakapas, while Swanton reported an estimate of 2,625 for the Chitimacha alone (Bierer 1978:452). Either figure complements the known reduction in both population and settlement over 200 years; Kniffen et al. (1987:74) report that only 50 Chitimacha remained in 1909, confined to a small tract near Charenton. During the twentieth century, the Chitimacha have grown in number and today they are a proud and important part of the cultural heritage of Louisiana.

Ethnographic Overview of the Houma People of Lafourche and Terrebonne Parishes

Data on the ethnography of the Houma people are sparse, and cogent, primary analyses of extant ethnographic data in historic context are lacking. This is as true for the present as for the immediate and more distant past. For the French Colonial period (1682-1803), this results from the fact that sixteenth and seventeenth century explorers, administrators, religious, entrepreneurial, and military personnel gathered very little substantive ethnographic data on most Native

American groups in the Mississippi Valley. Their interests, quite understandably, lay elsewhere. For the American period (1803 to the present), it is a result of the fact that the Houma have not been recognized officially as an Indian group and therefore they have been very little studied (Kehoe 1981:199-200). Even the establishment in 1968 of the United Southeastern Tribes of American Indians, Inc., did not pull the modern Houma into the fold, for they were not included in the newly formed power-base, organized largely to handle Native American land claims within the confines of the U.S. state and federal legal systems.

In spite of this situation, there have been five brief studies of the Houma as a Native American society: Speck (1943), Parenton and Pellegrin (1950), Roy (1959), Fischer (1968), and Stanton (1971). None of these investigations can be considered ethnographic, all being devoted almost exclusively to sociological or narrative description of the economic life of present-day Houma communities; moreover, all but Speck's analysis were framed as studies of "racial hybrids." The incomplete sociological data-gathering techniques chosen for these studies and the specific data fields chosen for investigation would be considered grossly inadequate for the gathering of ethnographic data by modern anthropological standards. Only Speck attempted the elicitation of data which might have provided some insight into the possible survival of native American culture traits, and even his data on kinship are sporadic, incomplete, and regrettably inadequate for either descriptive or reconstructive purposes.

Guevin (1983) summarized much of the available information about Houma life during the eighteenth and nineteenth centuries, but did not undertake ethnographic studies of contemporary Houma society. Guevin's aim was to employ ethnohistoric information about material culture, community organization, and subsistence as devices for identifying evidence of the Houma in the archeological record. Guevin also produced an informative review of other authors' views about the possible associations between ceramic traits and ethnic groups in the protohistoric archeological record of southeastern Louisiana. However, he found that "no specific diagnostic pottery trait has been uncovered for the historic Houma [although] the Houma culturally shared

with the historic Bayagoula and Natchez a strong indigenous Plaquemine ceramic tradition known as Addis Plain in the southern half of the Lower Mississippi River Valley" (Guevin 1983: 98). It is unfortunate that we probably will never be able to reconstruct totally past Houma lifeways. Even archeological data can provide only limited information on most customs.

There are, of course, some remaining clues to the Houma ethnographic past. The name *Houma* itself, for example, is the Choctaw word "red," and the full name of the people was expressed by the phrase *šakfi homma* (pronounced 'shakchee homma') "Crawfish Red [Town]," mirrored by their totemic emblem, a red crawfish (Dumont de Montigny 1753:1:184; Swanton 1952:185). The fact that *šakfi homma* was also the name of another documented but now extinct Choctaw-speaking group, the Chakchiuma — located in the late 1600s in central Mississippi at the confluence of the Yalobusha and Yazoo Rivers, south of the Chickasaw and north of the Choctaw — has led to the likely assumption that the Houma were originally part of that group (Swanton 1952:176). We are consequently at least sure that the Houma spoke Choctaw, though the language is not spoken by the Houma people today and probably has not been in use for at least a century and a half. Cajun French is the everyday language of the majority of contemporary Houma, although the younger generation is fluent in English (see Speck 1943; Stanton 1971; Kehoe 1981).

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

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

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

Described in 1685 as the "bravest nation on the river" by the explorer Henri de Tonti (Clairborne 1880:19; Cox 1905), by 1686 the French had formed an alliance with the Houma. This was renewed in 1699 by Iberville, who provides a description of the primary Houma town. Iberville wrote that the town, in which three chiefs lived, was a fortified village consisting of 140 houses and a population of approximately 600-700, 350 of whom were warriors (French 1875:64-85; Gravier in Thwaites 1896-1901:65:145-150; Margry 1879-1888:4:176-177, 184, 265-271; Shea 1861:143-147; Swanton 1946:140).

French settlement in the region and consequent contact with Europeans had an immediate effect on the Houma, for only one year later, in 1700, Iberville noted that half of them had died

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

In 1706, a group of Tunica were settled with the Houma, but hostilities between the two groups broke out, and a large number of Houma were killed, compelling the survivors to flee permanently from their erstwhile Tunica visitors (Swanton 1952:186). Those Houma who survived moved downriver, apparently in three separate groups (Curry 1979), and they settled first on Bayou St. John near New Orleans. They later moved upstream some miles near the present towns of Convent, Union, Donaldsonville, and Darrow in Ascension Parish, where three towns, Grand Oumas village and two Petite Oumas villages, were established (Giardino 1984: map figure 101; McWilliams 1953:129-130; Ries 1936:map 4; Charlevoix 1923; Thwaites 1896-1901:67:297). Between 1739 and 1758, they were joined by what was left of the Bayougoula, already living in Ascension Parish, and the Acolapissa, who had moved westward from the north shore of Lake Pontchartrain (Claiborne 1880). The three groups, all Choctaw speakers, maintained their own separate leaders, but the masses of the people, according to French accounts, were in the process of fusion into a single social entity (Claiborne 1880; Swanton 1946:139). This melding of peoples and social traits, though-be-it a coming together of three related Western Muskogean groups, certainly began the creolization process that Houma culture was to increasingly and continually undergo for the next two centuries. From

a number of accounts, we know that though the bulk of the Houma remained in Ascension Parish until the early to mid 1800s; a significant number moved west to Attakapas lands in the Lake Charles region around 1805. There, intermarriage with the local population added yet another, in this case non-Muskogean, cultural dimension to the Houma social system (De Kerlérec 1907 [1758]; Sibley 1805; Gallatin 1836).

Population estimates for the Houma from 1699 to 1930 indicate a rapidly diminishing population throughout the eighteenth and nineteenth centuries, with gradual recovery and increase beginning about 1900 and continuing through today (Table 4). After 1930, all Louisiana Native American groups are lumped by the U. S. Census Bureau simply as "Indian," and consequently it is possible only to give estimates from that date to the present. These population figures are further blurred by the fact that federal and state agencies use different criteria for defining an individual as "Indian," and by the fact that the originally pure-blooded Indian Houma have intermarried with both the local white Cajun and Negro Creole populations of Terrebonne and Lafourche parishes. The figures presented in Table 4 must simply be taken for what they are, all estimates.

Table 4. Houma population figures, A.D. 1650 - 1969.

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

As was noted earlier, the Bureau of Acknowledgment Research of the Bureau of Indian Affairs has argued that the Houma for whom census figures were reported in the present century were not descendants of the Houma for whom census figures were reported prior to 1840.

Ethnohistoric Data from the American Period (1803 - Present)

After the Louisiana Purchase in 1803, the U.S. Government reports of John Sibley (1805) and Albert Gallatin (1836) describe the Houma as still resident in Ascension Parish. We know, however, that by 1766 some Houma had begun to move to upper Bayou Lafourche near its confluence with the Mississippi (Brasseaux 1987). Settlement of the portions of Bayou Terrebonne and Bayou Lafourche in Terrebonne and Lafourche parishes by direct ancestors of the contemporary Houma commenced during the early nineteenth century. Their descendants have remained in this region to the present day, now centered in the six communities of Bayou du Large, Grand Caillou-Dulac, Lower Montegut, Lower Pointe au Chien, Champs Charles, and Lower Bayou Lafourche (Stanton 1971:1-2), although recent years have witnessed increased outmigration to urban and suburban locales. The first five of the traditional nineteenth and twentieth century Houma settlements are in Terrebonne Parish, and the last is partly in Terrebonne and partly in Lafourche Parish. None of these communities is exclusively Houma, and only Champs Charles has an Indian majority.

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

bayou communities listed above (Stanton 1971:44).

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

Houma Ethnography

The Houma were one of several (primarily Choctaw-speaking) groups that were encountered along or near the lower Mississippi River by French explorers in the late seventeenth century. Detailed characterizations of Houma culture and social organizations are lacking in early colonial documents. Sources from the French and early American periods do provide information about the populations, tribal movements and village locations of the Houma from 1684 through the early eighteenth century. However, links between the Houma of the colonial period and the modern Houma Indians of Louisiana are not well-documented.

The French Colonial Period

In spite of the lack of explicit ethnographic accounts in French colonial sources, a certain amount of general ethnographic information about the Houma, particularly including data on probable socio-political organization, can be recovered or inferred from records of that period. It is known, for example, that the Houma were organized into three villages; Iberville specifically mentioned the fact that there were three Houma chiefs (French 1875:84; Margry 1879-88:4:184). After the disastrous battle with the Tunica in 1706, the remnants of the Houma are said to have moved downstream in three groups, perhaps village-by-village (Curry 1979). There they eventually also settled in three separate villages: Grand Oumas and the two villages called Petite Oumas by the French (LaHarpe 1971; Giardino 1984: map figure 10.1). Even after the amalgamation with the Bayougoula and Acolapissa between 1739

and 1758, three separate villages remained (Claiborne 1880). Such settlement triads are, interestingly, characteristic of Choctaw towns, for there are references to other such groups, in each instance forming a single larger sociopolitical unit, though the organization and function of the larger units is never defined precisely in the sources (Du Roullet 1732; De Villiers 1923:239-241).

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

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

Paralleling the social system described above, which was applicable to all Choctaw-speaking communities, was a similar political structure, also characteristic of the closely related Western Muskogean Chickasaw and the Eastern

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

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

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

- (1) Houma towns were part of the Choctaw War Town system;
- (2) The totemic emblem of Houma Red Towns was the crawfish;
- (3) The Louisiana Crawfish Red Town people (the Houma) were probably a branch of the Mississippi Crawfish Red Town people (the Chakchiuma);
- (4) Houma towns were three in number from colonial through early modern

times, mirroring an expected Choctaw settlement pattern in which clan groups belonging to different moieties resided in different locales.

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

It is of particular importance to emphasize that not only the Houma but all Native American groups of the Lower Mississippi Valley, while sedentary villagers in a broad sense in the seventeenth and eighteenth centuries, nonetheless frequently relocated their towns from at least early proto-historic times well into historic times (Giardino 1984:237, 240). While the socio-political reasons for such relocations, coalitions, and mergings are not known, it has been demonstrated from the archeological data that such a pattern was typical of the entire region (Davis 1984:216, 231), and probably first became a feature of Lower Mississippi life sometime during the Late Archaic (ca. 2500 B.C.), if the archaeologically demonstrable interchange of economic goods throughout the Valley and along the north Gulf coastal plain through the Poverty Point Trade Nexus is meaningful. Thus, the relocation of the Houma towns from the Red River area south to Ascension Parish and then to Lafourche and Terrebonne parishes is not necessarily attributable solely to French pressures, European epidemic diseases, and/or intertribal pressures. The phenomenon may simply represent the continuation of an acceptable social pattern, one which, in the case of the Choctaw, enabled them to protect areal interests through the strategic placement of "Red Towns."

The Houma Today

While a full-scale ethnology of the Houma people is beyond the Scope of Work for this project, contact was made with the United Houma Nation, Inc. (UHN), which is the entity officially recognized by the State of Louisiana (but not by the U.S. government) as representing the Houma people. An initial meeting with the tribal chairperson and vice-chairperson was fol-

lowed by an exchange of correspondence regarding the proposed hurricane levees. Finally, a presentation regarding the project was made to the tribal council in September 1996.

The Houma continue to represent a significant proportion of the population of the communities identified by Stanton (1971). It should be noted, however, that reports of the number of Houma living in the traditional communities and elsewhere in Louisiana vary somewhat according to the criteria that are used to count the Houma. In a 1988 ethnographic report related to the petition of the United Houma Nation, Inc. (UHN), for federal recognition as an Indian tribe, the UHN recognized eight communities in which its membership was concentrated: Golden Meadow and Grand Bois (together equivalent to Stanton's [1971] Lower Bayou Lafourche community), Montegut, Lower Pointe au Chien, Isles St. Charles (identical to Stanton's Champs Charles), Grand Caillou and Dulac (equivalent to Stanton's Grand Caillou-Dulac community), and Du Large (Campisi and Sarna 1988). According to the UHN, membership in these communities ranged from about 800 in the Golden Meadow area to between 200 and 600 in the other communities, while over 1,100 members of the UHN were resident in Houma (Campisi and Sarna 1988: 4). Varying although generally smaller numbers of Houma live in other communities in Terrebonne and Lafourche parishes (e.g., Larose, Cutoff, Lafitte, and Lockport), but the United Houma Nation, Inc., does not regard these communities as traditional or primary Houma settlements. The U.S. Census of 1990, which relies upon self-ascribed ethnic identity rather than the criteria of the United Houma Nation, Inc., reported the following numbers of Houma by parish: Terrebonne - 4,951; Lafourche - 1,864; Jefferson - 1,702; St. Mary - 673; Plaquemine - 439; St. Bernard - 345; and St. Charles - 44 (U.S. Bureau of the Census 1990, Table 3).

Over the last 15 years, the UHN membership has experienced an accelerating pattern of outmarriage, accompanied by increasing outmigration to areas outside Terrebonne and Lafourche Parishes. According to UHN tribal records, in 1985 a total of 5,797, or 66.5 percent, of the 8,715 members resided in either Terrebonne or Lafourche Parish (United Houma Nation, Inc

1985: 127). The precise degree of outmigration since that time is difficult to ascertain, although the pattern clearly has intensified in recent years. In 1994, the Bureau of Acknowledgment Research (BAR) of the Bureau of Indian Affairs, U.S. Department of Interior, found that "two thirds of the [1992] membership [of 17,616 people] now lives in the New Orleans suburbs," where they are concentrated in and around Marrero (Bureau of Acknowledgment Research 1994, Anthropological Report, page 95). Factors responsible for these demographic changes appear to include changing social attitudes, declines in the estuarine and offshore fisheries, and economic opportunities afforded by urban centers.

The increase in exogamy or marriage to non-Houmas also has been studied in some detail by the Bureau of Acknowledgment Research. In their study of the membership of the United Houma Nation, Inc., and their ancestors, BAR genealogists determined that, for current UHN members born during the years between 1885-1899, 76 percent had two Houma parents. For UHN members born between 1940 and 1949, 57 percent of the group had parents who were both Houma. By the 1980s, only 15 percent of newly born children of UHN members had two Houma parents (BAR 1994, Genealogical Report, page 23).

With both outmarriage and outmigration from their traditional communities increasing, it

is not surprising that the subsistence and economic patterns of the Houma are becoming much more diversified. The traditional economic pattern, centered around fishing and trapping along Bayou Lafourche and Bayou Terrebonne and their distributaries, has not disappeared. However, fishing and trapping no longer comprise the primary occupation of the majority of the members of the United Houma Nation. Duthu (1997:432) reports that, among the Houma in Terrebonne and Lafourche parishes, "The economic base is largely dependent on shrimping and oystering, though a significant number of tribal members are employed in the petroleum industry. For those United Houma Nation members who moved to urban and suburban locales, and particularly to the parishes surrounding New Orleans, fishing and trapping are likely to be auxiliary or avocational activities if they are practiced at all.

The tribal council stated that the three historically Native American school buildings in the Lafourche-Terrebonne Parish area were, in its view, important monuments or landmarks of local and regional importance. In view of the significance of these buildings, the council requested assistance in nominating the structures to the National Register of Historic Places. Since these buildings fall outside the currently proposed Area of Potential Effect, nomination of these buildings to the National Register of Historic Places was outside the project Scope of Work.

CULTURE SETTING: HISTORIC PERIOD

Introduction

Part of a larger Morganza to the Gulf Feasibility Study, the present project area is located in eastern Terrebonne and western Lafourche parishes in southeastern Louisiana. The extensive waterways that weave through the study area have provided livelihoods to generations of trappers, shrimpers, sugarcane growers, and oil men.

Early Exploration, ca. 1519 - 1682

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

The first European to explore the Louisiana interior was Hernando de Soto. He led his expedition across today's southeastern United States; de Soto and his men crossed the Mississippi River near the present Tennessee/Mississippi state border in the spring of 1541. From that point, the explorers traveled westward, possibly as far as Oklahoma, before returning to the Mississippi, where De Soto died somewhere along the river in May 1542. The expedition survivors unsuccessfully attempted an overland route through Texas to the Spanish settlements in Mexico before finally returning to the Mississippi where they journeyed downriver and then set sail across the Gulf of Mexico. They reached Veracruz in September 1543. Following these unpro-

ductive expeditions, Spain took no further action to strengthen her claim to the lower Mississippi Valley; the Spanish left the region undisturbed for almost 140 years (Davis 1971:27-28; McLemore 1973:91-100).

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

French Colonial Era, 1698 - 1765

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

Recorded reference was made to Bayou Lafourche as early as 1699. Before returning to France for additional colonists and supplies, Iberville assigned his brother, Jean Baptiste le Moyne, Sieur de Bienville, command of the Mississippi explorations. During one of the Bi-

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

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

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

Spanish Colonial Era, 1765 - 1803

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

Acadian colonization of the Lafourche District flourished under Spanish rule. The historic *Lafourche des Chetimachas* settlement was located along the natural levees bordering both

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

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

Although an agrarian people, the Acadian settlers of lower Bayou Lafourche supplemented their farm production with fishing, hunting, and trapping, necessities in the marshlands. In the isolated Barataria region, which began along the east bank of Bayou Lafourche, smuggling also became a way of life for some of the inhabitants of the basin. In addition to hideouts, the wooded swamps offered timber resources for the more traditional occupations of shipbuilding and land-based construction. During the last years of Spanish colonial government, the first primitive canals were cut through the Lafourche marshes to aid these early settlers in their pursuits. Some canals were dredged for farmland drainage, others for trapping use (*trainasses*), and still others for access to navigable waterways and the port at New Orleans. Many of these early channels

eventually became artificial bayous; some have been maintained and improved through the years and remain in use today (Davis 1985:150-152; Goodwin et al. 1984:21-22; Speaker et al. 1986:13-14, 57).

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

Territorial Era, 1803 - 1812

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

The War of 1812

The project vicinity was affected only indirectly by the War of 1812. Capture of the city of New Orleans was vital to the British plan for control of the lower Mississippi River Valley.

Both Barataria Bay (considerably to the east of the project area) and Bayou Lafourche were considered to be potential British attack routes to New Orleans (Davis 1971:178-179; Owsley 1981:126). Defensive preparations were made in the event of a British approach along either waterway.

Military records listed Louisiana militia camps at both Barataria and on Bayou Lafourche during late 1814 - early 1815. One camp on Bayou Lafourche was based near its intersection with the Mississippi River in the Donaldsonville vicinity; the other encampment, known as Camp Hopkins, was located farther down the bayou. Manned by Captain Charles R. Hicks and his company from Colonel Alexander DeClouet's Regiment of Louisiana Drafted Militia, this downstream camp served as an outpost to prevent British invasion or supply transport from moving up Bayou Lafourche. Although the precise location of Camp Hopkins has not been recorded, an 1853 map of Louisiana depicts "Gen. Jackson's obstruction" at the junction of Bayou Lafourche and Bayou Catahoula (the latter, a connection to Lake Ouacha, or Salvador). This "obstruction" probably marked the position of the lower militia camp on Bayou Lafourche. The defensive position apparently was located in Township 17S, Range 20E, between the present-day communities of Ludevine and Larose, just upstream from the proposed project area (Figure 13) (Casey 1983:12, 75, 102).

Antebellum Era, 1815 - 1850

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

On March 22, 1822, State Senator Henry Schuyler Thibodaux sponsored legislation to create Terrebonne Parish from a portion of Lafourche Interior. As a result, Thibodaux is called "Father of Terrebonne" (League of Women Voters of Terrebonne Parish 1979). The following three theories have been advanced as to the origin of the name "Terrebonne": 1) the name originated when early French settlers called the



Figure 13. [1853] Excerpt from Bayley's New and Improved Map of Louisiana, showing proposed project vicinity and "Gen. Jackson's Obstruction".

land "Bon Terre" or good earth; 2) the name derived from the Derbonne family who were granted land by the Spanish governor of Louisiana, Baron de Carondelet; or, 3) Senator Thibodaux named Terrebonne after a parish in Canada where his father-in-law was born. Whatever its origin, Terrebonne Parish in 1822 became Louisiana's 26th parish. Originally, the parish seat was located at Bayou Cane, but in 1834, the seat of government relocated 4.8 km (3 mi) southwest to Houma. Terrebonne remains the largest parish, in terms of territory, in Louisiana. Houma, the chief municipality near the project area, was incorporated March 16, 1843 (Hansen 1971:257).

When the new parish was created in 1822, the Parish of Lafourche was split along Bayou Blue, with Terrebonne to the west and the Lafourche to the east (Figure 14) (Goins and Caldwell 1995:43; Thorndale and Dollarhide 1985). Much of lower Bayou Lafourche was surveyed by the Office of the U.S. Surveyor General during the 1830s and then resurveyed in the 1850s. No structures were depicted on the researched survey plats, but canals and cultivated fields appear in several land claims. Although each bayou-side tract held a standard French colonial depth of 40 arpents, the fields were located for the most part between the waterway and the natural levee. The remaining private and public acreage often was designated "IMPRACTICABLE TREMBLING PRAIRIE" or "IMPASSABLE TREMBLING & OVERFLOWED PRAIRIE." By 1850, most "public sections" had gone to the State of Louisiana under the U.S. Swamp Land Acts of 1849 and 1850 (Louisiana Surveyor General 1857a, 1857b, 1858; Wicker et al. 1993:6).

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

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

outnumber blacks (Goins and Caldwell 1995:55).

The Civil War

The Civil War had only an indirect impact on the project vicinity. In August or September 1861, under the orders of the Louisiana's Confederate commander, Major General David Twiggs, an "earthen water battery" was constructed on Grand Caillou Bayou, 32 km (20 mi) south of Houma (Figure 15 [see Chapter III]). The fort served dual purposes: to protect blockade runners that sailed into Grand Caillou and to repel enemy raids (Bergeron 1985:198). Originally called Fort Butler, the small Confederate fortification was renamed Fort Quitman around January 1862. The fort was manned by 137 enlisted men and five officers and contained two smoothbore 32-pounders. After a Federal naval force passed the forts and blockades along the Mississippi River and headed towards New Orleans in April 1862, the evacuation of Fort Quitman, as well as all forts located in the state, was ordered (Casey 1983:36, 70, 182; Bergeron 1985:198-206).

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

Postbellum Era

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



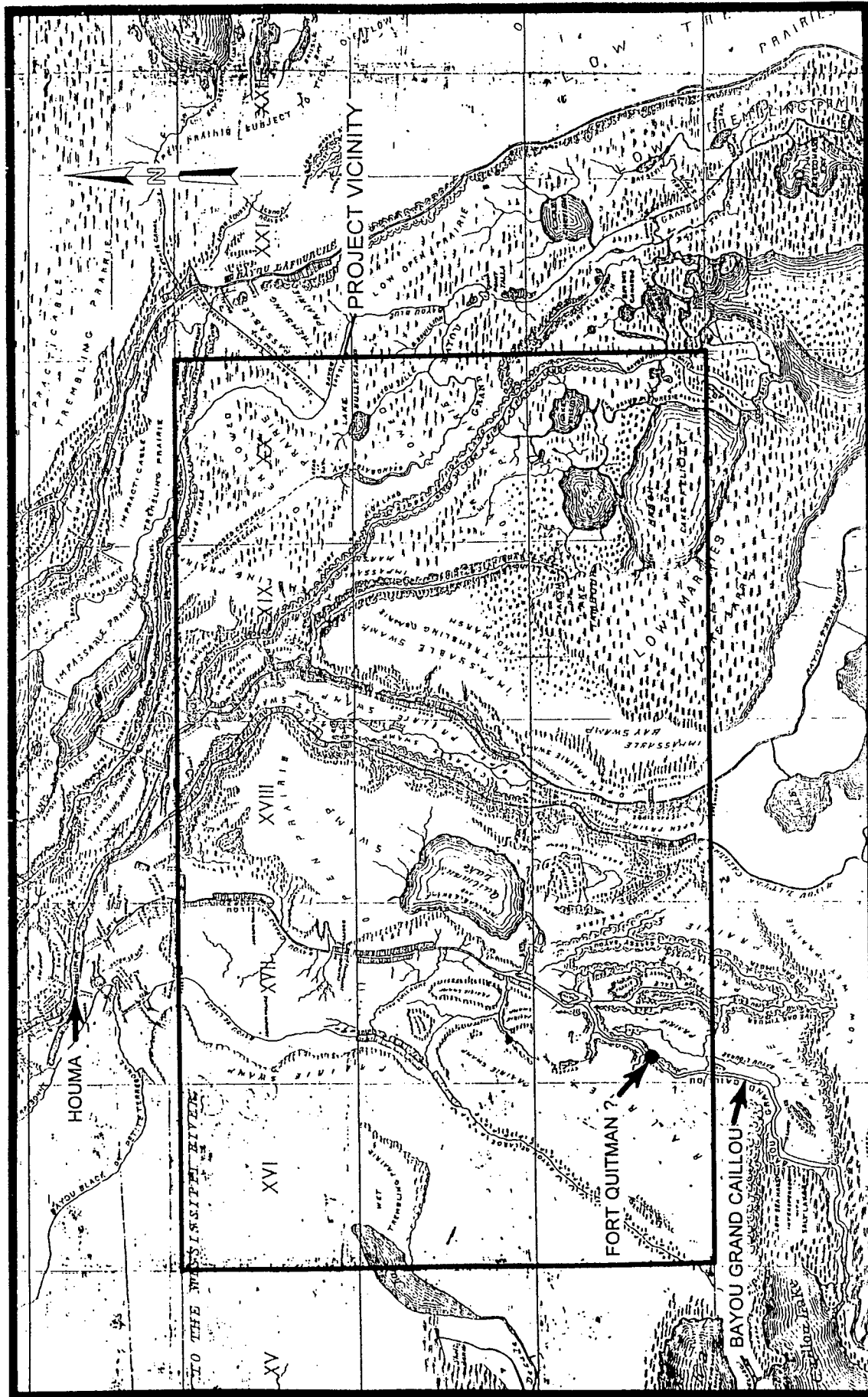


Figure 15. [1863] Excerpt from Houston's Department of the Gulf, Map No. 10, Mil. Approaches to New Orleans, showing the proposed project vicinity. Also shown is the estimated location of Fort Quitman on Bayou Grand Caillo.

Plantation Settlement Patterns in the Vicinity of the Project Area

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

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

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

The location of these plantations behind the levee crests made a linear arrangement impractical. Instead, mansions would be placed as closely

as possible to the levee crests, while the need to make maximal use of the limited remaining high land dictated that the sugar house, outbuildings, and laborers' quarters be clustered together, typically at a distance of 1 - 3 km (0.6 - 1.9 mi) back from the main residence.

When plantation agriculture spread south and west onto the levee systems of Bayou Teche and Bayou Terrebonne in the 1820s and later, previously unoccupied natural levee crests were once again available. However, the lateral extent of the levees of bayous like Terrebonne and Teche was much more restricted than along either Bayou Lafourche or the Mississippi. As a consequence of this limited availability of dry land, plantations along these smaller bayous generally have broader bayou frontage and less depth than their counterparts along larger streams, and the resulting bayou block settlement pattern is typified by the clustering of all buildings - mansions, laborers' quarters, sugar houses, and outbuildings - along the levee crests.

Sugar Plantations in the Vicinity of the Project Area

Red Star

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

Hard Scrabble

During the early 1800s, another settler, Thomas Ellender, married Catherine Roddy and established a homestead just above today's Montegut. Ellender was a persistent worker who purchased land at every opportunity; when he acquired a plantation he named it "Hard Scrabble"

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

Ashland Plantation

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

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

Terrebonne Plantation

Another vast sugar establishment, Terrebonne Plantation, developed in the project corridor at today's community of Montegut on Bayou Terrebonne about 18 miles south of Houma. The plantation had the southernmost sugar mill in the state of Louisiana; its location made it less sus-

ceptible to freezing temperatures in fall and winter. Like Ashland, Terrebonne Plantation flourished well into the twentieth century. A 36 inch narrow gauge railroad, built in 1891, extended 35 miles through the cane fields. The main line followed Bayou Terrebonne five miles down from the mill and through the project corridor; the plantation's local line also extended ten miles up the bayou to Colley [Caillou?] Switch, where it joined a branch line of the Southern Pacific. The plantation railroad was discontinued after the 1951 grinding season. When the mill ceased operation at the end of 1974, the machinery was dismantled and shipped to Guatemala (Butler 1980:211-215).

General Parish Population and Growth

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

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

Agricultural, Maritime, and Mineral Productions of the Project Area

A major economic endeavor of the region was the production of sugar. A crop that was well-suited to the soils and climate, sugar rewarded its growers handsomely. Even its byproduct, bagasse, enriched and revolutionized other industries. Beginning in 1922, the Celotex Corporation turned bagasse into what is known today as

insulation board. By 1927, the Celotex Corporation formed the South Coast Company and purchased 26 plantations, including Ashland and Terrebonne. The sugar factory at Ashland was shut down in 1927; Terrebonne ceased its operations after the 1974 grinding season (Butler 1980:199-215). In addition to the sugar crop, the region also produced cotton, hay, potatoes, corn, beans, cattle, and dairy products.

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

In 1917, a discovery was made that fostered the financial independence of a region and a state. It turned modest land owners into millionaires and caused regional and state economics to ride a rollercoaster. After several unsuccessful attempts, the first commercial gas well struck on March 17, 1917, in the Lirette Gas Field near Montegut. Approximately 100 million cubic feet of gas was produced, making it the largest producer in the world. By 1938, with the proliferation of oil wells throughout the project area, the total annual oil production for Terrebonne Parish reached 8,938,096 barrels, while natural gas production had attained 63,648,000 cubic feet. Crude oil production in the parish during the same year equaled \$9,338,000.00. By 1939, natural gas production had skyrocketed to 528,810,000 cubic feet. The petroleum industry had proved that Terrebonne Parish could be one of the most productive areas in the world (The Houma Daily Courier & The Terrebonne Press 1972; Department of Public Works Planning Division 1953).

Education

The educational system during the early days of the Lafourche country was non-existent. Children were taught the practicalities of life, such as fishing, hunting, farming, and trapping. If they learned to read and write, it was because

their parents knew how and taught their offspring at home after the day's chores had been completed. In the region of the current project area, the isolation of the families and the hardships of traveling compounded the belief that education was a private responsibility of the family, rather than of the government (The Houma Daily Courier & The Terrebonne Press 1972).

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

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

The Waterways of the Region

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

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

Petroleum canals crisscross the south Lafourche country today. The oil boom hit the parish in 1930, when the first well "came in." Numerous oil and gas fields now blanket the region, although the drilling frenzy has subsided in recent

years. The first petroleum canals were cut as service routes to the wells; today, though, pipeline routes appear to dominate the petroleum network in the coastal Lafourche region. Not only do these channels transport domestic petroleum products across lower Lafourche, but, with the development of Port Fourchon (the Louisiana Superport, off the coast below the mouth of Bayou Lafourche), designed to support deepwater tankers, foreign oil also can be conveyed through south Lafourche country to American markets (Ditto 1980:29-30, 70).

Summary

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

CHAPTER VI

PREVIOUS INVESTIGATIONS

Introduction

This chapter reviews archeological surveys that have been undertaken in the vicinity of the project area, as well as the sites known in the vicinity of the project area. For the purpose of this investigation, the “vicinity” of the project area has been defined as the area within 500 m (1,640 ft) of the project boundaries (Table 5). The 500 m (1640 ft) width or buffer zone was selected in part because of the characteristics of the project area. Most of the proposed levee alignments follow a series of roughly parallel, relatively narrow, relict natural levees; the use of a wider buffer zone, therefore, would have extended the investigation onto unrelated landforms, into intertributary wetlands, or created large areas of overlap. The result would have been, in the first case, the collection of largely irrelevant data and, in the second and third cases, the addition of no new data. The requisite data were collected from the State of Louisiana Division of Archaeology site files. In addition, Mr. Michael Stout of the U.S. Army Corps of Engineers, New Orleans District, kindly shared with the authors an unpublished map of the survey transects investigated by Coastal Environments, Inc., along Bayou du Large during their Terrebonne marsh study (Weinstein and Kelley 1992).

The present chapter begins with an overview of the archeological surveys that have been conducted in the vicinity of the project area. This presentation is followed by a discussion of the previously recorded prehistoric and historic ar-

cheological sites found throughout the project area.¹

Archeological and Cultural Resources Surveys within 500 m (1,640 ft) of the Project Area

As was noted in Chapter III, the intellectual history of archeological research in this region is unusual. Archeological survey of the area began at least as early as 1926 when Henry B. Collins, Jr., an associate curator of ethnology at the Smithsonian Institution, undertook an archeological reconnaissance along the Louisiana Gulf Coast for the Bureau of American Ethnology (Collins 1927). At that time, the archeology of the Louisiana coastal zone was almost completely unknown. Collins apparently expected few results from survey of such a low marshy area, and he was surprised by both the size and the number of the prehistoric sites he encountered (Collins 1927:200). Collins spent 10 days exploring the shell middens and mounds of Terrebonne Parish. He did not specify by name any of the sites he visited in the parish, but it is quite likely that he visited some of the more prominent ones located in or near the project area, e.g., Mandalay Plantation (16TR1) or the Marmande Plantation site (16TR19). Collins noted that the shell “heaps” were almost entirely composed of *Rangia cuneata* as well as other domestic refuse. Most sagaciously, he recognized that the mound sites and some of the pottery – particularly the check stamped types – showed connections with the

¹ Since a majority of the proposed levee alignment corridors are located in Terrebonne Parish, sites located in this parish are discussed first, followed by sites located in Lafourche Parish.

Table 5. Cultural resource surveys conducted within 0.5 km (0.3 mi) of the proposed Morganza to the Gulf project area.

REPORT NUMBER	TITLE/AUTHOR	PROJECT DESCRIPTION	RESULTS AND RECOMMENDATIONS
NA	<i>Archaeological Work in Louisiana and Mississippi</i> (Collins 1927)	Unit excavation	Showed connections between archeology of Louisiana Gulf Coast and mound building cultures of Mississippi and northern Florida. No specific recommendations were made.
NA	<i>Correlation of Prehistoric Settlements and Delta Development</i> (McIntire 1954)	Pedestrian and boat survey	Over 500 sites were recorded; however, few of these sites were assessed. No specific recommendations were made.
NA	<i>Prehistoric Indian Settlements of the Changing Mississippi River Delta</i> , Coastal Studies Series No. 1 (McIntire 1958)	Informant interviews, examination of aerial photographs, and extensive reconnaissance survey	Over 500 sites were recorded; however, few of these sites were assessed. No specific recommendations were made.
22-218	<i>Archaeological Survey of the Bayou Lafourche and Lafourche-Jump Waterway, Louisiana</i> (Neuman 1973)	Aerial examination and bankline survey	Identified Sites 16LF31, 16LF39, 16LF43, 16LF50, 16LF52. No specific recommendations were reported for any of these sites.
22-80	<i>Archaeological Survey of the Houma Navigational Canal and Bayous LaCarpe, Terrebonne, Petit Caillou, and Grand Caillou, Terrebonne Parish</i> (Neuman 1974)	Boat, windshield, and helicopter survey	Identified four archeological sites (16TR6, 16TR37, 16TR38, 16TR86). No specific recommendations were made.
NA	<i>An Archaeological Assessment of Coastal Louisiana</i> (Neuman 1977)	Archival research	No specific recommendations were made.
22-106	<i>Archaeological Investigations Along the Gulf Intracoastal Waterway: Coastal Louisiana Area</i> (Gagliano et al. 1975)	Pedestrian survey	A total of 158 prehistoric and 42 historic sites were identified. Of these, five sites were recommended for immediate archeological testing.
22-317	<i>Environmental Assessment of Proposed Pipeline Construction in Terrebonne, Lafourche, Jefferson and Plaquemines Parishes</i> (Gulf South Research Institute 1975)	Helicopter and pedestrian survey	A total of seven prehistoric period loci were located. No further testing was recommended for any of these loci.
22-350	Letter Report with No Title; Subject: Cultural Resources Survey of the Bourg-Larose Highway and the Bayou Blue Bridge and Approaches Route LA 24 (Rivet 1977)	Archival research, informant interviews, and unspecified type of field survey	No cultural resources were identified. No additional testing was recommended.
22-359	<i>Archaeological Survey for Louisiana Intrastate Gas Corporation, Pineville</i> (Neitzel 1978)	Pedestrian survey	No cultural resources were identified. No additional testing was recommended.
22-464	<i>Cultural Resources Impact Assessment, Houma-Terrebonne Regional Sewerage Plan</i> (Altschul 1978)	Informant interviews, pedestrian survey, and limited excavation	A total of 14 previously recorded sites were revisited. Additional testing was recommended at several of these sites.
22-563	Letter Report. Subject: Phase I Cultural Resources Survey of the Proposed Replacement of the LA 55 Bridge Over Humble Canal, Terrebonne Parish, Louisiana (Rivet 1979)	Records review and pedestrian survey	No cultural resources were identified; no additional testing was recommended.
22-901	<i>Cultural Resource Investigations, A Portion Of Bayou Grand Caillou, Terrebonne Parish, LA</i> (Flayherty and Muller 1985)	Archival research, boat survey, and magnetometer survey	A total of two previously recorded sites were relocated (16TR6 and 16TR37); one previously unrecorded site was identified; and 69 derelict watercraft were recorded.
22-1160	<i>Archaeological Survey of Three Proposed Forced Drainage Projects 4-4; 4-3B; 4-3C Parish Project No. 83-G-25 Terrebonne Parish, Louisiana</i> (Haag 1985)	Pedestrian survey and shovel testing	No cultural resources were identified. No additional testing was recommended.
22-1143	<i>Cultural Resources Survey of Western Sections of the Larose to Golden Meadow Hurricane Protection Project, Lafourche Parish, Louisiana</i> (Poplin et al. 1986)	Pedestrian survey, shovel testing, auger testing, and boat survey	A single previously recorded site was revisited (16LF99). No further testing was recommended.
22-1205	<i>Cultural Resource Investigations of Proposed Sewage Lines and Related Facilities in the Vicinity of Houma, Louisiana</i> (McIntire and Baumann 1987a)	Archival research, windshield survey, pedestrian survey, boat survey, examination of aerial photographs, and boring	No cultural resources were identified. No additional testing was recommended.
22-1206	<i>Cultural Resource Identifications of Bayou Petit Caillou, Bush Canal and Bayou Terrebonne in The Vicinity of Chauvin, Louisiana</i> (McIntire and Baumann 1987b)	Archival research, pedestrian survey, boat survey, shovel testing, boring and examination of aerial photographs	A total of two previously recorded sites (16TR10 and 16TR86) were combined (16TR10/16TR86). No new cultural resources were identified. No additional testing was recommended.

Table 5, continued

REPORT NUMBER	TITLE/AUTHOR	PROJECT DESCRIPTION	RESULTS AND RECOMMENDATIONS
22-1423	<i>A Cultural Resources Survey of Above-Ground Portions of a Proposed Pipeline Right-Of-Way in Section 58, T20S, R18E, Terrebonne Parish, Louisiana</i> (Heartfield, Price and Greene, Inc. 1989)	Archival research, shovel testing, and coring	No cultural resources were identified. No additional testing was recommended.
22-1387	<i>Archaeological Field Investigation, Plank Road Harry Bourg #3 Well Site, Bayou Du Large, Terrebonne Parish, LA</i> (Beavers 1989)	Pedestrian survey, shovel testing, and unit excavation	No cultural resources were identified. No additional testing was recommended.
22-1597	<i>A Reconnaissance Survey of Derelict Boats on Bayou du Large, Terrebonne Parish, Louisiana</i> (Stout 1992)	Boat survey	A total of 37 derelict vessels were documented along Bayou du Large. Additional survey and boat recordation was recommended.
NA	<i>Cultural Resources Investigations in the Terrebonne Marsh, South-Central Louisiana</i> (Weinstein and Kelley 1992)	Pedestrian survey, boat survey, and shovel testing	A total of 34 new sites were identified and 36 previously recorded sites were relocated.
NA	<i>1994 Annual Report For Management Units 4 and 5, Regional Archaeology Program, Museum of Natural Science, Louisiana State University</i> (Saunders 1994)	Unit excavation and subsurface probing	Previously recorded Site 16TR22 was revisited and tested. Additional data collected concerning the site included C-14 dating and the recordation of an additional historic period component. No recommendations were made.
NA	<i>Documentation of Several Historic Vernacular Watercraft of Bayou Du Large, Terrebonne Parish, Louisiana</i> (Robinson and Seidel 1995)	Documentation and recording of historic nautical architecture	No recommendations were made.
22-2019	<i>Phase I Cultural Resources Survey and Inventory of the Proposed Discovery Gas Transmission LLC Pipeline Project, Gulf of Mexico to Lafourche Parish, Louisiana</i> (Miller et al. 1996)	Airboat survey, pedestrian survey, subsurface probing, auger testing, and shovel testing	A total of two archeological sites (16LF65 and 16LF66) were identified; both were assessed as potentially significant and avoidance or additional testing/mitigation was recommended.
22-2083	<i>Cultural Resources Survey of Bayou Dularge Disposal Areas, Terrebonne Parish, Louisiana</i> (Walter et al. 1998)	Records review, pedestrian survey, auger testing, and shovel testing	No archeological sites were identified; however, a total of six modern standing structures were noted within the proposed project areas. All six structures were assessed as no significant and no additional recordation was recommended. In addition, no additional testing of the proposed project areas was recommended.
NA	<i>Phase I Cultural Resources Survey and Inventory of the Proposed Discovery Gas Transmission LLC 20 in O.D. Residue Pipeline Project, Lafourche Parish, Louisiana</i> (Williams et al. 1998)	Pedestrian survey and shovel testing	A single standing structure (29-1201) was identified. The structure was assessed as not significant and no additional testing was recommended.
22-2270	<i>Phase III Data Recovery Excavations at Site 16LF66, the Discovery Site, a Site Identified within the Discovery Producer Services, L.L.C., Larose Gas Processing Plant in Lafourche Parish, Louisiana</i> (Miller et al. 2000)	Magnetometer survey, unit excavation, and mechanical excavation	Phase III data recovery revealed that Site 16LF66 represented the remains of a perennial Plaquemine Culture occupation. Numerous cultural features, as well as a number of human burials, were excavated.

mound-building cultures of the Mississippi Valley and northern Florida.

Collins was assisted in his investigations in Terrebonne Parish by Randolph Bazet, a major figure in the history of avocational archeology in the region (Collins 1927:201). Bazet's knowledge of the region and his information about site locations were invaluable not only to Collins, but also to many later investigators. Bazet identified many of the more prominent sites in the region (e.g., the

Mandalay Plantation site [16TR1]). He also gave important collections of artifacts to several investigators over the years, including collections that have since been curated and remain available for study today (Weinstein and Kelley 1992:160-170).

The next archeological survey conducted in the project area was performed by McIntire and Saucier, geologists affiliated with Louisiana State University (McIntire 1954, 1958). The survey

involved visiting over 500 sites throughout coastal Louisiana. The principal purpose of the research was to examine the correlation between archeological settlement patterns and the different delta complexes of south Louisiana. Using the relative archeological ceramic sequence as it existed at the time, they attempted, quite successfully, to develop and refine the geological sequence associated with the various delta complexes and lobes. A secondary benefit of the research was the opportunity to study "the relationship of man to the shifting stream" (McIntire 1958:3), that is, to expand knowledge of prehistoric settlement in the area. McIntire revisited many of the known sites in the Louisiana coastal area and he continued to search for new sites (1958:18). At the sites he visited, McIntire made surface collections, compiled maps, and measurements, and took borings. Occasionally, small excavations were conducted at important sites.

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

McIntire conducted both pedestrian and vehicular survey (car/truck) and a boat survey of the coastal zone region. Sites were mainly discovered through interviewing local informants and by closely examining the aerial imagery of the area (R.T. Saucier personal communication, 1997). The survey was both thorough and extensive. As a result, it is unlikely that the major mounds, mound complexes, or large surficial shell middens of the area were not observed or investigated. In this respect, the current project area has

been surveyed, however, the probability is low that all of the buried or submerged sites, or earth middens, were identified.

McIntire made several significant observations about the patterning of sites in the proposed Morganza to the Gulf project area. First, he realized that his data supported a relatively early age – in archeological terms – for the Teche meander belt, represented in the vicinity of the project area by Bayou Black. This conclusion agreed with Russell's (1940) sequence of delta complexes, which at the time was the accepted sequence. This conclusion was based in part on the Marksville age attributable to the Mandalay Plantation site (now Site 16TR1) (McIntire 1958:64), which Phillips (1970, II:899-900) later made the type site for the Mandalay phase.

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

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

At least 13 of the sites discussed in the current study were examined by Philip Phillips in his *Archaeological Survey in the Lower Yazoo Basin, Mississippi, 1949-1955* (1970). The coastal plain of Louisiana was included in Phillips' taxonomy of cultural phases, and data from Sites 16TR1, 16TR6, 16TR7, 16TR10/86, 16TR19, 16TR22, 16TR23, 16TR26, 16TR34, 16TR37, 16TR38, and 16LF31 were utilized in formulating his phase descriptions. Regarding sites hitherto identified as Troyville period settlements, Phillips commented that McIntire had a tendency to classify sites as Troyville based on "the occurrences of Churupa, Mazique, or French Fork alone: in some cases a single sherd of one of these types has been sufficient" (1970:911). In many instances, Phillips moved sites from the Troyville period to the Bayou Cutler phase, based on a more rigorous look at the ceramic assemblages. Throughout his report Phillips acknowledged that researchers will, and should, modify his classification system based on a more refined analyses of the site assemblage and stratigraphic sequence.

Robert Neuman conducted two surveys noting the presence of several archeological sites in the current project area. He surveyed the Houma Navigational Canal and Bayous La Carpe, Terrebonne, Petit Caillou, and Grand Caillou (1974), and also Bayou Lafourche and Lafourche-Jump Waterway (1973). Both of these surveys entailed a reconnaissance of the bayou shorelines; this was performed either by boat, truck, or helicopter. During the 1974 study, Neuman noted the presence of Sites 16TR6 and 16TR37 along Bayou Grand Caillou, and 16TR86 along Bayou Terrebonne. Site 16LF31 was identified during the study of Bayou Lafourche. Both studies contained descriptions of site location and type (i.e., midden, earthwork, etc.), but involved no on-site testing. A few years later Neuman published "An Archaeological Assessment of Coastal Louisiana" (1977), an inventory of coastal archeological sites put together through archival research. This small publication contains a synopsis of investigations completed in the region, a geological history in the area, a description of the natural environment, and a table listing pertinent site information.

In 1975, Gulf South Research Institute conducted a pipeline survey in portions of Terrebonne, Lafourche, Jefferson, and Plaquemine

parishes. Survey was conducted on foot and from helicopter. As a result of this investigation, seven prehistoric loci were located, only one of these sites falls within the current project area (16TR215). The investigators assessed this diffuse surface scatter as not significant and no additional testing was recommended.

The Gulf Intracoastal Waterway and Bayous Grosse Tete, Petite Anse, Tigre, and Carlin were surveyed for archeological resources by Coastal Environments, Inc. (Gagliano et al. 1975). This investigation focused on the identification of previously unrecorded sites along the length of the canal, and on assessing the impact of canal dredging and spoil deposition on those resources. Site 16TR87, identified in Terrebonne Parish and along the banks of the Gulf Intracoastal Waterway, already had been impacted by the construction and dredging of the canal. The report produced by Coastal Environments, Inc., briefly described the location of this midden, but it contained no description of the artifacts present. Site 16TR87 was classified by the investigators as a site of moderate importance (1975:49). They recommended that the site be examined further by a qualified archeologist prior to any dredging or spoil bank modifications made along the canal.

In 1977, Philip G. Rivet conducted a survey for a bridge and the associated bridge approach routes across Bayou Blue in Lafourche Parish for the Louisiana Department of Transportation and Development (1977). Although the actual survey area was small, state records recorded Site 16LF31 in the immediate vicinity of the proposed project corridor. Since no cultural material was identified during the pre-construction survey, Rivet (1977) concluded that Site 16LF31 must lie slightly to the west of the intersection of Bayou Blue with Bayou L'Eau Bleu.

Robert Neitzel (1978) conducted a study of a then proposed pipeline canal that crossed the marshland near the town of Montegut, Louisiana (1978). This three mile stretch of terrain consisted mostly of flooded organic soils, but the pipeline right-of-way did cross one relict distributary channel, i.e., Bayou St. Jean Charles. No cultural material or evidence of intact cultural deposits was identified within the proposed route.

A more extensive survey of the region was undertaken by New World Research as part of an environmental impact statement being compiled

in association with the Houma-Terrebonne Regional Sewerage Plan (Altschul 1978). The goal of that investigation was to locate and to assess the potential impact the project might have on 31 previously recorded archeological sites located along the proposed sewerage routes. This study was divided into three stages and included a background literature search, relocation and testing of the 31 previously recorded archeological sites, and laboratory analysis of the collected artifacts. This report is relevant to the current investigation since 14 of the 26 terrestrial sites identified within the current project area were visited by Altschul. Sites 16TR1, 16TR3, 16TR6, 16TR9, 16TR10/86, 16TR19, 16TR26, 16TR33, 16TR37, 16TR38, 16TR51, 16TR71, and 16TR115 (then designated as 16TR72B) are all described within Altschul's report. This investigation was the first time that intensive surface reconnaissance and subsurface testing had been performed on many of these sites. Besides compiling individual site summaries, Altschul utilized the ceramic data to test some ideas about settlement type and site distribution. Ceramic serializations were completed, and the similarities among the ceramic assemblages were computed using the Brainerd-Robinson similarity coefficient. In addition to discussions of settlement patterning, Altschul also assessed the significance of each of the recorded sites. Sites 16TR1, 16TR9, and 16TR71 were evaluated as not significant. Sites 16TR26 and 16TR115 (16TR72B) were assessed as potentially significant, while Sites 16TR6, 16TR7, 16TR10/85, 16TR19/3, 16TR33, 16TR37, and 16TR38 were assessed as significant. Site 16TR51 was not evaluated since access to the area had been denied. It should be noted, however, that Altschul's (1978) assessment of site significance does not necessarily reflect the National Register of Historic Places (NRHP) eligibility listed on state site records.

On August 28, 1979, the Louisiana Department of Transportation and Development conducted a Phase I cultural resources survey and archeological inventory of a parcel of unspecified size associated with the then-proposed replacement of the Louisiana Highway 55 bridge over Humble Canal (Rivet 1979). Fieldwork consisted of pedestrian survey throughout the entire length and width of the proposed project area. No cultural resources were identified as a result of this

investigation, and no additional testing of the proposed Humble Canal project corridor was recommended (Rivet 1979).

A survey of portions of Bayou Grand Caillou was performed by R. A. Flayherty and J. W. Muller for the U.S. Army Corps of Engineers, New Orleans District in 1983. This survey was conducted by boat and was designed to locate all visible archeological resources, both terrestrial and aquatic, along Bayou Grand Caillou between Bayou Provost and the Houma Navigation Canal. This survey located two previously recorded sites (16TR6 and 16TR37) and one then unrecorded site; in addition, 69 derelict watercraft were identified. Their investigation of the two prehistoric sites, 16TR6 and 16TR37, consisted mainly of background research and annotating previous site descriptions. The survey methodology and results regarding the 69 derelict vessels will be examined in the subsequent section on watercraft.

In 1985, William Haag examined three proposed forced drainage areas in Terrebonne Parish. These three areas, lower Montegut, Pointe au Chien, and Isle de St. Jean Charles, were inspected prior to the construction of several water direction levees. The two areas examined along lower Montegut (along Bayou Terrebonne) and Pointe au Chien lie immediately adjacent to the currently proposed levee alignments. Haag surveyed all along the interface of the marsh and natural levee, a potentially favorable setting for prehistoric settlement. Pedestrian survey and the judgmental excavation of shovel tests throughout each project area failed to produce any evidence of intact cultural deposits.

In 1986, R. Christopher Goodwin & Associates, Inc., conducted a Phase I cultural resources survey of the proposed Larose and Golden Meadow Hurricane Protection Levee. Fieldwork included pedestrian survey, shovel testing, auger testing, and boat survey in an effort to locate cultural deposits along this particular section of the bayou and the associated shoreline. No cultural loci were identified within the project right-of-way; however, a nearby previously recorded site (16LF99) was tested to define its size and cultural affiliation.

In addition to the aforementioned investigation, three reports submitted to the Louisiana Division of Archeology in 1987 by William McIntire and Robert Baumann contain pertinent infor-

mation about the archeological sites located within the current project area. Report 22-1205 (McIntire & Baumann 1987a) details the survey of a proposed sewerage line project and its related facilities, south of Houma, Louisiana. An archival and intensive field investigation was performed for sections of Bayou Little Coteau, Ashland Canal, St. Louis Canal, and Bayou Petit Caillou. Previously recorded sites within their project area could not be relocated, and no new cultural loci were identified as a result of this survey. A second report, 22-1206 (McIntire & Baumann 1987b), was prepared after the completion of an archeological survey of Bayou Petit Caillou, Bush Canal, and Bayou Terrebonne near Chauvin, Louisiana. This survey was contracted in preparation for construction of an artificial levee and floodgates aligned with the three waterways, an area almost identical to the one surveyed by Robert Neuman (1974). Their findings confirmed the absence of cultural loci within these areas; however, they noted that previously existing Sites 16TR10 and 16TR86 fell near the project vicinity. During survey, the investigators compared the previous site descriptions and they interviewed local residents to deduce that only one site existed in the area. These efforts demonstrated that 16TR10 and 16TR86 were the same site and the two were subsequently combined into a single site number; the site was plotted where 16TR86 traditionally fell within the site maps. A third report, 22-1267 (1987c), details a cultural resource investigation along the east bank of Bayou Grand Caillou from Hog Bayou to Bayou Dulac. This survey was conducted to obtain a coastal use permit for construction of an artificial levee and pump station. These structures were to be built along the east side of Bayou Grand Caillou near the town of Dulac. The result of the field investigation was that no new cultural loci were located. The authors also discuss the previously recorded Site 16TR6; however, that site lay on the other (west) bank of Bayou Grand Caillou, outside of their project area.

Heartfield, Price and Greene, Inc., conducted a survey for an above-ground portion of a proposed pipeline corridor in Terrebonne Parish (1989). This pipeline corridor originated at a Meridian Oil Company surface facility on the east bank of Bayou Terrebonne and then crossed approximately 2.57 km (1.6 mi) of freshwater

marsh to intersect an existing pipeline. That portion of the corridor crossing the marsh was assessed to be devoid of any cultural remains. The start of the proposed line, however, lay at a point within the site boundary described by Jeffrey Altschul (1978) for Site 16TR10/86. Subsurface testing resulted in a slightly altered interpretation of the site. The results of this testing are described in the site description for Site 16TR10/86 in a later section of this chapter.

On April 18, 1989, Richard C. Beavers, an archeologist at the University of New Orleans, was called on to investigate a set of odd circular features that were observed during an environmental assessment for the Harry Bourg #3 Well site. This well site is located in Terrebonne Parish, approximately 365.76 m (1,200 ft) east of Bayou du Large, and south of the town of Thériot. Workers noticed circular depressions in the path of a proposed plank road and recognized the potential for them to be of cultural origin. These depressions measured 10.67 to 15.24 m (35 to 50 ft) in diameter and ranged from 0.76 to 1.52 m (2.5 to 5.0 ft) in depth. Beavers undertook an area reconnaissance and troweled the ground surface near the depressions. An inspection of the area failed to produce any evidence of prehistoric or historic features that might be related to these depressions. Some organic buildup was observed in the bottom of the depressions. Beavers theorized that these depressions were modern small dirt borrow pits, construction related holes, or small drainage control depressions used by former occupants of the area (1989:9-10).

A study in anticipation of a Corps of Engineers project to remove snags from the channel of Bayou du Large produced documentation of 37 derelict vessels along that waterway (Stout 1992). The goals of this survey were to record any such vessels in the project area and to evaluate them for National Register eligibility. This survey took place along a lengthy stretch of Bayou du Large, from Falgout Canal to Grand Pass. The specific vessels documented and evaluated are discussed later in this chapter in the section on watercraft.

A large scale project proposed by the New Orleans District Corps of Engineers to enhance flood protection for Morgan City, Louisiana, produced a prolonged cultural resources study of the Terrebonne Marsh (Weinstein & Kelley 1992). The project objectives, which included extending

the Avoca Island Levee, building additional ring levees and facilities, and producing a barrier along the Gulf Intracoastal Waterway, required a field survey of the proposed project areas, as well as site revisits within the roughly 1,812.86 km² (700 mi²) of Terrebonne Marsh that might be impacted. Coastal Environments, Inc., undertook this project in 1986 and continued work on all of the Corps' project lands and previously recorded sites to produce a final report in 1992. During research for this project, 34 new sites were located, and 36 previously recorded sites were revisited, including Sites 16TR3, 16TR19, 16TR71, 16TR207, and 16TR215. In the course of researching the previously documented sites, the researchers were able to reanalyze many of the artifact collections curated by earlier investigators. This aspect of the report is particularly valuable, in that many of the ceramic sherds were collected during McIntire's incipient investigations in the 1950s, and many of the theories surrounding the spread and influence of cultures and ceramic traits in the coastal zone relied on conclusions formed from that fieldwork. Weinstein and Kelley integrated a habitat model produced by the Coastal Ecology Institute of LSU with updated geomorphological sequences for the region, surface and subsurface testing of all the sites in question, a literature search, and detailed analysis of the collected ceramics from the Terrebonne Marsh. For many of the sites within the current project area, this study re-examined previous conclusions on the basis of more current evidence.

One of the sites within the project area was revisited and tested to determine the site's current status and to look for the presence of complicated stamped, shell-tempered ceramic wares. The results of this fieldwork were published in a report from the Museum of Natural Science at Louisiana State University (R. Saunders 1994). Site 16TR22, near the confluence of Mound Bayou and Bayou Grand Caillou, was visited to check on the presence of reported mounds, and excavation units were placed to collect data from this potentially significant but poorly understood site. The investigator, Rebecca Saunders, reported that one of the previously reported mounds was not observed and may have been lost due to erosion. Additionally, data collected from the site, including samples of shell submitted for C-14 dat-

ing, substantiated an earlier Coles Creek affiliation for the site. An additional historic component was revealed by a scatter of artifacts on the site surface. The numerous ceramic sherds recovered from the site, along with the record of stratigraphy observed in units placed in the existing mound, added greatly to an understanding of the site's chronology and mound construction.

One of the results of the study conducted by Michael Stout in 1992 was a recommendation to investigate further eight of the vessels that represented some of the last surviving examples of traditional watercraft on Bayou du Large (Stout 1992:23). This investigation subsequently was performed by R. Christopher Goodwin & Associates, Inc., in the fall of 1995. After locating the designated eight vessels, it was found that they either had deteriorated badly or disappeared below the water line in the interim years (Robinson and Seidel 1995:3-4). In keeping with the goals of the study to document vernacular watercraft on Bayou du Large, however, a new field survey was conducted, and six vessels were selected to record. This effort included measuring and photographing the selected vessels, as well as obtaining oral histories to place these vessels in historical and cultural context. Among the six vessels documented in this unpublished report, four appear to be within the current study area. One small mudboat, one chaland, and two large oyster/shrimp flat boats were described extensively in this report, and the owners were contacted for information pertaining to vessel utilization, choice of building materials, vessel history, and less objective topics such as their feelings about life as fishermen.

In 1996, R. Christopher Goodwin & Associates, Inc., performed a Phase I cultural resources survey and inventory along the proposed Discovery Gas Transmission LLC 30 in O.D. pipeline from the Gulf of Mexico to Lafourche Parish, Louisiana (Miller et al. 1996). This project entailed testing of the 23.7 km (14.8 mi) long shallow water portion of the right-of-way from the three mile (4.8 km) nautical limit of Louisiana State waters, to the mouth of Deep Bayou, and the 38 km (23.5 mi) long terrestrial portion of the 168.7 km (104.8 mi) long pipeline route. A corridor that measured 91 m (300 ft) in width was examined during the inventory. Fieldwork consisted of an airboat survey in combination with subsur-

face probing and auger testing, and where appropriate, a pedestrian survey augmented by systematic shovel and/or auger testing. Phase I survey also extended to ancillary facilities, and included an examination of the length and width of the then proposed Larose Gas Processing Plant, a temporary construction parking area, and three proposed access roads, along with the extra workspace that might be required at all water and road crossings. This inventory resulted in the identification of two previously unrecorded archeological sites (16LF65 and 16LF66) that dated to the Plaquemine period and that also contained secondary nineteenth/twentieth century components.

Site 16LF65 (Bayou Junction) was described as a subsurface scatter of prehistoric ceramic sherds and faunal material that extended along the north bank of Bayou Manuel at its confluence with Grand Bayou Blue. Based on Phase I delineation, the total site area was estimated as 80 x 90 m (262 x 295 ft). Site 16LF66 also was described primarily as a scatter of prehistoric ceramic and faunal material, but in addition it contained human bone and historic glass fragments, ceramic sherds, and pieces of metal. The site extended for over 100 m (328 ft) along the east bank of Grand Bayou Blue immediately below the confluence with Bayou Manuel. During the Phase I assessment, a total of three units (two 1 x 1 m [3.28 x 3.28 ft] and one 0.5 x 1 m [1.6 x 6.28 ft] units) were excavated within the defined Site 16LF66 boundary to evaluate better the site.

Based on subsurface integrity, demonstrable quantities of cultural deposits, and research potential as defined by the Louisiana Comprehensive Archaeological Plan (Smith et al. 1983), Site 16LF65 was assessed as a potentially significant cultural resource (Miller et al. 1996). Avoidance or additional evaluatory testing of Site 16LF65 was recommended. Its companion site (16LF66) also produced artifacts, food refuse, and evidence of human burials; it was assessed as a significant cultural resource and data recovery excavations were recommended (Miller et al. 1996).

In June of 1997, R. Christopher Goodwin & Associates, Inc., performed a Phase I cultural resources survey and archeological inventory of two proposed dredged material disposal sites located adjacent to Bayou du Large in Terrebonne Parish, Louisiana (Walter et al. 1998). This survey was conducted on behalf of the U.S.

Army Corps of Engineers, New Orleans District prior to dredging in Bayou du Large. Walter et al. (1998) stated that Disposal Site 1 was situated within portions of Sections 3, 4, and 9, of Township 20S, Range 16E, and it measured 2.6 ha (6.4 ac) in size. Disposal Site 2 reportedly measured 2.8 ha (6.9 ac) in size and it encompassed portions of Sections 9, 16, and 17, of Township 20S, Range 16E. Fieldwork for the project consisted of pedestrian survey augmented by both shovel and auger testing. While no archeological sites were identified during survey, six standing structures (Standing Structures 1 – 6) were documented. Each of these structures dated from the modern period and each was assessed as not significant. No additional recordation of the structures or additional testing of the project areas was recommended.

Between August 25 and 29, 1997, R. Christopher Goodwin & Associates, Inc., conducted a Phase I cultural resources survey and archeological inventory of a proposed 7 km (4.4 mi) long by 33.5 m (110 ft) wide pipeline corridor situated within Lafourche Parish, Louisiana (Williams et al. 1998). The survey was completed at the request of Discovery Gas Transmission LLC of St. Rose, Louisiana. The proposed pipeline right-of-way originated at the Larose Gas Processing Plant in Section 37 of Township 18S, Range 20E and extended in a northerly direction before terminating at the Texas Eastern Transmission Meter Site situated in Section 100 of Township 17S, Range 20E. Pedestrian survey augmented by shovel testing resulted in the identification of three cultural resource loci (5-1, 5-2, and 5-3) as well as the identification of three standing structures (SS1, SS2, and SS3 [29-1201]). All three identified cultural resource loci were scatters of modern materials including ceramic sherds, bottle and window glass, metal beverage containers, plastic, and tile. None of these loci received official Louisiana state site numbers and all three were assessed as not significant. No additional testing of Loci 5-1, 5-2, and 5-3 was recommended.

Only one of the identified standing structures (SS3 [29-1201]) represented construction greater than 50 years in age. This structure was described as a single story barn/storage building of vernacular construction. It was suggested that Structure 29-1201 was possibly constructed ca.

1940. Williams et al. (1998) reported that the structure would be relocated prior to proposed pipeline construction. The remaining two identified standing structures (SS1 and SS2) were both described as modern, pre-fabricated buildings representing post-1947 construction. All three of these structures (SS1, SS2, and SS3 [29-1201]) were assessed as not significant and no additional testing was recommended.

Phase III data recovery excavations at the Discovery Site (16LF66) were conducted between April and July, 1997, by R. Christopher Goodwin & Associates, Inc., on behalf of Discovery Gas Transmission, LLC, of St. Rose, Louisiana (Miller et al. 1999). Site 16LF66 was situated in Section 2, of Township 18S, Range 20E, and at the confluence of Bayous Blue and Manuel. The site originally was recorded by Goodwin & Associates, Inc., during a Phase I cultural resources survey and archeological inventory of the then proposed Larose Gas Processing Plant (Miller et al. 1996; see Brown et al. 1997). The site was characterized as a Plaquemine period sheet midden and burial site overlain by an historic period artifact scatter. Since environmental, engineering, and safety considerations precluded avoidance of Site 16LF66, data recovery of 100 percent of the site area was recommended.

The Phase III mitigation of Site 16LF66 began with the topographic mapping of the site followed by the establishment of a site grid. Next, a remote sensing survey of the entire site was conducted utilizing a portable proton magnetometer. The survey was designed to identify areas with a higher probability for containing intrusive cultural features. Following the remote sensing survey, eighty-two 1 x 1 m (3.3 x 3.3 ft) units were excavated throughout the site area. Lastly, all of the topsoil at Site 16LF66 was removed mechanically in order to identify all Native American burials present at the site (Miller et al. 1999).

Site 16LF66 contained the remains of a perennial Plaquemine culture occupation dating primarily from the fifteenth century A.D. Miller et al. (1999) noted that the midden deposits excavated at Site 16LF66 produced a variety of important new information about Plaquemine subsistence in the marshes of southeastern Louisiana. While faunal remains were numerous, mac-

robotanical remains generally were sparse. The site yielded limited evidence of maize. A wide range of cultural features, including hearths, pits, postholes, and wall trenches, also were identified and these provided information about the range and spatial distribution of activities conducted at the site. In addition, 22 human burial locations representing 37 individuals were located; excavation of these burials yielded important demographic information for the Plaquemine peoples of south Louisiana (Miller et al. 1999).

Miller et al. (1999) report that Phase III data recovery excavations at Site 16LF66 provided information on the subsistence patterns, activities, populations, and burial practices of a Plaquemine culture community in southeastern Louisiana. These excavations and the analyses of the materials recovered from them, mitigated the anticipated adverse impacts to Site 16LF66 by the then proposed construction of the Discovery Producer Services, LLC, Larose Gas Processing Plant. After the completion of the data recovery effort, no culturally significant deposits were left in situ at Site 16LF66 (Miller et al. 1999).

Previously Recorded Prehistoric and Historic Sites in the Project Area

All previously recorded sites lying in the project area and within 500 m (1,640 ft) of the project area are included in this discussion. The inclusion of sites outside the project area to 500 meters serves many purposes. Because the current depiction of the numerous project alignments and corridors is still preliminary, a slightly broader area was chosen to account for future refinement. This buffer zone should allow for current mapping inaccuracies or future decisions that could shift or realign any of the proposed levees. In addition, areas outside but within 500 m (1,640 ft) of the project area may be impacted by borrow pits or other levee construction activities. At the same time, slightly increasing the scope of coverage enhances the discussion of prehistoric and historic development around the project area, while still dealing only with distributaries and landforms directly related to the project.

The 68 previously recorded sites that lie within the current study region are summarized in

Table 6. Among the total sites, 21 possess a prehistoric component, seven possess both prehistoric and historic components, and 40 sites are recorded derelict vessels located on portions of bayou channels that cross the study area. None of the prehistoric sites listed exhibit any evidence of occupations prior to the Marksville period, and many maintain standing earthworks. Historic artifacts encountered at site locations are mainly attributed to late historic household scatter or refuse, except at Site 16TR22, which may contain evidence of an earlier nineteenth century homestead. One site (16TR7) contained an early report of a possible settlement-era brickworks; however, no structural remains supporting this account were uncovered by any field investigators.

The terrestrial sites recorded within the study area are summarized below. A brief investigative history for each site is given, along with interpretations of site age and ceramic typologies.

Site 16TR1 (Mandalay Plantation Site)

Site 16TR1 is a Marksville period site, with evidence of subsequent Baytown and Coles Creek occupations, that is situated near the edges of a cane field once belonging to the Mandalay Plantation. The site sits approximately 700 m (2,296.5 ft.) south of Bayou Black, on either the dispersed alluvial soils of Bayou Black, or possibly on a small crevasse natural levee that emanates from Bayou Black (Weinstein and Kelley 1992:293). The site can be found on the 7.5' series topographic quadrangle Humphreys, Louisiana, in Section 104, of Township 17S, Range 17E. The Mandalay Plantation site has gained some significance over the years in studies attempting to interpret the occupation sequence of the Teche-Mississippi channel and the distribution of Marksville sites in coastal Louisiana. Ironically, the amount of actual archeological testing at the site has been rather meager.

The site originally was visited and collected by local avocational archeologist Randolph Bazet in the 1920s and 1930s. He later reported the site to William McIntire, who analyzed Bazet's ceramics and used the data in his report on coastal prehistoric settlements. His classification of this small assemblage included marker types indicating a Marksville presence (McIntire 1958:Pl.13):

<u>Ceramic Type</u>	<u>Percentage</u>
Marksville Stamped	30.0
Marksville Incised	70.0

The Mandalay Plantation site became the first site officially recorded in Terrebonne Parish containing a description of an earth mound and artifacts of Marksville origin. The realization that 16TR1 was probably a Marksville period village site helped McIntire establish a case for a Boeuf-Red phase to the Teche-Mississippi channel during that time period (see McIntire 1958 for complete discussion). He describes the site in his text as a surface scatter of ceramic sherds that had clearly been affected by one hundred and fifty years of agricultural development. The mound's specific location is not established, since no archeologists visiting the site later reported seeing an intact earthwork. Mr. Bazet may have relayed the existence of a mound at the site to McIntire, who repeated it in his description. Nonetheless, the identification of Marksville ceramics aided McIntire in his goal of establishing a chronology of crucial geologic episodes within the region, and a scenario for the spread of Marksville influence into southern Louisiana.

Philip Phillips used these site data and the accumulated information from various other site reports within the Teche-Mississippi region to formulate a new phase, striving to account for the slightly deviant assemblages reported in the lower coastal areas. Using the Mandalay Plantation site as a phase type station, he created the *Mandalay phase* of the Marksville period, observing that the only real criterion for such a label was a higher frequency of Marksville Incised pottery than that of Marksville Stamped (Phillips 1970:899-900). Neuman (1977:21) and Gagliano (Gagliano et al. 1975:42) retained the more generalized "Marksville" classification for the site in their respective archeological surveys. However, besides Mr. Bazet, none of these other researchers actually visited the site.

Jeffrey Altschul was required to visit the site during his cultural resources impact assessment of the Houma-Terrebonne regional sewerage plan in 1978. He was able to interview Mr. Bazet, who curiously did not recall any site within the property of the old Mandalay Plantation (Altschul

Table 6. Sites within 0.5 km (0.3 mi) of the Proposed Morganza to the Gulf project area.

SITE NUMBER/ NAME	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	FIELD METHODOLOGY	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR01 (Mandalay Plantation)	Terrebonne	Humphreys, La. N3272222 E716670	Reported earth mound (not evident to later investigators); shell, prehistoric period ceramic sherds, and faunal material	Type site for Mandalay phase, Marksville period; possibly earlier Marksville present (Jefferson Island phase)	Pedestrian survey and shovel testing	Not significant (disturbed), but warrants monitoring (Altschul 1978); not assessed (Weinstein and Kelley 1992)	McIntire 1958; Phillips 1970; Gagliano et al. 1975 (22-106); Altschul 1978 (22-464)
16TR03 (St. Eloie Plant)	Terrebonne	Lake Theriot, La. N3262436 E716898	Shell midden and prehistoric period ceramic sherds reported by McIntire. Altschul's description of 16TR3 is actually another locus	Plaquemine period	Pedestrian survey	Significant (Altschul 1978)	Neuman 1977 (22-123); Altschul 1978 (22-464); Weinstein and Kelley 1992 (22-1487)
16TR06 (Dulac)	Terrebonne	Dulac, La. N3251929 E721648	Hearth, shell midden and mound; prehistoric period ceramic sherds, lithics, faunal material, shell, historic period ceramic sherds, and glass sherds	Late Coles Creek - early Plaquemine period; historic period - antebellum to present	Pedestrian survey and shovel testing	Significant (Altschul 1978)	Neuman 1974 (22-80); Neuman 1977 (22-123); Altschul 1978 (22-464); Flayhart and Muller 1983 (22-901); McIntire and Baumann 1987c (22-1267)
16TR07 (Indian Mound)	Terrebonne	Lake Quitman, La. N3247333 E728950	Five earth mounds reported (of which only three remain); prehistoric period ceramic sherds, shell, faunal material, lithics, metal, and glass sherds. An historic period cemetery exists atop one of the mounds	Prehistoric (probably Plaquemine period)	Pedestrian survey and unit excavation	Not significant (Altschul 1978)	Neuman 1977 (22-123); Kniffen and McIntire 1952; Altschul 1978 (22- 464)
16TR09 (Bayou Petit Caillou)	Terrebonne	Lake Quitman, La. N3249555 E730295	Shell midden; prehistoric period ceramic sherds, shell, and historic period building materials	Undetermined prehistoric period; undetermined historic period	Pedestrian survey	Not assessed (Altschul 1978)	Neuman 1977 (22-123); Altschul 1978 (22-464)
16TR10/16TR86 (Bayou Terrebonne/ Rhodes Cemetery)	Terrebonne	Lake Tambour, La. N3250804 E732915	Two earth mounds; prehistoric period ceramic sherds, and shell	Coles Creek and Plaquemine period	Pedestrian survey, shovel testing, and unit excavation	Significant (Altschul 1978)	McIntire 1951; Neuman 1977 (22-123); McIntire and Baumann 1987c (22- 1267); Altschul 1978 (22- 464)
16TR19 (The Marmande Plantation Site)	Terrebonne	Lake Theriot, La. N3262660 E717175	Earth mound and shell midden; prehistoric period ceramic sherds, faunal materials, and shell	Possible Troyville period; Coles Creek period (Bayou Cutler phase) and Plaquemine period	Pedestrian survey	Significant (Altschul 1978; Weinstein and Kelley 1992)	Collins 1927; Kniffen and McIntire 1952; Altschul 1978 (22-464); Weinstein and Kelley 1992 (22-1487)
16TR22 (Mound Bayou)	Terrebonne	Lake Quitman, La. N3247800 E719040	Two earth mounds (one eroding into Bayou Grand Caillou); prehistoric period ceramic sherds, <i>rangia</i> shell, charcoal; possible redeposition of midden materials around site	Coles Creek - Mississippian period	Pedestrian survey and unit excavation	Potentially significant (Saunders 1994)	McIntire 1951; Neuman 1977 (22-123); Saunders 1994

Table 6, continued

SITE NUMBER/ NAME	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	FIELD METHODOLOGY	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR23 (Bayou Dulac)	Terrebonne	Lake Quitman, La. N3250252 E723907	Shell midden; prehistoric period ceramic sherds and shell	Coles Creek- Mississippian period	Pedestrian survey	Not assessed	Neuman 1977 (22-123)
16TR26 (Bayou Sale # 1)	Terrebonne	Lake Quitman, La. N3249431 E722949	Shell midden; prehistoric period ceramic sherds and shell	Undetermined prehistoric period	Pedestrian survey and shovel testing	Potentially significant (Altschul 1978)	Neuman 1977 (22-123); Altschul 1978 (22-464)
16TR33 (Pointe au Chien #2)	Terrebonne	Lake Bully Camp, La. N3258934 E746069	Earth mound; midden; prehistoric period ceramic sherds, faunal material, shell, and brick fragments	Undetermined prehistoric period; Undetermined historic period	Pedestrian survey, shovel testing, and unit excavation	Significant (Altschul 1978)	Neuman 1977 (22-123); Altschul 1978 (22-465)
16TR34 (Pointe au Chien #3)	Terrebonne	Lake Bully Camp, La. N3255603 E74866	Three earth mounds	Prehistoric period (possible Bayou Petre phase)	Pedestrian survey	Not assessed	Phillips 1970
16TR37 (Ellesly Plantation)	Terrebonne	Dulac, La. N3257277 E723208	Two earth mounds	Plaquemine period (Medora phase); Undetermined historic period	Pedestrian survey and shovel testing	Significant (Altschul 1978)	McNire and Kniffen 1952; Phillips 1970; Neuman 1974 (22-80); Altschul 1978 (22-464); Flaherty and Muller 1983 (22-901)
16TR38 (Indian Mound- Grand Caillou)	Terrebonne	Dulac, La. N3262250 E722700	Three earth mounds; modern graves; prehistoric period ceramic sherds, lithics, shell, historic period ceramic sherds, metal, and faunal material	Plaquemine period; Undetermined historic period	Pedestrian survey, shovel testing, and unit excavation	Significant (Altschul 1978)	Neuman 1974 (22-80); Altschul 1978 (22-464)
16TR51 (Johnson School)	Terrebonne	Bayou Sauveur, La. N3250851 E712608	Shell midden; prehistoric period ceramic sherds and shell	Undetermined prehistoric period	Pedestrian survey	Not assessed	Altschul 1978 (22-464)
16TR71 (Old Bridge)	Terrebonne	Lake Theriot, La. N3255268 E714766	Shell midden; prehistoric period ceramic sherds, faunal material, shell, metal, historic period ceramic sherds, and glass shards	Possible Coles Creek period; Plaquemine - protohistoric period; Undetermined historic period	Pedestrian survey, auger testing, and unit excavation	Not significant (Altschul 1978)	Neuman 1977 (22-123); Altschul 1978 (22-464); Weinstein and Kelley 1992 (22-1487)
16TR87 (G1WW-Houma South)	Terrebonne	Humphreys, La. N3270480 E717440	Shell midden	Undetermined prehistoric period	Pedestrian survey	Not significant (Weinstein and Kelley 1992)	Gagliano et al. 1975 (22- 106)
16TR89 (East Provost)	Terrebonne	Lake Theriot, La. N3258644 E722412	Shell midden	Mid - late Marksville period, possibly extending to Baytown period	Pedestrian survey	Not assessed	Site form only
16TR115 (Deep Bayou Channel)	Terrebonne	Lake Quitman, La. N3245536 E721778	Prehistoric period ceramic sherds and lithics	Plaquemine period	Pedestrian survey and shovel testing	Not assessed	Altschul 1978 (22-464)
16TR151 (“BFYM” Site)	Terrebonne	Lake Quitman, La. N3248360 E720200	Shell midden; prehistoric period ceramic sherds and shell	Plaquemine or Mississippian period	Pedestrian survey	Potentially significant (Flaherty and Muller 1983)	Flaherty and Muller 1983 (22-901)
16TR152 (“Grand Caillou”)	Terrebonne	Dulac, La. N3251425 E721700	Historic period shipwreck	Unspecified historic period	Boat survey	Potentially significant (Flaherty and Muller 1983)	Flaherty and Muller 1983 (22-901)

Table 6, continued

SITE NUMBER/ NAME	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	FIELD METHODOLOGY	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR153	Terrebonne	Dulac, La. N3253715 E722250	Historic period shipwreck	Unspecified historic period	Boat survey	Potentially significant (Playherly and Muller 1983)	Playherly and Muller 1983 (22-901)
16TR154 ("Mary Lee")	Terrebonne	Dulac, La. N3256125 E723175	Historic period shipwreck	Unspecified historic period	Boat survey	Potentially significant (Playherly and Muller 1983)	Playherly and Muller 1983 (22-901)
16TR155 ("Kenny H"- Morgan City)	Terrebonne	Dulac, La. N3256080 E723150	Historic period shipwreck	Unspecified historic period	Boat survey	Potentially significant (Playherly and Muller 1983)	Playherly and Muller 1983 (22-901)
16TR156 ("Sonny Boy")	Terrebonne	Dulac, La. N3258790 E722825	Historic period shipwreck	Unspecified historic period	Boat survey	Potentially significant (Playherly and Muller 1983)	Playherly and Muller 1983 (22-901)
16TR157 ("Dolly K")	Terrebonne	Dulac, La. N3259640 E722750	Historic period shipwreck	Unspecified historic period	Boat survey	Potentially significant (Playherly and Muller 1983)	Playherly and Muller 1983 (22-901)
16TR160 (Hebert Site)	Terrebonne	Houma, La. N3269838 E720655	Shell midden	Undetermined prehistoric period	Pedestrian survey	Not assessed	Site form only
16TR207 (XV-GIWW)	Terrebonne	Humphreys, La. N3270260 E717215	Shell midden; prehistoric period ceramic sherds, shell, and faunal material	Possible Baytown period	Pedestrian survey and probing	Not significant	Weinstein and Kelley 1992 (22-1487)
16TR213 (Waterproof Distributary)	Terrebonne	Humphreys, La. 3270170 E713000	Prehistoric period ceramic sherds and fired clay	Plaquemine period	Pedestrian survey and shovel testing	Not assessed	Site form only
16TR215 (Waterproof Point Field)	Terrebonne	Humphreys, La. N3271120 E713140	Prehistoric period ceramic sherds	Mid - late Coles Creek period	Pedestrian survey and shovel testing	Not significant	GSRI 1975 (22-317); Weinstein and Kelley 1992 (22-1487)
16TR222	Terrebonne	Lake Theriot, La. N3254452 E714763	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR223	Terrebonne	Lake Theriot, La. N3253945 E714061	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR224	Terrebonne	Lake Theriot, La. N3252366 E713229	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR225	Terrebonne	Lake Theriot, La. N3252366 E713229	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR226	Terrebonne	Lake Theriot, La. N3252275 E713244	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR227	Terrebonne	Lake Theriot, La. N3252183 E713229	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR228	Terrebonne	Lake Theriot, La. N3252183 E713229	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR229	Terrebonne	Lake Theriot, La. N3252122 E713213	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR230	Terrebonne	Lake Theriot, La. N3252000 E713198	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR231	Terrebonne	Lake Theriot, La. N3251488 E712975	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)

Table 6, continued

SITE NUMBER/ NAME	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	FIELD METHODOLOGY	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR232	Terrebonne	Bayou Sauvure, La. N3250244 E711838	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR233	Terrebonne	Bayou Sauvure, La. N3249335 E711259	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR234	Terrebonne	Bayou Sauvure, La. N3248793 E710915	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR235	Terrebonne	Bayou Sauvure, La. N3248777 E710838	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR236	Terrebonne	Bayou Sauvure, La. N3248671 E710808	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR237	Terrebonne	Bayou Sauvure, La. N3248671 E710808	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR238	Terrebonne	Bayou Sauvure, La. N3248640 E710716	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR239	Terrebonne	Bayou Sauvure, La. N3248503 E710473	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR240	Terrebonne	Bayou Sauvure, La. N3248503 E710473	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR241	Terrebonne	Bayou Sauvure, La. N3248366 E710412	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR242	Terrebonne	Bayou Sauvure, La. N3248366 E710412	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR243	Terrebonne	Bayou Sauvure, La. N3248046 E710305	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR244	Terrebonne	Bayou Sauvure, La. N3247915 E710290	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR245	Terrebonne	Bayou Sauvure, La. N3247915 E710290	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR246	Terrebonne	Bayou Sauvure, La. N3247915 E710290	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR247	Terrebonne	Bayou Sauvure, La. N3247915 E710290	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR248	Terrebonne	Bayou Sauvure, La. N3247747 E710229	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR249	Terrebonne	Bayou Sauvure, La. N3247747 E710229	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR250	Terrebonne	Bayou Sauvure, La. N3247473 E710046	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR251	Terrebonne	Bayou Sauvure, La. N3247137 E709669	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR252	Terrebonne	Bayou Sauvure, La. N3247137 E709669	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR253 (Captain Scott)	Terrebonne	Bayou Sauvure, La. N3247137 E709669	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16TR254	Terrebonne	Bayou Sauvure, La. N3246945 E709534	Historic period shipwreck	ca. 1890 – present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)

SITE NUMBER/ Table A-continued	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	FIELD METHODOLOGY	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR255	Terrebonne	Bayou Sauvour, La. N3246823 E709320	Historic period shipwreck	ca. 1890 - present	Unspecified reconnaissance	Not significant	Stout 1992 (22-1597)
16LF31 (Bayou L'eau Bleu)	Lafourche	Larose, La. N3270773 E751447	Shell midden; prehistoric period ceramic sherds and shell	Plaquemine (Bayou Petre phase) period	Pedestrian survey	Not assessed	McIntire 1958; Phillips 1970; Neuman 1973; Neuman 1977 (22-123)
16LF65	Lafourche	Larose, La. N3270800 E752160	Shell midden; prehistoric period ceramic sherds, shell, lithics, and faunal materials	Plaquemine period	Pedestrian survey and shovel testing	Potentially significant	Miller 1996
16LF66	Lafourche	Larose, La. N3270760 E752160	Midden; prehistoric period ceramic sherds, shell, lithics, faunal material, human skeletal material, historic period ceramic sherds, glass shards, and nails	Plaquemine period	Pedestrian survey, shovel testing, unit excavation, and mechanical excavation	Eligible	Miller 1996
16LF108	Lafourche	Lake Bully Camp, La. N3259980 E747800	Prehistoric period ceramic sherds, faunal material, and shell	Late Coles Creek - early Mississippian period	Pedestrian survey	Not assessed	Site form only

1978:120). Altschul went to the area indicated on maps for 16TR1, performed a controlled surface collection of the plowed fields, and noted that “no topographic fluctuations were visible in the sugar cane fields” (1978:123). The results of that surface collection, and of four shovel tests placed around the site, convinced him that the site was disturbed. The fieldcrews found no subsurface intact remains, but surface-collected a small assortment of plain body sherds, and one mammal bone fragment (Altschul 1978:Table 19). Altschul concluded that the site had been destroyed, and that assigning it to the Marksville period was probably premature (1978:124).

Weinstein and Kelley (1992) took an opportunity to examine the archived artifacts from Site 16TR1 that were collected from earlier in the century. They were able to locate a curated group of artifacts at LSU including some additional, unaccounted-for bags which they did not include in this review. Their reanalysis of the total assemblage (integrating later typological distinctions and their own personal observations regarding paste and manufacture), is as follows (Weinstein and Kelley 1992:Table 7-5):

<u>Ceramics</u>	<u>Total</u>
Baytown Plain	
<i>var. Little River</i>	4
<i>var. Marksville</i>	22
<i>var. Percy Creek</i>	1
<i>var. Troyville</i>	1
<i>var. unspecified</i>	47
Creek Incised	
<i>var. unspecified</i>	1
French Fork Incised	
<i>var. unspecified</i>	1
Marksville Incised	
<i>var. Marksville (?)</i>	1
<i>var. Sunflower</i>	1
Unclassified Incised on Baytown paste	1

Their impression of the paste utilized in many of the ceramic sherds, especially the Baytown Plain *vars. Marksville* and *Sunflower*, was that it had the soft, chalky quality diagnostic of early Marksville pottery (Weinstein and Kelley 1992:295). The sherds recorded by McIntire as examples of Marksville Stamped were reclassified by these researchers as French Fork Incised. Subsequently, they questioned the classification of 16TR1 as a late Marksville (Mandalay phase) site, and preferred to claim an early Marksville

occupation. Additionally, they suggested in their summary that the Mandalay phase was as yet too tenuously defined and that a more accurate phase description for this site and many others would be Toth's Jefferson Island phase (Toth 1977, 1988). Based on the remaining ceramic evidence, a transitional Marksville-Baytown occupation, and a more probable mid to late Coles Creek occupation, were posited.

Whether or not the Mandalay Plantation site had a continuous sequence of habitation or was subject to chronologically separate occupations is impossible to say without more artifacts and more fine tuned analysis. Currently, the evidence of an earthwork at the site is based on an early, unsubstantiated account, although Weinstein and Kelley thought they noticed a dark circular soil stain on 1955 aerial photographs of the site area. The site certainly exists in an area that would have been attractive for the establishment of long term settlements. Bayou Black, Little Bayou Black, Bayou du Large, and Bayou Grand Caillou all converge in the area that today is the city of Houma, a few miles east of 16TR1's location. To date, however, the scant amount of actual archaeological testing at the site belies the significance attached to it.

Site 16TR3

Site 16TR3 consists of a shell midden and prehistoric artifacts situated on a relict distributary natural levee called the Marmande Ridge, near Bayou du Large. This site lies within the irregular Section 30, of Township 18S, Range 17E, and on the associated 7.5' series topographic quadrangle Lake Theriot, Louisiana. This site originally was recorded by McIntire in 1952, although there has been some confusion regarding its actual location and relationship to the mound Site 16TR19, which is situated just to the north-east.

Although recorded in the Louisiana site records in 1952, some artifacts housed at LSU and dated 1939 show that the site's location may have been known earlier. Unfortunately, there is no record of the person(s) responsible for this early collection (Weinstein and Kelley 1992:296). McIntire's description on the site record form states that it consisted of a shell midden in a sugarcane field southwest of Site 16TR19, and that it had been nearly completely destroyed by plow-

ing. A look at the original map shows the site located approximately 200-300 ms (656-984 ft.) to the southwest of Site 16TR19. Robert Neuman also incorporated Site 16TR3 into his inventory of Louisiana coastal archeological resources, but repeated the data contained on the site form (Neuman 1977:21).

During Jeffrey Altschul's visit to Site 16TR19, he reported a nearby large scatter of previously unrecorded prehistoric and historic materials in the field adjacent to Bayou du Large (east of Site 16TR19). He assumed that this scatter of prehistoric shell and ceramic sherds must be Site 16TR3, due to its proximity to Site 16TR19. Spread out over a cane field along the west bank of Bayou du Large, this locus yielded a collection of Plaquemine/Early Mississippian ceramics, faunal materials, daub, lithics, and historic artifacts. Altschul combined materials collected from this locus with the 16TR19 artifacts during his analysis, asserted a synchronic occupation of both sites, and modified the state archeological records to reflect this.

Weinstein and Kelley realized during their study of selected Terrebonne Marsh archeological resources (1992) that many discrepancies existed in the accounts of site investigation at this locale. Reviewing Altschul's work there, they became convinced that the additional artifact scatter along Bayou du Large did not conform to McIntire's description of either the site's location or its artifact composition. Their conclusion was that this second locus discovered by Altschul could not be 16TR3, but was a new, distinct site (now designated 16TR218), suitably linked to 16TR19. Site 16TR3, then, remains the plowed-over shell midden mapped by McIntire to the southwest of the mound.

Unfortunately, the artifacts encountered by McIntire are inadequately described in his research. Weinstein and Kelley reanalyzed the 1939 collection (Catalogue No. 5253) from the site, which consisted of 17 sherds of Baytown Plain *var. unspecified*, and one sherd of Larto Red *var. unspecified*. The survey crews associated with Coastal Environments' 1992 survey attempted to relocate 16TR3 and gather more artifacts, but they were unsuccessful. Weinstein and Kelley have classified this site on the basis of one Larto Red sherd and the "early feel" of the Baytown Plain sherds as a Baytown or even

late Marksville site, distinct and clearly earlier than the Plaquemine-Mississippian mound at Site 16TR19. Relocation of the site and further ceramic evidence would help to clarify its relationship to the mound focus of Site 16TR19.

Site 16TR6

Site 16TR6 is a reported shell midden, earthwork, and possible hearth existing along the banks of Bayou Grand Caillou, straddling the line between Sections 86 and 87, in Township 19S, Range 17E. The site occupies the confluence of Bayou Grand Caillou and Bayou Dulac, perched along the subsiding natural levee systems associated with these drainages. The site is also adjacent to the proposed Bayou Grand Caillou Floodgate south of the town of Dulac. Site 16TR6 can be found on the USGS 7.5' series topographic quadrangle Dulac, Louisiana.

Randolph Bazet reported a hearth in the embankment of Bayou Grand Caillou decades ago, prompting McIntire to visit the site in 1951. He noted an exposed shell midden along the low water line of both banks of the bayou, which was in a progressive state of decay due to cutbank erosion. It is reported that McIntire sunk some auger tests into the surrounding soil matrix to test for intact midden, and measured a shell lens with a maximum thickness of 32 to 64 cm (1 to 2 ft) (McIntire and Baumann 1987c). Subsidence and changes in water levels already had submerged the intact midden below the level of the surrounding marsh. A deposit of water worn shell and potsherds was reported from the site, along with a conical earth mound approximately 2 m (6 ft) in height and 16 m (50 ft) in diameter, constructed on top of the shell base on the west bank. McIntire's description of the mound places it right along the river bank, "cut nearly in half, exposing a cross-section of the mound based on the underlying shell" (McIntire and Baumann 1987c). Some samples were taken and submitted for C-14 dating at the Humble Oil Company labs, which produced the following dates:

<u>Sample</u>	<u>Age</u>
0-39	200±100
0-44	300±100
0-113	260±100

Robert Neuman viewed and referenced the site in a 1974 impact assessment, but his brief

description seems to rely heavily on McIntire's earlier findings. Jeffrey Altschul visited, collected, and excavated portions of the site in 1978. While doing his site testing, he noticed a small artificial earthwork crowned by an historic cistern set some 80 m (262.46 ft) back from the west bank of the bayou, and presumed this must be the mound mentioned in previous records. By presuming that this more recent earthwork is the mound mentioned in earlier accounts, he effectively diminished somewhat the significance of the site in his summation. Although his testing and mapping efforts greatly enhanced the existing site record, his resolution of the mound's position is suspect. McIntire leaves little doubt as to where he observed the existing earthwork, stating that "by 1955 the entire mound and in situ shell midden matrix had eroded into the bayou" (McIntire and Bauman 1987c). It seems likely that, contrary to Altschul's assertion that the prehistoric mound was a case of mistaken identity, there actually was a highly disintegrated prehistoric mound built on a shell base visible from the bayou, and that the earthwork he noted did not fall within the site perimeter.

Artifacts collected on initial investigation tentatively pointed to a Plaquemine period occupation. Altschul gathered artifacts from the surface of the site (including along the waterline), and placed six shovel tests and ten core samples along the banks to test for the presence of an intact midden or other buried deposits. Soil stratigraphy and the absence of cultural material in the shovel tests suggested to him that the main body of the site described years earlier was now submerged (Altschul 1978:93). The artifact assemblage included many water worn ceramic sherds, some lithic fragments, faunal remains, and, of course, shell. Ceramic types present consisted of Baytown Plain *var. Percy Creek*, Baytown Plain *var. unspecified*, Bell Plain *var. Holly Bluff*, Churupa Punctated *var. Thornton*, Coles Creek Incised *var. Hardy*, Coles Creek Incised *var. unspecified*, Harrison Bayou Incised *var. Harrison Bayou*, L'Eau Noir Incised *var. Australia*, Mazique Incised *var. Manchac*, Plaquemine Brushed *var. Plaquemine*, and many unidentifiable plain body sherds (Altschul 1978:Table 12). The ceramic assemblage composition suggested a Plaquemine occupation, or even Coles Creek/Plaquemine occupation, due to the presence of

certain types (Coles Creek Incised *var. Hardy*, Churupa Punctate *var. Thornton*, Mazique Incised *var. Manchac*). The surface scatter, which is overwhelmingly wave eroded and drawn out along many hundreds of meters of bankline, may constitute the wave deposited remnants of the original site, which are now presumably underwater.

Site 16TR7 (Indian Mound Site)

Indian Mound site is a conglomerate of prehistoric earthworks and varied historic constructs located along the west bank of Bayou Petit Caillou near the Robinson Canal. This site can be found on the 7.5' series topographic quadrangle Lake Quitman, Louisiana, in Section 71 of Township 20S, Range 18E. The mound complex was constructed on the natural levee associated with Bayou Petit Caillou, and initially was recorded in 1931 by Randolph Bazet. Artifacts relating to the prehistoric component include ceramic sherds, lithics, shell, and faunal remains. The historic component includes a family cemetery placed atop one mound, scattered fragments of historic metal and glass, and a brick factory supposedly constructed on a second mound during the area's early historic settlement period (Altschul 1978).

Five mounds originally were reported at the site; however, one mound was leveled by the Placid Oil Company to build its office, and local long-term residents could not recall the existence of a fifth mound. The destroyed mound was reportedly the one that had the historical brickworks built on top of it. Of the three surviving mounds, two are on the sodded lawns of local residents, and the third is surmounted by the Picou family cemetery. Long ago, the Picou family reportedly had a house constructed on top of Mound 2, but nothing of it remains today. Mound 1 is a square based, truncated mound measuring 25 m (82 ft) x 25 m (82 ft) x 2.2 m (7.2 ft) high; Mound 2 is a square based, truncated mound measuring 10 m (32.8 ft) x 10 m (32.8 ft) x 0.56 m (1.8 ft) high; and Mound 3 is a rectangular based, truncated mound 18 m (59 ft) long x 10 m (32.8 ft) wide x 0.11 m (36 ft) high (Altschul 1978:71).

The site was designated as a Troyville-Coles Creek settlement by Neuman (1977:22). Testing by Altschul included surface collecting the area, searching for a possible fifth mound, and exca-

vating into Mound 2. The fairly developed nature of the area, plus erosion witnessed along the bayou, introduced questions about site integrity. Overall, the identifiable ceramics found to date point to a later Plaquemine habitation. Ceramic types collected by Altschul included Plaquemine Brushed *var. Plaquemine* and some plain body sherds. Additionally, a single lithic chunk, faunal remains, some shell, and historic artifacts were gathered from the site. More conclusive information about the site await further field research.

Site 16TR9 (Bayou Petit Caillou Site)

Site 16TR9 consists of a vaguely described prehistoric locus and an historic artifact scatter discovered by McIntire in 1951. This site is located on the west bank of Bayou Petit Caillou, and can be found on the 7.5' series topographic quadrangle Lake Quitman, Louisiana, within Section 62 of Township 20S and Range 18E. Little information is recorded about the nature of the artifacts taken from the site. The reported historic building materials, historic ceramic fragments, and scattered oyster shells from the site area are attributed to an oyster processing factory known from the area by local residents. A prehistoric shell midden (cultural affiliation unknown) is recorded at the site, and some collection apparently was made (catalogue No. LSU #51-5), but there is no description of any prehistoric artifacts on the site record form. The remnant midden was mostly destroyed at the time of its recordation (1951), and Jeffrey Altschul was unable to relocate the site during his survey in 1978. His field crews walked along banklines and brushed back grasses along the bayou, but were unsuccessful in finding any prehistoric material. They did notice some historic refuse and scattered oyster shell, however, confirming the presence of some minor historic episode. The recorded prehistoric component of Site 16TR9 may have been lost in the intervening years to wave action and bankline erosion along the bayou. It has been documented that historic oyster gathering and processing were responsible for a number of visible shell heaps along Bayou Petit Caillou (McIntire and Baumann 1987b:10). Since no other shell varieties besides oyster are described on the site form, it is possible that the shell feature classified as prehistoric midden instead may have been the result of later commercial shellfish gathering activities.

Site 16TR10/86 (Bayou Terrebonne/Rhodes Cemetery Site)

Site 16TR10/86 received a dual site number in response to an adjustment made as a result of separate investigations of the same site conducted over the years. The site was discovered by William McIntire in 1951, integrated into his research on coastal development, and placed on the maps with the site number 16TR10. This earliest formal description of the site placed it along the east bank of Bayou Terrebonne, about 2.01 km (1.25 mi) south of the Bush canal. Two low earthen mounds were reported to be present, with an early settler cemetery, known as the Rhodes Cemetery, seated atop one of the mounds. The site was assessed to be in good condition, and a collection of ceramic sherds was recorded, although there was no description of types or amounts. Philip Phillips grouped the Bayou Terrebonne site together with regional Baytown period sites, as well as Coles Creek period sites (Phillips 1970:figures 445 and 446). In a survey of the Houma Navigational Canal and Bayous La Carpe, Terrebonne, Petit Caillou, and Grand Caillou in 1974, Robert Neuman described a new site along the east bank of Bayou Terrebonne consisting of two low earthen mounds, with the northernmost mound surmounted by an historic cemetery. This site became 16TR86, and it was mapped in the western portion of Section 58, of Township 20S, Range 18E. This site was designated as a Coles Creek mound site (Neuman 1977:22). Altschul visited Site 16TR86 in 1978 and conducted testing at the site, in conjunction with mapping the site's general location and intrasite features. During a cultural resources survey of portions of Bayou Terrebonne conducted by William McIntire and Robert Baumann in 1987, the nearly identical descriptions of Sites 16TR10 and 16TR86 became apparent on comparison, and a goal was formulated to reconcile them through additional field reconnaissance, plus interviews with local residents. Local residents, who were keenly aware of the distinctive mound configuration, confirmed that only one set of double mounds was ever known from the area. Upon deliberation, McIntire and Baumann dismissed the less certain early map location of 16TR10, and combined the two site numbers (1987b:9).

The mound site sits at the edge of a greatly subsided natural levee, surrounded by a broad marshy plain. The mounds are the only elevated points in the area, making them ideal flood protected spots for dwelling construction. In fact, Mound B had a residence built atop it by the Rhodes family of Houma, who lived there for nearly one hundred years. This is now the spot of the family cemetery. The majority of data on the site's prehistoric component was accumulated by Altschul during his field session. A controlled surface collection combined with subsurface testing of Mound A produced some 326 identifiable sherds, 13 wave eroded sherds, 1 bifacial thinning flake, shell, faunal remains, plus some historic artifacts (Altschul 1978:Table 7). The analyzed ceramics included the types Baytown Plain *vars.* *Little River* and *unspecified*, Coles Creek Incised *vars.* *Hardy* and *unspecified*, Evansville Punctated *var.* *Rhinehardt*, French Fork Incised *var.* *Iberville*, L'Eau Noir Incised *vars.* *Anna*, *Australia*, and *L'Eau Noir*, Maddox Engraved *var.* *Baptiste*, Mazique Incised *var.* *Manchac*, and Plaquemine Brushed *var.* *Plaquemine*. The ceramics indicate a Plaquemine, and possibly Coles Creek, occupation of the site. In the opinion of Altschul, the sherds more particular to the Coles Creek period seemed to have been aggregated at the northern end of the elongated, bank-hugging surface scatter (1978:63). He suggested two separate habitations of this site based on the spatial separation of assigned Coles Creek material.

One more recent study has involved Site 16TR10/86. A cultural resource assessment for the above ground portions of a proposed pipeline right-of-way in Terrebonne Parish conducted by Heartfield, Price, and Greene (1989) predicted encountering this site at the intersection of the proposed pipeline canal with Bayou Terrebonne. Using Altschul's map as a guide, they looked over the low, nearly immersed area of impact but observed no prehistoric cultural material. A few shovel tests that quickly filled with water indicated that the entire shoreline probably had suffered subsidence during the years since Altschul's visit. These shovel tests failed to reveal any subsurface intact cultural material. Their conclusion was that the artifact scatter described by Altschul (which would have extended into their project study area) represented a redeposition of artifacts

that was transported by water or some other historic activities, and that no longer existed (Heartfield, Price, and Greene, Inc. 1989:8-9).

Site 16TR19 (Marmande Plantation Site)

The Marmande Plantation site near Bayou du Large has been a repeatedly visited and well documented mound site within Terrebonne Parish. The large, well preserved earthwork is, in fact, annotated on the USGS 7.5' series topographic quadrangle Lake Theriot, Louisiana, and it can be found within irregular Section 31, of Township 18S, Range 17E. The site is located approximately 1 km (0.62 mi) west of present day Bayou du Large, and it is situated at the confluence of an abandoned distributary levee and the Marmande Ridge. Weinstein and Kelley (1992) assigned both the distributary levee and Marmande Ridge to the Teche-Mississippi delta complex. However, other evidence favors an early Lafourche complex date for these features (see Chapter II, this volume). These confluences or intersections of distributary natural levee have proven to be highly attractive for the establishment of larger residential site complexes throughout the southern Louisiana coastal region (Beavers et al. 1984:63; Gibson 1978; Goodwin et. al. 1991:77; Weinstein and Kelley 1992:160).

Randolph Bazet collected from the site in 1924 and noted its location; a subsequent collection he made in 1926 was sent to William McIntire in the 1950s to aid in his research of the region. Henry Collins from the Smithsonian Institution discussed Louisiana coastal sites and may have visited this one with Mr. Bazet during his field survey of Louisiana and Mississippi in the 1920s (Collins 1927 as referenced in Weinstein and Kelley 1992:161). A more extensive archeological effort was conducted by McIntire and Kniffen in 1952, who recorded the site on site forms, mapped it, and took boring samples. They described the dimensions of the large, truncated mound as being 3.65 m (12 ft) high and 22.86 m (75 ft) in diameter. McIntire's classification of the acquired Bazet ceramics formed the basis of a Troyville assignment to the site. He also identified a Coles Creek and Plaquemine occupation, based on the presence of Mississippian-era ceramic types. Using Phillip's criteria for lower Louisiana classification, the inclusion of a Troyville component becomes tenuous (Phillips

1970:921-922). His taxonomic scheme would incorporate the ceramic types (as defined by McIntire) into the Bayou Cutler phase (Coles Creek period) and later Delta Natchezan phase (Plaquemine period) (see Phillips 1970:953; Weinstein and Kelley 1992:163 for complete discussion). Additionally, Neuman lists the site with mound dimensions and the Troyville-Plaquemine occupation sequence intact (Neuman 1977:22). Jeffrey Altschul completed a more substantive survey of this particular site during the 1978 field investigations, although the mound proper was not within his designated project area, so no sub-surface excavations were undertaken. His revised dimensions for the lone earthwork became 5.9 m (19.4 ft) in height and 25 m (65.6 ft) in diameter. A large number of ceramic sherds were collected from around the mound, and from a discrete locus adjacent to Bayou du Large. His breakdown of the ceramic collection from around the mound follows (Altschul 1978:Table 15):

<u>Ceramics</u>	<u>Percentage</u>
Baytown Plain	
var. <i>Little River</i>	2
var. <i>unspecified</i>	12
Coles Creek Incised	
var. <i>Coles Creek</i>	1
var. <i>Hardy</i>	6
var. <i>Mott</i>	2
French Fork Incised	
var. <i>Iberville</i>	2
Mazique Incised	
var. <i>Manchac</i>	3
Pontchartrain Check Stamp	
var. <i>Pontchartrain</i>	7
Unidentifiable	11
Plain body sherds	54

Additionally, one secondary flake, three lithic chunks, several pieces of daub, two unknown bones, and five oyster shells were collected from around the mound (Altschul 1978:Table 15). Altschul suggested that the mound was constructed during the Plaquemine era, but that a Coles Creek component might underlie it. Because of the potential of the site to yield important information, Altschul recommended that some preservation measures be considered in order to limit further erosion or pothunting, and stated that the site may be eligible for the National Register of Historic Places.

It should be mentioned that the discrete cultural scatter along Bayou du Large was deemed to be 16TR3 by Altschul, and these artifacts were linked on state records to the mound Site 16TR19. The reassessment by Weinstein and Kelley of this problematic conclusion led to a redesignation of this locus with a new site number (see above description of 16TR3; Weinstein and Kelley 1992:163-164). This associated site, 16TR218, lies outside the current study area and is briefly mentioned because of its relationship to sites included in this study.

Additional site testing and a review of previously curated artifacts was undertaken by Weinstein and Kelley (1992). Four shovel tests were placed in cardinal directions relative to the mound, and one shovel test was placed in the crest of the natural levee; these shovel tests showed similar underlying soil stratigraphy. Recognizable plow zone mixed with *Rangia* shells indicated some surface disturbance to the site environs. One auger test east of the mound displayed no cultural remains. The reanalysis of curated artifacts, including McIntire's collection, led to new ceramic type assignments for many of the sherds. A revised portrait of the site indicated by the overall artifact collection pointed to a strong Coles Creek presence at 16TR19, with continuous Plaquemine and Mississippian (possibly proto-historic) occupation (Weinstein and Kelley 1992:166-171). Their impression is that McIntire erroneously identified some of the sherds present, and an earlier Troyville affiliation was unwarranted. A conclusive study of the construction specifics of the mound and its importance in the local scheme of neighboring sites and regional political organization remains to be undertaken. Nonetheless, continuing investigations at the site attest to its potential significance for regional archeological research.

One additional aspect of the site needs to be mentioned. A large scatter of historic artifacts was discovered just to the northeast of the mound by Weinstein and Kelley (1992). This large surface collected assemblage included machine produced bottle glass with bottle manufacturer marks dating to post-1917, whiteware sherds, semi-porcelanous ceramic ware sherds, stoneware sherds, brick, and metal fragments. The recovered

artifacts point to an early twentieth century home-
stead (Weinstein and Kelley 1992:166).

Site 16TR22 (Mound Bayou Site)

Site 16TR22 sits on the greatly subsided natural levee associated with Bayou Grand Caillou, at the point of intersection with Mound Bayou. The site is slightly south of Mound Bayou and spread down the west bank of Bayou Grand Caillou, in Section 17, of Township 20S, Range 17E. The site location can be seen on the 7.5' series topographic quadrangle Lake Quitman, Louisiana, in proximity to the proposed Houma navigation canal floodgate. The ancient distributary natural levee soils along this section of Bayou Grand Caillou have sunk to the level of the surrounding marsh, making the site's low earthworks a noticeable, tree covered terrain feature.

An early report by McIntire of this site listed three possible mounds and a shell midden, with artifacts scattered along the western shore of Bayou Grand Caillou. He stated that the smaller mound (0.45 m [1.5 ft] high) appeared to be a burial mound, and that two larger tumuli nearby (listed as 5 ft. high) also may have been prehistoric earthworks. Percentages of ceramic types from the site are listed by McIntire in a summary table (McIntire 1958:Plate 13):

<u>Ceramics</u>	<u>Percentage</u>
Natchez Incised	2.4
Leland Incised	4.8
Fatherland Incised	9.7
Moundville Type	9.7
Evangeline Interior Incised	2.4
Australia Interior Incised	2.4
Fort Walton Type	19.9
Dupre Incised	2.4
Manchac Incised	34.2
Plaquemine Brushed	9.7
Swift Creek Complicated	
Stamped	2.4

McIntire recorded the site as a possible village-ceremonial-burial center, falling somewhere within the range of Coles Creek through Mississippian periods. As is noted on the site form, the effects of bayou erosion and soil subsidence already were taking their toll on the site at that time. This mixed bag of Mississippian ceramics reported by McIntire is the type of assemblage Philip Phillip wrestled over while defining phases of Mississippian-Plaquemine settlements in the

coastal plain region of Louisiana. He placed the Mound Bayou site in with Bayou Petre phase sites, based on the presence of certain ceramic markers such as the Moundville Type and Fort Walton Type sherds (Phillips 1970:951-953; Figure 447). The site is also referenced in Robert Neuman's *An Archaeological Assessment of Coastal Louisiana*, identifying the site as a Coles Creek-Mississippian mound site with a shell midden and a ceramics scatter (1977:22).

Later testing of the site was performed by Rebecca Saunders from LSU in 1994. The presence of one shell-tempered, concentric circle complicated stamped potsherd in the previous collection brought her attention to the site, as that type of ceramic is rare in Louisiana (Saunders 1994:90). A field session was organized to investigate and sample the site's ceramic remains, to check on site integrity, and to look for intact deposits. A combination of systematic surface collecting and the placement of one 1 x 2 m (3.28 x 6.56 ft) unit in a mound was used to gather more information about the rapidly eroding site. Saunders's description of the site is slightly at variance with McIntire's; two earth mounds were noted, not three as listed on the site record. It was assumed that a third mound may have been lost to bayou erosion and lateral movement. The larger mound, Mound A, was measured at 25 m (82 ft) in diameter by 1.2 m (3.9 ft) high; the smaller Mound B measured at 15 m (49.2 ft) in diameter by 0.75 m (2.5 ft) high. Although the mounds were observed to be roughly conical or dome shaped, a definitive classification of their morphology and purpose awaits a more extensive study on the mounds proper.

The excavated unit on Mound A extended to a depth of 1 m (3.28 ft) before filling up with standing water. It was noted that artifact density increased with each level dug, along with the amount of burnt and unburnt *Rangia* shell present in the mound fill dirt. It was surmised that this represented a sort of "reverse" stratigraphy: the initial mound fill was borrowed from superficial living surfaces, and the dirt piled successively on top from local subsoils. Since the *Rangia* shell seemed to be clearly associated with the artifacts, a sample of unburned shell was collected for carbon-14 dating and submitted to Beta Analytic for testing (assay # Beta-74542). The carbon dating results from a single *Rangia* shell yielded a

measured age of 910 $\pm$ 60 BP, a C13/C12 ratio of -9.3 ‰, and a corrected age of 1170 $\pm$ 60 BP. Probing around the site produced no evidence of in situ features or middens. Only two undecorated shell tempered ceramics ended up being collected; they were identified as Bell Plain *var. unspecified*. The diagnostic ceramic sherds collected from the site plus the corroborating C-14 date suggest a late Coles Creek to early Plaquemine occupation of the site (Table 7). An additional historic scatter of artifacts also was encountered and analyzed. This scatter, including two sherds of pearlware, places an occupation sometime in the mid-nineteenth century, perhaps earlier, on the site grounds (Table 7).

Site 16TR23

This site consists of a prehistoric shell midden situated along the southern bank of Bayou Dulac, near its intersection with Bayou Bluff. The site is located on the 7.5' series topographic quadrangle Lake Quitman, Louisiana, within Section 2, of Township 20S, Range 17E. As shown in Figure 16, the site sits atop a subsided distributary natural levee and crevasse natural levee alluvium, surrounded by the sinuous waterways and small marsh lakes of Terrebonne Marsh.

State archeological records show the recorder of this site to be Randolph Bazet in 1936; however, no mention of any artifacts is on file. McIntire surface collected the site later, and retrieved a small amount of unspecified ceramic sherds from the midden, leading to a Coles Creek through Mississippian classification for the site. Robert Neuman does not augment these data in his coastal archeological site synopsis (1977:22).

Site 16TR26

Site 16TR26 consists of a small shell midden located directly on the west bank of Bayou Sale, in Section 11, of Township 20S, Range 17E. This site can be found on the 7.5' series topographic quadrangle Lake Quitman, Louisiana. The site is very near a juncture of the two natural levees formed by Bayou Sale and Four Point Bayou, as well as the Bayou Bluff crevasse natural levee (Figure 16). The natural levee silt loams appear to be largely subsided, though, and the site

is now part of a low-lying region bordered by freshwater marsh.

Recorded initially by William McIntire in 1951, the site was already in the process of eroding into Bayou Sale. Jeffrey Altschul's visit to the site showed the midden to be mostly destroyed, but an existing surface scatter of ceramic sherds still lined the bank. Four shovel test pits were placed within the confines of the visible ceramic scatter to test for evidence of in situ remains or features. Although the shovel test pits produced no artifacts, a surface collection yielded five plain body sherds. The lack of diagnostic artifacts and the noticeably advanced degradation of the site matrix have made it difficult to make any determinations about the chronological position of Site 16TR26.

Site 16TR33 (Point au Chien #2)

Site 16TR33, positioned atop subsided natural levee deposits near Bayou Pointe au Chien, consists of a small, truncated earthwork, associated prehistoric refuse, and an historic rectangular brick structure supposedly seated atop the earthwork. The area surrounding the site has become freshwater marsh due to the tremendous subsidence that has taken place on the clayey soils of the natural levee. The site can be located on the Lake Bully Camp 7.5' series topographic quadrangle in Township 19S and Range 20E (this area has not yet been divided by a Public Land Survey).

The site was recorded in 1952 by McIntire and Kniffen after receiving information from Randolph Bazet about a mound site near Bayou Pointe au Chien. The earthen mound was found to have a slightly elongated circular base, but truncated on top, with the dimensions 9.14 x 6.1 x 2.13 m (30 x 20 x 7 ft) high. Jeffrey Altschul visited and tested the site in 1978; five shovel test pits were placed around the base of the mound, and two shovel test pits were placed nearby in the subsided natural levee soils. Additionally, two units were excavated into the mound slopes. Artifacts recovered from the shovel test pits consisted of 1 sherd of French Fork Incised *var. Iberville*, plus faunal materials identified as mammal bones and shellfish remains. Many of the faunal materials were collected from a dark sandy clay loam stratum from within the shovel test pit, identified as a possible midden layer. No mention of the

Table 7. Artifacts collected from the Mound Bayou Site (16TR22) by Saunders.

PROVENIENCE	PREHISTORIC CERAMICS	HISTORIC ARTIFACTS
Surface	351 Baytown Plain <i>var. unspecified</i> 2 Coles Creek Incised <i>var. Mott</i> 3 Coles Creek Incised <i>var. Hardy</i> 1 Coles Creek Incised <i>var. Blakely</i> 1 Coles Creek Incised <i>var. Greenhouse (?)</i> 2 Mazique Incised <i>var. Manchac</i> 1 Bell Plain <i>var. unspecified</i> 1 Medora Incised (?) <i>var. Medora</i> 1 Chevalier Stamped <i>var. unspecified</i> 1 unidentified surface (Baytown paste) 1 unidentified incised (Baytown paste) 1 unidentified incised (sandy paste) 1 unidentified surface, rim sherd	2 shell edged pearlware 2 pearlware 1 annular ware 1 kaolin clay pipe bowl 1 glazed earthenware elbow pipe 7 refined earthenware 1 refined earthenware rim 1 lead glaze red earthenware 1 glazed, red ware 9 stoneware 1 roofing slate 18 brick 2 wood (burnt)
Excavation Unit Level 1 (0-10cmbs)	2 Baytown Plain <i>var. unspecified</i>	None
Excavation Unit Level 2 (10-20cmbs)	Sterile	None
Excavation Unit Level 3 (20-30cmbs)	2 Baytown Plain <i>var. unspecified</i> 1 Mazique Incised <i>var. Manchac</i> 1 unidentified incised (Baytown paste)	None
Excavation Unit Level 4 (30-40cmbs)	9 Baytown Plain <i>var. unspecified</i> 4 Addis Plain <i>var. unspecified</i> 1 French Fork Incised <i>var. French Fork</i>	None
Excavation Unit Level 5 (40-50cmbs)	1 Baytown plain <i>var. unspecified</i>	None
Excavation Unit Level 6 (50-60cmbs)	2 Baytown Plain <i>var. unspecified</i> (exterior & interior burnished) 4 Baytown Plain <i>var. unspecified</i>	None
Excavation Unit Level 7 (60-70cmbs)	6 Baytown Plain <i>var. unspecified</i> 1 Addis Plain <i>var. unspecified</i> 1 Evansville Punctate <i>var. unspecified</i>	None
Excavation Unit Level 8 (70-80cmbs)	3 Baytown Plain <i>var. unspecified</i> 2 Baytown Plain <i>var. unspecified</i> (burnished exterior) 1 Baytown Plain <i>var. unspecified</i> (plate form) 4 Addis Plain <i>var. unspecified</i> 1 unidentified incised, rim only (Baytown paste)	None
Excavation Unit Level 9 (80-90cmbs)	18 sherds less than 1/2 inch 15 Baytown Plain <i>var. unspecified</i> 8 Addis Plain <i>var. unspecified</i> 4 Mazique Incised <i>var. Manchac</i> 1 Addis Plain <i>var. Addis</i> 1 unidentified incised (Addis paste)	None
Excavation Unit Level 10 (90-100cmbs)	14 sherds less than 1/2 inch 10 Baytown Plain <i>var. unspecified</i> 13 Addis Plain <i>var. unspecified</i> 4 Baytown Plain <i>var. unspecified</i> (burnished interior) 1 Coles Creek Incised <i>var. unspecified</i> 2 Coles Creek Incised (?) <i>var. Hardy</i> 1 Baytown Plain <i>var. unspecified</i> , simple bowl 1 Addis Plain <i>var. Addis</i> 1 Bell Plain <i>var. unspecified</i> 1 Baytown Plain <i>var. unspecified</i> , 1 unidentified punctate, very compact paste	None

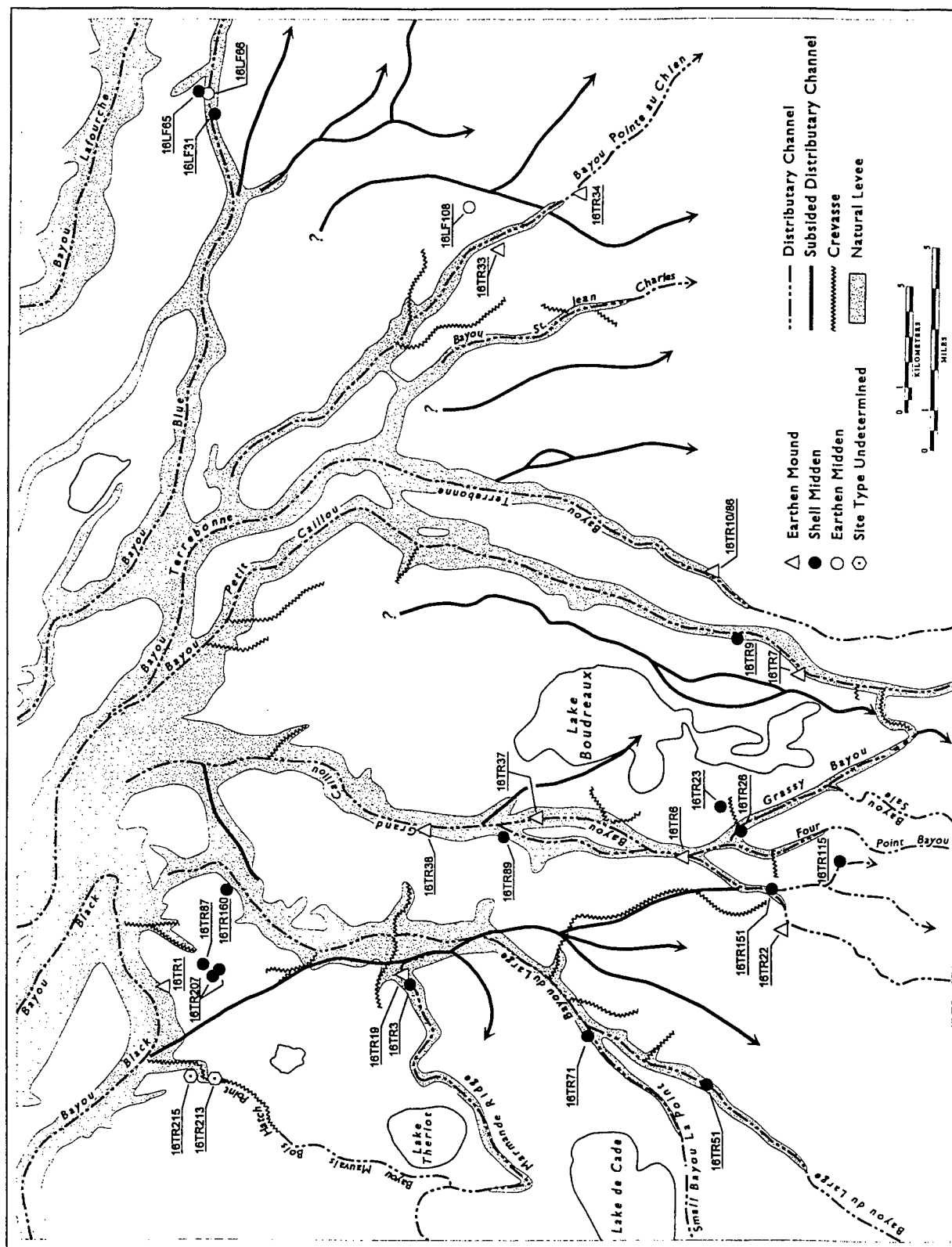


Figure 16. Map of archeological sites in the vicinity of the proposed Morganza to the Gulf project area, showing the differential distribution of site types.

background or even existence of the brick remains atop the mound is contained in Altschul's report. The paucity of recovered materials from Site 16TR33 makes it difficult to date the site or to speculate about its function.

Site 16TR34 (Point au Chien #3)

This site is a small mound complex located along Bayou Pointe au Chien that only minimally has been investigated or described to date; along with sites Point au Chien #1 and Point au Chien #2 (16TR32 and 16TR33), it adds to the inventory of flat-topped mound sites strung out along the distributary levee ridge. The site sits on the subsided clayey soils of the natural levee's western base slope. Site 16TR34 can be found on the 7.5' series topographic quadrangle Lake Bully Camp, Louisiana., in Township 19S and Range 20E. No description of any material that was collected exists; however, a curation catalogue number is on file at LSU (#52-266). The dimensions of the three mounds are summarized by Neuman (1977:22). A more complete recounting of the mound arrangement is provided on the original site form:

Three earthen mounds, apparently square shaped. One mound (S) is abt (*sic, passim*) 5' high and on top is 45' square, and flat. At base it is abt 75' square. The corners are oriented to the compass points. Abt 50' N toward the bayou is the 2nd mound. This one is smaller, abt 3' high. NW of this mound, abt 100 yds, is the 3rd mound, abt same size as #2. A hole was made in the top of the S mound to a depth of 3'. Well oxidized silty clay was found throughout.

This description of the site suggests that it functioned as a small ceremonial center. Phillips grouped Point au Chien #3 in with Mississippian, Bayou Petre phase sites in the coastal region of Louisiana, but no mention is made as to what criteria he used (Phillips 1970:98, Figure 447).

Site 16TR37 (Ellesly Plantation Site)

This mound site is situated along the east bank of a natural levee currently occupied by Bayou Grand Caillou. The site is positioned within Section 1, of Township 19S, Range 17E, and it can be seen on the 7.5' series topographic

quadrangle Dulac, Louisiana. The site has two prehistoric truncated mounds and has produced a variety of prehistoric and historic artifacts. The mounds attracted attention early on due to their noteworthy size: Mound A is 6.1 x 12.2 x 6.7 m (20 x 40 x 22 ft) high, and Mound B is 18.3 x 30.5 x 1.52 m (60 x 100 x 5 ft) high. Both mounds are rectangular shaped, truncated mounds. Dissection of the site becomes somewhat difficult due to the veneer of historic/modern structures superimposed on the prehistoric locus. Jeffrey Altschul's site map (1978:Figure 28) shows a family cemetery (Carlof Cemetery) that sits adjacent to and spans Mound B. A church, a second cemetery, and miscellaneous buildings and trailers surround the site. Furthermore, two artificial (modern) earthworks exist within the site boundary. One of these artificial earthworks is a flat topped dirt pile adjoining Mound B, built to extend the area of elevated ground available for new cemetery plots. The other mapped earthwork consisted of a graded earth platform, anticipating house construction. The entire site lies on former Ellesly Plantation land, which is now transected by Highway 57 (narrowly missing Mound B). Despite all this historic/modern activity over the site, the condition of the site remains good, and a number of archeologists have visited it.

The Randolph Bazet collection from the 1920s contains artifacts referenced to this site. McIntire and Kniffen (1952) visited and surface collected the site, recording the mound dimensions in the process and submitting forms to the state. Apparently, at that time it was deemed this was a village-ceremonial center exhibiting a sequence of Troyville through Mississippian occupation. Neuman re-visited and briefly described the site, but apparently did not investigate it further (1974, 1977). His description in a project report mentions one mound at the site; as that survey was done mainly by boat, truck, and helicopter reconnaissance, it is theorized he may have observed only the large Mound B next to the highway, and missed the smaller Mound A, set back in the trees. Upon reviewing the data known at that time, Phillips (1970:pg. 987, figure 447) included the site in the Mississippian Medora phase of lower Louisiana, a phase described as "Plaquemine culture" by others (Phil-

lips 1970:950-951). He apparently repudiated the belief that this mound complex dated from Troyville times.

More extensive work at this site by Jeffrey Altschul in 1978 included mapping the location of the mounds, the excavation of shovel test pits, and the recordation of the surrounding modern cultural features. His testing involved scanning the surface for artifacts, placing six shovel tests throughout the site, and digging two test pits, one on the Mound B, and one near a positive shovel test. The test pit on Mound B encountered an historic grave, so the work was relegated to the portion apart from the interment. Artifacts and a possible thin midden layer were encountered there. The shovel tests placed in the area immediately adjacent to the mounds produced few artifacts. Of the 27 ceramic sherds collected and analyzed, no strongly diagnostic types were discovered. A few sherds of Baytown Plain *var. unspecified* were identified, and the rest consisted of nondescript plain body sherds (Altschul 1978:Table 11). Altschul's tentative conclusion was that the site resembled a Plaquemine period ceremonial center, but that further excavations were needed to understand the site.

Site 16TR38 (Indian Mound/Grand Caillou Site)

Site 16TR38 is another prominent mound site in Terrebonne Parish, accessible from Highway 57 and parish road 61. The site is located on the west bank of Bayou Grand Caillou on natural levee soils, in Section 8, of Township 18S, Range 17E. The site can be found on the 7.5' series topographic quadrangle Dulac, Louisiana. Two smaller waterways, Bayou la Carpe and Bayou Boeuf, meander through the marshy flat terrain to join Bayou Grand Caillou near the site. A small unnamed bayou that may have existed prehistorically runs along the south edge of the site, approximately 25 m (82 ft) from Mound A. There are two existing mounds at this site, the larger (Mound A) measuring 40 x 40 m (131.2 x 131.2 ft) by 4.75 m (15.58 ft) high, and the second (Mound B) measuring 25 m (82 ft) in diameter by 1.35 m (4.43 ft) high. Both of the mounds are flat topped structures, although the larger Mound A exhibits more angular side slopes than Mound B. A third mound existed earlier in this century; however, it was leveled in

the 1960s by the property owner to generate more tillable land. His personal recollection was that skeletal remains were uncovered in the lower levels of the earthwork (Altschul 1978:77).

Randolph Bazet collected from this site in the 1930s; Neuman also describes the site (1974; 1977:22), and assigns it a Coles Creek affiliation based on mound morphology and on a review of the ceramics. Phillips assigns this mound complex to the Bayou Petre phase, a later Plaquemine-era phase defined by a late southern Louisiana ceramic assemblage that shows certain affinities or influences from cultures to the east (Phillips 1970:951-954:Figure 447). Altschul's fieldwork at the site included surface collecting, digging shovel tests, and excavating three units (one on each mound and one west of the mounds). Dark, alternating bands of soils in the Mound A test pit were interpreted as the remains of a burnt log pile (ceremonial fire?) atop the mound. A total of 616 sherds was recovered, mostly from the surrounding fields, which fell into the following types: Baytown Plain *var. unspecified*, Coles Creek Incised *var. Hardy*, Harrison Bayou Incised *var. Harrison Bayou*, L'Eau Noir Incised *vars. Australia* and L'Eau Noir, Mazique Incised *var. Manchac*, Plaquemine Brushed *var. Plaquemine*, and many plain body sherds (Altschul 1978:Table 10). The overall percentages of recovered ceramics led Altschul to label this site as a definite Plaquemine period village ceremonial center. Altschul believed that he recognized a pattern of artifact clustering within the surface scatter, which he reasoned, might indicate the positions of dispersed homesteads. Although impacted by modern agricultural activities, the site retains good potential for future research.

Site 16TR51

This site, an eroding shell midden embedded in the east bank of Bayou du Large, has produced few artifacts and little evidence regarding the site's overall integrity. Located in Section 34, of Township 19S and Range 16E, the site can be found on the 7.5' series topographic quadrangle Bayou Sauveur, Louisiana. Tributary natural levee soils underlie the midden along Bayou du Large. The reported midden is also very near to state Highway 315 and to a

number of modern structures, bringing up questions about possible impacts to the site. The Louisiana state site records show the recorder to be Mr. Randolph Bazet, who, in later years, was reported not to remember the site (Altschul 1978:113). Although Altschul was denied access to the property by the landowner, his field crew was able to produce a sketch map of the site locality and to check the peripheral area for surface artifacts. Two ceramic sherds were collected, one sherd of Owen Punctate *var. Owens*, and one plain body sherd (Altschul 1978:Table 17). The data available from Site 16TR51 thus far are insufficient to provide further information about the site.

Site 16TR71

Another shell midden site, Site 16TR71, is located on the west bank of Bayou du Large approximately 500 m (1,640 ft) south of the Falgout Canal. The site sits in Section 24, of Township 19S and Range 16E, and it can be found on the 7.5' series topographic quadrangle Lake Theriot, Louisiana. This particular section of Bayou du Large coincides with a relict natural levee associated with Small Bayou la Pointe, creating a relatively broad base of silty clay loam soils for settlement activities (see Figure 16). Modern construction along the bayou has impacted many of the natural bankline features. A bridge across the bayou lies just on the southern edge of the reported midden scatter. Two paved roads including Highway 315 parallel the bayou on either side. According to locals, routine bayou dredging is responsible for periodic spoil deposits left along the shoreline in the vicinity of the site.

The site initially was visited and recorded by Randolph Bazet in 1953, who loaned his artifacts to William McIntire to aid in his research. The site was assigned to the Plaquemine period based on analysis of the artifacts (McIntire 1958:Plate 8). Upon Altschul's visit to the site, he noticed some oyster shell and historic/modern cultural material scattered around the west bank of the bayou. Sometime during his investigation, he was informed that another, now removed bridge crossed the bayou at the point where the site was located. His investigation did recover a number of prehistoric artifacts, and evidence suggestive of a prehistoric shell midden, but

these were concentrated in an area where the base supports for the reported old bridge would have been located. Some subsurface sampling was done by auger testing, and cleaning a bankline profile in the area of recovered prehistoric sherds. The stratigraphic evidence indicated that a probable redeposition of soils had taken place, during the process of constructing the local roads and bridges. Altschul seemed to confirm this with interviews of local residents, including a Mr. Norman Fredericks who lived on the property. The ceramics recovered included the types Baytown Plain *var. unspecified*, Coles Creek Incised *var. Hardy*, Maddox Engraved *var. Baptiste*, and a number of plain body sherds (Altschul 1978:Table 16). Altschul substantiated the Plaquemine period assignment for the cultural materials, but asserted that they were not primary deposits as initially recorded.

Although Altschul's interpretation of the site seems reasonable, Coastal Environments, Inc., revisited the site and reassessed the existing ceramics from 16TR71, bringing to light some new questions (Weinstein and Kelley 1992). Weinstein and Kelley had a chance to interview Mr. Norman Fredericks again, who stated that there never was a second bridge location, and that the existing bridge was in the same place as the previous one. Altschul had noted and drawn a lens of oyster shells in his stratigraphic profile, and assumed it had been used as road bedding for the older bridge (Altschul 1978:110). If a second bridge location never existed, then there would be little reason for there to be roadbed materials and secondary soil deposits at the site location. Weinstein and Kelley (1992:318-321) contend that the shell lens and accumulated cultural materials do in fact represent the original site location. Their re-analysis of the existing ceramics moves some of McIntire's sherds into new categories. Their account of the ceramics is as follows (Weinstein and Kelley 1992: Table 7-16):

<u>Ceramics</u>	<u>Total</u>
Addis Plain	
<i>var. Addis</i>	24
<u>Ceramics</u>	<u>Total</u>
Baytown Plain	
<i>var. Little River</i>	7
<i>var. unspecified</i>	14
Bell Plain	

<i>var. unspecified</i>	1
Fatherland Incised	
<i>var. Stanton</i>	1
Leland Incised	
<i>var. Russell</i>	1
Maddox Engraved	
<i>var. Emerald</i>	1
Mazique Incised	
<i>var. Manchac</i>	1
Owens Punctated	
<i>var. McIlhenny</i>	1
Plaquemine Brushed	
<i>var. Plaquemine</i>	1
Unclassified Incised on Baytown paste	1

The Addis ceramics exhibited a very compact, well-made paste, three of which are from a Natchezan-style carinated bowl with incised lines at the top (Weinstein and Kelley 1992:320). Their impression of the overall assemblage was that it represented a strong late-Plaquemine, possibly proto-historic occupation, with hints of an earlier Coles Creek habitation. The Coastal Environment crews attempted to relocate the site, but found only a few shells. Erosion reported along the bayou (a loss of 4.6 - 6.1 m [15 - 20 ft] of bankline) in recent decades has apparently destroyed any signs of the midden or in situ deposits.

Site 16TR87

Site 16TR87 is an exposed shell midden discovered during a project survey of the Gulf Intracoastal Waterway (GIWW) undertaken by Sherwood Gagliano, Richard Weinstein, and Eileen Burden in 1975. The site is located in Section 59, of Township 17S, Range 17E, and on the 7.5' series topographic quadrangle Humphreys, Louisiana. The reported midden is situated directly on the east shore of the GIWW, about 1.6 km (1 mi) south of the Bonvillain Canal, and it extends for roughly 3.05 m (10 ft) along the canal bankline. Although the site environment today is marshy and flat, the site actually rests on natural levee soils associated with a subsided, ancient stream channel (Figure 16). This site originally was described and recorded, but not collected, so there currently are no artifacts available to help determine site age. A 30.32 cm (8 in) thick lens of *Ostrea* and *Rangia* shells in a blackish humic soil was noted, capped by a layer of brownish-orange spoil. This portion of the midden appeared to be reasonably

intact, but canal dredging and routine canal maintenance activities are likely to have impacted this site, along with ongoing bankline erosion. At the time the site was investigated, the effects of erosion already had been noted. No more information about the site has been recorded since.

Site 16TR89

Site 16TR89 is another eroded midden site minimally described in state archeological records. The site can be found on the 7.5' series topographic quadrangle Dulac, Louisiana, in Section 1, of Township 19S, R17E. The site is positioned along the south bank of Bayou Provost, a minor distributary that traverses the marsh east-west to connect Bayou Grand Caillou with Bayou du Large. The geologic setting of the area entails a confluence of three natural levee ridges just north of the site. Branching off of the still active north-south channel and natural levee of Bayou Grand Caillou are a relict natural levee to the east, and a relict natural levee to the west, which can be discerned on topographic maps as crossing through the site. The inherent advantages of natural levee confluences for aboriginal human settlements is discussed at length in many archeological studies within the deltaic plain (Beavers et al. 1984:63; Gibson 1978; Goodwin et al. 1991:77; Weinstein and Kelley 1992:160).

Very little data on this site currently is available. The Louisiana archeological site record notes a series of 0.91 x 2.44 m (3 x 8 ft) high remnants of eroded levee or spoil containing shell. Potsherds were collected, and attributed to a mid to late Marksville occupation, possibly extending into the Baytown period. Erosion at the site was noted; its current status is unknown.

Site 16TR115

This site was detected and recorded by Jeffrey Altschul during his assessment of cultural resources for the Houma-Terrebonne regional sewerage plan (1978). It can be found on the 7.5' series topographic quadrangle Lake Quitman, Louisiana, in Section 9, of Township 20S, Range 17E. The site is situated on natural levee soils associated with Bayou Grand Caillou, and Bayou Plat, which forks off from Bayou Grand Caillou to the west. This site, an elongated shell

midden embedded in the west bank of a minor waterway named Deep Bayou, was discovered initially in dredge materials from the bayou. The site was designated as Site 72B, a companion locus to Site 72A, by Jeffrey Altschul who felt their similarities warranted a similar taxonomic nomenclature. Through surface collecting and the placement of four shovel test pits, along with a bankline profile cut through the midden, Altschul determined that this was a reasonably intact shell midden from a Plaquemine period seasonal camp (1978:102). No evidence of earthworks was found during fieldwork, and the site area was noted to be experiencing the effects of subsidence. Because the site is nearly 800 m (2,624 ft) distant from Site 72(A), the State re-designated it with the new site number, Site 16TR115.

Site 16TR151

Site 16TR151 was encountered during an investigation of a portion of Bayou Grand Caillou performed for the New Orleans District Corps of Engineers in 1983. Although the goal of this study was to locate derelict vessels that might be impacted by the planned bayou dredging, the investigators, R. A. Flayherty and J. W. Muller, noted the presence of a prehistoric shell midden along the banks of the bayou. Documentation of the site to date is based entirely upon their initial inspection (Flayherty and Muller 1983).

This site lies within Section 9, of Township 20S, Range 17E, and it can be seen on the 7.5 series topographic quadrangle Lake Quitman, Louisiana. The site's geomorphological setting encompasses the bifurcation of two low natural levee ridges, the one currently channelized by Bayou Grand Caillou as it flows today, and an abandoned fork that is partially occupied by Bayou Plat and Wax Bayou (see Figure 16). More precisely, the site is situated directly across from the point where Bayou Plat diverges from Bayou Grand Caillou, along the east bank. From their boat, Flaherty and Muller noticed a seemingly intact shell midden mixed with potsherds measuring 30 to 50 cm (11.81 to 19.68 in) thick. Roughly a meter or so of silt overburden is reported to cap the midden. No earthworks were observable from their vantage point in the bayou, and the effects of bayou erosion

and bank collapse were noted. The site has been classified as a Plaquemine (Mississippian) site based on the few ceramics recovered from the site.

Site 16TR160

Site 16TR160 consists of a large scatter of shell and an uninvestigated but intriguing oak covered ridge located near it; the site is situated approximately 300 m (984 ft) west of Bayou du Large. Site 16TR160 lies approximately 3.8 km (2.4 mi) to the south of Houma, and it can be found on the 7.5' series topographic quadrangle Houma, Louisiana, topographic quadrangle in Section 32, of Township 18S, Range 17E. The natural levee ridge associated with Bayou du Large underlies the site, with evidence of subsidence apparent throughout the site area. The site consists of a 91.4 x 45.7 m (300 x 150 ft) scatter of shell, ceramic sherds, and bone distributed along the partially sunken levee ridge slope. The state site record states that the "shell may have been dredged from 17 ft," without further explanation. Unfortunately, the nature of the site and the associated materials are not known due to a somewhat sketchy description. The site recorder attributed this locus to the Neo-Indian period, which is defined by Neuman (1984:3) as the time span extending from 2000 B.C. to A.D. 1600.

Site 16TR207

This site appears to be the redeposited remains of a shell midden situated along both banks of the Gulf Intracoastal Waterway (GIWW). The site was discovered during an archeological survey of Terrebonne Marsh conducted by Coastal Environments, Inc. (1992:155). Personnel on that field investigation noticed tell-tale shell concentrations mixed in with the bank spoil situated along the canal, and they proceeded to record the concentration as a site. The deposit identified along the east bank of the canal was characterized as a wave washed beach deposit of *Rangia* shell, which overlapped onto the spoil dirt. Probing with a 1.83 m (6 ft) probe failed to identify any recognizable shell lenses or concentrations below the spoil layer. Along the west bank, there was a surface scatter and two more beach deposits of shell. Here, too, probing did not uncover any subspoil materials.

The observed materials were concluded to be the vestiges of a primary midden lens coming from somewhere in the GIWW channel, which presumably was fragmented during dredging operations and redeposited along both banks. A total of twelve sherds of Baytown Plain *var. unspecified* were recovered from both loci. The lack of diagnostic sherds, and the overall poor quality of the recovered sherds prevented designating a cultural affiliation for the site.

Site 16TR207 can be found on the 7.5' series topographic quadrangle Humphreys, Louisiana., in Section 13, of Township 18S, Range 17E. Although the area today resembles inter-distributary wetlands, the site sits upon alluvial soils from a relict crevasse natural levee that have sunk to the marsh level. The lack of evidence for site integrity, and the continuous effects of subsidence, shoreline erosion, and canal maintenance activities, make it unlikely that the site will produce further useful data.

Site 16TR213

Site 16TR213 is a small artifact scatter located 2 km (1.24 mi) to the south of Bayou Black, which can be found on the 7.5' series topographic quadrangle Humphreys, Louisiana. The site is not adjacent to any currently active waterways, but it is situated on a relict crevasse natural levee ridge that emanates from Bayou Black near where the town of Waterproof stands today. The site is located in Township 18S and Range 16E, in a predominantly marshy area undivided by previous land surveys.

Site 16TR213 is characterized as a diffuse scatter of prehistoric artifacts located in a plowed field. A combination of surface collecting and subsurface testing of the clayey, poorly drained field produced few artifacts, but some ceramic sherds and fired clay fragments were recovered. The ceramics present in the assemblage were categorized as Coles Creek *var. Hardy* and Coleman Incised variety unknown. Shovel tests excavated within the confines of the artifact scatter failed to reveal any midden or intact cultural features. The wet conditions of the soil, however, reportedly hampered more extensive excavation efforts. This site appears to be representative of a Plaquemine era village or seasonal encampment.

Site 16TR215 (Waterproof Point Field Site)

This site, situated on the same crevasse levee ridge as 16TR213, is approximately 1 km (0.62 mi) south of Bayou Black, in a cane field near the Houma fluid services road that routes south out of the town of Waterproof. The site can be found on the 7.5' series topographic quadrangle Humphreys, Louisiana, and it is between Sections 60 and 61, of Township 17S, Range 16E. A survey to assess environmental and archeological impact along a proposed pipeline corridor conducted by Gulf South Research Institute (GSRI) in 1975 initially describes this particular artifact scatter. This newly discovered locus fell very close to the previously mapped Bazet/McIntire site (16TR73), and it was assumed to be part of the same site. This connection stuck for a number of years until it was realized by Mr. Bazet that he had erred in his locational description of that site (Altschul 1978:271). Site 16TR73 later was placed correctly south of the Gulf Intercoastal Waterway, rather than up to the north near the town of Waterproof. Once these discrepancies were laid to rest, the locus found by GSRI was designated 16TR215.

The description contained in the report produced by GSRI is that of a mixed prehistoric/historic artifact scatter in a cultivated field, approximately 91.4 x 61.0 m (300 x 200 ft) in size. The nature of the collection is recorded as follows:

Although the field in which the site is located was fallow at the time observations were made, fewer than a dozen aboriginal sherds were recovered. Two have incising, three are red-slipped, and the remainder are plain; all are clay tempered. The sample is far too small to permit certain identification. The historic artifacts consist of a shell-tempered cement as well as ironstone and crockery fragments. (GSRI 1975:29).

A review of the site materials and a revisit to the site were undertaken in 1992 by Coastal Environments, Inc., as part of their Terrebonne Marsh assessment. They easily found the site in the cane fields, which conformed to the earlier dimensions recorded by GSRI. A controlled surface collection was conducted, along with the excavation of 23 shovel test pits. The subsurface

testing within the boundaries of the artifact scatter produced no indications of subsurface artifact concentrations or features. A small collection of ceramic sherds was recovered, and compared against the pottery fragments found by the GSRI crews. After combining the two collections, the ceramic types identified included Coles Creek Incised vars. Coles Creek and unspecified, Baytown Plain *var. unspecified*, Mazique Incised *var. Kings Point*, and some unclassified incised sherds on a Baytown paste (Weinstein and Kelley 1992:Table 6-28). The sherds previously classified as being red-slipped were in fact oxidized Baytown Plain sherds. The field crews commented that this site appeared to be entirely within the plowzone, but they recognized the possibility of still buried features at the locus. The final conclusion was that the site was probably a disturbed, if not mostly destroyed, example of a habitation site from the Coles Creek period (Weinstein and Kelley 1992:273).

Site 16LF31 (Bayou L'Eau Bleu)

This site in Lafourche Parish was discovered by Roger Saucier and William McIntire in 1953, approximately 3 km (1.9 mi) southwest of the town of Larose. The site is located along the south bank of Bayou Blue, near the junction of a number of waterways, including Bayou Blue, Bayou L'Eau Bleu, Bayou Manuel, and the Grand Bayou Canal. The site is positioned across the bank and slightly west from the point where Bayou L'Eau Bleu intersects Bayou Blue, hence the site name. Bayou Blue occupies a natural levee ridge which joins another low, partially subsided levee ridge just to the east of Site 16LF31. The site can be found on the 7.5' series topographic quadrangle Larose, Louisiana, in Township 18S and Range 20E.

Site 16LF31 consists of a shell midden and associated artifacts situated along the edge of the bayou in a plowed field. Artifacts collected from the first visit to the site are not extensively described, although the following ceramic percentages are listed by McIntire (1958:Plate 13):

<u>Ceramics</u>	<u>Percentage</u>
Fatherland Incised	58.5
Moundville Type	8.3
Fort Walton Type	24.9
Unclassified	8.3

In Phillip's discussion of the Bayou Petre phase of coastal Louisiana, he is somewhat cautious distinguishing between the Bayou Petre phase and the Deltan Natchezan phase, but he uses archeological evidence from McIntire and Saucier to formulate some guidelines for coastal site classification. Primarily, the identifiable presence of eastern influence in ceramic manufacture is seen as the main rationale for identifying a coastal Mississippian site into the Bayou Petre phase. Moundville and Fort Walton pottery fall under this category, as does limestone tempered Fatherland Incised (Phillips 1970:951-955). Using this criterion, he placed the Bayou L'Eau Bleu site within the sphere of Bayou Petre phase sites in the southeastern Louisiana coastal region (Phillips 1970:Figure 447). A site reconnaissance conducted by Robert Neuman along Bayou Lafourche and Lafourche-Jump Waterway (Neuman 1973:1) notes the presence of a shell midden in a cultivated field at this spot. In Neuman's later published assessment of coastal archeological resources, Site 16TR31 retains the Plaquemine designation (Neuman 1977:24). No further data are provided on the site.

Site 16LF65

Site 16LF65 is a prehistoric settlement recently encountered on the north bank of Bayou Manuel, at the point where the bayou intersects Grand Bayou Blue. The site can be seen on the 7.5' series topographic quadrangle Larose, Louisiana. The site sits atop distributary natural levee soils, in an area that is geologically complex as it exhibits numerous landforms created by ancient and modern stream channels. This site initially was discovered during the Phase I survey of property acquired for a proposed gas processing plant and access road, and was delineated through the placement of 14 shovel tests and five auger tests. This subsurface testing revealed dark, rich midden earth and two distinct shell lenses, visually distinct from the local clayey substratum.

The midden soils of 16LF65 yielded a significant quantity of animal bone, shell, charcoal, and ceramics, and the materials recovered were characterized by their excellent state of preservation (Miller et al. 1996:228). The peaty soil

capping the midden helped to create an anaerobic environment preserving the various faunal materials contained within the midden. The prehistoric ceramics recovered from this site included Baytown Plain var. *Cataouache*, Baytown Plain var. *unspecified*, and four unidentified sherds. In addition, numerous pieces of fired clay and several unmodified lithic fragments were mixed in with the organically rich midden soil.

The abundant faunal materials isolated through screening and soil flotation included small- to medium-sized mammal bones, oyster shell fragments, *Rangia* shell fragments, unidentified shell fragments, fish bones and scales, an alligator bone fragment, a snake scale fragment, and many unidentifiable small bone fragments (Miller et al. 1996:229). These cultural remains were recovered from intact subsurface midden soils. Based on the diagnostic ceramic sherds recovered during survey, this site was classified as a Plaquemine period settlement. The presence of intact buried deposits and the overall high degree of site integrity led to an assessment that Site 16LF65 could have significant research potential as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]).

Site 16LF66

Site 16LF66 was identified recently during a Phase I cultural resources survey for a proposed gas processing plant near Larose, Louisiana. The site is located south of Bayou Manuel and east of Bayou Grand Blue, along the low natural levee positioned adjacent to Grand Bayou Blue. As a result of the Phase I investigation, a large quantity of late prehistoric ceramic sherds, faunal materials, some patches of fragmentary sheet midden, features associated with human remains, and a subassemblage of historic artifacts was recovered. After identification of human burials, work was halted at the site to complete the required notification and assessment (Miller et al. 1996:247).

The Phase I testing effort at Site 16LF66 revealed areas of dark soil staining mixed with prehistoric refuse exhibitivie of either discrete household middens or buried living surfaces. Some mixing of soils was evident at the site, but the cultural strata were enveloped by sterile clays, indicating an overall high degree of integrity for

the site. The human remains detected at the site were found to be in context within the prehistoric soil horizon. Through shovel testing and the excavation of 3 units, a total artifact assemblage of 2,432 specimens was recovered before work was ceased. A breakdown of the overall assemblage shows 247 prehistoric ceramic sherds, 2 lithic artifacts, 2 bone points, 1,975 faunal specimens, and 206 historic artifacts.

The ceramic sherds from Site 16LF66 were primarily Baytown Plain var. *Cataouache*, and Baytown Plain var. *unspecified*. A smaller number of recovered sherds were classified as Anna Incised var. *unspecified*, and Carter Engraved var. *unspecified* (Miller et al. 1996:228-237). Lithic materials at the site were sparse, consisting mainly of one chert biface and one flake. The faunal materials recovered consisted primarily of fish bone, with lesser amounts of mammal, reptile, and bird bone. A number of shellfish were recovered in context with prehistoric features, including *Rangia cuneata*, and two other unidentified specimens.

The available data from Site 16LF66 suggested that it is a single component habitation and mortuary site associated with the Plaquemine culture. The apparent concentration of faunal materials in the north-central portion of the site, and the apparent clustering of burial features in the vicinity of two of the excavation units, suggested that discrete activity areas are present at the site. The presence of these burial features and apparent occupational surface led to a recommendation for avoidance of the site or complete data recovery prior to construction of the proposed gas processing plant, if avoidance was not feasible.

Data recovery excavations subsequently were completed at Site 16LF66 in 1997 (Miller et al. 2000) by R. Christopher Goodwin & Associates, Inc. The Phase III mitigation of Site 16LF66 began with the topographic mapping of the site followed by the establishment of a site grid. Next, a remote sensing survey of the entire site was conducted utilizing a portable proton magnetometer. The survey was designed to identify areas with a higher probability for containing intrusive cultural features. Following the remote sensing survey, eighty-two 1 x 1 m (3.3 x 3.3 ft) units were excavated throughout the site area. Lastly, all of the topsoil at Site 16LF66

was removed mechanically in order to identify all Native American burials present at the site (Miller et al. 1999).

Site 16LF66 contained the remains of a perennial Plaquemine culture occupation dating primarily from the fifteenth century A.D. Miller et al. (1999) noted that the midden deposits excavated at Site 16LF66 produced a variety of important new information about Plaquemine subsistence in the marshes of southeastern Louisiana. While faunal remains were numerous, macrobotanical remains generally were sparse. The site yielded limited evidence of maize. A wide range of cultural features, including hearths, pits, postholes, and wall trenches, also were identified and these provided information about the range and spatial distribution of activities conducted at the site. In addition, 22 human burial locations representing 37 individuals were located; excavation of these burials yielded important demographic information for the Plaquemine peoples of south Louisiana (Miller et al. 1999).

Miller et al. (1999) report that Phase III data recovery excavations at Site 16LF66 provided information on the subsistence patterns, activities, populations, and burial practices of a Plaquemine culture community in southeastern Louisiana. These excavations and the analyses of the materials recovered from them, mitigated the anticipated adverse impacts to Site 16LF66 by the then proposed construction of the Discovery Producer Services, LLC, Larose Gas Processing Plant. After the completion of the data recovery effort, no culturally significant deposits were left in situ at Site 16LF66 (Miller et al. 1999).

Site 16LF108

This site was encountered by archeologists from the U.S. Army Corps of Engineers, New Orleans District, during their inspection of Corps dredging and levee construction operations on Grand Bayou. These operations were part of the Larose to Golden Meadow Hurricane Protection Project, Mitigation Levee, performed during the spring and summer of 1991. The remains of a cultural locus were unearthed in dredge spoil taken from the bayou channel, and used to built up the protection levee. The cultural materials were deposited along the west bank of Grand

Bayou, in the undivided northwest portion of Township 19N and Range 20E. Site 16LF108 can be found on the 7.5' series topographic quadrangle Lake Bully Camp, Louisiana.

After construction of the earthen hurricane protection levee was completed, three elongated artifact scatters were noticed across the levee. These scatters contained a mix of ceramic sherds, faunal remains, and some oyster and *Rangia* shells. Since it was known that the dirt for that section of the levee was retrieved from a specific channel segment of Grand Bayou, it was presumed that the original site lay submerged somewhere between the banks of the bayou. The presence of a barnacle on one of the ceramic sherds supported this conclusion. The ceramic assemblage included one Plaquemine Brushed sherd, 1 Coles Creek Incised sherd, and 20-25 smooth, undecorated, possible Baytown Plain sherds. The paucity of shell in the artifact scatter suggested that the cultural materials did not represent a ruptured shell midden lens or facies, but instead were part of an earth midden or similar cultural feature. Testing at this site was limited to surface observations and grab-surface collecting due to the lack of evidence for any potential intact subsurface materials on the shores of Grand Bayou.

The site environment today is that of flat brackish marsh surrounding the bayou. However, the bayou channel flows over an older, subsided natural levee. Materials from the site indicated a Coles Creek or Mississippian occupation; however, a more precise refinement of the site's time period is not possible due to the small amount of artifacts gathered.

Investigations of Watercraft in the Project Area

The importance of water to the development of the project area can not be overstated. The entire study area lies within the Gulf Coastal Plain physiographic province, an area characterized by a mixture of land and water with little or no topographic relief. This unique meeting of land and sea creates a region characterized by interactive freshwater, saltwater, and brackish water environments, rich in biological diversity. An aerial view of the region depicts a panorama of bays, lakes, rivers, creeks, bayous, and ponds punctuating the even, flat wetlands. Even the underlying soils exist as a result of large scale fluvial and

deltaic processes. To someone living outside this region, the semiaquatic landscape may seem unfamiliar, even somewhat alien. To the people inhabiting this region for thousands of years, the problems associated with navigating through this environment were of paramount importance.

Settlement patterning in the region emphasized the need for access to both good agricultural land and to the available natural resources. Habitation areas clustered along the elevated landforms such as the natural levees and relict cheniers, and the waterways typically served as the main avenues of intersettlement transportation for both indigenous tribes and later settlers. Because of the highly dynamic character of the coastal plain, new watercourses could be created or old ones could disappear in geologically short spans of time. While some distributaries may have been active for more than a millennium, most had an active life of only a few hundred years (Saucier 1994:143). Serious episodes of overbank flooding and crevasse building often created opportunities for travel to previously untapped resource areas, altering the linear spread of settlement units. Artificial waterways also played a large part in the development of the coastal plain. For more than 250 years, canal builders worked in South Louisiana, excavating transportation routes through an environment that is easily channelized (Davis 1976 as referenced in Davis 1985:150). Historically, this added another intricate web of water routes to the already numerous naturally occurring distributaries. Canals were constructed for a variety of reasons, including decreasing flood hazards, draining farmlands, transportation and commerce, fur animal trapping, logging, and as channels for petroleum pipelines (Davis 1985:150-160). One of the most significant commercial canals in the nation, the Gulf Intracoastal Waterway, also traverses the project area. In a region such as this, where watercraft may outnumber cars in some areas, there are obvious implications regarding cultural resources surveys and the inclusion of shipwreck locations and historic vessel identification.

The Archaeological Resources Protection Act of 1979 qualifies an archeological resource as "any material remains of human life which are at least 100 years of age and which are of archeological interest," including all portions of shipwrecks including, but not limited to, armaments, apparel,

tackle, and cargo (36 CFR 229). In researching an area with the potential of encountering shipwrecks or vessels, not only the vessel structure, but inherently related items also come under scrutiny. Watercraft or sunken vessels less than 100 years of age may be eligible for the National Register of Historic Places criteria for evaluation (36 CFR 60.4). The National Register criteria for evaluating significance includes objects:

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of persons significant in our past; or
- C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction: or
- D. That have yielded, or may be likely to yield, information important in prehistory or history.

With the types of vessels commonly encountered in Louisiana's coastal plain region, the two most likely criteria for significance are usually embodied in Criteria C and D. A sunken vessel eligible under Criterion C must be structurally intact; a deteriorated sunken vessel may be eligible under Criterion D if the remains of either the vessel or its contents are capable of yielding significant information (National Register Bulletin 15:87). Due to the strong relationship of man with water based economies in this region, the design and function of watercraft can and often does provide strong reflections of cultural, geographical, and economic forces.

The classification of vessels in coastal Louisiana requires the consideration of a rather unique set of regional conditions. However, the change from one style of boat to another generally has been gradual, with older craft continuing to operate for some years after new craft have been introduced (Pearson et al. 1989:69-70). Watercraft throughout this area often are multifunctional, serving in different capacities under different owners. Many original designs are formulated and constructed according to the specifications of a

particular boat owner, and modifications to original vessels are commonplace. Southern Louisiana in particular is known for its "folk boats," hand made wooden vessel forms that adhere to a long tradition of local design, fabrication, and utilization (Comeaux 1985:161). Additionally, the region has seen many historical episodes of immigration, from such diverse countries as France, China, Vietnam, Syria, Italy, Yugoslavia, Korea, and the Philippines. These families and workers brought with them ethnic boat building traditions that helped to make the local watercraft inventories more heterogeneous. Visitors to Filipino stilt communities along the coast in the late 1800s noted the odd, flat-bottomed craft with batten sails in use by the Filipino fishermen (Caron 1979). Taking into account all of this variation is a particular challenge to researchers documenting local watercraft of southern Louisiana.

Surveys of the waterways of the current project area (Flayherty and Muller 1983; Stout 1992) documented many of the vessel types characteristic of the region. In general, any boat that was abandoned or partially submerged was documented as a result of this investigation. The problem of defining a "derelict vessel" was compounded by the fact that many boat owners salvaged or refitted previously dormant boats between field visits. Stout (1992) eschewed magnetometer testing, recognizing that shallow-water drainages are usually cleared of boat wrecks immediately to keep the channels clear. Flayherty & Muller (1983) attempted magnetometer testing, but were hampered by poor local conditions. Their remote sensing investigation failed to identify any magnetic anomalies that might be indicative of shipwrecks. Visible derelict vessels were located, assessed for condition, classified by type, and many of them were photographed. The documented vessels ranged in condition from good to very poor. A brief discussion of the vessel types noted within the current project area will be given here to aid in understanding the local historical adaptation to the surrounding environment. Although numerous vessels are utilized throughout southern Louisiana, the constraints of a bayou environment (i.e., a shallow, narrow, and generally snag-filled watercourse) prohibit the use of many larger vessel types. Much of the vessel terminology in use here has acquired specialized meaning within French south Louisiana, and it

must be viewed in respect to the unique history of watercraft development throughout the region.

Among the types of small wooden "folk" craft commonly used in southern Louisiana, and subsequently observed during survey were flatboats and skiffs. Although the term "flatboat" encompasses many different flat-bottomed vessels used in the South, in southern Louisiana flatboats commonly are understood to be the small, wooden flat-bottomed boats used by fishermen. The identifying characteristics of this vessel type are: an oblong shape with a blunt bow (scow bow) and stern, a flat bottom, and vertical or slightly flared sides (Comeaux 1985:168). Flatboats evolved from the large barges that traveled down the Mississippi River, but they were downsized to meet the needs of the fishermen working in the coastal areas. Because of their flat bottoms, these boats are very stable, and ideal for moving across the shallow waters of small bayous and marshes. Many of the boats in this region have flat bottoms, including *skiffs*, *chalands*, and *bateaux*; however, the nomenclature and evolution of flatboats in the region is confusing and subject to debate.

Comeaux implies that the term "flatboat" is a larger encompassing term that includes all flat-bottomed boats throughout Louisiana. The term *chaland* is used to describe the early flatboat used in French Louisiana, paddled or poled from a standing position (Comeaux 1985:168). Spitzer (1979) also discusses the evolution of flat-bottomed boats in Louisiana, stating that the small, rectangular boat used exclusively in Lafourche, Assumption, and Terrebonne parishes is really a *chaland*, and that the term "flatboat" refers to the larger flat-bottomed boats used on the Mississippi River and the larger streams to the north (Spitzer 1979:30-31). Regardless of this technical differentiation, the term "flatboat" still is commonly understood to be these small boats used in coastal Louisiana. Flatboats in this region are utilized for fishing, crossing the bayous, transporting small cargoes, and crawfish farming. With the addition of motors, flatboats underwent some minor modifications and are commonly called *bateaux* in French Louisiana. The *bateau* has come to be recognized as a slightly different vessel type in contemporary Louisiana. Then length of the boat was increased, a rudder was added, and usually it exhibited a raised bow to accommodate the large amount of forward sheer (Comeaux

1985:170). Decking usually was added, and a small cabin structure, seated toward the aft portion of the boat, was a common modification. The *bateaux* used in southern Louisiana were more common in the Atchafalaya drainage system, and are increasingly rare today.

The *skiff* or *esquif*, has a flat bottom also, a pointed bow, and a blunt stern. Skiffs seem to comprise a large and loose class of boats that have gradually supplanted pirogues in general popularity (Robinson and Seidel 1995:15). Skiffs are an ancient type of boat, found in inland waters throughout America and Europe. In Louisiana, three variants are commonly recognized: the Lake Skiff, Mississippi Skiff, and the Creole Skiff (Comeaux 1985:166; Spitzer 1979:30). These different types show an adaptation to local environments and regional usage. The Lake Skiffs are larger and broader beamed craft, intended for carrying loads across larger bodies of water. Creole Skiffs are the smallest, and are classified as having the narrowest beam, the greatest amount of sheer and rake out of the water at the stern, and a V-shaped transom (Comeaux 1985:166). Mississippi Skiffs retain qualities intermediate between these two other forms. Skiffs have delicate lines and can be modified to fit the needs of an individual, so they are predominantly built in small boatyards by qualified boatbuilders.

The rise of commercial fishing and shrimping created the need for larger boats. Vessels evolved to extend these activities into less protected waters, requiring greater stability and the ability to handle rough water (Robinson and Seidel 1995:18). Because many of these boats were still crossing small, shallow bayous and coastal bays, they tended to utilize flat bottoms like their inland predecessors. The vessel types most prevalent in coastal Louisiana are luggers, trawlers, and "Lafitte" skiffs. The traditional inland and near-shore craft, the lugger, evolved from sailing vessels. These vessels were generally small, seldom measured more than 6.1 to 9.1 m (20 to 30 ft) in length, and got the name "lugger" from their Mediterranean influenced rigging system (Comeaux 1985:172). Later motorized versions became larger and more seaworthy, and were the preferred craft for oyster fishermen. Additionally, they exhibited a more V-shaped bottom, and greater freeboard. Although sometimes fitted for

shrimping, these are still the predominant vessels used in commercial oyster harvesting.

Trawlers generally are associated with the fishing and shrimping industries in coastal Louisiana. Prior to the introduction of motorized shrimp boats, fishermen would sail out to shallow ocean bays in a "canot," a small sailing and fishing vessel. Large nets called seines were set out by men in rowboats, who also collected the net back to the main boat, where the shrimp haul was pulled in (Butler 1985:165). A vessel type adequate for the incipient local shrimping industry was introduced from outside Louisiana, and it was commonly known as the "South Atlantic trawler." This large, deep draft vessel form soon was integrated into the inventory of Louisiana watercraft; it can be constructed of either wood or steel. Trawler variants have acquired new names that signify the depth of water they commonly are used in. "Florida-type shrimp trawlers" denote the larger, open water trawlers, and "shrimp trawler" is the name given to boats used in bay and near-shore shrimping (Comeaux 1985:172).

The "Lafitte" skiff developed from the Mississippi Skiffs that were brought down to shallow coastal waters and used in early shrimping activities. They are flat-bottomed boats, like the other skiffs, and have large engines attached to them. The powerful inboard engines normally attached to these boats make them relatively quick in open water. The "Lafitte" skiffs also have a more complex hull than inland flatboats, with a relatively high bow that is not sharply raked, and sheer that often is topped with washboards (covering boards) and coamings. The washboards usually are extended aft in a fantail or pronounced counter, which may help to protect the rudder and provide additional deck space aft (Robinson and Seidel 1995:19).

The last vessel type observed along Bayou Grand Caillou was the tug or tow boat. Tugs are larger motorized boats used to push loads or other boats that are unable to move under their own power. Tug or tow boats are ubiquitous in areas where larger ships are trafficking. In the coastal region, tugs have been used as fishing boats quite frequently. The survey of Bayou Grand Caillou documented some older wooden framed tugs, which are becoming increasingly rare.

Among the boats documented within the current project area, only one was assessed as potentially significant (16TR152; BGC No. 53). This vessel was characterized as an oyster lugger with a round stern. The poor condition of the boat and lack of records prevented much useful information being gathered about the boat. Most of the boats were found not to constitute any prime examples of regional boat types, although the wooden "folk" boats noted may at some point become significant due to their diminished construction and use throughout the region (Stout 1992:23).

Previous Architectural Investigations

The project area includes one property, the Montegut School, that is listed on the National Register of Historic Places. Built in 1912 and facing Bayou Terrebonne and Louisiana Highway 55 in the community of Montegut, the school is a two-story frame structure constructed in a local vernacular style. The structure originally was nominated to the National Register as "a symbol of the 'coming of age' of education in lower Terrebonne Parish," as it represents the period early in the present century when public education began to become widely available in the area.

In addition to the Montegut School, standing structures were identified in the files of the Louisiana Division of Historic Preservation within 500 m (1,640 ft) of the currently proposed levee alignment corridors (Table 8); each of these buildings is located in Terrebonne Parish. Of the 59 structures, 6 fall within the boundaries of the project area as currently defined (Tables 9 and 10). Residential structures comprise 56 of the 59 structures, while the remaining three are commercial establishments.

Only 8 of the 59 structures date from the nineteenth century, while 40 date from 1900 to 1920. Finally, seven structures were built between 1900 and 1945, while the construction date of the remaining building is not known. A majority of the buildings were recorded by Paul Leslie in the early 1980s. None of the 59 structures has been evaluated applying the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]). Additional investigation of each structure may be required to assess how the current project corridor may impact either directly or indirectly these previously recorded standing structures.

Table 8. Standing Structures located within 500 m (1,640 ft) of the currently proposed project area.

STANDING STRUCTURE NO.	ADDRESS	TYPE	DATE RANGE
55-0804	Rt. 1, Box 327, Houma	Residence	ca. 1910
55-0805	Rt. 1, Box 327, Houma	Residence	ca. 1855
55-0883	Rt. 1, Box 485, Houma	Residence	ca. 1925
55-0888	Box 58A, Bayou DuLarge, Houma	Residence	ca. 1900
55-0889	Box 65, Bayou DuLarge, Houma	Residence	ca. 1880
55-0916	Box 33, Theriot	Residence	ca. 1915
55-0917	Box 35, Theriot	Residence	ca. 1880
55-0918	Box 37, Theriot	Residence	ca. 1890/1900
55-0919	Box 43A, Theriot	Residence	ca. 1900
55-0920	Box 56, Theriot	Residence	ca. 1930
55-0921	Box 56, Theriot	Residence	ca. 1930
55-0922	Box 116, Theriot	Residence	ca. 1900
55-0923	Box 47 Theriot	Residence	ca. 1920
55-0924	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0925	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0926	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0927	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0928	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0929	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0930	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0931a	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0931b	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0931c	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0932	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0933	Rt. 6, Box 10, Houma	Residence	ca. 1900

Table 8, continued

STANDING STRUCTURE NO.	ADDRESS	TYPE	DATE RANGE
55-0934 - 55-0936	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0937	Rt. 6, Box 10, Houma	Residence	ca. 1900
55-0938	Rt. 6, Box 12, Houma	Residence	ca. 1895
55-0939	Rt. 6, Box 266, Houma	Residence	ca. 1880
55-0940	Rt. 6, Houma	Residence	ca. 1912
55-0941	Rt. 6, Box 617, Hwy. 3011, Houma	Residence	ca. 1915
55-0942	Rt. 4, Box 380, Houma	Residence	ca. 1926
55-0943	Rt. 6, Box 918a, Houma	Residence	ca. 1910
55-0944	P.O. Box 60A, Dulac Post Office	Residence	ca. 1912
55-0945	General Delivery, Dulac	Residence	ca. 1920
55-0962	Star Rt., Box 360, Chauvin	Residence	1914
55-0963	Star Rt., Box 526, Chauvin	Commercial	1914
55-0993	Rt. 3, Box 800, Montegut	Residence	ca. 1900
55-0994	Rt. 7, Box 816, Montegut	Residence	ca. 1900
55-0995	Rt. 3, Box 800, Montegut	Residence	ca. 1900
55-0996	Rt. 3, Box 802, Montegut	Residence	ca. 1925
55-0997	Rt. 3, Box 803, Montegut	Residence	ca. 1925
55-0998	Rt. 3, Box 804, Montegut	Residence	1900
55-0999	Rt. 3, Box 814 (or Box 807), Montegut	Residence	1920
55-1000	Rt. 3, Box 808, Montegut	Residence	ca. 1909
55-1001	Rt. 3, Box 812, Montegut	Residence	ca. 1900
55-1002	Rt. 3, Box 814, Montegut	Residence	1920
55-1003	Montegut	Residence	1915
55-1004	Box 602, Montegut	Residence	1915
55-1005	Box 602, Montegut	Residence	1915
55-1006	Standing structure form missing from state files		
55-1007	c/o David Croche, Montegut	Residence	ca. 1870
55-1008	Box 591, Hwy. 55, Montegut	Residence	ca. 1870
55-1009	Rt. 1, Box 185, Montegut	Residence	ca. 1920
55-1010	Rt. 1, Box 220, Montegut	Residence	ca. 1910
55-1011	Rt. 1, Box 239, Montegut	Residence	1830
55-1012	Rt. 1, Box 280, Montegut	Residence	ca. 1910
55-1013	Rt. 1, Box 280, Montegut	Commercial	ca. 1892
55-1016	Hwy 665	Commercial	1938

Table 9. Standing Structures located within the Proposed Highway 57 Levee Alignment.

STANDING STRUCTURE NO.	ADDRESS	TYPE	DATE RANGE
55-0962	Star Rt., Box 360, Chauvin	Residence	1914
55-0963	Star Rt., Box 526, Chauvin	Commercial	1914
55-1010	Rt. 1, Box 220, Montegut	Residence	ca. 1910
55-1012	Rt. 1, Box 280, Montegut	Residence	ca. 1910
55-1013	Rt. 1, Box 280, Montegut	Commercial	ca. 1892

Table 10. Standing Structures located within the Proposed Recon 500 Levee Alignment.

STANDING STRUCTURE NO.	ADDRESS	TYPE	DATE RANGE
55-1010	Rt. 1, Box 220, Montegut	Residence	ca. 1910
55-1011	Rt. 1, Box 239, Montegut	Residence	1830
55-1012	Rt. 1, Box 280, Montegut	Residence	ca. 1910
55-1013	Rt. 1, Box 280, Montegut	Commercial	ca. 1892

CHAPTER VII

PREDICTIVE MODELS OF ARCHEOLOGICAL SITE LOCATION AND MANAGEMENT RECOMMENDATIONS

Introduction

This chapter is divided into two parts. The first discusses several of the many methods of predicting archeological site distributions, and considers their application to the Morganza to the Gulf project area. As a necessary preliminary, the settlement patterns of the project are discussed, and a number of pertinent observations about them are made. The second part of the chapter presents a series of recommendations for management or treatment of the cultural resources of the project area. Some of the recommendations are based on quantitative results drawn from the predictive model, while others are inferences drawn from diverse observations and data. The recommendations include suggestions for further testing and investigation of the Area of Potential Effect of the project.

Development of Predictive Model of Archeological Site Distribution

The utility and importance of predictive modeling have long been recognized in cultural resource management (e.g., Coastal Environments, Inc. 1977; Gunn 1979; King 1978; Schiffer and House 1975, 1977). Concern with true prediction is rare in archeology, however, most likely because the complexity of archeological problems is such that the successful prediction of non-trivial phenomena is exceedingly unusual. Consequently, academic interest in predictive models of archeological site location has been limited, although not absent (e.g., Green 1973). In contrast, cultural resource management concern

with effective predictive modeling has been lively and intense because of the practical, statutory need to identify and inventory archeological sites. Predictive modeling has appeared to promise both utility and cost-effectiveness to planners and managers of public lands, whose funds never approach the theoretical limits of their legal mandates.

A wide variety of different kinds of predictive models have been employed by archeologists. A lengthy review of the predictive modeling literature (Kohler and Parker 1986:399-400) divides models into two main types: empiric correlative and deductive. *Empiric correlative models* seek to identify correlations between past human settlement patterns and environmental variables. They commonly apply techniques of probabilistic sample survey to acquire an initial data set to examine for correlations. Sometimes the existence of certain correlations is simply assumed based on theoretical considerations. Subsequently, the probability or density of archeological loci is predicted through a statistical process of regression or other method of extrapolation (e.g., Anderson et al. 1988; Davis 1990; Futato 1989; Kvamme 1985; Parker 1985). Empiric correlative models predominate in cultural resource management. *Deductive models* are much rarer. They attempt to deduce the locations of archeological sites from principles of human behavior (Kohler and Parker 1986:432-440). Such models tend to focus on the principles and psychology of decision-making (Gunn 1979; Limp and Carr 1985; Reynolds and Zeigler 1979; Schiffer 1979).

It also should be observed that all models, but especially empiric correlative ones, will only be as good as the data input into them. Take, for example, a hypothetical model based on correlations between settlement, hydrology, relief, and vegetation. If the spatial resolution of the independent variables is poor, then resolution of the predictions will be the same. If the environmental data are modern, they may be irrelevant to ancient settlement patterns; any correlations that were discovered could be spurious and even misleading. This particular problem is acute in the Morganza project area; because of the dynamism of the deltaic processes in the region, reconstructing detailed environmental data for any period in prehistory is impossible. For instance, trying to develop predictor variables like "distance to water" – a commonplace observation in the uplands – is almost meaningless where deltaic progradation, subsidence, and transgression are continual processes; it is barely an exaggeration to suggest that the value of such a variable changes with every winter storm. Similarly and for the same reasons, examining floral suites would not contribute in a meaningful way to an effective model in the Morganza to the Gulf project area.

The review of the literature conducted for the present study suggests one outstanding observation. There does not appear to be any correlation between the complexity or sophistication of the quantitative aspect of the model and its success at predicting archeological site location. "Methodological finesse appears misplaced in a field with so many unresolved basic issues . . ." (Kohler and Parker 1986:399). How would one operationalize the ultimate refinement of multivariate logistic regression (Parker 1985) in an area where it is impossible to observe the independent variables? If the goal of the model is to predict probabilities of site occurrence (as opposed to site locations, for instance), there is no reason to believe that mathematically simple extrapolation of site densities from known areas to unknown areas is less precise or accurate (e.g., Futato 1989) than more complex methods. It is important to recognize that predictive modeling is not an end in itself, but rather part of a dynamic feedback process wherein additional data can be used to continually refine initial approximations.

In spite of their differences, virtually all models share at least one characteristic: a preoc-

cupation with human settlement patterns. This is natural because all such models are essentially attempts to extrapolate settlement patterns to unknown areas by examining the relation between known settlement patterns and a second variable, usually some aspect of the landscape. Archeologists recognize that human locational behavior is patterned, and they have attempted to identify those patterns to be able to specify more fully their models. Therefore, most predictive models rely upon the specification of the relevant settlement patterns and/or the principles underlying the patterns.

Settlement Patterns

The effective study of ancient settlement patterns in Americanist archeology began in the 1940s and 1950s, as an outgrowth of the cultural ecological paradigm of anthropologists such as Julian Steward (Willey 1953:XVIII-XIX; Willey and Sabloff 1980:146). The two early leaders in this field were Gordon Willey and Robert McCormick Adams. Willey, as Bowditch Professor at Harvard University, exerted enormous influence on Maya archeology, drawing it toward settlement pattern studies (Willey et al. 1965). Adams had a similar effect on Near Eastern archeology because of his baseline studies of settlement patterns in the alluvial valleys of Mesopotamia (Adams 1965, 1981; Adams and Nissen 1972). For many years a professor at the University of Chicago, and later Secretary of the Smithsonian Institution, Adams wielded no less influence than Willey. The result of their work and their colleagues' was the recognition that ancient settlement patterns reflected the dynamics of extinct social systems and the interaction of those systems with their natural environment. In the succeeding decades, settlement pattern studies have become ubiquitous in archeology.

The historic and prehistoric settlement patterns of the Morganza to the Gulf Feasibility Study project area were determined largely by the dynamic geomorphology of that region of the deltaic plain. The constraints placed upon the location of human settlement in this area were – and remain – extreme, much more so than in typical upland environments (Beavers 1982:101). The overarching consideration affecting all settlement has been the presence or absence of, and the pattern of, dry land available for habitation

and other activities. As was explained in Chapter II, the pattern of habitable land, in turn, was determined largely by the location and extent of natural levees associated with Mississippi River distributaries of different ages. The principal problem to be solved by modeling settlement in this region is to determine how settlement, subsistence, and other activities were patterned within these highly complex and anisotropic landforms.

Several sets of relevant data are available to help address this question. First, there are data on prehistoric and historic archeological sites known within the project area and its immediate vicinity. These data were presented in Chapter V of this report. Data also are available on archeological site occurrence and location in three adjacent or nearby regions: Bayou Barataria (Beavers 1982; Franks and Yakubik 1990; Gagliano et al. 1979; Speaker et al. 1986), southwest Louisiana (Gibson 1975a, 1975b, 1978), and the Terrebonne Marsh (Smith, Dunbar, and Britsch 1986, Weinstein and Kelley 1992). These studies and the data they contain permit some predictions about archeological site locations.

In the Barataria region, Gagliano et al. (1979: 5-1 - 5-2) were able to summarize the settlement patterns as follows:

Sites generally occur in complexes, with the larger and apparently more intensively occupied places situated on the natural levees of major distributaries, usually at their juncture with a smaller distributary. The smaller distributaries provided access to active subdelta and backswamp areas where more ephemeral and specialized hunting, fishing, and harvesting camps were located.... Given the relatively small size of the area and the easy transportation access afforded by the distributaries, it is likely that each of these complexes was interrelated. Through most of their history they probably functioned as an extended linear village. Ethnographic data lends support to this type of model.

The key observations in this passage, which recur throughout the region and the literature, are the presence of major sites at the confluences of distributaries, and the linearity of settlement along the natural levees of the bayous. Beavers (1982:103-104) documented a similar pattern in the Barataria Basin with additional data:

Even at this imperfect stage of understanding, the basic linear model can be enlarged to include: elevated ground to live on, plus exploitative and communicative strategy. Residential complexes in the basin tend to focus at the confluences of tributary/distributary streams and trunk channels. At these points, the factors dictating residential locations are satisfied. Confluences tend, by their very nature, to be concentrated areas of elevated ground, as the converging levee ridge systems merge and overlap. Confluence situations, especially on streams with low flow gradients, are loci of biomass concentrations (Odum 1971). This strategic location of residential sites can be seen at every confluence in the upper part of the basin.

Beavers (1982:105-122) was also able to discuss two additional patterns that had eluded his predecessors. First, he identified small, special activity, resource extraction or exploitation sites in the vicinity of larger residential sites, but usually located differentially in the backswamps or at the distal extremes of levee systems, i.e., where special resources were located. This pattern was a consequence of the distribution of resources: different ecozones were parallel to the bayou levee systems. Since the ecozones tended to be long and linear, the efficient exploitation strategy involved crossing the landscape perpendicular to the levees. Thus, he was able to identify sites of different apparent functions and to show that they were distributed differently than residential sites. Second, he identified a simple, regional socioeconomic or political hierarchy of sites. The central places (redistribution, information-processing sites) were represented by the mound sites usually found at major stream confluences. The central places were surrounded by and related to constellations of smaller satellite sites. In sum, Beavers really introduced the concept of the settlement system into the discussion of Barataria Basin prehistory.

Additional cultural resource survey and inventory yielded a yet larger and more complete sample of archeological site locations in the Barataria Basin (Speaker et al. 1986). Analysis of these data led to the conclusion that "most of the sites are located in bottomland hardwood forests and forested swamps near linear waterways, except those that are near Lake Salvador" (ibid.: 86). This observation prompted the following model of archeological site occurrence:

Zones of high sensitivity are within one-quarter mile of Lake Salvador's beach line. Zones of medium sensitivity are between one-quarter to one-half mile from a linear waterway and the beach line of Lake Salvador in the forested swamp areas. Low sensitivity zones are those in the intermediate swamp and brackish swamp (ibid.).

Speaker et al. (citing Holmes 1984) also raised the possibility that historic settlement patterns for the area might be predicted on the same basis as prehistoric ones, largely because of the continuities between prehistoric and historic adaptations to the remarkable environment of the delta. These broad continuities are confirmed by other studies of the area, including one in the upper Lafourche delta (Beavers et al. 1984:132-135).

One last study analyzed the settlement patterns of the Barataria region (Franks and Yakubik 1990: 100-105). The authors examined the settlement pattern at the confluence of Bayou Coquilles and Bayou Des Familles. An almost continuous distribution of shell middens occurs in this area. Their analysis suggested that the largest sites actually occurred along Bayou Coquilles, the smaller of the two distributaries. Nevertheless, the very largest sites were those at the confluence of the two streams. The interpretation of this pattern is complicated, however, because the sites date from several different periods, the Marksville through Mississippian periods. The pattern, therefore, is partly the result of a palimpsest of small, ephemeral occupations that accumulated to create the appearance of large continuous occupations.

There are some identifiable differences between the geomorphology of the Barataria Basin and the present project area. First, the Barataria area is older than the Lafourche delta complex; the Barataria subdelta has a longer history of settlement than most of the Morganza project area. Second, Bayou Des Familles - Barataria is one of the most sinuous distributaries in the deltaic plain. Most of the distributaries in the deltaic plain are of low sinuosity. The major exceptions are Bayou Des Familles - Barataria; the old Teche trunk channel, comprised of Bayous Teche and Black; the uppermost portion of Bayou Lafourche, between Donaldsonville and Napoleonville; and the present Mississippi trunk channel. Thus, the high sinuosity of Bayou Des Familles - Barataria,

which likely affected the settlement pattern along it, is anomalous in the context of the delta. Thus, the settlement pattern of the Barataria Basin cannot be extrapolated wholesale to the Lafourche - Terrebonne region. Nevertheless, the underlying principles that apparently created the settlement pattern would seem to be applicable to the present project area. These principles include:

- 1) settlement is by necessity concentrated along the natural levees of the bayous, giving rise to linear patterns where site density is high;
- 2) there is a disproportionate tendency for sites to occur at confluences of distributaries, especially large and important sites, presumably because of the unusual concentration of high ground, the easy access to different environments, and ease of transport and communication;
- 3) sites can be differentiated according to their functions and sites of different functions sometimes exhibit different spatial distributions:
 - 3a) specialized resource extraction sites tend to be located on the distal portions of distributaries, either the distal flanks or the distal extremities;
 - 3b) specialized administrative - religious - political centers (read *mounds*) tend to be located at favorable stream confluences;
- 4) to the degree that the societies in question exhibited stratification, there may be a vertical hierarchy of settlements as well as horizontal, functional differentiation of them.

Gibson, working in southwest and south central Louisiana, has documented settlement patterns that are similar to those described above; his contribution, however, has been distinctively quantitative and, naturally, reflects as well the unique environments in which he has surveyed (Gibson 1975a, 1975b, 1978). For example, in one study of the Mermentau River drainage, Gibson (1975b) examined the degree of association between sites and vegetative communities and between sites and their bankline positions along streams. In both cases, the association between site locations and the second variable were not random (ibid.:81-92). Although low expected values in some of the contingency tables raise questions about the validity of some of the statis-

tics (e.g., *ibid.*: Table 31), the principal conclusions – that sites were differentially associated with certain plant communities and specific stream positions (i.e., cutbank and reach) – remain unassailable. Gibson (1975a) was able to draw very similar conclusions from a similar data set collected along the Vermilion River. In this case, however, he also statistically evaluated the association between sites and stream confluences and identified a statistically significant preference for settlement at junctions (*ibid.*:87).

In a third study, Gibson (1978:230-231) not only reaffirmed his earlier conclusions with a new data set, but also tested a new hypothesis: that settlement would be concentrated at the marsh - swamp ecotone in the project area, which lay in the lower Atchafalaya basin. Although he found a disproportionate frequency of sites in proximity to the ecotone, his conclusion was weakened by the fact that the ecotone must have shifted inland or seaward with every variation in discharge from the Atchafalaya River. Since the competence of the Atchafalaya has fluctuated greatly in recent and historic times, it is clear that the number of prehistoric sites at the modern ecotone is probably an accidental or artificial statistic.

A more important conclusion of the same report was that the density of prehistoric archeological sites on the natural levees of the project area was 36.1 sites/km². This figure, of course, merely raises the question of the mean size of the sites. If the average size of the sites were large (i.e., 2.5 - 3.0 ha [6.2 – 7.4 ac]), it would imply continuous horizontal occupation of the natural levee system. If sites were small on average, then their distribution might nearly be sporadic. The statistic is nonetheless important for modeling settlement in similar regions. Prehistoric site densities for marsh and swamp were found to be 0.12 sites/km² and 0.48 sites/km², respectively (Gibson 1978:229-230, 261). Moreover, it is not clear whether any of the recorded sites truly lie in interdistributary wetlands or whether, as seems more likely, they rest upon subsided natural levees or some other type of geomorphic structure (cf., Weinstein and Kelley 1992:366-367). Nevertheless, it is important to realize that virtually no spot in the marsh or swamp can be *a priori* eliminated from consideration as a possible site location. It is almost impossible to accurately and precisely map all geomorphic features in a project

area using only extant maps and aerial photographs. Therefore, it is impossible to be certain that all subsided levees and similar features have been identified. Thus, for purposes of prediction, the probability of site occurrence in any particular spot will never reach zero, even though it may approach zero.

Two other studies from the Atchafalaya basin provide data that are indispensable to the development of a predictive model in the area. Both investigations were developed by the U.S. Army Corps of Engineers, New Orleans District, as part of a larger strategy of cultural resource management in the Atchafalaya basin. Smith, Dunbar, and Britsch (1986) produced a landscape classification and geomorphic mapping of the Atchafalaya basin, delta, and the Terrebonne marsh. They then examined the distribution of known archeological sites in relation to the geomorphic features they had mapped, taking into account the ages of the landforms and their histories. In this way, they demonstrated the utility of performing a geomorphic study prior to cultural resources survey, because so many sites occur on relict natural levees that have subsided or otherwise have become obscured.

Weinstein and Kelley's work in the Terrebonne marsh (1992:75) geographically overlapped and to some degree relied upon that by Smith et al. (1986). Weinstein and Kelley's complex project included a variety of survey and inventory components; of particular concern here is their probabilistic sample survey of part of the marsh, including the natural levees of Bayou du Large. Bayou du Large was the easternmost extreme of the Terrebonne marsh study; it also forms the western edge of the Morganza to the Gulf project area. Part of their probabilistic survey also took place within or near the Morganza project area, along the natural levees of Bayou Black (Weinstein and Kelley 1992:Plate 3). Their probabilistic sample survey consisted of 607.05 ha (1,500 ac) of low probability terrain investigated by means of canal bankline survey (*ibid.*:74-75). Survey of these low probability segments encountered no archeological sites (*ibid.*:159). An additional 303.53 ha (750 ac) of high probability terrain was surveyed by canal bankline survey (*ibid.*:74-75); during this portion of the survey two archeological sites were encountered (*ibid.*:159). Finally, another 303.53 ha

(750 ac) of high probability terrain were surveyed using pedestrian survey augmented by systematic shovel testing at 45.72 m (150 ft) intervals along transects spaced 15.24 m (50 ft) apart. This high probability terrain consisted of 300.17 ha (741.7 ac) of natural levee and 3.36 ha (8.3 ac) of relict beach ridge (*ibid.*: 74-75, 159, 366-368). Survey of the terrestrial portion of the sample registered 16 sites, 5 on the beach ridges and 11 on the natural levees (*ibid.*:366-367). Considering that no relict beach ridges have been identified in the Morganza project area, the most relevant statistic is that 11 sites were encountered in an area measuring 300.17 ha (741.7 ac). This yields a site density of 0.037 sites/ha (0.0148 sites/ac). It will be noted that the 303.53 ha (750 ac) high probability area surveyed by boat through bankline survey was not considered in this estimate of site density. The two sites discovered in that portion of the survey were found rather by coincidence; canal bankline survey is demonstrably and notoriously ineffective in this region (*ibid.*:160), and therefore it would not be productive to commingle those data: doing so would only result in an artificial and unjustifiable lowering of the apparent density of sites.

The enormous difference in site density estimates between Gibson (1978) and Weinstein and Kelley (1992) requires comment. Converted into the same units of measurement, the former reported 0.361 sites/ha while the latter projected 0.037 sites/ha. Given the methods of both projects (and archeology in general), no great precision or accuracy of measurement is to be expected, but a difference of an order of magnitude is disillusioning. There are at least two reasons to prefer the more recent estimate of Weinstein and Kelley (1992):

- 1) the underlying geomorphic data available to Weinstein and Kelley were much more complete and reliable than those available to Gibson;
- 2) Weinstein and Kelley's survey transects were randomly and independently selected, suggesting that, for statistical purposes, they are probably much more representative of the local environment; and
- 3) the area surveyed by Weinstein and Kelley (1992) was closer to, more similar to, and in fact, geographically overlapped, the Mor-

ganza to the Gulf project area, whereas Gibson's project area was further west.

Turning to the fourth and last data set applicable to the predictive model, we can consider those sites and data available from the project area itself and the immediately vicinity. These sites, and the research relative to them, were described in Chapter VI, "Previous Investigations." Most of the data on prehistoric settlement available to us today were collected or compiled by McIntire (1954, 1958). He mapped sites by chronological period in order to investigate and document the geomorphic history of the shifting delta lobes, which was his primary goal. He also mapped sites by type or function to examine settlement patterns (e.g., McIntire 1958: Plate 2). McIntire divided sites into five different types (*ibid.*: 8-18): earth mounds, shell mounds, shell middens, black-earth middens, and beach deposits. This typology is not based on clear principles: a beach deposit, for example, probably should be considered as some kind of taphonomic category, while an earth mound is an architectural form that is usually presumed to carry certain sociological implications. Similarly, it is not entirely clear whether shell mounds are architectural forms or merely large shell middens that have been heaped up to a considerable height. It also is noteworthy that McIntire discovered few earth middens, or at least few sites are so classified on his maps (*ibid.*:Plate 2). Earth middens are unlikely to be discovered except through subsurface testing; consequently, it is almost certain that such sites are dramatically underrepresented in McIntire's work. Non-shell middens probably continue to be underrepresented in the site inventory of the area, if only because little systematic shovel testing has been performed in the vicinity.

Despite these obvious drawbacks, McIntire's typology actually revealed some geographic patterning when mapped. The differential distribution of site types in the Lafourche delta area is quite obvious in McIntire's monograph (*ibid.*:Plate 2): there are massive concentrations of shell middens at the distal extremities of distributaries, especially Bayous du Large and Petit Caillou. Other concentrations of shell middens occur to the west of the current project area in the Terrebonne marsh. In contrast, most of the earth mounds occur deeper in the interior of the dis-

tributary system. The earth mounds occur in two places: one group appears to fall about halfway between the coast and Houma; many of these fall in the vicinity of the Morganza project area. Although it is difficult to match up some of the sites on McIntire's map with the current state site numbers, these mounds sites appear to include 16TR19 (Marmande Plantation), 16TR6 (Dulac), 16TR7 (Indian Mound), 16TR37 (Ellesly Plantation), 16TR38 (Indian Mound -Grand Caillou), 16TR33 (Pointe au Chien #2), and 16TR34 (Pointe au Chien #3), all of which fall within 500 m (1640.4 ft) of the Morganza project area. The second group of mound sites falls in the vicinity of Houma, all north of the project area, where several of the Lafourche distributaries are entangled with Bayous Black, Little Black, and Blue.

It is interesting to note that, in terms of regional settlement patterns, large "temple" mounds are unusually common in the project area. Phillips (1970: 967) was apparently the first to make this observation:

The outstanding locality for rectangular mounds in the Delta is on the distributaries of the Lafourche - Mississippi, in quadrangles 35-N and 35-O [essentially the project area]. Of four sites with large and therefore unmistakable, platform mounds reported by McIntire, only two, Ellesley (35-N-3 [16TR37]) and Pointe au Chien (35-O-1), had sufficient pottery samples for dating. Both are definitely post-Coles Creek.

Certainly, there are more than four such sites in the vicinity of the project area. It is equally certain that this pattern is late, probably Mississippian period in date.

The pattern of mound sites in the interior, where the waterways meet, and the shell middens at the distal ends of the distributaries, could be retrodicted by settlement pattern theory. Mound sites commonly are thought of as centers of communication, administration, political and religious power, and possibly as nodes in systems of exchange and redistribution (e.g., Anderson 1990; Bense 1994:191-195; Blitz 1993:69-74). It is reasonable to expect that they would occur at junctions in communication and transportation networks and, during later periods such as Coles Creek and Plaquemine, in areas with more extensive arable lands. Such areas occur in the vicinity of the project where multiple distributaries ap-

proach each other and their natural levees merge. The most dramatic example of this phenomenon in the immediate area is around the town of Houma; a number of distributaries of different ages meet and merge there, forming a rather extensive tract of elevated terrain. Smaller but still unusually large expanses of natural levee occur at almost every confluence of distributaries or sometimes at natural land bridges between distributaries formed by crevasse natural levees. One of the largest of these in the project area is at the intersection of Bayou du Large and Marmande Ridge, where an unusually broad expanse of alluvium developed as result of the superposition of a Lafourche distributary over a Teche age one. At that confluence, one of the largest mound sites in the region occurs, 16TR19, the Marmande Plantation site (Figure 16). A similar situation occurs at Site 16TR37, the Ellsley Plantation Site, which lies near the confluence of three distributaries, one of which is now subsided. Although it seems unlikely that mound sites of any magnitude remain undiscovered in the project area, it is nonetheless possible that large and important earth midden sites, which at least today lack mounds, lie buried or unnoticed in the project corridor. Thus, it is reasonable to predict that such sites are disproportionately likely to occur at the confluences of distributaries or at land bridges between distributaries. A total of 25 such high probability areas, identified by the project geomorphologist and marked by circles of 1 km (0.62 mi) radius, are depicted on the project area maps (Attachment I). The likelihood that archeological sites exist on the natural levees within those circles would appear to be higher than the probability that they exist on a natural levee outside of those circles. There are no empirical data, however, that can be used to quantify that difference in probability.

A similar situation can be predicted for the historic period; the same areas at confluences of distributaries would have been particularly attractive loci of settlement, with an abundance of arable land and easy communication and transportation. As noted above, there is some evidence from adjacent regions that historic and prehistoric settlement patterns are similar, in part because of the similarity of the adaptations in the two periods, which in turn is partly conditioned by the rich and dynamic environment of the area. In

some places it is obvious that historic settlement was concentrated in the areas that would be predicted for prehistoric settlement, as well. For example, there are concentrations of historic settlement at the modern town of Theriot and north of it in the area of Marmande Plantation. These also are very high probability areas for prehistoric settlement.

Predictions of Site Occurrence

Taking all of the foregoing into account, the following predictive statements can be made about archeological site distributions:

- 1) Past settlement was almost entirely confined to natural levee deposits, with the possible exception of historic shipwrecks that will occur in distributary channel deposits; therefore, archeological sites will occur in the same areas, regardless of whether the geomorphic structures are presently subsided. It is vital to recognize, however, that not all geomorphic features can be identified based on the presently available data. For example, presently unsuspected distributary natural levees could be discovered by subsurface testing.
- 2) Sites of all periods will occur preferentially at distributary confluences and crevasse land bridges, as marked by circles on the accompanying maps (Attachment I).
- 3) Site types will be distributed differentially, with central places like mounds and plantations occurring preferentially at distributary confluences, and with resource procurement sites occurring preferentially on the distal flanks and extremities of distributaries. In fact, mounds will be heavily over-represented in the project area, because it does not include the corresponding distal portion of the distributary system.
- 4) Earth middens are the most common type of site that remains to be identified in the project area. Without doubt, the inventory of extant sites is much more complete for shell middens and mounds of all kinds than for earth middens. Earth middens are probably common but very poorly recognized in the project area.
- 5) Overall site density on natural levees in the project area can be estimated at 0.037 sites/ha (0.0148 sites/ac). It could be argued that densities of sites should be higher on the older as compared to the younger landforms in the project area, simply because of the additional time available for habitation or other activities. In fact, no evidence in favor of this hypothesis can be adduced; the available data are equivocal. Some older landforms (i.e., the Bayou Des Familles - Barataria system) appear to have very high sites densities, but some other old landforms - like Bayou Black in the vicinity of the project area - exhibit no evidence of unusually high site densities. Moreover, those portions of the project area that are appreciably older than the young Lafourche complex landforms are rather limited in extent. Thus, this lack of discrimination is unlikely to effect the overall outcome of any prediction, especially given the overall crudeness of the available methods. It has been argued, above, that site density will be higher within the high probability circles shown on the project maps than outside them; although this is very likely to be true, there is no logically consistent basis for estimating the difference in density. A total of 1,568 (3,875 ac) of natural levee deposits are found within the proposed Highway 57 levee alignment, while 914 ha (2,258 ac) of natural levee deposits are found within the Recon 55 levee alignment (Table 11). Consequently, assuming a site density on the natural levees of 0.037 sites/ha, a total of 58 sites can be predicted to occur on the natural levees within the Highway 57 levee alignment and 34 sites can be expected to occur in the Recon 500 levee alignment. Such figures suggest a completely spurious level of precision, however, because the variability inherent in all human behavior, including settlement patterns, certainly reduces the confidence level of this prediction.
- 6) Site density in interdistributary wetlands, although very low, will be greater than zero.
- 7) Shipwrecks and derelict vessels appear to be common in the larger distributary channels, although there may be difficulties in determining whether a vessel is abandoned or merely decommissioned.
- 8) Historic plantations will exhibit the nodal block and bayou block settlement patterns described by Rehder (1978), with the latter predominating; plantations will occur preferentially where there are unusual expanses of arable land.

Table 11. Areas of different landforms within the Morganza to the Gulf project area.

LANDFORM	AREA (HA)	
	HIGHWAY 57	RECON 500
DNL _C	4	4
DNL	286	135
DNL _D	579	372
DCH	82	22
DNL _S	507	331
CNL	25	10
CNL _D	89	40
CNL _S	78	22
IW	747	468

Cultural Resource Management Recommendations

Area of Potential Effect

One of the first steps in taking into account the effects of any federal undertaking on cultural resources is to define the "Area of Potential Effect" (APE). In this case, it may be premature to attempt to anticipate all the effects of so large a project as the planned levee alignment corridors. Nevertheless, a fuller and more detailed determination of the APE may be necessary before planning for the Morganza to the Gulf Project is complete. At present, it is not clear whether the project area as delineated includes only the proposed levees, or the levees and their corresponding borrow pits, or an area defined by some other set of criteria. Because the engineering of the levee system remains unclear, it also is not possible to predict the effects on the hydrology of the area. By altering the hydrology of the area, the Corps of Engineers could cause an effect to all the sites within the proposed ring levees. Potentially more significant, altering the hydrological regime could cause changes in vegetation or coastal erosion outside the levee system, either of which could in theory contribute to the deterioration of sites at a considerable distance from the project area (Garrett 1983, Louisiana Wetland Protection Panel 1985). These considerations notwithstanding, for present purposes, the APE of the project will be assumed to be the project area delineated on the project maps (Attachment I).

Archeological Sites, Standing Structures, and Cemeteries in the Project Area

As presently defined, 24 archeological sites (16TR19, 16TR3, 16TR71, 16TR33, 16TR239, 16TR240, 16TR241, 16TR242, 16TR243, 16TR244, 16TR247, 16TR248, 16TR249, 16TR250, 16TR255, 16TR251, 16TR253, 16TR254, 16TR22, 16TR26, 16TR33, 16TR34, 16LF108, 16LF65, and 16LF66) fall within the limits of the proposed Highway 57 levee alignment (Tables 12 and 13). Only 5 archeological sites (16TR33, 16TR34, 16LF108, 16LF66, and 16LF65), however, are positioned within the proposed Recon 500 levee alignment. Similarly, a greater number of standing structures is located within the Highway 57 levee alignment (n=6; 55-962, 55-963, 55-1010, 55-1011, 55-1012, and 55-1013) than in the Recon 500 levee alignment (n=4; 55-1010, 55-1011, 55-1012, and 55-1013). The potential effects of the currently proposed levee project on these resources should be considered prior to project implementation.

Finally, the USGS 7.5 minute series quadrangle maps for the project area depict three cemeteries within the Area of Potential Effect as presently planned. These consist of the St. John Cemetery (Houma, Louisiana quad.), the Holy Family Cemetery (Dulac, Louisiana quad.), and the cemetery associated with Sacred Heart Church in Montegut (Montegut, Louisiana quad.). Although most cemeteries are specifically excepted from nomination as historic properties under 36 CFR 60.4, they may require evaluation or other special treatment. In addition, other cemeteries, marked or unmarked, may exist within the project area and simply not be marked on the U.S.G.S. quadrangle maps. Treatment of marked and unmarked burials may be guided by Louisiana state statutes.

Archeological Testing of the Project Area

After assessing previously known or suspected historic properties in the APE, an appropriate next step would be to examine in more detail the distribution of cultural resources within the project area. One way of accomplishing this would be to collect additional data that would serve to test some of the predictive statements made in the previous section. The survey should include a random component, so-

Table 12. Sites within the proposed Highway 57 Levee Alignment.

SITE NUMBER & NAME	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR19 (The Marmande Plantation Site)	Terrebonne	Lake Theriot, La. N3262660 E717175	Earth mound and shell midden; prehistoric period ceramic sherds, faunal materials, and shell	Possible Troyville period; Coles Creek period (Bayou Cutler phase) and Plaquemine period	Significant (Altschul 1978; Weinstein and Kelley 1992)	Collins 1927; Kniffen and McIntire 1952; Altschul 1978 (22-464); Weinstein and Kelley 1992 (22-1487)
16TR03 (St. Eloie Plant)	Terrebonne	Lake Theriot, La. N3262436 E716898	Shell midden and prehistoric period ceramic sherds reported by McIntire. Altschul's description of 16TR3 is actually another locus	Plaquemine period	Significant (Altschul 1978)	Neuman 1977 (22-123); Altschul 1978 (22-464); Weinstein and Kelley 1992 (22-1487)
16TR71 Old Bridge	Terrebonne	Lake Theriot, La.	Shell midden; bones, sherds, fauna, shell, metal, historic ceramics, glass	Coles creek (?), Plaquemine-protohistoric; historic	Not eligible	Neuman 1977: 22-123 Altschul 1978: 22-464 Weinstein & Kelley 1992: 22-1487
16TR239	Terrebonne	Bayou Sauveur, La. N3248503 E710473	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR240	Terrebonne	Bayou Sauveur, La. N3248503 E710473	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR241	Terrebonne	Bayou Sauveur, La. N3248366 E710412	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR242	Terrebonne	Bayou Sauveur, La. N3248366 E710412	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR243	Terrebonne	Bayou Sauveur, La. N3248046 E710305	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR244	Terrebonne	Bayou Sauveur, La. N3247915 E710290	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR247	Terrebonne	Bayou Sauveur, La. N3247915 E710290	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR248	Terrebonne	Bayou Sauveur, La. N3247747 E710229	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR249	Terrebonne	Bayou Sauveur, La. N3247747 E710229	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR250	Terrebonne	Bayou Sauveur, La. N3247473 E710046	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR255	Terrebonne	Bayou Sauveur, La. N3246823 E709320	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR251	Terrebonne	Bayou Sauveur, La. N3247137 E709669	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR253 (Captain Scott)	Terrebonne	Bayou Sauveur, La. N3247137 E709669	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)
16TR254	Terrebonne	Bayou Sauveur, La. N3246945 E709534	Historic period shipwreck	ca. 1890 – present	Not significant	Stout 1992 (22-1597)

Table 12, continued

SITE NUMBER & NAME	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR22 (Mound Bayou)	Terrebonne	Lake Quitman, La. N3247800 E719040	Two earth mounds (one eroding into Bayou Grand Caillou); prehistoric period ceramic sherds, <i>rangia</i> shell, charcoal; possible redeposition of midden materials around site	Coles Creek – Mississippian period	Potentially significant (Saunders 1994)	McIntire 1951; Neuman 1977 (22-123); Saunders 1994
16TR26 (Bayou Sale # 1)	Terrebonne	Lake Quitman, La. N3249431 E722949	Shell midden; prehistoric period ceramic sherds and shell	Undetermined prehistoric period	Potentially significant (Altschul 1978)	Neuman 1977 (22-123); Altschul 1978 (22-464)
16TR33 Pointe au Chien #2	Terrebonne	Lake Bully Camp, La.	Earth mound; midden; sherds, faunal, shell, brick fragments	Prehistoric-unknown; historic	Significant	Neuman 1977: 22-123 Altschul 1978: 22-465
16TR34 (Pointe au Chien #3)	Terrebonne	Lake Bully Camp, La. N3255603 E74866	Three earth mounds	Prehistoric period (possible Bayou Petre phase)	Not assessed	Phillips 1970
16LF108	Lafourche	Lake Bully Camp, La. N3259980 E747800	Sherds, bone, shell	Late Coles creek-early Mississippian (Plaquemine)	Not assessed	Site form only
16LF65	Lafourche	Larose, La. N3270800 E752160	Shell midden; sherds; shell; lithics; bone; fauna	Plaquemine	Potentially eligible	Miller 1996
16LF66	Lafourche	Larose, La. N3270760 E752160	Midden; sherds, shell, lithics, bone, fauna; one human burial; historic sherds, glass, nails	Plaquemine	Potentially eligible	Miller 1996

Table 13. Sites within the proposed Recon 500 Levee Alignment.

SITE NUMBER & NAME	PARISH	7.5' QUADRANGLE & UTM	SITE DESCRIPTION	CULTURAL AFFILIATION	NRHP ELIGIBILITY	AUTHOR AND REPORT NO.
16TR33 Pointe au Chien #2	Terrebonne	Lake Bully Camp, La.	Earth mound; midden; sherds, faunal, shell, brick fragments	Prehistoric-unknown; historic	Significant	Neuman 1977: 22-123 Altschul 1978: 22-465
16TR34 (Pointe au Chien #3)	Terrebonne	Lake Bully Camp, La. N3255603 E74866	Three earth mounds	Prehistoric period (possible Bayou Petre phase)	Not assessed	Phillips 1970
16LF108	Lafourche	Lake Bully Camp, La. N3259980 E747800	Sherds, bone, shell	Late Coles creek-early Mississippian (Plaquemine)	Not assessed	Site form only
16LF65	Lafourche	Larose, La. N3270800 E752160	Shell midden; sherds; shell; lithics; bone; fauna	Plaquemine	Potentially eligible	Miller 1996
16LF66	Lafourche	Larose, La. N3270760 E752160	Midden; sherds, shell, lithics, bone, fauna; one human burial; historic sherds, glass, nails	Plaquemine	Potentially eligible	Miller 1996

that the sample of data collected is truly representative. A random subsample of the 25 high probability areas indicated by the project geomorphologist could be selected for survey. Within the natural levee deposits of those high probability areas, systematic subsurface testing, taking the form of closely spaced shovel tests, should be conducted. Any archeological sites detected as a result of survey, including previously known ones, should be carefully delineated, through surface collection and additional small excavations, with the multiple goals of determining the site structure and stratigraphy, and collecting an assemblage of artifacts large enough to establish the age, cultural affiliation, and function of the site. Borings also should be undertaken, both at sites and within these high probability areas, to clarify the geomorphology and stratigraphy of these locales. Borings need to be made and logged by a geologist with attention to details of color, bedding, minor structures, weathering, and other sedimentary characteristics. Additional survey of randomly selected natural levee deposits *outside* of the high probability circles designated by the project geomorphologist should be conducted using identical techniques. This would permit a determination to be made about whether there is a difference in density of sites or types of sites found in the areas inside and outside of these circles. It also would provide some portion of the data necessary to produce a more precise estimate of the total inventory of cultural resources in the project area.

There also would be practical and methodological utility in stratifying the random samples of survey areas such that they included

some proportion of completely subsided natural levee; the contractor then should be required to use *demonstrably effective* techniques to survey the submerged portions of the natural levees. This would help in addressing several questions: 1) do submerged natural levee deposits possess strata of the ages and types anticipated? 2) do submerged natural levees provide enhanced or reduced conditions of preservation for archeological deposits in this environment? and 3) what are the particular cultural property management issues that need to be addressed with regard to submerged terrestrial sites in this project area?

The data garnered through any additional testing should be used dynamically to refine the predictive model. The precision, accuracy, and specificity of the model can be increased through collection of relevant data. Of course, improvement or testing of the predictive model in and of itself will not necessarily constitute compliance with the relevant historic preservation and cultural resource management statutes. It may be, however, an important step towards full compliance.

Consultation

The continuation of consultation with Native American groups also is recommended. The United Houma Nation has indicated its interest in preserving the early Indian schools of the area by nominating them to the National Register of Historic Places. Both the United Houma Nation and the Chitimacha Tribe of Louisiana may wish to identify either historic properties or traditional cultural properties in the vicinity of the project.

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APPENDIX I
SCOPE OF WORK

SCOPE OF WORK
CULTURAL RESOURCE SAMPLE SURVEY
FOR THE MORGANZA TO THE GULF FEASIBILITY STUDY

Contract No. DACW29-97-D-0018

I. LOCATION, OBJECTIVE, PURPOSE AND AUTHORITY

1.1 Location: The study area is located in the eastern portion of Terrebonne Parish and the west half of Lafourche Parish. Attachment I (study area plans) illustrates the location of the study area.

1.2 Objective: Conduct a cultural resource survey to determine the location of previously recorded prehistoric and historic cultural resources, and conduct a cultural resource sample survey to test the predictive model of cultural resource site occurrence that was developed during the earlier Phase I research; see Corps of Engineers New Orleans District Cultural Resource Report COELMN/PD-98/05. Upon completion of the cultural resource survey, the contractor will produce a technical report. The cultural resource report will be utilized by COE personnel to assess project impacts and develop realistic cost estimates for future investigations.

1.3 Purpose: To obtain the professional services, labor, materials and equipment necessary to complete above noted objective.

1.4 Authority: The U.S. Army Corps of Engineers (COE) is obligated under the National Historic Preservation Act (NHPA), and National Environmental Policy Act (NEPA) to take into account the effect its undertakings have upon cultural resources within a given project area. Under these laws and regulations, the COE assumes responsibility for the identification and evaluation of all cultural resources within the project boundaries. In addition, the COE must afford the State Historic Preservation Officer (SHPO), and on occasion the Advisory Council on Historic Preservation (ACHP), the opportunity to review and comment upon proposed undertakings and associated cultural resource investigations.

II. BACKGROUND

2.1 Proposed Federal Actions: The Corps of Engineers is investigating two possible levee alignments in the vicinity of Houma, Bayou Grand Caillou and Bayou Dularge Ridge. The purpose of the levees is to provide the residence with both flood and

hurricane surge protection. Each alignment will take advantage of existing forced drainage levees, pumping stations and flood control structures. Additional flood gates, a lock, and numerous water control structures will be constructed to enhance levee protection and reduce environmental/hydrological impacts. Attachment I (study area plans) illustrates the location of the proposed project features and levee locations.

2.2 Previous Research: Past cultural resource investigations have resulted in the recording of 219 sites within Lafourche and Terrebonne parishes. No Paleo-Indian and/or Archaic sites are recorded in the project area; however, all remaining time periods are well represented. In 1997 R. Christopher Goodwin and Associates completed a Phase I cultural resource literature and records review of the project area. As a result of this work, a predictive model of cultural resource site occurrence was developed (Corps of Engineers New Orleans District Cultural Resource Report COELMN/PD-98/05).

III. **SERVICES**: The contractor shall perform all work required to provide the following services and products:

3.1 Cultural Resource Sample Survey (Task I): The location of known cultural resources and the potential for such resources within the unsurveyed portions of the project area was determined in the earlier 1997 Phase I report noted above. This determination/model was based upon the combined analysis of prehistoric and historic site data, cultural resource contract reports, published literature, land-use data, and geomorphological/soils data and reports. The total project area (area which may be affected by construction and borrow activity) is approximately 20,000 acres. The Contractor will conduct a 1000 acre cultural resource sample survey (5% of the total project area). Additionally, the contractor will work with the local sponsor to acquire land owner permission and right-of-entry to conduct survey and testing investigations. The Contractor will maintain right-of-entry records (phone calls, letters, conversation record sheets etc.) to verify attempts and methods utilized to gain right-of-entry).

A. Based upon the earlier 1997 Phase I report, the Contractor will survey and test a representative sample of both high and low probability areas. Approximately 1/3 of the survey sample should include low probability areas. The remaining survey sample should include a representative sample of the various landform types noted within the 1997 report (COELMN/PD-98/05, page 138). Many areas have subsided and are now covered by shallow water and marsh vegetation. Access will be difficult due to vegetation and shallow water. Thus, a shallow draft boat and/or air boat may be needed to gain access to many project

areas. In some cases, a long metal probe may be the only way to effectively locate cultural resources. Obstructions in the marsh deposits can be felt with the probe then augured to retrieve possible cultural evidence.

To improve efficiency and reduce cost, the Contractor shall take advantage of the numerous man-made and natural canals that cross-cut the project area. Inspection of the canal banks and associated spoil will afford an opportunity to obtain data on marsh geomorphology and past human settlement. By assuming that a 100 foot (30.5 meter) corridor can be adequately covered by boat, 12.14 acres can be covered per-linear mile of canal.

In elevated high potential areas covered by vegetation, shovel testing and/or testing with a hand auger should be utilized. Where possible, the pedestrian survey will be conducted along parallel transects spaced 25 meters apart. Shovel and/or auger tests will be placed along these same transects at 25 meter intervals. Shovel and/or auger test intervals in adjacent transects will be staggered or offset to maximize coverage. Back-dirt should be screened and examined for cultural evidence. Soil characteristics and stratigraphic associations will be described and recorded for all positive shovel and auger tests.

B. All previously recorded sites within the project limits (16TR3,19,26,33,71,160,& 16LF108) and, newly recorded cultural resource sites within the project limits will be evaluated and their present condition and integrity assessed. Depending on site condition and location, testing will be accomplished through shovel and/or auger tests and by metal probes. The goal of this testing will be a determination of the horizontal and vertical dimensions of the site, and if possible, its cultural affiliation and integrity. Field techniques will follow acceptable professional standards and methods. For the purpose of this contract, it has been assumed that a total of fifteen cultural resource sites will need testing. This estimate includes the previously recorded sites noted above.

(1) All measurements shall be made in the metric system.

(2) Back-dirt resulting from shovel and auger tests will be screened through 1/4 inch mesh. Soil characteristics and stratigraphic associations will be recorded for each test.

(3) Where applicable, surface collections will be conducted in a systematic fashion. Collections can be made along transects and/or within established grid units. A representative sample of all artifact/ecofact categories will be made. Faunal and/or floral collections should reflect the biological diversity within the midden. All diagnostic cultural material will be collected.

(4) All human remains and/or burials and associated artifacts shall be left undisturbed. Upon discovery, the COR will be contacted immediately.

(5) A site map will be prepared for each cultural resource site. The map will document the horizontal locations of all shovel tests and auger tests, collection units, diagnostic cultural materials, features and the horizontal limits of the deposit. A permanent site datum should be selected or established and marked on the map.

(6) Upon completion of field investigations, all test holes shall be back-filled.

(7) All cultural resources sites will be recorded on the appropriate State of Louisiana site forms and clearly delineated on USGS topographic maps (1:24,000 scale).

(8) Appropriate State of Louisiana site update forms, standard site forms and standing structure forms shall be filled out and submitted to the Division of Archeology (Louisiana department of Culture recreation & Tourism).

C. In addition to the archeological sites noted above, standing structures within the project limits need to be evaluated and the appropriate state standing structure forms completed. Three previously recorded standing structures, 1011, 1012, and 1013, need to be revisited and updated state forms completed. Additionally, their exact location needs to be plotted and their proximity to the proposed levee assessed. For the purpose of this contract, it has been assumed that a total of eight standing structures will need to be evaluated. This estimate includes the previously recorded sites noted above.

3.4 Laboratory Analysis and Cultural Resource Report

(Task II): All cultural material, reports, drawings, maps, photographs, notes, and other work developed in the performance of this contract shall be and remain the responsibility and/or sole property of the Government and may be used on any other work without additional compensation to the contractor. The Contractor agrees not to assert any rights and not to establish any claims with respect thereto. The Contractor agrees to furnish and provide access to all retained materials at the request of the COR.

A. Laboratory analysis and curation will be conducted in accordance with the following:

(1) All recovered archeological materials and artifacts shall be washed, preserved/stabilized and cataloged. All

cultural materials shall be properly stored and secured from vandalism and extremes in temperature and humidity.

(2) Laboratory techniques and artifact analysis should meet acceptable professional standards. Faunal and floral remains will be identified according to standard zooarcheological procedures.

(3) Following completion of this delivery order, all cultural materials and records will be turned over to the State of Louisiana, Division of Archeology, Office of Cultural Development. Thus, all cultural materials and records will be cataloged according to the Division of Archeology's standards. The Contractor shall work with the Louisiana Division of Archeology and the COR to coordinate the transfer of all archeological materials and records.

B. A draft report shall be prepared. The draft cultural resource field report will complement the earlier Phase I report (COELMN/PD-98/05) and serve as a supplement to that report. The extensive literature review and background data contained within the earlier report does not have to be reproduced within the supplement. However, maps will have to be updated to show the newly revised levee alignments and newly recorded cultural resource sites. A set of maps will be provided with each copy of the supplemental report; however, they will not be permanently bound to the report. The supplement will not contain specific site locations. The draft report is expected to be a polished product and accurate representation of the final report with two exceptions: 1) the draft report will be double spaced and 2) photographs may be photo-copied rather than being in publishable form. Report style shall follow acceptable professional standards as established by American Antiquity. The Cultural Resource Report shall contain, but not be limited to the following:

- (1) Discussion of proposed Federal action/project.
- (2) Research methodology and detailed discussion of field and laboratory techniques.
- (3) Discussion of cultural resource sites within project area. Cultural resource site locations, horizontal/vertical provenience and site integrity will be discussed. Detailed site maps and soil profiles will be prepared to accompany discussions.
- (4) Artifact description and analysis accompanied by tables and illustrations.
- (5) Comparison of cultural resource sites, materials and

associated data with local and regional chronologies.

(6) If possible, a determination of cultural resource site significance and National Register Eligibility (see Revised 1991, National Register Bulletin 15, "How to Apply the National Register Criteria for Evaluation", Published by the National Park Service).

(7) Discussion of project impacts and recommendations for future investigations and mitigation. Contractor will illustrate on project maps those areas not recommended for survey, areas previously surveyed, areas surveyed during this project and, areas that need to be surveyed in future.

(8) In order to preclude vandalism, the draft and final reports shall not contain specific locations of archeological sites. A set of 1:24000 scale maps with sites plotted upon them will be included as a detachable enclosure at the end of each report

C. Once the draft report has been reviewed and accepted by the Contracting Officers Representative (COR), a preliminary final report shall be prepared. Following inspection and acceptance of the preliminary final report, the final report will be prepared and 40 copies forwarded to the COR. The final 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.

D. In addition to the above noted technical report (supplement), the Contractor will reprint and revise the earlier Phase I report (COELMN/PD-98/05). The maps will be removed and the narrative adjusted accordingly. Specific site locations will only appear on the maps associated with the above noted supplemental report.

IV. CONTRACTING OFFICER AND CONTRACTING OFFICERS REPRESENTATIVE

4.1 The COR for this project will be Dr. Edwin Lyon, CELMN-PD-RN, (504) 862-2548. The technical representative will be Dr. Kenneth Ashworth (504) 862-2548.

4.2 The Contracting Officer (CO), and COR may at all reasonable times inspect or otherwise evaluate the work being performed. All inspections and evaluations will be performed in such a manner as will not unduly delay progress of the work. It is

necessary that close coordination between the contractor and Government be maintained throughout all contract periods to ensure satisfactory completion.

V. CONTRACT SCHEDULE

5.1 Contract proposal and estimate shall be submitted within 10 days of receipt of delivery order package.

5.2 The Government shall review the proposal within 5 days of receipt.

5.3 The Contractor shall submit safety plan five days following award of delivery order and begin Task I no later than 15 days following approval of safety plan.

5.4 The Contractor shall complete Tasks I and II (completion of the draft report) 200 days following award of the contract. Three copies of the draft report will be submitted to the COR for review. The COR will review the draft report and forward comments to the contractor 30 days following its receipt. The Contractor will make the required changes and forward the pre-final report (1 copy) to the COR within 15 days of receipt of the review comments. The COR will inspect the pre-final report and notify the Contractor of its acceptance no later than 5 days following its receipt. The Contractor will prepare the final report and forward 40 copies within 5 days of its acceptance. A reproducible master (both hard-copy and computer diskette) and associated GIS/CAD computer data should accompany the final reports.

5.5 A brief, one page monthly progress report will be submitted along with each monthly billing voucher. The progress report will cover the billing period noted on the voucher. Each report will discuss project status, work performed, logistical problems and difficulties, if any, in meeting the contract schedule. Cost breakdowns should be grouped according to specific "Tasks".

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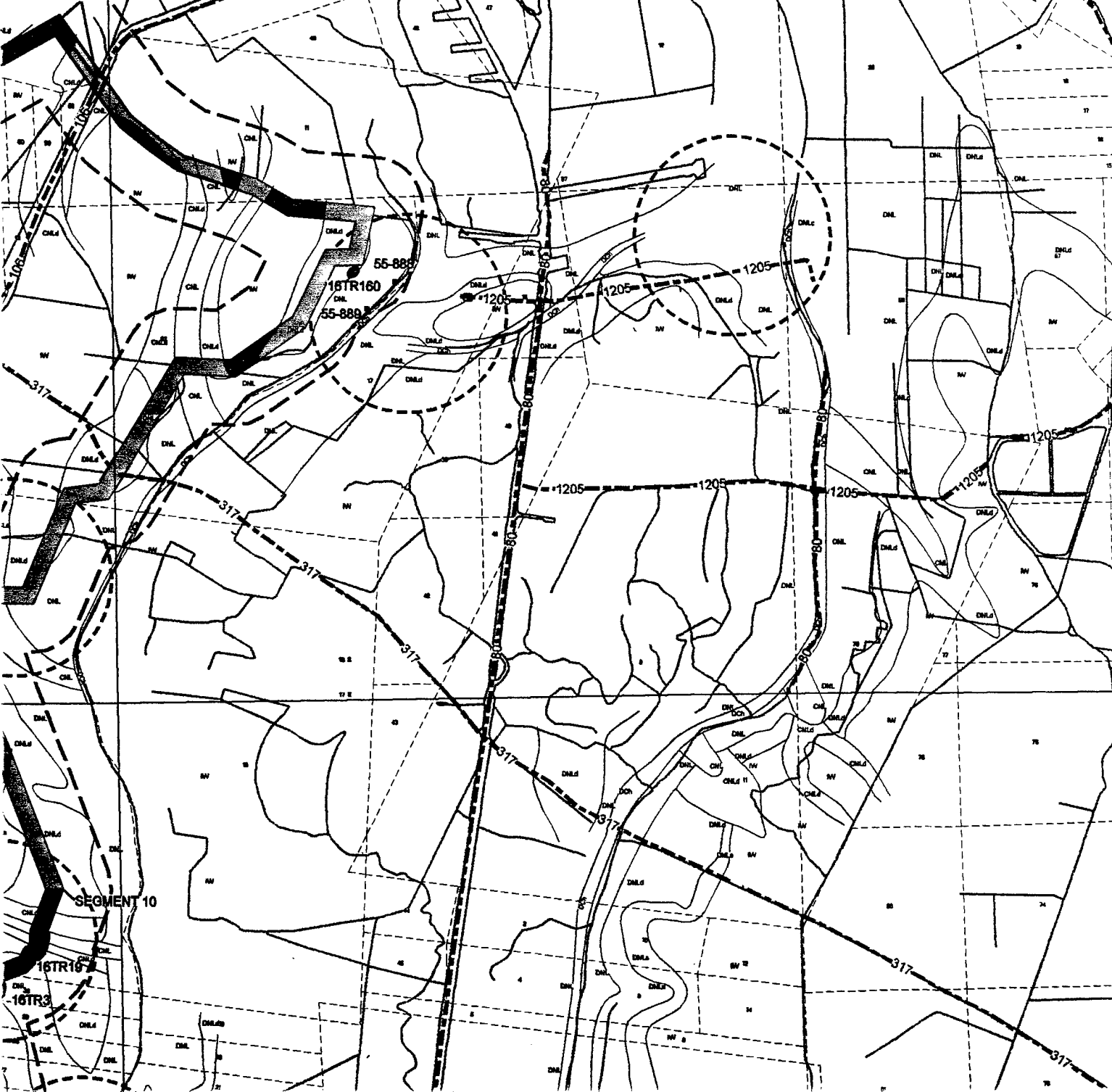
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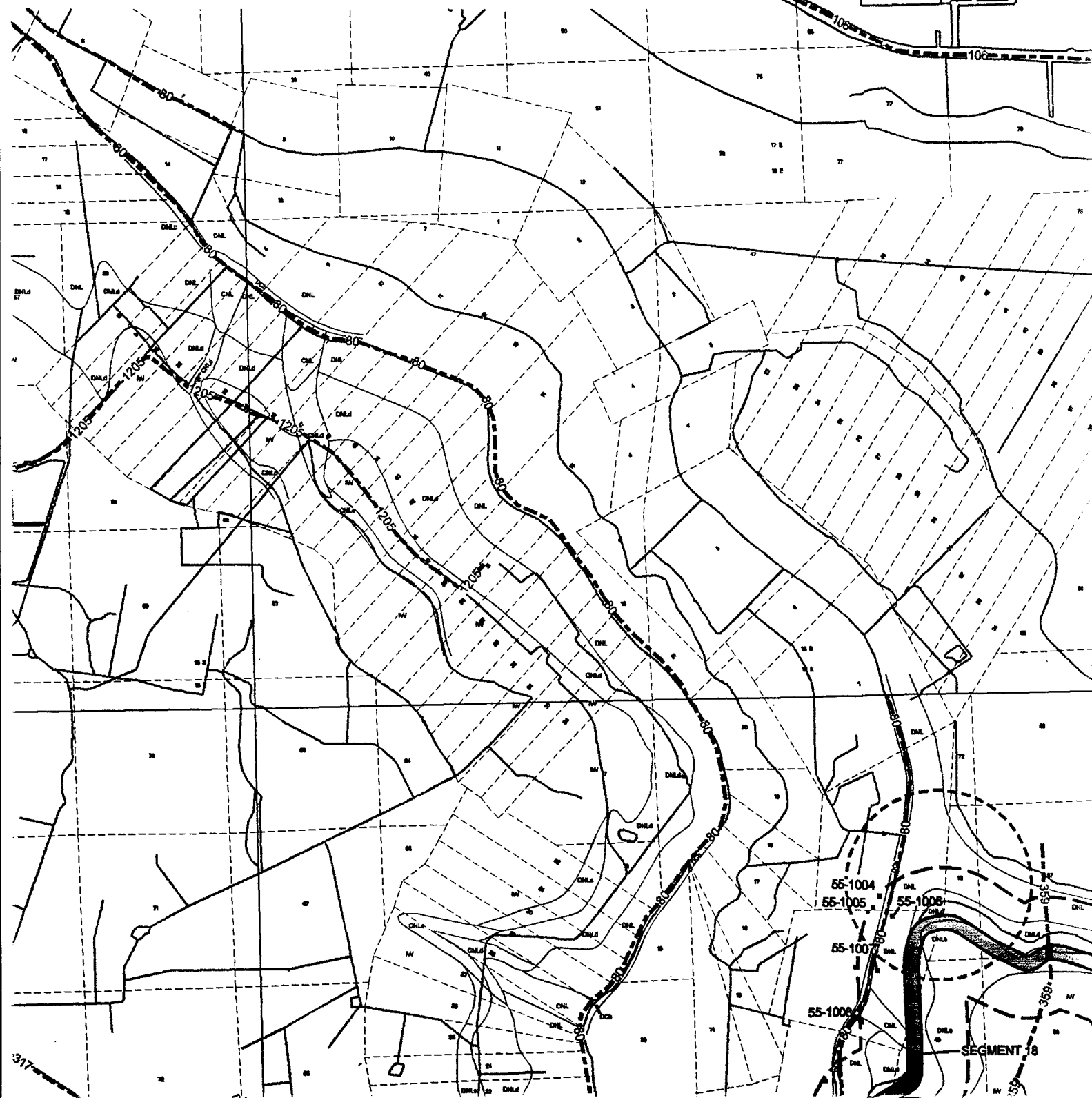
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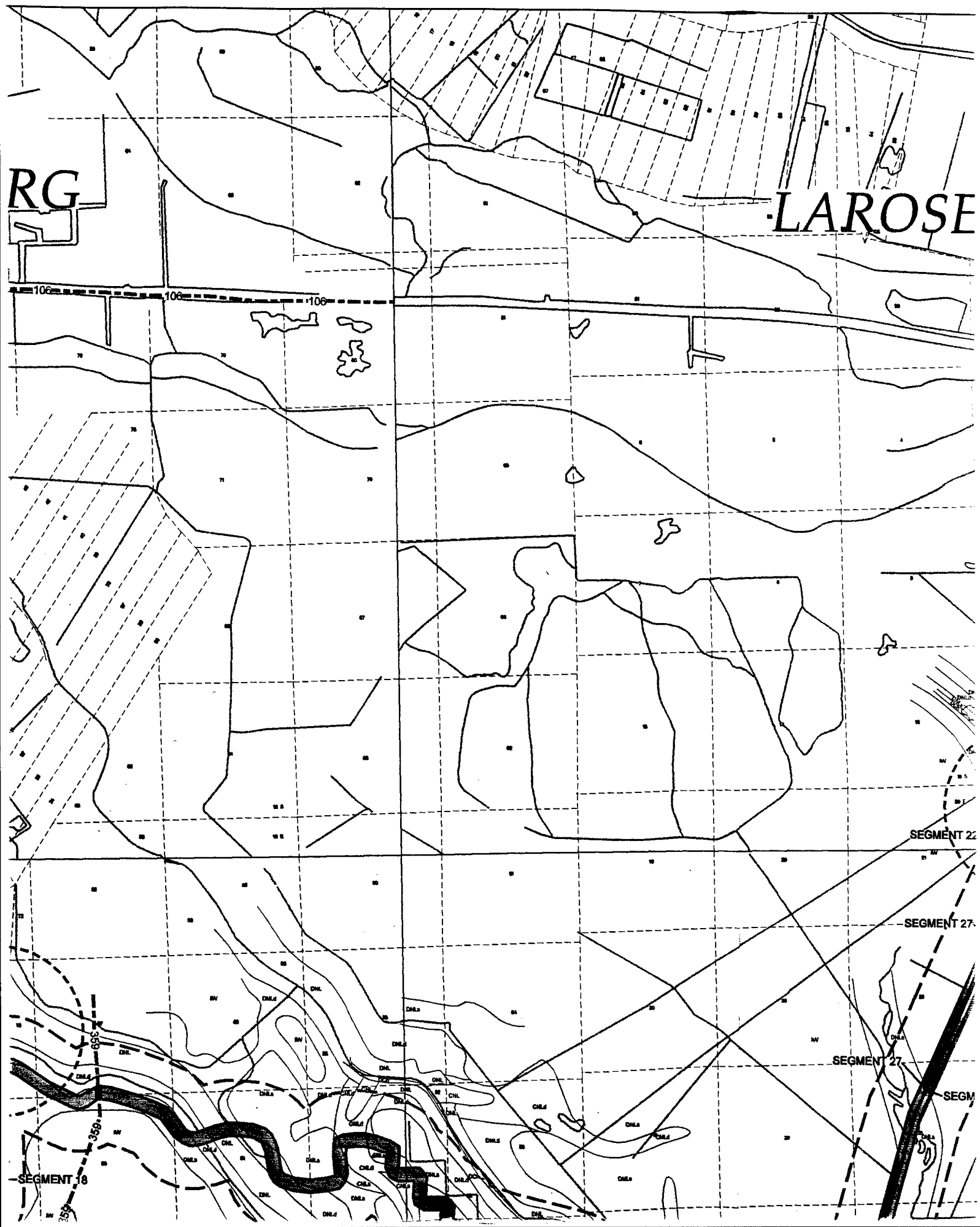
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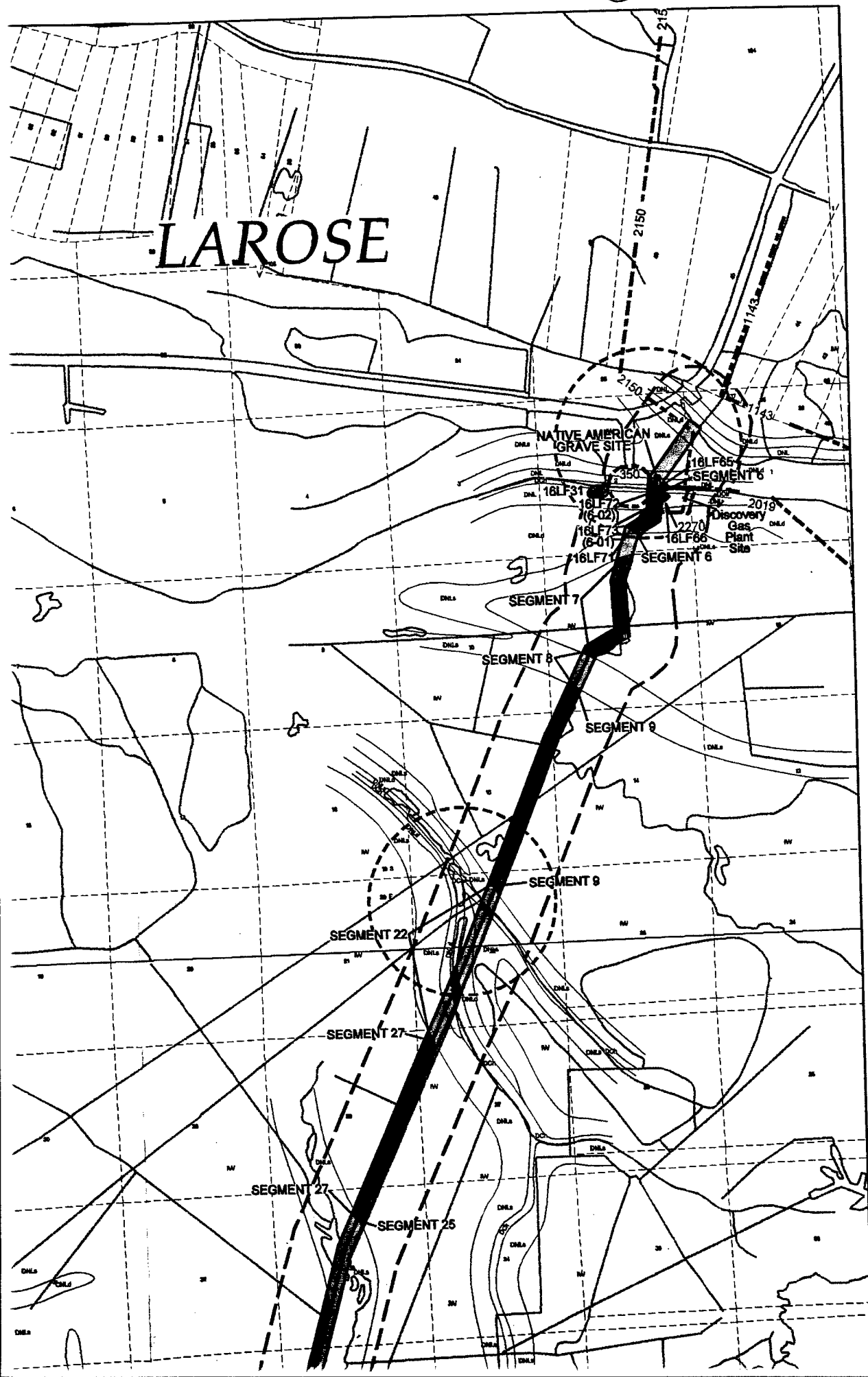
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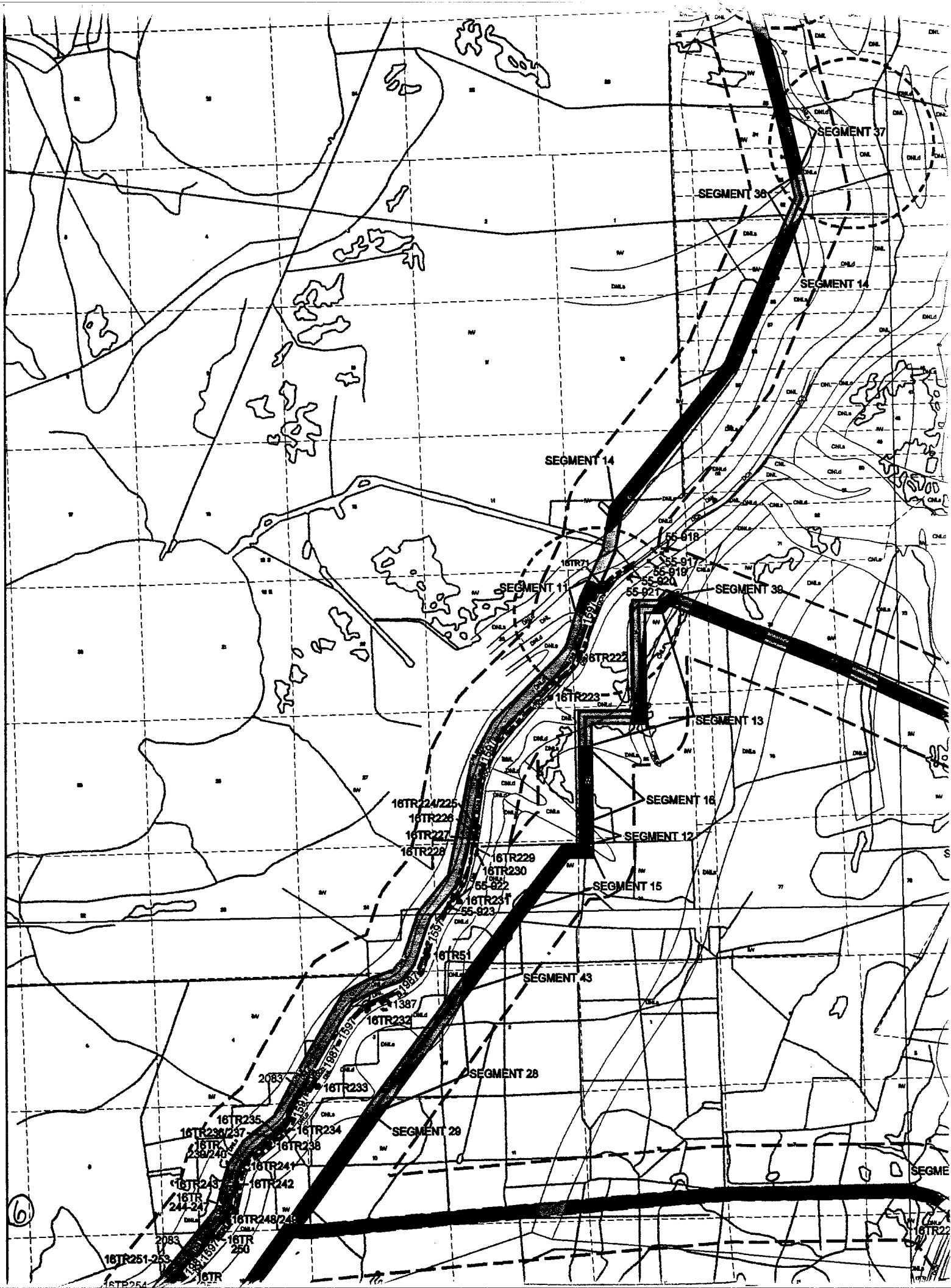
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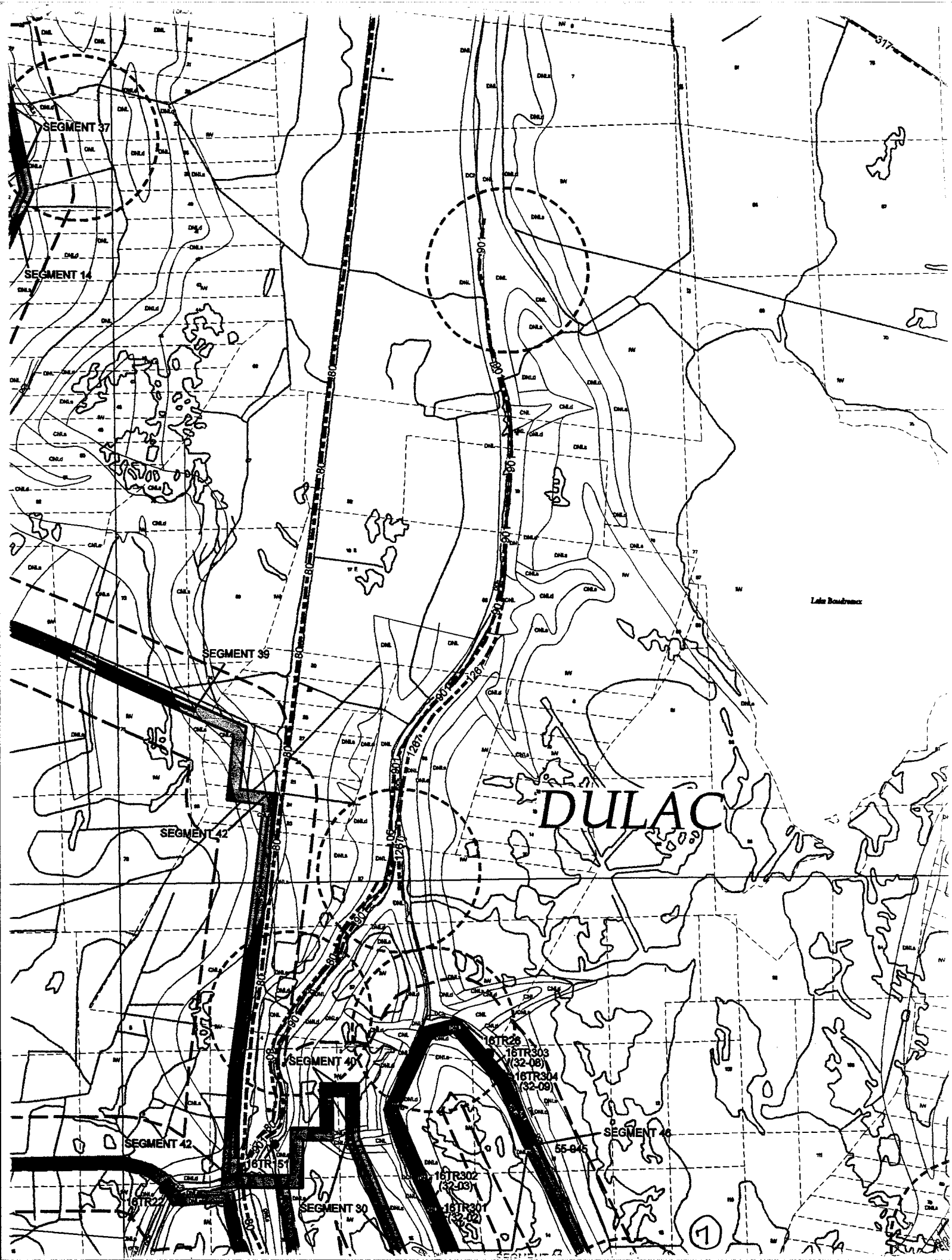


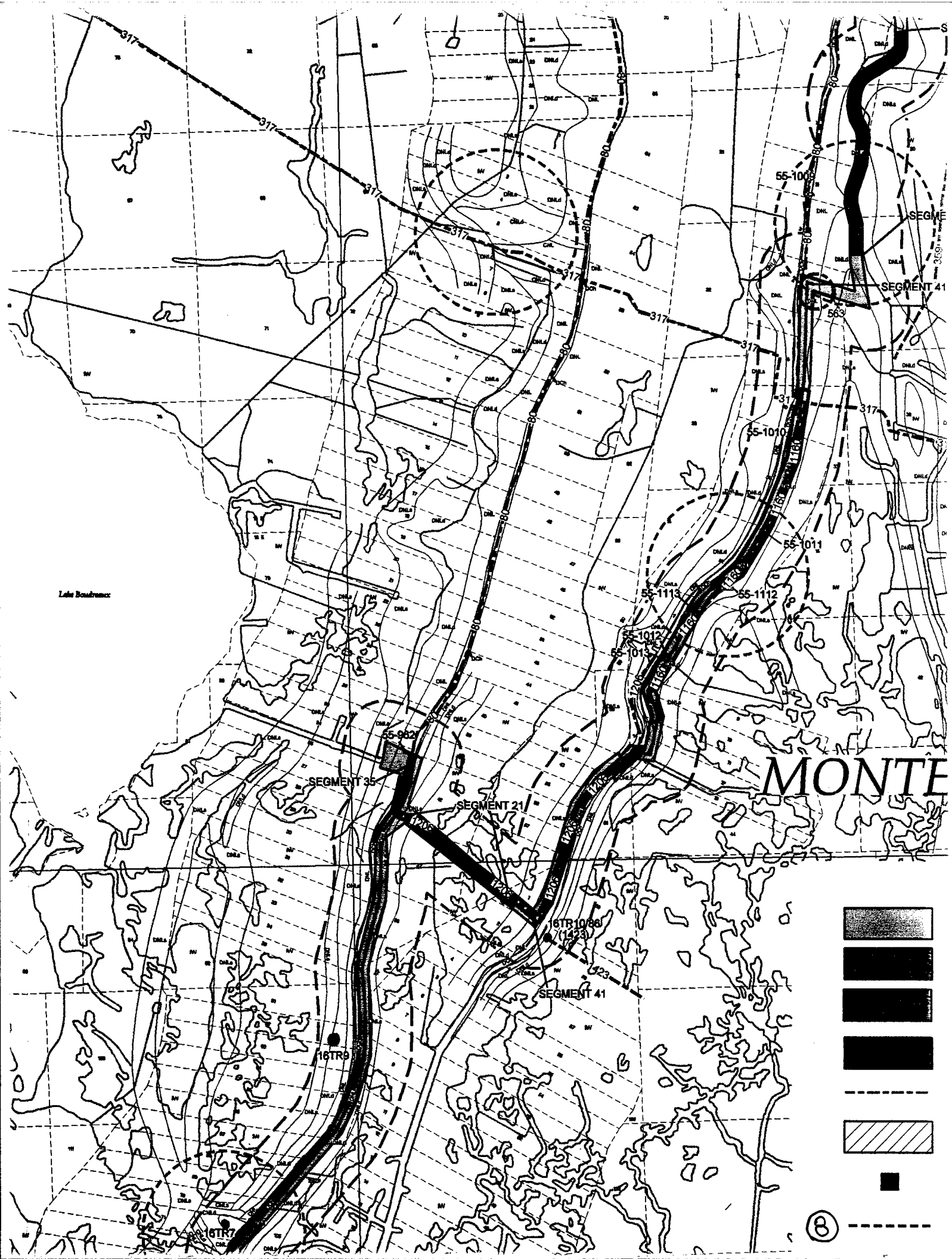


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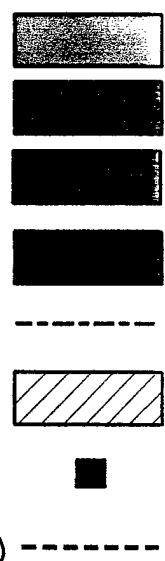


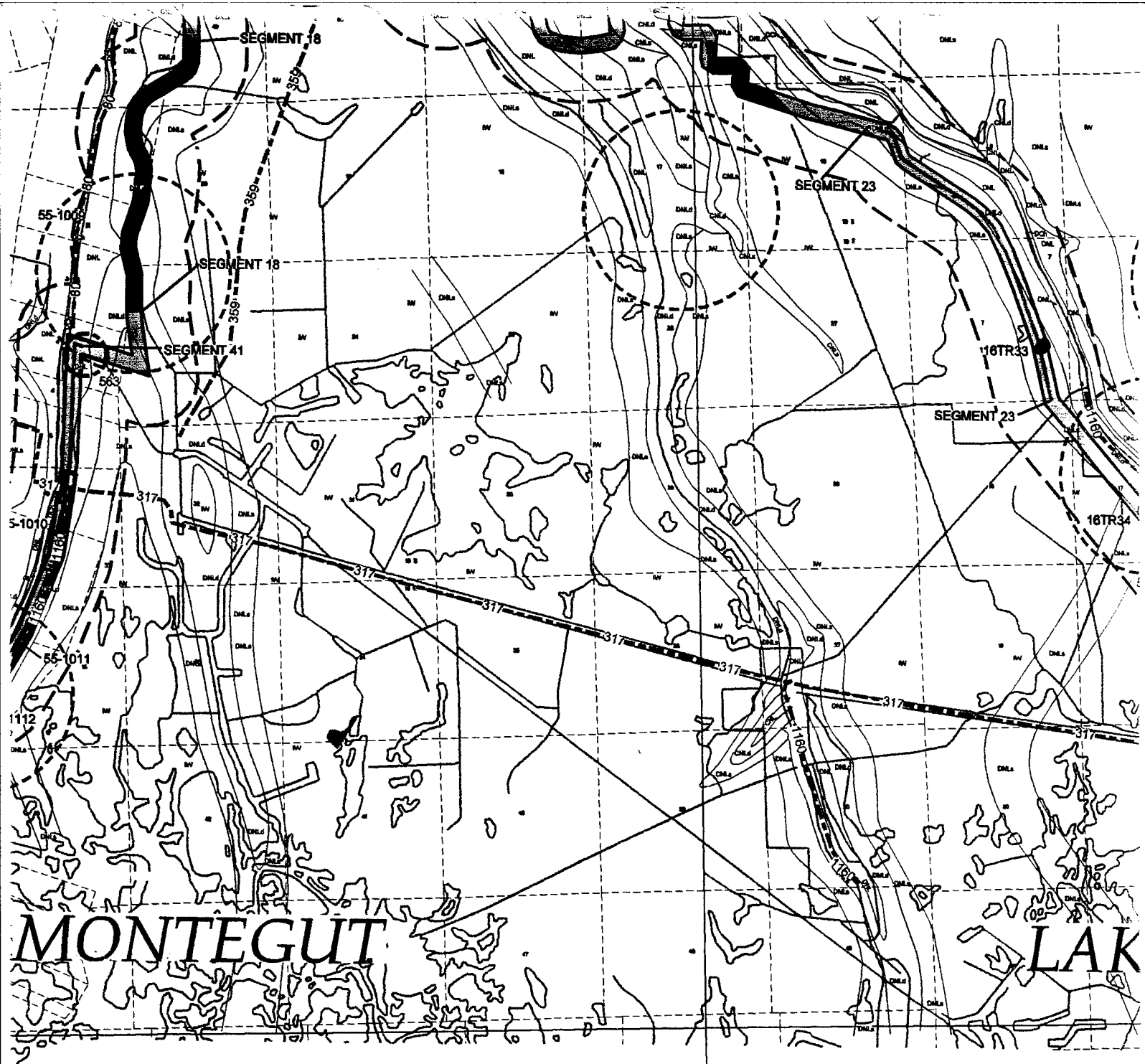






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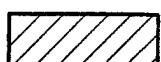
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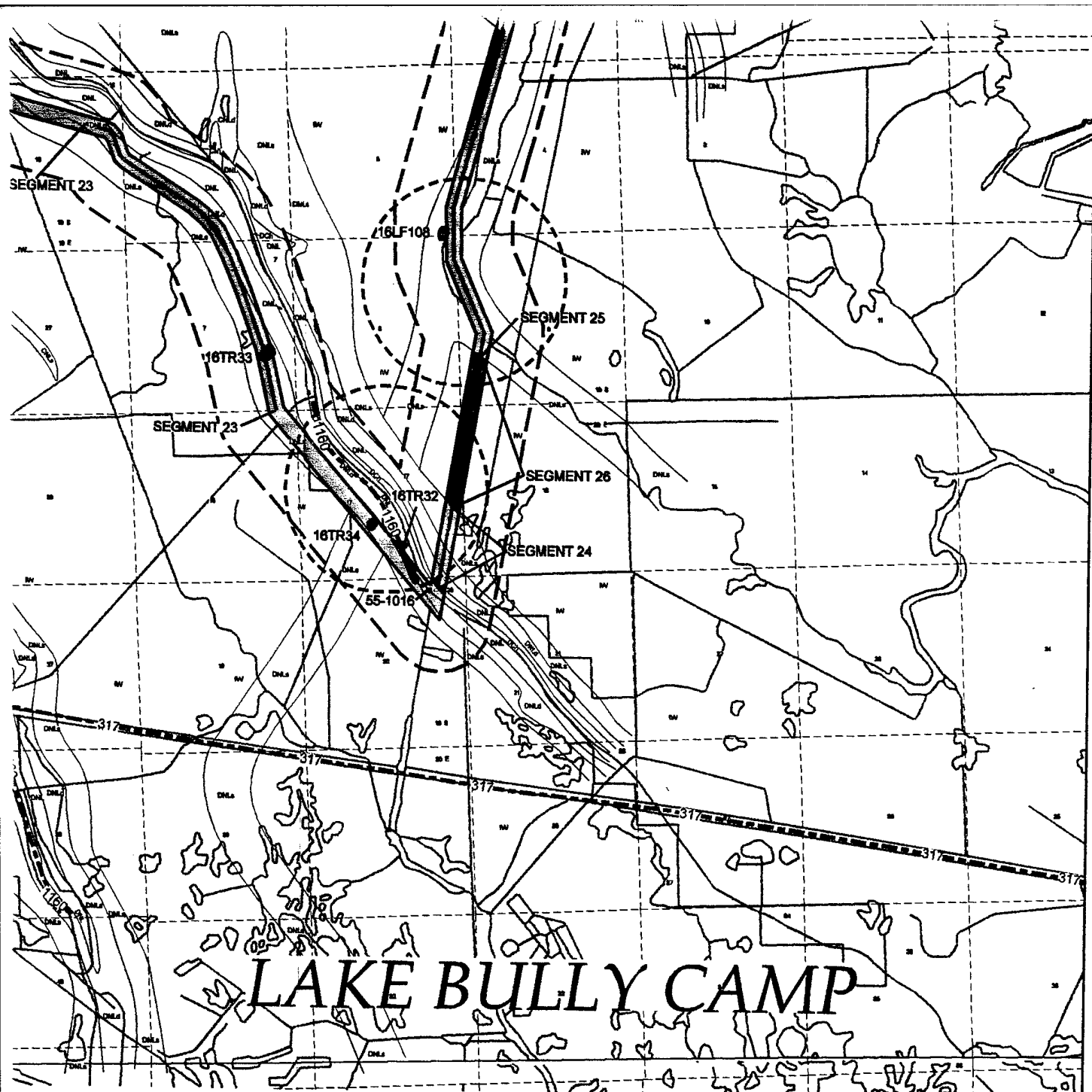
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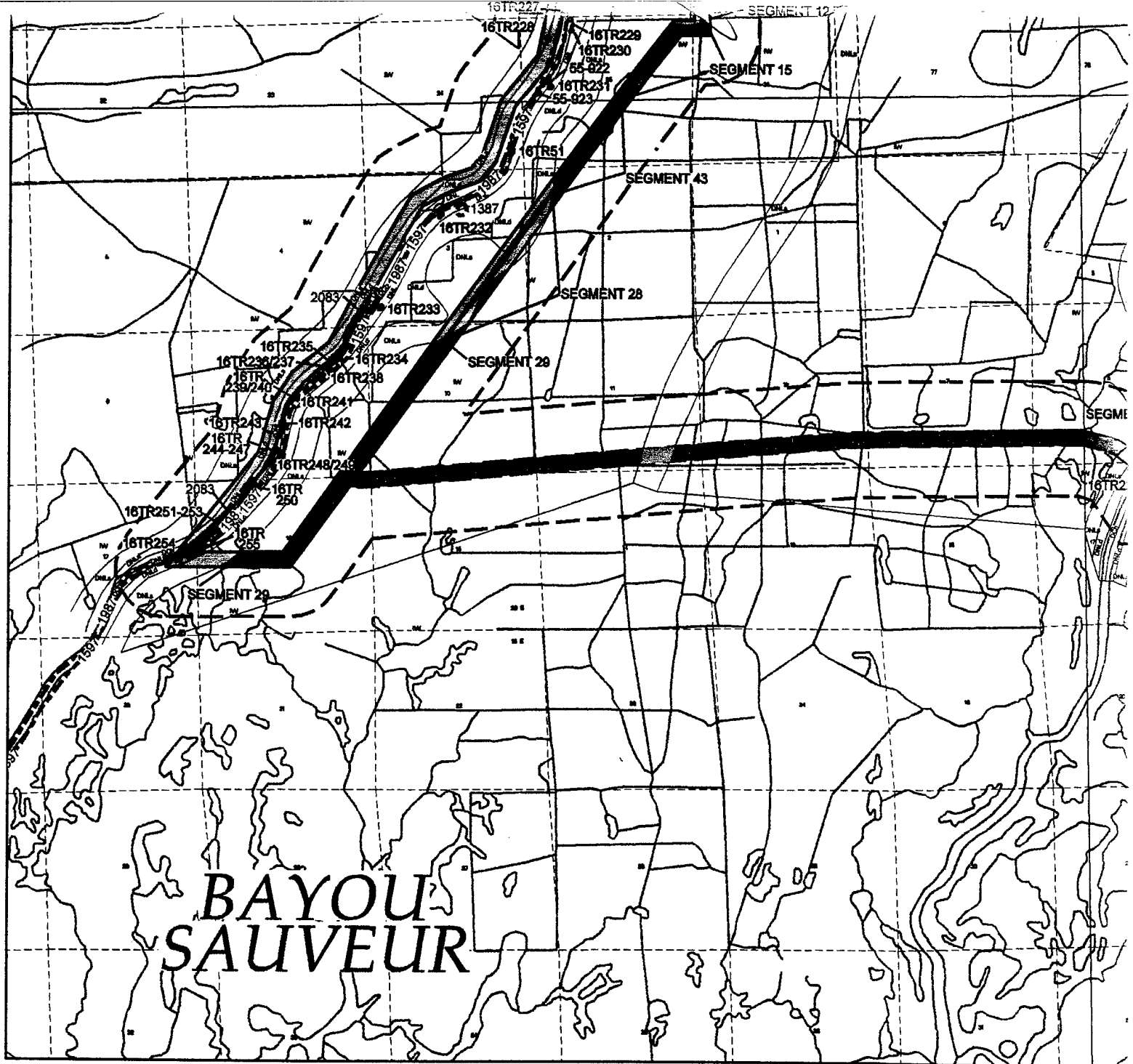
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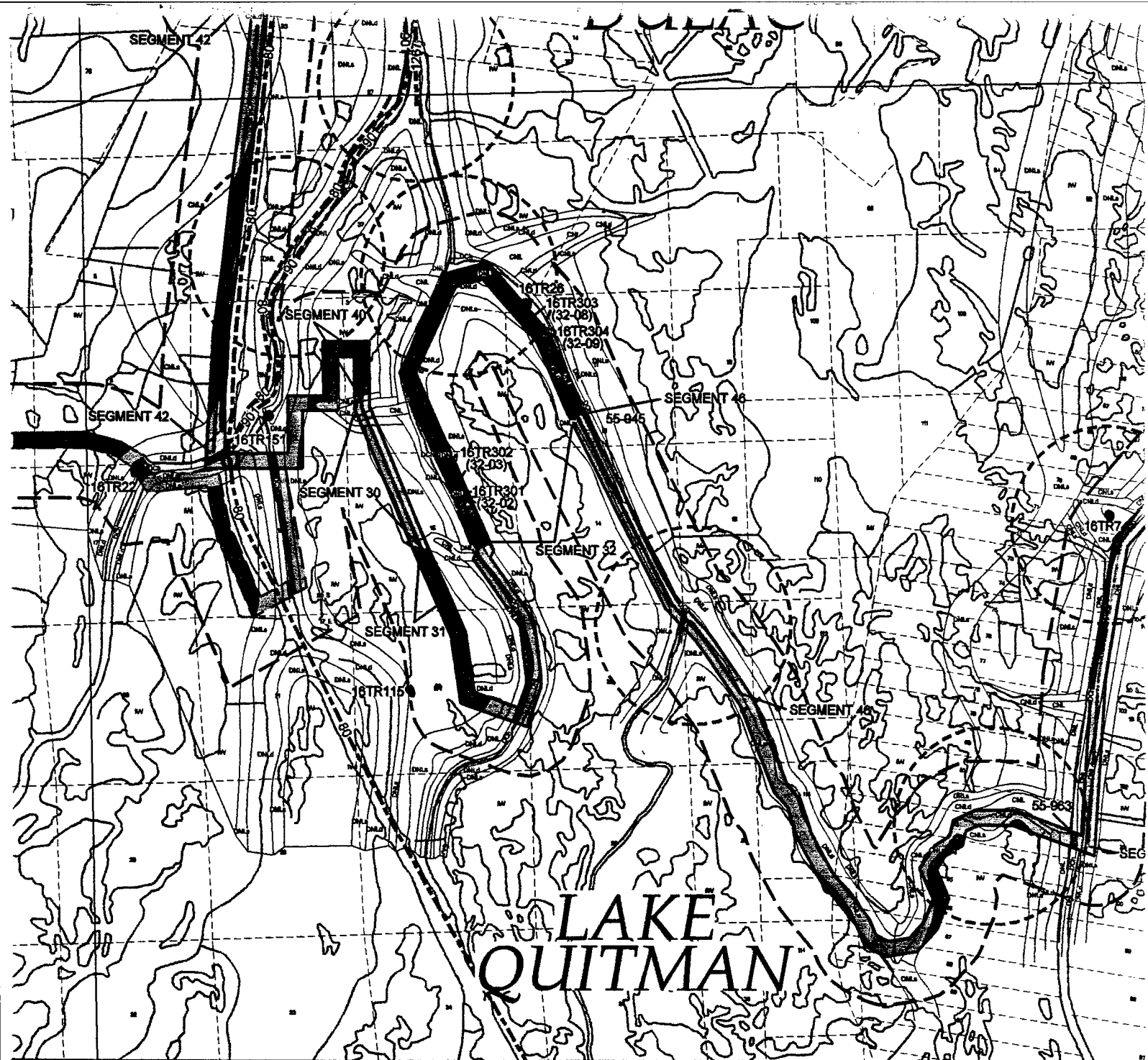


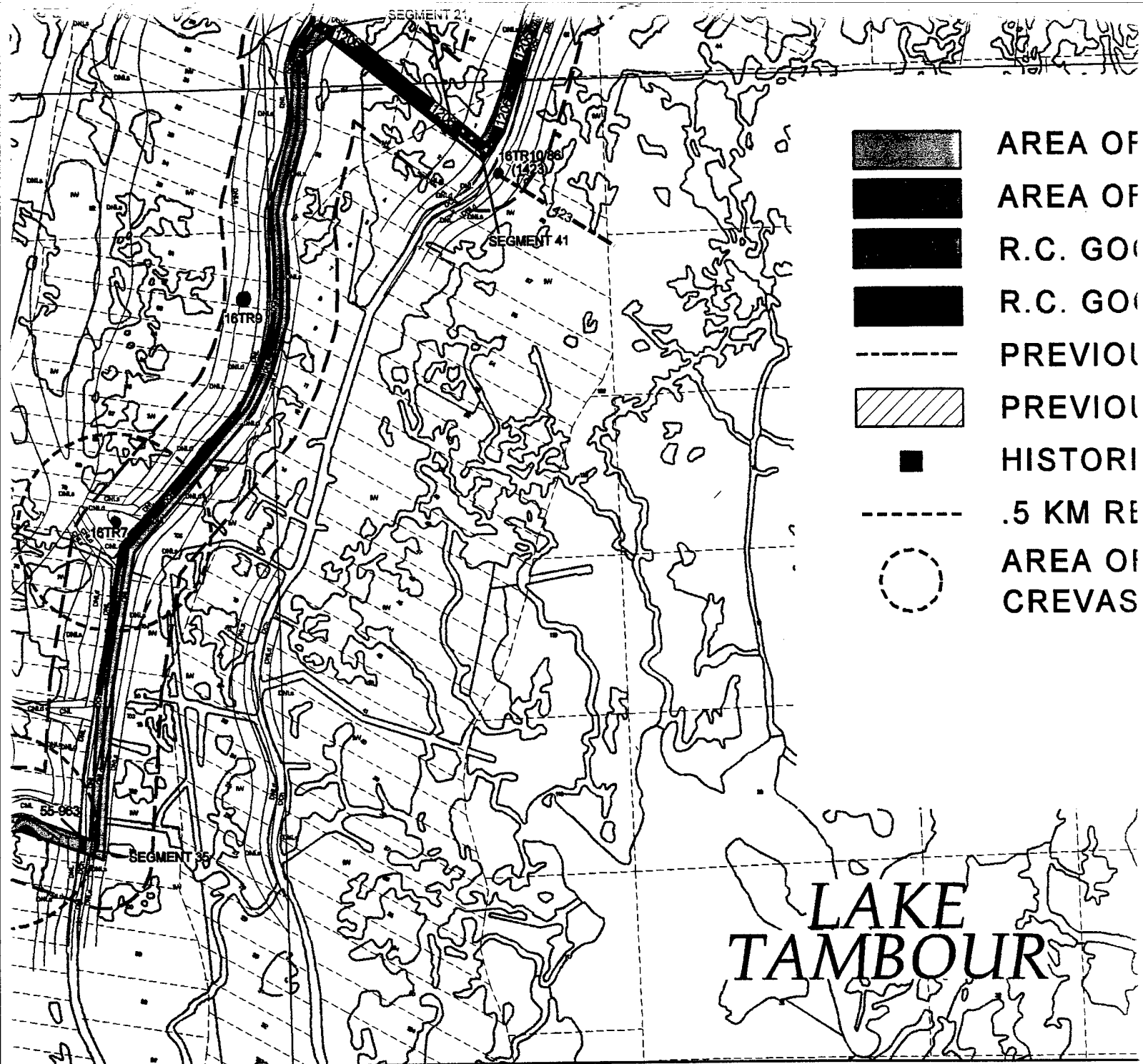
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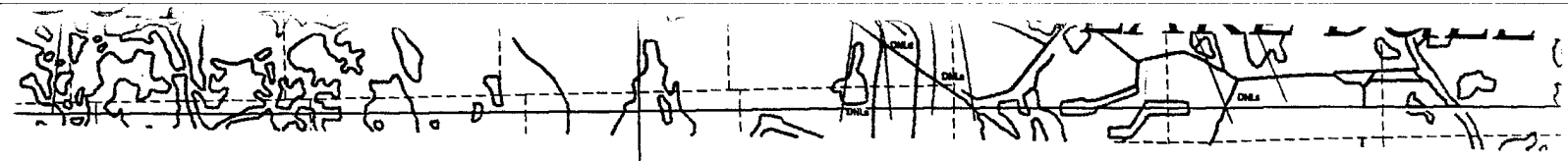
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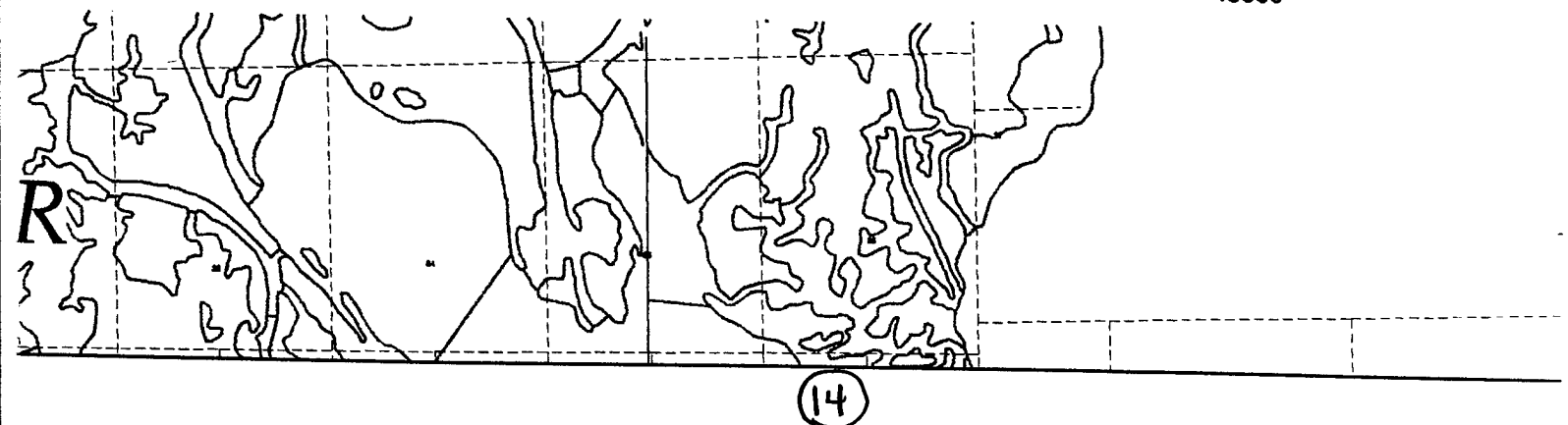
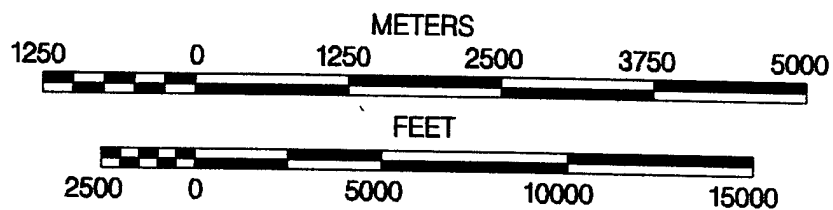








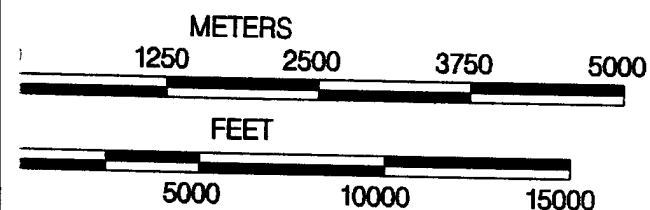
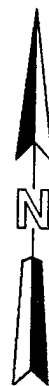
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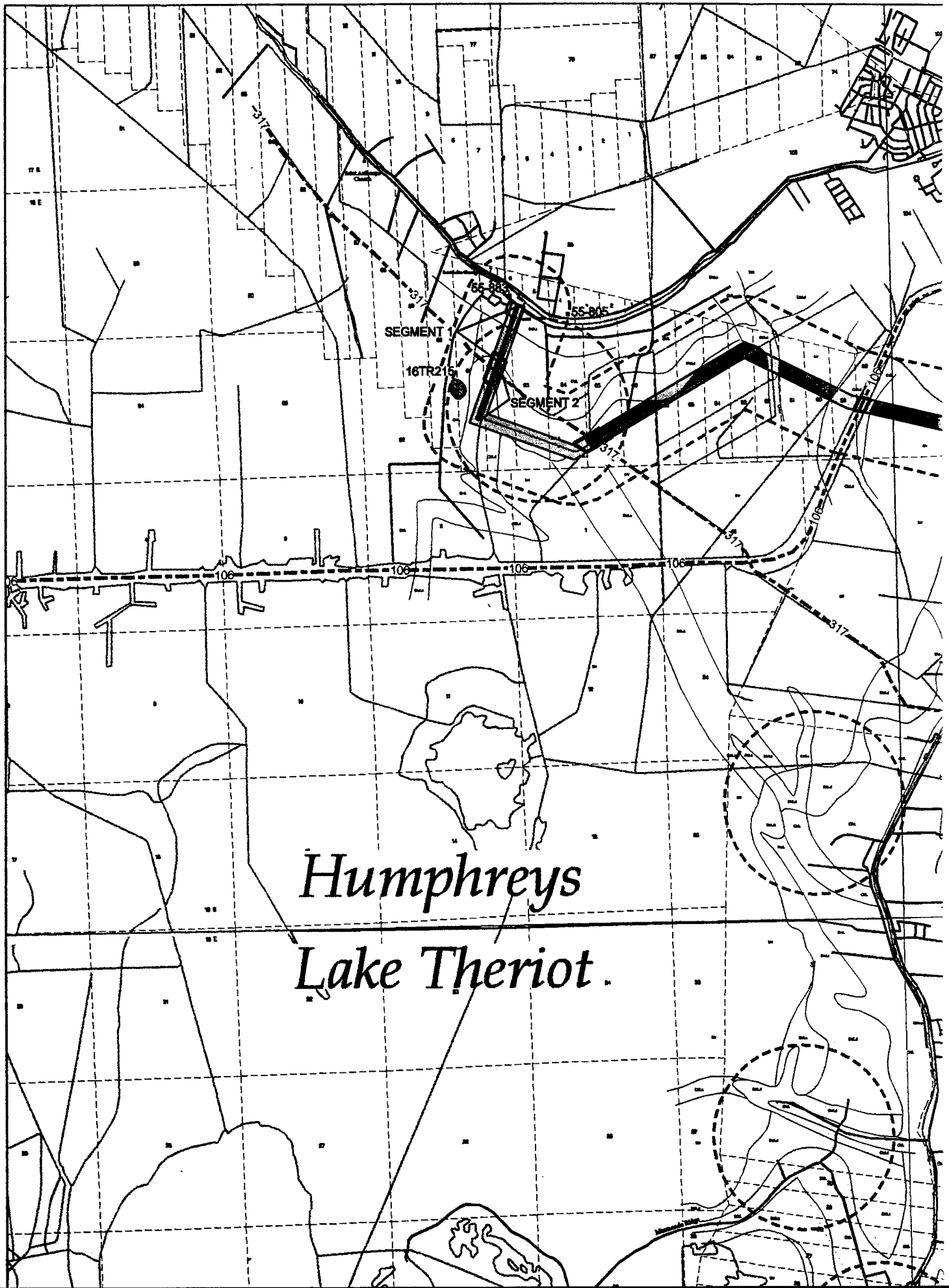
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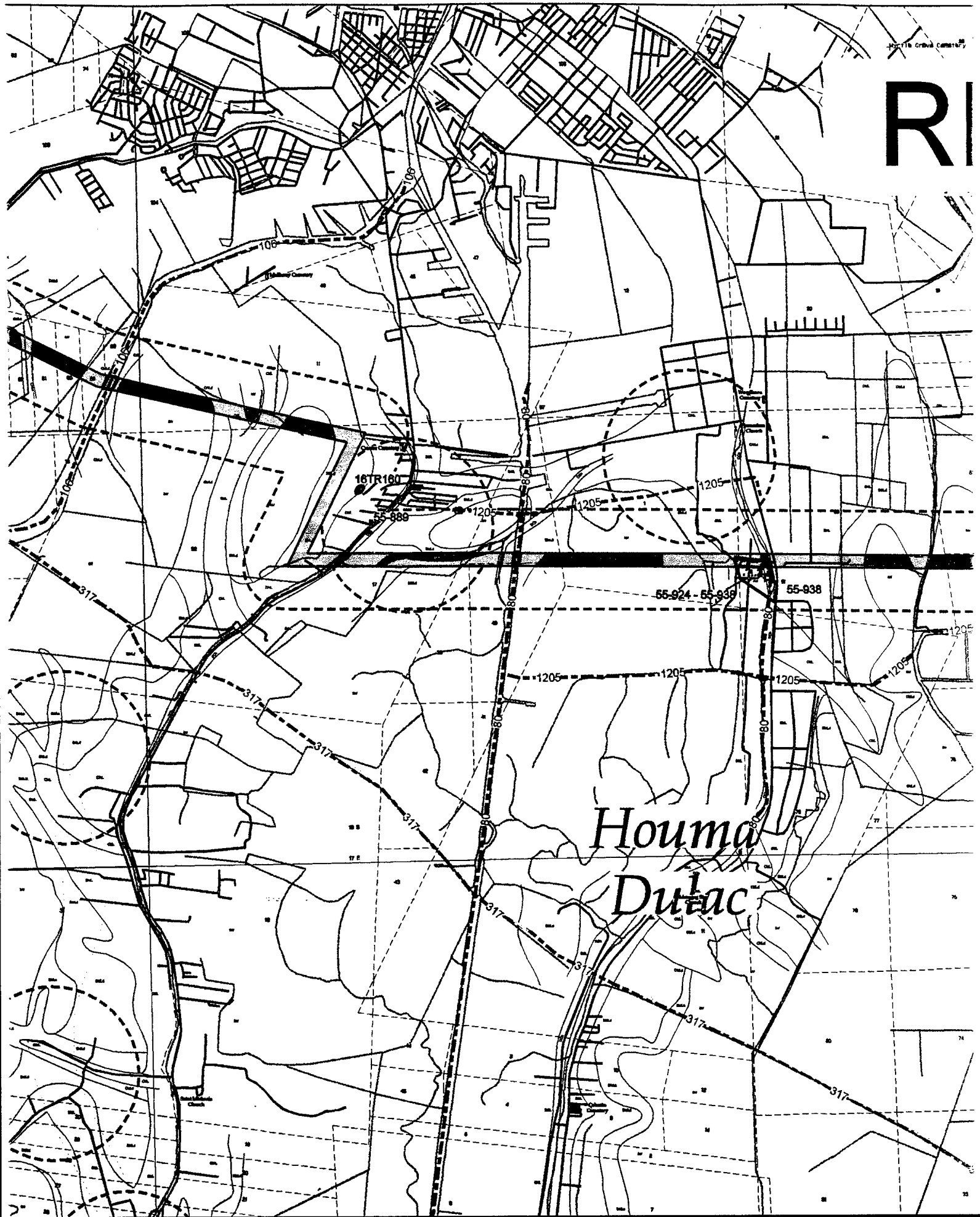
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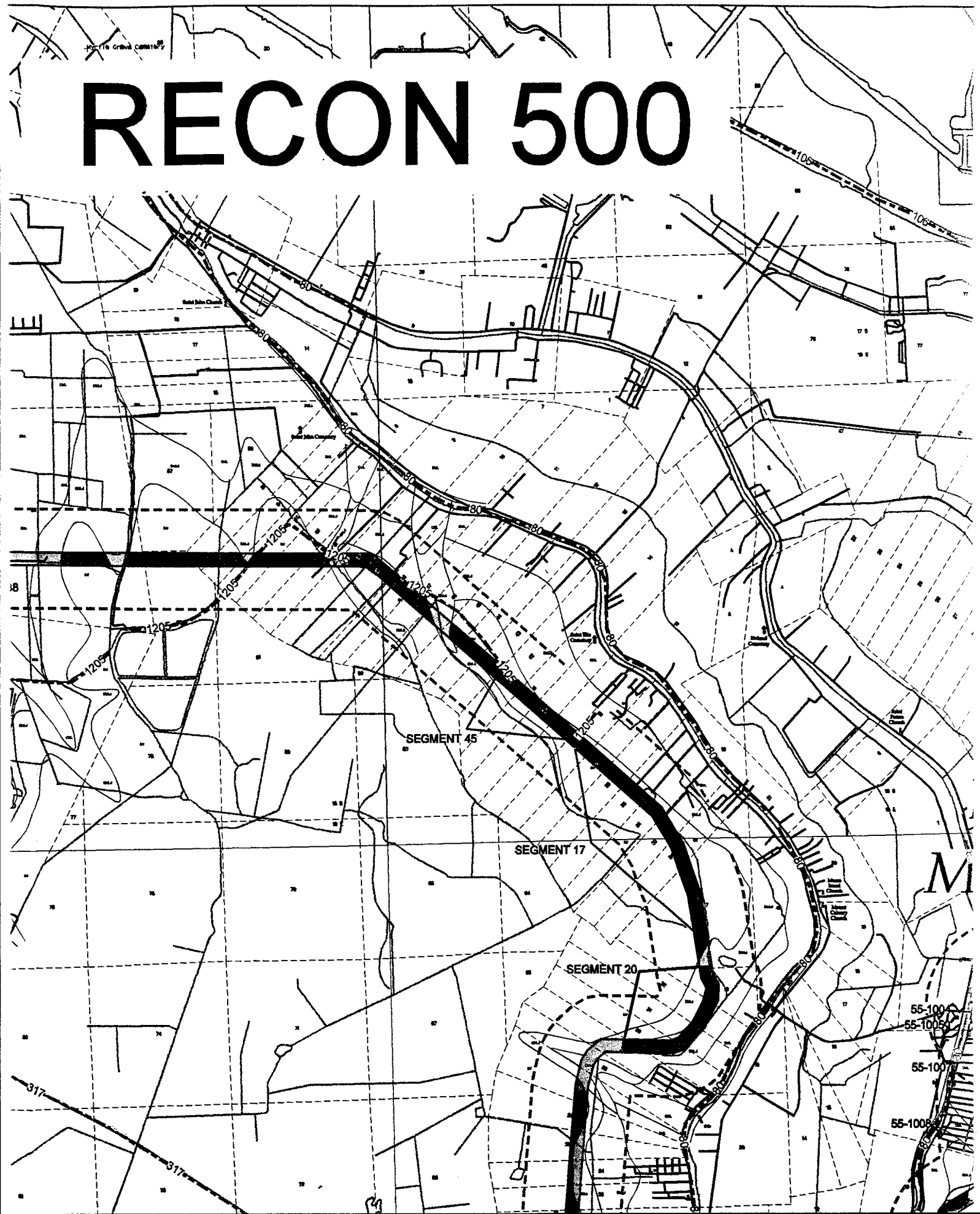
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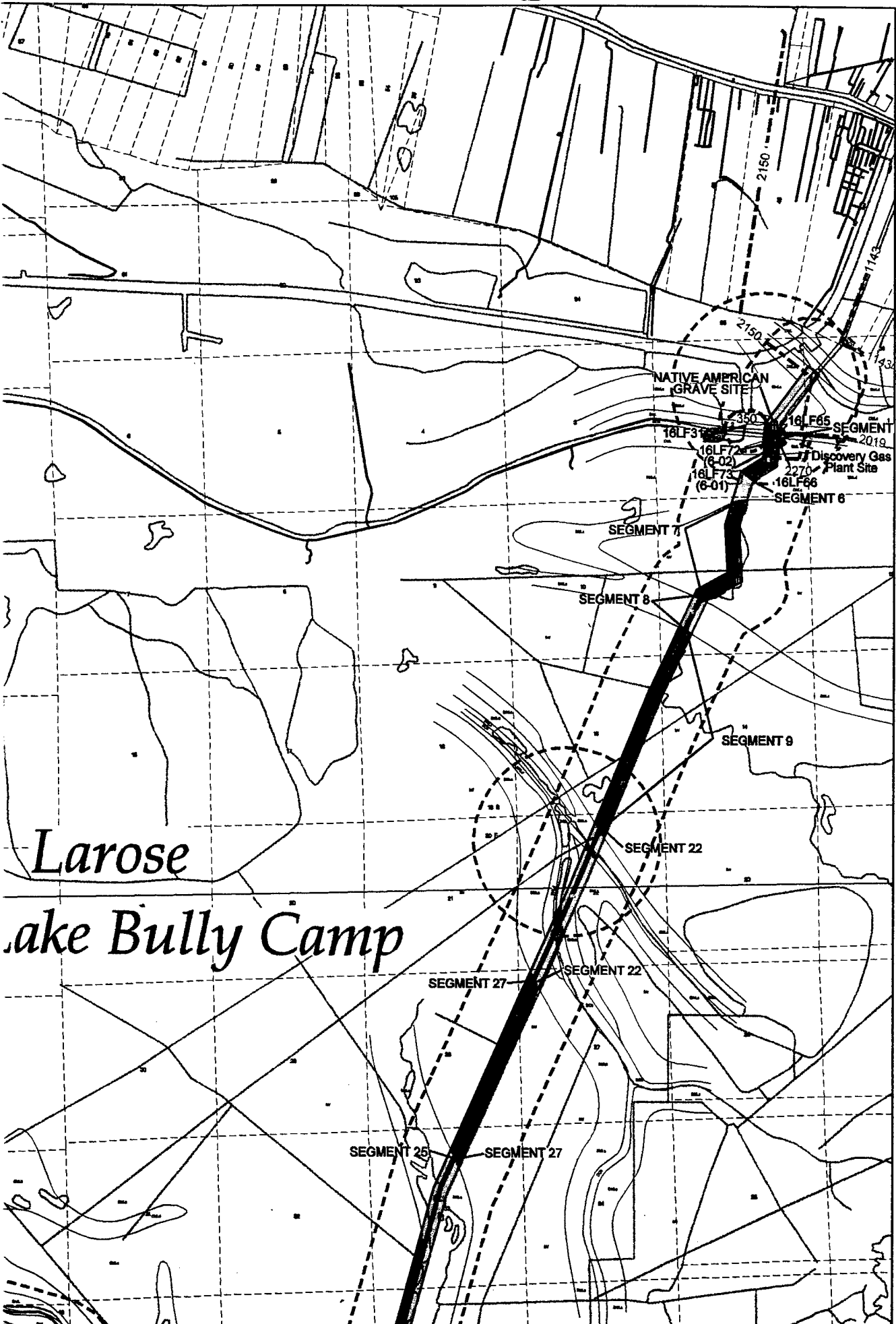
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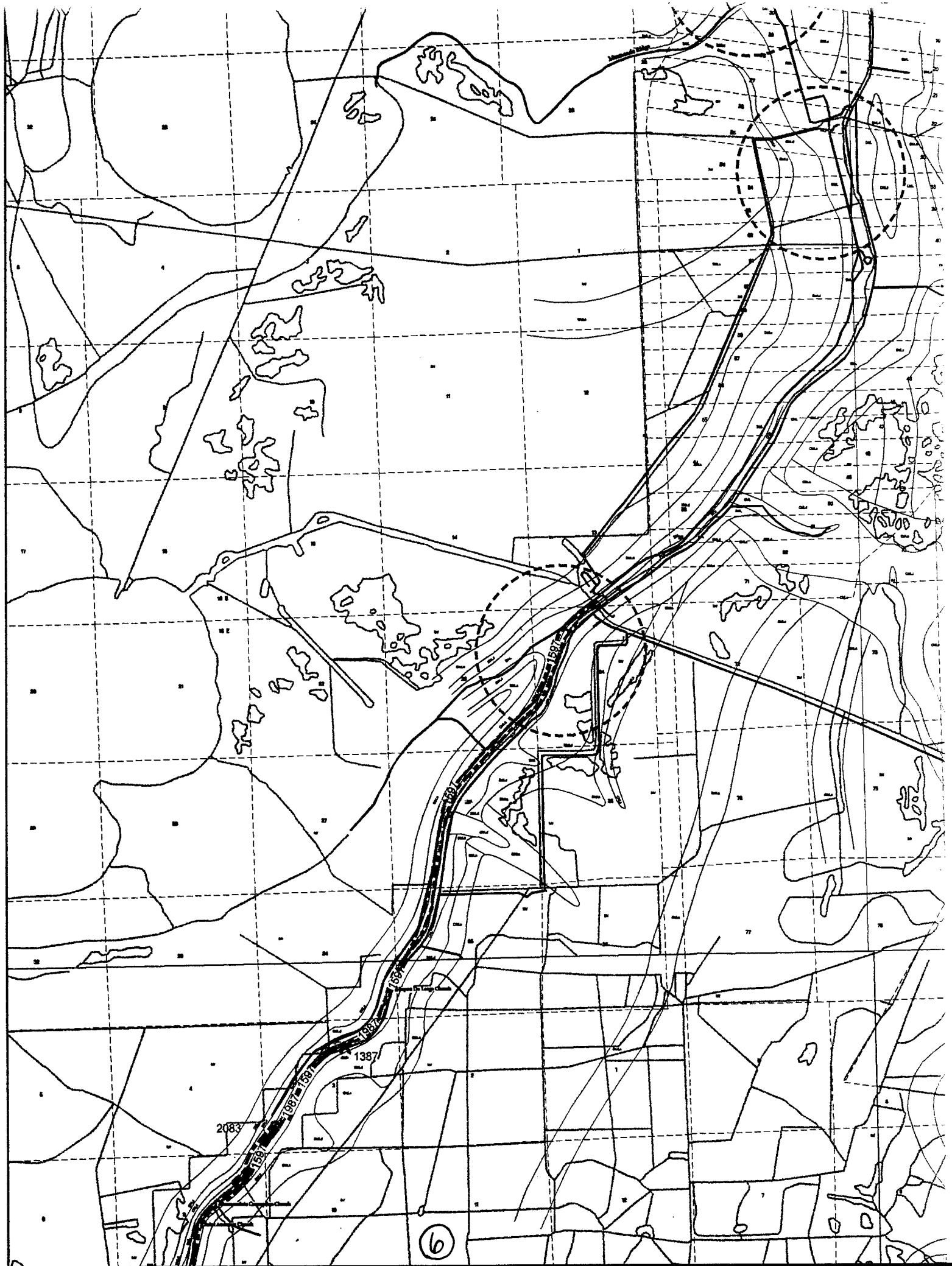
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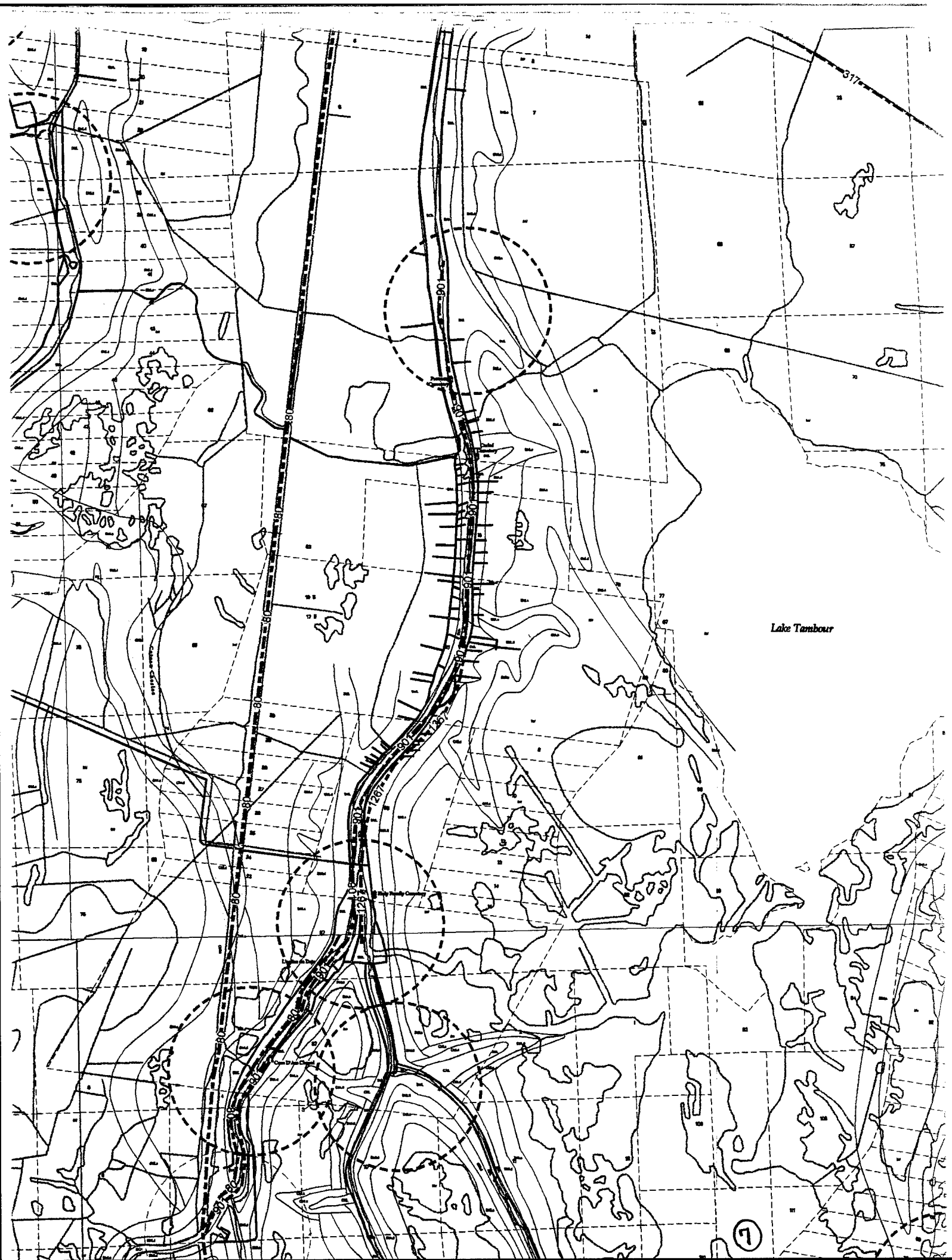
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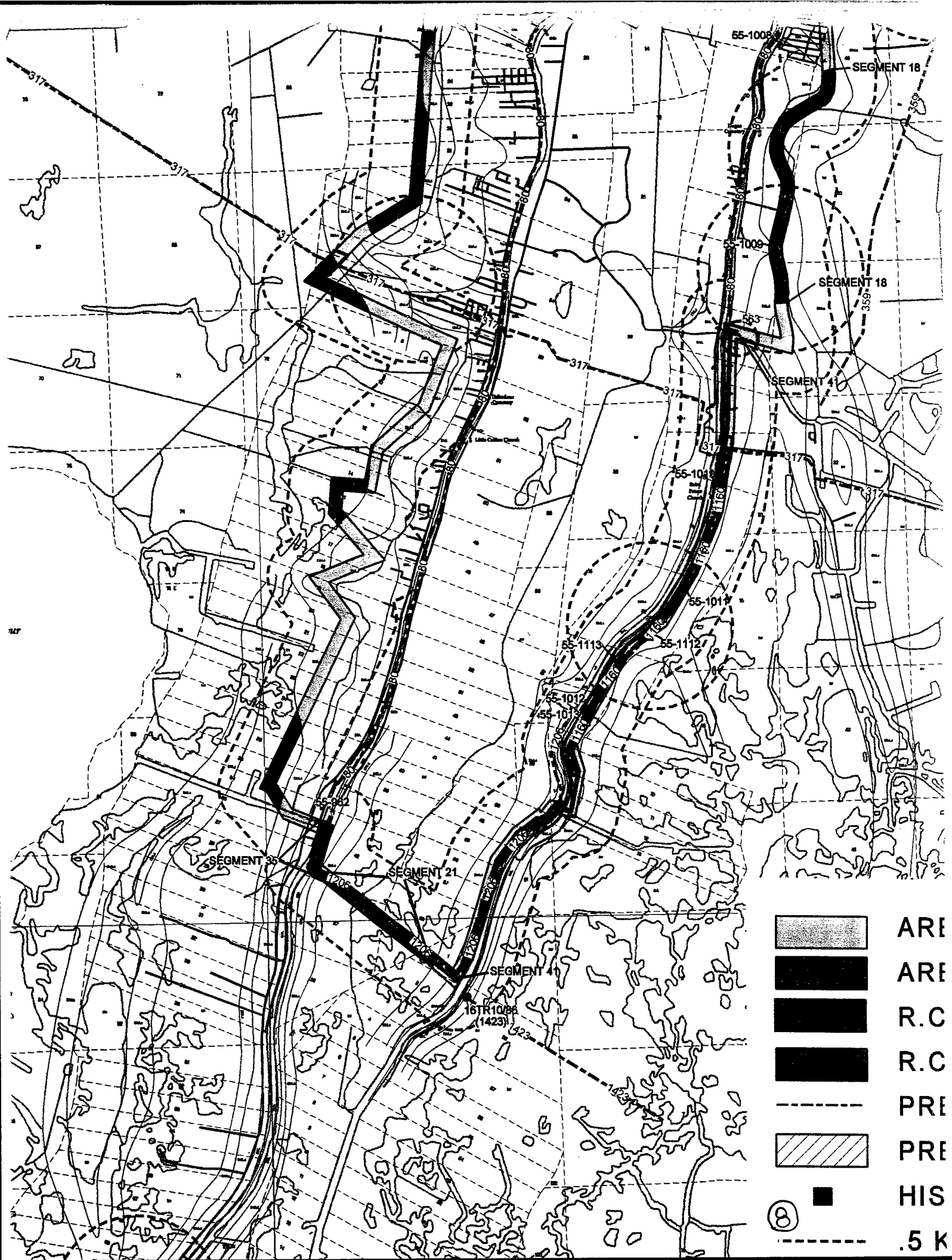
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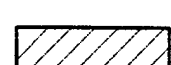
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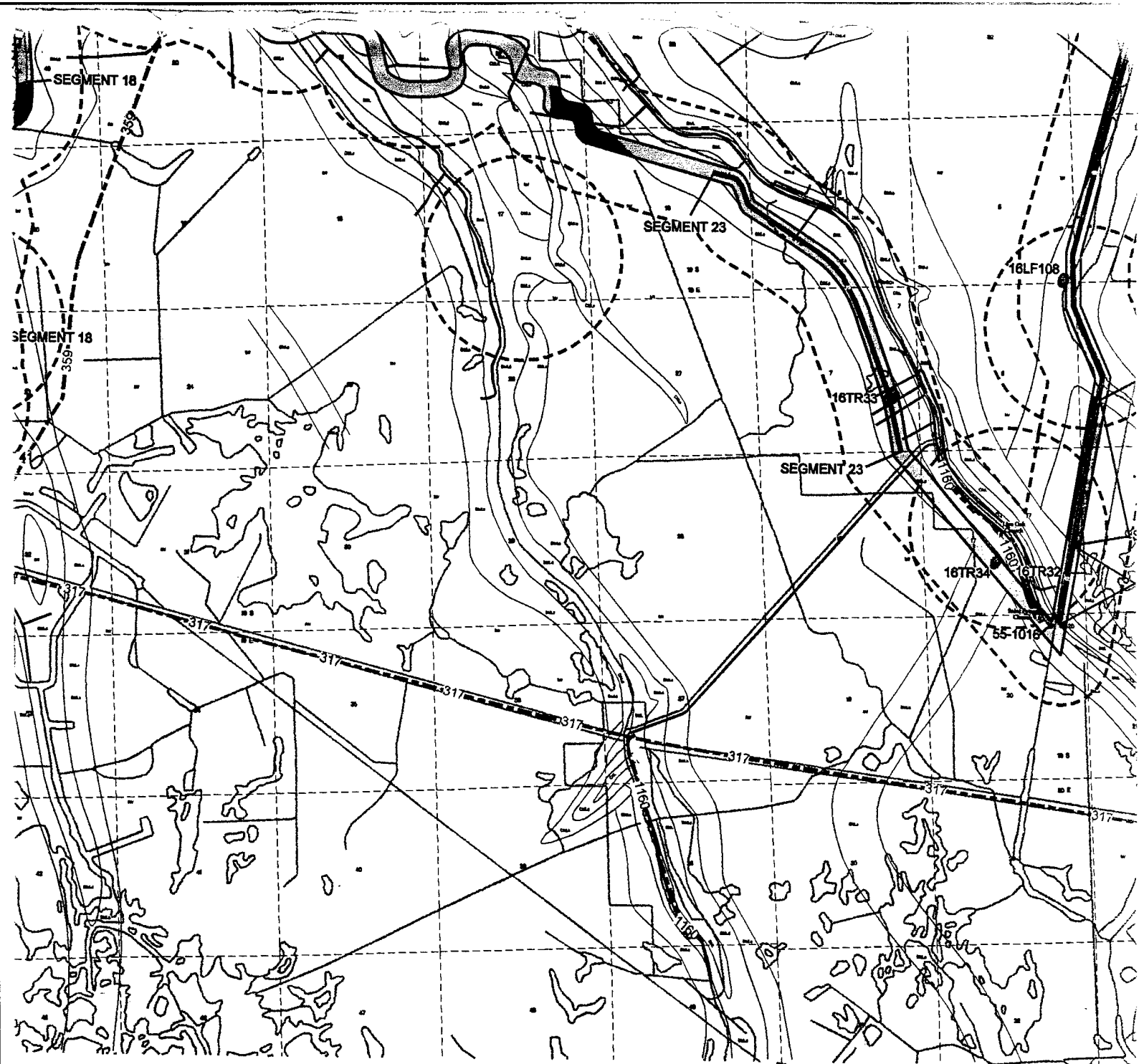
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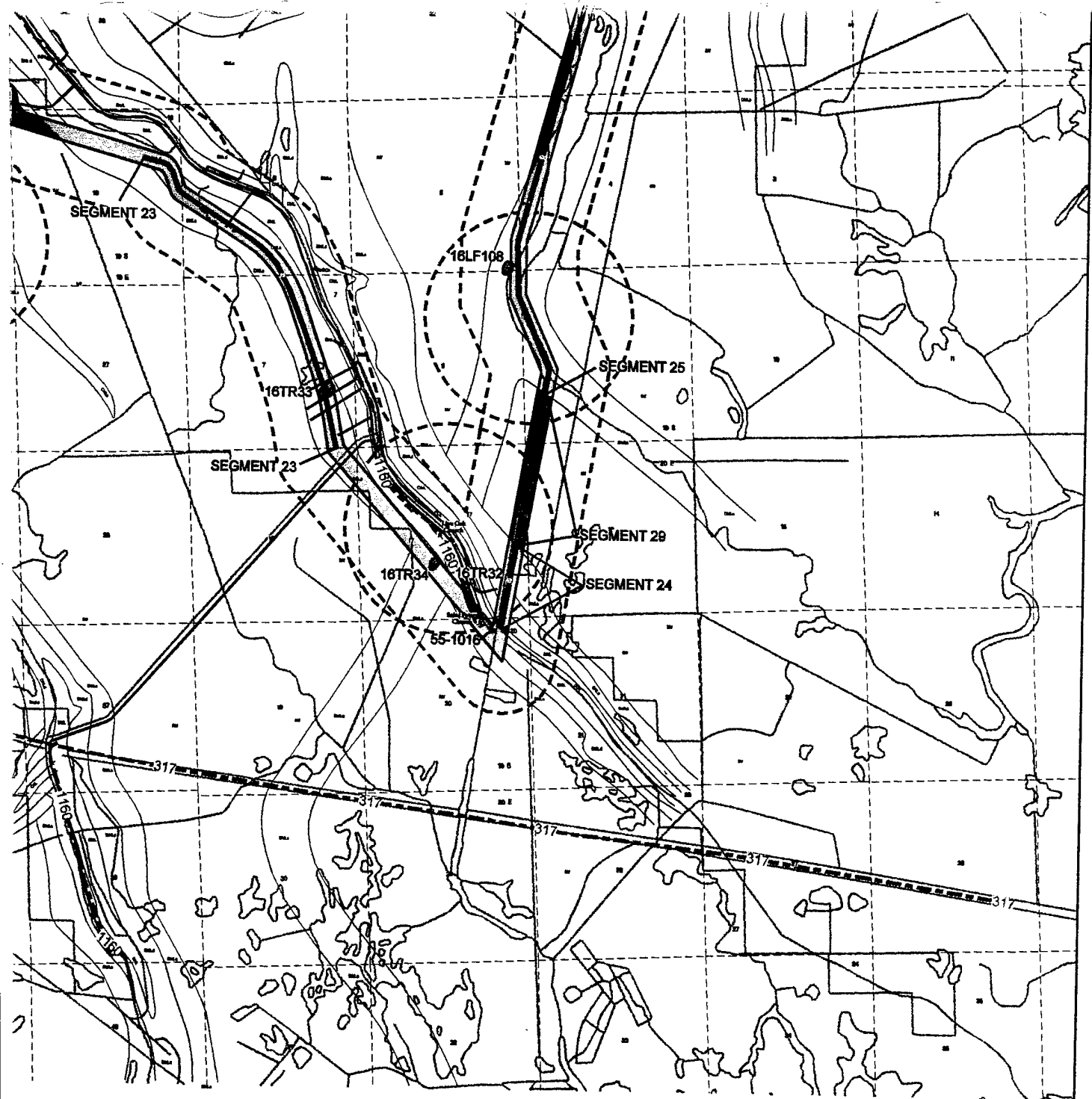
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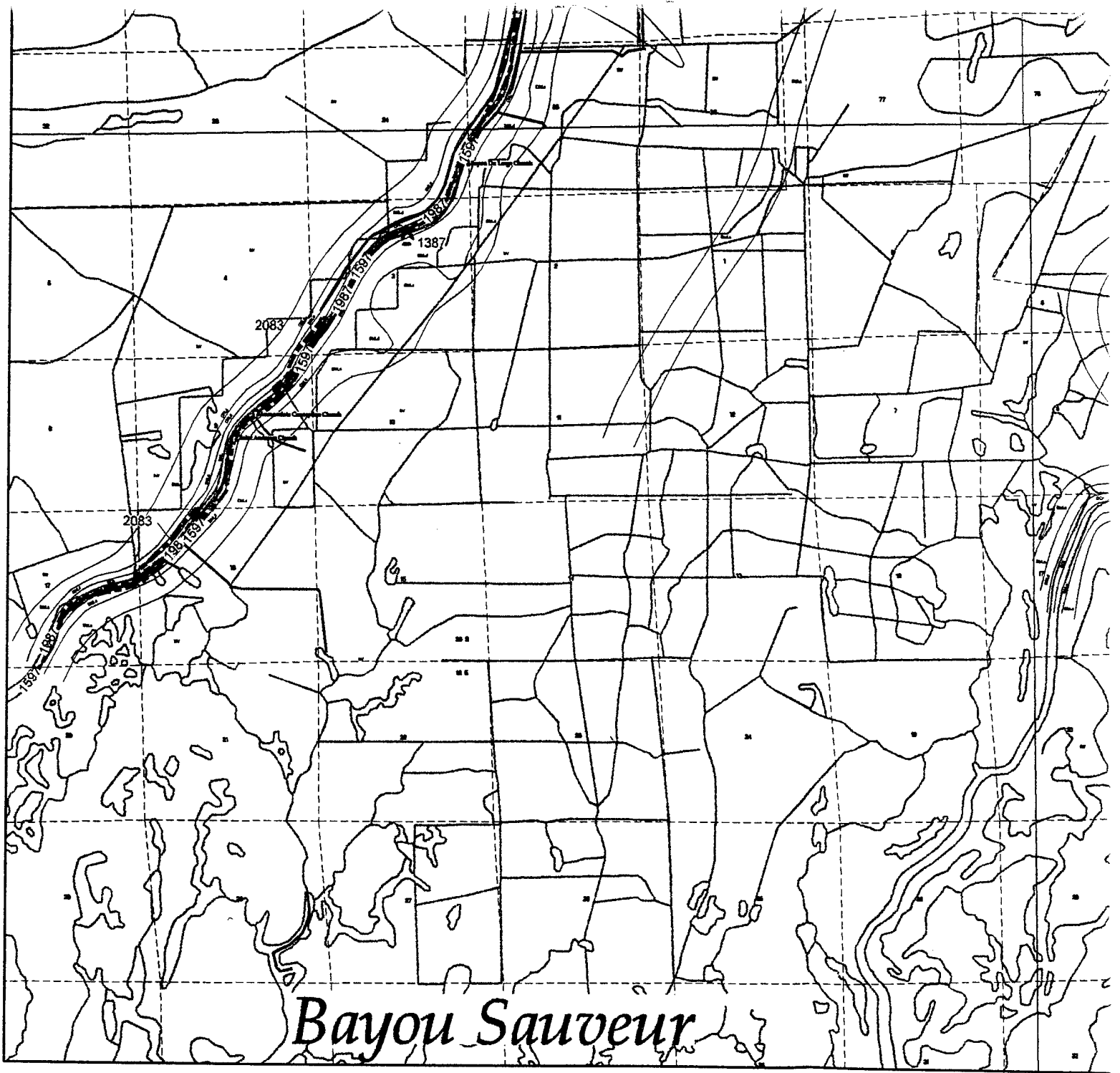


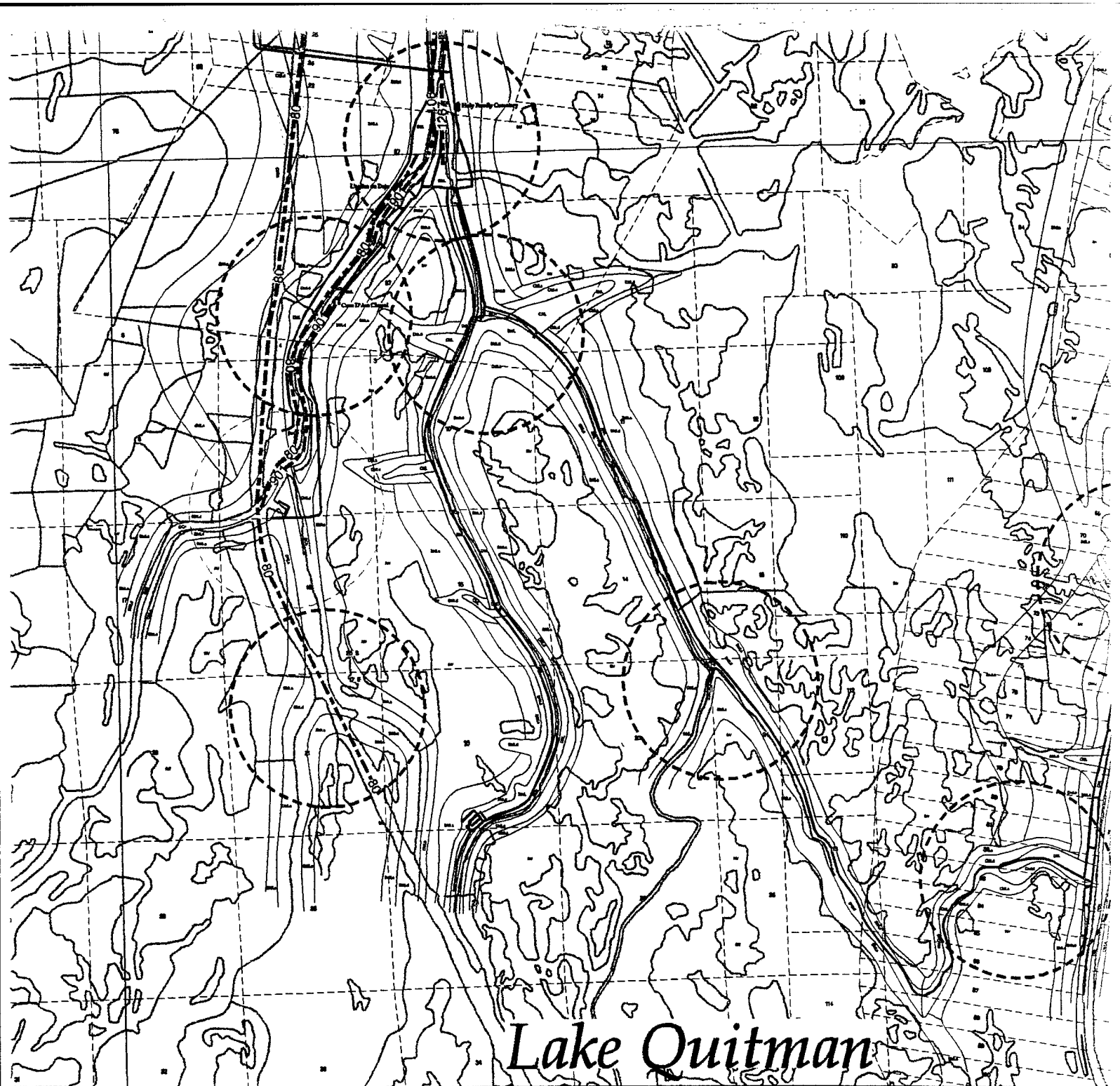
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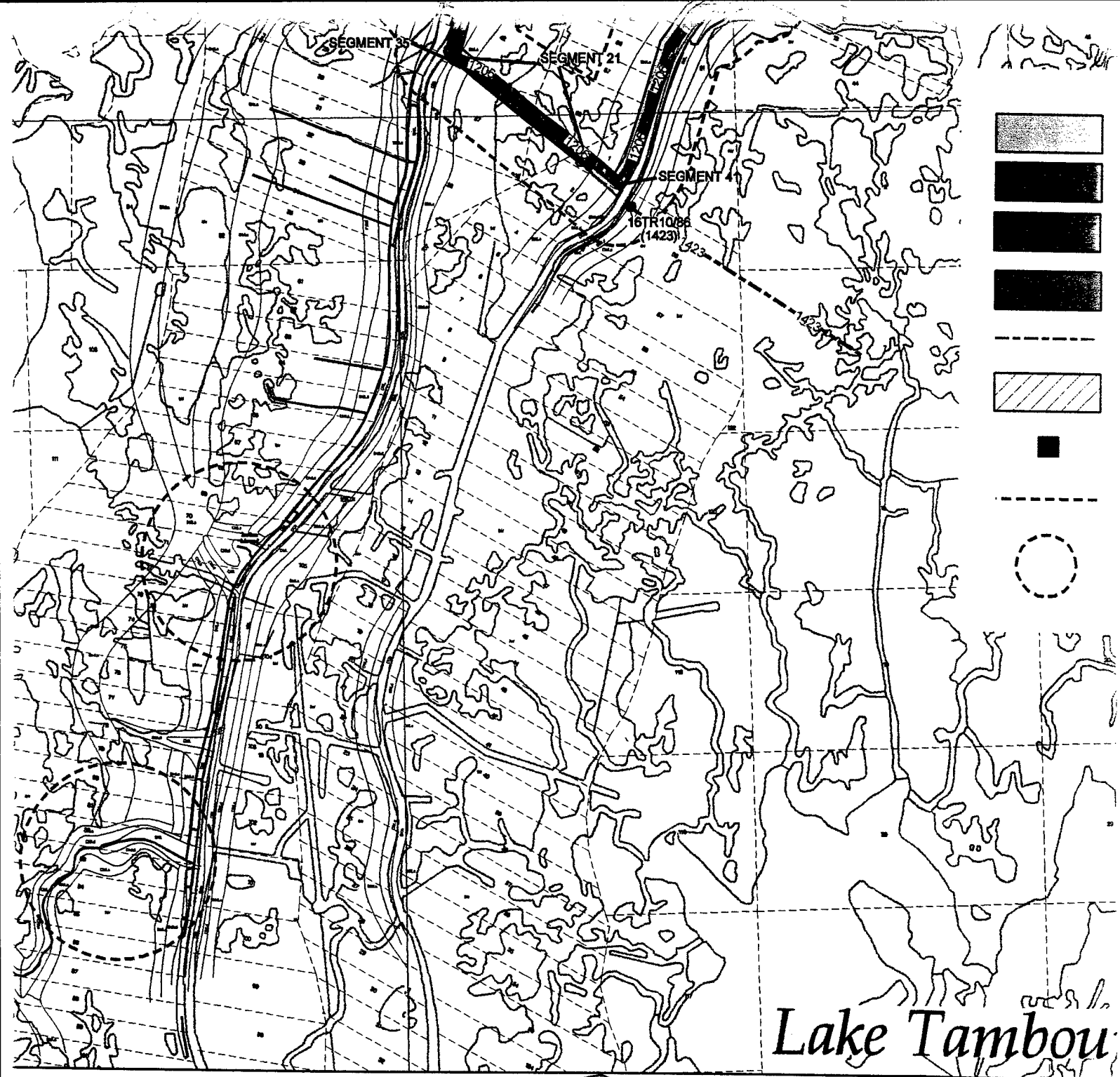


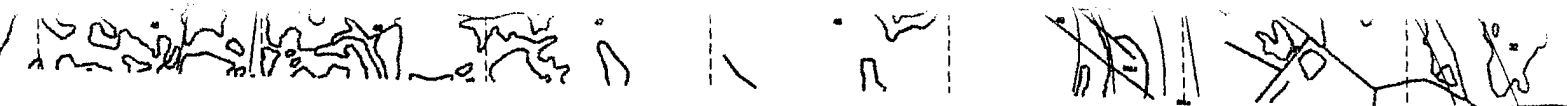


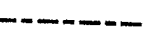
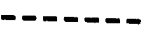


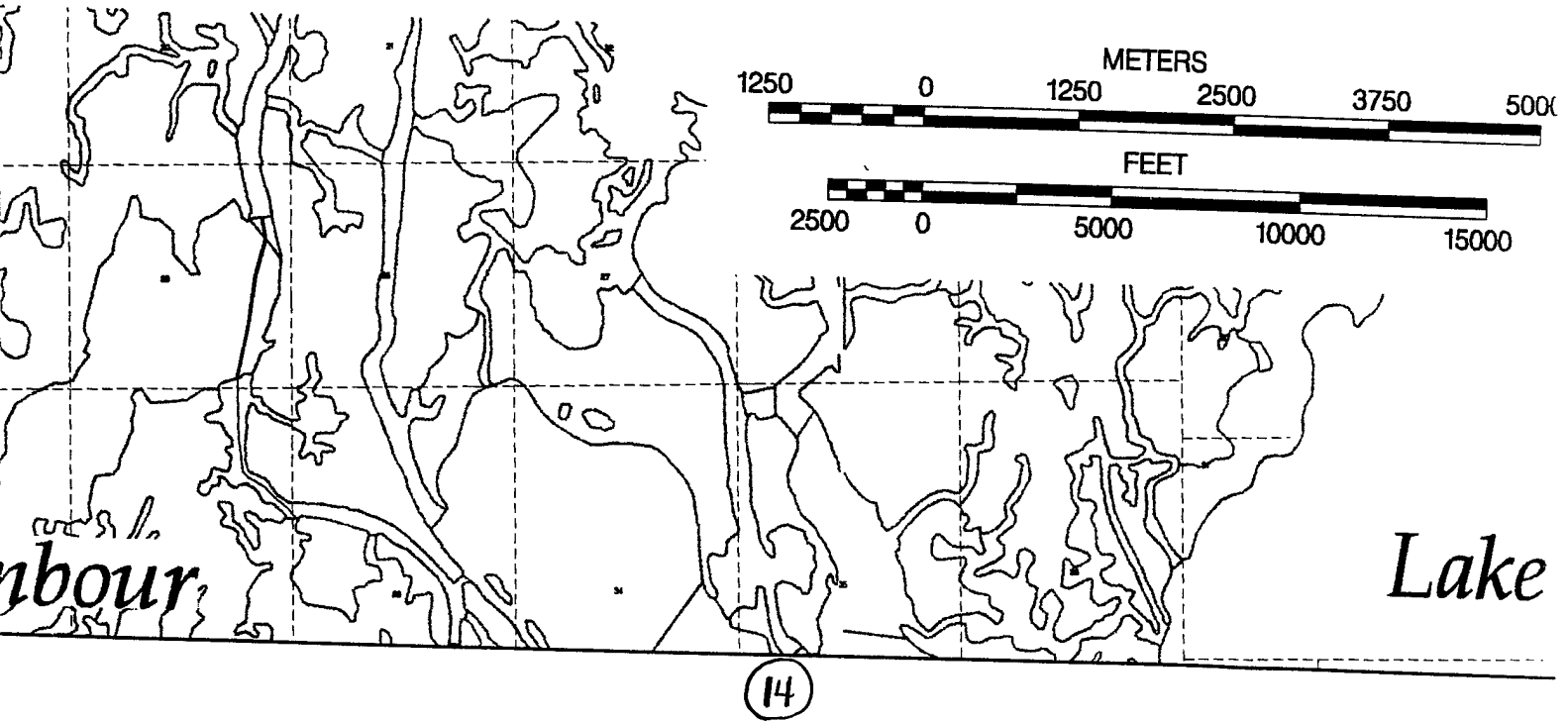
Lake Quitman

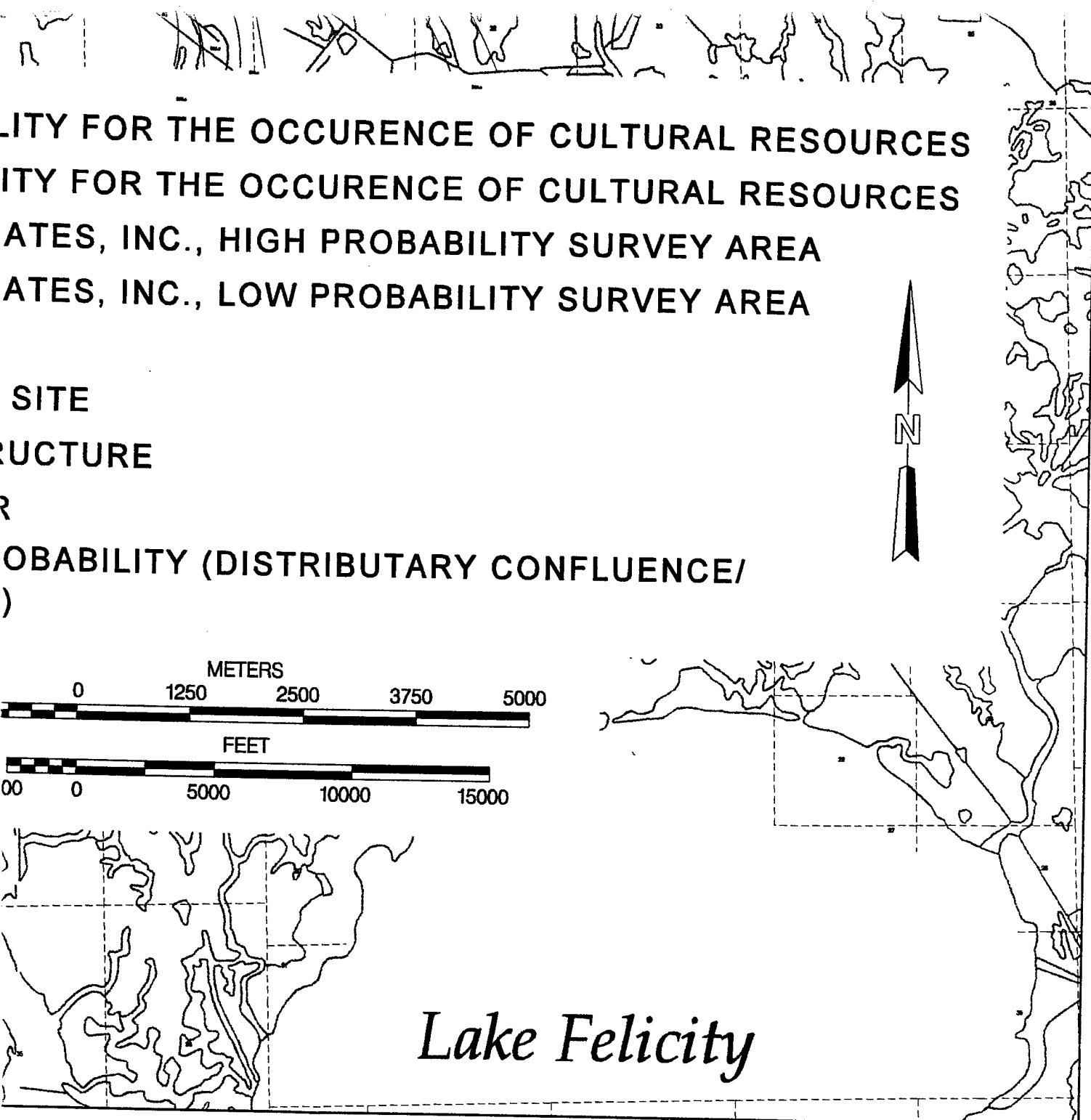
12





-  AREA OF HIGH PROBABILITY FOR THE OCCURENCE OF
-  AREA OF LOW PROBABILITY FOR THE OCCURENCE OF
-  R.C. GOODWIN & ASSOCIATES, INC., HIGH PROBABILITY
-  R.C. GOODWIN & ASSOCIATES, INC., LOW PROBABILITY
-  PREVIOUS SURVEY
-  PREVIOUSLY RECORDED SITE
-  HISTORIC STANDING STRUCTURE
-  .5 KM RESEARCH BUFFER
-  AREA OF ULTRA HIGH PROBABILITY (DISTRIBUTARY CO
CREVASSE LAND BRIDGE)





ITY FOR THE OCCURENCE OF CULTURAL RESOURCES
ITY FOR THE OCCURENCE OF CULTURAL RESOURCES
ATES, INC., HIGH PROBABILITY SURVEY AREA
ATES, INC., LOW PROBABILITY SURVEY AREA

SITE
UCTURE

OBABILITY (DISTRIBUTARY CONFLUENCE/
)

Lake Felicity