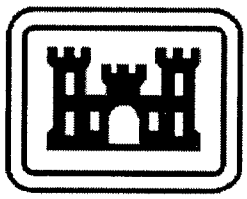

US Army Corps of Engineers

DACW29-97-D-0016
Delivery Order 18

CULTURAL RESOURCE SURVEY FOR THE WEST BANK VICINITY OF NEW ORLEANS, LOUISIANA, HURRICANE PROTECTION PROJECT

Final Report

December 2000

EARTH SEARCH, INC.
P.O. Box 850319
New Orleans, LA 70185-0319

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

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	December 2000	Final Report; August through November 1999

4. TITLE AND SUBTITLE
Cultural Resource Survey for the West Bank Vicinity of New Orleans, Louisiana, Hurricane Protection Project

5. FUNDING NUMBERS
DACW29-97-D-0016
Delivery Order 18

6. AUTHOR(S)
Aubra Lee, Gary Gordon, Roger T. Saucier, Benjamin D. Maygarden, and Michael Godzinski

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Earth Search, Inc.
P.O. Box 850319
New Orleans, LA 70185-0319

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Corps of Engineers
New Orleans District
P.O. Box 60267
New Orleans, LA 70160-0267

10. SPONSORING/MONITORING ORGANIZATION REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Unclassified. Distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

Earth Search, Inc., was contracted by the U.S. Army Corps of Engineers, New Orleans District (NODCOE), to conduct Phase I cultural resources survey within the proposed West Bank Vicinity of New Orleans, Louisiana, Hurricane Protection Project area. Fieldwork was conducted between September 14, 1999, and September 23, 1999. One hundred and forty-four bucket auger tests were excavated along 51 pedestrian transects during field investigations within the approximately 22-acre project area. No historic or prehistoric cultural resources were discovered in the project area, but three surface scatters of very recent materials were noted during survey, as well as a structure less than 50 years of age. Since no archeological sites or historic properties were discovered within the project area, ESI recommends no further work.

14. SUBJECT TERMS
Archeology, Bayou Barataria, geomorphology, Hero Cut-off, Hurricane Protection Feature, Plaquemines Parish

15. NUMBER OF PAGES
61

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

Earth Search, Inc. (ESI), performed Phase I cultural resources survey within the proposed West Bank Vicinity of New Orleans, Louisiana, Hurricane Protection Project area. Fieldwork was conducted between September 14, 1999, and September 23, 1999. One hundred and forty-four bucket auger tests were excavated along 51 pedestrian transects surveyed during field investigations. No significant cultural resources were discovered in the project area, but three surface scatters of very recent materials were noted during survey. Since no cultural resources were discovered within the project area, ESI recommends that no further archeological investigations are necessary, and that the proposed construction be allowed to proceed.

Project Area Description

The project area is located in Sections 35 and 95 of Township 14 South, Range 24 East (Figure 1). Bayou Barataria forms the northern boundary of the project area, while the Gulf Intracoastal Waterway Harvey Canal No 1 Hero Cutoff is the western boundary. Bayou Road is the closest feature to the southern boundary of the project area. The eastern boundary corresponds to an unnamed, shell-covered road running northwest/southeast. This undesignated road is located approximately 2,000 ft (609.57 m) west of the Hero Pumping Station (or Ronald Pumping Station).

The project area dimensions were determined to be approximately 400 ft (121.91 m) north/south and 3400 ft (1036.26 m) east/west. The eastern terminus of the project area baseline corresponds to Station 149 + 43.82 and the western end to Station 183 + 43.82. Industrial development has occurred intermittently along Bayou Barataria's bank line. Other modifications to the natural landscape include a northwest/southeast, shell-covered road located near the center of the project area and a pipeline right-of-way crossing in the extreme western portion of the project area (Figure 2).

Project Action

The United States Army Corps of Engineers, New Orleans District (NODCOE) is planning a hurricane protection feature for the West Bank Hurricane Protection Project. This protection feature will consist of an earthen levee to be built within the 400 ft (121.91 m) wide project area. Activities associated with this project will include the removal of all vegetation within the levee footprint and construction easement, construction of an access road, and construction of the levee. All these activities have the potential to impact and/or destroy any cultural resources located within the project area. Therefore, NODCOE contracted ESI to perform a Phase I cultural resources survey in order to locate any potential cultural resources in the project area and determine their significance in terms of National Register of Historic Places (NRHP) criteria.

Report Organization

The natural setting is described in Chapter 2, while the geomorphic history and processes are discussed in Chapter 3. Prehistoric and historic Native American cultural development is synthesized in Chapter 4. Chapter 5 provides a general overview of Euroamerican colonization and settlement. Previous investigations in the vicinity of the project area are presented in Chapter 6. Archeological field investigations and results are described in Chapter 7 and management recommendations based on these field investigations are presented in Chapter 8.

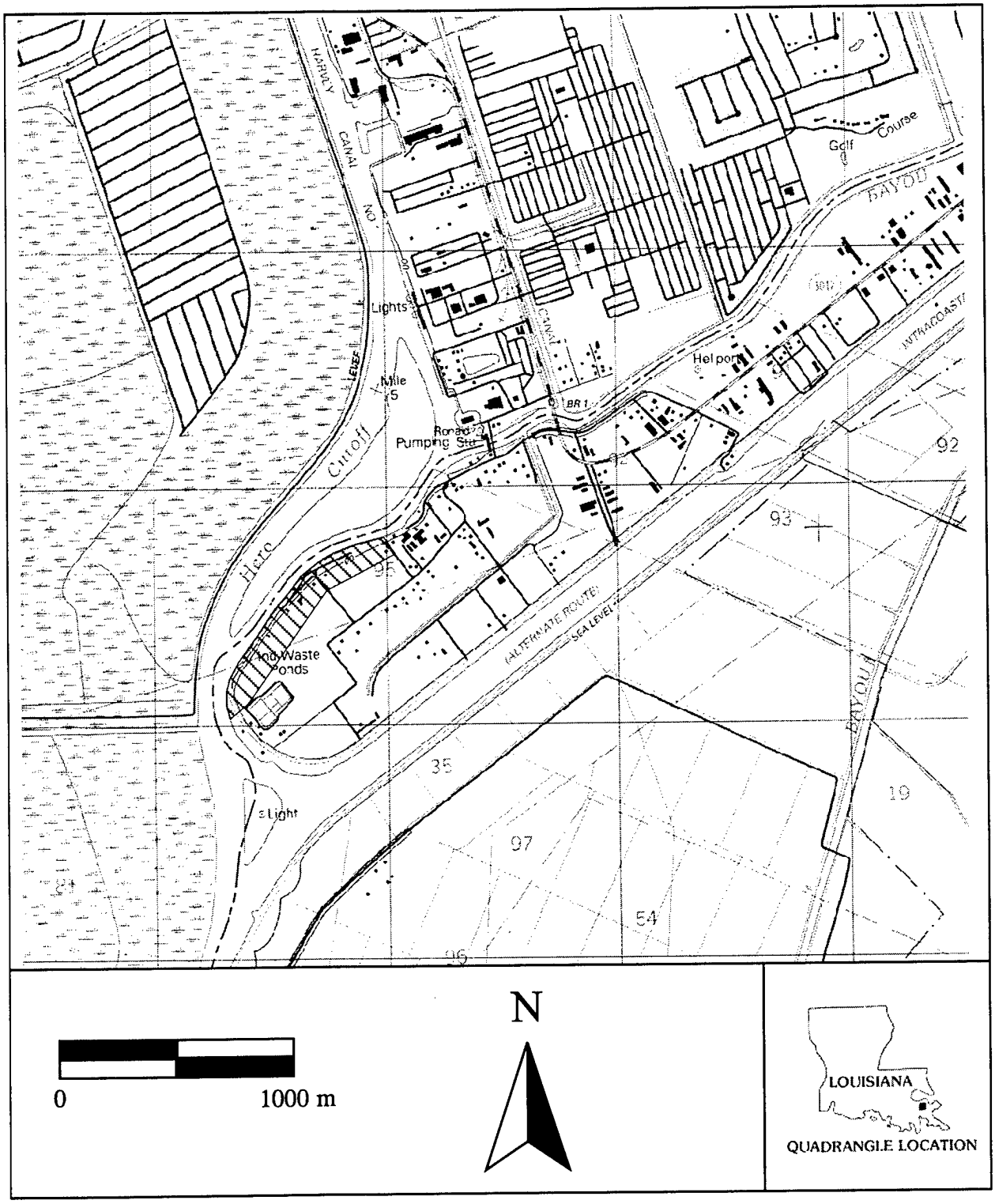

Figure 1. Excerpt from Bertrandville, LA 7.5' quadrangle (1992) showing project area.

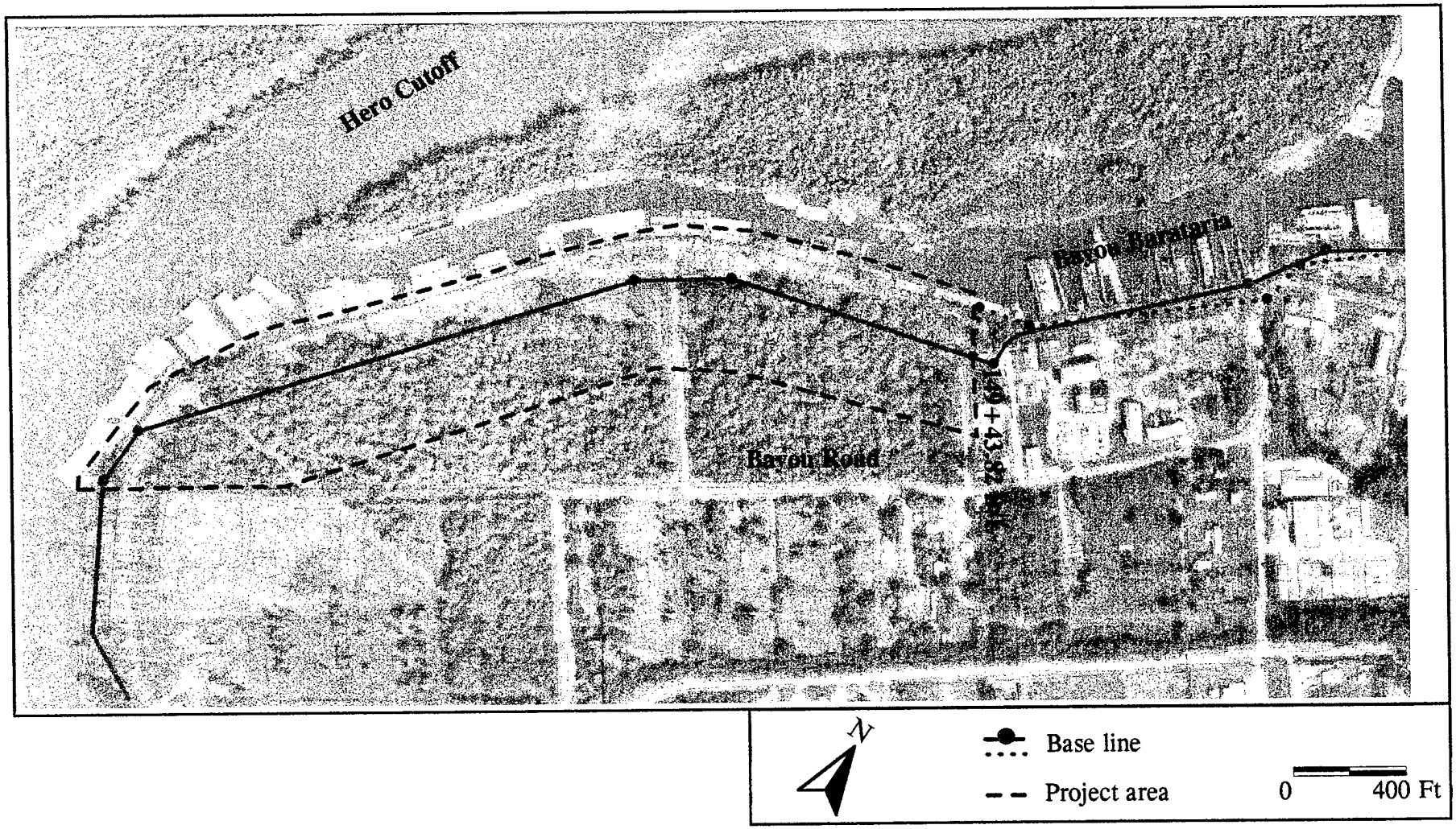

Figure 2. Excerpt from U.S. Army Corps of Engineers, New Orleans District project area map.

CHAPTER 2
NATURAL SETTING

Climate

Climate affects human groups directly and indirectly in terms of temperature, precipitation, seasonality, the effects on flora and fauna, and changes in soils over time (Evans 1978:3). All of Louisiana is located within an area of humid meso-thermal climate of the humid subtropical type generally characterizing all of the Southeastern United States (Trewartha 1970:12-13). The present-day climate of Plaquemines Parish is marked by long, hot, and humid summers, although the coastal area is cooled by breezes from the Gulf of Mexico (Matthews 1983:2; USDA/NRCS n.d.). The average temperature is 81 degrees F, with an average daily maximum of 90 degrees. Winters are generally warm, with rare snowfalls and occasional incursions of cool air from the north. The average temperature is 54 degrees F, with an average daily minimum of 44 degrees.

In most years, the growing season exceeds 260 days (White et al. 1983:103; USDA/NRCS n.d.). This means that it is often possible to schedule successive plantings of a crop between the last freeze in spring and the first freeze in the fall. In addition, 56 percent of the annual precipitation of 147.5 cm (58.07 in) falls in April through September. This is the growing season for most crops.

Soils

In their study of the Barataria Unit of Jean Lafitte National Historical Park and Preserve, White et al. (1983:103) observe that the eastern third of the park has alluvial soils of the Inceptisols type supportive of hardwood bottom vegetation, and the marsh vegetation in the western region exhibits soils of the Histosols type. Rita Muck is the specific soil type delineated within the project area (USDA/NRCS n.d.:Sheets 2 and 4). This soil is found on natural levees of Mississippi River distributaries and freshwater marshes.

Rita Muck has a level surface layer approximately 4 in (10.16 cm) thick. The surface layer is an extremely acid dark muck. The subsoil is gray and greenish gray mottled, firm clay. This poorly drained, firm, mineral soil is located in former freshwater marshes that are drained and protected from floods by levees and drained with pumps. The subsoil extends to an approximate depth of 30 in bgs (76.2 cm bgs). The water table is located 2 to 3 feet (0.60 to 0.91 m) below the ground surface under normal conditions (USDA/NRCS n.d.).

The soil has a medium soil fertility rating. Water and air move very slowly through the thin muck layer, but rapidly through a network of permanent cracks characteristic of the clay subsoil. Rita muck is poorly suited for pasturage and cultivation due to subsidence and high water table. Grasses such as common Bermuda, dallisgrass, tall fescue, and rye are considered suitable pasture plants. The soil has a limited capacity to support heavy machinery thereby making it poorly suited to urban uses or development (USDA/NRCS n.d.).

Plant Species

Plaquemines Parish can be divided into five primary environmental units and two secondary units (Bahr and Hebrard 1976:2). The primary units are forested wetland (swamp), fresh marsh, brackish marsh, saline marsh, and offshore area. Secondary units are beaches and other elevated areas (cheniers, natural levees, and spoil banks). White et al. (1983:103) identify the five general types of communities as hardwood bottom, intermediate swamp, cypress-tupelo swamp, marsh, and man-altered. The four environmental units described below are natural levee/hardwood bottoms, forested wetlands (swamps), fresh marsh, and brackish

marsh. Natural levees/hardwood bottoms receive primary focus, since this is the environment contained within the project area. Attention is necessarily given to forested wetlands/cypress-tupelo swamps and fresh marshes because these units are immediately adjacent to the natural levee/hardwood bottom unit, and the plant and animal species differ somewhat depending on unique characteristics of the units. Brackish marshes are also described because these are the source of *Rangia cuneata*, a mollusk very important in the pre-contact Native American diet of the region.

The plant species found in the four environmental units are identified below. The animal species are described in the next section. There is a direct relationship between the types of vegetation and animal species present, since most animals depend on specific plants for food or, as carnivores, will seek out these plant-eating animals.

Natural Levees/Hardwood Bottoms. The natural levees are extremely important as "ecological reservoirs of species diversity" (Bahr and Hebrard 1976:62). The majority of plant species are not suited for human consumption, but they provide a diversity of habitats for terrestrial animals. The hardwood bottom forests are dominated by water oak (*Quercus nigra*). Subdominants within these ridge forests include sweet gum (*Liquidambar styraciflua*), hackberry (*Celtis laevigata*), and live oak (*Quercus virginiana*). From the two hardwood bottom sites sampled, the average importance value of each dominant and subdominant species mentioned above was 82, 33, 31, and 20 respectively. Such a species composition agrees with Braun's (1950) description of bottoms in the Mississippi Delta region. Also, as she states, "the southern aspect of this forest is emphasized by the abundant palmetto (*Sabal minor*)." Several other species that characterize these forests include box-elder (*Acer negundo*), honey-locust (*Gleditsia triacanthos*), American elm (*Ulmus americana*), and Nuttall oak (*Quercus nuttallii*).

The most common shrub species in the hardwood bottoms are palmetto and green haw (*Crataegus virdis*). In some areas thickets of possum-haw (*Ilex decidua*) are found. Forest gaps support elderberry (*Sambucus canadensis*) and French-mulberry (*Callicarpa americana*). Occasionally the introduced camphor-tree (*Cinnamomum camphora)* is found. Vines are quite striking and common, including poison-ivy (*Rhus toxicodendron* var. *vulgaris*), Virginia creeper (*Parthenocissus quinquefolia*), supple-jack (*Berchemia scandens*), pepper-vine (*Ampelopsis arborea*), muscadine (*Vitis rotundifolia*), and hemp-weed (*Mikania scandens*) (White et al. 1983:103-104).

Bahr and Hebrard (1976:Table 1) add cottonwood (*Populus heterophylla*), bald cypress (*Taxodium distichum*), roughleaf dogwood (*Cornus drummondii*), black willow (*Salix nigra*), shagbark hickory (*Carya ovata*), pumpkin ash (*Fraxinus tomentosa*), persimmon (*Diospyros virginiana*), deciduous holly (*Ilex decidua*), and Shumard red oak (*Quercus shumardii*).

Forested Wetland/Cypress-Tupelo Swamp. This unit is adjacent to the natural levee/hardwood bottom forest. Bahr and Hebrard (1976:13) observe the community is affected by water level and drainage, with a swamp occurring in an area where the soil is "...usually saturated or covered with water for one or more months of the growing season." True swamp forest is dominated by bald cypress (*Taxodium distichum*) and tupelo gum (*Nyssa aquatica*). Other vegetation present includes swamp maple (*Acer rubrum* var. *drummondii*), pumpkin ash (*Fraxinus tomentosa*), and woody shrubs, such as Virginia willow and buttonbush (*Cephalanthus occidentalis*). Climbing vines are very common, including poison ivy (*Rhus toxicodendron* var. *vulgaris*), evening trumpet flower (*Campsis radicans*), greenbrier or cat-briar (*Smilax* spp.), *Silvo manso*, and *Ampelopsis cordata*. Spanish-moss (*Tillandsia usneoides*), mistletoe, ferns, and lichens are also represented. White et al. (1983:105) add wax-myrtle (*Myrica cerifera*), smart-weed (*Perscicaria punctata*), alligator-weed (*Alternanthera philoxeroides*), swamp-potato (*Sagittaria lancifolia*), water hyacinth (*Eichhornia crassipes*),

red iris (*Iris fulva*), blue iris (*Iris giganticaerulea*), and bur-marigold (*Bidens laevis*) to the list. The water hyacinth is not native to the region.

Fresh Marsh. This zone differs from the swamp forest wetland in that it exhibits increased thickness of organic sediment. There is a lack of trees (White et al. 1983:106). Plant species include maidencane (*Panicum hemitoma*), bulltongue (*Sagittaria falcata*), spikerush (*Eleocharis* sp.), alligator-weed (*Alternanthera philoxeroides*), sedge (*Cyperus odoratus*), cat-tail (*Typha* spp.), water millet (*Echinochloa walteri*), water hyssop (*Bacopa monnieri*), smartweed (*Polygonum* sp.), three-cornered grass (*Scirpus olneyi*), and giant cutgrass (*Zizaniopsis miliacea*) (Bahr and Hebrard 1976:Table 2).

Brackish Marsh. Bahr and Hebrard (1976:Figure 1) show brackish marshes some distance south of the project area. The Gulf water level at the coast influences both the system water level and salinity in the brackish marsh. The major plant species present are wire grass (*Spartina patens*), salt grass (*Distichlis spicata*), oyster grass (*Spartina alterniflora*), dwarf spikerush (*Eleocharis parvula*), black rush (*Juncus romerianus*), and three-cornered grass (*Scirpus olneyi*).

Animal Species

Animal species are restricted to specific units to some extent on the basis of plant species or other factors, such as water, but there is also some movement of animals between environmental units. Thus, deer may be found at times in any of the diverse units of the Barataria Basin (swamp, fresh marsh, and bottomland hardwood forest) depending in part on seasonal availability of plant resources and varying annual conditions, such as drought.

Natural Levee/Bottomland Hardwood Forest. This unit offers the best habitat for terrestrial animals since it rarely floods. Various nut-bearing trees produce mast during the fall attractive to a variety of mammals and birds. Native mammals common in this environment include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), squirrel (*Sciurus* sp.), rabbit (*Sylvilagus* sp.), and opossum (*Didelphis virginiana*).

The white-tailed deer is a browsing ruminant. Its diet "...consists of tender shoots, twigs, and leaves, a wide assortment of herbaceous foodstuffs, acorns of a number of oak species, and certain fruits" (Smith 1975:19). Deer are selective in their feeding habits, with the diet shifting significantly from season to season. Although deer are found in climax forest situations where a closed canopy exists, their population densities are low. The greatest number of deer are found in small areas of varying types, where maximum edge areas between habitat zones exist. In Plaquemines Parish, this would be where the hardwood bottoms give way to forested wetlands, or similar edges. The mast in the bottom hardwoods unit attracts deer during the fall and winter, although the tender plants of the swamps provide at least seasonal nourishment. The range of deer usually does not greatly exceed one mile (Smith 1975:20-21). Although deer can be hunted all year, there are behavioral changes associated with the rutting season (September-November) that make male deer more curious and belligerent. At these times, they are easier to hunt. During most of the year, the hunting strategy of slow stalking and concealment potentially frightens the game.

Raccoons are nocturnal feeders, generally secluded in dens during the day (Arthur 1928:87-98; Smith 1975:43). Dens (tree cavities, fallen logs) tend to be near creeks, bayous, or rivers. Seasonal availability dictates the kinds of foods taken. Winter foods consist of carrion, winter-killed fish, corn, and mice. Spring and summer foods include mulberries, dewberries, crayfish, and insects, with corn, wild grapes, and blackberries added to the diet in late summer. Fall foods include fruits and nuts (persimmons, pecans, acorns). Raccoons

cover large distances and forage in diverse habitats, but their home range tends to be about one mile in diameter.

The opossum prefers woodland regions with open water areas. They are not found in densely forested areas lacking water, and they avoid open areas (Arthur 1928; Smith 1975:86). They are strictly nocturnal, except in circumstances when they are disturbed and appear during the day. Opossums prefer to eat insects, but other foods include rabbit (feeding on carrion), pokeberry, wild grape, persimmon, and blackberry.

The cottontail rabbit is found in a wide variety of dry habitats. It is found in closed canopy forests, but population densities are greater in open brushy or forest border habitats with shrubby vegetation and small open areas (Smith 1975:92). Food preference shifts with the seasons. During the winter they live on dried herbs, grasses, fruits, and berries. During the growing season, they eat leaves, stems, flowers of grasses, herbs, and sedges. They are most active at night and during the early morning.

Swamp. Aquatic animals are the most abundant animals to be exploited in this unit, although mammals are known to inhabit or invade the swamp in their quest for food. Native mammals recorded are swamp rabbit (*Sylvilagus aquaticus*), deer, and raccoon (Bahr and Hebrard 1976:23). Otters (*Lutra canadensis*) also are occasionally found. Birds include osprey, red-shouldered hawk, kingfishers, herons, and egrets (Bahr and Hebrard 1976:21, 23; Department of Conservation 1931).

Aquatic animal species are well represented, and fish species include the blue catfish (*Ictalurus furcatus*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), black crappie (*Pomoxis nigromaculatus*), and bowfin (*Amia calva*) (Bahr and Hebrard 1976:22-23; Department of Conservation 1933). A number of species of gar (*Lepisosteus* spp.), as well as other fish, have been collected in the unit (Bahr and Hebrard 1976:Table 10). Reptiles include alligator (*Alligator mississippiensis*), box and snapping turtles, skinks, and cottonmouth moccasins (Bahr and Hebrard 1976:21, 23).

Fresh Marsh. Mammals are poorly represented in this unit, although they occasionally seek food resources in the freshwater marshes. Native mammals observed at times include mink (*Mustella vison*) and raccoon. Deer occasionally graze in the fresh marsh (Bahr and Hebrard 1976:27, 29). Birds recorded in the marshes include marsh wrens, yellowthroats, egrets, blackbirds, bitterns, gallinules, herons, marsh hawks (Bahr and Hebrard 1976:29).

Animals found more readily in aquatic contexts include fish and some reptiles. In associated water bodies, a significant variety of fish have been noted. These include spotted gar (*Lepisosteus oculatus*), gulf menhaden (*Brevoortia patronus*), bay anchovy (*Anchoa mitchilli*), carp (*Cyprinus carpio*), black bullhead (*Ictalurus melas*), yellow bullhead (*Ictalurus natalis*), channel catfish (*Ictalurus punctatus*), bluegill (*Lepomis macrochirus*), spotted sunfish (*Lepomis punctatus*), largemouth bass (*Micropterus salmoides*), and numerous others (Bahr and Hebrard 1976:Table 10). The largest reptile present in this environmental unit is the American alligator (*Alligator mississippiensis*) (Bahr and Hebrard 1976:29).

Brackish Marsh. The muskrat (*Ondatra zibethicus*) is the primary herbivorus mammal consistently occupying the brackish marsh (Bahr and Hebrard 1976:37, 120). It eats primarily vegetable foods, including the root systems of plants that grow in or about water (cat-tail and *Scirpus* sp.). Rabbits and white-tailed deer are found more rarely, compared to their presence in fresh marshes. Mink (*Mustella vison*) prefer the fresh marsh, but they become more numerous in brackish marshes during periods of peak muskrat density. Raccoon and otter (*Lutra canadensis*) have also been observed in brackish marsh areas.

During spring and summer, bird species become numerous. These include king rail, boat-tailed grackle, and red-winged blackbird. Other birds present include dabbling duck (mallard, mottled duck, black duck, gadwell, pintail, green-winged teal, blue-winged teal, baldpate, and shoveler) (*Anas* sp.), diving ducks (redhead, canvasback, scaup, ringnecked, ruddy, and mersgansers) (*Aythya* sp.), egrets, herons, bitterns, ibises, osprey, and kingfishers.

Alligators seasonally range from the swamp forest to the salt marsh, but reptiles generally become less numerous as salinity increases. Fish found in the brackish marsh include spot (*Leiostomus xanthurus*), southern flounder (*Paralichtys legostigma*), croaker (*Micropogon undulatus*), sea trout or speckled trout (*Cynoscion nebulosus*), sheepshead (*Archosargus probatacephalus*), silver perch (*Bairdiella chrysura*), and black and red drum (*Pogonias cromis*).

Rangia cuneata shell is found at prehistoric sites throughout the region. Byrd (1976) examined the nutritional and caloric value of this brackish water mollusk in order to determine its relative importance to prehistoric diets. She found that *Rangia* was relatively low in food value when compared to other food resources available to prehistoric Native Americans. However, the clams are relatively abundant and require little energy to collect. In addition, *Rangia* may have contributed to trace element intake and other aspects of diet that remain undetermined. Also, the large volume of *Rangia* shells that result from harvests represent an important source of "fill" in low-lying areas subject to flooding. It is possible that Native Americans were deliberately using *Rangia* shells to provide greater topographic relief for their habitations.

CHAPTER 3
GEOMORPHIC SETTING AND HISTORY

Purpose and Scope

This report contains a brief description of the geologic setting, landforms, geomorphic processes, and geomorphic history of the project area as related to a survey and evaluation of possible cultural resources. In an environment that has been as dynamic as the Mississippi River deltaic plain during the course of human occupation, it is essential to understand the nature and origin of the natural landscape for two primary purposes. One is to anticipate the presence and possible location of significant sites of human habitation and/or use, and the second is to assess the state of preservation of the possible sites. Further, if sites are present, the natural landscape may contain valuable information regarding their regional cultural context and the ecological base of the inhabitant's subsistence.

No fieldwork was accomplished as part of this geomorphic evaluation and none was deemed advisable. The information contained herein was derived from the published literature and supplemented heavily with the writer's strong personal familiarity with the geomorphology and geoarchaeology of southeastern Louisiana (e.g., Saucier 1963, 1994). Topographic and historical maps and aerial photos of the project vicinity were also consulted.

Project Location

The project area lies in southeastern Louisiana south of the Mississippi River and the greater New Orleans metropolitan area. More specifically, it lies about 9.6 km (6.0 mi) south of the town of Gretna in extreme northwestern Plaquemines Parish. The project encompasses slightly over 1.0 km (0.6 mi) of the east (or south) bank of Bayou Barataria immediately upstream from its junction with the Hero Cutoff segment of the Harvey Canal. Bayou Barataria in this area lies less than a kilometer north of and trends parallel to the Gulf Intracoastal Waterway (Alternate Route). The project area is in a heavily industrialized area where undoubtedly there has been substantial modification of the natural ground surface. In addition, the project area is along that portion of Bayou Barataria, which, before the Hero Cutoff, was the route of the Harvey Canal.

General Geologic and Geomorphic Settings

The project area lies in the Gulf segment of the Gulf and Atlantic Coastal Plain province of North America. More specifically, it lies in the northeastern portion of the Mississippi River deltaic plain at the southern end of the Lower Mississippi Valley. Geologically, the deltaic plain overlies the northern portion of the east-west trending Gulf Basin, a deep structural trough called the Gulf Coast Geosyncline where the continental crust 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 (Murray 1961). It is an area where subsidence is a dominant process.

The 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. At the project location, the Holocene prism or veneer is about 24 m (80 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 (Kolb and VanLopik 1958; Saucier 1963, 1994).

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. 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 (a matter of centuries) 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.

Physiographically, the deltaic plain is an exceptionally flat and low-lying tract of alluvial land that is overwhelmingly dominated by two landscapes—broad expanses of intratidal wetlands characterized by swamps, marshes, shallow lakes, and tidal channels; and low, narrow natural levee ridges flanking the present course of the Mississippi River and its numerous abandoned deltaic distributaries.

Intratidal wetlands occur in interdistributary lowlands that are nearly enclosed shallow basins between major distributary ridges. The project area occurs at the upstream end (northeast corner) of the Barataria Basin, one of the largest and most classically developed interlobe basins of the deltaic plain. The basin is bounded on the east and north by the natural levee ridge along the modern channel of the Mississippi River from Donaldsonville, La., to the Gulf. On the west and south, it is bounded by the large Bayou Lafourche distributary and the closely associated ones of the Lafourche delta complex.

The wetlands of the basin are interrupted only in small measure by several small natural levee ridges that serve to divide the basin into a series of subbasins. As shown in Figure 3, the project location lies in a small subbasin bounded on the east and north by the Mississippi River natural levee ridge, on the northeast by a small natural levee ridge formed by what has been called the Unknown Bayou distributary (Saucier 1963), and on the west by the somewhat larger natural levee ridge along the Bayou des Familles distributary.

Maximum elevations of the deltaic plain in the project vicinity occur along the Mississippi River natural levee ridge to the north where they are only about 1.8 to 2.1 m (6 to 7 ft) above sea level (NGVD). Elevations along the Bayou des Familles natural levee ridge are everywhere less than 1.5 m (5 ft) above sea level. All natural elevations in the project area approximated sea level and have subsided to below that datum in developed areas where the organic-rich interdistributary deposits have been desiccated and consolidated (Saucier and Snowden 1995).

Geomorphology of the Project Area

The depositional environment of the project area is that of an interdistributary lowland characterized (in its natural state) by a cypress swamp vegetation assemblage. As stated above, the lowland is bordered on three sides by natural levee ridges. The geomorphic processes involved in the formation of all of these environments plus the nature of the deposits and surficial soils have been described in detail in numerous publications and are not repeated herein. The reader is referred to such references as Coleman and Gagliano (1964), Kolb and VanLopik (1958), and Saucier (1994) for further information.

Bayou Barataria, while not a depositional landform, is the most important landscape element in the project area. This stream is a tidal channel that has functioned for two purposes. It has conveyed the runoff from local subbasin precipitation southward out of the lowland and eventually into Barataria Bay and the Gulf of Mexico. In the project area, it has

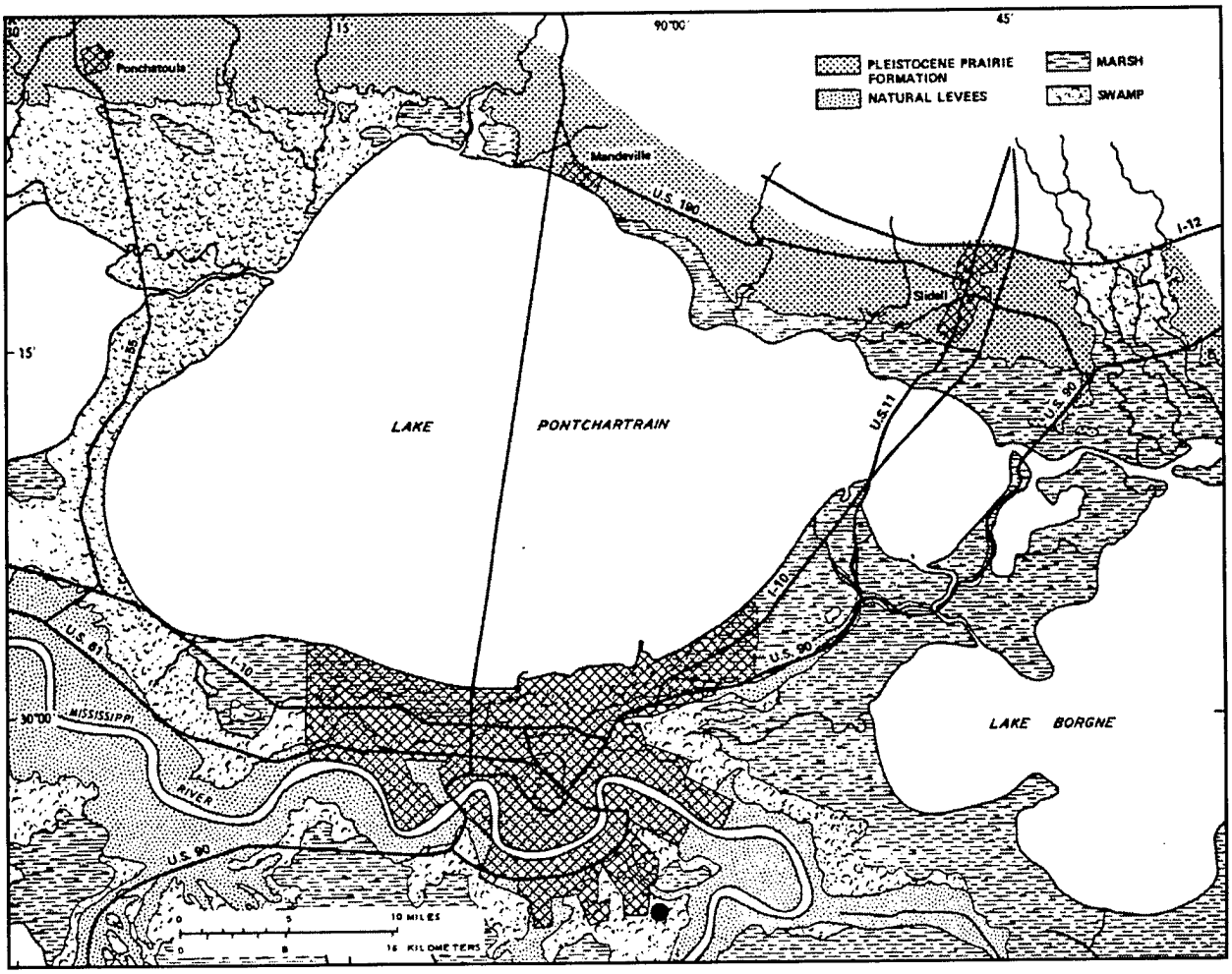

Figure 3. Major landforms and natural depositional environments in the greater New Orleans area. Project location shown by black dot. From Saucier and Snowden (1995).

not been influenced by distributary natural levees; however, about 7.7 km (4.8 mi) downstream at the community of Crown Point, La., the stream enters the abandoned channel of the Bayou des Familles distributary and is bounded by prominent natural levees. The second purpose of Bayou Barataria has been to accommodate the discharge of overbank flows from the Mississippi River during times of seasonal flooding. These overflows have carried sufficient fine-grained suspended sediment that Bayou Barataria has very small and topographically indistinct natural levees, but nevertheless ones that could have supported limited prehistoric habitation.

Geomorphic History and Geoarchaeological Considerations

Events of the late Pleistocene and early to middle Holocene epochs are not relevant to the geoarchaeology of the project vicinity. During these periods, sea level was more than a few meters lower than at present and the landscape of the area was that of an entrenched, emergent coastal plain. Any cultural remains, highly unlikely to have been present and/or preserved, would be located at depths greater than 20 m (65 ft). Readers are referred to Kolb and VanLopik (1958) and Saucier (1963 and 1994) for more information.

About 5,500 yrs ago, with sea level at most only a few meters lower than present, the project area as well as virtually all of the greater Lake Pontchartrain/New Orleans areas were characterized by a shallow arm or embayment of the Gulf of Mexico. The Mississippi River had begun constructing a subaerial deltaic plain by about 7,500 yrs ago, but it was located in central coastal Louisiana well to the west of the project vicinity. The first Mississippi River deltaic deposits were not introduced in the project vicinity until about 4,800 yrs ago when the river shifted upstream to the eastern side of its alluvial valley and extended a delta complex into the New Orleans area (Saucier 1963, 1994). The complex was designated the Cocodrie subdelta by Saucier (1963) and later the Mississippi River and Bayou Lafourche lobe of the St. Bernard complex by Frazier (1967). Details of this complex or lobe are largely unknown, but it does not appear that any significant deltaic distributaries were present south of New Orleans. The area may have become an intratidal wetland (coastal marsh) for a short period of time, but probably was reworked and destroyed by marine processes within a millennium. No land surface dating to this delta complex is believed to be preserved in the subsurface of the project area, thus no cultural remains dating to the Late Archaic period should be present.

About 3,400 yrs ago, according to the estimate of Frazier (1967), deltaic sedimentation returned to the greater New Orleans area with development of the Bayou des Familles lobe of the St. Bernard complex (Figure 4). Although no natural levees from this system formed in the project area, very likely it was characterized by intratidal, interdistributary wetlands. Drainage from the wetlands east of Bayou des Familles likely was eastward into the Gulf of Mexico and Bayou Barataria did not exist.

Within no more than 1,000 yrs and probably about 2,700 yrs B.P., the Metairie Bayou distributary of the St. Bernard complex developed in the New Orleans area and one of its branches trended southeastward as indicated by the Unknown Bayou distributary (Figure 4). This extended intratidal wetlands considerably farther to the east and the new natural levee ridge effectively blocked eastward drainage of the wetlands into the Gulf. Thenceforth, drainage had to be to the south and no doubt this is when Bayou Barataria came into existence. It is postulated that it was about this time that the Bayou des Familles distributary became inactive and this may have been when the southern portion of Bayou Barataria occupied the abandoned distributary channel south of Crown Point.

The Unknown Bayou distributary probably was active for only a few hundred years judging from the modest size of its natural levees (Saucier 1963). After it was abandoned, the interdistributary wetlands in the project vicinity must have become an extremely productive

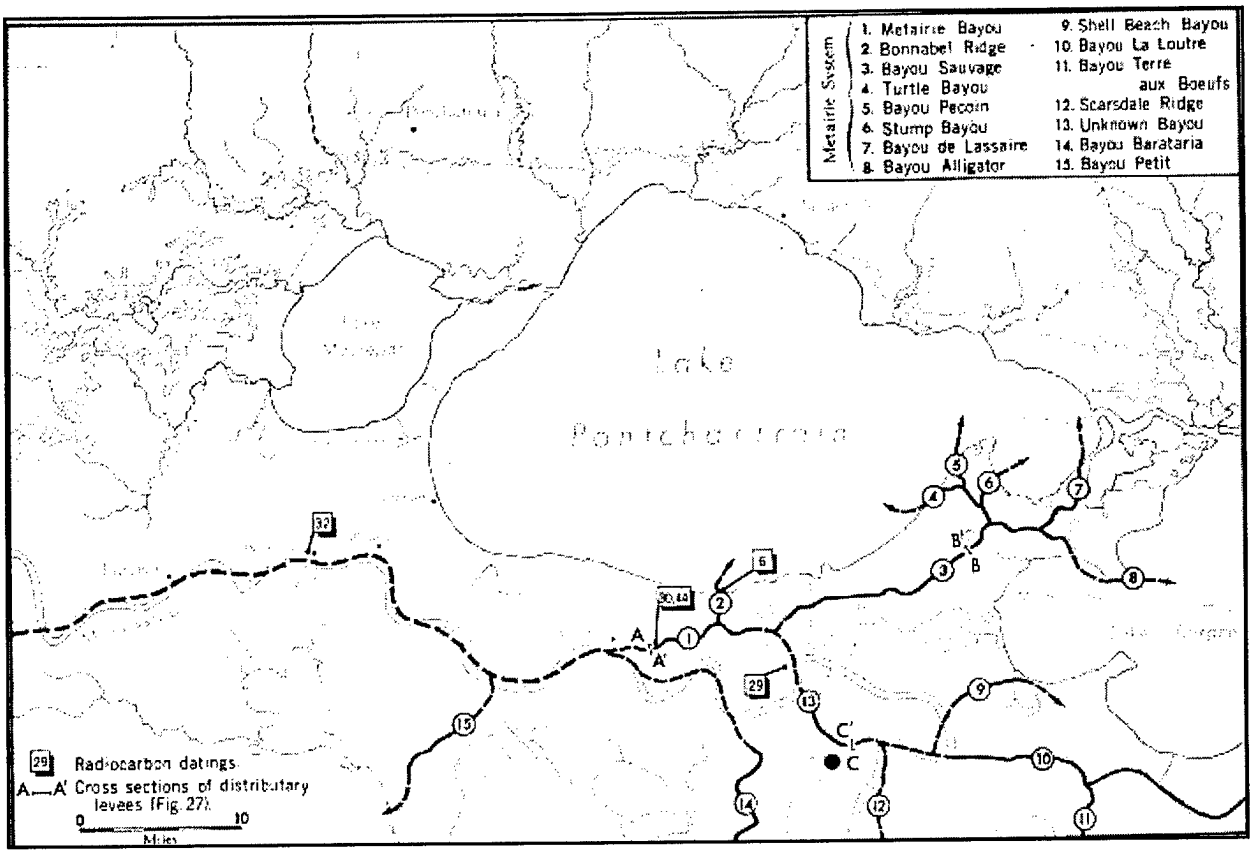

Figure 4. Locations and names of distributaries of the St. Bernard complex in southeastern Louisiana. Project location shown by black dot. From Saucier (1963).

and ecologically attractive environment for hunting, gathering, and fishing. During this time, the banks of Bayou Barataria essentially lacked natural levees and hence would have been subjected to *occasional* flooding. However, the lack of natural levees certainly would not have prevented this waterway from being widely used for communication, contact, and trade by Formative Stage cultures. The presence of small, temporary encampments along the bayou would not be unexpected.

A period of very limited delta growth in the St. Bernard complex after about 2,200 yrs ago, and hence infrequent flooding, has been attributed to upstream diversion of most river flow into the Lafourche complex to the southwest of the New Orleans area (Frazier 1967). It is believed that full-flow conditions returned to the New Orleans area by about 1,200 yrs ago during a lull in Lafourche complex activity (Saucier 1963). This was marked by establishment of the present river course through the city area north of the project area. Overbank flooding would have substantially increased during the next several centuries and until natural levees became well established along the new route. Bayou Barataria would have served to convey the overflow to the south and this is believed to have been when the small natural levees formed along the bayou. Overall favorable ecological conditions in the subbasin would have persisted with no more than a slight decline due to more turbid waters. Thus, this is when Mississippian cultures may have inhabited and used the Bayou Barataria area to a greater extent than their predecessors. These conditions continued into historic times.

Since Bayou Barataria developed about 2,700 yrs ago, it has probably gotten progressively a little larger, but apparently it has not changed in position or configuration. There are no geomorphic indications of course changes or any lateral channel movement by point bar growth. This is quite typical of wetland tidal channels that lack a significant sediment load, especially those with banks composed of clayey interdistributary deposits that are hard to erode.

Maps of the eighteenth and nineteenth centuries document the presence of Bayou Barataria in the early historic period. For example, a map of the English Turn area (Ross 1765) lacks precision, but it depicts Bayou Barataria south of New Orleans at this early date (Figure 5). Similarly, a Civil War vintage map of the New Orleans area (Houston 1863) shows its presence, but with greater detail and precision as would be expected considering the later date (Figure 6).

In conclusion, there is a moderate probability that sites of the Formative Stage, especially the latter part, may be present along Bayou Barataria. There is, however, nothing about the specific project location that would have made it more attractive or less attractive to prehistoric peoples than other reaches of the bayou. Any cultural remains that may be present should be within less than a meter of the ground surface and near the present stream banks. They are likely to be veneered with artificial fill or badly disturbed by industrial activities.

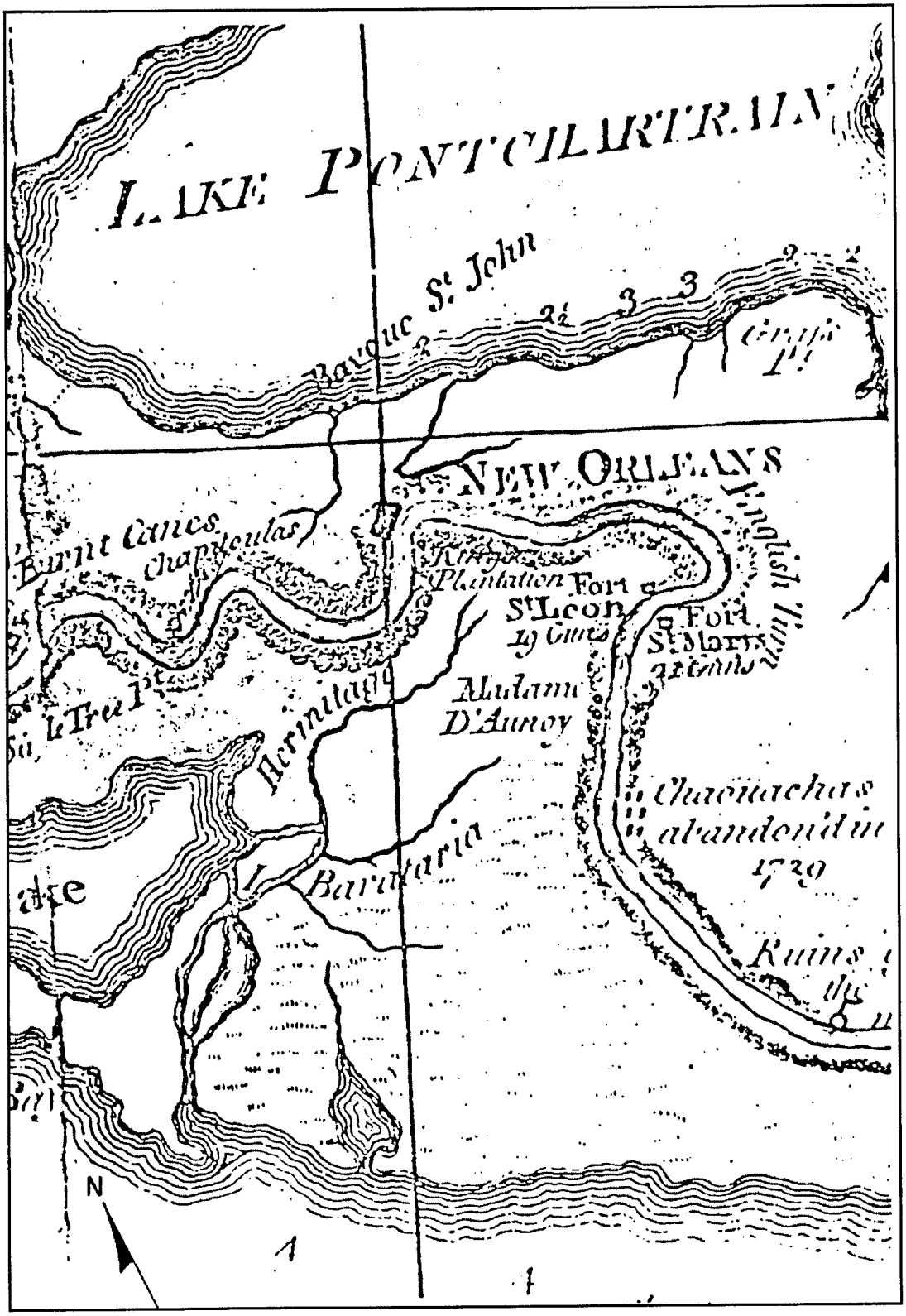

Figure 5. Detail of English Turn. From Ross (1765).

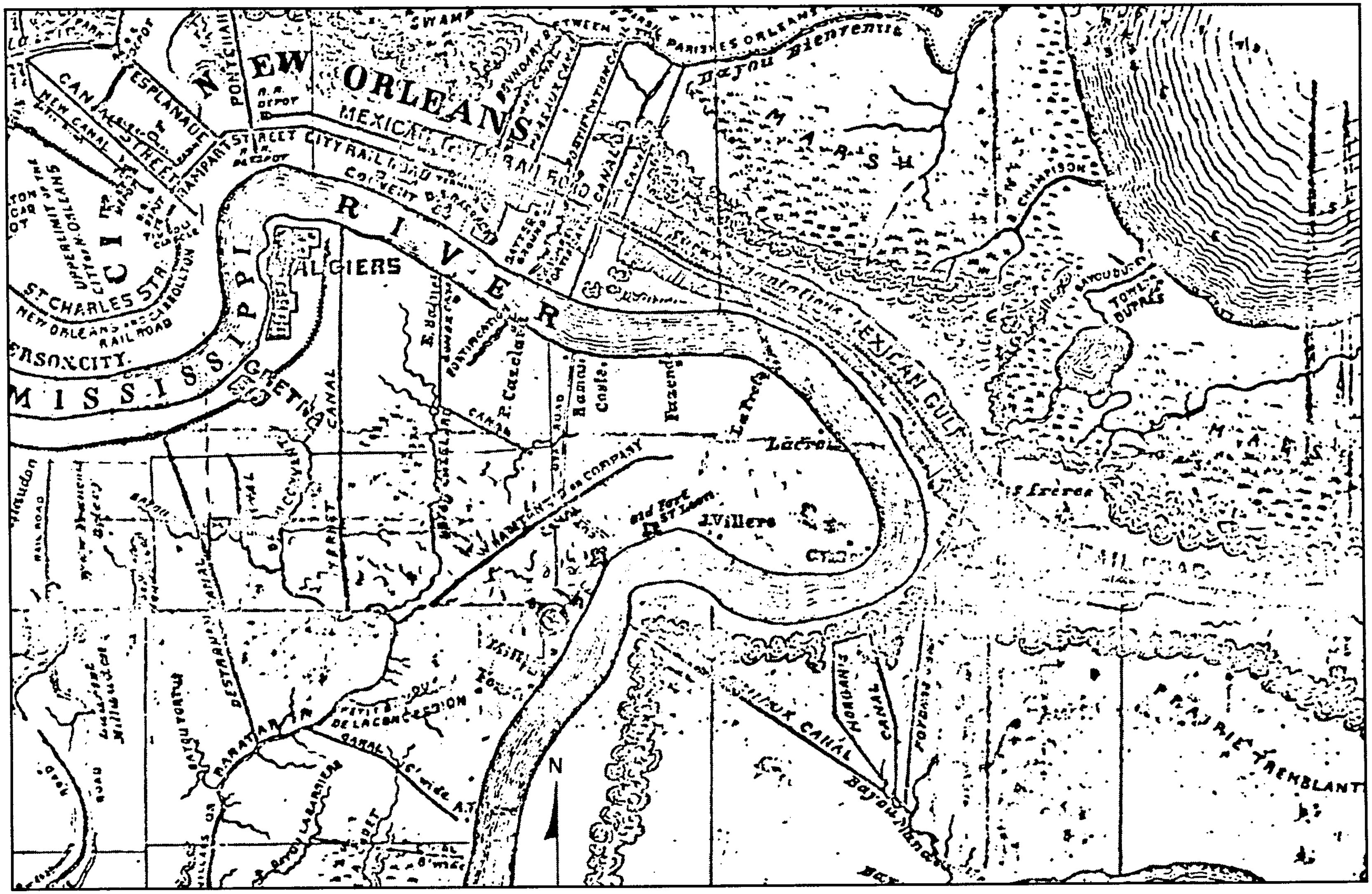

Figure 6. Military approaches to New Orleans during the Civil War. From Huston (1863).

CHAPTER 4
ABORIGINAL OCCUPATIONS IN SOUTHEASTERN LOUISIANA

Introduction

This chapter presents a brief overview of Native American culture history in southeastern Louisiana. In general, few sites dating to the Paleo-Indian or Archaic Periods have been reported in southeastern Louisiana (Gagliano 1963; Gagliano and Saucier 1963). Although land formation was occurring in the study area during the Archaic period, evidence indicates that human occupation occurred subsequent to maximum development of the distributary network. Additionally, Paleo-Indian and Archaic period sites are likely to have been buried or destroyed by subsequent riverine processes.

Despite over 50 years of archeological research in the Barataria Basin portion of the coastal zone, basic culture historical and chronological subdivisions remain vaguely defined and poorly understood. The archeology of the Barataria Basin is, however, generally well understood in the broadest perspective of Lower Mississippi Valley prehistory.

The Poverty Point Period

The name Poverty Point is derived from the type site, an area of massive earthwork construction in northeast Louisiana (Ford and Webb 1956; Gibson 1983; Neuman 1984). The Poverty Point Site (16WC5) is believed to have been a cultural center with trade networks and influence extending throughout the Lower Mississippi Valley (Byrd 1991; Gibson 1983). Baked clay balls known as Poverty Point objects are one of the important traits that mark the period. Other traits include elaborate lapidary and microlithic industry, use of steatite vessels, and the importation and use of exotic non-local stone (Gibson 1983; Neuman 1984).

The earliest known sites in the vicinity of the study area are dated to the Poverty Point period. The Linsley (16OR40) and Garcia (16OR34) sites are located in Orleans Parish (Gagliano and Saucier 1963), and the Bayou Jasmine site (16SJB2) is located at the western end of Lake Pontchartrain (Duhe 1977; Gagliano and Saucier 1963:Figure 1). The Garcia site is situated on a buried natural levee associated with an early course of the Mississippi River. Located at the eastern tip of Orleans Parish, the site consisted of an eroding *Rangia* beach deposit. A series of radiocarbon dates, baked clay balls, and a characteristic Poverty Point artifact assemblage consisting principally of microlithic tools and a variety of chipped and polished stonework are evidence that date the site to the Poverty Point period (Gagliano and Saucier 1963:Table 1). Material dredged from the subsided *Rangia* shell midden at Garcia was used to define the Bayou Jasmine-Garcia Phase of the Poverty Point period (Gagliano and Saucier 1963; Gagliano et al. 1975:44-47).

Another important site representing this period and phase is the Bayou Jasmine site (16SJB2). Here, the evidence for a Poverty Point period occupation consists principally of baked clay Poverty Point objects quite similar in size and shape to those from the Poverty Point site (16WC5) (Gagliano and Saucier 1963:321). Duhe (1977:35-37) also reports the presence of small numbers of Poverty Point microtools and a relatively minor quantity of non-local lithic material, including unworked quartz crystals, orthoquartzite projectile points, worked hematite, steatite (which was rare) and an unidentified gray-brown chert. The Bayou Jasmine site also supported an extensive Tchefuncte component, along with later Marksville, Coles Creek, and Plaquemine occupations (Duhe 1977; Gagliano and Saucier 1963).

The Tchula Period

Tchula period occupations in the Lower Mississippi Valley are equated with the Tchefuncte culture. The period has also been identified as the Formative (Jenkins and Krause 1986), or Early Ceramic period because, with the exception of fiber-tempered pottery, it was the interval during which initial pottery complexes appeared in the Lower Mississippi Valley (Neuman 1984:113, 122). Sites are few and scattered, with most occupations found in the coastal zone (Neuman 1984). These data are interpreted to suggest that the peoples of the Tchefuncte culture were largely seminomadic hunters and gatherers (Neuman 1984:135). However, within subareas such as South Louisiana, regional artifact markers, primarily Tchefuncte type ceramics, are useful for recognizing occupations (Phillips 1970:7, 8, 15, 76) and possibly for defining regional populations (Shenkel 1981; Weinstein 1986).

Peoples of the Tchefuncte culture were the first to engage extensively in the manufacture of ceramics. Fiber-tempered and some grog-tempered or temperless sherds have been recovered from earlier Poverty Point contexts (Webb 1982). These may represent primarily trade goods from the earliest pottery-making cultures in the east. The basic Tchefuncte ware is temperless or grog-tempered, with accidental inclusions of small quantities a sand and vegetable fiber. Sand-tempered wares represent a minority constituent of Tchefuncte site (16ST1) assemblages (Shenkel 1984:47-48). Ceramic decorations and various percentages of these decorations have been used to create several regional phases of the Tchefuncte culture in the study area (Weinstein 1986). The Pontchartrain phase is considered the earliest Tchefuncte manifestation in the region, and is thought to date from ca. 500 B.C. to ca. 250 B.C. Pontchartrain phase sites are moderately common in the Pontchartrain Basin. The most notable of these sites are the Tchefuncte site (16ST1) in St. Tammany Parish, and the Big Oak (16OR6) and Little Oak Island (16OR7) sites in Orleans Parish (Ford and Quimby 1945; Neuman 1984; Shenkel 1981, 1984; Shenkel and Gibson 1974). A later Beau Mire phase has been proposed to encompass the period from ca. 250 B.C. to A.D. 1, although this phase is not accepted by all researchers (Shenkel 1981, 1984; Weinstein 1986; Weinstein and Rivet 1978).

Tchefuncte sites in the study area are confined to the areas around Lake Pontchartrain and appear to be associated with relatively early river channels and lake margins. Tchefuncte subsistence is fairly well known. Excavations at the Big Oak Island and Little Oak Island sites suggest an emphasis on hunting and fishing (Shenkel 1981, 1984). Shenkel (1981:331) argues that these two sites initially had occupations that supported "permanent or semi-permanent villages." Later, there is evidence that there may have been functionally different occupations, with Big Oak Island evolving into a "specialized" shellfish and fish procurement and processing station (Shenkel 1981, 1984) that was "unquestionably associated with the contemporaneous village component at the Little Oak Island site" (Shenkel 1981:331-332, 1984). Shenkel (1981:333-334) emphasizes the narrow range of exploited foods (primarily *Rangia* clams and marsh-estuarine fish and mammals) in the Pontchartrain phase, noting that many other equally productive resources were virtually ignored.

Social complexity was relatively minimal in the Tchefuncte culture. Settlements are generally small and lack certain evidence of earth works or other complex features. Burials are common, but rarely, if ever, contained grave furnishings. The evidence for earthen structures, such as mounds, is debatable. Low, domed mounds have been associated with Tchefuncte culture sites, but the data for securely attributing these constructions to the Tchefuncte people are limited (Neuman 1984:117, 135; Toth 1988:27). Unlike earlier Poverty Point culture, Tchefuncte people did not import non-local or exotic lithics to their sites, nor did they engage in lapidary art to the best of our knowledge.

The Marksville Period

The Marksville period is generally subdivided into two sequential temporal units, early Marksville and late Marksville. The early Marksville period is associated with the Hopewellian Tradition manifested throughout the Eastern United States (Phillips 1970:7, 17-18, 886; Toth 1988). The Hopewell Tradition has two major centers of development in Ohio and Illinois; this tradition dates to between 200 B.C. and A.D. 400. Diffusion of aspects of the culture may have resulted from the activity of traders who established a wide-ranging network, sometimes termed the "Hopewellian Interaction Sphere" (Caldwell 1964). In addition to diagnostic pottery types of the Marksville period, conical burial mounds were characteristic of the culture (Toth 1988). Interments are generally associated with grave goods. Some of these artifacts were manufactured from exotic raw materials (Neuman 1984:142-168; Toth 1974, 1988).

The late Marksville period appears to witness an increase in cultural diversity in the Lower Mississippi Valley and also perhaps on the coast. In much of the Lower Mississippi Valley, the Issaquena culture developed over several centuries beginning around A.D. 200 (Greengo 1964; Gibson 1977; Phillips 1970; Williams and Brain 1983). In the Louisiana coastal zone, the cultural situation is very vague and poorly understood.

Early Marksville occupations in the eastern coastal zone are identified with the Labranche phase (Phillips 1970:898, Figure 444). The definition of Labranche phase sites principally consisted of sites at which the frequency of Crooks Stamped (now Mabin Stamped, *var. Crooks*) was equal to or greater than Marksville Stamped. As noted by Gagliano et al. (1979:4-4), the Labranche phase is "overextended geographically." Nonetheless, Labranche is still found as the phase name used in regional culture historical summaries (Perrault and Pearson 1994:Figure 6; Weinstein 1994a:38, Figure 3-4), but it appears to be used only as a name to fill an otherwise blank space.

Excavations at the Coquilles site (16JE37) at the junction of Bayou des Familles and Bayou Coquilles yielded important evidence concerning the Marksville period occupation in the Barataria region (Beavers 1982a; Giardino 1984a, n.d.). Surveys of the Bayou des Familles channel indicate the possible presence of Marksville period (phase or cultural relationship unknown) sites consisting principally of small shell scatters (Beavers 1982b). Evidently, there is an early Marksville occupation at the Boudreaux site (16JE53) located on the bank of Bayou Barataria near Crown Point (Beavers 1982a:26; 1982b:110).

Additional early Marksville occupations in the lower Barataria region include Kenta Canal (16JE51), Dupree Cutoff I (16JE8), Dupree Cut Off II (16JE9), Three-Bayou Field (16JE98), Isle Bonne (16JE60), and Bayou Cutler (16JE3) (Gagliano et al. 1979:4-8--4-19). The early Marksville occupation at Bayou Cutler is evidently the best representation of this time period outside of Coquilles (and possibly Boudreaux). Surface collected sherds from this site include Baytown Plain, *var. Marksville*, some with cross hatched and slanted line rim treatments. Decorated pottery consisted of Marksville Incised, *var. Hill Bayou*; Marksville Stamped, *vars. Marksville*, *Old River*, and *Sunflower*; Mabin Stamped, *vars. Mabin* and *Point Lake*; Churupa Punctated, *vars. Boyd* and *Hill Bayou*, and *unspecified*; and Indian Bayou Stamped, *var. Cypress Bayou* (Gagliano et al. 1979:4-3--4-5).

The late Marksville period occupation in the eastern Louisiana coastal zone is assigned to the Magnolia phase without attribution as to its cultural (as opposed to temporal) affiliation (Phillips 1970:898-899). The Magnolia phase is generally dated to the period ca. A.D. 200-400 (Perrault and Pearson 1994:Figure 6). Magnolia phase components were identified by the presence of specific rim modes and by the absence of Crooks Stamped (now recognized as Mabin Stamped, *var. Crooks*), and the presence of later Marksville markers, including Marks-

ville Stamped, ("probably but not necessarily" *var. Troyville*), Yokena Incised, and unspecified variants of Churupa Punctated (Phillips 1970:899). Based on the radiocarbon dates from the Coquilles site, it is evident that there was a late Marksville occupation associated with the midden deposits to the west of the mound area (Giardino 1984a). Ceramics from the late Marksville component of the site included examples of Baytown Plain identified as being like *vars. Marksville* and *Satartia* (including rim modes similar to those associated with Issaquena, such as "Arcadia", "DeSha", and "Peak"); Marksville Incised, *vars. Marksville* and *Yokena*; Marksville Stamped, *vars. Manny*, *Newsome*, and *Troyville*; Churupa Punctated, *vars. Churupa* and *Thornton*; and rare examples of Catahoula Zoned Red (Giardino 1984a:16-32). Radiocarbon dates date this assemblage from ca. A.D. 319-650 at two standard deviations.

Late Marksville ceramics have also been recovered from sites farther down the Barataria waterway. Most notably, there is a small but well-defined component at the Bayou Cutler site (Gagliano et al. 1979:4-19--4-27, Figures 4-17 and 4-18, Appendix A). Additional components include Isle Bonne (16JE60), Kenta Canal, Fleming (16JE36), Bayou Villars (16JE68), Rosethorn School (16JE50), Shipyard (16JE85), and Bayou Dupont-Dupre Cut Off (16JE91). Ceramics from these sites include classic modes on Baytown Plain, *var. Satartia*, and Marksville Incised, *vars. Goose Lake*, *Leist*, and *Yokena* (Gagliano et al. 1979:Figures 4-17 and 4-18).

The Baytown Period

The Baytown period has been defined as the interval between the end of Hopewellian inspired Marksville culture and its later Issaquena and related descendants, and the emergence of Coles Creek culture. The Baytown period is often referred to as the "Troyville period" by Delta archeologists. Because of the perceived lack of diagnostic markers for the period in southeastern Louisiana, it is often assimilated with the subsequent Coles Creek period, and the two are together referred to and discussed as "Troyville-Coles Creek cultures" (e.g., Neuman 1984).

Historically, the interval between roughly A.D. 400 to 700 has been one of the most difficult to understand from a culture historical perspective (Kidder 1995:33-34). When Phillips (1970:911-912) established the Whitehall phase to encompass the Baytown period in the Louisiana coastal zone, he specifically noted that the phase "would be more accurately described... as a collection of widely dispersed sites" (1970:911) rather than a coherent archeological manifestation. Kidder (1994a) has argued that Whitehall is not an appropriate phase for this region. Whitehall is better represented in the areas north of the Barataria Basin (Weinstein 1974). Furthermore, Kidder (1994a) argues that the Baytown period in the Barataria Basin, and probably all of coastal Louisiana, may be subdivided temporally into early and late phases. The earliest phase of the Baytown period in coastal Louisiana has been termed the Grand Bayou phase, and the later phase is the Des Allemands phase (Giardino 1993; Kidder 1994a).

The "type" site for Baytown period occupations in the lower Barataria region is the Isle Bonne site (16JE60) (Beavers 1982b; DeMarcay n.d.; Holley and DeMarcay 1977). Amateur excavations at this site revealed a stratified Baytown period occupation associated with two low rises formed by the accumulation of *Rangia* shell (DeMarcay n.d.; see also Gagliano et al. 1979:Appendix A). Ceramics recovered included Larto Red, *var. Larto* (often with bulbous thickened rims), Coles Creek Incised, *var. Phillips*, French Fork Incised, *var. Brashear*, Woodville Zoned Red, *var. Woodville*, Evansville Punctated, *var. unspecified* (probably similar to *var. Duck Lake*); Indian Bay Stamped, *var. unspecified*; Marksville Incised, *var. unspecified* (*Vick*-like); and Mazique Incised, *vars. Bruly* and *Mazique*.

The Grand Bayou phase is marked by the presence of the so-called terminal Marksville ceramic tradition, characterized elsewhere by local analogs to Marksville Incised *vars. Anglim*

and *Vick*, and Marksville Stamped, *var. Bayou Rouge*. Larto Red pottery is evident, as are late variants of Churupa Punctated, especially something similar to *var. Watson*. Rim modes include characteristic early Baytown thickened rim modes and rim and lip notching. Plain pottery consists of relatively thick, coarse grit-grog tempered plain pottery. This later phenomenon, the use of very thick coarse plain ware, may be diagnostic of the Grand Bayou phase, at least along Grand Bayou. Grand Bayou phase components have been identified at Bruly St. Martin, Shell Beach, Gibson Mounds, 16SC42, 16SC43, and 16SC45.

Des Allemands phase components can be identified in stratigraphically unmixed contexts, but are difficult to separate from the early Coles Creek Bayou Cutler phase (Giardino 1993). The use of the "six mile" treatment may be one of the best and most consistent diagnostic hallmarks of the Des Allemands phase, although it certainly is continued into the Coles Creek period. A characteristic of the Des Allemands phase is single- and possibly double-lined examples of Coles Creek Incised, often with incisions on thickened rims. Early Mazique Incised variants are found for the first time, and are especially notable for the initial appearance of Mazique Incised, *var. Bruly*. Thick, coarse grit-grog tempered plainwares dominate collections, but sand added to the paste achieves a brief period of popularity. The Isle Bonne site is essentially the type site for the Des Allemands phase.

Evidence for Baytown period occupations within the study area is scarce. However, surface collections from the Gheens Crevasse on the east side of Bayou Lafourche yielded tenuous evidence of late Baytown or early Coles Creek components (Hunter et al. 1988; Pearson et al. 1989).

Grand Bayou and Des Allemands should be considered phases of the so-called "Coastal Troyville" culture. Grand Bayou demonstrates ceramic affinities to phases up the Mississippi River, especially the Troyville culture phases at Greenhouse and in the Tensas Basin. Grand Bayou is not the same culturally as the Troyville peoples living in the Mississippi River Valley proper, however. Absent on the coast are the distinctive site plans, site hierarchies, burial mounds and mortuary patterns, and total ceramic repertoire. This "Coastal Troyville" culture seems to represent a hunting and gathering society widely distributed across the habitable parts of the coastal zone (Giardino 1993). Although farther north and to the east contemporary groups constructed mounds and earthen platforms (Blitz and Mann 1993; Kidder and Wells 1992), there are not certain data to substantiate this practice in the Delta.

In contrast with the Grand Bayou phase, the Des Allemands phase peoples seem to have a more eastern orientation (Giardino 1993). It is at this time that we see the beginnings of what appears to be relatively intensive interaction with Weeden Island or Weeden Island-related groups along the eastern gulf Coast (Belmont 1967; Belmont and Williams 1981). Although these external connections are notable, the peoples of the Louisiana coastal zones were developing their own unique adaptations to the delta environment of the Mississippi River. Des Allemands phase ceramics mirror a broad trend in Lower Valley prehistory marking the origins of later Coles Creek patterns.

The coastal pattern of intensive exploitation of fish, deer, and muskrat is in place by the end of the Baytown period. Shellfish harvesting or exploitation continues, but little evidence for settlement differentiation exists at present. The data recovered from the Pump Canal site hint at a series of relatively brief occupations, and the *Rangia* seasonality data indicate a late spring or early summer occupation (Jones et al. 1994). Perhaps at this time populations living in the Barataria Basin were making seasonal trips to the distal ends of distributary courses to hunt, fish, and exploit the *Rangia* beds in the nearby brackish water environments. If this was a part of a seasonal round that involved living in larger, more established villages, such sites have not yet been found. Possibly Bruly St. Martin, located well into the interior of the Barataria Basin, might qualify for such a village location.

Given our limited data, it is difficult to establish any socio-political patterning with confidence. It appears that the Des Allemands phase peoples were egalitarian hunter-gatherers. The data are at present too equivocal to determine whether or not mound-building was occuring during the Baytown phase on the coast (Weinstein et al. 1978), and no strong site hierarchy has yet been identified. Site differentiation may exist, but what evidence there is indicates that site function plays the determining role in the size and nature of site occupation.

The Coles Creek Period

The Coles Creek period is the interval that begins with the emergence of Coles Creek culture in the southern part of the Lower Mississippi Valley and ends with the establishment of "full-blown" Mississippian culture in the northern part of the Valley (Phillips 1970:18). Although it appears to represent a population zenith in the eastern coastal zone, many sites tentatively classified as Coles Creek may actually be from the Baytown period (Wiseman et al. 1979:3/5).

Coles Creek culture in the central Lower Mississippi Valley is characterized by small ceremonial centers with mounds. These were surrounded by villages of varying size. The culture developed in the area between the mouth of the Red River and the southern part of the Yazoo Basin. A distinctive coastal variant of Coles Creek culture emerged at the same time, and no doubt there was a dynamic relation among and between Coles Creek period populations on the coast and in the interior (Brown 1984:95; Jeter and Williams 1989).

Mounds associated with the Coles Creek culture generally are larger and exhibit more construction stages than those found at earlier Marksville period sites. A more significant difference is that Coles Creek mounds are pyramidal and flat-topped, and they were used as substructures for religious and/or civic buildings (Ford 1951; Williams and Brain 1983). In contrast, Marksville peoples generally built conical burial mounds (Neuman 1984:167).

The advent of the Coles Creek period in the Louisiana coastal zone is marked by changes in ceramic frequencies and, to a lesser extent, by the appearance of new types or varieties and the disappearance of others. More fundamental patterns of economic and social behavior also change, but at a seemingly slower rate. Unlike previous periods, Coles Creek is well known, at least in terms of the ceramics. Typical ceramics include Pontchartrain Check Stamped, Coles Creek Incised, French Fork Incised, Mazique Incised, Chevalier Stamped, Beldeau Incised, Chase Incised, Rhinehart Punctated, and "Coles Creek rims" (Phillips 1970:921). In the Lower Mississippi Valley, Coles Creek has been divided into early, middle, and late phases (Phillips 1970; Williams and Brain 1983). More recently, however, a fourth, usually "transitional" Coles Creek (or in some cases early Plaquemine) phase has been added (Brown 1985; Kidder 1994b; Weinstein 1987).

The archeological record of south Louisiana is sufficiently detailed so that the Coles Creek period is divided into spatially discrete geographic areas. In the coastal zone, there are at least three geographic areas with two Coles Creek phases each. In the eastern portion of the coastal zone, from roughly the Atchafalaya eastward to the St. Bernard marshes, the Coles Creek is defined to include the Bayou Cutler, Bayou Ramos, and St. Gabriel phases (Weinstein 1987).

The settlement patterns of the Coles Creek period are not well understood at this time. There is a general sense that populations were organized into a relatively loosely arranged hierarchy of site types. The best defined model comes from the Terrebonne marsh area west of the Barataria Basin. Here, Weinstein and Kelley (1992) hypothesize a pattern of major mound sites, satellite villages, and seasonal camps or shellfishing stations. The mound sites consisted

of one or more earthen mounds, presumably supporting the structures of elite chiefs and/or priests. They suggested that the Gibson Mounds may have served as the major Coles Creek period mound center in this area, although the precise chronology of all the mounds is as yet undetermined. Most, if not all of Mound C at Gibson Mounds appears to have been constructed during the Bayou Cutler phase. Smaller village sites are found along stable levee segments, usually at the junction of one or more tributaries.

In the Barataria Basin, the archeological data are not adequate to fully address the nature of settlement and social organization. Excavations at the Fleming site (16JE36) indicate that Coles Creek period occupations comprise a considerable portion of the vertical extent of this site (Holley and DeMarcay 1977). Along with the Bayou Villars and Isle Bonne sites, Fleming makes up one of the important "Barataria complex" occupations (Gagliano et al. 1979; Holley and DeMarcay 1977). This locality is presumed to be the major center for Coles Creek and Mississippi period settlement in the lower part of the Barataria Basin. All three of these sites supported earthen or shell mounds, although none can be solely assigned to the Coles Creek period (Gagliano et al. 1979).

There were major Coles Creek occupations at both the Sims (16SC2) and Bowie (16LF17) sites, and numerous Coles Creek period occupations are found in the interdistributary basin between bayous Lafourche and Barataria (Hunter et al. 1988; Pearson et al. 1989). The density of Coles Creek occupation in this area is remarkable and suggests that this region was one of the central loci of activity during this period. Sims and Bowie are presumed to be major villages dating to the Coles Creek period (Davis and Giardino 1981; Jackson 1977). Numerous Coles Creek occupations are found on Bayou Barataria and its distributaries south of the confluence with Bayou Villars. The Pump Canal site can also be hypothesized to be an important village occupation during the Coles Creek period (Giardino 1993; Jones et al. 1994). It may have been an important locality serving as a "base camp" for exploiting the resources of the surrounding marshes and lakes.

In the eastern section of the coastal zone, from the Atchafalaya Basin eastward, Weinstein (1987) observed that the Transitional Coles Creek/Plaquemine occupations were best defined as a extension of the St. Gabriel phase, first defined by Brown (1985) based on excavations at the type site (16IV128) (Woodiel 1980). St. Gabriel or contemporary occupations are found at Mulatto Bayou (16SB12), Thibodaux (16AS35), and Bergeron School (16LF33) (Weinstein 1987:93). Absent in the eastern delta area are varieties such as *Mott* and *Plaquemine*.

The available data from surrounding areas suggest that the Transitional Coles Creek/Plaquemine occupation of the Barataria Basin was largely unchanged from earlier Coles Creek times. The major settlements continue to be located along Bayou Barataria or farther inland on the distributary channels of Bayou Lafourche or at the edges of large crevasse splays. The largest site of this time appears to be the Bowie site (Jackson 1977). A contemporary component is also found at the Sims site. The concentration of sites at the junction of Bayous Barataria and Villars is the best candidate for regional center in the Barataria Basin, but the precise chronology of these sites is still unknown.

Although Brown et al. (1979) note that important changes in settlement (and presumably subsistence) are initiated during Transitional Coles Creek/Plaquemine times in the Petit Anse region, no such evidence is found in regions to the east. In the Terrebonne marshes, the settlement pattern evidently continues unbroken from earlier times (Weinstein and Kelley 1992:353-355). The quantity and number of mounds constructed appear to increase through time, but how many date to this interval cannot be determined at present. A clear mound center and subsidiary village hierarchy developed during the Coles Creek period and probably continues into these transitional times. The trend in the coastal zone is one of gradual and

steady evolution within the region. External influences may be present, but they do not appear to be notable in terms of the process of culture change. The origins of the Mississippi period cultures of the coastal zone seem to be wholly local. Later events, though, seem to suggest that this region witnessed a significant influence from Mississippian groups farther eastward along the coast.

The Mississippi Period

The beginning of the Mississippi period is marked by the appearance of emergent Mississippian culture in the northern part of the Lower Mississippi Valley and throughout much of the interior Southeast. Mississippian culture characteristics, such as shell tempering and the use of maize agriculture, did not penetrate into much of the central Lower Valley until after ca. A.D. 1200. Plaquemine culture is the term used to denote the indigenous late prehistoric populations of most of the Lower Mississippi Valley and adjacent coastal regions. Archeological evidence suggests that Plaquemine culture emerged from a Coles Creek base and was later influenced by Mississippian intrusions from farther up the Mississippi River Valley. Multimound construction and artifact assemblages are evidence that link the two. Absence of European trade goods indicates that the Plaquemine culture reached its zenith prior to European contact (Neuman 1984:258-259).

The late prehistoric culture history and chronology of the eastern portion of the Louisiana coastal zone is not well understood at present (Jeter and Williams 1989:191). The data indicate that local Plaquemine populations in the region developed out of the Transitional Coles Creek/Plaquemine beginning at roughly A.D. 1200 (Jeter and Williams 1989:191-195; Weinstein 1987). At roughly the same time, however, Mississippian ceramics (and possibly peoples), which are identified with the Pensacola variant of Mississippian culture, enter into the area from the east, presumably via the Gulf Coast. Sites in the eastern coastal zone with shell tempered pottery in large quantities are identified with the Bayou Petre phase, while late prehistoric sites in the area without shell tempered pottery, and which show evidence of more Lower Valley ceramic characteristics, are identified with the so-called Delta-Natchezan phase. Although these Mississippian ceramics tend to be found primarily in the easternmost part of the region, Mississippian Bayou Petre phase pottery is not wholly confined to this region (McIntire 1958). To further complicate the picture, there is increasing evidence that the late prehistoric populations in the Barataria Basin integrated some of the Mississippian designs and styles into the local ceramic repertoire (Davis and Giardino 1981).

The Plaquemine occupation of the Barataria Basin and adjacent parts of the coastal zone is designated the Barataria phase. This phase was defined by Holley and DeMarcay based on amateur excavations conducted at the Fleming site (Holley and DeMarcay 1977; Manuel 1984). Fleming consists of at least one earth and shell mound, and a shell midden (Holley and DeMarcay 1977:4; Weinstein 1987:96). The Fleming site is one of three apparently contemporary occupations at the junction of Bayou Barataria and Bayou Villars. The Isle Bonne and Bayou Villars sites also consisted of earth and shell middens and mounds (Gagliano et al. 1975:24, 58, 1979; Holley and DeMarcay 1977; Weinstein 1987:96). As noted by Weinstein (1987:96), "this large mound complex forms the hub of the Barataria phase."

The Barataria phase is differentiated from the contemporary Medora phase of the Mississippi Valley by the absence of Plaquemine Brushed pottery and by the extensive use of so-called Southern Cult motifs in association with typically Lower Valley pottery such as Anna Incised and L'Eau Noire Incised (Holley and DeMarcay 1977; Weinstein 1987:96). The Barataria phase ceramics, however, are otherwise Plaquemine in composition. Major types and varieties associated with this phase include L'Eau Noire Incised, *vars. L'Eau Noire* and *Bayou Bourbe*, Carter Engraved, Maddox Engraved, and Mazique Incised, *var. Manchac* (Holley and DeMarcay 1977:14-18).

With the decline of Moundville and its influences across the Gulf Coast in the later part of the fifteenth century, the deltaic part of the coastal zone saw once again a renewed emphasis on indigenous styles in ceramics. The so-called Delta Natchezan phase represents the final late prehistoric phase in the region. Ceramics of this phase show a strong continuity from the Barataria/Bayou Petre phase occupations in the region, with the addition of pan-Lower Valley varieties such as Fatherland Incised, *vars. Fatherland* and *Bayou Goula*. Shell tempering continues as an important, but not unique, characteristic in the ceramics from the region (Giardino 1985).

The largest excavated late prehistoric site in the deltaic portion of the coastal zone is the Sims site (Davis 1981; Davis and Giardino 1981; Giardino 1985). Excavations in areas 1 and 3 at Sims revealed Mississippi period deposits attributable to the Bayou Petre and Delta Natchezan phases. Excavations in area 3 at Sims revealed a late Mississippi period component thought to be related to the terminal occupation at the Bayou Goula site and possibly dating to the protohistoric or early historic period (Giardino 1985).

The Bowie site also contained a minor Bayou Petre or Delta Natchezan phase occupation (Jackson 1977). During this late prehistoric period, archeological sites are found across much of the marsh and levee lands of the eastern coastal zone. Collections from the Buras Mounds (16PL13) and from the Bayou Ronquille site (16PL7) demonstrate that there were important mound occupations located near the modern day coast and associated with recent distributary channel courses (see Kniffen 1936; Weinstein 1987).

The Bayou des Familles channel appears to witness an increase in occupation frequency during the late prehistoric and into the historic periods (Beavers 1982b; Franks and Yakubik 1990; Fuller 1991; Swanson 1991; Yakubik 1989). Mississippi period sherds at a number of small shell middens along the bayou suggest that either larger populations were exploiting the region, or that they were visiting the area more frequently. None of the Mississippi period sites are large, nor do they show evidence of the building of typically Mississippian site plans or features (mounds, mound-plaza arrangements). The radiocarbon dates from the Bayou Des Familles site (16JE218), in conjunction with the ceramic assemblage, however, demonstrates that both shell tempered and clay/Addis pottery were being used at the same time.

In contrast with the Petit Anse region, the eastern coastal zone does not witness very dramatic changes in settlement during the post-Coles Creek era. Several important trends become evident, however. First, we see an expansion of settlement into more recently formed marsh areas and along peripheral distributary channels adjacent to the essentially modern course of the Mississippi River. Sites such as Buras Mounds and Bayou Ronquille are good examples of this trend (Kniffen 1936; Weinstein 1987). There is also an evident pattern of nascent settlement coalescence focusing on relatively centralized, frequently mounded, communities. In the eastern coastal zone, we see the formation of a small number of large mound groups that appear to be the central focus of occupation in the region. Other than these mound sites, though, large late prehistoric sites are not especially evident. Bayou Petre and Delta Natchezan non-mound sites are small, and generally are associated with well-elevated stretches of levees. The typical Coles Creek marsh adaptation appears to have been abandoned for one presumably more focused on the cultivation of domestic crops in well-drained areas.

The subsistence and sociopolitical organization of the late prehistoric period is not well documented. A small amount of corn was recovered from uncertain contexts at the Fleming site. Analysis of the fauna from Sims indicates that the later prehistoric inhabitants of the site were exploiting a narrower range of animals, and were placing less emphasis on marsh species, notably alligator and muskrat. At Pump Canal, however, the post-Coles Creek occupants appear to have been carrying on with a marsh oriented subsistence patterns, focusing on musk-

rat, raccoon, deer (to a lesser extent), fish, and amphibians (Misner and Reitz 1994). This late prehistoric occupation (or occupations) appears to have been relatively transient and may represent the shift from village type occupations to more temporary, possibly seasonally occupied, camps. Changes in faunal exploitation and settlement type at Pump Canal appear to correlate with changes in local environments (Jones et al. 1994). Ethnohistorical data from the region suggest that the Chitimacha Indians practiced a mixed fisher-farmer-collector subsistence strategy. Maize and other cultigens were planted on elevated plots of land, frequently along bayous, with populations periodically (perhaps seasonally?) ranging out to marshes and lakes to gather shellfish and to fish. In the early historic period, the Chitimacha evidently moved in mixed-sex family groups, and they may have spent much of the summer away from their garden plots.

There is little doubt that the late prehistoric Indians of the eastern coastal zone were living in stratified chiefdom level societies at the time of early European contact. Weinstein and Kelley (1992) suggest a hierarchically organized settlement pattern for the late prehistoric communities in the Terrebonne marsh area, involving mound communities, lesser villages, and seasonal resource collecting stations or camps. Along Bayou Lafourche, Altschul (1978) identified two temporally distinct patterns, corresponding to what are identified as Plaquemine and Mississippian cultural occupations. The earlier, Plaquemine pattern evidently involved a seasonal pattern of movement focusing on a centralized fall/winter community located on interior forested levees, with spring/summer occupations consisting of dispersed habitations spread across most major landforms, but especially emphasizing the exploitation of marsh and coastal resources (Altschul 1978:184-186). Evidence for status differentiation in and among these communities is minimal (Altschul 1978:186). The second pattern described by Altschul is associated with the "Mississippian" occupation of the region (1978:186), with large, sedentary mound communities occupying elevated levees. Altschul hypothesizes that "a sizable proportion of the villagers lived in dispersed homesteads" (1978:186). He further infers that, "While there is no definitive evidence, the location and complexity of these sites indicates that plant domesticates were heavily utilized" (Altschul 1978:186).

Summary

As the archeology of the eastern coastal zone becomes more understood, the complexity in the region is evident. There is a strong correlation between the regional culture history and changes in the environment, caused ultimately by shifts in the Mississippi River's course. Native Americans in the region adapted themselves to these changing environments in a number of ways. The initial occupation of the eastern coastal zone is during the Poverty Point period. We know little about these occupations in terms of subsistence or social organization. Evidently, some of these coastal populations were participating in the widespread Poverty Point interaction sphere.

The first well recognized occupation of the region occurred during the early Woodland and is associated with the Tchefuncte culture. Tchefuncte occupations are especially common along Lake Pontchartrain, but are infrequent farther south. Some tentative evidence suggests that it was at this time that humans began to move into the lower Barataria region.

The succeeding Marksville period witnessed an expansion of human populations into newly formed lands within the study area and marks the first extensive colonization of the lower Barataria Basin. Excavations at the Coquilles and Boudreaux site indicate the presence of an extensive and perhaps intensive early Marksville period occupation. However, neither site has yielded evidence for the complex mortuary programs, trade contacts, or social complexity normally associated with Marksville culture.

Late Marksville occupations are also evident in the eastern coastal zone. Based on the ceramics, these appear to be similar to those identified with the Issaquena culture farther north, but specific cultural connections have not been illuminated due to a lack of well-controlled excavations. Several important components of this time period have been suggested, most notably at Coquilles and Bayou Cutler, but once again, specific data and exact chronologies are lacking.

During the Baytown period, the coastal zone witnesses an increase in population or at least habitation. The lower Barataria Basin is home to several sites of this period, notably Isle Bonne, which appears to date to the later part of the Baytown sequence. We can speculate that at this time there was a movement of peoples out from the interior part of the basin towards the marsh and coast to the south.

The pattern noted in the Baytown period continues in the Coles Creek period. Populations continue to expand along the coastal zone, especially along channels extending into the marsh. Some parts of the Barataria region see fairly intense occupations. This is especially notable south of the confluence of Bayous Barataria and Villars, and to the west in the Bayou Des Allemands region and extending to Lake Salvador. Coles Creek peoples seem to be very intensively exploiting marsh habitats, and they do not appear to have been cultivating domesticated plants.

During the Mississippi period, we see a gradual shift from the Coles Creek pattern of marsh exploitation towards one evidently oriented towards agricultural practices. There is little change during the early part of the period. By the Barataria phase, there may be some contraction in the number of sites and the range of exploitation. There is an increasing emphasis on larger, possibly more permanent settlement along well-drained levees. A distinctly bimodal settlement pattern evolves by ca. A.D. 1300-1400, consisting of large villages, frequently with mounds, located on well drained soils with small, dispersed communities scattered across most of the major landforms. By the late prehistoric period, this pattern seems to be emphasized, especially along the major tributaries and waterways. Major mound centers were probably the locations of ruling civic and religious elite, and small, dispersed settlements are likely to have been dependent on the larger centers in an economic or political sense.

CHAPTER 5
HISTORICAL OVERVIEW

Plaquemines Parish is the southernmost parish in Louisiana. It is a ninety-mile-long peninsula, encompassing the terminal delta of the Mississippi River. The word "plaquemines" is a French derivative of a Mobile Indian word meaning "persimmons". Historically, Plaquemines Parish is important because of its strategic location encompassing the mouth of the Mississippi River; most of the early commerce of the Mississippi Valley sailed through this area prior to waterways development in the twentieth century, and it remains an extremely important route for ocean-going vessels. The area of Plaquemines Parish was made a portion of Orleans County of the Territory of Orleans in 1805, and was organized as Plaquemines Parish, one of the original 19 parishes of the Louisiana Territory, on March 31, 1807 (Plaquemines Council, Chamber of Commerce 1972:3; Calhoun 1995: 232; Goins and Caldwell 1995:41-42).

The Colonial and Antebellum Periods

René-Robert Cavelier de La Salle was the first Frenchman to travel to the mouth of the Mississippi River. He explored the river from Canada to the Gulf of Mexico, sending three expeditions through the passes to the gulf. In 1682, he claimed the whole Mississippi Valley for France. In the period of initial contact between the French and Native Americans, the western portion of Plaquemines Parish was at the indistinct boundary of areas inhabited by Muskogean- and Chitimachan-speaking Indian tribes. The Quinipissa/Mugulasha were resident in the vicinity of the modern west bank of Jefferson Parish in 1682. In 1700, in the area of future Plaquemines Parish, Iberville built Fort de la Boulaye, the first French fortification along the Mississippi River. The arrival of the French triggered numerous migrations of various Indian tribes, and in 1706, the Bayougoula were living in what became Plaquemines Parish. The French moved the Chawasha into the Barataria area in 1712, and the tribe crossed the River into modern Plaquemines Parish by 1722. After the outbreak of the Natchez War in 1729, the French attacked the Chawasha and the tribe moved upriver of New Orleans (Plaquemines Council, Chamber of Commerce 1972:3; Goins and Caldwell 1995:18, 21).

The majority of Plaquemines Parish consists of marsh and swamp, and during the colonial era, development in the vicinity of the project area was sporadic and limited due largely to the shortage of arable land. Early eighteenth-century settlement was concentrated directly below New Orleans, where cultivation was feasible, and also around a number of forts established on the river. But by 1760, plantations had appeared on both sides of the river as far south as Pointe a la Hache. Indigo, corn, rice, and livestock were the dominant agricultural commodities in the region. Although the Plaquemines Parish population was sparse, slaves (1,647) outnumbered whites (334) by 1770 (Goodwin et al. 1986:80).

Bayou Barataria divides Plaquemines Parish from Jefferson Parish and is the northern boundary of the project area. Bayou Barataria was evidently discovered by the French in about 1722 (Swanson 1991:49). The original French edition of Le Page du Pratz' *Histoire de la Louisiane*, published in 1758, provides an early description of the Barataria area, and how it came to be named:

> On leaving that coast [of the Gulf of Mexico] of white and crystal sand in order to go northward, we find five or six lakes which communicate with one another and which are, doubtless, remains of the sea. Between these lakes and the river [Mississippi], is an earth accumulated on the sand, and formed by silt of the river... between these lakes there is nothing but sand, on which there is so little soil that the sand-bottom appears to view; so that we find there but little pasture which some strayed buffaloes come to eat; and no trees, if we except a coast on

> the border of one of these lakes [Lake Salvador] which is all covered with evergreen oaks, fit for ship-building. This land extends a league in length by half a league in breadth; and was called Barataria, because it is enclosed by these lakes and their outlets, to form almost an island on dry land, as was that of which Sancho Panza was made governor [in Miguel de Cervantes' *Don Quixote*] [quoted in Swanson 1991:1].

To the north of the area described by Le Page du Pratz, in the vicinity of modern Bayou Des Familles, were narrow natural levees of alluvial soil supporting stands of live oaks, with backswamps in *cyprière*. Toward Bayou Rigollettes, Bayou Barataria flowed through swamps and marsh. French reconnaissance of the Barataria region made evident the area's potential for the extraction of timber, game, fish, furs, and shell (see for example, Bellin 1764). The earliest French place-name to occur in the area was *L'Hermitage*, appearing on a number of eighteenth-century maps in the area to the east of Lake Salvador (Holmes 1986:49; Swanson 1991:15).

The first land grant in the Barataria area was that made by the Company of the Indies on June 14, 1726, to Jean-Baptiste Massy and his partners, Jean-Baptiste Bourbeau and Charles Frederig de Merveilleux. During the remainder of the eighteenth century a number of French concessionaires and land holders farmed their Barataria tracts, raised livestock, or engaged in extractive industries such as timbering or harvesting furs, mostly toward the upper reaches of Bayou Barataria (Holmes 1986:50, 53; Goodwin et al. 1989; Swanson 1991).

When the Spanish obtained possession of Louisiana in 1769, they established Fort San Felipe and Fort Bourbon near the mouth of the river (Calhoun 1995:232). Settlements continued to spread southward in the Spanish colonial era, past the bend in the river known as "English Turn," but remained largely confined to a narrow strip of dry, arable land between the river's banks and the swamps.

In 1779, the Spanish colonial government decided to establish a settlement of Canary Islander immigrants in Barataria, along what came to be known as Bayou Des Familles. The Población de Barataria was a failure, and most of the Canary Islanders had left the area by 1785. The Spanish Crown nullified grants of most of the land in Barataria after it became vacant when the *Isleños* departed, and regranted it to new owners. Prior to 1789, Francisco Bouligny had purchased a plantation on the west bank of the Mississippi originally owned by Joseph Villars Dubreuil. In 1789, Bouligny obtained from Governor Miro an "order of survey" granting him the lands behind his plantation that bordered the Dubreuil canal and Bayou Barataria, for a depth of several leagues. In 1792, Jean-Baptiste Degruy and his partner, François Mayronne, purchased this plantation from Francisco Bouligny, including all of the lands and rights given to Bouligny. These tracts for which Degruy sought confirmation of his title later figured in the litigation that embroiled the Barataria lands in the first half-century of U.S. possession.

Several important developments impacted settlement in the interior of Plaquemines and Barataria region during the late Spanish colonial period. By the 1790s, indigo had ceased to be a profitable crop due to Louisiana's grower's inability to compete in the international market. Sugarcane largely replaced indigo at the end of the colonial period as the main commercial crop of the south Louisiana alluvial districts. The wet, saline soils of Plaquemines Parish, and to a lesser extent, the narrow natural levees of Bayou Barataria, were suitable for growing sugar cane. As Berquin-Duvallon descended the Mississippi River from New Orleans in 1802, he observed a scatter of sugarhouses, sawmills, and vegetable farms spread out along the river between New Orleans and the marshes toward the mouth of the Mississippi River (Davis 1806:19-20). Soon after the Louisiana Purchase, small land holdings along the river began to be bought up and consolidated into larger plantations. The need for firewood to fuel the sugar

houses resulted in large-scale land clearing of the cypress stands, in the backswamps and interior of Barataria, and in turn, this increased the amount of available agricultural land (Goodwin et al. 1986:95). However, the majority of the arable land was still to be found on river frontage. The plantations of Plaquemines Parish had a wide frontage and shallow depth, in contrast to some plantation development elsewhere in Louisiana, where a small section of river front supported a wedge-shaped property of cultivated backlands (Swanson 1991:109-111).

In 1807, Jean Baptiste Degruy and François Mayronne partitioned their plantation, which reached from the west bank of the Mississippi River to Barataria. Subsequently, Degruy purchased Mayronne's portion. By 1809, Degruy was living at the confluence of Bayou Des Familles and Bayou Barataria and growing sugar cane on the east bank of Bayou Des Familles, the first planter recorded as growing sugar cane on a commercial scale in Barataria. However, Degruy was unable to remain solvent. He was a master carpenter and building contractor, and he grew sugar cane on his plantation. He also thoroughly exploited his Barataria lands. On them he grazed about 300 head of cattle, produced fence posts and pickets from lumber, and manufactured carts. He established a lime-making facility in Barataria, mining prehistoric Indian mounds for shells and reducing them to lime in primitive kilns that may have been set up in proximity to the source mounds. Degruy also cooperated with the infamous smugglers of the Barataria area, including the Lafitte brothers (Swanson 1991:109-111).

The colorful and legendary figures of Jean Lafitte and his brother, Pierre Lafitte, became active in smuggling in the Barataria region from about 1805. Their stock in trade was merchandise subject to importation restrictions or tariffs, such as slaves, pig iron, ceramics, glassware, and cloth, highly in demand in Louisiana. These items were obtained from seagoing vessels captured by the piratical efforts of professional sailors like Dominique You, René Beluche, and Louis Chighizola. The Baratarian captains worked under a masquerade of "privateering," which had only a flimsy pretense of legality, while the Lafittes principally supervised the distribution and sale of the merchandise once it was brought ashore. Barataria was an ideal base for these activities, with a deep-water anchorage at Grand Terre, and a network of waterways that allowed transportation of goods to the city of New Orleans, as well as to Bayou Lafourche and the plantations above the city. The Baratarian landowners were, for the most part, in various degrees of complicity with the Lafittes. The nature and extent of the Lafittes' activities have been wildly exaggerated and romanticized, but they ran a successful operation from their base in Barataria for nearly ten years despite periodic attempts by U.S. officials to crack down on smuggling. During the crisis of the British invasion of Louisiana in 1814, the size of the Lafittes' illicit operations on the coast made it impossible for the United States military to ignore him. The U.S. Navy raided Grand Terre and took into custody all of the vessels and merchandise present, as well as arresting anyone they could catch at the scene. The Lafittes had been forewarned and escaped. The Baratarians captured at Grand Terre were released from prison to take part in the Battle of New Orleans. The Lafittes, whose patriotic motives were dubious, offered their services against the British invaders, while likely hoping to regain possession of some of the vessels and merchandise confiscated at Grand Terre. As it happened, neither of the Lafittes were present at the Battle of New Orleans. The Lafittes and they and the captured Baratarians were subsequently pardoned for any illegal activities they may have perpetrated. Jean Lafitte gave up on Barataria and eventually moved his base of operations to Texas (Maygarden et al. 1995).

After the end of the Lafittes' escapades in Barataria, the area sank back into being literally and figuratively a backwater. Tracts in the region were bought and sold frequently while landowners (notably John McDonogh) sought to wrest profits from cane growing, timbering, livestock raising, and other activities.

By the last decade of the antebellum period, the population of Barataria had increased substantially since the decline of the *Isleño* settlement. Despite a major crevasse in 1849-1850,

1,176 inhabitants were enumerated in the Barataria region in the 1850 census. Of these, 657 persons were white and 504 persons (46 percent of the total) were slaves. Of the slaves, the great majority (79 percent) were owned by large plantation owners and lived at the plantation centers of West Jefferson Parish, rather than dispersed in the back lands. A small majority (51 percent) of the adult free males in the Barataria region worked full- or part-time on the large plantations as engineers, overseers, skilled laborers, etc., and overall, 65 percent of the total Barataria population lived on the plantations. Of the remainder of the white male inhabitants who did not work on the plantations, 25 percent had their occupation listed in the census as hunter, 9 percent worked on the water, and 8 percent were farmers. However, many of these free residents of Barataria probably worked at a number of occupations, hunting, fishing, logging, and doing agricultural labor on a seasonal basis (Holmes 1986:89).

The properties of John McDonogh were divided and sold at auction following his death in 1859. Large sugar plantations remained in the Barataria vicinity throughout the antebellum period, despite another major, devastating crevasse in 1858. Sugar planters bought much of the available land formerly owned by McDonogh in the Barataria Basin.

The Civil War and Late-Nineteenth Century

Early in the Union invasion of Louisiana via the Mississippi River in April 1862, the Union fleet ran past Forts Jackson and St. Philip in Plaquemines Parish, making the subsequent capture of New Orleans inevitable (Calhoun 1995: 232). Close to the major Union base of operations in Louisiana, the interior of Plaquemines Parish and the Barataria area were spared large-scale conflict.

The Civil War seriously disrupted the Louisiana sugar industry, and the post-emancipation agricultural labor system took several years to stabilize. Nevertheless, in the post-bellum period, the Barataria basin and Plaquemines Parish remained entirely agricultural in nature. The sugar plantations struggled to survive with shortages in capital and cheap labor. The immigration of small numbers of Chinese did little to relieve labor shortages on the cane plantations, but the arrival of large numbers of Italians from the 1880s on helped revive the agrarian economy. Rice cultivation made a comeback in Barataria and Plaquemines, and oranges were grown for the first time in the area. Corn, vegetable, and cattle raising were also important during the post-Civil War decades. In 1889, Henry C. Warmoth built the New Orleans, Fort Jackson, and Grand Isle Rail Road line through Plaquemines Parish, following the present right-of-way of the Southern Pacific Rail Road tracks that parallel the Mississippi River levee.

Logging and lumbering had been important in the Barataria Basin since the French colonial period. However, pre-industrial logging methods were unable to fully exploit the timber resources of the cypress backswamps. In 1889, the pullboat was invented, and in 1892, the overhead cableway railroad skidder. These developments allowed cypress and other species of trees to be logged in virtually any environment. Coincidental with a surge in national demand for lumber, the new technologies led to a boom in logging activity throughout Louisiana. So efficient were these logging methods that within a single generation, almost all virgin stands of cypress had been depleted in Louisiana, and by 1925, the industry was in major retraction (Mancil 1972:76-77, 82-85).

The so-called "golden age" of cypress lumbering in Louisiana was a brief but intense episode of dramatic change in the cultural and natural geography of southern Louisiana. Characteristic of this industrial logging period was the purchase or lease of large swamp tracts by logging companies, who moved in with temporary support and processing facilities. The logging companies altered the landscape by building canals or railway embankments, and then removed virtually all trees of marketable size. Workers moved throughout the cypress region,

residing in barracks or quarters boats while employed in a particular area, and then leaving when extraction on any tract had been completed. In the Barataria region, the logging industry evidently drew on a distinctly different labor pool than was the case in the large cypress reaches of the Atchafalaya Basin. In the eastern Atchafalaya Basin area, about one-third of the workers in the cypress logging industry were of Native American, African-American, or mixed heritage (Grace 1946:232), but in the Barataria region virtually all of the laborers were African-Americans who worked under white supervisors. A large logging camp might have 80 African-Americans and six whites. Much of the cypress and hardwood timber from the Barataria Basin was milled at the Louisiana Cypress Company, afterward the Rathborne Lumber Company, located on the Harvey Canal at the Mississippi River.

The Twentieth Century

At the beginning of the twentieth century, Plaquemines Parish had a population of 13,039 people who were largely employed in the oyster and livestock industries, as well as on the various sugar plantations throughout the parish. An Oyster Commission was created under a 1902 act of the General Assembly. Its goal was to build up the oyster industry in the state. The Oyster Commissions duties were to police the Natural Oyster Reefs in the several parishes along the Gulf Coast and endeavor to enforce the provisions of the oyster law, protecting the oyster beds. Some of the corporations involved in the oyster industry were: The Louisiana Navigation and Fisheries Company Limited, The Crescent City Packing Company, The Conway Oyster Company, The Dymond Island Oyster Company and the Whale Bay Oyster Company. Yugoslavian immigrants were instrumental in developing Plaquemine Parish's oyster industry. The oyster industry of Plaquemines Parish thrived through the 1920s, when hurricanes and the development of the Bohemia Spillway damaged oyster beds, forcing many Yugoslavians to relocate (Southern Manufacturer 1905: 13-14; Goodwin et al. 1986:158).

Small-scale farming on the natural levees continued in the Barataria Basin, and efforts were also made to develop large-scale agricultural tracts on basin and marshlands. However, in many cases, drainage efforts produced subsidence, making agriculture yet more difficult after a limited period of productivity (Holmes 1986:109-110, 116-121)

Meanwhile, by 1925, virgin cypress stands in south Louisiana were almost entirely depleted, and the large cypress mills went into decline. Smaller, portable mills became more prevalent (Holmes 1986:108-109). In the swamps and marshes of Plaquemines and in the Barataria region, by 1930, many residents were squatters engaging in extractive pursuits, such as hunting, fishing, and trapping for their livelihood. Demand for muskrat fur grew after 1900, and with the reduction of the alligator population in the Louisiana swamps, the number of muskrats available for trapping soared. Shrimping was done on a large scale in the Barataria Basin in the late-nineteenth and early-twentieth centuries. The stilt villages where the shrimpers lived and where shrimp were dried for export were a characteristic feature of Barataria Bay. Oystering, crabbing, and moss collecting were other extractive activities that were pursued in the Barataria area on an extensive scale. In more recent decades, technological developments, particularly in water transportation, have had a substantial impact on these traditional undertakings (Holmes 1986:109-110, 116-121).

During the first half of the twentieth century the oyster and sugar industries declined in importance while the citrus, sulphur and petroleum industries expanded. Port Sulphur, established by the Freeport Minerals Co., also known as the Freeport Sulphur Company, grew rapidly after 1932 (Meyer 1981:68). Oil exploration and extraction has been a major component in the twentieth-century history of the Barataria Basin. In 1935, Texaco discovered the Lafitte Oil Field, and subsequently pipelines were extended from the field to the Mississippi River and to refineries at Grand Ecaille. The Barataria Oil Field was discovered in 1939, and the Lake Salvador and Delta Farms Fields in 1940. Numerous further, subsidiary fields have been

opened in the half-century since the oil industry arrived in the Barataria Basin. In the developmental period, oil field workers lived in houseboats or oil field camps, and subsequently the towns of Lafitte, Barataria, and Crown Point grew as residential communities for oil field workers (Holmes 1986:122). One individual, Judge Leander Perez, played a major role in the development of Plaquemines Parish in the twentieth century. He is credited with effecting reforms in many different venues, among them: 1) rearranging parish financing; 2) building public schools at the cost of millions of dollars; 3) extensive road building; 4) establishment of water purification plants; and 5) building a system of drainage and protection levees (Meyer 1981:69).

Due to increased industrialization and new job opportunities, the population of Plaquemines Parish has continued to grow at a slow but steady rate through the years. However, it is not the growth in numbers that is notable, but rather the change in demographics. In 1960, 7,776 of the parish's 22,545 residents lived in an urban setting, or roughly one-third of the population. By 1990, 21,134 of the parish's 25,575 residents lived in locations designated urban. The percentage of people who lived in rural settings changed from 66% in 1960 to 17% in 1990. This reflects the increasing role of industry and the decreasing role of agriculture in Plaquemines Parish. An example of industrial and commercial development during recent decades in Plaquemines has occurred along LA Hwy 3017, strategically located between the Harvey Canal and the G.I.W.W. Alternate Route. In recent years, the important industries for Plaquemines Parish have been oil and related industries, sulphur, manufacturing, and retail trade. And although the role of agriculture has overall declined in Plaquemines Parish, the citrus and Creole tomato crops make significant contributions to the economy. The Barataria portion of Jefferson Parish has also experienced demographic changes, particularly an increase in residential land-use. At present, the Barataria Basin exhibits a diversity of characteristics, with natural features and land use patterns reflecting the survival of traditional ways of life in the area, and also the impact of modern developmental and industrial activities (U.S. Department of Commerce 1990; Calhoun 1995: 232; Goins and Caldwell 1995).

The Harvey Canal and the G.I.W.W.

The presence of the Harvey Canal and Gulf Intracoastal Waterway Alternate Route were crucial to the development of the current project area. The Harvey Canal was evidently begun after 1835 and completed by 1848 (Hinks et al. 1991:22), providing an important route between Bayou Barataria and the Mississippi River. However, it did not connect with the Mississippi River at its northern end until construction of the Harvey Canal Lock in 1907. Prior to the construction of the lock, boats proceeding from the canal to the river were hauled by mules over the levee onto a railway, and then toward the river on a track that was submerged at its river end. In addition, the canal does not currently occupy its original channel for at least a portion of its length. The WPA widened the canal in about 1934, and also shifted the channel of at least the northern portion of the canal approximately 125 feet to the west. The original Harvey Canal lock was replaced by a much larger structure at its present location within the channel alignment followed by the WPA construction (WPA 1937). Since the Harvey Canal has always been shown on historic maps as following a perfectly straight line between the Mississippi River and Bayou Barataria, it is difficult to say how far down its length the original canal channel was altered by the WPA construction. In addition to some alteration of the course of the channel, the Harvey Canal was substantially widened when it became part of the Intracoastal Waterway system. This occurred simultaneously with the WPA construction of the Harvey lock and was completed in 1934 (Hinks 1991:25; Swanson 1975:89-91; Maygarden et al. 1994).

In 1945, the canal banks south of the industrialized zone along the Harvey Canal were occupied by marsh or forest, except near Bayou Barataria, where drained marsh extended north 1 to 1.3 km from the bayou on the eastern side of the Harvey Canal and between the

Harvey and Murphy Canals. The industrial zone extended south along the eastern side of the canal about 2.3 km from the river as a narrow but almost unbroken series of buildings or slips. By 1951, discontinuous development extended slightly farther south along the canal's eastern side as far as the present alignment of Thirty-eighth Street. Isolated development appears by the Hero Pumping Station and slightly farther north, opposite the northern (upper) end of the Hero Cutoff, which forms the modern confluence of Bayou Barataria and the main navigation channel of the Harvey Canal. By 1955, several other parcels on the eastern side of the Harvey Canal near Bayou Barataria had been developed. By 1965, near-continuous development extended south along the eastern side of the Harvey Canal as far as Bayou Barataria. Small, developed tracts extended southwest along the eastern bank of Bayou Barataria, 1 km from the original confluence of the Harvey Canal with the bayou, near the Hero Pumping Station. Only minor expansion of the developed tracts along the canal appeared in 1966 and 1969.

By 1975, on the eastern side of the Harvey Canal, one additional large tract, approximately 2 to 2.3 km north of Bayou Barataria, was developed by 1975. An electrical transmission line that crosses the Harvey Canal passes through the northern end of this tract. Also by 1975, a large complex of industrial waste ponds appeared on the eastern bank of Bayou Barataria about 1.5 to 1.8 km southwest of the original confluence of the bayou and the Harvey Canal. This complex of ponds lies opposite the mouth of an east/west-oriented pipeline canal and the northern (upper) end of the Lower Hero Cutoff. The Lower Hero Cutoff by this time extended the alignment of the navigation channel southward through Hero Cutoff by removing a small point bar on the western bank of Bayou Barataria. By 1991, previously vacant tracts on the eastern side of the Harvey Canal and Bayou Barataria in the vicinity of the Hero Pumping Station were developed. No further industrial development had occurred on the western side of the canal south of Lapalco Boulevard, and this has remained a wetlands area.

The G.I.W.W. Alternate Route. The Gulf Intracoastal Waterway was developed ca. 1934 and originally connected with The Harvey Canal via Bayou Barataria. The extension of the Algiers Canal, designated the G.I.W.W. Alternate Route, was begun by 1951. Excavation had advanced to Woodland Highway, but both roadbeds were intact. Photos taken in 1945 and 1951 show no development and only small areas of cleared land along the future canal course. The Algiers Canal excavation extended south to Bayou Barataria by 1955, and at that date, narrow strips of unexcavated land still separated the bifurcated southern (lower) end of the Algiers Canal from Bayou Barataria. A pre-1945 northwest/southeast-oriented drainage canal had been widened from the bayou (near the Hero Pumping Station) to the Algiers Canal. The southern end of this minor canal, located in Section 35 of T14S R24E, was closed by 1965. In 1955, the roadbed of Peters Road, running southeast from Bayou Barataria to Alvin Callender Field, still crossed the canal bed in Section 94. That roadway was removed by 1965. The Bayou Barriere drainage canal west of Alvin Callender Field appears in 1955. The Plaquemines Pumping Station, on the eastern side of the Algiers Canal in Sections 14 and 89, was connected to the Bayou Barriere Canal by the greatly widened course of an earlier drainage canal that ran northwest/southeast. The excavated canal in 1951 and 1955 photos is narrower than in 1965. No commercial/industrial development appeared along the Algiers Canal in 1955.

By 1965, the Algiers Canal had assumed its present dimensions. The present bridge crossing the canal at Woodland Highway and the bridge and tunnel crossing at Belle Chasse Highway (LA Highway 23), appear at this date. New Orleans Sewerage and Water Board Pumping Station No. 11 appears on the eastern side of the Algiers Canal in Section 24 of T14S R24E by 1965. Development on the western side of the Algiers Canal at this date was concentrated along Engineers Road (Highway 3017) south of Belle Chasse Highway. Discontinuous development extended 1.9 km southwest of Belle Chasse Highway in Sections 68, 24, and 14 of T14S R24E. A smaller tract on the southern side of Peters Road in Section 94 included ca-

nalside structures. By 1966, several structures had appeared along Engineers Road just north of Peters Road, in Section 91 of T14S R24E.

By 1972, extensive commercial/industrial development had taken place on the western side of the Algiers Canal extending 1.4 km southwest of Belle Chasse Highway in Sections 30 and 68 of T14S R24E. Scattered tracts were developed between Engineers Road and the Algiers Canal, southward as far as Peters Road in Sections 89, 90, 91 and 94. By 1991, development was extensive along the entire western side of the Algiers Canal and G.I.W.W. Alternate Route.

CHAPTER 6
PREVIOUS INVESTIGATIONS

The project area lies just to the west of Bayou Barataria, which separates Jefferson and Plaquemines Parishes. The Barataria Basin is archeologically well known, having witnessed numerous research projects in and around its borders. One of the best-studied areas within the Barataria Basin is the Bayou Des Familles channel to the west and south of the current project area. Hundreds of sites have been recorded in the basin as a whole, and almost a hundred from Bayou Des Familles alone. Unfortunately, archaeological surveys in the immediate project vicinity have been less fruitful. A comprehensive discussion of the history of archaeology in the Barataria Basin can be found in Kidder et al. (1995).

In the mid-1930s, a professional branch of archaeology began developing in Louisiana. This began with excavations and surveys throughout the state (Czajkowski 1934, Ford 1936, and Kniffen 1936). While the work by Czajkowski at the Little Woods sites (16OR1-5) was scientifically questionable, the excavations did demonstrate the temporal priority of Tchefuncte ceramics relative to those identified as Coles Creek (Czajkowski 1934). At roughly the same time, James A. Ford conducted a series of excavations and surveys in the Lower Mississippi Valley, and in 1936, he published a seminal book on the archeology of the central part of that region (Ford 1936). Ford's work became the yardstick by which all other cultural sequences in the Lower Mississippi Valley would be measured (Neuman 1984).

In 1936, F. B. Kniffen, a cultural geographer, undertook an archeological survey in the eastern coastal zone. This research was designed to assist in the dating of geological features (notably waterways and associated features) by examining Indian sites associated with each of them (Kniffen 1936). Kniffen visited and made collections from 36 archeological sites in the Mississippi River delta area, and formulated two chronologically distinct ceramic "complexes". The earlier of these two complexes was called Bayou Cutler, after the site of the same name (16JE3), and the other Bayou Petre, named for the site of the same name in St. Bernard Parish (16SB11) (Kniffen 1936). Kniffen identified a number of ceramic traits which distinguished these two complexes, and called attention to the similarities and differences between the coastal ceramics and those identified by Ford in the Lower Valley (Kniffen 1936). The effect of Kniffen's work was to incorporate the archeology of the coastal zone into the broader picture of Southeastern archeology which was emerging at that time. Kniffen's work also suggested that the cultural ties of peoples living in the coastal zone were northward up the Mississippi Valley.

In 1953-54, W. McIntire, another cultural geographer, undertook a study of the area "to learn more about prehistoric man in coastal Louisiana, and to use his cultural remains as an aid in unraveling some of the geological history of the deltaic plain" (McIntire 1954:1). This research was significant in geographic scope and in the extent to which it provided the benchmark for subsequent refinements of the culture history of the entire coastal zone (McIntire 1954, 1958; Neuman 1984). Basing his culture historical framework on revisions of Ford's work ultimately published by Phillips, Ford, and Griffin (1951; Ford and Quimby 1945; Ford and Willey 1940), McIntire aligned the coastal zone culture history with that promulgated for the Lower Mississippi Valley (1954, 1958). By the time McIntire's work was revised in 1958, a chronological framework had emerged which is still recognizable today. Special note should be made of McIntire's revision of the Bayou Cutler and Bayou Petre complexes, which were respectively placed in the Coles Creek and Plaquemine periods. A coastal Troyville culture/period was recognized, along with Marksville remains. McIntire also noted the presence of moderate quantities of late prehistoric ceramics attributable in style or actual fabric to the Moundville [Pensacola] and Fort Walton cultures of the eastern Gulf Coast region (McIntire 1954, 1958).

McIntire's work also involved a great deal of archeological survey and some limited testing and soil coring. No sites on Bayou Des Familles were visited, but McIntire did investigate a number of sites on Bayou Barataria, mostly south of the confluence of Bayous Barataria and Villars (Gagliano et al. 1979; McIntire 1958). Based on his analysis of the ceramics from the area, McIntire (1958:74) suggested that the lower course of Bayou Barataria had supported an important Troyville occupation. More recent archeological research in the lower Barataria region indicates that many of these Troyville sites may actually date to the Marksville period. McIntire's data also showed that many of the sites in the Barataria region supported extensive occupations through much of the prehistoric period, and that there was an important late prehistoric component located at and around the Fleming site (16JE36).

After McIntire's work, it would be almost 20 years before substantial archaeological research within the coastal zone was published. In the 1970s, the pace of archeological research in the coastal zone increased as more research was undertaken and as Federally mandated cultural resources management studies were implemented. Archeological surveys of the Gulf Intracoastal Waterway recorded several archeological sites in the Barataria Basin near the Bayou Des Familles channel (Gagliano et al. 1975), and in 1975, J.R. Shenkel undertook a study of several sites in the Bayou Des Familles and Bayou Segnette Waterway area (Shenkel 1975). Amateur investigations at the Fleming (16JE36) and Isle Bonne (16JE60) sites were conducted between 1974 and 1976 (DeMarcay n.d.; Holley and DeMarcay 1977). These sites provided important evidence for continuity of occupation in the Barataria Basin and suggested the significance of the so-called Barataria complex of sites at the confluence of Bayous Barataria and Villars. This complex was hypothesized to represent a long-term habitation area and late prehistoric mound complex, and was possibly the central community in the lower Barataria region (Holley and DeMarcay 1977).

Archeologists from Coastal Environments, Inc., conducted an in-depth archeological survey of parts of Bayous Barataria, Rigaud, and Segnette, adding 34 new archeological sites to the regional inventory (Gagliano et al. 1979). Significantly, this work presented a detailed and influential paleogeographic reconstruction of the region. Archeological data were combined with then-current geomorphic evidence to show the nature of habitation and its shifts through time as river courses and streams changed their direction, flow, and consequently, their environment.

Continued investigations in the Bayou Des Familles area were undertaken as part of the planning and implementation of the Jean Lafitte National Historical Park and Preserve. Research consisted of surveys along the bayou channels, as well as excavations at the Coquilles site (Beavers 1982a, 1982b; Giardino 1984a, n.d.; Swanson 1991). The data from these surveys were utilized for several regional syntheses, notably inventories of archeological data in the park area and also in Jefferson Parish (Goodwin et al. 1985; Holmes 1986; Speaker et al. 1986). These reviews, however, did not add any substantial new data to the existing archeological record. Speaker et al. (1986) argued that 11 of the sites listed by Beavers (1982b) should be reclassified as "non-sites" since they were likely to represent historic disturbances, dredge spoil, or natural shell deposits.

Throughout the 1980s and 1990s, numerous surveys and excavations were undertaken within the boundaries of the park (Kelley and Bryant 1986; Poplin 1987; Comardelle and Witschey 1990; Franks and Yakubik 1990; Goodwin et al. 1989). The two most recent data recovery projects were undertaken by Earth Search, Inc., at the Bayou Des Familles and Camino sites (Kidder et al. 1995 and Yakubik 1995).

Within Jefferson and Plaquemines Parishes, few surveys have been conducted in the area between Bayou Barataria and the heavily occupied Mississippi River natural levee. Two surveys at the Alvin Callender Field (U.S. Naval Air Station) yielded no sites or

archaeological remains (Beavers 1978 and Pietak 1996). Site 16PL41, the nearest recorded site to the current project area, was examined by Hinks et al. 1991. At that time, the site was determined to be a modern shell deposit associated with the construction of the Algiers Canal/Intracoastal Waterway. While there is considerable disparity in the amount of research conducted in the Barataria Basin and along the Mississippi River compared to the intervining area, the paucity of sites in the latter area may be a function of the landscape rather than an example of an error of understudy. Further surveys in the region are the only method of testing this hypothesis.

CHAPTER 7
FIELD INVESTIGATIONS

Introduction

This portion of the report describes all aspects of fieldwork undertaken within the project area. Survey and recordation methods are detailed. The different survey blocks within the project area are defined, and general subsurface profiles are presented for each. Although no significant cultural resources were discovered within the project area, three recent surface scatters were encountered and are described.

Methodology

Field investigations consisted of intensive pedestrian survey of the project area. The project area was divided into survey blocks labeled A, B, and C. Transects were spaced 30 m apart and auger tests were excavated every 30 m along each transect. Transects within the survey blocks were numbered consecutively as were the auger tests along each transect.

Auger test placement was staggered to maximize coverage of the area. Auger tests were excavated to 2 m below ground surface until sufficient stratigraphic data were obtained to identify culturally sterile subsoils. Thereafter, tests were terminated when the sterile subsoils were encountered. Soil excavated from the tests was screened through ¼-inch wire mesh when conditions permitted. Very clayey soil was carefully trowel sorted and examined for artifacts. All excavations were immediately backfilled after work was completed.

Soil data were recorded for each auger test and a subsurface profile drafted. These data include distance from transect origin, soil type, depth below ground surface, Munsell color, inclusions within the soil matrix, and degree of water saturation. All transects and auger tests were placed on a scale map (Figure 7).

Survey Block A

Survey Block A is situated on the eastern end of the project area between baseline stake 149 + 43.82 and an undesignated, northwest/southeast, shell-covered road. Twelve transects were surveyed within this block. Survey progressed from west to east within the block. Forty-six auger tests were excavated. Eighteen could not be excavated due to the presence of either impenetrable surfaces (e.g., the shell-covered road) or the existing levee (Figure 7). In one instance, the auger test location was abandoned after the field crew was attacked by wasps.

No historic or prehistoric cultural resources were discovered in this survey block, but a very recent surface scatter of material was observed along Transect 5 between Auger Tests 4 and 5. Several loads of metal cans and a large cache of "telephone" poles were noted at this location. The wooden poles may have functioned as moorings for barges until replaced by metal moorings in the very recent past.

Soil data obtained from the auger tests suggest a fairly uniform subsurface profile exists within Survey Block A. Transect 7 provides a typical profile for Survey Block A. The first stratum is a 10YR 2/2 (very dark brown) organic loam that extends to 43 cm below ground surface (cmbgs). Below this is a 10YR 2/2 (very dark brown) silty clay noted between 43 and 80 cmbgs. At 80 cmbgs, a 10YR 4/2 (dark grayish brown) silty clay, which extends to 135 cmbgs, was noted in the profile. The final stratum is a water-saturated, N4 (dark gray) gleyed silty clay (Figure 8).

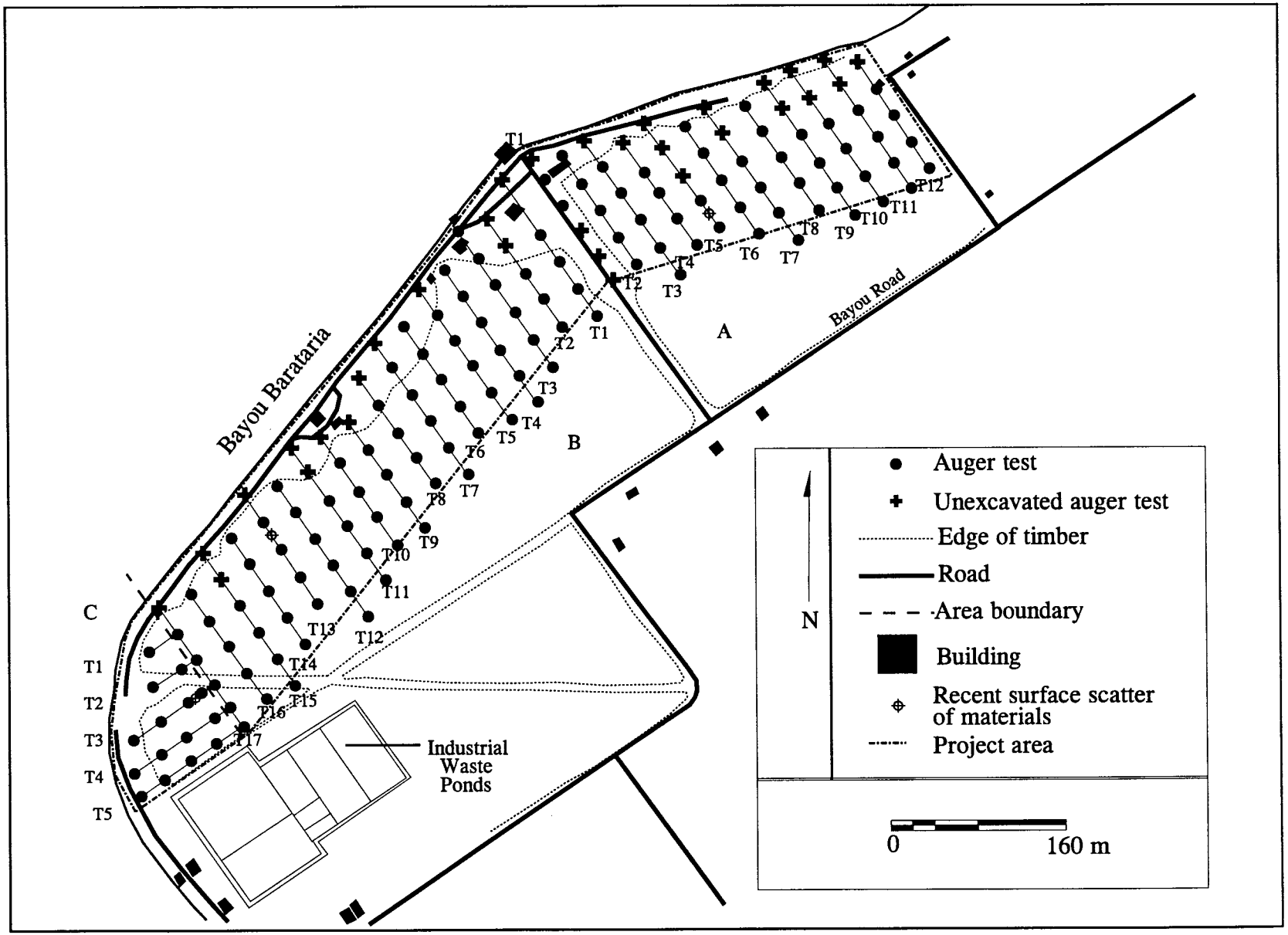

Figure 7. Map of project area showing test locations.

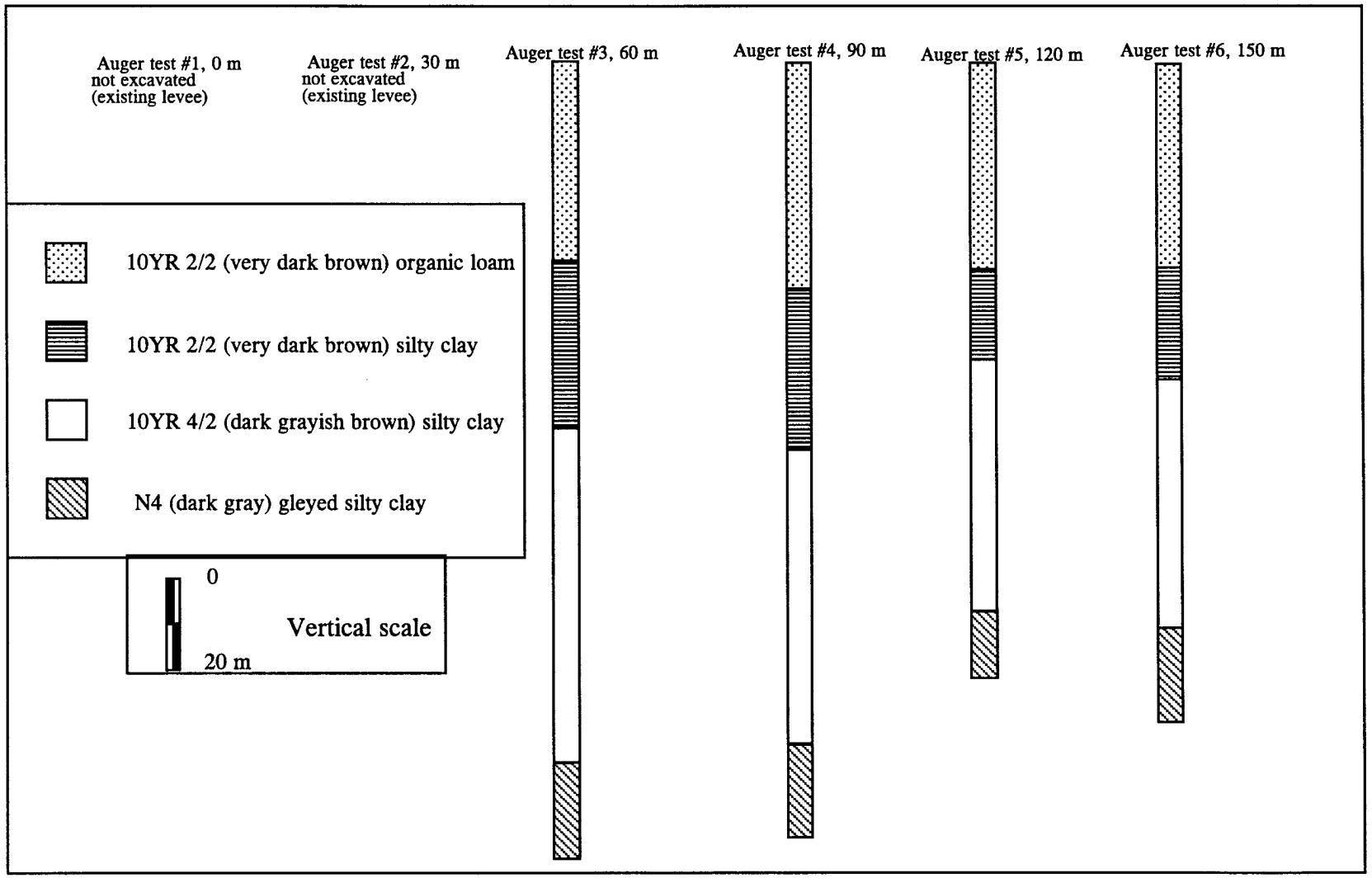

Figure 8. Auger test profiles, survey block A, transect 7.

Survey Block B

This survey block is located immediately west of and adjacent to Survey Block A. The western boundary of Survey Block B is arbitrary and coincides with an angle change in the project area baseline (Figure 7). Seventeen transects were surveyed within this block from east to west. Seventy-five auger tests were excavated. Sixteen could not be excavated due to the presence of either hard surfaces (e.g., shell-covered road) or the existing levee.

No historic or prehistoric cultural resources were discovered in Survey Block B, but a very recent surface scatter of material was noted along Transect 13 between Auger Tests 2 and 3. This second surface scatter contained whiskey bottles, "Corn Huskers Lotion" bottles, several brick, iron cables, a rubber ball, sheet metal, and sheet fiberglass fragments. These materials suggest a disposal area utilized by the businesses along Bayou Barataria and/or by families living south of Bayou Road.

As was the case in Survey Block A, the auger tests excavated in Survey Block B suggests a fairly uniform subsurface profile with limited variation due to industrial development and water saturation. Transect 12 provides a typical profile for this survey block. The first stratum is a 10YR 2/2 (very dark brown) loam that extends to an average depth of 50 cmbgs. Below this is a 10YR 4/2 (dark grayish brown) silty clay that extends to an average depth of 110 cmbgs. The final stratum encountered in Survey Block B is a N4 (dark gray) gleyed clay (Figure 9).

Survey Block C

Survey Block C is situated at the extreme western end of the project area. Five transects were surveyed, and sixteen auger tests were excavated. Survey progressed from the northern end of the survey block to the southern end.

No historic or prehistoric cultural resources were identified during survey, although a recent surface scatter of materials was noted along Transect 3 between Auger Tests 3 and 4. This third surface scatter contained a concentration of modern bottles (ca. 1970), one plate fragment, and several lengths of iron cable. These items suggest a mixed industrial and domestic assemblage more than likely deposited by business concerns and residences south of the survey area (Figure 7).

The general subsurface profile obtained from auger tests in Survey Block C is somewhat different than soils encountered in the other survey blocks. The uppermost stratum is either a 10YR 2/2 (very dark brown) or 10YR 3/2 (very dark grayish brown) loam. The loam extends to an average depth of 70 cmbgs. The organic content of the loam varies significantly. Almost no organic content is found along Transects 1-3, but the loam is highly organic along Transect 4. *Rangia* shell fragments were noted in the profile in those auger tests located near the bankline/levee.

The second stratum noted in the profile is a 10YR 4/1 (dark gray) loamy clay that extends to an average depth of 145 cmbgs. In one instance, at the beginning of Transect 1, the dark gray loamy clay was located above the very dark brown loam, suggesting this location was disturbed by levee construction along Bayou Barataria. The silt content of the stratum increases significantly below 100 cmbgs. The final stratum seen in Survey Block C is either a 10GY 4/1 (dark greenish gray) or a 10B 5/1 (bluish gray) gleyed clay that is usually encountered below 145 cmbgs (Figure 10).

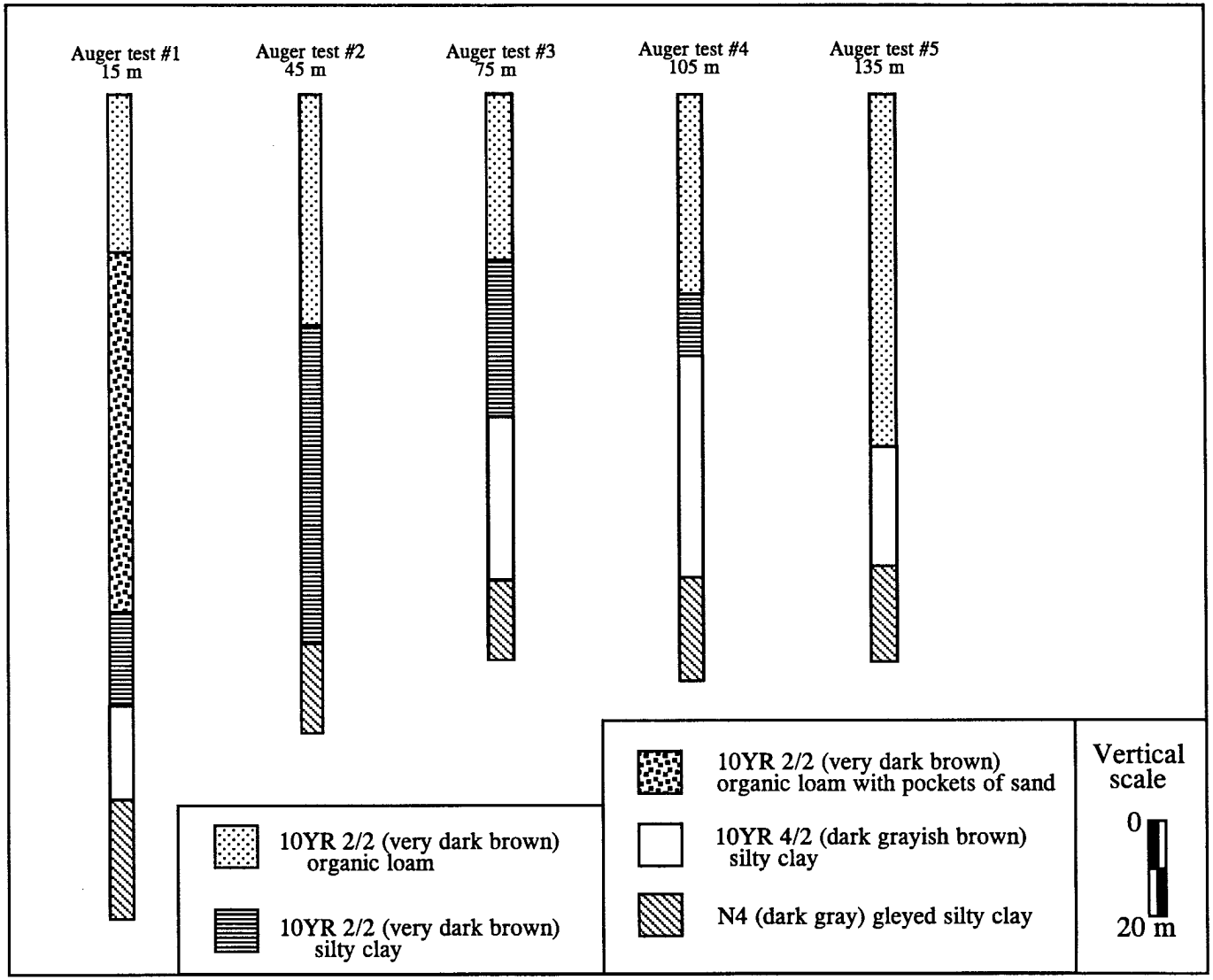

Figure 9. Auger test profiles, survey block B, transect 12.

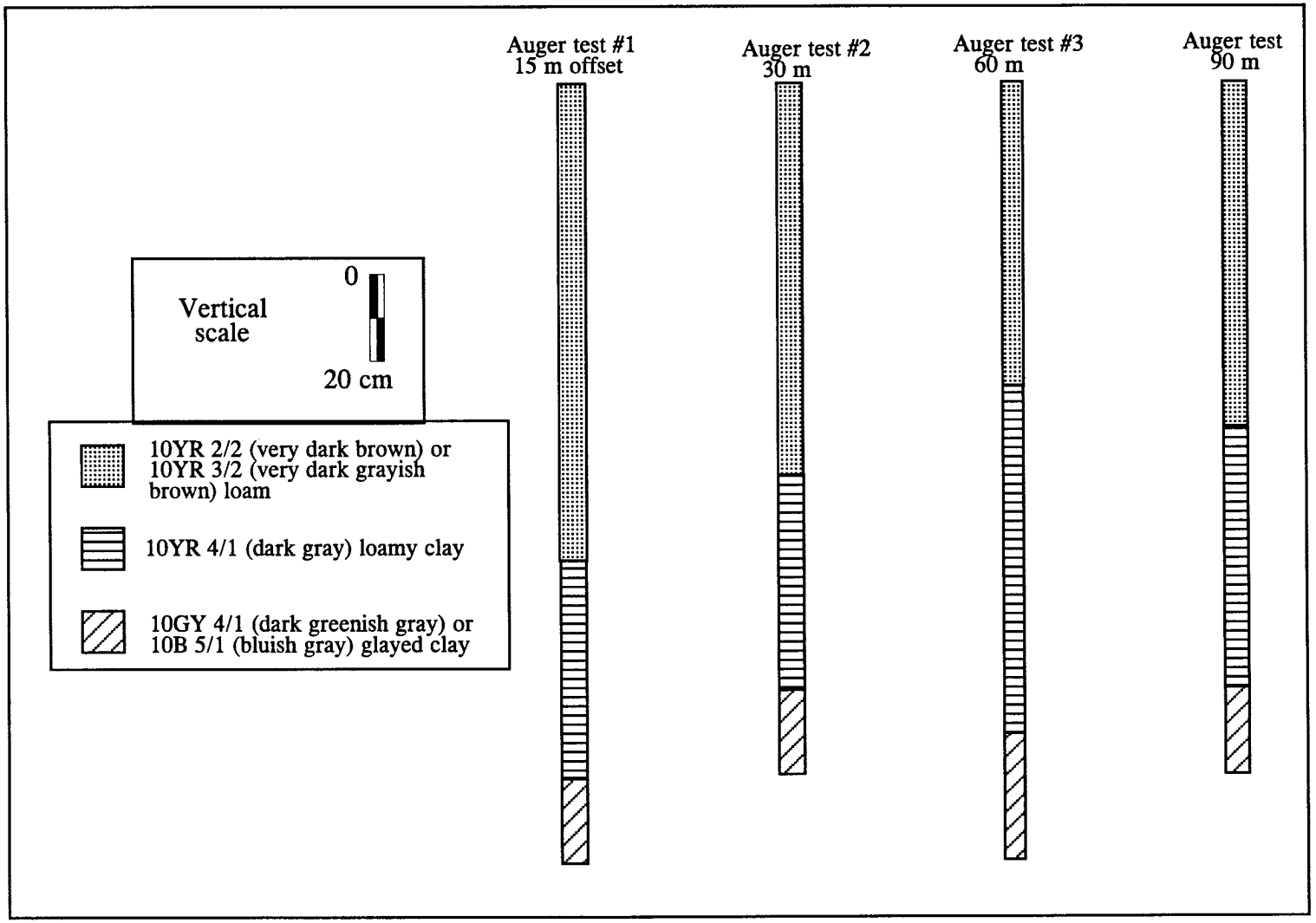

Figure 10. Auger test profiles, survey block C, transect 3.

Standing Structures

The only architectural resource located in the project area consisted of one badly deteriorated house. It is located immediately adjacent to the levee in the extreme northeast corner of the project area. It may have been a shotgun with a gable front, but many building episodes have obscured the true former appearance of the building. It is not likely that the structure is greater than fifty years of age. No historic diagnostic attributes were observed. In fact, many modern building materials (e.g., plywood and paneling) were observed. These facts, along with the observation of aluminum windows, attest to the modern origins of this ruinous structure. This building does not possess any of the qualities of significance or integrity as defined by the National Register of Historic Places.

CHAPTER 8
RECOMMENDATIONS

Pedestrian survey within the proposed project area failed to discover any historic or prehistoric cultural resources. Three very recent surface scatters of material were identified, one in each of the survey blocks. The types and ages of these materials suggests they are less than 20 years old and do not constitute archeological sites. In addition, the remains of one badly deteriorated structure was identified. This structure also appears to be less than 50 years old. Therefore, ESI recommends that no further work is necessary within the proposed project area. Construction of the proposed hurricane protection feature should be allowed to proceed.

REFERENCES CITED

Altschul, Jeffrey H.
1978 *The Houma-Terrebonne Archaeological Project.* Report of Investigations 10, New World Research, Ft. Walton, FL.

Arthur, Stanley C.
1928 *The Fur Animals of Louisiana.* Bulletin No. 18, State of Louisiana Department of Conservation, New Orleans.

Bahr, L. M. and J. J. Hebrard
1976 *Barataria Basin: Biological Characterization.* Center for Wetland Resources, Louisiana State University: Baton Rouge.

Beavers, Richard
1978 *Cultural Resourses Survey and Assessment of the Proposed U.S. Coast Guard-Gulf Strike Team Building, Coast Guard Air Station, Alvin Callender Field, Belle Chasse, Plaquemines Parish, Louisiana.* Submitted to the Division of Archaeology, Baton Rouge.

1982a *Data Recovery for Area of Adverse Impact by Proposed Access Facilities at the Barataria Basin, Marsh Unit-Core Area.* Submitted to Jean Lafitte National Historical Park and Preserve, New Orleans.

1982b *Archeological Site Inventory: Barataria Basin Marsh Unit-Core Area, Jean Lafitte National Historical Park, Jefferson Parish, Louisiana.* Submitted to Jean Lafitte National Historical Park and Preserve, New Orleans.

Bellin, Jacques N.
1764 *Cours du Fleuve Saint Louis depuis ses embouchures jusqu' à la Riviere d'Iberville et Coses Voisines.* Paris. Copy on file, Louisiana Collection, Howard Tilton Memorial Library, Tulane University, New Orleans.

Belmont, John S.
1967 The Culture Sequence at the Greenhouse Site, Louisiana. *Southeastern Archaeological Conference Bulletin* 6:27-34.

Belmont, John S., and Stephen Williams
1981 Painted Pottery Horizons in the Southern Lower Mississippi Valley. In *Traces of Prehistory, Papers in Honor of William G. Haag*, edited by F. H. West and R. W. Neuman, pp. 19-42. Geoscience and Man 22, School of Geoscience, Louisiana State University, Baton Rouge.

Blitz, John H., and C. Baxter Mann, Jr.
1993 *Archaeological Investigations in Coastal Jackson County, Mississippi.* Interim Report 1, Mississippi Gulf Coast Archaeological Project, Bay St. Louis.

Braun, E. Lucy
1950 *Deciduous Forests of Eastern North America.* Blankiston, Philadelphia.

Brown, Ian W.
1984 Late Prehistory in Coastal Louisiana. In *Perspectives on Gulf Coast Prehistory*, edited by D.D. Davis, pp. 94-124. University of Florida Press, Gainesville.

1985 *Natchez Indian Archaeology: Culture Change and Stability in the Lower Mississippi Valley*. Archaeological Report 15, Mississippi Department of Archives and History, Jackson.

Brown, Ian W., Richard S. Fuller, and Nancy Lambert-Brown
1979 *Site Survey in the Petit Anse Region, Southwest Coast, Louisiana*. Research Notes 11, Lower Mississippi Survey Petit Anse Project, Peabody Museum, Harvard University, Cambridge.

Byrd, Kathleen M.
1976 The Brackish Water Clam (*Rangia Cuneata*): A Prehistoric "Staff of Life" or a Minor Food Resource. *Louisiana Archaeology* 3:23-31.

1991 Poverty Point Culture: Its Local Manifestations, Subsistence Practices, and Trade Networks. *Geoscience and Man* 29, School of Geoscience, Louisiana State University, Baton Rouge.

Caldwell, Joseph R.
1964 Interaction Spheres in Prehistory. In *Hopewellian Studies*, edited by Joseph R Caldwell and Robert Hall, pp. 135-143. Scientific Papers 12, Illinois State Museum, Springfield.

Calhoun, Milburn (ed.)
1995 *Louisiana Almanac*, Pelican Publishing Company, Gretna.

Coleman, J.M. and Gagliano, S.M.
1964 Cyclic Sedimentation in the Mississippi River Deltaic Plain. *Transactions-Gulf Coast Geological Societies* 14:67-80.

Comardelle, Michael and Walter R. T. Witschey
1990 *Survey of Spanish Colonial Archaeological Sites in the Barataria Unit of the Jean Lafitte National Park and Preserve*. Copyright 1990 Comardelle and Witschey.

Czajkowski, J. Richard
1934 Preliminary Report of Archeological Investigations in Orleans Parish. *Louisiana Conservation Review* 4:12-18.

Davis, David D.
1981 Ceramic Classification and Temporal Discrimination: A Consideration of Later Prehistoric Stylistic Change in the Mississippi River Delta. *Midcontinental Journal of Archaeology* 6:55-89.

Davis, Dave D., and Marco J. Giardino
1981 Some Notes on Mississippian Period Ceramics in the Mississippi River Delta. *Louisiana Archaeology* 7:53-66.

Davis, John (trans.)
1806 *Travels in Louisiana and the Floridas in the Year 1802, Giving a Correct Picture of Those Countries*. I. Riley & Co., New York.

DeMarcay, G. B.
n.d. A Preliminary Report on Isle Bonne, 16JE60. Manuscript on file, Department of Anthropology, University of New Orleans, New Orleans.

Department of Conservation
1931 *The Birds of Louisiana*. Bulletin No. 20, State of Louisiana Department of Conservation, New Orleans.

1933 *Fishes and Fishing in Louisiana*. Bulletin No. 23, State of Louisiana Department of Conservation, New Orleans.

Duhe, Brian J.
1977 Preliminary Evidence of Seasonal Fishing Activity at Bayou Jasmine. *Louisiana Archaeology* 3:33-74.

Evans, John G.
1978 *An Introduction to Environmental Archaeology*. Cornell University Press, Ithaca.

Ford, James A.
1936 *Analysis of Indian Village Site Collections from Louisiana and Mississippi*. Anthropological Study 2, Department of Conservation, Louisiana Geological Survey, New Orleans.

1951 *Greenhouse: A Troyville-Coles Creek Period Site in Avoyelles Parish, Louisiana*. Anthropological Papers Vol. 44, Pt. 1, American Museum of Natural History, New York.

Ford, James A., and George I. Quimby, Jr.
1945 *The Tchefuncte Culture: An Early Occupation of the Lower Mississippi Valley*. Memoir 2, Society for American Archaeology, Salt Lake City.

Ford, James A., and Clarence H. Webb
1956 *Poverty Point, A Late Archaic Site in Louisiana*. Anthropological Papers Vol. 46, Pt. 1, American Museum of Natural History, New York.

Ford, James A., and Gordon Willey
1940 *Crooks Site, a Marksville Period Burial Mound in LaSalle Parish, Louisiana*. Anthropological Study 3, Department of Conservation, Louisiana Geological Survey, New Orleans.

Franks, Herschel A., and Jill-Karen Yakubik
1990 *Archeological Survey on 65 Acres of Land Adjacent to Bayou des Familles*. Professional Papers No. 26, Southwest Cultural Resources Center, National Park Service, Santa Fe.

Frazier, D.E.
1967 Recent Deltaic Deposits of the Mississippi River: Their Development and Chronology. *Transactions-Gulf Coast Association of Geological Societies* 17:287-311.

Fuller, Richard S.
1991 *Identification and Analysis of Artifacts from Thirteen Sites in and Adjacent to the Barataria Unit of the Jean Lafitte National Historical Park, Jefferson Parish, Louisiana*. Submitted to Jean Lafitte National Historical Park and Preserve, New Orleans.

Gagliano, Sherwood M.
1963 A Survey of Preceramic Occupations in Portions of South Louisiana and Mississippi. *Florida Anthropologist* 16:105-132.

Gagliano, Sherwood M., and Roger T. Saucier
1963 Poverty Point Sites in Southeastern Louisiana. *American Antiquity* 28:320-327.

Gagliano, Sherwood M., R.A. Weinstein, and E.K. Burden
1975 *Archaeological Investigations along the Gulf Intracoastal Waterway: Coastal Louisiana Area*. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Gagliano, Sherwood M., R.A. Weinstein, E.K. Burden, K.L. Brooks, and W.P. Glander
1979 *Cultural Resources Survey of the Barataria, Segnette, and Rigaud Waterways, Jefferson Parish, Louisiana.* Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Giardino, Marco J.
1984a *Report on the Ceramic Materials from the Coquille Site (16JE37), Barataria Unit, Jean Lafitte National Historical Park.* Submitted to the National Park Service, Jean Lafitte National Historical Park and Preserve, New Orleans.

1984b Documentary Evidence for the Location of Historic Indian Villages in the Mississippi Delta. In *Perspectives on Gulf Coast Prehistory*, edited by D. Davis, pp. 232-257. University Presses of Florida, Gainsville.

1985 Ceramic Attribute Analysis and Ethnic Group Composition: An Example from Southeastern Louisiana. Unpublished Ph.D. Dissertation, Department of Anthropology, Tulane University, New Orleans.

1993 Cultural Chronology for 16SC27. Manuscript on file at Earth Search, Inc., New Orleans.

n.d. *Overview of the Archeology of the Coquilles Site, Barataria Unit, Jean Lafitte National Historical Park, Louisiana*. Submitted to the National Park Service, Jean Lafitte National Historical Park and Preserve, New Orleans.

Gibson, Jon
1977 *Archaeological Survey of Portions of Little River, Boeuf River, and Big Creek, East Central and Northeastern Louisiana*. Center for Archaeological Studies, University of Southwestern Louisiana, Lafayette.

1983 *Poverty Point*. Anthropological Study No. 7, Louisiana Archaeological Survey and Antiquities Commission, Baton Rouge.

Goins, Charles R., and John M. Caldwell
1994 *Historical Atlas of Louisiana*. University of Oklahoma Press, Norman.

Goodwin, R. Christopher, Stephen Hinks, William P. Athens, Paul C. Armstrong, Sylvia I. Fauret, Jennifer A. Cohen, and James M. Wojtala
1989 *Cultural Resources Investigations of the West Bank Hurricane Protection Project, Jefferson Parish, Louisiana*. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Goodwin, R. Christopher, Marvin D. Jeter, Mark A. Catlin, Jeffrey E. Treffinger, Paul C. Armstrong, Jill-Karen Yakubik, Roderick Lincoln, Mary K. Knill, Herschel A. Franks, and Carol Poplin
1986 *Cultural Resources Survey of the New Orleans to Venice Hurricane Protection Project, Reach C Enlargement, Plaquemines Parish, Louisiana.* Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Goodwin, R. Christopher, Jill-Karen Yakubik, Peter Gendel, Kenneth Jones, Debra Stayner, Cyd H. Goodwin, Galloway Selby, and Janice Cooper.
1985 *Preserving the Past for the Future: A Comprehensive Archaeological and Historic Sites Inventory of Jefferson Parish, Louisiana.* Submitted to the Division of Archaeology, Baton Rouge.

Grace, Albert L.
1946 *The Heart of the Sugar Bowl: The Story of Iberville.* Privately published, Plaquemine, LA.

Greengo, Robert E.
1964 *Issaquena: An Archaeological Phase in the Yazoo Basin of the Lower Mississippi Valley.* Memoirs 18, Society for American Archaeology, Salt Lake City.

Hinks, Stephen, William P. Athens, Ralph Draughon, Jr., Susan Barrett Smith, and Paul Heinrich
1991 *Cultural Resources Investigations for the Westbank Hurricane Protection Project, Plaquemines and Jefferson Parishes, Louisiana.* Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Holley, George R., and Gary B. DeMarcay
1977 Preliminary Report on the Prehistory of Barataria. Paper Presented at the 3rd Annual Meeting of the Louisiana Archaeological Society, New Orleans.

Holmes, Barbara
1986 *Historic Resources Study: The Barataria Unit of Jean Lafitte National Historical Park.* Professional Papers No. 5, Southwest Cultural Resources Center, National Park Service, Santa Fe.

Hunter, Donald G., Charles E. Pearson, and Sally K. Reeves
1988 *An Archaeological Survey of Golden Ranch Plantation, Lafourche Parish, Louisiana.* Submitted to the Division of Archaeology, Baton Rouge.

Jackson, H. Edwin
1977 A Preliminary Report on Analysis of Bowie Site (16LF17) Materials. Manuscript on file, Center for Archaeology, Tulane University, New Orleans.

Jenkins, Ned J., and Richard A. Krause
1986 *The Tombigbee Watershed in Southeastern Prehistory.* University of Alabama Press, Tuscaloosa.

Jeter, Marvin D., and G. Ishmael Williams, Jr.
1989 Ceramic-Using Cultures, 600 B.C.-A.D. 700. In *Archeology and Bioarcheology of the Lower Mississippi Valley and Trans-Mississippi South in Arkansas and Louisiana*, by M. D. Jeter, J. C. Rose, G. I. Williams, Jr., and A. M. Harmon, pp. 111-170. Research Series 37, Arkansas Archeological Survey, Fayetteville.

Jones, Kenneth R., Herschel A. Franks, and Tristram R. Kidder
1994 *Cultural Resources Survey and Testing for Davis Pond Freshwater Diversion, St. Charles Parish, Louisiana*, 2 volumes. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Kelley, David B., and Douglas D. Bryant
1986 *A Cultural Resources Survey of the Estelle Plantation Tract, Jefferson Parish, Louisiana*. Submitted to J.J. Krebs and Sons, Inc., New Orleans.

Kidder, Tristram R.
1994a Ceramic and Cultural Chronology. *In Cultural Resources Survey and Testing for Davis Pond Freshwater Diversion, St. Charles Parish, Louisiana*, edited by K. R. Jones, H. A. Franks, and T. R. Kidder, pp. 397-432. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

1994b Excavations at the Blackwater Site (16TE101), Tensas Parish, Louisiana. Paper Presented at the Annual Meeting of the Louisiana Archaeological Society, Kenner.

1995 *Archeological Data Recovery at 16JE218, Jefferson Parish, Louisiana*. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Kidder, Tristram R., Gayle Fritz, Kenneth R. Jones, Patrick Jones, Richard Kesel, Benjamine Maygarden, Todd McMakin, Lawrence Santeford, Roger T. Saucier, Rhonda L. Smith, Douglas Wells, and James Whelan
1995 *Archeological Data Recovery at 16JE218, Jefferson Parish, Louisiana*. Submitted to the Division of Archaeology, Baton Rouge.

Kidder, Tristram R., and Douglas C. Wells
1992 Baytown Period Settlement Organization in the Lower Mississippi Valley. Paper Presented at the 49th Annual Meeting of the Southeastern Archaeological Conference, Little Rock.

Kniffen, Fred B.
1936 A Preliminary Report on the Indian Mounds and Middens of Plaquemines and St. Bernard Parishes. In *Lower Mississippi River Delta: Reports on the Geology of Plaquemines and St. Bernard Parishes*, by R.J. Russell, H.V. Howe, J. H. McGuirt, C.F. Dohm, W. Hadley, Jr., F. B. Kniffen, and C. A. Brown, pp. 407-422. Geological Bulletin 8. Department of Conservation, Louisiana Geological Survey, New Orleans.

Kolb, Charles R. and Jack R. Van Lopik
1958 *Geology of the Mississippi River Deltaic Plain, Southeastern Louisiana*. Technical Report No. 3-483, U.S. Army Engineer Waterways Experiment Station, Vicksburg.

Mancil, Erwin
1972 An Historical Geography of Industrial Cypress Lumbering in Louisiana. Unpublished doctoral dissertation, Department of Geology and Anthropology, Louisiana State University, Baton Rouge.

Manuel, Joseph O., Jr.
1984 The Fleming-Berthoud Site 16JE36. *Louisiana Archaeological Society Newsletter* 11(2):5-7.

Matthews, Dayton
1983 *Soil Survey of Jefferson Parish, Louisiana*. United States Department of Agriculture, Soil Conservation Service, New Orleans.

Maygarden, Benjamin, Kenneth R. Jones, Natalie Maillho, Jill-Karen Yakubik and Catheren Jones.
1994 *Land Use History for West Bank Hurricane Protection East of the Harvey Canal, in the Vicinity of New Orleans, Louisiana*. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Maygarden, Benjamin, Lawrence G. Santeford, Jill-Karen Yakubik, and Allen Saltus
1995 *Cultural Resources Investigations on Grand Terre Island, Jefferson Parish, Louisiana*. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

McIntire, W.G.
1954 *Correlation of Prehistoric Settlements and Delta Development*. Trafficability and Navagability of Delta-Type Coasts, Trafficability and Navagability of Louisiana Coastal Marshes, Technical Report 5, Louisiana State University, Baton Rouge.

1958 *Prehistoric Indian Settlements of the Changing Mississippi River Delta*. Coastal Studies Series 1. Louisiana State University, Baton Rouge.

Meyer Sr., J. Ben
1981 *Plaquemines: The Empire Parish*, Laborde Printing Company, Inc.: Baton Rouge.

Misner, Elizabeth J., and Elizabeth J. Reitz
1994 Vertebrate Fauna from 16SC27. In *Cultural Resources Survey and Testing for Davis Pond Freshwater Diversion, St. Charles Parish, Louisiana*, vol. 2, by Kenneth Jones, Herschel A. Franks, and Tristram R. Kidder, pp. 439-502. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Murray, Grover E.
1961 *Geology of the Atlantic and Gulf Coastal Province of North America*. Harper & Brothers, New York.

Neuman, Robert W.
1984 *An Introduction to Louisiana Archaeology*. Louisiana State University Press, Baton Rouge.

Pearson, Charles E., Bryan L. Guevin, and Sally K. Reeves
1989 *A Tongue of Land near La Fourche: The Archaeology and History of Golden Ranch Plantation, Lafourche Parish, Louisiana.* Submitted to the Division of Archaeology, Baton Rouge.

Perrault, Stephanie L., and Charles E. Pearson
1994 *Cultural Resources Survey and Testing, Bayou L'Ours Shoreline Protection and Marsh Restoration Project, Lafourche Parish, Louisiana.* Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Phillips, Philip
1970 *Archaeological Survey in the Lower Yazoo Basin, Mississippi, 1949-1955.* Peabody Museum of Archaeology and Ethnology Papers 60, Harvard University, Cambridge.

Phillips, Philip, J. Ford, and J. Griffin
1951 *Archaeological Survey in the Lower Mississippi Alluvial Valley, 1940-1947.* Papers of the Peabody Museum of American Archaeology and Ethnology Volume 25, Harvard University, Cambridge.

Pietak, Lynn Marie
1996 *Background Research and Archaeological Investigations of Naval Air Station, New Orleans, Plaquemines Parish, Louisiana.* Submitted to the Division of Archaeology, Baton Rouge.

Plaquemines Council, Chamber of Commerce of the New Orleans Area
1972 *Plaquemines: Where Nature Means Progress.* Privately published.

Poplin, Eric C.
1987 *Level II Archaeological Survey, Big Woods Development Area, Environmental Education Center, Phase I, Barataria Unit, Jean Lafitte National Historical Park, Jefferson Parish, Louisiana.* Submitted to the National Park Service, Southwest Region, Santa Fe.

Ross, Lieut.
1765 *Map of Louisiana.* Historic New Orleans Collection, New Orleans.

Saucier, Roger T.
1963 *Recent Geomorphic History of the Pontchartrain Basin.* Coastal Study Series 9, Louisiana State University, Baton Rouge.

1974 *Quaternary Geology of the Lower Mississippi Valley.* Research Series 6, Publications on Archeology, Arkansas Archeological Survey, Fayetteville.

1994 *Recent Geomorphic History of the Pontchartrain Basin.* Coastal Studies Series No. 9, Louisiana State University, Baton Rouge.

1994 *Geomorphology and Quaternary Geologic History of the Lower Mississippi Valley.* U.S. Corps of Engineers, Mississippi River Commission, Vicksburg, MS.

Saucier, R.T., and J.O. Snowden
1995 Engineering Geology of the New Orleans Area. In: *Field Trip Guide Book #6a and 6b,* Geological Society of America Annual Meeting 1995, New Orleans, Louisiana.

Shenkel, J. Richard
1975 Archaeology. In *Draft Environmental Statement of Bayou Des Familles Development Corporation Flood Control Levee in South-Central Jefferson Parish, Louisiana*. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

1981 *Oak Island Archaeology: Prehistoric Estuarine Adaptations in the Mississippi River Delta*. Submitted to the National Park Service, Jean Lafitte National Historical Park and Preserve, New Orleans.

1984 Early Woodland in Coastal Louisiana. In *Perspectives on Gulf Coast Prehistory*, edited by D.D. Davis, pp.41-71. Ripley P. Bullen Monographs in Anthropology and History, University of Florida Press, Gainesville.

Shenkel, J. Richard and Jon L. Gibson
1974 Big Oak Island: An Historical Perspective of Changing Site Function. *Louisiana Studies* 8:173-186.

Smith, Bruce D.
1975 *Middle Mississippi Exploitation of Animal Populations*. Anthropological Papers No. 57, Museum of Anthropology, University of Michigan, Ann Arbor.

The Southern Manufacturer
1905 *Sketch book: The Lower Coast, its Resources, Institutions and Splendid Prospects*, New Orleans, Louisiana.

Speaker, John Stuart, Joanna Chase, Carol Poplin, Herschel A. Franks, and R. Christopher Goodwin
1986 *Archeological Assessment of the Barataria Unit, Jean Lafitte National Historical Park*. Professional Paper No. 10, Southwest Cultural Resources Center, National Park Service, Santa Fe.

Swanson, Betsy
1975 *Historic Jefferson Parish, From Shore to Shore*. Pelican Publishing Company, Gretna, Louisiana.

1991 *Terre Haute de Barataria: An Historic Upland on an Old River Distributary Overtaken by Forest in the Barataria Unit of the Jean Lafitte National Historical Park and Preserve*. Jefferson Parish Historical Commission, Harahan, Louisiana.

Toth, Alan
1974 *Archaeology and Ceramics at the Marksville Site*. Anthropological Papers 56, Museum of Anthropology, University of Michigan, Ann Arbor.

1988 *Early Marksville Phases in the Lower Mississippi Valley: A Study of Culture Contact Dynamics*. Archaeological Report 21. Mississippi Department of Archives and History, Jackson.

Trewartha, Glenn T.
1970 Climates of the Earth. In *Goode's World Atlas*, edited by Edward B. Espenshade, Jr., pp. 12-13. Rand McNally & Company, Chicago.

USDA/NRCS
n.d. Draft Soil Survey for Plaquemines Parish. Unpublished.

United States Department of Commerce, Bureau of the Census
1990 *1980 and 1990 Census of Population and Housing, Computer Summary, Tape File 1A, Louisiana*. Washington, D.C.

Webb, Clarence H.
1982 The Poverty Point Culture. *Geoscience and Man* 17 (second edition, revised). School of Geoscience, Louisiana State University, Baton Rouge.

Weinstein, Richard A.
1974 An Archaeological Survey of the Lower Amite River, Louisiana. Unpublished masters thesis, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

1986 Tchefuncte Occupation of the Lower Mississippi Delta and Adjacent Coastal Zone. In *The Tchula Period in the Mid-South and Lower Mississippi Valley*, edited by D. H. Dye and R. C. Brister, pp. 102-127. Archaeological Report 17, Mississippi Department of Archives and History, Jackson.

1987 Development and Regional Variation of Plaquemine Culture in South Louisiana. In *The Emergent Mississippian*, edited by R. A. Marshall, pp. 85-106. Cobb Institute of Archaeology, Mississippi State University, Starkville.

1994a *Cultural Resources Investigations Related to the West Belle Pass Headland Restoration Project, Lafourche Parish, Louisiana*. Submitted to the Division of Archaeology, Baton Rouge.

1994b *Archaeological Investigations Along the Lower Lavaca River, Jackson County Texas: The Channel to Red Bluff Project*. Submitted to the Galveston District, U.S. Army Corps of Engineers, Galveston.

Weinstein, Richard A., and David B. Kelley
1992 *Cultural Resources Investigations in the Terrebonne Marsh, South-Central Louisiana*. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Weinstein, Richard A., and Philip G. Rivet
1978 *Beau Mire: A Late Tchula Period Site of the Tchefuncte Culture, Ascension Parish, Louisiana*. Anthropological Report No. 1, Louisiana Archaeological Survey and Antiquities Commission, Baton Rouge.

White, David A., Steven P. Darwin, and Leonard B. Thien
1983 Plants and Plant Communities of Jean Lafitte National Historical Park, Louisiana. *Tulane Studies in Zoology and Botany* 24(2):101-129.

Williams, Stephen and Jeffrey P. Brain
1983 *Excavations at the Lake George Site, Yazoo County, Mississippi, 1958-1960.* Papers of the Peabody Museum, Harvard University, Volume 74, Cambridge.

Wiseman, Diane E., Richard A. Weinstein, and Kathleen G. McCloskey
1979 *Cultural Resources Survey of the Mississippi River-Gulf Outlet, Orleans and St. Bernard Parishes, Louisiana*. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.

Woodiel, Deborah K.
1980 St. Gabriel: Prehistoric Life on the Mississippi. Unpublished masters thesis, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

Works Progress Administration of Louisiana (WPA)
1937 *Some Data in Regard to Foundations in New Orleans and Vicinity*, Vol. I. Works Progress Administration of Louisiana.

Yakubik, Jill-Karen
1989 *Archaeological Investigations of Six Spanish Colonial Period Sites*. Professional Papers 22, Southwest Cultural Resources Center, National Park Service, Santa Fe.

Yakubik, Jill-Karen, Benjamin Maygarden, Tristram R. Kidder, Shannon Dawdy, Kenneth Jones, Roger T. Saucier, Gayle Fritz, Allen Saltus and Charlene Keck
1995 *Archeological Data Recovery for a Spanish Colonial Period Site*. Submitted to the New Orleans District, U.S. Army Corps of Engineers, New Orleans.