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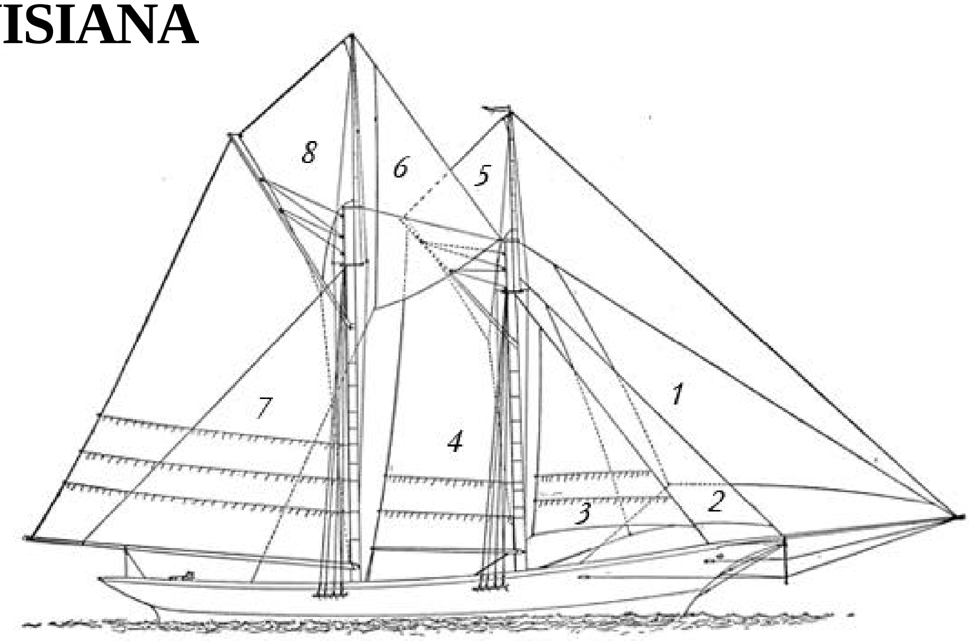
PHASE I CULTURAL RESOURCES REMOTE-SENSING SURVEY FOR THE SOUTH PECAN ISLAND FRESHWATER INTRODUCTION PROJECT (ME-23), VERMILION PARISH, LOUISIANA



Draft Report May 2008

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PHASE I CULTURAL RESOURCES REMOTE-SENSING SURVEY FOR THE SOUTH PECAN ISLAND FRESHWATER INTRODUCTION PROJECT (ME-23), VERMILION PARISH, LOUISIANA

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ABSTRACT

In February 2008, Earth Search, Inc. (ESI), conducted Phase I submerged cultural resources survey of two proposed 1.7 mile (mi) (40.07 kilometer [km]) freshwater conveyance canals in Pecan Island, Vermilion Parish, Louisiana. The work was performed under contract to C. H. Fenstermaker and Associates, Inc. The proposed actions include dredging and widening one of the existing canals to be utilized as a conveyance channel and using its sediments to build a minimum 1,300 ft section of bank and refurbish existing channel banks, installation of a drainage culvert under Highway 82 to facilitate movement of freshwater, and removal of the earthen plug at White Lake. Although much of the right-of-way (ROW) had been disturbed by previous canal excavations, no cultural resources investigations had been conducted. The current remote sensing investigations were undertaken to locate any submerged archaeological resources within the project area, define the boundaries of any such resources, and evaluate the resources in terms of National Register of Historic Places (NRHP) criteria. Field investigations of the two canals utilized a Geometrics 858 terrestrial magnetometer interfaced with a Trimble AG114 DGPS unit deployed from the bow an airboat. Overall, approximately 9.24 acres (A) (3.74 hectares [ha]) of canalized waterway were surveyed. The remote sensing survey identified 38 anomalies comprising 24 targets, including a pipeline that transverses the project area. All targets and anomalies represent modern debris, some of which was deposited during the Hurricane Rita in 2005. As a result, no evidence of cultural resources was discovered and no further research is recommended.

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CHAPTER 1
INTRODUCTION

Introduction

In February 2008, Earth Search, Inc. (ESI) conducted Phase I submerged cultural resources survey of two proposed freshwater conveyance canals in Pecan Island, Vermilion Parish, Louisiana. The work was performed under contract to C. H. Fenstermaker and Associates, Inc. The proposed actions include dredging and widening one of the existing canals to be utilized as a conveyance channel and using its sediments to build a minimum 1,300 foot (ft) (396.24 meter [m]) section of bank and refurbish existing channel banks, installation of a drainage culvert under Highway 82 to facilitate movement of freshwater, and removal of the earthen plug at White Lake. Although much of the right-of-way (ROW) had been disturbed by previous canal excavations, no cultural resources investigations had been conducted. The current remote sensing investigations were undertaken to locate any submerged archaeological resources within the project area, define the boundaries of any such resources, and evaluate the resources in terms of National Register of Historic Places (NRHP) criteria.

Field investigations of the two canals utilized a Geometrics 858 terrestrial magnetometer interfaced with a Trimble AG114 DGPS unit deployed from the bow an airboat. The remote sensing survey identified 38 anomalies comprising 24 targets, including a pipeline that transverses the project area. All targets and anomalies represent modern debris, some of which was deposited during the Hurricane Rita in 2005. As a result, no evidence of potential cultural resources was discovered and no further research is recommended.

Project Area Description

The project area is located in Township 15S, Range 1W, in Sections 30 and 31 of the *Floating Turf, 1992* 7.5-minute quadrangle and in Sections 29 and 32 on the *Pecan Island 1992* 7.5-minute quadrangle. It consists of two existing canals aligned north-south (Figure 1). The two canals were designated as East Canal (the existing conveyance channel) and West Canal (the proposed new conveyance channel). East Canal extends 6,717 ft (2047.3 m) north from LA Highway 82 to White Lake. It is approximately 40 ft (12.19 m) wide at the top and approximately 25 ft (7.62 m) wide at the bottom. At the time of the survey, the canal was drained by way of pumps and revealing the canal floor littered with modern debris including disarticulated lumber, corrugated tin, crab pots, crawfish pots, and sections of metal pipe. The West Canal currently retains a substantial amount of water. It is approximately 30 ft (9.14 m) wide at the top and 20 ft (6.1 m) wide at the bottom and depth of approximately 6 feet (1.83 m). West Canal extends 1,732 ft (528 m) north from LA Highway 82. It then turns east for 478 ft (145.7 m). From here it extends 5,072 ft (1546 m) north to White Lake. Its total length is 7,374 ft (2247.5 m). Overall, approximately 9.24 acres (A) (3.74 hectares [ha]) of canalized waterway were surveyed.

Report Organization

Chapter 2 describes the natural setting of the project area. Chapter 3 summarizes the prehistory of the region. A historical overview is presented in Chapter 4. Historic watercraft types are discussed in Chapter 5. Previous archaeological investigations are discussed in Chapter 6, while the field methodology and the results of the investigations are described in Chapter 7. Chapter 8 presents conclusions drawn from the current research and ESI's recommendations.

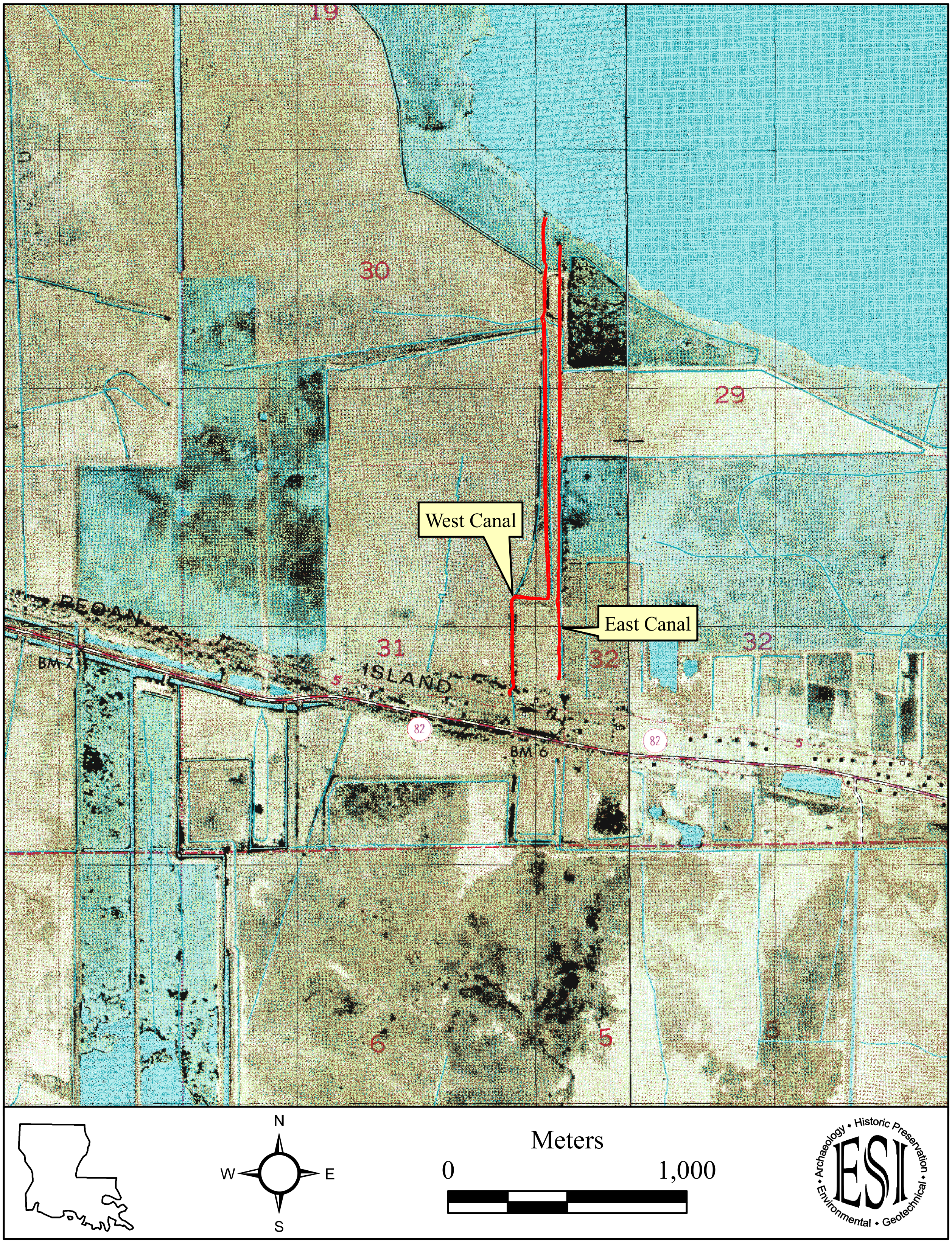

Figure 1. Excerpts from the USGS *Floating Turf* and *Pecan Island* 1:24,000 topographic quadrangles showing project area in red.

CHAPTER 2
ENVIRONMENTAL SETTING

Introduction

This chapter describes the natural environment surrounding the project area. The geologic history of the area is presented as a prelude to more detailed discussion of the Chenier Plain Marsh found in Vermilion Parish. Soils, climate, faunal, and floral data are also presented in this chapter. These data are a framework that informs the archaeologists about the relative age of the landscape investigated and therefore the prehistoric cultures may have occupied them. In addition, these data provide insights into the various species of plant and animal life that may have been exploited for subsistence purposes.

According to Saucier (1994:plate 13), the project area lies completely within the chenier plain, the dominant geological feature of southern Vermilion Parish. The physiographical information provided here will focus on this aspect of the natural environment. The Prairie Complex, located well to the north of the current project area, will be discussed as a part of the overall geologic history of the area, but will be excluded from the specific physiographical discussion.

Geologic History

The oldest landform in region is the part of the Prairie Complex and was created during the last interglacial high sea level episode that dates anywhere between 120,000 and 135,000 B.P. At this time, the fluvial actions of the Mississippi and Red rivers resulted in the formation of a broad coastal plain that graded gently to sea level. This ancient plain was as high as or slightly higher than the contemporary or present coastal plain. During the formation of the ancient coastal plain, the Mississippi and Red rivers flowed separately into the Gulf of Mexico. The Red River, and later the Mississippi River, shifted back and forth across the region, creating meander belts and blanketing large areas with alluvium (Saucier 1994:226-227).

After 120,000 B.P., sea level fell as continental ice sheets either formed or grew worldwide. As sea level fell, the Mississippi River system adjusted and began to down cut rather than meander. The end result was that a deep valley was created within the existing coastal plain. As the Mississippi River created this deep valley, it systematically destroyed the meander belt created between 120,000-135,000 B.P. The end result of this fluvial action was that the Mississippi River captured the Red River and as a result, both the Red and Mississippi Rivers abandoned their interglacial coastal plains and turned the former coastal plain into the part of the Prairie Terrace (Saucier 1994:226-227).

Between 25,000 to 120,000 years ago, sea level rose and fell several times by many tens of meters. During this period, the Mississippi River repeatedly filled in its valley in response to high sea level and subsequently eroded it in response to low sea level. During one of the high sea level episodes, the Mississippi River shifted its course west to the Lafayette area. This lateral migration destroyed many older deposits as well as portions of the Prairie Terrace complex. The laterally migrating Mississippi River deposited sediments and created the ridge and swale, meander cutoffs and loops, and river courses that now characterize its surface. Eventually, renewed growth of continental ice sheets caused sea level to drop and the Mississippi River again cut deeply into its coastal plain, destroying much of its new developed meander belt along with older Prairie Terrace complex sediments.

The last time that continental ice sheets advanced across the northern part of North America the spring and summer melting of ice dumped large volumes of glacial water and sediment into the Mississippi River. The glacially derived water carried large quantities of sediment and spread it over the floor of the Mississippi River Valley. During the winter and fall, the melting ceased and left the braided channels and streams that comprised the Mississippi River largely dry. Strong winter and fall winds eroded silt and clay from the flood plain and deposited it as loess on uplands situated on either side of the Mississippi Valley. The accumulation of loess on the Prairie Terrace adjacent to the walls of the Mississippi Valley started about 25,000 B.P. and largely ceased within the Lafayette area about 12,000 B.P. The topography characteristic of the regional uplands has been created by the time loess ceased to be deposited along the valley walls. Exceptions to this are the streams and valleys that were created subsequent to this geomorphic event (Autin et al. 1991; Saucier 1994).

In response to the end of the Pleistocene, sea level began to rise rapidly and the Mississippi and other coastal rivers started to build up their flood plains. By 9,000 to 10,000 B.P., the Mississippi River had built up its valley floor close to modern levels and established meander belts along the west side of the alluvial valley (Saucier 1994:252-254,plate 28). The Mississippi River continued to occupy meander belts along the western side of the river valley. The Bayou Portage and Bayou Teche meander belts are most likely the youngest of these meander belts. Older meander belts have either been buried or destroyed by lateral migration associated with the Bayou Portage belt. About 3,800 B.P., the Mississippi River abandoned Bayou Teche for a course on the eastern side of the alluvial valley. After abandonment by the Mississippi River, the Red River continued to flow down Bayou Teche until about 1,800 B.P when it too abandoned this bayou (Saucier 1994:254-261, plate 28).

Physiography

The project area is located exclusively within the Chenier Plain Marsh. The Chenier Plain is restricted to the southern part of the parish. This physiographic zone contains approximately 50 percent of the parish.

Chenier Plain Marsh. Cheniers are stranded Gulf of Mexico beaches situated within Holocene (post-Pleistocene) marshes. Cheniers associated with the Mississippi River deltaic sequence begins just west of Vermilion Bay and extends westward into Texas. Cheniers are formed of fine-grained sediments such as silt and sand deposited at the mouth of a river. Each chenier contains individual ridges that are ribbon-like deposits 5-10 ft (1.52-3.04 m) thick, several hundred feet wide, and quite long. Chenier ridges form on thin gulf bottom deposits and are flanked by marsh deposits. The oldest cheniers are located farthest inland and are believed to be just less than 3,000 years old. Cheniers, regardless of age, have formed since sea level reached its present level (Saucier 1994:30, 157-159).

The cheniers located in Vermilion Parish may be neatly subdivided into two groups based on age. The oldest group contains the Pecan Island group while the younger grouping contains the Chenier au Tigre and Mulberry Island groups. Also included within the younger grouping is Sand Ridge and Bill's Ridge (Murphy and Libersat 1996:112).

Three types of marshes have formed since the inundation of the Prairie Complex and the creation of the Chenier Plain. Freshwater marshes are found in the interior of the parish in an area surrounding White Lake. Specifically, the freshwater marshes are located the Prairie Complex and the Pecan Island Cheniers. Brackish marshes are located intermediate between the Freshwater and Saline Marshes east of White Lake. Brackish marshes are situated primarily between Chenier au Tigre and the Pecan Island cheniers and function to protect the freshwater marshes from salt water intrusion. Saline marshes are located along the gulf coast in the southeastern and southwestern corners of the parish (Murphy and Libersat 1996:111-112).

Soils

A total of five soil types exist in the current project area. These soils will be discussed as they trend from south to north within the project area. Generally, the saline marsh exists near the chenier ridge while more fresh water marsh extents north to White Lake.

Bancker muck is the marsh soil type located south of the chenier. It is characterized as fluid clayey muck that is poorly drained. This soil type is frequently flooded and frequently ponded. It is very slightly to slightly saline (Soil Survey Staff 2008).

Two soil types are associated with the chenier ridge itself: Hackberry sandy clay loam and Chenier sandy clay loam. Hackberry sandy clay loam (0-1 percent slope) is characterized as an overwash deposit located on the toe slope of the chenier ridge. It is somewhat poorly drained; however, it is rarely flooded and does not pond. Chenier sandy clay loam (1-3 percent slope) is located on the rise of the chenier. It is somewhat excessively drained and rarely flooded. Water does not pond on this soil type. The parent material for the chenier ridge is shell and beach sand (Soil Survey Staff 2008).

The next soil type to be discussed is the Mermentau clay which is located north of the chenier, trending into the marsh. This clay is poorly drained and frequently flooded. This soil trends from very slightly to moderately saline (Soil Survey Staff 2008).

The four previously discussed soil types represent minority types within the project area. The dominant soil type is the Larose mucky clay associated with the freshwater marsh. This marsh soil is very poorly drained. It is non-saline to very slightly saline. Larose mucky clay is frequently flooded and frequently ponded (Soil Survey Staff 2008). This soil type is mapped between the Mermentau clay and the southern shore of White Lake, the northern edge of the project area.

Climate

The region in which the survey area lies has a humid, subtropical climate that characterizes the Louisiana coastal plain bordering the Gulf of Mexico. Being adjacent to Vermilion Bay, this region is dominated by subtropical humid air masses. Periodically, drier air from continental air masses from the north and west influence the weather of this region (Grymes 2000).

During the summer, temperatures can be hot. According to data collected at Vermilion Lock from 19521-1981, July and August are the warmest months, with an average daily maximum temperature of 90.0°F (32.2 °C), and 89.8°F (32.1°C), respectively. For this same time period, the average daily minimum temperatures were respectively, 72.4 °F (22.4 °C) and 71.7°F (22.1 °C) (Murphy and Libersat 1996:2).

Winter temperatures in Vermilion Parish are typically very mild. The average monthly minimum temperatures for the winter months are all above freezing. The coldest months are January and February, which for the period 1951 to 1981 at Vermilion Lock, Louisiana, respectively had average daily maximum temperatures of 60.2°F (15.7°C) and 62.9°F (17.2°C). For January and February respectively, average daily minimum temperatures for this period was 40.2°F (4.56°C) and 42.2°F (5.67°C) (Murphy and Libersat 1996:2).

Precipitation occurs regularly throughout the year. Although rainfall is reasonably well distributed throughout the year, July and August had slightly greater monthly average precipitation. According to data from Vermilion Lock for the period 1951-1981, 8.59 in (21.82 cm) of precipitation fell on average in July, while 7.1 in (18.03 cm) of precipitation were recorded on average in August. The driest months of the year are October and November, with an average monthly precipitation of 3.32 in (8.43 cm) and 3.72 in (9.45 cm), respectively. Snowfall is very rare in Vermilion Parish, with no measurable snowfall in 99 percent of all winters. The average relative humidity is 60 percent in mid-afternoon, at which point it rises to peak at an average of 90 percent relative humidity at dawn (Murphy and Libersat 1996:2).

Faunal Communities

The brackish marshes of Vermilion Parish provide habitat for a diverse assemblage of wildlife. The area surrounding the project area supports a variety of fish, including croaker *(Micropogon undulatus)*, red drum *(Sciaenops ocellatus)*, black drum *(Pogonias cromis)*, flounder *(Paralichtys legostigma)*, mullet (*Mugil* spp.), shad (Clupeidae), menhaden (*Brevoortia patronus*), and seatrout *(Cynoscion nebulosus)*. A variety of mollusks, shrimp, and crab use the brackish marsh for nursery purposes (Murphy and Libersat 1996**.** Amphibians and reptiles are abundant, the largest of which is the alligator (*Alligator mississippiensis*). As might be expected, a wide variety of birds can be found living in the region on a permanent basis as well as seasonally. These include various ducks as well as geese (Murphy and Libersat 1996).

Terrestrial and semi-aquatic mammals abound in the marshes. The most common mammals include rabbit (*Sylvilagus* spp.), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), raccoon (*Procyon lotor*), and otter (*Lutra canadensis*). Nutria (*Myocastor coypus*) is now very common in southern Louisiana, but was not introduced from South America until the twentieth century (Gibson 1978:100; Jones and Shuman 1988:5; Murphy and Libersat 1996).

Floral Communities

The brackish water type of marsh makes up approximately 130,813 A (52,939.3 ha) in the parish. Twenty-six native plants have been identified in the brackish water marsh. Some of the more common plants found in this environment include marshhay cordgrass (*Spartina patens*), three cornered grass *(Scirpus olmeyi)*, tallow trees (*Sapium sebiferum)*, smooth cordgrass (*Spartina alterniflora*), seashore saltgrass *(Distichlis spicata)*, needlegrass rush (*Juncus roemeranus*), bushy seaoxeye (*Borrichia frutescens*), and saltwort *(Batis maritime)* (Murphy and Libersat 1996:65, Table 8).

CHAPTER 3
PREHISTORY OF SOUTHERN LOUISIANA

Introduction

This chapter presents a synopsis of the prehistoric aboriginal cultures that were present not only in the project area but the surrounding region as well. Some of the material include in the culture period descriptions was obviously obtained from sites outside the regional parameters of the project area. However, these data are pertinent to our current interpretation of these prehistoric groups and were included for this reason. As noted in Chapter 2, the Chenier Plain within which the project area is located does not seem to be more than 3,000 years old. Therefore, this discussion of prehistoric aboriginal occupations begins with the Poverty Point period since the landscape is to young for either Paleo- and/or Archaic period settlement.

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

The Poverty Point culture serves as a transition from the late Archaic to the early Woodland and is typified by the Poverty Point site (16WC5) in West Carroll Parish. Poverty Point-related sites are spread throughout Louisiana, eastern and southern Arkansas, western Mississippi, and southeastern Missouri, but the culture appears to have been centered along Bayou Macon in northeastern Louisiana. Sites are generally located on levees, terrace edges, stream-lake junctions, and coastal environments (Neuman 1984:90-91; Webb 1970:33-35).

Sites associated with this culture range from the large regional mound centers, such as the Poverty Point and Claiborne (22HA501) sites, to small hamlets. Many of these large sites are oval or horseshoe shaped. The large earthworks at Poverty Point, although not the first of their kind, were probably the largest earth features in North America at the time of their construction (Neuman 1984). This characteristic, along with the presence of non-local lithic resources apparently traded from great distances, led Gibson (1974) to propose that the larger regional centers were occupied by a ruling elite and that Poverty Point may have represented the first chiefdom-level society in North America. However, the chiefdom model for Poverty Point has not yet garnered universal acceptance (Johnson 1980:251-281; Gibson 1970:319-348; 1990:201-237; Steponaitis 1986:377-378). In Catahoula Parish, sites such as Caney Mounds (16CT5), Wild Hog Mound (16CT27), and Shoe Bayou (16CT342) are described as camps. This suggests that Poverty Point period social organization here did not exceed the band level (Hunter 1970).

Evidence from the Copes site (16MA47) in the northeastern corner of Louisiana indicates that at least some settlements in Poverty Point times were occupied year-round and had a diverse subsistence base, with an emphasis on hunting and fishing (Jackson 1982:73-86; 1989:173-203). Exploitation of deer, squirrel, rabbit, raccoon, turkey and other wild birds, turtle, and numerous species of fish followed a pattern already well established in the early- to mid-Archaic (Jackson 1989; Steponaitis 1986:371). Recovery of squash at the Copes site (Gibson 1990:204) and the variety of edible plants available in the Lower Mississippi Valley suggest that gathering could have been supplemented by small-scale gardening (Gibson 1970).

The Poverty Point period represents the florescence of long-distance trade already evident in the late Archaic, including importation of exotic cherts and other lapidary materials from the central United States and the Great Lakes area (Neuman 1984:101-102). Caching of galena has been taken as evidence that the Poverty Point site was a regional distribution node in a large trade interaction sphere (Walthall et al. 1982). Diagnostic artifacts of Poverty Point culture include tiny microlithic perforators, fired clay objects, tubular pipes, clay figurines, rough hoes and celts, and jasper beads. It has been proposed that the fired clay objects were used for stone-boiling, since stones are scarce in the alluvial regions. Pottery sherds recovered include fiber-tempered and sand- or clay-tempered wares. Bowls were also made of steatite and sandstone (Webb 1982:12-13). Motley points, often made from non-local cherts, are the index point type for Poverty Point sites (Neuman 1984:99). Epps and Gary points are also present (Heartfield et al. 1985:8). The presence of atlatl weights and an antler atlatl hook in the Poverty Point assemblage indicate spear throwers were utilized. Pitted stones and grinding basins may have been associated with the processing of nuts and seeds for food.

The Womack site (16CT312) is a multi-component site believed to represent a series of successive short-term occupations. Although ceramics indicate there were also occupations during the Marksville or Coles Creek periods, the dominant occupations occurred during the Poverty Point period. There is no archaeological evidence suggesting that the occupants participated in the Poverty Point culture interaction sphere (Hunter et al. 1995:100). Archaeological evidence suggested that the Womack site was primarily a lithic extraction/workshop site where chert cobbles were reduced to completed bifacial forms. Artifacts included Morhiss, Gary, and Ellis points; an end scraper; a perforator; lamella blades; a hammer stone; a grooved bead blank; a grooved sandstone abrader; and lithic debitage. The presence of fire-cracked rock suggests that food preparation also took place. Pollen analysis revealed that the physical setting of the site during occupation was not drastically different from that of today. The pollen assemblage represented a southern oak-pine forest.

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

In the Lower Mississippi River Valley, the Tchula period is characterized primarily by the introduction and subsequent widespread use of pottery. Also notable during this period is an increase in population as well as attenuated inter-regional relationships. Originally defined in southern Louisiana (Ford and Quimby 1945), these characteristics form the core of the Tchefuncte archaeological culture of the lower valley (Jeter et al. 1989:117-127; Neuman 1984:113-136; Weinstein and Kelley 1992). Ceramics are the diagnostic artifacts of this as well as most of the succeeding prehistoric cultures. Pottery attributed to Tchefuncte occupations has a seemingly non-tempered, laminated paste believed to represent minimal preparation of the raw clay before firing. Other attributes frequently associated with Tchefuncte ceramic complexes are podal supports and jab-and-drag incising (Kelley 1989:19). Common decorations appearing on these vessels include punctations, fabric and cord impressions, narrow and wide line incisions, and simple rocker stamping. The dominant Tchula/Tchefuncte ceramic types are Tchefuncte Plain, Tchefuncte Incised, Tchefuncte Stamped, Lake Borgne Incised, Orleans Punctated, Tammany Punctated, Alexander Incised, and Alexander Pinched (Toth 1988:23).

Four regional phases, including the Pontchartrain phase [500-250 B.C.], the Beau Mire phase [250 B.C.- A.D. 1], the Lafayette phase [500 B.C.-A.D. 1], and the Grand Lake phase [500 B.C.-A.D. 1], represent Tchefuncte occupations in Louisiana. Tchefuncte sites in the Atchafalaya Basin are commonly composed of shell middens and often contain intact organic remains. The faunal assemblage from Morton Shell Mound (16IB3), located in Iberia Parish, indicates that deer, alligator, raccoon, goose, and catfish were utilized as the primary sources of protein. Botanical remains included hickory nuts, acorns, plums, grapes, persimmons, squash, and gourd. The latter two may be indicative of plant domestication (Neuman 1984:119). Tchefuncte settlements tend to be located along slow, secondary streams that drain bottomlands, in littoral settings, or near floodplain lakes (Neuman 1984:133; Gibson 1974:85; Jeter et al. 1989:125; Toth 1977:50). Evidence for Tchefuncte houses is virtually non-existent. Excavation of the premound surface at the Lafayette Mounds site (16SM17) revealed small postmolds, some forming an arc. If these posts were part of a structure, it would be circular and measure approximately 10 m in diameter (Ford and Quimby 1945:21-22; Jeter et al. 1989:121; Neuman 1984:134). Conversely, investigations at Little Oak Island (16OR7) revealed 160 postmolds many of which are believed to represent wall posts and roof supports for long, shed-like structures approximately 20 m long (Neuman 1984:134).

Marksville Period (A.D. 1-400)

The Marksville culture of the Lower Mississippi Valley is believed to have participated in an extensive interregional exchange network commonly labeled the Hopewell Interaction Sphere (Caldwell and Hall 1964). The primary focus of this interregional exchange network was among various societies inhabiting the Ohio and Illinois River valleys (Hudson 1976:72; Hunter et al. 1995:23; Stoltman 1978:721). These groups acquired and traded various exotic raw materials that included copper, marine shells, mica, obsidian, and sharks' teeth. Different theories have been offered in an attempt to explain this interaction. Most emphasize either an economics or a combination of economic and socio-religious factors; but the exact nature of the interaction sphere remains problematical. Most often, finished products made from exotic materials were recovered from burials placed in conical earthen mounds. In addition to these burial mounds, Hopewellian societies constructed large earthworks that were circular, octagonal, square, and zoomorphic (Hunter et al. 1995:23; Kelley 1989:20; Neuman 1984:140-142; Toth 1988:211-212).

Toth (1988:211-212) has argued that Marksville culture developed out of the preceding Tchula period Tchefuncte culture as a result of intermittent contacts with the societies occupying the Ohio and Illinois valleys. He emphasizes the evidence for interaction is limited solely to certain aspects of Marksville ceramic traditions and mortuary practices, but his interpretation of the nature of interregional interaction is speculative (Hunter et al. 1995:23). Subsistence and economic data from Marksville period sites are relatively non-existent. Information gathered for sites in the midwest (Asch et al. 1979) indicate intensive collection of wild plant foods and faunal resources complemented by horticultural practices revolving around native and tropical cultigens. Maize is believed to be lacking or of only minor importance at this time.

Coastal Marksville settlement data suggest a hierarchical arrangement of sites. Multi-mound sites are usually located at the junction of tributary/distributary streams and main trunk stream channels. Single mound sites are located on natural levee ridges between stream junctions while smaller village or hamlet sites are scattered around the larger mound sites (Beavers 1982:103-106; Gagliano et al. 1978:4-7; Jeter et al. 1989:140; Wiseman et al. 1979:6-19). Evidence of non-mound Marksville structures is as scarce as that for the preceding Tchula Period. Excavation of the inland Marksville Peck site (16CT268) near Sicily Island, Louisiana revealed post molds outlining a rectangular structure that measured approximately 8 x 14 ft (2.43 x 4.26 m). It is not clear if this structure is associated with the Marksville component at this site.

Located south of Morgan City are the Bone Point (16SMY39) and Oak Chenier (16SMY49) sites. These sites yielded Marksville-like artifacts, principally ceramic sherds. The Bone Point site is located on a natural levee on the right descending bank of Bayou Shaffer at the former junction of Bayou Shaffer and Bayou Penchant. Gibson (1982:410-412) reported that the cultural material was not *in situ*, and that the shell midden was a recent development. The Oak Chenier site is a *Rangia*/earth midden located on the right descending side of Bayou Chene on the south shore of Avoca Island Lake. Gibson et al. (1978:127-132) recorded this site and noted its assemblage contained Marksville ceramics. It should be noted, however, that the site form indicates a cultural affiliation for each of these sites as Troyville/Coles Creek with no reference to a Marksville component (LA State Site Files). Initially identified as Troyville in age, these sites have been reassigned to the late Marksville period on the basis of revised ceramic analysis (Weinstein and Kelley 1992:35).

Baytown Period (A.D. 400-700)

Most aspects of the Baytown period are poorly understood, which has led some archeologists to characterize this period as an era of cultural decline following the Hopewellian florescence (Griffin 1967:187; Phillips 1970:901). However, there are indications that this period may in fact be a time of population growth and increased social integration (Braun 1977; Styles 1981). As with most post-Archaic cultures in the Lower Mississippi Valley, more is known about the ceramics produced by these groups than other aspects of their lifeways (Kidder 1993:13-18). Even though available evidence is relatively scarce, it does suggest that Baytown period habitation sites are either small hamlets or large communities with mounds (Kidder 1993:18). Kidder (1993:18) notes that grave goods, although rare at Baytown period sites, were often elaborate and seem to support his contention of little differentiation of status at these sites. Moreover, Kidder (1993:18) indicates Baytown period subsistence is probably a continuation of earlier Marksville hunter-collector patterns. During this period, changes in the stone tool tradition reflected a transition from the atlatl to the bow and arrow. Dart points were replaced by small arrow points.

The Whitehall site (16LV19) on the Amite River exists as the sole representative of the Whitehall phase (A.D. 400-700) in southeast and south-central Louisiana. However, strong Baytown components have been identified at the Gibson Mounds (16TR5) (Weinstein et al. 1978:Tables 29-30, Fig. 63; Weinstein and Kelley 1992:36). Reported ceramics from this site include Coles Creek Incised, *var. Stoner*; Evansville Punctated, *var. Amite*; French Fork lugs; Larto Red, *vars. Larto* and *Silver Creek*; Mazique Incised, *var. Bruly*; and Woodville Zoned Red, *var. Woodville* (Weinstein and Kelley 1992:36).

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

The Coles Creek period was at one time considered to be part of a broadly defined Troyville period (Neuman 1984). However, Troyville and contemporaneous cultures are now treated as regional variants within the Baytown period. Many Coles Creek mound sites, which typically consist of a group of mounds around a plaza, appear to be built over earlier Baytown period platform mounds (Kidder 1993:22).

The cultural developments of the Coles Creek period are impressive and appear to establish the foundation on which later Plaquemine and Mississippi cultures were built. The development of substantial platform mounds, in the form of truncated pyramids, shows an ability to organize the labor needed for large earth-moving projects. Larger sites have several mounds clustered around a plaza. Mortuary or temple structures stood on the mound summits.

Similarities to the Weeden Island culture of northwest Florida can be seen in the Lower Mississippi Valley cultural florescence occurring during this time period. Community patterns such as the construction of small mounds around plazas indicates the stratification of social systems during this period. Incised, stamped, and punctated pottery types with decorative restrictions around the rim of the vessel are distinctive of both cultures (Weinstein and Kelley 1992:37).

The current consensus of opinion among archeologists is that the Coles Creek period represents the rise of chiefdom-level societies in the Lower Mississippi Valley. However, the emergence of social rank and of regional political centers seems to occur only at the end of the period (Kidder 1992:29-30; Steponaitis 1986:386; Woodiel 1993:121; Nassaney and Cobb 1991:302-306). Belmont (1983:276-278) at one time framed a concentric model for Coles Creek settlement. The principle multi-mound center was flanked by a series of smaller mound centers in a belt-like arrangement. Dense habitation sites formed a second “belt” near the smaller mound centers. Finally, sites denoting less intense occupations formed a final “belt.” Currently this model seems to owe more to incomplete recording of Coles Creek sites than it does to actual settlement pattern (Williams and Brain 1983:369-407).

Structural data are more forthcoming during the Coles Creek period, but most structures investigated at this point are associated with mounds (Brown 1985:251-305). Circular house patterns seems to be the normal house type described in the Lower Mississippi River valley archeological literature (Brown 1985:273, 277). Two types of circular house patterns have been discovered through excavation: circular wall trench and circular individually set post patterns. Circular wall trench patterns appear to have been more common in the southern portion of the Lower Mississippi Valley whereas the individually set post pattern is more common in the northern half. This apparent dichotomy should be viewed judiciously since individually set post pattern houses have been identified in the southern portion of the Lower Valley (Brown 1985:274). Excavations at the Richardson site (16CT409) revealed a partial post mold pattern associated with an early-middle Coles Creek non-mound occupation (Hunter et al. 1995:103-204). Thirteen post molds were discovered during excavation and seem to form an arc (Hunter et al. 1995:141, Figure 45). If this post mold arc were in fact part of a circular pattern, the house would have been approximately 11 m in diameter (Hunter et al. 1995:203).

Within the general study area, there are three temporally sequential phases for the period: Bayou Cutler [A.D. 700-800], Bayou Ramos [A.D. 850-1000], and St. Gabriel [A.D. 1000-1200]. Ceramic types and varieties are used to separate the difference phases. The Bayou Cutler phase ceramic complex contains Coles Creek Incised, *vars. Coles Creek* and *Athanasio*; Mazique Incised, *var. Mazique*; Pontchartrain Creek Stamped, *var. Pontchartrain*; and French Fork Incised. The Bayou Ramos phase complex includes Avoyelles Punctated, *var. Avoyelles*; Beldeau Incised, *var. Beldeau*; Coles Creek Incised, *var. Mott*; Mazique Incised, *var. Kings Point*; and Pontchartrain Check Stamped, *var. Tiger Island*. The St. Gabriel phase assemblage includes Harrison Bayou Incised, *var. Harrison Bayou*; Coles Creek Incised, *var. Hardy*; Mazique Incised, *var. Manchac*; and Evansville Punctated, *var. Wilkinson* (Weinstein and Kelley 1992:37).

Mississippian Period (A.D. 1200-1700)

The Mississippi period was the final prehistoric period in eastern North America. There are two interpretations of the relationships between Coles Creek, Plaquemine, and Mississippian groups in the Lower Mississippi Valley. Phillips (1970) believed the Plaquemine culture developed from the Coles Creek, with interaction between Plaquemine and Mississippian cultures resulting in changes in the resident population. In time, Mississippian groups entered the area and displaced the resident groups. Brain (1978), however, maintains that the resident Coles Creek population became Plaquemine as the result of contact with Mississippian groups. Mississippian influence continued to increase, in time displacing the characteristics of the resident groups.

There has been considerable debate over the nature of the Plaquemine to Mississippian transition. Most notably, there is some doubt about the diffusion of Mississippian traits to Plaquemine populations. Kidder (1993) indicates that the notion of Mississippian diffusion fails to explain many of the cultural traits of the Plaquemine culture. However, there was clearly a diffusion of certain traits, such as the use of shell tempering in ceramics, and new patterns in domestic architecture (Kidder 1993:27). Political consolidation and the emergence of a religious elite are also contributed to Mississippian influences. Mound sites became less scattered but larger, while non-mound sites were smaller but more numerous.

Plaquemine culture provides the first definite evidence for a ranked society in the late prehistoric period (Kidder 1992:29-30). In many parts of the Southeast, there appears to have been a hierarchy of sites. Special purpose camps and farmsteads were scattered throughout the region. The latter were sites where nuclear and extended families lived in small huts and cultivated maize, beans, and squash. The small huts were more than likely rectangular individually set post houses (Brown 1985:274, Table 1). These houses ranged in size from 6.1 to 9.1 m on a side. The diet was based primarily on the consumption of cultivated plants, but it also included the use of game and wild plants. Many of the scattered farmsteads appear to have been oriented toward mound centers. Excavations have shown that these centers were occupied for long periods, and that the mounds supported structures and were surrounded by palisades. The groups appear to have had chiefdom-level political systems. There was differential access to goods, and some sites evidence specialization in the production of certain classes of material goods.

The Louisiana coastal zone experienced cultural change and variation similar to the rest of the Lower Mississippi Valley. As mentioned above, the Plaquemine culture (ca. A.D. 1200) appears throughout the region. Large mound sites such as Gibson (16TR5), and the Berwick Mounds (16SMY184) are likely representatives of major Plaquemine centers (Weinstein and Kelley 1992:38). Smaller sites represented by isolated mounds probably indicate the presence of minor villages. Plaquemine components are exemplified in numerous shell middens possibly serving as seasonal collecting locales for the inhabitants of the larger mound sites (Altschul 1978; Gibson 1978; McIntire 1958; Weinstein et al. 1978; Weinstein and Gagliano 1985; Weinstein and Kelley 1992).

The Medora site (16WBR1) in West Baton Rouge Parish is the type site of the Plaquemine culture. The Medora phase [A.D. 1200-1500], established by Gagliano (1967) based on Qumiby's (1951) excavations of the Medora site is one of the early Plaquemine period phases in the region (Weinstein and Kelley 1992:39). The second two phases represented in the area are the Barataria phase [A.D. 1200-1500] and the Burk Hill phase [A.D. 1200-1600]; all three phases are identified on the basis of ceramic type and variety.

Also during this time period, evidence of the so-called "Southern Cult" is represented primarily by cult designs which occur on pottery in the Barataria phase (Holley and DeMarcay 1977:16; Weinstein 1987; Weinstein and Kelley 1992:39). This, in addition to the distribution of shell-tempered pottery ,suggests an eastern Gulf coast origin occurring around Mobile Bay (Gagliano et al. 1975:27; Weinstein et al. 1978:8).

By approximately 1500 A.D., the material culture of the aboriginal groups in the Louisiana coastal zone appeared similar to that encountered by the early French explorers. The Delta Natchezan phase [A.D. 1500-1700] was created by Phillips (1970) to include all of south Louisiana with ceramics similar to the proto-historic and historic Natchez. Bayou Goula (16IV11), the type site for this phase, is the assumed location of the historic Bayou Goula (Weinstein and Kelley 1992:39). A small amount of shell-tempered pottery including Addis Plain *vars. Greenville* and/or *St. Catherine* may be associated with the Delta Natchezan phase. However, the principal ceramic markers include Fatherland Incised, *vars. Fatherland* and *Bayou Goula* (Quimby 1957:121-128; Brain 1969; Brown 1985; Phillips 1970; Steponaitis 1974; Weinstein and Kelley 1992:39).

CHAPTER 4
HISTORICAL OVERVIEW OF VERMILION PARISH AND PECAN ISLAND

Introduction

The study area is located on Pecan Island in the southern marshes of Vermilion Parish. The parish is known for its extensive oil and gas fields, as well as its production of rice. It was originally a part of Lafayette Parish and the earlier Attakapas District. Many of Vermilion's residents are descendents of the Acadians, the first settlers in the area. This chapter offers an overview of the history of Vermilion Parish and discusses the history of Pecan Island.

Pre-Colonial Period to 1765

Considered part of the western frontier during the French and Spanish colonial periods, the Attakapas region of southwest Louisiana comprised what are now St. Martin, Lafayette, and Vermilion Parishes. This remote region, known for its prime grazing land, saw little European settlement before the arrival of the Acadians in 1765. At the beginning of the historic period, the inhabitants of the region were several bands of Native American tribes called the Atakapas. Their territory ranged from the Vermilion River in the east, stretching westward past the Mermentau River to the Calcasieu and lower Sabine Rivers. "Atakapas" ("man eaters") was a name given them by Mobilian or Choctaw speakers because of purported cannibalistic practices, but they referred to themselves as many tribes did, as "the People" (*Ishak*). Two eastern bands of the Atakapas, the *Hikike Ishak* or "Sunrise People," at various times lived at the western edge of modern St. Mary Parish. They occupied locations on upper Bayou Teche, lower Vermilion River, near Plaquemine Brule, near lake Arthur on the Mermentau River, on western Grand Lake, on Lower Bayou Nezpique, on Bayou Queue de Tortue, and on Lacassine Island. The total Atakapas population may have totaled about 2,000 to 2,500 in the second half of the seventeenth century (Swanton 1952:198-199; Kniffen et al. 1987:46; Goins and Caldwell 1995:21).

The Atakapas were initially isolated from French settlement in southeastern Louisiana because of the obstacle the Atchafalaya Basin provided to migration and trade. In the 1720s, Bienville estimated the Atakapas at about 200 warriors. In the late-1730s, the Atakapas made entreaties to the French to trade pelts, bear oil, and horses for European goods and the French were happy to comply (Usner 1992:1100-101). Increased contact with the French negatively affected the Atakapas with disease, and substantial European settlement in their territory began in the mid-eighteenth century. After 1760, European settlement within the Atakapas district accelerated, and the Atakapas began to withdraw westward. The Atakapas sold land between Bayou Teche and the Vermilion River to French settlers. In 1779, the eastern Atakapas bands at the Vermilion River and the Mermentau River had a total of about 180 warriors, and furnished warriors to Galvez's expedition against the British. By 1805, only about 80 warriors remained in the single surviving Atakapas town on the Vermilion River, and of these, about 30 were Houma and Tunica that had joined the Atakapas. A handful of eastern Atakapas may have resided on the Mermentau River into the 1830s, but otherwise, they were absent from their former eastern range by this date (Swanton 1952:198-199; Kniffen et al. 1987:75; Goins and Caldwell 1995:21). Louis Juchereau de St. Denis of Quebec (d. 1744), cousin of Jean Baptiste Le Moyne, Sieur de Bienville (1680-1768) and Pierre Le Moyne, Sieur d'Iberville (1661-1706), established the Poste des Attakapas along the Bayou Teche, one of the first trading outposts in the western region.

Situated along the western frontier, the Attakapas District was reached via a complex route that utilized no less than three of the largest waterway systems in the region. From New Orleans the route along the Mississippi River, Bayou Plaquemine and the Atchafalaya River could have been navigated in about six days, if the water and weather conditions were favorable.

The rolling grass lands to the west of the Teche, ideal for ranching, were converted quickly into *vacheries* (ranches) by former traders and discharged French military officers. Regarding the quality of lands in the Attakapas District, Paul Alliot remarked in his reflections on Louisiana to Thomas Jefferson that the "lands and the excellent meadows…can be compared in goodness to the best grass in France" (Alliot 1911:115). In 1805, Governor William C. C. Claiborne wrote to Secretary of State James Madison exclaiming that the Attakapas and Opelousas districts were the most important districts of the territory because "the land was fertile, well adapted to cultivation, Improvements considerable, settlers numerous and respectable" (Brasseaux 1996b: 463).

The Acadians, 1765-1803

The first migration of settlers to the Attakapas region began at the twilight of the French colonial regime (1699-1766). In March of 1764, Jean-Antoine Bernard D'Hauterive and André Masse were granted the first land grant in the region, which was followed by a grant to Jean-Baptiste Grevemberg on 16 July 1765, and a grant to François Ledée on 19 February 1769. The Ledée grant was the largest in the area, with approximately 20,000 superficial arpents centered on present day Breaux Bridge. The D'Hauterive-Masse land grant was situated in the St. Martinville area, with a bulk of the acreage between bayous Teche and Tortue around the present Lake Dauterive in Iberia Parish. In an enterprising move to make the land profitable with as little supervision possible, D'Hauterive and Masse entered into a cattle/land agreement with eight leaders from the newly arrived Acadians: Olivier Thibodeau, Jean-Baptiste Broussard, Joseph Broussard (*dit* Beausoleil), Victor Broussard, Alexandre Broussard, Jean Dugas, Joseph Guilbeau, and Perre Arceneau. The agreement stipulated that each family would receive one bull and five cows with calves during each of six consecutive years, and the use of the D'Hauterive property. At the end of six years, each family would return the same number of cows and calves (of the same age and breed) that they had received initially. The remaining cattle would then be divided between D'Hauterive and the Acadians. According to the contract, the Acadians would "obligate themselves and hypothecate their present and future property, individually and jointly, and M. Dauterive does likewise and hypothecates his property" (Rees 1976:17, 43-44). No mention of a transfer of land was made. It may be assumed that this arrangement was used as a means for the Acadians to establish a financial foothold in Louisiana, and that at the end of the six years they would be free to relocate wherever they wished. Louisiana *commissaire-ordonnateur* Denis-Nicolas Foucault and Governor Charles Philippe Aubry, aware of the financial and logistical advantages of the agreement for New Orleans, were quick to approve the contract (Conrad 1990:8). The production of cattle was considered vitally important to the support of New Orleans during times of war with the British, since the remoteness of the region provided unexposed communication and supply lines to New Orleans (Brasseaux 1996a: 126). In a letter regarding the transaction, Foucault stated:

> We were persuaded [to approve the contract] all the more readily, for the fertility of these lands…will shortly place them, the majority of whom are very industrious farmers, in a position to…furnish the needs of this city (quoted in Brasseaux 1996a:126).

Louis Andry, a veteran military engineer, was assigned by Foucault to lead the Acadians to the D'Hauterive-Masse concession. Once there, he was to work closely with Joseph Broussard, the head of the Acadian expedition, to establish the village, map out common grounds, and distribute parcels of land to families according to size (Rees 1976b: 126). It is interesting to note that the records of the St. Martin of Tours Church show that Joseph Guilbeau, Jean Dugas, and Joseph and Alexandre Broussard (*dit* Beausoleil because of his propensity for smiling) died of small pox or yellow fever in 1765, within a few months of their arrival in the Attakapas District (WPA 1941: 401).

The arrival of the Acadians marked the beginning of a population “boom” in the Attakapas region. In addition to the cattle in the contract, the Acadians were given flour, hardtack, hulled rice, salt pork, and beef to support themselves for six months, plus farming tools, seed rice and corn. By April 1765, 231 immigrants had settled in the Attakapas District with foodstuffs, tools, muskets, and building materials worth about 15,500 livres (Rees 1976: 126). Yet by May 1765, Foucault was forced to renege on his offer of foodstuffs and supplies to the newly arriving Acadians exiles that wanted to reunite with their kinsmen in the western district. Following the Seven Years War, the French royal warehouses were empty and there were no monies available to replenish them. Instead of sending new arrivals to the Attakapas District, an expensive undertaking, Foucault directed them to lands on the right bank of the Mississippi, above the German district, and gave them supplies from local tradesmen. Following the Treaty of Fontainebleau in 1766, the first census taken by Governor Don Alexandro O’Reilly shows a population of 409 persons in the Attakapas region. This influx of people, Acadians in particular, slowed slightly when in 1768 Spanish governor Antonio de Ulloa forbade settlers from moving to the Attakapas region, and residents were banned from harboring fugitive Acadians under the threat of property confiscation or immediate expulsion from the colony. This order was primarily due to the obstinancy of the Acadians, who continually ignored Ulloa’s directives and set off to settle wherever they wanted.

Of the 542 colonial land concessions in the Attakapas District made between 1765 and 1803, only 154 concessions were made to Acadians, or approximately 28.4 percent. This was a small number when compared to 50.3 percent of all concessions held by non-Acadian French grantees. Non-Acadian French land holders also received larger grants: the average size of the Acadian concession was 618 superficial arpents, while the average non-Acadian French concession was approximately 985 superficial arpents (Conrad 1990: 10). Most Acadian grantees lived on their concessions and were committed to investing in the improvement of their land in order to ensure their proprietorship. The majority of their non-Acadian French counterparts were absentee landlords in search of supplemental income. In 1797, a settlement document signed by Governor Manuel Gayoso de Lemos outlined the requirements for land request approval. First, bachelors were required to prove their success at farming for four years before securing the title to their homesteads, or else show proof of having married into the family of an “honorable” planter. Catholic settlers were preferred, although non-Catholics with “great personality” were “occasionally accepted.” Protestant preachers, however, were not to have their land requests granted. As for the number of acres to be granted, the document stipulated that 200 acres were to be granted to all approved settlers, with an additional 50 acres for each child and 20 acres for each slave owned (Pourciau 1985: 4).

For the Acadians who had settled in the St. Martinville area, there were several impediments to their success and prosperity that impelled them to move farther west to the present-day Lafayette and Vermilion parishes and beyond. Committed to maintaining their former way of life in addition to their tendencies toward isolationism, the Acadians often were at odds with their Francophone neighbors. They were also highly susceptible to yellow fever and malaria outbreaks. Perhaps the most compelling reason for them to seek land beyond the St. Martinville area had to do with the dwindling availability of unoccupied land. Under the Louisiana law of forced heirship, it was mandated that all children were to share equally in the community property of their parents, thus forcing the break-up of cohesive land grants into smaller and smaller portions. In addition to this, American settlers were immigrating to the area following the Louisiana Purchase in 1803, and comprised 17.5 percent of all land concessions (Conrad 1990: 10). With this influx of people into the region, fuel and construction resources became scarce. The combination of these factors forced the Acadians to relocate to the western fringes of the Attakapas District, centering on bayous Teche, Carencro and Vermilion. These land grants followed the traditional French and Spanish riverbank long lot pattern of survey, six arpents wide and forty arpents deep. The prairies beyond the bayous went unclaimed (but not unused) well after 1803, and thus were surveyed in the township and range system (Guaranty Bank, 1980).

The Antebellum Period

In 1830, former French diplomat François Barbé-Marbois gave this description of the Attakapas settlers:

> They are without much instruction, and still speak the French of the time of the bucaniers; but the rudeness of their language does not extend to their deportment: they are of mild manners; hospitality is no where exercised with more cordiality….Here the luxury of the city has entirely disappeared, and the cloth-loom is oftentimes the only ornament of the drawing room. At Attakapas there is no magnificence, and no poverty…The dwellings in this settlement are very much scattered, churches are rare, and the number of priests is very small (Barbé-Marbois 1977: 357-358).

This kind of isolation, both by choice and by nature, created problems that would propagate the development of new parishes. Lafayette Parish cleaved from St. Martin Parish (created in 1807 by the First Legislature of the Territory of Orleans) in 1823, and on March 25, 1844, Vermilion Parish was created out of the lower half of Lafayette Parish by Act No. 81 of the Louisiana Legislature. There was some argument over the location of the new parish seat. Father Antoine Desire Megret, Pastor at Vermilionville (present-day Lafayette) had purchased in 1843 a tract of land on Bayou Vermilion upon which he built a new chapel to serve the residents of the southern portion of Lafayette Parish, soon to be Vermilion Parish. This tract was situated in what is now in the town of Abbeville. When Vermilion Parish was created in 1844, Father Megret endeavored to have the seat of justice located on the tract of land that he had purchased. However, Robert Perry, the legislator who had sponsored the bill for the formation of the parish, wanted the seat of justice to be located at Perry's Bridge, where he himself owned extensive properties. Perry was successful in his bid, and so the first parish seat was located at Perry's Bridge on Bayou Vermilion, which had been the main commercial center for Bayou Vermilion in the early years of the nineteenth century before the establishment of Vermilionville. The courthouse at Perry's Bridge was held in an old store house. Not to be outdone, Father Megret sought to move his chapel to Perry's Bridge, but he was offered a poor spot of land located at the edge of the swamp, a place completely unsuitable for the foundation of a church. Father Megret returned to his original tract and immediately began to subdivide it into lots. The new village, which he originally named La Chapelle but quickly changed it to Abbeville, after the town of Abbeville in the Department of the Somme, France, grew larger than its rival, Perry's Bridge, within one year. In June of 1845, Father Megret approached Parish Judge William Kibbe, and proposed that if he donated all of the land for public streets and civil buildings, constructed buildings to be used as a courthouse and jail, then perhaps the legislature would consider officially moving the parish seat to Abbeville before the event of his death. For two years the offer was considered, and on March 1, 1847, the parish officially accepted Father Megret's proposition and donation of land. On March 8, 1848, the bill was approved in the state legislature, and the town of Abbeville was incorporated in 1850. Father Megret died on December 6, 1853, and the spring legislature permanently established Abbeville as the seat of justice for Vermilion Parish (Vermilion Historical Society 1983:9-11; Fortier 1914:570).

Settlers began arriving in the vicinity of present-day Intracoastal City in the mid-1840s. Robert Green, his wife, Melissa Pope Green, and their two sons moved from Illinois to a forty acre tract at the edge of the mouth of Vermilion Bayou, in an area known as Lower Egypt. They moved in order to begin hog farming, but after a few years they left the area. Four more families, the Whites, Fosters, Kibbes, and Cessaces, also moved into the areas and established themselves as fishermen and trappers. The area remained a quiet fishing and trapping community until the middle of the twentieth century (Vermilion Historical Society 1983:16).

The economy of Vermilion Parish prior to the Civil War was dominated heavily by the cattle industry, which made use of the extensive marshes as prime pasturage for livestock. Many farmers who were not involved in cattle produced sugar and corn. No rice was reported to have been produced in the parish in 1860. Farms in this area were, on average, between 400 and 600 acres in size. There were, however, relatively few slaves in the parish, and as of 1850, slaves comprised approximately 30 percent of the population. Only one percent of slaveholders in the parish owned greater than 50 slaves in 1850, whereas the majority of slaveholders (approximately 70 to 80 percent) owned less than 10 slaves. The census of 1850 enumerated 1,067 slaves out of a an aggregate population of 3,408 persons. A decade later, the aggregate population had increased to 4,324 persons, of whom 1,316 were slaves (USHCDB; Hilliard 1984:33-34, 37-38, 46, 48, 50,76-77).

The Late Nineteenth and Early Twentieth Centuries

Vermilion Parish remained quiet during the Civil War, and thus escaped the destruction experienced by many other parishes in southeast Louisiana. The parish population grew very little between 1860 and 1870: the total population was recorded at 4,528 persons, of whom 1,047 were African-Americans. By 1880, however, the aggregate population almost doubled, enumerating 8,728 persons, and the 1890 census counted an African-American population of 2,899 persons, with a total population of 14,234 persons. The arrival of the railroad through Lafayette in the early 1880s helped to bring new settlers to parish, although the southern portions of the parish still remained sparsely populated. In 1900 the population boomed to 20,705 residents (USHCDB).

During the second half of the nineteenth century, the cattle industry of Vermilion Parish became its most important resource. Before the Civil War, the principal market for southwestern Louisiana cattle was New Orleans. Many of the marshy prairies were used to winter herds of cattle, which grew fat off the abundant grasses. Before the availability of truck transportation, the ranchers were required to swim their stock across the bayous and marshes to get to the New Orleans markets (WPA 1941:429). After the war, the New Orleans markets proved too limited, and as a result, the industry suffered a temporary lull until the arrival of the railroad. When the railroad was completed through Lake Charles to Houston, the old cattle drives gave way to more efficient means of transportation to larger cattle markets, such as St. Louis, Chicago, Fort Worth, and Kansas City. With larger markets available and the demand for prime beef year round ever increasing, the cattle industry in Vermilion Parish experienced tremendous growth that would not slow with the arrival of the twentieth century.

Extensive vacherie owners in Vermilion Parish were William Harrington, Adrien and Adrien Hebrard Nunez, and J.P. Gueydan. (Millet 1997:449-450). Most of these cattlemen spent very little on cattle upkeep; most of the expense was on branding and marketing. Due to the abundant grasslands, water sources, and mild winters, most cattlemen left their cattle to graze unhindered during the winter months: the White Lake area was the favorite place to winter the herds. It was also an ideal place for summer pasturage since the abundant willow trees provided excellent shade and protection from the heat. The pasturage in the marsh was as good "as there is in the world, [where] strong, nutritious grass grows in great abundance, resembling very much in taste and appearance what is known in the Middle States as red top, only a little taller and as thick as it can stand" [quoted in Millet 1997:451]. Despite the generally favorable conditions, hazards for open range foraging were common: lack of shelter, prolonged drought, unstable soil, excessive heat and cold, disease—the most deadly of which was charbon, insects, heavy rains, freak tides, overgrazing, poor drinking water, marsh fires, saltwater intrusion, undesirable plant growth, lack of reserve feed, and occasional rustling were all a part of the risk in raising cattle

(Millet 1997: 453). All in all, cattle rustling was rare in the parish simply because there was no quick, inconspicuous way to move the cattle out. Greater worries for the cattlemen were flooding and drought.

Livestock was usually driven off the pasturage in late August, after the spring and summer vegetation had matured and dried. The pasturage was then burned to promote rapid growth in the fall and winter (Millet 1997:451). To travel through the marshes, cowboys would cut trails with a horse and several gentle cows following behind. At appointed sites along waterways, a chuck wagon/sailing vessel would serve as a floating bed-and-breakfast to the cowboys. After the herd had been deposited in the requisite pasturage, the trail hands would load up their horses and gear and sail home, out of the marshes. Twice a year cattlemen would round up their stock for branding, the only form of identification for the mingling herds out on the prairie marshes. Branding was so serious that parish police juries would sell unbranded livestock, and use the proceeds to pay bounties for wolves' and wildcats' pelts and to help defray road construction costs. Cattle from Vermilion Parish were usually shipped out to New Orleans and Galveston by barge from the Cheniere au Tigre and the landing at Belle Isle. When the Kansas City, Watkins, and Gulf Railroad was extended to Port Arthur in the 1890's, the southwestern cattle market was immediately expanded to the Midwest and beyond. By 1915, another railroad, the Louisiana and Western Railroad, had connected Abbeville with its main line, which had a hub in Lafayette. The Iberia and Vermilion Railroad also had a spur that connected the Louisiana and Western Railroad with the Franklin and Abbeville Railroad , which in turn connected with the New Iberia and Northern Railroad and the Morgan's Louisiana and Texas Railroad, again expanding the marketability for Vermilion cattle (Millet 1997:458; Goins and Caldwell 1995:69).

The 1880s witnessed a change in the landscape of open-range ranching. Cattlemen began fencing in pasturage, as well as introducing finer bloodlines in the stock. Dairying also gained a greater importance in an area where milk and other dairy products were scarce. It was noted in the New Orleans *Daily Picayune* that "some of the creole cows give twelve quarts of milk a day without shelter in winter or summer, and with no food except the natural grasses of the marsh and the prairies, [and] as good butter has been and can be made along the coast, as is made in the North and West" [quoted in Millet 1997:453]. By the early twentieth century, it was estimated that several thousand head of cattle were grazing along the route of the Intracoastal Canal (Southern Manufacturer 1910:47).

In addition to the cattle industry, Vermilion Parish was actively involved in rice production. With the advance of technology, planters were able to convert marsh land into vast rice fields. By the early twentieth century, Vermilion Parish produced 12 percent of all rice grown in the United States, and the Louisiana State Rice Milling Company operated a mill in Abbeville. Other crops produced in the parish were cotton, sugar cane, corn, sweet potatoes, Irish potatoes, and truck vegetables. Lemons, grapes, mandarins, pomegranates, pecans, and English walnuts also were grown for export.

The southern portions of Vermilion Parish provided a variety of sources of income, namely in fishing and trapping. Pelts from mink, muskrat, otter, raccoon, 'possum, and beaver supplemented the income of fishermen, who netted a myriad of fresh and saltwater fish, including catfish, oysters, shrimp, and terrapin. Wild game included rice birds, pheasants, becasine, snipe, partridges, papabots, wild duck, and deer (LA Historical Bureau 1940:156-157; Fortier 1914:570-571; LA Dept. of Agriculture 1920:160).

Unlike the neighboring parishes of Cameron and Calcasieu, the oil and gas industry in Vermilion was slow to establish itself. In 1932, the Gueydan Oil Field began producing oil in 1932. The Gueydan field produced 192,200 barrels of oil in its first year, 164,600 barrels in 1933, 112,019 barrels in 1934, and only 82,369 barrels in 1935, for a total of 551,188 barrels.

When the Intracoastal Waterway was built in 1941, more than 200 oil and gas related industries moved into the lower Vermilion Parish area to begin extensive exploration and extraction (LA Dept. of Conservation 1936:135).

People continued to move into the parish as a result of its largess and agricultural and economic opportunities. In 1910 the parish experienced another population increase, growing to 26,390 residents, of whom 23,483 resided in rural areas. In 1920, however, the parish population remained just about the same, increasing to only 26,482 residents. The growing trend continued into 1930, when the census enumerated 33,684 persons, and again in 1940, with an aggregate population of 37,750 persons, of whom 5,043 were African-American. In 1950, however, the population decreased to 36,929 persons. As a sign of its prosperity, by 1940 Vermilion Parish boasted of 94.4 miles of state highways, two newspapers, six state approved high schools, three banks, 29 manufacturing plants, 457 retail stores, 3,474 automobile registrations, 990 telephones, and 3,400 electric refrigerators (USHCDB;LA Historical Bureau 1940:157).

History of Pecan Island

The settlement of Pecan Island largely parallels that of Vermilion Parish. Native American settlement preceded its discovery by later explorers. However, Pecan Island remained a colonial backwater. Claims that the pirate Jean Lafitte buried treasure on the chenier persist (WPA 1945:442). The early history of Pecan Island is a blend of legend and fact.

According to the WPA Guide to Louisiana, Pecan Island was discovered in the 1840s by Jake Cole, a Texas cattleman (WPA 1945:442). Cole and several companions were in the south Louisiana marshes searching for grazing land when he noticed the distant oasis of trees on the chenier. Legend has it that his companions were deterred by the marsh bog, so Cole pressed on alone. Cole is perhaps responsible for the name "Pecan Island" because he returned with his pockets full of them as proof of his reaching the chenier (WPA 1945:442). From his details of the chenier, Pecan Island might have received another name for he claimed the island was "strewn from end to end with bleached human bone" (WPA 1945:442). The source of these bones formed the foundation of various legends and theories. One legend states that Jean Lafitte "habitually" murdered captives on the island. Another myth claims the pirate introduced smallpox to the island by burying the bodies of disease victims there, thus decimating the Indian population (WPA 1945:442). Lastly, Native Americans were cited as the cause of the bone scatter. As previously stated, the Attakapas were purported to engage in cannibalistic practices. Reportedly, Pecan Island was a "retreat" for the Attakapas who brought prisoners to the island, "cooked them with clams, feasted with ease, and tossed the bones aside" (WPA 1945:442).

Despite the myths and legends surrounding the reported bone scatter, the fact remains that mortuary mounds exist on Pecan Island. When Henry B. Collins of the Smithsonian Institution surveyed Pecan Island in 1926, he documented total of 22 mounds. The mounds clustered into three groups named largely by landowner, the Veazey mounds, the Morgan mounds, and the Cypress mounds. Collins wrote about the Morgan mounds:

> Unfortunately, the largest mound on the Morgan place has suffered to an unusual degree from the activities of "money-hunters," and its value from a scientific standpoint has been greatly impaired. However I was able to do enough digging to observe the stratification and to get a dozen or more skulls from near the top.

Only a single mound remains from the original 22 documented by the Smithsonian Institution. Many mounds were excavated for road fill (Pokrant et al. 2006). Some mounds may have been victims of pirate treasure hunters who reportedly dynamited the mounds in 1925 (WPA 1945:443).

In the 1800s, Pecan Island was listed as a Naval Reserve due to tree resources that provided timber utilized by the Navy. Southern live oak (*Quercus virginiana*) grows in abundant hammocks on the chenier. During the age of tall ships, live oak was used for shipbuilding because of its inherent strength and natural curvature that complemented ships' timbers (Wood 1981).

Settlers on Pecan Island could obtain land from the government after residing on the property for four years. These intrepid settlers grew cotton and sugar cane. They also hunted and trapped various marsh species including mink, raccoon, and alligator (WPA 1945:444). The WPA writers documented the names of the families that settled Pecan Island. Acadian settlers by the name of Broussard, Veazey, and Hebert were noted along side the Spanish surnames of Nunez and Bourques. Also included were the Anglo-Saxon names of Foster, Campbell, Vaughan, Choate, and Winch (Wench) (WPA 1945:443). Decedents of these settlers still reside on Pecan Island today.

Pecan Island existed in isolation until the middle of the last century. The first road to Pecan Island was built in 1953. Prior to the 1950s, the only way on or off the chenier was by boat. The mail boat, *Crescent*, made the eight-hour trip from Abbeville for deliveries three times a week (Bradshaw 2004).

With the coming of the road, electricity and telephone service soon followed. Another event in the 1950s disrupted life on Pecan Island. Hurricane Audrey struck the chenier on 27 June of that year. The tidal surge washed over the Pecan Island and residents rode out the storm in their attics as the marsh rose and the storm raged. Some of the older residents of Pecan Island who survived Hurricane Audrey also experienced Hurricane Rita, the second hurricane to make landfall in Louisiana on 24 September 2005.

CHAPTER 5
VERNACULAR WATERCRAFT TYPES AND SHIPWRECKS IN THE PROJECT AREA

Researching the types of watercraft ubiquitous to a particular area throughout history can aid in the identification and temporal association of encountered shipwrecks and vernacular watercraft. Probing historic documentation of vessel losses is another avenue to assist in identifying submerged cultural resources reportedly lost within a specific area. Archeologists combine the two methods not only to determine what types of vessels may be encountered but where historic vessels were typically lost or abandoned. Watercrafts were developed, constructed, and modified for use in the shallow lakes and bayous and shoaled, snag-filled rivers throughout southwest Louisiana. Sea-going vessels with deeper drafts were confined to traveling upriver within a maintained navigation channel or dispersing their cargo among smaller vessels or boats for transport inland. During travel upriver or down, vessels from small pirogues to large steamboats were subject to overloading, foundering, snagging, collision, and even boiler explosion. As such, many vessels have been lost throughout the centuries in these waterways. A discussion of the types of watercraft known to have operated on the water bodies of the project area is presented below along with a listing of known vessel losses.

Various types of watercraft have been used to ply the rivers of the southwest Louisiana and its associated bayous from the earliest prehistoric inhabitants to the modern-day local residents and commercial enterprises. While a discussion of the types of Louisiana watercraft can provide guidelines for identifying boat types, there exists no rigid morphological categorization. The lines between "types" of watercraft are fluid rather than finite, allowing for similarly appearing vessels defined as separate types to exhibit one or more characteristics of the other watercraft style. In an attempt to identify the types of vernacular-constructed watercraft that were used throughout prehistory and history, a discussion of each type and its requisite characteristics will be presented to demonstrate changes in morphology and continued trends that may be evident in the archeological record.

Malcolm Comeaux's 1985 article discussed the evolution of and similarities between watercraft through time. He argued that these changes occurred due to the variety of environments encountered, new technologies introduced, cultural changes, and changes in the world regarding new developments and desires for exploiting various resources. Comeaux stated that, "changes are molded by people to fit their ideals, needs, and knowledge, and in these changes there is continuity, as the new ways are superimposed on the old. In this manner some boat types are abandoned while others evolve and change" (Comeaux 1985:162). Watercraft were and are designed to operate in various or specific environments, for various or specific purposes, and generally, to operate efficiently and endure as long as possible. Though their morphologies may slightly or significantly differ, their overall use as a means of transportation (whether of people, ideas, resources, or commerce) is identical. For the purposes of demonstrating this evolving technology, a discussion of the earliest types of watercraft will be presented first, followed by subsequent vessel types of the modified styles or manufacturing techniques of their predecessors. Vernacular craft include several main forms: pirogue or canoe types, rafts and skin craft, flat-bottomed boats (used to describe any flat bottomed craft including the specific "flatboat" form), keelboats (any vessel with a bottom keel, including the specific "keelboat" form), sailing vessels, and steamboats. Modern vessel types will be described to demonstrate the evolution of watercraft construction and technology. While historical documentation of the loss of vessels before the nineteenth century is often incomplete or scarce, documentation of the loss of vernacular watercraft rarely exists. These vessels were also deposited into the archeological record through abandonment, catastrophic loss, or foundering though few were ever reported. Unfortunately, few documents exist other than the occasional historic newspaper article that included details on the loss of these local craft. With the scarcity of this documentation in mind, it is impossible to accurately hypothesize the number of vernacular watercraft lost within a particular waterway or region. Instead, the probability of locating archeological examples of each type of vessel within the project area will be assessed based on an estimation of a vessel type's popularity of use compared temporally with the size of the local or regional population.

Pirogue or Canoe Types (*Pirogue,* also: *Periagua, Periauger, Pirage,* Dugout, etc.)

The pirogue, or dugout canoe, represents one of the earliest forms of vernacular watercraft recorded in Louisiana (Figure 2). The pirogue is a long, narrow, flat-bottomed, double-ended vessel that could be paddled or rowed. This vessel type was certainly used by native populations long before European contact and remains in use today. The early pirogue was constructed in a manner involving felling of a tree and use of fire and hand tools to burn and hollow out the log. Cypress was typically the wood of choice, though other wood varieties could be used instead (Comeaux 1985:164). The process of building a dugout was described by Andre Penicaut, a ship's carpenter accompanying Iberville in 1699. Penicaut observed:

> To make these they kept a fire burning at the foot of a tree called cypress until the fire burned through the trunk and the tree fell; next, they put fire on top of the fallen tree at the length they wished to make their boat. When the tree had burned down to the thickness they wanted for the depth of the boat, they put out the fire with thick mud; then they scraped the tree with big cockle shells as thick as a mans (sic) finger; afterward, they washed it with water. Then they cleared it out as smooth as we could have made it with our tools. These boats may be twenty-five feet long. The savages make them of various lengths, some much smaller than others. With these they go hunting and fishing with their families and go to war or wherever they want to go [McWilliams 1953:8-9, cited in Pearson et al. 1989:72].

After contact with the native population by Spanish and French explorers and settlers, the French recognized the utility of these vessels for navigating the inland waters and for transporting goods or personnel and began to use them customarily. While native populations constructed a pirogue with blunt ends and thick hulls, French boat-builders fashioned their pirogues with pointed ends and thinner hulls to reduce their weight for portage and paddling. The method of construction and tools used in this manner changed little over the centuries. Size, however, did change, with early pirogues exhibiting lengths of 40 ft or more and a wide beam, to later pirogues that were generally shorter and with a narrower beam (Comeaux 1985:164). Pearson et al. (1985:71) reproduced a segment of Garcilaso de la Vega's 1543 account of an attack by a flotilla of "Indian canoes", which described dugout canoes with a capacity for holding 75 to 80 passengers. As time passed, pirogue length dramatically diminished to a typical size of 12 to 14 ft in length with a similar proportional decrease in beam. The widespread use of these vessels steadily declined after the invention of steam engine technology for transportation in the early-nineteenth century. After the early-twentieth century, pirogues drastically declined and appeared only in the southern coastal areas and swamps. The decline of the pirogue is attributable to changes in watercraft technology, necessities of transporting more bulk goods, and reduction of available cypress trees for their construction.

Another type of pirogue, distinguished from its predecessor, the dugout, is the planked pirogue (also *peniche* or *pirogue en planche*). This version of the pirogue is constructed with cypress planks instead of a single log (Figure 3). Though constructed differently, the planked pirogue operates and appears virtually identical to its earlier cousin. It is constructed at the typical length of 12 to 14 ft, like the later dugouts, has a slightly wider bow than stern, flat bottom, slightly flared gunwales that curve toward the front and rear, small fillets to reinforce the bow and stern, two thwarts (one of which also functions as a seat), and a strip of molding placed

Figure 2. Photograph of Malcolm Comeaux with a dugout pirogue (Louisiana Folklife website 2008).

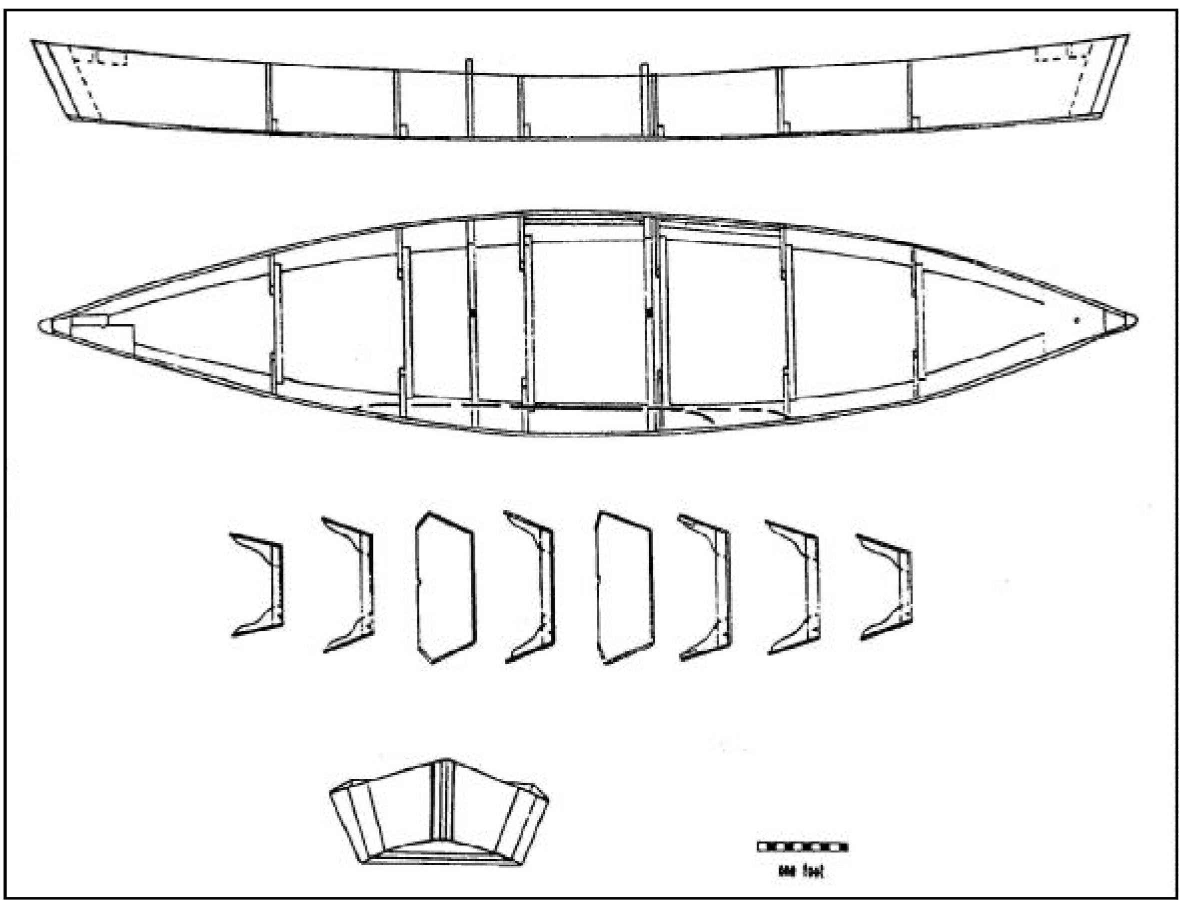

Figure 3. Hull plan of a planked pirogue (Pearson and Saltus 1991:99).

along the top of the gunwales (Comeaux 1985:166). Planked pirogues are used throughout the swamp and marshlands of Louisiana, propelled by paddle or pole.

Archeological examples of pirogues have been recorded. One example, described by Pearson et al. (1989:72), included a 27-ft portion of a dugout found partially exposed in marshland on the north shore of Lake Salvadore in St. Charles Parish. The vessel measured two ft wide and had a flat bottom. Due to the lack of an intact sample, the overall length of the vessel could not be determined. Radiocarbon samples returned dates of A.D. 1540 +/- 90, A.D. 1620 +/- 80, and A.D. 1650 +/- 80 (Pearson et al. 1989:72). Another dugout canoe, measuring 12.5 ft long, 18 inches wide, and a seven inch depth of hold recorded at Fluker's Bluff in the Amite River, St. Helena Parish, returned a radiocarbon date of A.D. 1222 (Pearson et al. 1989:72). Though few pirogues have been documented by archaeologists, the probability that many prehistoric and historic pirogues still lie well preserved in the thick estuarine sediments of the project area remains moderate to high.

Rafts and Skin Craft

Skin Craft (Bark Canoes). Bark canoes, according to Saltus, represent the only type of skin craft employed in the Maurepas and Pontchartrain basins during the early historic European explorations (Saltus 1988:40). He described skin craft construction as consisting of a wooden framework covered with either bark or animal skins (Saltus 1988:41). Bark canoes and other skin craft were paddled, had no rudder, and could be sailed using a small sail crafted from birch bark and upright poles. Though Spanish and French explorers probably did not enter the immediate project area for any lengthy time, the likelihood of encountering archeological examples of historic bark canoes is very low.

Rafts. These types of watercraft were simply constructed floating platforms of cane, logs, or reeds bound together (Comeaux 1985:172). The rafts were built for temporary use, such as to cross a waterway or transport a small cargo (Figure 4). Rafts could be fitted with a small lean-to for shelter or a sail when winds were favorable. They could also be constructed of the logs themselves that were being transported downriver for sale (Saltus 1988:42). Saltus referred to an archeological investigation of a log raft found on the Natalbany River in Springfield. This craft was constructed with cypress pins, called wooden dogs, driven into sycamore timbers laid across the logs (Saltus 1988:42). Later modifications employed metal chain dogs or ring dogs in place of the wooden dogs for fastening. Due to the typical practice of constructing a raft with the logs that were meant for sale downriver, there is a low probability of discovering a historic raft during archeological surveys within the project area.

Bundle Craft (Cajeu). Bundle craft consist of a form specified as *cajeux*, which were made of bound cane (Saltus 1988:41). These vessels were likely very small and used to transport small cargo or personal belongings across small waterways, rather than a person. Bienville, in 1700, described the construction and use of *cajeux* to carry their baggage while they swam behind the craft, pushing it to the other side of the Mississippi River (Pearson et al. 1989:81). Though simple to make, bundle crafts never became a highly popular means of transportation and, therefore, are not likely to be located during archeological surveys.

Flat-Bottomed Craft

Flatboats, used generally to describe any flat-bottomed craft, appeared in the late-eighteenth century and assumed a role of prominence alongside pirogues. Flat-bottomed boats are ideally suited for navigation of the shallow and narrow waterways of the Lower Atchafalaya Basin and its bayous. Though many terms are used interchangeably to describe these forms of watercraft (skiff, *bateau*, flatboat, barge), and one term can be used to describe markedly different forms of early historic and modern craft, the following vessel types will be generally defined.

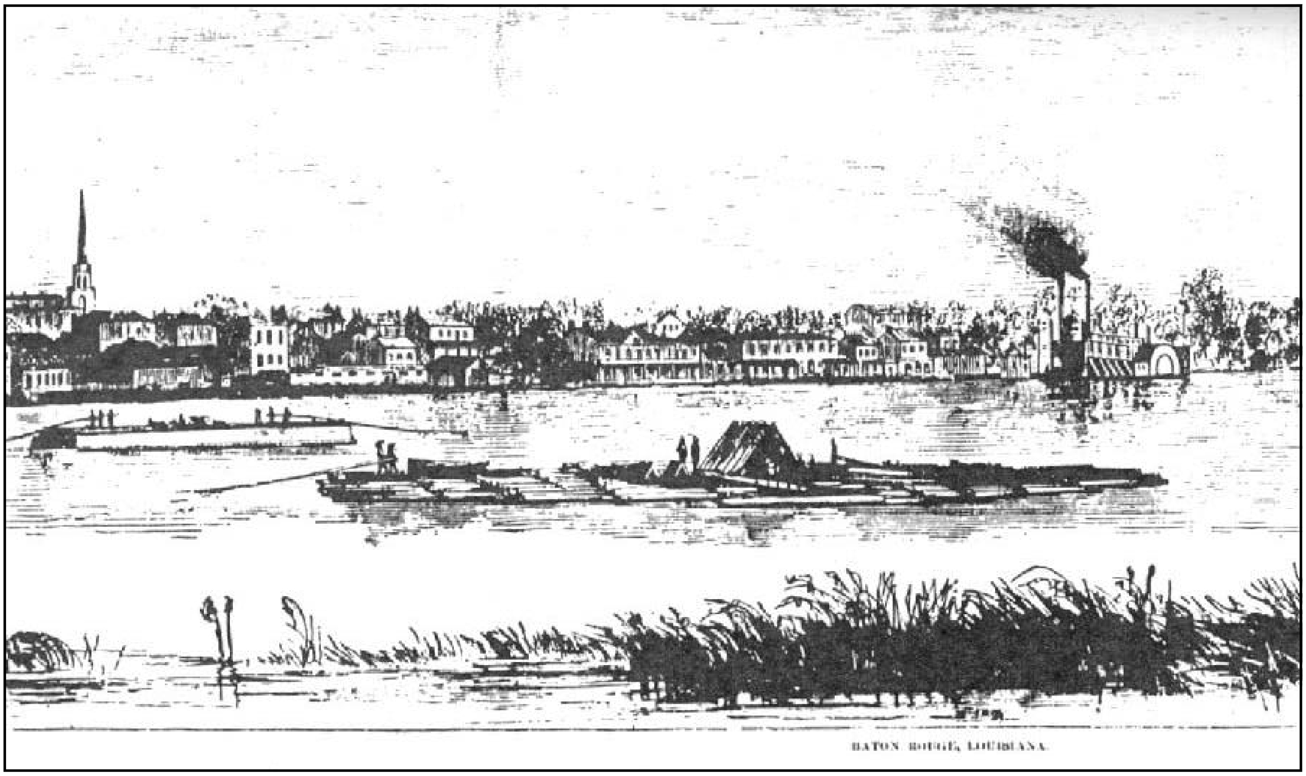

Figure 4. Raft in foreground on the Mississippi River (Saltus 1988:43).

Bateau. *Bateau*, French for "boat," is a vernacular term applied to more than one form of vessel. The term has been used interchangeably with skiff to describe a small cargo-carrying, flat-bottomed craft, leading to much confusion when attempting to define vessel types for archeological purposes (Pearson et al. 1989:90). The eighteenth-century description, referred to as a *bateau*, appeared as a flat-bottomed craft, double-ended with sharply tapered bow and stern, ranging in length from 12 to 80 ft though usually between 20 and 40 ft (Figure 5) (Birchett et al. 2001:52). Saltus described this form as round-chined, distinguished from the square-chined *chalands*, scows, *radeaux*, and flatboats/barges, and the angular-chined planked pirogue, skiffs, and yawls (Saltus 1988:44). This early form of *bateau* was larger than a canoe and had a greater carrying capacity than the pirogue (Pearson et al. 1989:80). It was used to transport a small to medium-sized cargo and was rowed, poled, or sailed on rivers and lakes. It likely evolved from the early flatboats, appearing in the early-eighteenth century (Pearson et al. 1989:249; Birchett et al. 2001:115).

The term *bateau* is used in modern context to describe a vessel typically measuring 15 ft or more long and five ft wide, and sheered forward. Modern *bateau*x are large, flat-bottomed vessels with a blunt bow and stern and forward sheer (Figures 6 and 7). Also referred to as john boat, joe boat, launch, put-put, or gas boat, these vessels operate on the bayous, containing partially decked fore, aft and sides creating an open space in the middle (Pearson et al. 1989:249). Larger forms may have a cabin and can be virtually identical to "flatboats." They are propelled by inboard motors and are currently being replaced by aluminum and fiberglass forms (Birchett et al. 2001:115). Due to their inability to plane at speed, because of their slender and heavy form, *bateaux* began to fade in popularity after the mid-twentieth century (Comeaux 1985:170). These vessels have all but disappeared from the modern fleets of vernacular watercraft. Historic bateaux may remain in the archeological record within the project area as long as they remain well preserved and buried in sediments. Their probability of discovery during archeological surveys is low to moderate.

***Chaland* (Plank Boat, *Chaland a Boeufs*, Spanish *Chalan*).** The *chaland*, or "barge" in English, is a flat-bottomed, square-chined, rectangular craft with sharp, angular, upward-slanting ends and no sheer (Figure 8). These vessels generally measured 10 to 14 ft in length, roughly three ft in beam, and resembled the barge form. Typically operated as ferries, *chalands* were only used to transport goods and people short distances, such as across a river or water body; and were propelled by paddling (Pearson et al. 1989:248). A variety of *chaland* is the "plank boat", typically used for logging. This vessel had a narrower beam than the *chaland*, at less than two ft wide (Pearson et al. 1989:248). The *chaland* form is considered a primitive type of flatboat and likely evolved from the early form of the barge in Louisiana. The heyday of the *chaland* occurred from the late-eighteenth and early-nineteenth centuries, and its popularity diminished after technology and desires changed (Birchett et al. 2001:52). Another variety of *chaland*, the *chaland a boeufs*, appeared as a much larger flatboat with a large cabin with many windows, typically transporting cattle (Birchett et al. 2001:115). Due to its heyday before a substantial population of permanent settlers entered the project area, few, if any, historic *chalands* are likely to be found in the archeological record. Their probability for discovery within the project area is low.

***Radeau* (Flatboat, *Bateau Plat*).** The radeau, a flat-bottomed, square-chined vessel resembling modern flatboats, was used by eighteenth-century explorers on the Mississippi River and its tributaries. The French term literally means "raft;" this craft was primarily used for transporting bulk cargo (Saltus 1988:48). *Bateau plat* has also been used interchangeably with *radeau*. Surrey, however, noted that the early-eighteenth-century vessel referred to as a *bateau plat* was, "not a 'flatboat' of the type which became common on the Mississippi River in later years." It "had a sharp bow and stern and was of light draft and narrow beam. It was made of several pieces of timber with a broad flat bottom, was larger than a canoe and of greater capacity than the large pirogue" (Surrey 1916:60-61). Due to its early use in Louisiana exploration, this type of historic watercraft is not likely to be discovered during archeological investigations.

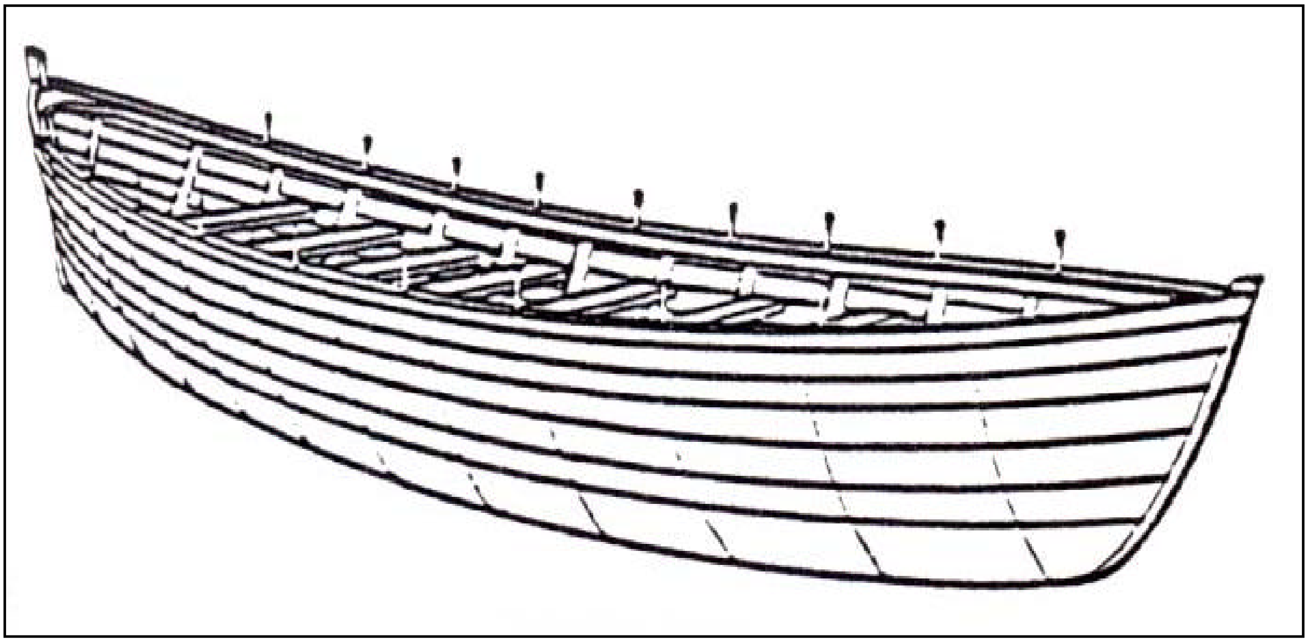

Figure 5. Sketch of a colonial-era bateau (Saltus 1988:45).

Figure 6. Modern bateau exhibiting forward sheer (Comeaux 1985:167).

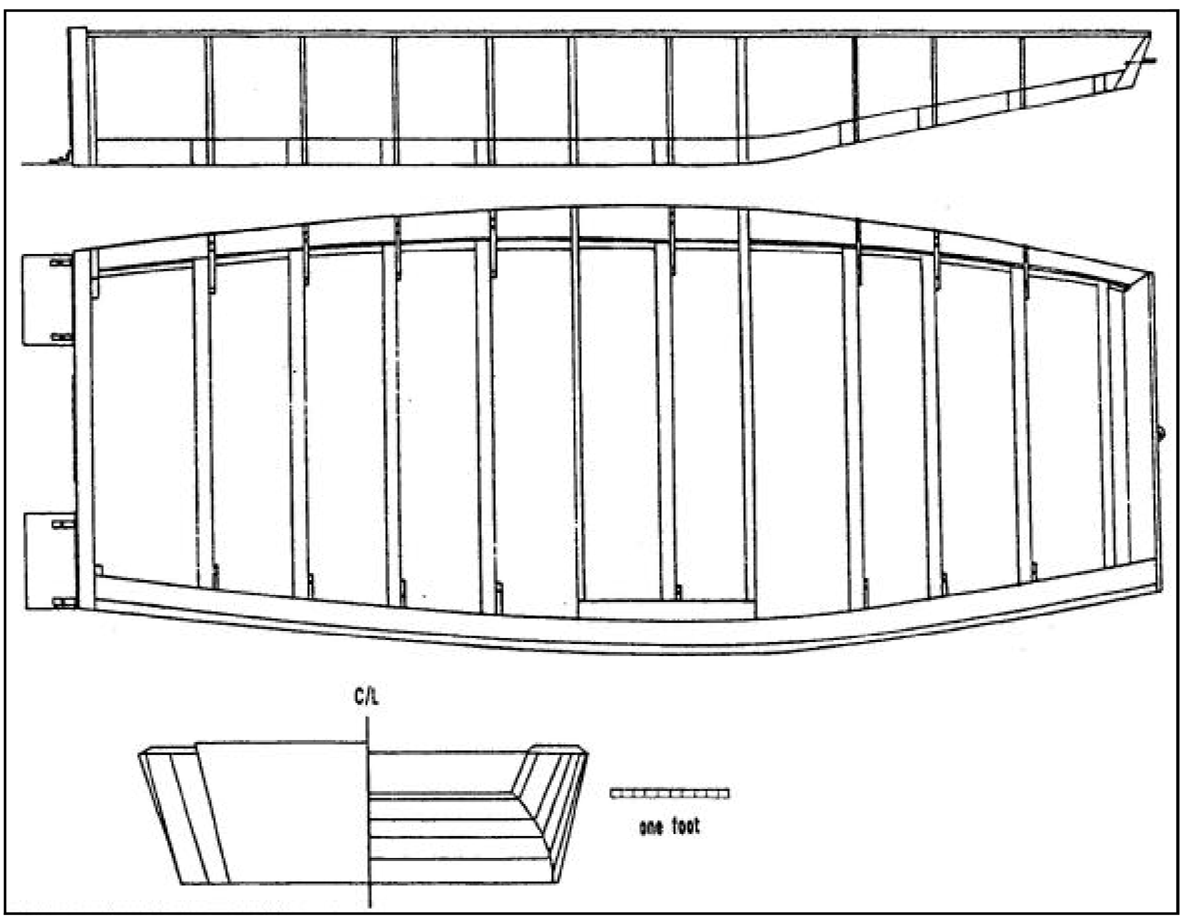

Figure 7. Hull plan of a modern bateaux (Pearson and Saltus 1991:98).

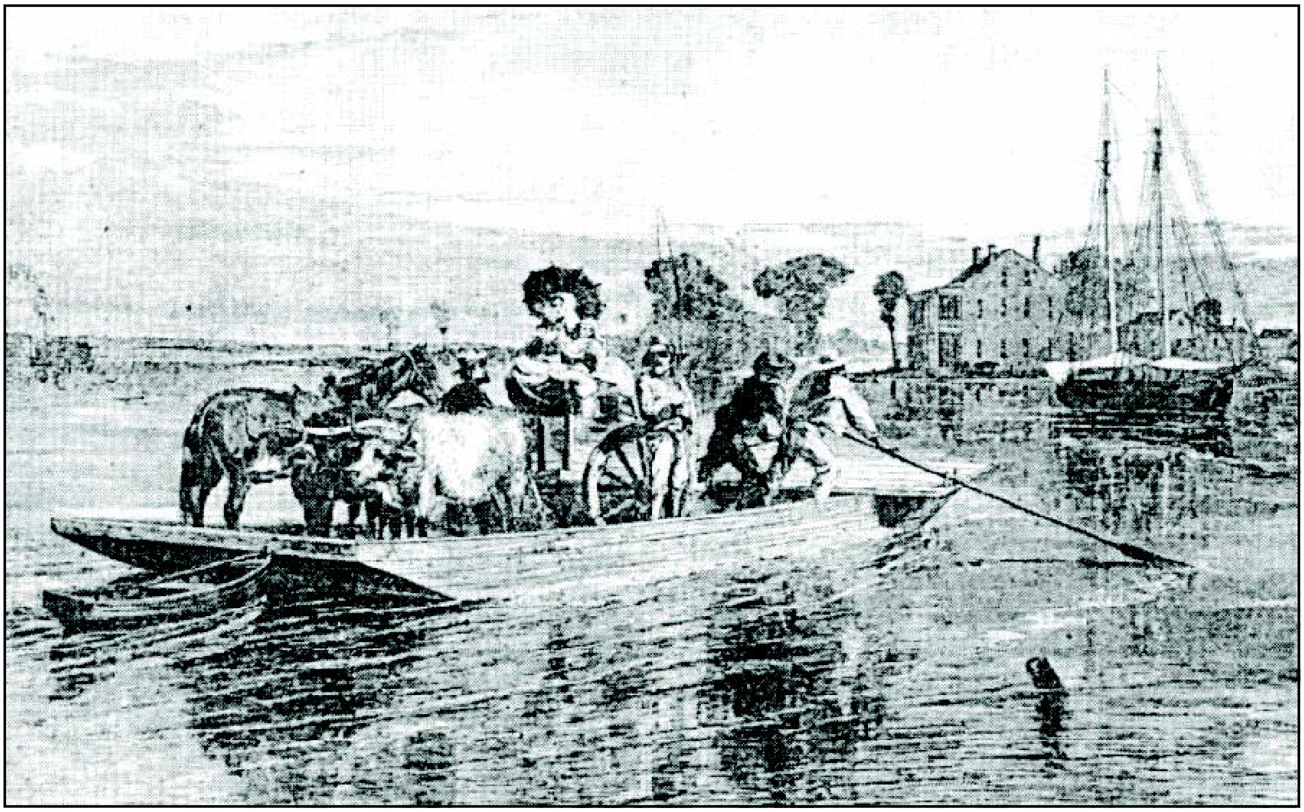

Figure 8. Image of a chaland with skiff in foreground and schooner in background (Birchett et al. 2001:53).

Scow. Saltus described the hull of the scow as a combination of the *chaland* and *radeau*. He quoted Chapelle's (1951, American Small Sailing Craft) description of the scow as "a rectangular box with narrow ends sloping outward from the bottom, usually with shoal upright transoms or end timbers finishing off these sloping ends on top" (Saltus 1988:49). He described its methods of propulsion using poles, paddles, oars, or by following the currents. Used to ferry passengers and cargo across and along waterways, the scow has been documented in the archeological record at site 16LV66 in Springfield, Louisiana (Figure 9) (Saltus 1988:49). Its form is similar to and smaller than the barge. Remains of a scow within the project area are possible if they were quickly buried by sediments and preserved. There is a low to moderate probability of locating a historic scow during archeological surveys within the project area.

Flatboat (Ark, *Bateau Plat*, New Orleans Boat, Ferry, Broadhorns, Coal Barges, Wharf Boats, Quarterboats). Though the term can be loosely applied to any vessel with a flat bottom, the traditionally defined flatboat has an oblong or rectangular shape, blunt bow (also called scow bow) and stern (slightly wider than bow), square chine, flat bottom, and vertical or slightly flared sides (Figure 10) (Comeaux 1985:168). These vessels probably evolved from the early barge form, since barges were commonly referred to as "flatboats," though were typically smaller. Early flatboats and barges shared construction techniques: built upside down, bottom planking oriented across the beam of the vessel rather than longitudinally along its length (Comeaux 1985:168). Also called *bateau plat*, French for "flat boat", early flatboats generally measured 12 to 14 ft. in length with a three ft. beam and were constructed of oak or pine. Later flatboats were constructed longer, up to 100 ft. long and 20 ft. wide (Birchett et al. 2001:52). They were not decked, had flaring sides, a raked bow and stern, did not have cabins, and contained horizontal and elbow braces on the inside for hull strengthening (Pearson et al. 1989:249; Birchett et al. 2001:115). Usually constructed without iron fasteners, wooden pins or treenails were used instead though the vessel was increasingly subject to collapse. Baldwin further described their construction:

> The flatboat was built on sills or gunwales of heavy timbers about six inches thick and was strengthened by sleepers. The gunwales were a foot or two high, and on top of them were mortised studs three inches thick and four to six inches wide. At the top of these studs were fastened the rafters that were to bear the roof. The planks of the floor were about two inches thick, but the siding boards were of ordinary thickness. The bow was raked forward so that it would offer less resistance to the water (Baldwin 1941:48).

Early flatboats were propelled by paddle or oar and were renowned for their stability and maneuverability. The term *chaland* has also been applied to the flatboat, further emphasizing the blurred lines between watercraft "types." Flatboats also drifted downriver with the current to their place of destination where they were eventually sold off and dismantled for wood material and timbers (Birchett et al. 2001:54). After the introduction of the small internal combustion engine at the dawn of the twentieth century, the design of flatboats changed (Figure 11). The overall length of the vessel generally increased, though its beam was not altered significantly. Forward sheer increased dramatically, causing the bow to rise high out of the water. A rudder was introduced along with a transom-mounted motor for propulsion. Modern flatboats, however, are constructed of marine plywood, average 16 ft. in length (shorter than a *bateau*), have a wide bottom, raked bow, stern is broad but not raked, and are powered by an outboard motor allowing the vessels to plane at speed (Comeaux 1985:170; Pearson et al. 1989:249; Birchett et al. 2001:115). The ability to plane above rather than plow through the water at speed gave an immediate advantage to the flatboat over the historic *bateau*, assuring the demise of the early form of *bateau* (Comeaux 1985:170; Pearson et al. 1989:249).

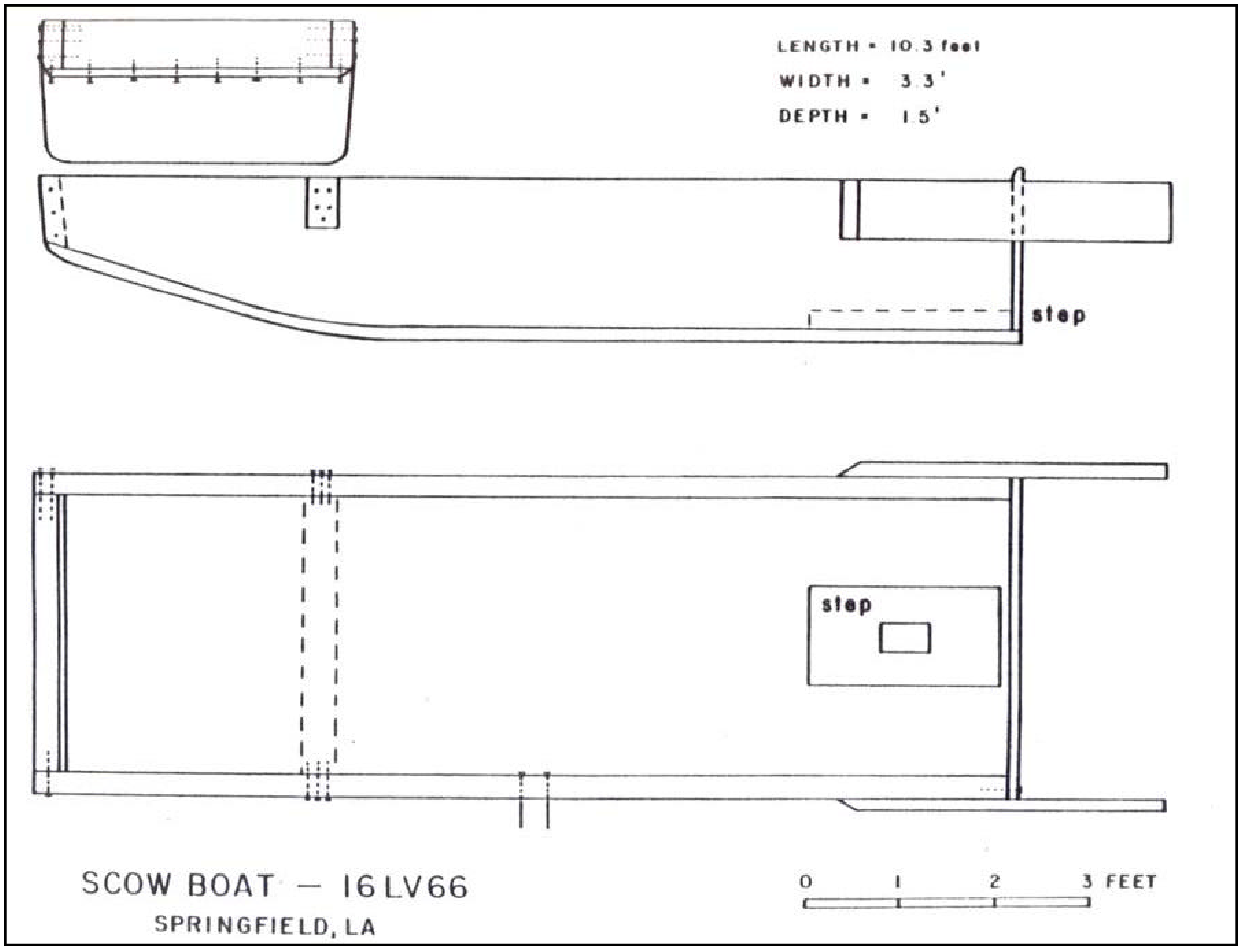

Figure 9. Hull plan of a scow documented at 16LV66 in Springfield, LA (Saltus 1987:72).

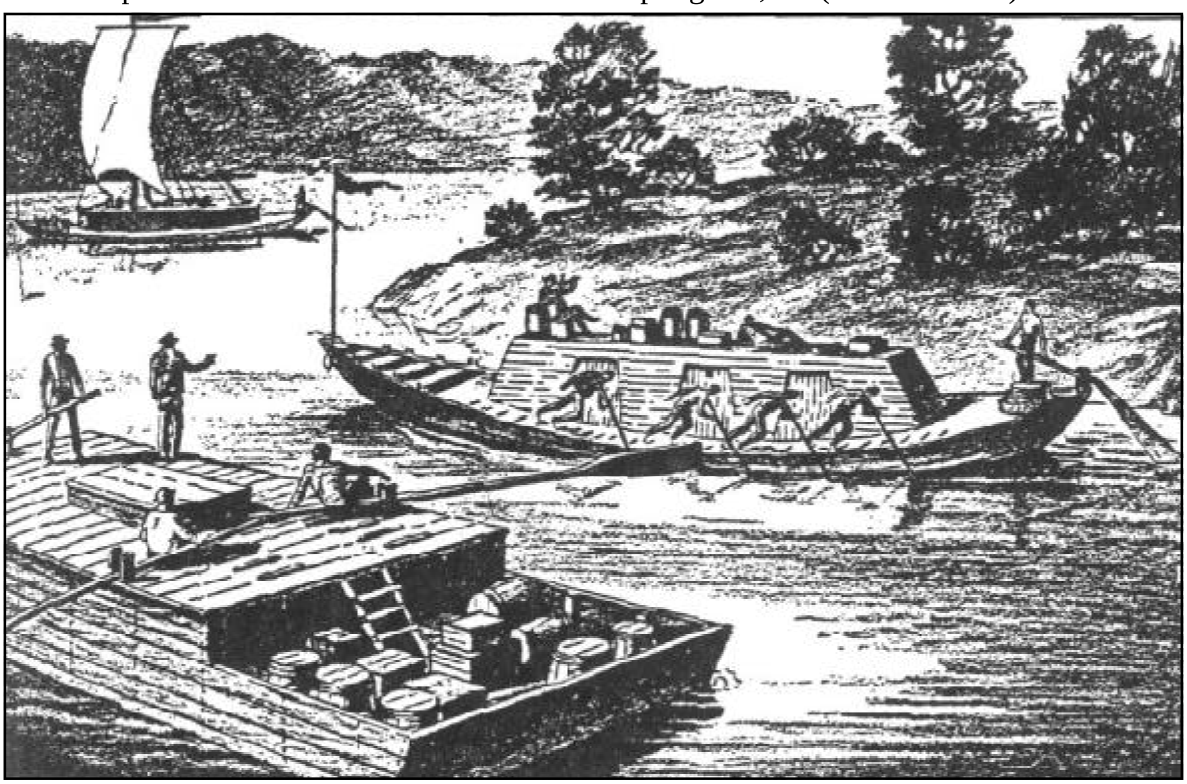

Figure 10. Scene of a flatboat on the river with keelboats in the background (Saltus 1987:52 after Baldwin 1941).

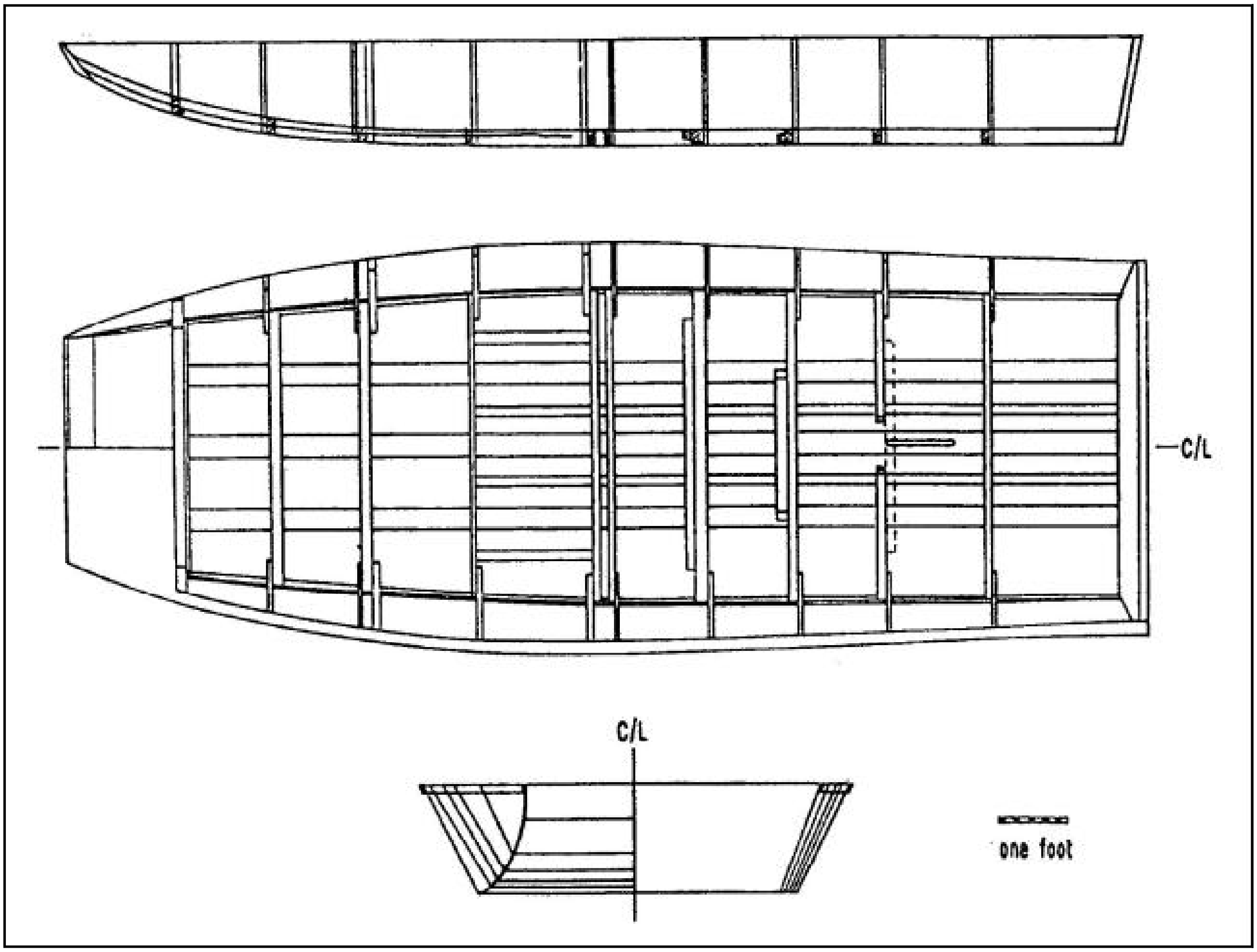

Figure 11. Hull plan of a flatboat (Pearson and Saltus 1991:97).

The dependence upon flatboats for transporting bulk goods implies an abundance of constructed vessels. However, the usual practice of dismantling the early form of flatboat upon reaching the terminus of a major waterway, such as in New Orleans, indicates that if discovered in the archeological record, the vessel may have accidentally foundered while underway or was abandoned. Saltus reported the discovery of a flatboat with a cabin at site 16ST135 on the Tchefuncta River. This vessel was originally interpreted as the deckhouse to a steamboat, but was later identified as a flatboat, measuring 44.2 ft in length, 14.2 ft in beam, and a two ft depth of hold (Saltus 1988:149). He reported that the sides were mortised with tongue and groove planking. Another flatboat, constructed of plywood and coated in fiberglass, was recorded by archeologists at the Adams Place site (Watercraft 2, 16SMY55) on Bayou Shaffer. This flat would have measured 15-7 ft. in length, 6.1 ft. in beam, and 1.5 ft. deep if complete. Evidence for outfitting with a motor was reported by the archeologists, thereby dating this vessel to the early- to mid-twentieth century (Pearson and Saltus 1991:94-97). The probability of discovering a historic flatboat within the project area is moderate. Modern flatboats, however, are abundant within the project area and are likely to be discovered abandoned or lost.

Barge (Decked or Deckless, Also Refers to a Keeled Form). A barge is another type of flat-bottomed vessel and relative of the "flatboat," usually with a boxy appearance, built up sides, square chine, and often towed by steamboat to transport large quantities of materials and supplies (Figure 12) (Saltus 1988:54; Birchett et al. 2001:52). Though early barges were constructed of wood, modern barges are now made of iron and steel. The terms "flatboat" and "barge" have often been used interchangeably, thereby causing confusion when attempting to define vessel types. Some barges were constructed with keels and were fitted with a mast and sail (Pearson 1989:98). Though different in form, keeled barges were constructed for virtually the same purpose as flat-bottomed barges; for transporting quantities of goods and cargo. Large, flat-bottomed barges measured nearly 170 ft in length and had a three-ft draft (Pearson 1989:98). Keeled barges were steered by a rudder and often had a cabin on the rear deck. Barges have been recorded in the archeological record throughout the Maurepas Basin and Lake Pontchartrain's North Shore waterways (Saltus 1987, 1988). One such barge is the deckless barge recorded by Saltus during his 1984-85 investigations in the Blood River (Saltus 1985). This partially exposed wooden vessel measured 61.2 ft long, 18.3 ft wide, and 3.4 ft depth of hold (Saltus 1988:32). Modern barges have dramatically increased in size, to hundreds of ft. in length. These barges are often pushed or pulled by tugboat and transport enormous quantities of cargo. Though barges are prevalant throughout history and modern times, there is a low probability of existence in the archeological record in the project area.

Skiff (*esquiff*). Skiffs are identifiable by their small size, flat bottom, sharp and pointed bow, angular chine, and squared or blunt stern, resembling the traditional rowboat form. Ranging in length between 14 and 25 ft. and rising in popularity in the late-eighteenth and early-nineteenth centuries, skiffs were typically employed to move goods and supplies (Pearson and Saltus 1991:90). The term "skiff", though, is also applied to any small vessel with a pointed bow, hence often a source of confusion. This term has been generally applied to vessel types also identified as "*peniche*," "*chaloupe*," and "*galere*" (Comeaux 1985:166). Skiffs can be divided into three varieties based on the morphology of the stern: the Creole skiff, the Mississippi skiff, and the lake skiff (Figure 13). The Creole skiff is a small vessel with a very narrow beam, greatest sheer and rake at the stern than the other varieties, and a V-shaped transom. The Mississippi skiff is slightly larger with a wider beam, less sheer and rake at the stern than the Creole skiff, and a less pronounced V-shaped transom. The lake skiff is larger and wider than the other two varieties, with a wide and nearly rectangular transom. Comeaux stated that each variety evolved to effectively operate in particular environments (Comeaux 1985:166). The Creole skiff is typically operated in inland waters as it is the least stable of the three but is the easiest to row. The Mississippi skiff operates in either inland waters or the rougher coastal lakes and bays or larger rivers and is more stable than the Creole skiff. The lake skiff is reportedly the most stable, is seaworthy, and has the heaviest cargo carrying capacity. It is operated specifically in the

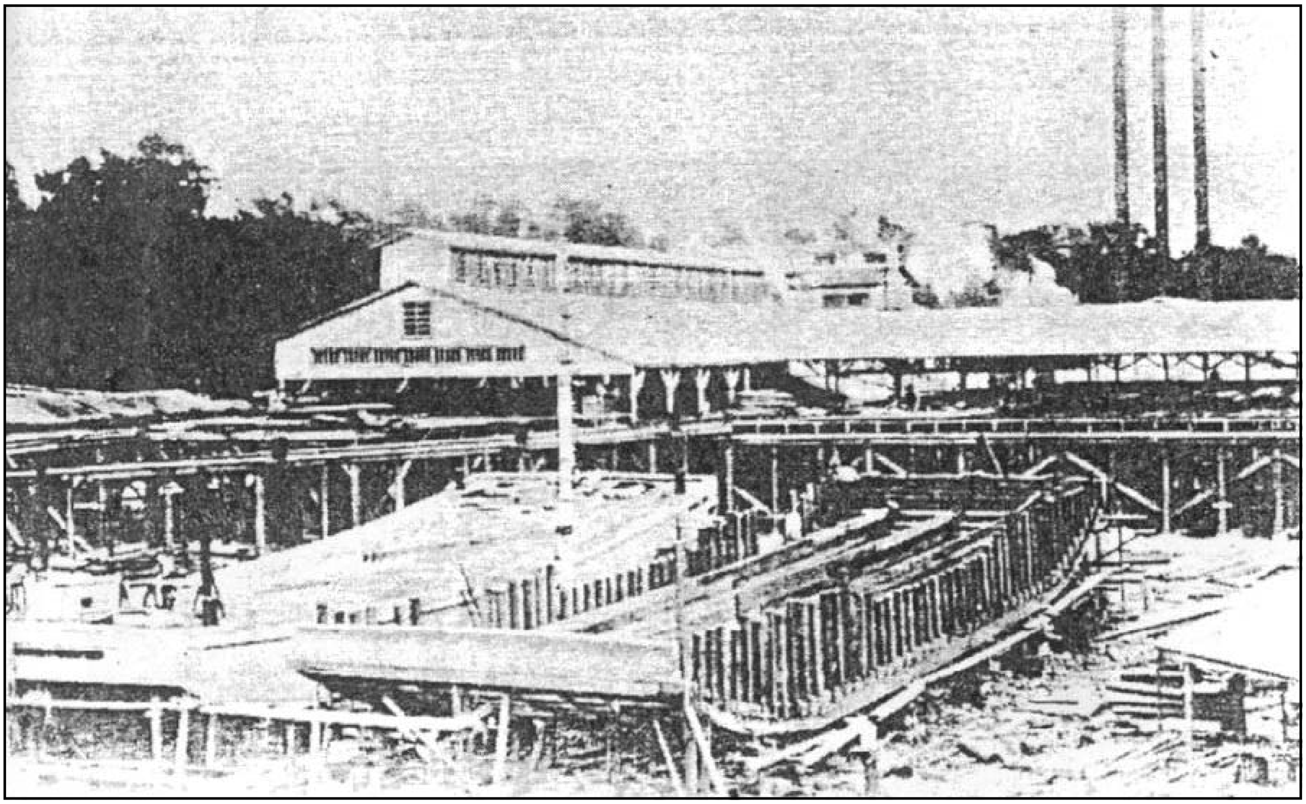

Figure 12. Early twentieth century photograph of barges during construction (Saltus 1988:152).

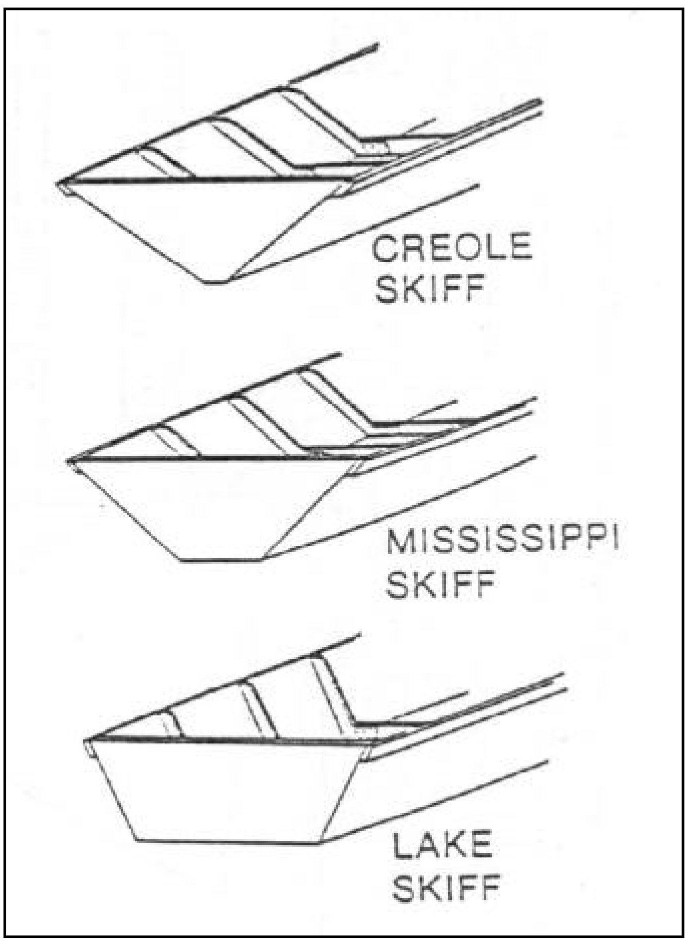

Figure 13. Sketch of the different stern morphologies of the skiff (Saltus 1988:57).

coastal waters or the larger rivers. Skiffs are typically rowed and the use of a *joug* allows the rower to stand as the tholepins and straps are elevated and extended out past the gunwales (Figure 14). The *joug* is typically used on the Creole skiff but can appear on any variety of craft. Skiffs could also be propelled by sail or by cordelling, a method of pulling the boat along with two ropes stationed on shore.

Later forms of skiffs bear some resemblance to the traditional rowed skiff. The implementation of outboard motors for propulsion allowed skiffs to travel faster. These later skiffs with outboard motors evolved into two varieties as well: the Lafitte skiff and the Atchafalaya skiff (Figure 15). Lafitte skiffs were designed to operate with inboard engines in shallow waters along the Gulf coast and plane on the water when underway (Figure 16 and 17). Comeaux described them as "sleek craft" widely used in the shrimping industry (Comeaux 1985:168). The Atchafalaya skiff developed in the Atchafalaya Basin, hence its designation, to operate in the swamps and bayous of the Basin. This craft utilizes an outboard motor and is designed to plane on the water when under power. The pointed bow with little rake allows it to cruise over thick aquatic vegetation. There is no rake between the gunwales and the stern, and the broad bottom extends back from the center of the vessel. Due to the lack of sheer on the gunwales, this type of later skiff is easy to construct. The term "*canotte*" is applied to larger skiffs with an inboard engine and often with a cabin and decking (Comeaux 1985:168; Pearson et al. 1989:249). *Canottes* are very similar in form to the small lugger, which will be described later. As the popularity of pirogues waned, skiffs rose to prominence (Birchett et al. 2001:52).

Historic and modern skiffs have been recorded by archaeologists in the Tchefuncta River and Blood River (Saltus 1988). Skiffs in the Atchafalaya Basin recorded by archeologists include a small cypress skiff (16SMY61) and a motorized Lafitte skiff at the Adams Place site (Watercraft 1 at 16SMY55) on Bayou Shaffer. The flat-bottomed cypress skiff was located onshore and measured 18 ft. 10 in. long with a 4 ft. 8 in. beam and 11½ in. depth of hold (Pearson and Saltus 1991:88). The Lafitte skiff lay partially exposed alongside dock pilings and measured 28.6 ft. long with a 9.5 ft. beam and 3.4 ft. depth of hold (Pearson and Saltus 1991:92). The cypress skiff exemplified a variety popular between 1910 and 1940, while the Lafitte skiff, with the use of cypress and plywood in its construction, likely dated to the early- to mid-twentieth century (Pearson and Saltus 1991:91-94). Their historic prevalence and use to this day by residents throughout the southwester Louisiana implies a moderate probability of discovery within the project area.

Yawl (Riverine Type, General Term also Applied to "Skiffs"). Yawl is a term applied to a small boat that served as a service boat for large, ocean-going sailing ships, though the term has been applied to skiffs as well. The riverine version of the yawl is flat-bottomed, with an angular chine, constructed of oak or yellow pine, and fastened with iron fasteners (Saltus 1988:56). Often used as a lifeboat or service boat for steamboats, the yawl had a pointed bow, wide bottom, wide in the gunwales, and had a large, squared stern to carry line ashore or to steamboats (Saltus 1988:56). Not to be confused with the keeled type of yawl that serviced larger ships, the river yawl is typically propelled by oars (Saltus 1987:83). This vessel, used typically as a service boat for steamboats, has a low probability of discovery within the project area.

Keelboats

Keelboat is a general term used to describe vessels constructed with a bottom keel and designed for travel on rivers. The keel, used not only for longitudinal strengthening of the hull, prevented the bottom of the hull from damage when striking a sub-merged snag or shallow shoal (Pearson et al. 1989:98). Pearson et al. defined two types of keelboat: keelboats proper and barges (the keeled variety) (1989:98). The term keelboat also refers to a specific form of craft described below.

Figure 14. Photograph of a skiff with *jougs* (Comeaux 1985:165).

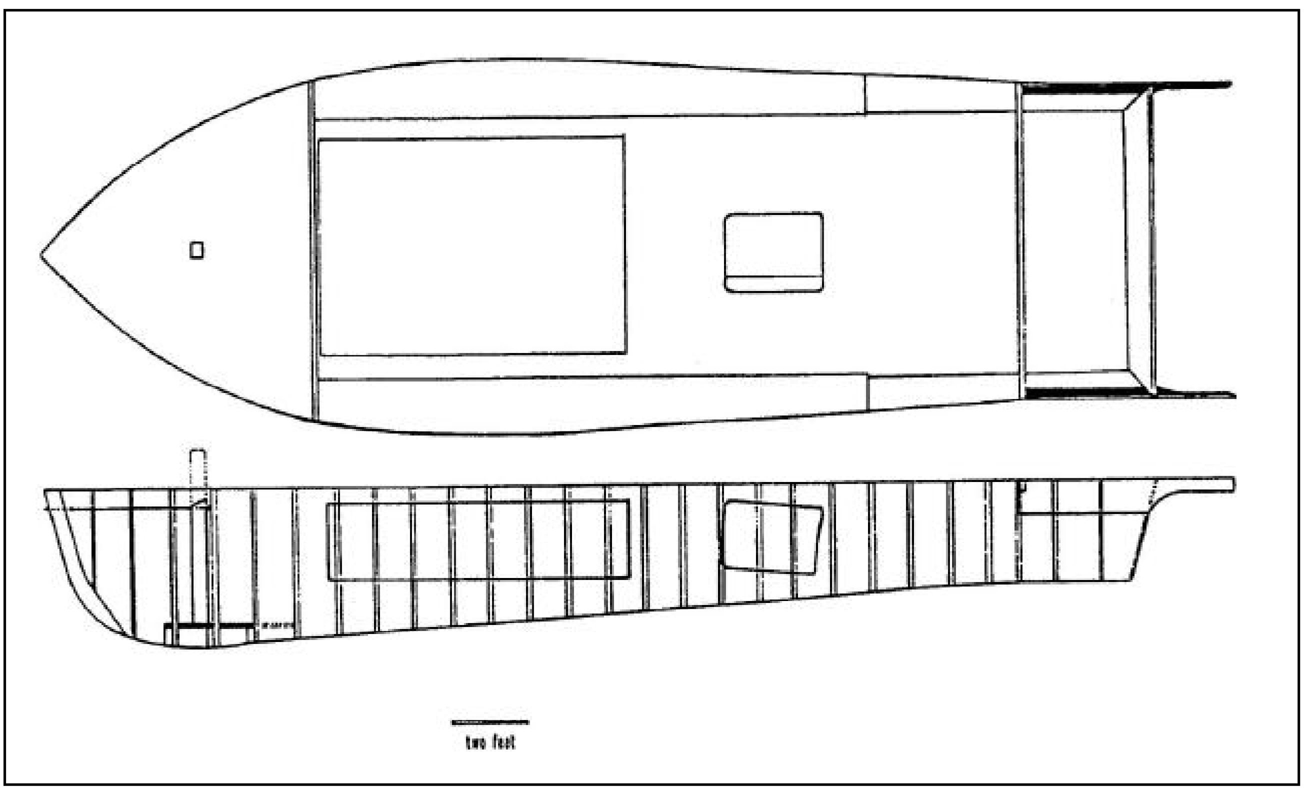

Figure 15. Hull plan of a Lafitte skiff (Pearson and Saltus 1991:95).

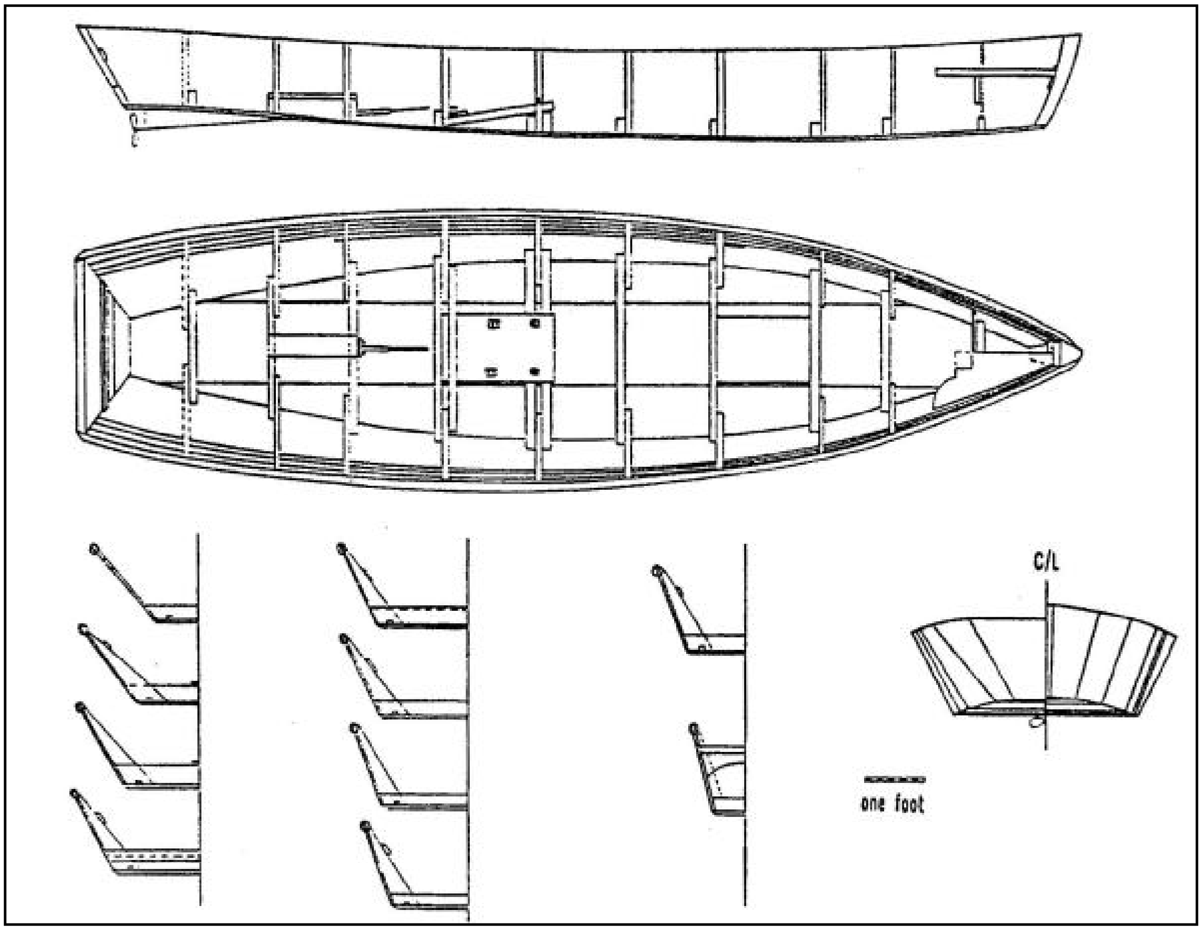

Figure 16. Hull plan of a modern motorized skiff (Birchett et al. 2001:116).

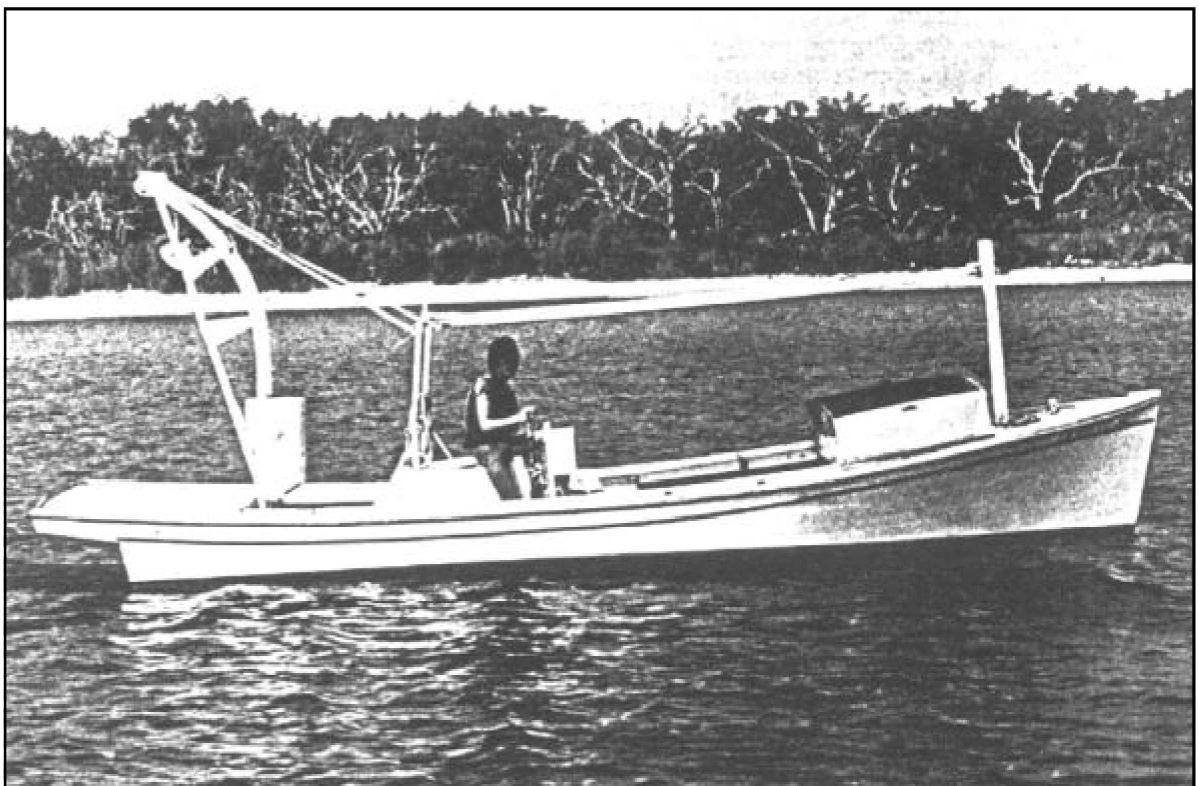
Figure 17. Photograph of a motorized Lafitte skiff (Comeaux 1985:165).

Keelboat (Bercha, Berge, Barge, Berchita). The term "keelboat" also refers to a specific type of vessel with a keeled and rounded bottom. This form was double-ended with a pointed bow and stern, shallow keel, and a 12- to 18-in. cleated footway constructed around the gunwales (see Figure 10) (Birchett 2001:53). They measured 40 to 80 ft long, seven to ten ft wide, a three to four ft depth of hold, and a draft of two ft when fully loaded (Pearson et al. 1989:98). Some had seats for four to twelve rowers while others were fitted with sailing rigs. The keelboat could have a cabin or cargo box in the middle (Pearson et al. 1989:98). "Sweeps," or oars, located on either side provided a means of propulsion and a sweep at the stern served as a rudder (Birchett et al. 2001:54). Keelboats were also propelled by poling or cordelling upstream and then drifting downstream with the current. The typical keelboat could transport between 15 and 50 tons of cargo (Birchett et al. 2001:53-54). Keelboats rose to prominence in the late-eighteenth and early-nineteenth centuries and were subsequently replaced by the steamboat in the mid-nineteenth century (Birchett et al. 2001:54). They continued in use after the mid-nineteenth century by those operating in the narrow and shallow bayous and inland rivers where many steamboats could not enter (Birchett et al. 2001:54). The probability of locating a historic keelboat in the project area is moderate to low.

Longboat (*Bateau Plat, Chaloup*). Saltus described the longboat as "deep, with broad bows and a wide belly; it was double-banked, occasionally decked, and fitted with mast and sails" (Figure 18) (Saltus 1987:58). Steered with a rudder and typically fitted with a davit for lifting anchors, the longboat usually served as a ship's boat during the early European explorations until it was gradually replaced by the launch toward the end of the eighteenth century (Saltus 1988:73). The longboat typically exhibited lengths between 19 and 36 ft but also needed a wide beam to ensure stability while maneuvering in coastal or bay waters to service the much larger sailing vessel (Saltus 1988:77). This form of watercraft has also been described as *bateau plat* or *chaloup* (Saltus 1988:77), which indicate other forms of vessels as well, lending to the general versatility of vernacular nomenclature. The probability of discovering a historic longboat in the archeological record within the project area is low due to its general use as a ship's boat assisting larger, ocean-going vessels 1 and its steady decline in use before the nineteenth century.

Launch (*Chaloup* in French, *Lancha* in Spanish). The launch, typically measuring 19 to 26 ft in length, also served as a ship's boat and increasingly usurped the longboat in popularity toward the end of the eighteenth century. The launch was smaller than the *lanchon*, or keeled form of barge, and wider with a relatively flat bottom (Figure 19) (Saltus 1988:73). This vessel was typically used to transport cargo or small parties of crew to and from an anchored ship. Its rise in prevalence was due to its proportionally larger size yet shallower draft compared to the longboat. Though it was apparently not as adept a small sailing vessel as the longboat, the launch was typically propelled by rowing (Saltus 1988:73). Several launches, though of more modern forms, have been recorded by Saltus in the Maurepas Basin (Saltus 1985). The rise in popularity of this vessel over its predecessor, the longboat, into the nineteenth century during increasing population growth within the Morgan City area implies a higher probability of discovery than the longboat. The probability of locating a historic launch within the project area is low due to its general use as a ship's boat associated with larger sailing vessels.

***Chaloup* (Shallop, Longboat; Any Small Ship's Boat to a Vessel of 60 Tons).** The term *chaloup* has been used interchangeably to describe vessels operating as ship's boats to larger sailing vessels of up to 60 tons burden (Pearson et al. 1989:93). The term, when applied to the vessel larger than the launch or longboat, indicates a vessel length typically between 27 and 29 ft (in the eighteenth century), or 27 to 34 ft (in the nineteenth century), and closer in hull appearance to the pinnace or yawl (Figure 19) (Saltus 1988:80). Though used by early-eighteenth-century explorers and settlers, the *chaloup* was more adept in deep water and open ocean than narrow and shallow rivers and bayous. The typical form had a round and deep hull well suited for bay and ocean use but the shallow rivers and inland waters caused the hull to drag

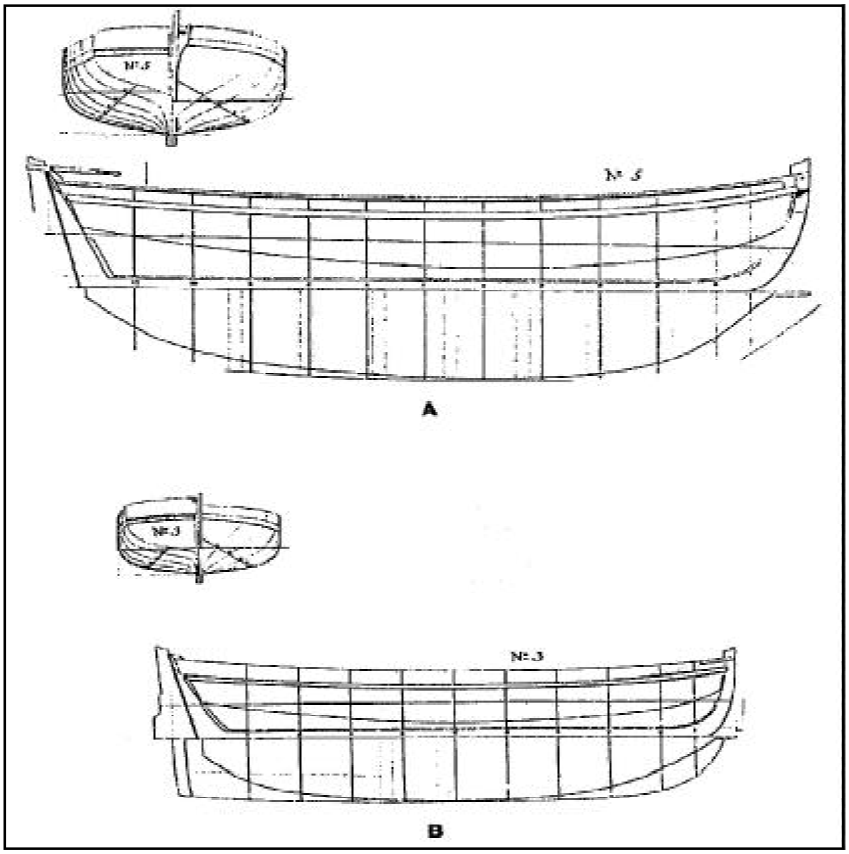

Figure 18. Hull plans of a longboat (top) and a launch (bottom) (Pearson et al. 1989:87 after Chapman 1967 [1768]:Plate XLVIII).

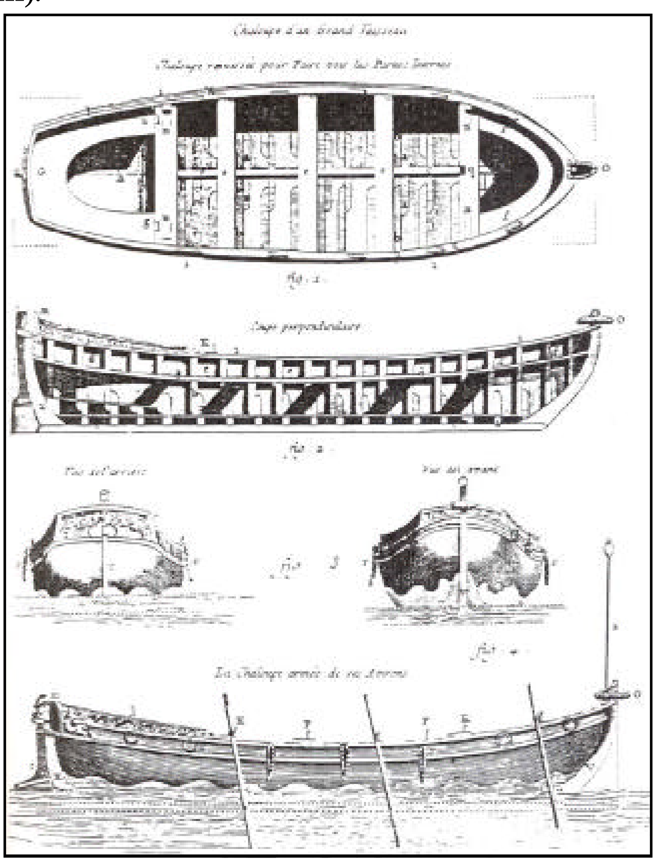

Figure 19. Hull plan of a chaloupe (Saltus 1988:81).

along the bottom and create greater resistance in a current (Pearson et al. 1989:93). The *chaloup* could be rowed or sailed. No known archeological examples of a *chaloup* have been recorded to date. The probability of discovering a historic *chaloup* in the archeological record of the project area is low.

***Felouque* (*Felucca* in Spanish).** The *felouque* was a keeled boat with a flat-bottom and shallow draft (Saltus 1987:41). This vessel type was often employed as a ship's boat, like the longboat and launch, but had a different form (Figure 20). Wider than a barge, the *felouque* was typically rowed but could be sailed (Saltus 1987:41). When fitted with its lateen sails and oars, it resembled the *chaloup* but was designed in such a way to allow placement of the helm at either bow or stern (Saltus 1987:43). Appearing as early as the eighteenth century, the *felouque* endured until the early-nineteenth century but did not become as popular as the longboat or launch (Saltus 1987:43). A nineteenth-century example, enrolled in New Orleans, measured 33 ft long, nine ft and seven in. wide, three ft deep, with two masts, one deck, a square stern and a plain head (Saltus 1988:85). No known archeological examples of a *felouque* have been re-corded to date. The early appearance of this vessel form and its lack of popularity imply a low probability of discovery within the project area.

Barge (*Bercha*, *Lanchon*, Wherry; the Keeled Variety is Different from the Flatboat Form). Constructed similar to the keelboat but wider, barges were constructed with a keel and hull planking fastened to frames. Not to be confused with the flat-bottomed variety of barge, the keeled barge appeared similar to the double-ended keelboat though is longer, wider, and heavier (Figure 21) (Pearson et al. 1989:98). They were constructed of lengths up to 170 ft and drew approximately three ft of water though they averaged 32 to 57 ft in length in the eighteenth century and 46 to 125 ft in the nineteenth century (Pearson et al. 1989:98; Saltus 1988:65). Saltus reported that the overall length of barges steadily diminished in the nineteenth century: "1833-1841 length ranged from 52 to 125 ft long, 1841-1849 length ranged from 45 to 87 feet long, and 1850-1860 length ranged from 52 to 70 feet long" (Saltus 1988:71). The *lanchon* was reportedly much larger than a keelboat, averaged 12 to 20 ft in beam, retained a crew of fifteen or more, and had a cargo capacity of 30 to 40 tons (Saltus 1988:65). The keeled barge was fitted with a mast and square sails for propulsion and rudder for maneuverability. Poling or cordelling were also used for upstream travel. Often, a small cabin was constructed on the rear deck. The cargo capacity of the larger barges was typically between 50 and 150 tons (Saltus 1988:65). Much of the confusion arising when describing the keeled form versus the flat-bottomed, rectangular form was summed up by Saltus, "The barge is one of the most interesting and most misunderstood of riverine craft. Part of the confusion stems from the pervasive notion of the modern square scow river barge…The barge was similar in construction to a keelboat, but was intended for use on the larger main trunk routes of the river" (Saltus 1988:65). The barge, both keeled and flat-bottomed varieties, was used primarily for transporting cargo and supplies but appeared in two dramatically different forms. The term barge is often applied to other similar appearing vessels of both keeled and flat-bottomed varieties, thereby causing additional confusion. The keeled barge was commonly used throughout the eighteenth and nineteenth centuries, therefore, there is a low probability of discovering a historic barge within the project area.

Pinnace. The early pinnace was very similar to the contemporaneous *chaloup* (shallop) of the eighteenth century (see above *chaloup* description) though it was longer than a chaloup and included a deck (Figure 22) (Saltus 1988:83). The pinnace is a small sailing craft that also contains oars for rowing. This vessel type served a much larger man-o-war ship and steadily increased in size over time (Saltus 1988:83). No known archeological examples of a historic pinnace exist to date. There is a low probability of discovering this vessel type in the archeological record within the project area.

Yawl. The small sailing yawl, not to be confused with the term applied to small, flat-bottomed riverine craft also called skiffs, appeared similar in hull to the pinnace, yet was narrow

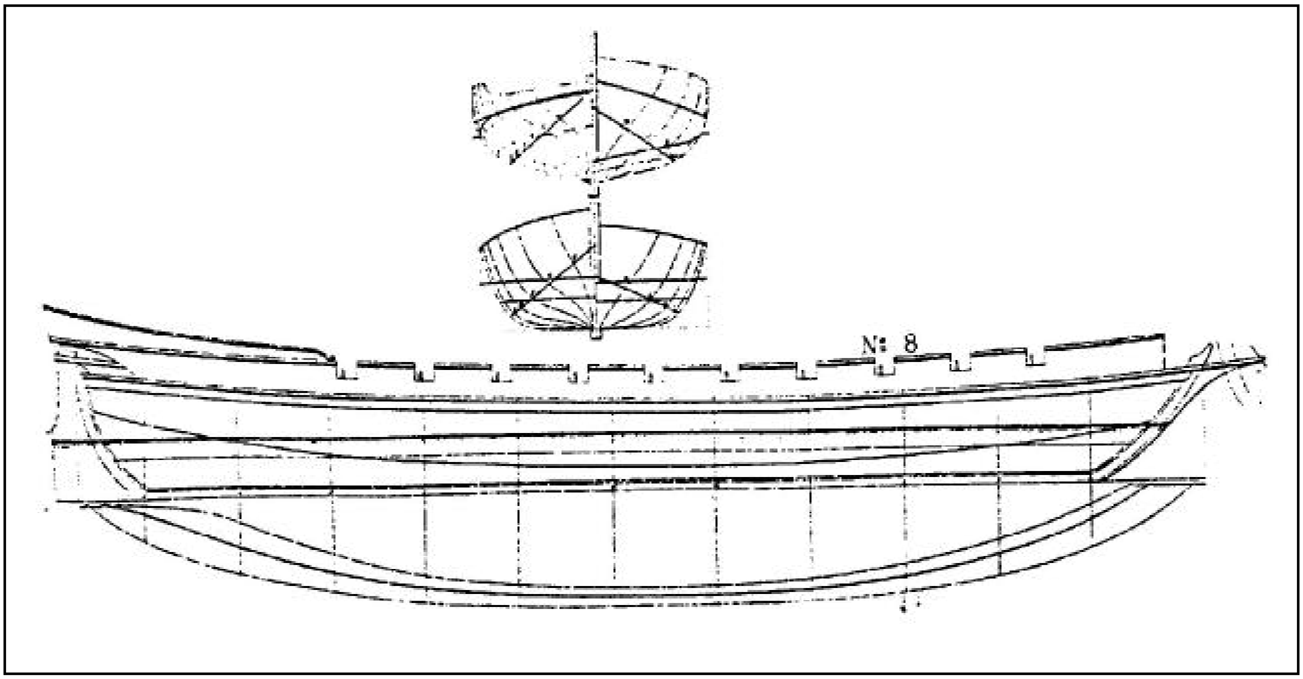

Figure 20. Hull plan of a felouque (Pearson et al. 1989:86 after Chapman 1967 [1768]:Plate LX).

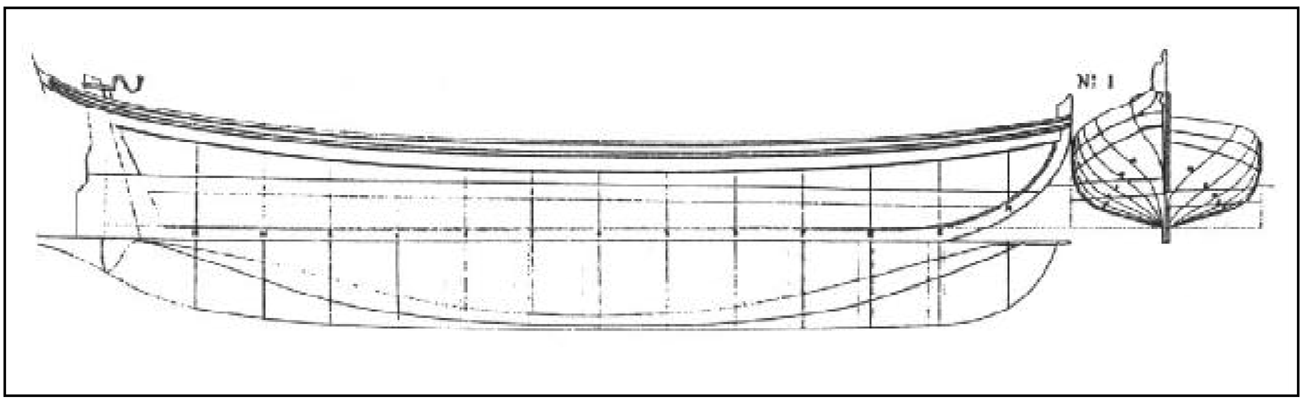

Figure 21. Hull plan of an early keeled barge (Saltus 1987:31).

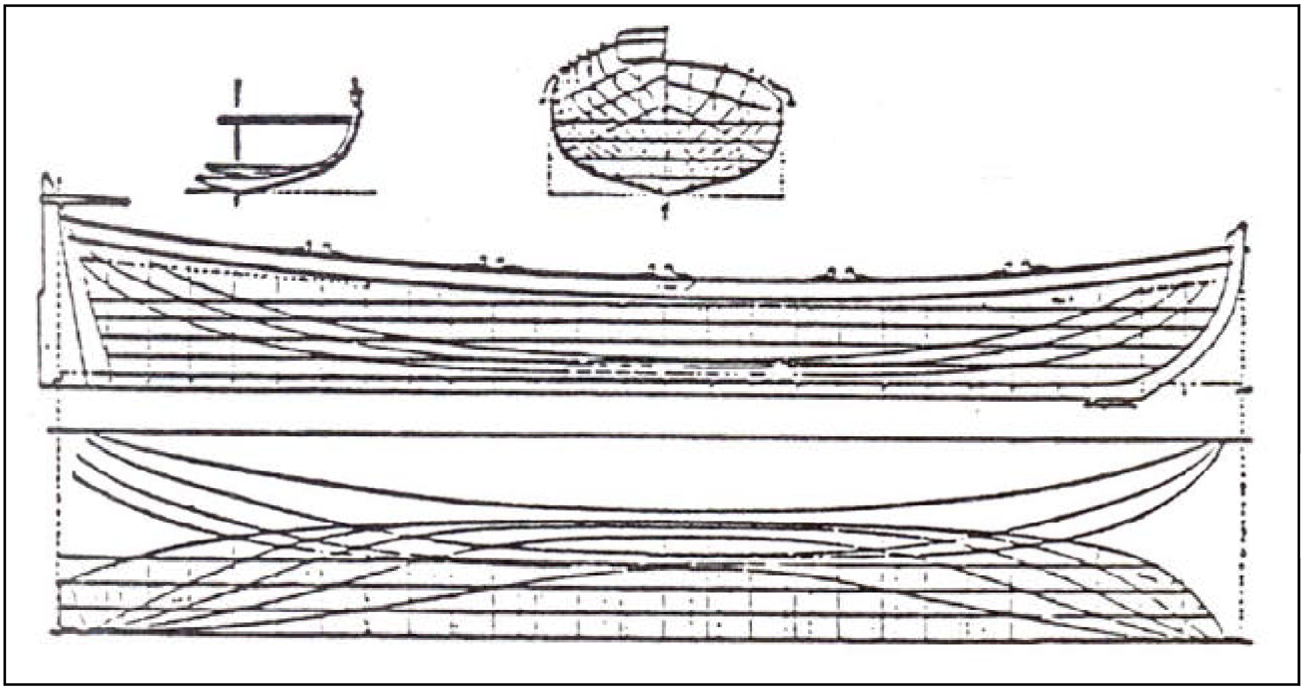

Figure 22. Hull plan of a pinnace (Saltus 1988:84 after Chapelle 1951).

and carried a smaller complement of oars (Saltus 1988:83). The yawl, often used as a pilot boat, appeared as early as the eighteenth century, measuring 11 to 26 ft in length. By the early-twentieth century, the sailing yawl appeared in lengths between 26 and 60 ft (Saltus 1988:83). No known archeological examples of a historic sailing yawl exist to date. There is a low probability of discovering this vessel type in the archeological record within the project area.

Sailing Vessels

Sailing vessels include those craft designed for sailing in open ocean and deep waters. Exhibiting similar hull construction techniques and overall form, sailing vessels were often classified by size but could be designated by diverse names according to variations within hull forms and sail configuration. Large sailing ships generally appear as sturdy vessels with heavy construction, a large and durable keel, use of floor timbers and futtocks to form the hull, keelson atop the floors and keel, longitudinal stringers for hull strengthening, deep draft and depth of hold, single or multiple decks, greater angle of deadrise than flat-bottomed vessels for stability at sea, inward curvature of the upper hull sides above its maximum beam called tumblehome to increase stability, and a complex stern and transom built to articulate with a large rudder system for steering (Steffy 1994). With more extensive masting, rigging, and sail configuration, and deeper drafts than riverine craft, these vessels were typically larger than the small sailing craft utilized in the shallow coastal waters and narrow rivers and bayous of southern Louisiana. Sailing vessels were used by the earliest French and Spanish explorers for Trans-Atlantic crossing, for cargo transport and military use through the era of the steamship, and into modern times as pleasure craft. Versatile sailing craft, such as the schooner or sloop, appeared in various sizes from small to large and could sail the waters of the coastal lakes. Sailing vessels were often serviced by ship's boats of various types, described above, to transport cargo or personnel from the larger ship to shore.

The reported loss of larger sailing vessels, especially those military warships or merchantmen, occurred far more frequently than reported losses of vernacular-constructed craft, if they occurred at all. Access to historical documents of vessel losses greatly assist the archaeologist in identifying locations of known wrecking events and any subsequent activities that may have impacted a wreck, such as dredging or obstruction removal. These sources include the WPA's 1937-38 *Wreck Reports: A Record of Casualties to Persons and Vessels on the Mississippi River, its Tributaries, on Lakes and other Waterways of the U.S. Customs District Port of New Orleans 1873-1924,* and the *Navigation Casualties: 1866-1910, On the Mississippi, Red, Ouachita, Yazoo, Pearl, Alabama, Apalachicola, Coosa, Sabine, Teche, Atchafalaya; and other rivers in Louisiana, Texas, Florida, Mississippi, and Alabama, including those of the 10th district*. Sailing vessel types are described according to the forms that are known to have been utilized within Southern Louisiana, the Gulf of Mexico, and the coastal waterways.

Frigate. The early-eighteenth-century explorers utilized a vessel known as a frigate, a larger vessel designed for sailing in the open ocean. This vessel type was typically three-masted and ship-rigged. Ship-rigged is a term describing the sail configuration employing square sails on the main and fore masts with lateen or gaff-rigged sails on the mizzen mast and square topsails (Pearson et al. 1989:81). Iberville brought several "frigates" with him from France during his 1699-1700 explorations of Louisiana, including *Le Badine*, a 32-gun royal frigate, *Le Marin*, a 38-gun frigate with a 130 man crew, (and) the Francois, a 58-gun frigate" and several smaller sailing ships (Pearson et al. 1989:81). Pearson et al. stated that the term "frigate" was also applied to vessels with a single gun deck, which would have included merchantmen as well as warships (Pearson et al. 1989:81). One example of a frigate is included in Chapman's 1768 work that depicts a ship-rigged, frigate-built ship measuring 136 ft long, 36 ft in beam, 19 ft in draft, and 761 tons burden (Figure 23) (Chapman 1768:Plate III; Pearson et al. 1989:81). Later eighteenth and nineteenth-century frigates were typically very large sailing vessels with multiple gun

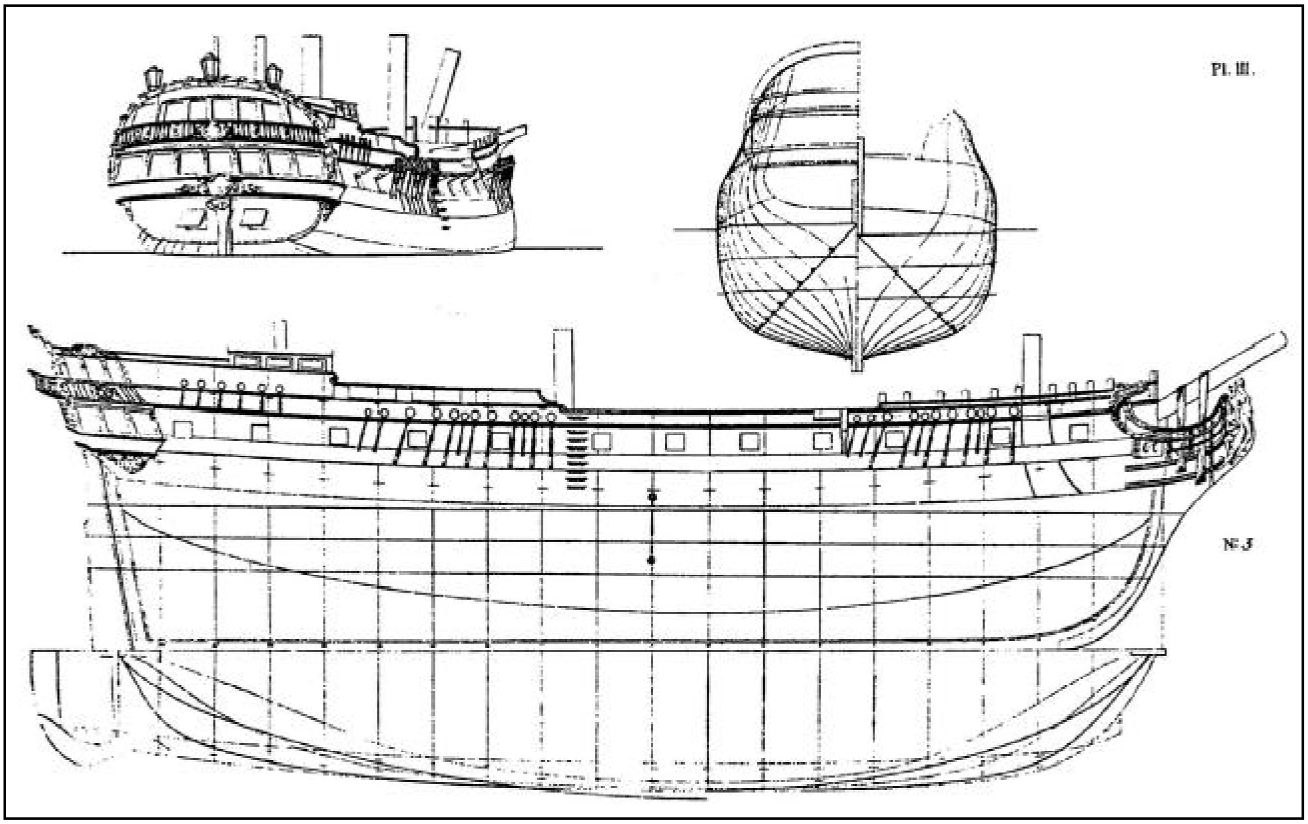

Figure 23. Hull plan of a frigate (Pearson et al. 1989:82 after Chapman 1967 [1768]:Plate III).

decks and elaborate sail configurations. U.S.S. *Constitution* is an example of a large frigate built as a warship during the American Revolution. This form of frigate was certainly larger than the early-eighteenth-century variety. No examples of historic frigates have been documented in the archeological record within the project area. There is a low probability of locating frigates within the project area.

Schooner (*Goelette* in French, *Goleta* in Spanish). The schooner is typically "a sharp-built vessel, with two masts of considerable length and rake, with small top mast, and fore and aft sails (Figure 24). A schooner carries a square fore top sail and top gallant sail" (Brande 1856 quoted in Saltus 1988:89). Its versatility allowed the schooner to operate in the open ocean, shallow bay waters, rivers, or inland lakes of southern Louisiana. Nineteenth-century schooners throughout coastal Louisiana typically measured 28 to 87 ft in length, while twentieth-century versions measured 46 to 74 ft in length (Saltus 1988:89). The schooner is a type of sailing vessel whose name refers to its sail configuration. Schooners can be further divided and specified according to type of rigging, function, or region of use. Originally rigged with square topsails, early schooners were referred to as topsail schooners. Later schooners were referred to as fore-and-aft schooners due to their rigging with Bermuda sails aligned fore and aft rather than squared to the masts (Saltus 1987:68). This variety was further divided into two, three, and four-masted schooners. When defined by their function, schooner types included: pilot schooners, trading schooners, fishing schooners, and packet schooners. Those defined by hull form included: scow schooners, barge schooners, pungy schooners, file bottom schooners, and ram schooners (Saltus 1988:90). Centerboard schooners contained a centerboard that was placed either through or alongside the keel, which dropped through the bottom of the hull and allowed the vessel to sail faster, steer easier, and tack closer to the wind (Barkhausen 1990:34). Schooners defined by region of use included: Chesapeake Bay schooners, Great Lakes schooners, and Coastal schooners (Saltus 1987:68). Saltus argued that, "the diagnostic attribute is the vessel's shallow draft and wide beam, dictated by the environment, depth, and functional need" (Saltus 1988:90). Further elaborating the variability in schooner size, a two-masted schooner had a typical size range of 23.6 to 88 ft in length, 10 to 24.5 ft in beam, and 2.5 to 9.4 ft in depth of hold (Saltus 1988:90). There is a low probability of discovering a historic schooner within the project area.

Sloop (Catboat). The sloop, another versatile sailing craft, can be defined as "a vessel with one mast like a cutter; but having a jib stay, which a cutter has not. Also the general name of ships of war below the size of frigates" (Brande 1856 quoted in Saltus 1987:71). Like the schooner, sloop also refers to sail configuration (Figure 25). Other varieties of the sloop include the sloop-of-war, ship-sloop, brig-sloop, and corvette (Saltus 1988:92; Blackburn 1978). Sloops were also capable of sailing in various environments including the narrow inland rivers and the open ocean. Their variability of size included typical ranges of 30 to 77 ft in length, 11 to 19.67 ft in beam, and 2.9 to 6.42 ft in depth of hold (Saltus 1988:92). Coastal Environments, Inc., recorded a historic sloop or schooner in Bayou Shaffer (Pearson and Saltus 1991). Site 16SMY61, however is not located within the project area. There is a low probability of discovering a historic sloop within the project area.

Lugger. The lugger is a widely used sailing or motorized vessel, popularized in the nineteenth century, likely adapted from a type of sailing vessel native to the Mediterranean. Chapelle argued that the lugger was adapted from the keel yawl-boats but added a centerboard (Chapelle 1951). He also added:

> The construction of the boats was conventional: sawn frames, carvel planking, and the usual plank keel of the centerboarder. The timbering and plank were often local longleaf pine and cypress. The boats usually had a long and well-formed run and trimmed by the stern, which reduced the bluntness of the rather full bow. These luggers sailed very fast, were powerful boats, and were reputed very close-winded. The deck arrangement was almost standardized: there was a large U-

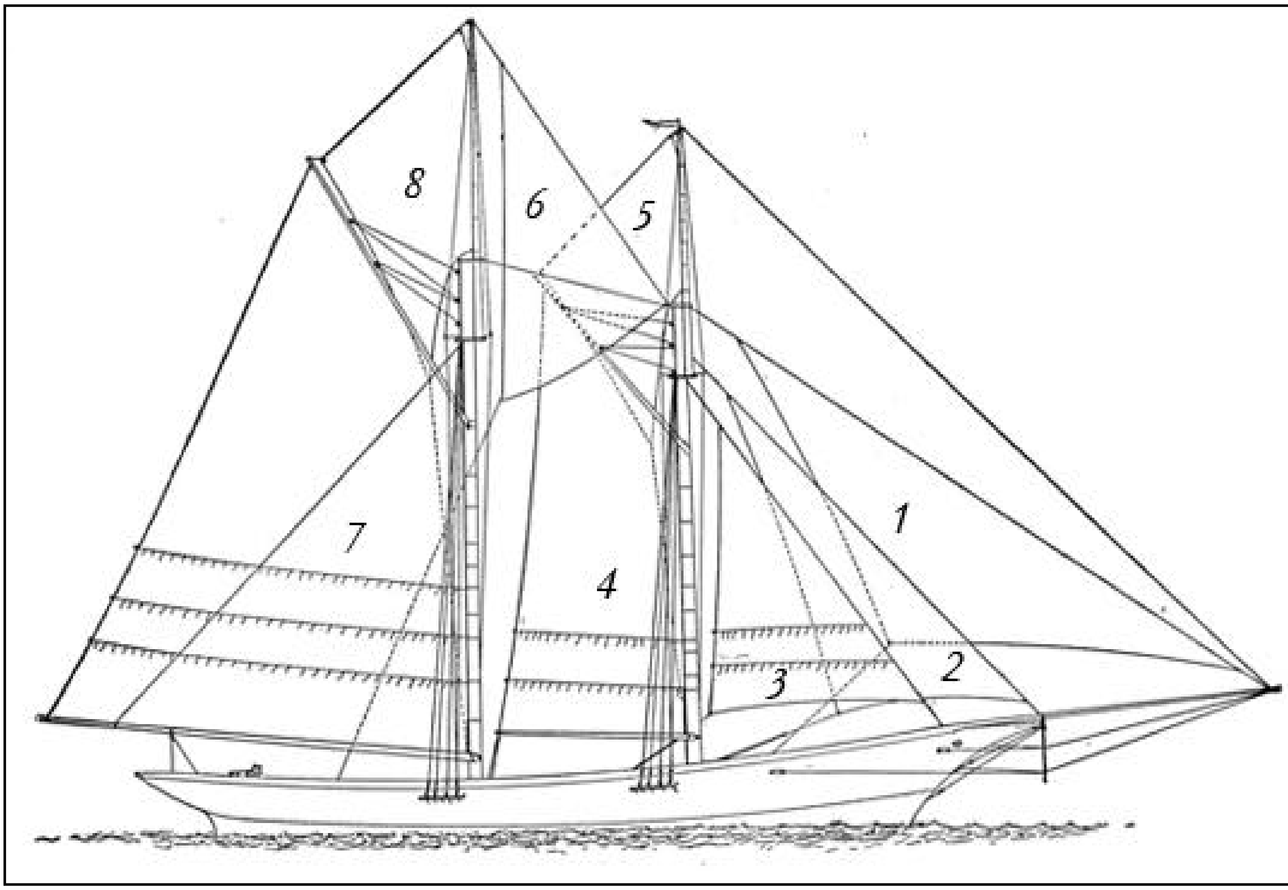

Figure 24. Sail plan of an early-nineteenth century schooner *Lynx* (from *Lynx* Educational Foundation 2005).

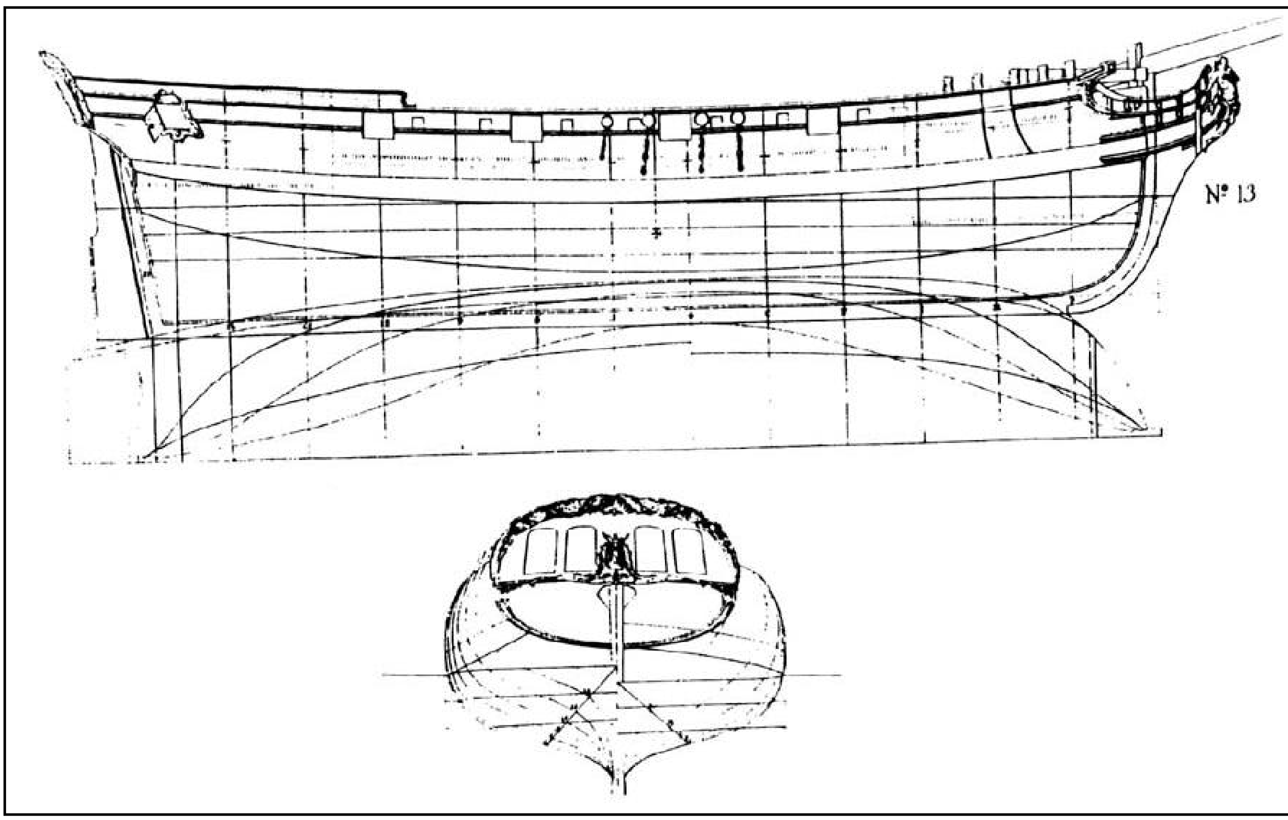

Figure 25. Hull plan of a sloop (Saltus 1987:74 after Chapman 1967 [1768]: Plate XIII).

shaped cockpit, the forward portion of which was bulkheaded off and covered with four to six hatch covers. The open part aft was fitted with a U-shaped bench and was the steering well. At the extreme bow, in the larger boats, was a small trunk cabin containing the cuddy with two berths. The centerboard case divided the hatch-covered hold longitudinally; the boards were very large in these boats. The luggers ranged in size from about 18 to 45 feet in length, and it is claimed that it was the practice of many builders to construct all of their boats on one model, varying the scale to suit the owner's requirements and pocketbook. Most of the luggers had a good deal of crown in the decks. The rudder was always hung outboard, and the ends of the hulls had very little rake. The curve of the stem below the water line was very slight, which made the lower forebody very fine; the hollow in the forefoot was often very marked. This was supposed to help the boats to hold on close-hauled in shallow water where the board could not be lowered very much [Chapelle 1951:284].

The early lugger, whose name is derived from the rig of Mediterranean sailing boats, had rounded hulls and used centerboards (Figure 26) (Pearson et al. 1989:198; Comeaux 1985:172). Employed as work boats for oystering and shrimping activities, luggers operated frequently in the shallow coastal lakes, bayous, and marshes as well as the deeper bays (Pearson et al. 1989:198). With the advent of the motorized lugger, older sailing luggers were surpassed in quantity and popularity. Motorized luggers, omitting the centerboard, allowed for rapid transport of fishing commodities to the market unlike the slower sailing luggers (Comeaux 1985:172). These luggers included a cabin to house the engine and operating controls. Motorized luggers appear typically as flat-bottomed, small craft, generally 20 to 30 ft long. More seaworthy luggers, of 40 to 50 ft length, were introduced later to access offshore oyster and fishing resources (Comeaux 1985:172). The probability of locating historic and modern luggers in the project area is low.

Steamboats: Before, During, and After the Civil War

Although the project area is located far from a historic navigable waterway and the probability of discovering a steamboat archaeologically within the project area is considered low, a discussion of steamboats is warranted. Steamboats represent one of the most technologically innovative watercraft used in the nineteenth century. Propelled by steam engines, boilers, and paddlewheels, they were designated as side-wheelers or sternwheelers according to where the paddlewheel(s) were located on the vessel (Figures 27 and 28). Steamboats developed on the eastern rivers in the early-nineteenth century, but rapidly spread throughout the western rivers (Pearson et al. 1989:107). Steamboats were predominantly used on the inland waterways but other types were operated in the coastal waters and open ocean, those vessels retaining their sailing rigs but adding steam propulsion. The chronology and development of steamboat technology will not be discussed in detail here, but several sources offer descriptive accounts and histories of this technological innovation (see Birchett et al. 2001, Hunter 1949, Mitchell 1975, Pearson et al. 1989, Petsche 1974, Preble 1883, and Scharf 1996 for further information).

Pearson et al. divided the steamboat era into three temporal categories: the early years of steam (1812-1860), the Civil War years (1861-1865), and the final years of steam (1866-1936) (Pearson et al. 1989). Steamboats appeared in the early- to mid-nineteenth century within the region at roughly the same time as the popularity of keelboats, barges, and flatboats arose. As Pearson et al. summed up:

> The application of steam power to navigation coincided with the industrial revolution in the United States…It is important to emphasize that long after the steamboat appeared in use flatboats and keelboats maintained their importance on the river…the peak years for flatboat arrivals were 1845-1847, after the steamboat

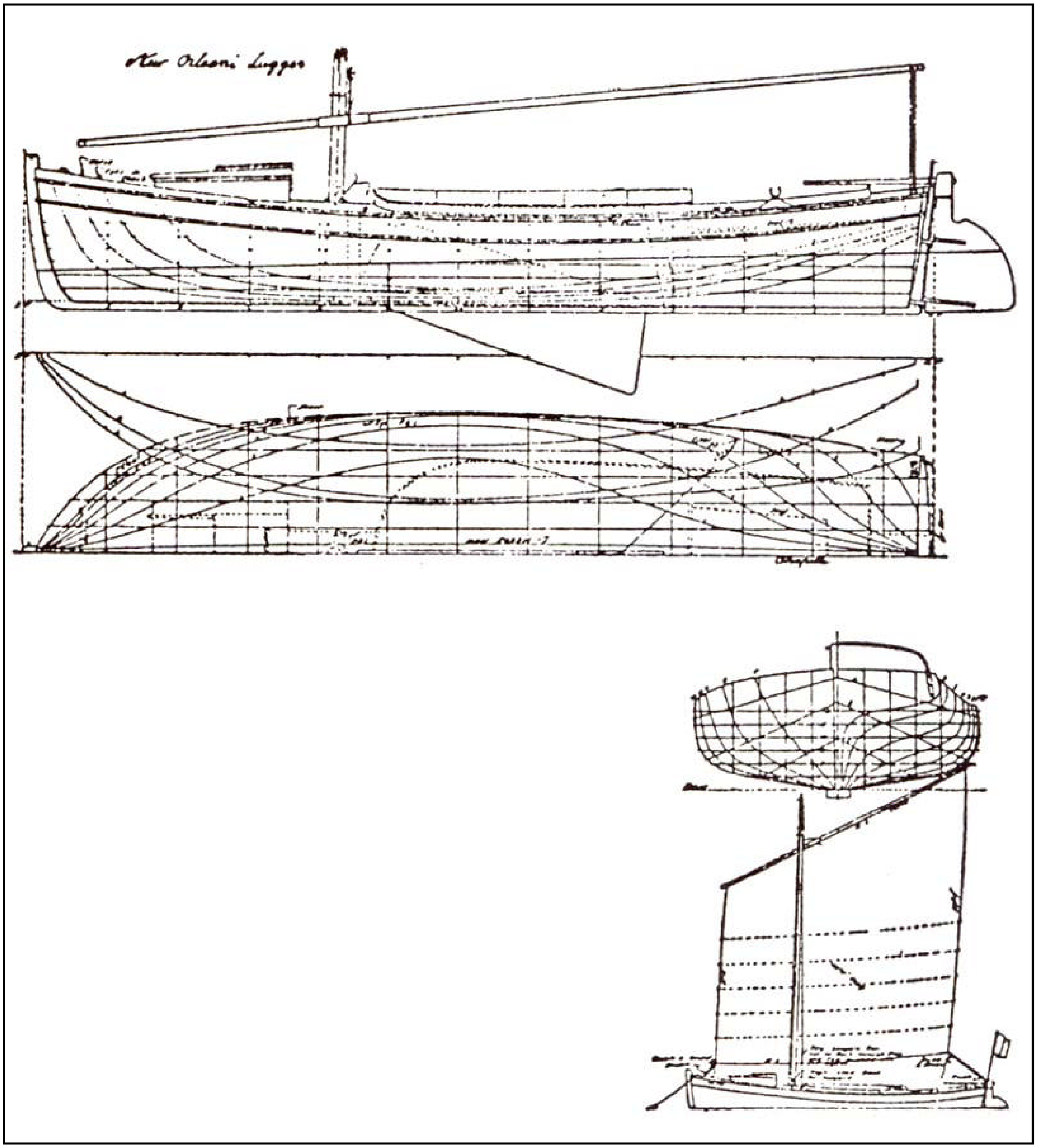

Figure 26. Hull plan of a lugger (Pearson et al. 1989:199).

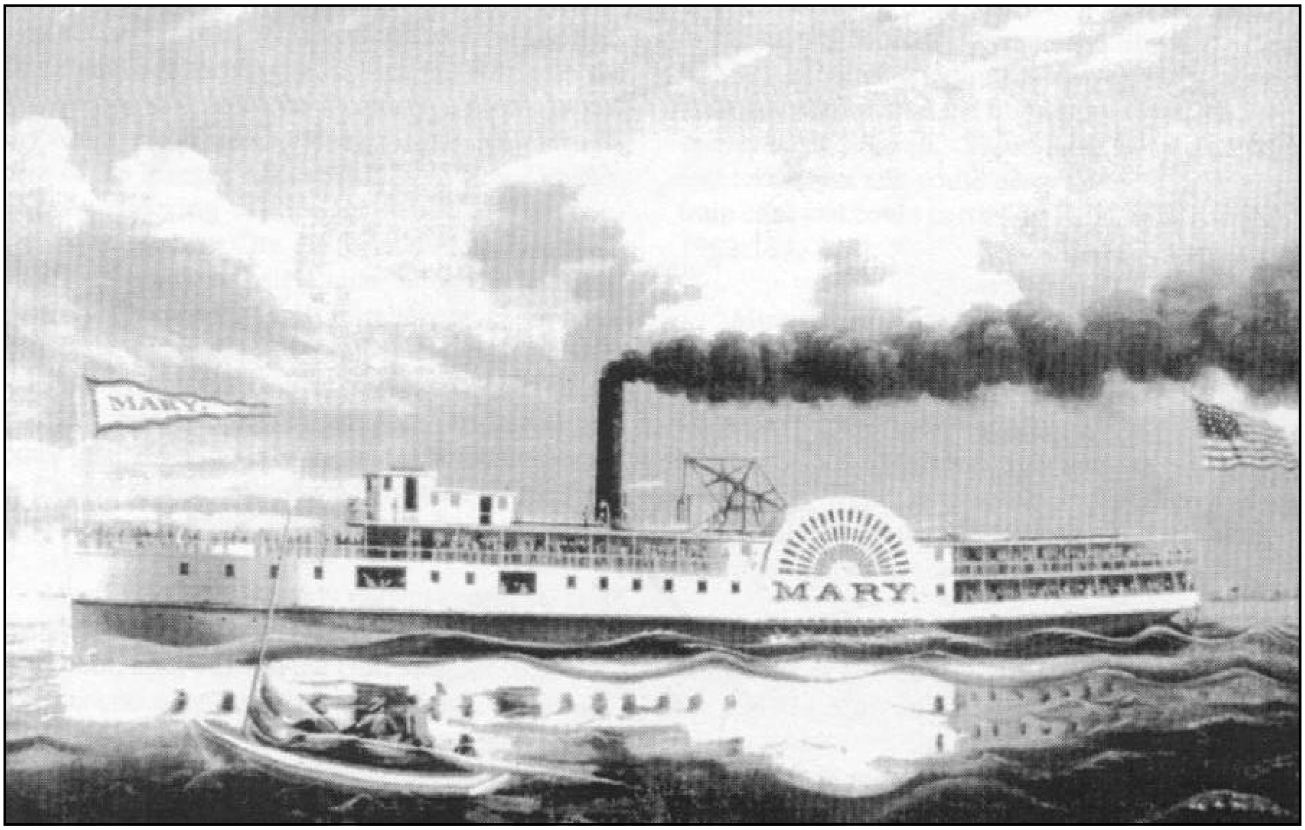

Figure 27. Artist's rendition of a sidewheel steamer (Birchett et al. 2001:88).

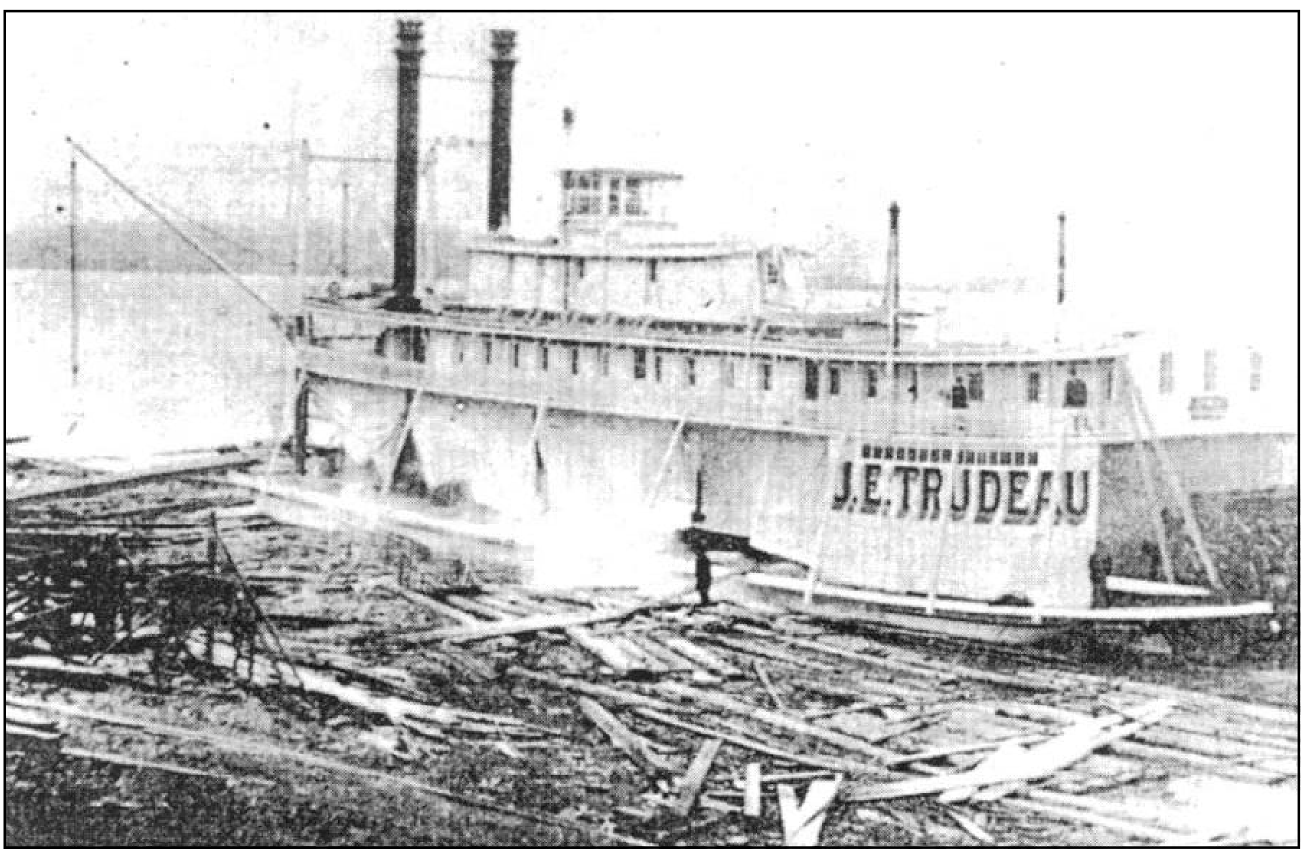

Figure 28. Early photograph of a sternwheel steamer (Birchett et al. 2001:84).

> had become well established as a freight and passenger carrier [Pearson et al. 1989:105-107].

Steamers were subject to several different hazards while underway. Common causes of vessel casualties included fire, explosion, snagging, collision, and obstructions. Fires were often caused by simple negligence, such as a burning candle or lantern. Boiler explosions occurred frequently causing many deaths and loss of steamboats. Snags were caused by tree trunks that had fallen into the river with one end protruding upwards toward the surface. Other obstructions could be caused by wrecked or abandoned vessels, debris in the water, or shallow shoals. Negligence, however, likely caused a majority of steamboat casualties. To maximize the utility of steamboats, these vessels were often overloaded with goods and passengers causing many deaths when a vessel caught fire or exploded. Another cause of steamboat casualties occurred when the vessel was operated at maximum speed thereby increasing the likelihood of causing significant hull damage when hitting snags or shoals. Speed and maximum cargo carrying capacity were two of the most important goals for steamers, which dramatically increased the chances for casualties due to operator negligence. According to Pearson et al.:

> The term 'hot engineer' came into use to describe engineers who deliberately refused to monitor water and steam gauges, if any were used. Pressure was often increased by hanging a weight on the safety valve. 'Close pilots' were those who allowed steam pressure to build to a dangerously high level before pulling away or while racing other boats. Such practices led to spectacular accidents killing hundreds of people and destroying thousands of dollars of property [Pearson et al. 1989:142].

The risks associated with steam travel caused many vessel losses in the early years. Birchett et al. reported an average lifespan for western river steamboats of four years duration before 1850, while their contemporaneous sailing vessel counterparts endured for an average of 20 years (Birchett et al. 2001:137). Within the Atchafalaya Basin, for example, steamboat longevity was 2.9 years before 1861, 5.3 years during the Civil War, and 10.5 years after the Civil War (Birchett et al. 2001:138). In constant competition with the railroad, steamboats plied the inland waterways throughout the nineteenth and early-twentieth centuries, carrying freight and passengers throughout this region.

When the Civil War erupted, steamboat technology took a dramatic turn. This technology, formerly used to propel large and bulky vessels carrying cargo and passengers, was modified for use on sleek and fast warships. Sailing ships were often converted to steam or modified to travel by either method of propulsion. During the war, Union forces formed a blockade along the Gulf and Atlantic coasts to stifle import and export of goods and food to and from the Confederacy (Pearson et al. 1989:159). Blockade runners, quite successfully, ran through the blockade and participated in contraband trade to keep food and supplies moving into and throughout the South. Due to the lack of dependable supply lines and material sources, the Confederates had to improvise.

In February 1861, the Confederate Navy Department was formed and soon after initiated the construction of a naval fleet (Scharf 1996). Those vessels not constructed by the Confederacy were pressed into service or captured from the Union fleets. Ironclads developed as the newest weapons in naval warfare. These vessels, often wooden-hulled below the waterline, were constructed with a thick iron skin over a wooden or iron framework to protect the upper decks and crew from enemy gunfire. The Union steamers typically were constructed or modified for operation in the open ocean or bays rather than the shallow and narrow southern inland waterways. New vessels had to be constructed in order to attack Confederate vessels holed up in the bayous and rivers of the south. Gunboats became the vessel of choice for conducting or defending against attacks within the inland waterways and western rivers of the south. Other vessels designed for specific war-related purposes included: ironclads, ironclad towboats, wooden gunboats, supply vessels, rams, and artillery boats (Pearson et al. 1989:164). As the project area is located far from any substantial historic navigable waterway, there is a very low probability of locating these vessels during the archeological survey.

Post-Civil War and Other Modern Craft

Post-Civil War watercraft continued to utilize steam engine technology until they were gradually fazed out by the invention of diesel and gasoline-powered motors. The slow-moving steamboats gave way to the towboats and barges for transporting large quantities of goods. According to Pearson et al, "towboats and barges became the predominant mode of river freight transportation" and should be considered "the most important development in inland water transportation since the beginning of steamboating on western waterways" (Pearson et al. 1989:180).

> They (towboats and barges) are more accurately viewed as successors to flatboats than steamboats because they hauled cargo previously carried by flats such as coal, wheat, lumber, salt, and iron ore. Steamboats became increasingly restricted to local and short-distance trades. Those which survived the competition from railroads and barges operated for the most part as tramp steamers, picking up freight wherever they could find it [Pearson et al. 1989:180].

Railroads also played a significant role in the demise of the steamboat.

One historic steam vessel known to have operated in vicinity of the project area is the mail steamer, *Crescent* (Figure 29). This vessel, which operated in the 1930s, has the characteristics of a scaled-down towboat. Owned by Mary J, Sweeny of Lafayette, Louisiana, this vessel operated as a delivery vessel transporting mail from Abbeville to Pecan Island. During its operation, the *Crescent* embarked to Abbeville on Mondays, Wednesdays, and Fridays. It returned Pecan Island on Tuesdays, Thursdays, and Saturdays (Louisiana Digital Library, 2008).

It is unknown if this vessel was specifically built to deliver mail from Abbeville to Pecan Island, however, it is most likely that the *Crescent* operated on the Vermilion River during its career and was utilized as a mail carrier after steam vessels became the less popular mode of river freight transportation and the development of diesel-powered motors progressed.

Modern watercraft in the southwest region of Louisiana has evolved from the earliest vessels used in the expansion of the native and American populations and growth of commerce and industry. These vessels are often designated by terms that also refer to markedly different historic vessel types such as *bateau*, flatboat, or barge. As such, these vessels will not be described in great detail as early watercraft forms were described above. Modern watercraft are used primarily for transportation of commodities and raw materials, pleasure craft, or participation in the seafood procurement industry throughout the project area. These vessels have typically abandoned the sailing rigging for motorized propulsion though a few old-fashioned holdouts still remain. Modern watercraft include skiffs, *bateaux*, putt-putts, launches, motorized luggers, trawlers, flatboats, schooners, and even small pirogues. Houseboats, usually constructed on a barge-type platform, are another type of watercraft prevalent in the region. However, there is a low probability for that may be discovered within the project area.

Trawler. In the early-twentieth century, the exploitation of shrimp as part of the seafood industry brought the motorized shrimp trawler to the fleets of vessels traveling to deeper waters in the Gulf of Mexico (Figure 30). Initially introduced by outsiders, the South Atlantic trawler, of 50 to 65 ft in length, was modified by Louisianans to become the shrimp trawler, a smaller version designed to trawl the bay and nearshore waters of Louisiana (Comeaux 1985:172). Trawlers exhibit substantial forward sheer, high, flaring bows, with a nearly vertical stem, and

Figure 29. Photograph of the mail steamer, *Crescent* (Louisiana Digital Library website, 2008).

Figure 30. Photograph of a modern trawler (Brassieur n.d.).

broad, flat hulls (Brassieur 2005). Larger versions, designed for deeper waters, are known as Florida-type shrimp trawlers. Trawlers are constructed of wood or steel and have been readily adopted and adapted by local residents to suit the needs of the seafood industry and the constraints of the environment. Though the deeper drafted Florida-type shrimp trawlers are found among the deepwater ports throughout Louisiana, the smaller, coastally-adapted trawlers can be found within the project area. Despite to the prevalence of trawlers employed in the seafood industry, there is a low probability of locating historic trawlers that have foundered or were abandoned within the waterways of the project area.

Summary

The preceding discussion of watercraft types provided definitions for common types of watercraft that are likely and not likely to be located within the project area. It should be acknowledged that often one term for a specific vessel form is applied as a general term as well. For example, the skiff can indicate a specific form of small craft or is used as a general term applied to any small craft resembling a rowboat. Barge is another term that applies to an early keeled, double-ended vessel as well as a flat-bottomed, rectangular, boxy platform used for transporting cargo downriver. Two very different hull forms are employed for the same purpose; transportation of cargo. The frequent use of vernacular terms for more than one form of watercraft can be vague and confusing. The discussion above attempted to clarify the types of watercraft likely to be found within the project area and to recognize the continuing evolution of watercraft whereby new techniques and styles modify older ones.

Preservation of Submerged Cultural Resources

Two factors directly influence the preservation of submerged cultural resources: environment and human action. The nature of the marine environment can aid preservation of wrecks or it can initiate rapid degradation of these fragile resources. Changes in river course can lead to complete burial and eventual land-locking of shipwrecks that originally were lost in the river. Vessels abandoned along an embankment can be filled with sediments or scoured by a high current. Storm surges from hurricanes carry a high sediment load, and are likely to bury historic shipwrecks lost within the project area under tens of feet of silt and sand forming a protective anaerobic environment. Scouring actions from storm surges also can cause dispersal of hull fragments and artifacts along the bottom or allow the hull to settle lower and lower into soft bottom. Upon settling down to hardpan, though, the vessel then becomes subject to erosion (Damour 2005: 116).

Human action can cause as much destruction to historic shipwrecks as environmental factors. Salvage activities remove valuable (and diagnostic) machinery and structural elements. Diagnostic artifacts can be disturbed or entirely removed from their context making identification of a shipwreck much more difficult. Historic dredging and snag removal operations often destroyed and removed shipwrecks from the archeological record. Wake from passing vessels can create substantial wave action to dislodge fragments of wooden-hulled wrecks. Repetitive wave action against shallow or partially exposed wrecks will rapidly accelerate their destruction. Finally, looting is a recurring problem that dramatically affects the ability of the archeologist to identify a shipwreck site. Often, diagnostic artifacts and vessel components such as bells, anchors, rudders or propellers are removed by treasure-seekers and souvenir-hunters, thereby removing much of a vessel's identity. The above factors must be acknowledged when determining the likelihood of preservation of watercraft within the project area. The probability of preservation is high if riverine sediments buried vessels quickly. Preservation is low in areas where vessels lie exposed to the elements and human activities. Those vessels lost or abandoned near shore may have been picked clean by salvage, eroded by scouring, or damaged by repetitive exposure to boat wake (Damour 2005: 117).

The above summation of watercraft types, known vessel losses, and preservation issues create a baseline of data to facilitate the identification of submerged cultural resources. With this information, the archeologist can determine what cultural resources may be found, within what time range these vessels may originate, and how the sites are impacted by environmental and human action. Studies of technological innovations and changes in watercraft construction techniques provide temporal frameworks from which to assign a date range for a shipwreck site. Tabulating known vessel losses within a specific area assists determination of the cultural affiliation of a site. Considering environmental and human impacts to cultural resources, the archeologists can assess the potential for scattering of cultural materials or relative intactness of a site. These factors play a significant role in determining the NRHP eligibility of a site and whether sites should be protected, avoided, or mitigated.

CHAPTER 6
PREVIOUS INVESTIGATIONS

Prior to the commencement of field investigations, a literature search and records review was performed. Research at the Louisiana Division of Archaeology revealed that there are no sites within the current project area and there is one previously recorded archaeological site (16VM45) located within a one-mile (1.6 km) buffer of the project area (Figure 31). Research at the Louisiana State Library revealed that there are no previously recorded standing structures located within the one-mile (1.6 km) buffer of the project area. Also, research using the NRHP database revealed that there are no NRHP properties located within the one-mile (1.6 km) buffer in the project area. The site located within one-mile buffer and known vessel losses in the project area are discussed below.

16VM45

16VM45 (Sosthene Broussard site) is a prehistoric and historic surface scatter located Vermillion Parish within the one-mile buffer of the project area. It is located on the USGS *Floating Turf, LA* (1979) 15-minute quadrangle in the southwest quarter of Section 15, T15S, R1W. The site is approximately 40m x 80m (131.23ft x 262.46 ft). The possible Woodland prehistoric component consists of ceramic sherds. They include Larto Red, Coles Creek Incised (var. Pecan Island), and shell tools. The historic component consists of a 19^{th} and 20^{th}-century occupation site. Artifacts recovered include ceramics and glass fragments. Also according to landowner information, a tenant farm worker had been interred on the property. No subsurface testing was conducted. The NRHP eligibility for this site is unknown due to the lack of subsurface testing (LA Site Files). No report is available for this site. This site will not be affected by activities of the current project.

Known Vessel Losses in the Project Area

Tabulating historic vessel loss by examining historic documentation can aid the archeologist in identifying submerged cultural resources within a project area. Comparing past and present shorelines and river meanders provides a baseline for identifying high probability areas for shipwrecks. Sources such as newspaper accounts, historic nautical charts, compiled wreck reports and navigation hazards, and previous archeological and historical investigations can provide copious amounts of data on vessel loss. Two sources providing much of this data included the *Wreck Reports: A Record of Casualties to Persons and Vessels on the Mississippi River, its Tributaries, on Lakes and other Waterways of the U.S. Customs District Port of New Orleans 1873-1924* and *Navigation Casualties: 1866-1910, On the Mississippi, Red, Ouachita, Yazoo, Pearl, Alabama, Apalachicola, Coosa, Sabine, Teche, Atchafalaya; and other rivers in Louisiana, Texas, Florida, Mississippi, and Alabama, including those of the 10^{th} district* each published in 1938 by the Works Progress Administration. These sources documented vessel name, type, tonnage, date built and lost, location and events of loss or casualty. Though only listing vessel loss or casualty after the Civil War, these sources can provide valuable information for compiling a list of shipwrecks near the project area. Other sources proving useful for identifying shipwrecks within the project area included the Automated Wreck and Obstruction Information System (AWOIS) maintained by NOAA and the U.S. Coast Guard's *Shipwrecks and Casualties: The Coast Guard Reports* available on-line. Research using these sources revealed that there are no known vessel losses within one-mile of the current project area.

Finally analysis of historic navigation charts revealed that the project area is not located near any historic navigable waterways. Review of the *Constance Bayou, 1955* 15-minute quadrangle indicates that the canals were partially constructed at the time of the drafting of the map (Figure 32). Landowner interviews also provided information regarding the historic use of

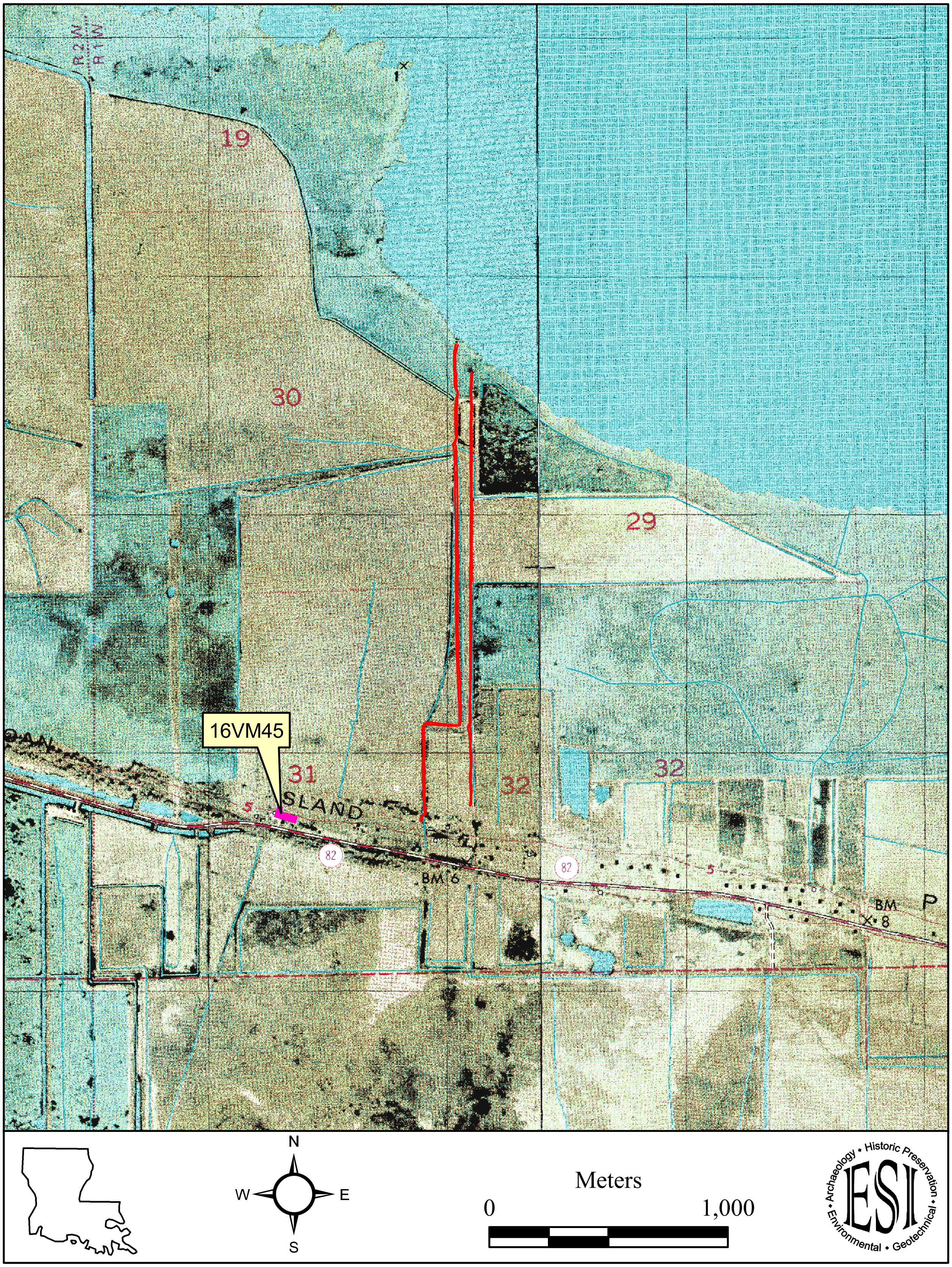

Figure 31. Excerpts from the USGS *Floating Turf* and *Pecan Island* 1:24,000 topographic quadrangles showing the previously recorded site within one mile of the project area.

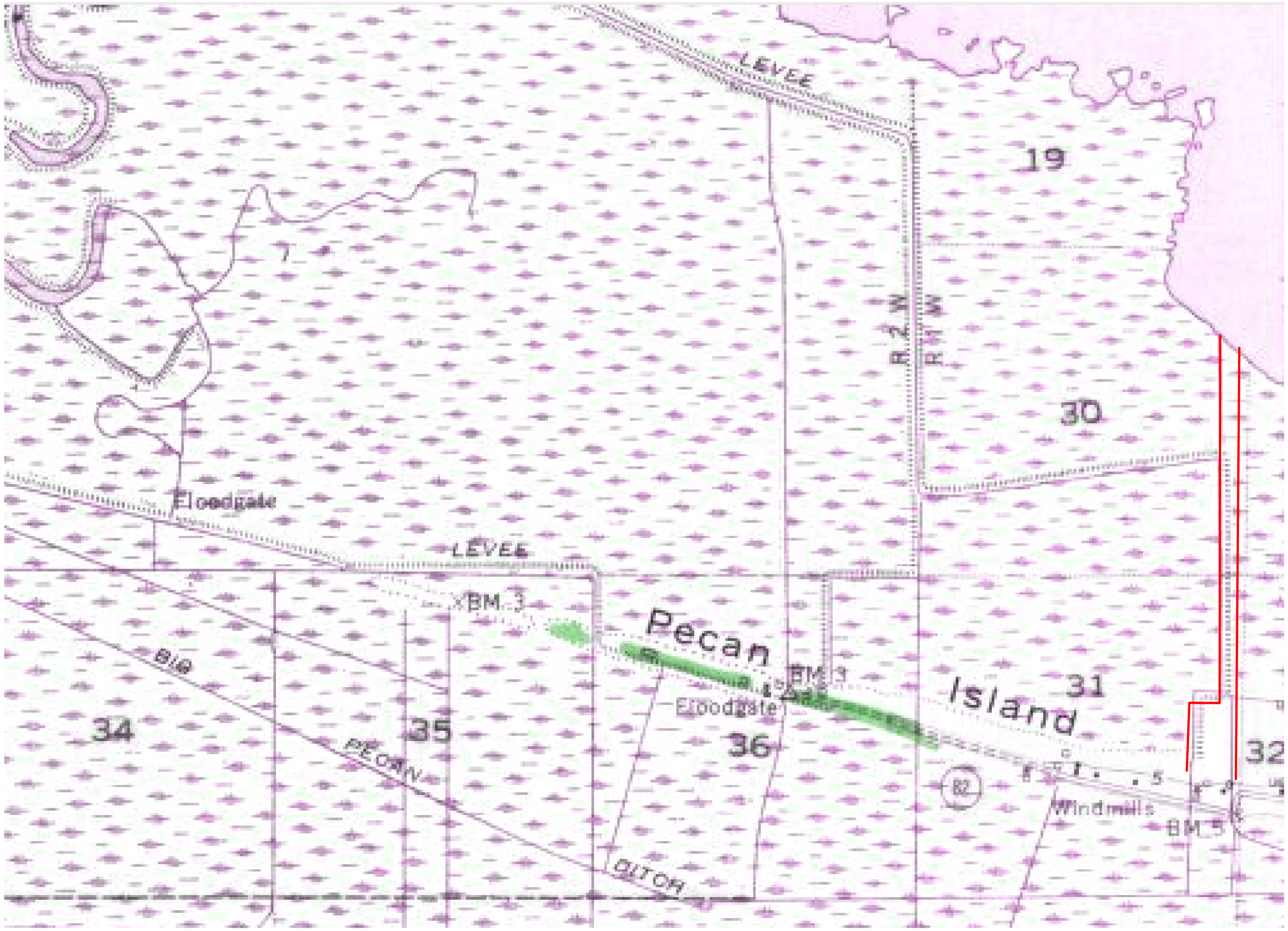

Figure 32. Excerpt from the 1955 USGS *Constance Bayou, LA*   15' quadrangle showing the project area in red (source: University of Alabama 2008, online historical maps).

the canal and revealed that the canals within the current project area were historically dug for the purposes of water retention, draining the surrounding land to utilize for cattle farming. Landowners also informed that the canals have been historically excavated to maintain depth, in some cases, to increase depth for water retention and that no remains of any vernacular watercraft have ever been encountered.

CHAPTER 7
FIELD INVESTIGATIONS AND RESULTS

Survey Methodology

The project area consisted of two canals (East Canal and West Canal) and the earthen plugs located at the north ends of the canals (Figure 1). A total of 2.66 miles (4.28 km) of canalized waterway were surveyed. The cultural resources magnetometer survey was confined within the banks of each canal and two survey lines were transected in each canal. Throughout the course of the survey each bank line was visually scanned for exposed cultural resources.

A three-person survey team, comprising two employees of Earth Search, Inc. (ESI) and one employee of Specialized Environmental Research, Inc. (SER), was designated to conduct the remote sensing survey. These personnel included John Rawls, a marine archeologist, Stuart Nolan, a marine archeological assistant, from ESI, and Scotty Broussard from SER, the airboat pilot. The SER employee piloted the survey vessel and ESI employees operated the magnetometer and performed all magnetometer data analysis and interpretation. Safety procedures designed by SER were in place throughout the duration of the fieldwork, including daily safety briefings and use hearing protection.

The three-person survey team commenced the marine remote sensing survey of the project area on February 25, 2008 and completed the project on February 28, 2008. A total of 4.95 linear miles of canalized waterway were surveyed, utilizing a magnetometer.

Once completing the survey, the magnetometer data was initially manipulated in Geometrics MagMapper2000® software. This program allows the user to convert initial magnetometer data from a .bin file format to .xyz file format, which allows the data to be read by the Hypack® Max software suite.

Hypack® Max suite, was used for editing magnetic data, while magnetic contouring and smoothing was accomplished using the Tin Model program (included in Hypack® Max). Contoured and smoothed magnetic data was exported from Hypack® Max in the .dxf file format, for conversion to “shape file” (.shp) formats used in the ESRI® ArcGIS Desktop, Version 9.1 software package. All survey maps are projected in the Louisiana Coordinate System South Zone North American Datum of 1983 (NAD83).

All records including maps, field notes, data sets, and photographs of the field investigations are at currently at Earth Search, Inc., 4212 St. Claude Avenue, New Orleans, Louisiana, 70117 and will be permanently curated with the State of Louisiana, Department of Culture, Recreation, and Tourism, Division of Archaeology, P.O. Box 44247, Baton Rouge, Louisiana, 70804-4247, (225) 342-8170. The curation facility is located at the Galvez Building, Room B-023, 602 N. Fifth Street, Baton Rouge, Louisiana, 70802, (225) 342-4475.

Survey Equipment

ESI provided all equipment used to run and log data from the magnetometer during the course of the survey.

Survey Vessel. Initially the magnetometer survey was attempted using a MARSHMASTER 2000 marsh buggy provided by SER. The magnetometer sensor was extended forward of the cockpit and engine with an aluminum spar far enough to prevent any magnetic interference. However, due to the low water and muddy conditions of canals, the marsh buggy proved inadequate to navigate the canals efficiently enough to conduct survey. The magnetometer survey was then conducted from a 15 ft (4.8 m) long airboat. The SER employee piloted the airboat throughout the course of the survey. The magnetometer sensor was extended 10 ft from the vessel's engine, far enough to eliminate any associated noise.

Magnetometer. For the purposes of archeological survey, magnetometers are used chiefly for the detection of objects composed of, or containing, ferrous metals. Throughout this survey, an EG&G Geometrics 858 MAGMAPPER Portable Cesium Magnetometer was employed. This model of terrestrial magnetometer is equipped with a cesium sensor, a more sensitive and energy efficient alternative to standard proton precession magnetometers. It has an accuracy of 0.008nT/Hz RMS. Cesium sensors are typically used where a higher performance magnetometer is needed. In archaeology and geophysics, where the sensor is moved through an area and many accurate field measurements are needed, the Cesium magnetometer measures at a faster rate (5 samples per second) allowing the sensor to be moved through an area more quickly for a given number of data points; and the lower noise of the Cesium magnetometer allows those measurements allows those measurements to more accurately show variations in the field with position.

Global Positioning System. The GPS is the most accurate technology available for both marine and terrestrial navigation. By computing the distance to three or more GPS satellites orbiting the earth, a GPS receiver can calculate an accurate horizontal and three-dimensional position. This process is called satellite ranging. Differential GPS is one of the most accurate forms of GPS navigation, providing position solutions with five meter or better accuracy.

Differential GPS relies on error corrections transmitted from a reference station placed at a known location. The reference station calculates the error correction in the satellite range data and broadcasts these corrections to the mobile receiver. A significant portion of the error in GPS measurements can be eliminated by the GPS receiver incorporating these corrections. The errors caused by the ionosphere, the atmosphere, and by selective availability can be eliminated with this method of using GPS navigation.

The GPS reference locator and mobile receiver utilized during this survey was the Trimble AG114 DGPS/Beacon receiver and MBA-2 antenna. This system is interfaced with the Geometrics 858 console. This system provided positioning information during the survey. Trimble AG114 DGPS beacon/receivers uses the USCG network of radiobeacons, which is a free DGPS service. The accuracy of this DGPS device never exceeded 10 ft. during survey.

Data Analysis and Interpretation

Analysis and interpretation of magnetometer data is not an exact science. Without ground-truthing and formal investigation of magnetic anomalies, identification of such anomalies as "cultural" or "potentially significant" is tenuous at best. Though analysis and interpretation of these data are difficult, there exist some guidelines for interpreting magnetic data. Factors such as size, character, and duration are often utilized to interpret whether a magnetic signature is modern or older and indicative of historic archeological resources or modern debris. These factors are dependent upon a variety of anomaly source characteristics, including size, shape, number of objects, orientation, and mass; magnetic susceptibility; distance of the anomaly from the point of measurement; and magnetic properties of the surrounding matrix. Size (also strength or deflection) refers to the intensity to which a ferrous object or group of objects modifies the earth's ambient magnetic field. Measured in gammas or nanoTeslas (nT), smaller ferrous objects create a smaller deflection in the ambient magnetic field than much larger objects. For example, tools such as a screwdriver or hammer can measure as low as one gamma or as high as 10 gammas, depending upon the object's proximity to the magnetometer sensor. Objects such as an automobile can measure as high as 40 gammas or smaller if further from the towfish/sensor

(Figure 33). Pipelines, barges and other large features can measure in the hundreds or thousands of gammas depending on the proximity of these features to the magnetometer sensor. Steamboats and ironclad vessels, typically carrying much more iron and steel as part of their construction or machinery than a wooden-hulled vessel, for example, will register a substantial magnetic intensity (Damour et. al. 2005: 133).

Besides size or intensity, character and duration are two other factors used to interpret magnetic data. Character, or type, refers to a magnetic signature appearing as dipolar, monopolar, or complex (Figure 34). Magnetic anomalies caused by a single-source ferrous object typically form a positive-negative anomaly pair known as a dipole. The dipole normally is oriented along the axis of magnetization, with the negative portion located nearer the north pole of the source object. The positive portion of the anomaly commonly is of greater intensity than the negative portion. Monopoles are characterized by anomalies exhibiting either a positive or negative deviation from the ambient magnetic field. Monopoles often are formed by non-ferrous geological features; linear objects such as pipe or long rods where only one end is detectable with the magnetometer; and dipolar anomalies in which only one of the poles is detected in the search pattern. Breiner stated that there are no true magnetic monopoles, "but only dipoles whose ends are far apart" (Breiner 1973:18). Historic shipwrecks and watercraft, which often contain numerous ferrous objects, usually produce complex magnetic signatures comprising multiple dipole and/or monopolar anomalies. This class of signature is particularly apparent when the wreck is scattered and dispersed (Damour et al., 2005:133).

Duration of an anomaly is measured in either time or distance. Time indicates the total number of continuous seconds that an anomaly was recorded during survey. This measurement, however, can vary in relation to the speed of the survey vessel. Distance, on the other hand, indicates the linear distance along a survey line that an anomaly was detected and is not influenced by the speed of the survey vessel. One other factor that must be considered when interpreting magnetic data is the proximity of the sensor to the anomaly. As a rule, the strength of an anomaly is proportional to the inverse cube or square (depending on orientation) of the distance between the source and the point of measurement. Because of this rapid decline in anomaly strength, objects near the sensor are more likely to produce marked variation in magnetic intensity than are more distant objects (Breiner 1973). This can be of significant concern during marine magnetometer surveys, during the course of which the magnetometer towfish/sensor may "fly" at different depths in the water column. When combined with changes in water depth throughout a waterway, predicting the size and identity of an anomaly or group of anomalies without corroborative visual evidence can be extraordinarily difficult. Also, objects that are deeply buried may be recorded as smaller intensity anomalies due to their distance from the sensor (Damour et al., 2005: 136).

When considering size, character, and duration together, a baseline for interpreting magnetic data is created. With this in mind, some generalizations of magnetic data can be made. Anomalies exhibiting a short duration often indicate small objects or modern debris that has not been present long enough to alter the ambient magnetic field other than immediately around it. Anomalies with a longer duration often indicate larger objects or features that have been in situ for decades or centuries and have gradually expanded the distance of magnetic disturbance from the source over the ambient field. This, of course, depends upon the magnetic intensity of the anomaly and the proximity of the sensor to the original source when detecting it. An anomaly that registers a moderate intensity over a longer distance, with a gradually fluctuating signature, can indicate a deeply buried object or an older magnetic anomaly, and perhaps a historic cultural resource. For example, the magnetic signature of a nineteenth century steamboat lying upon the surface of the sea floor or river bottom in 20 ft of water will certainly differ from that of a similarly sized steamboat deeply buried in 20 ft of sediments (Damour et al., 2005: 136).

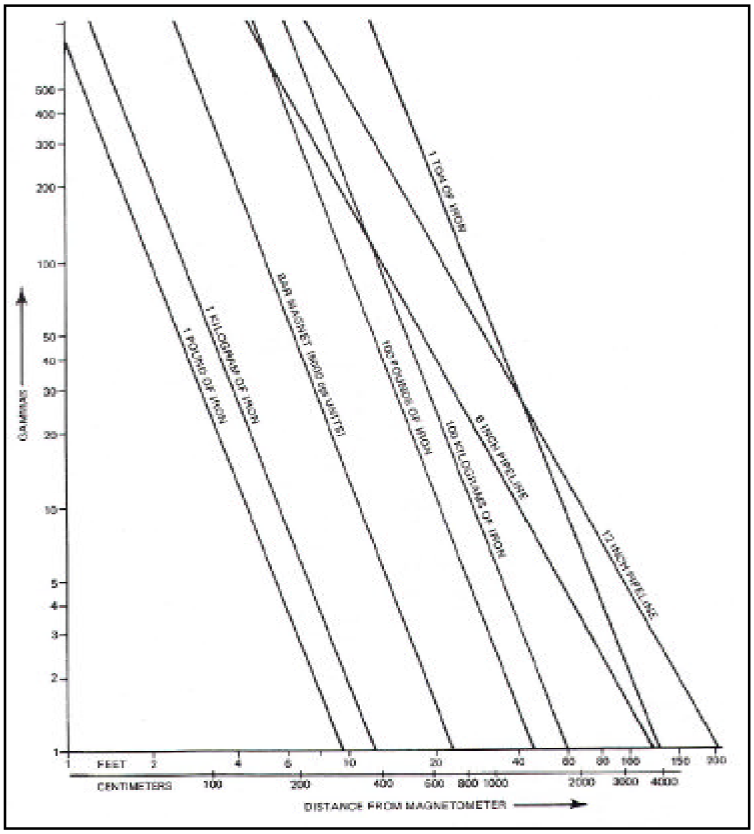

Figure 33. Graph depicting estimates of anomaly amplitude bases on size and distance from the magnetometer (Breiner 1973:43).

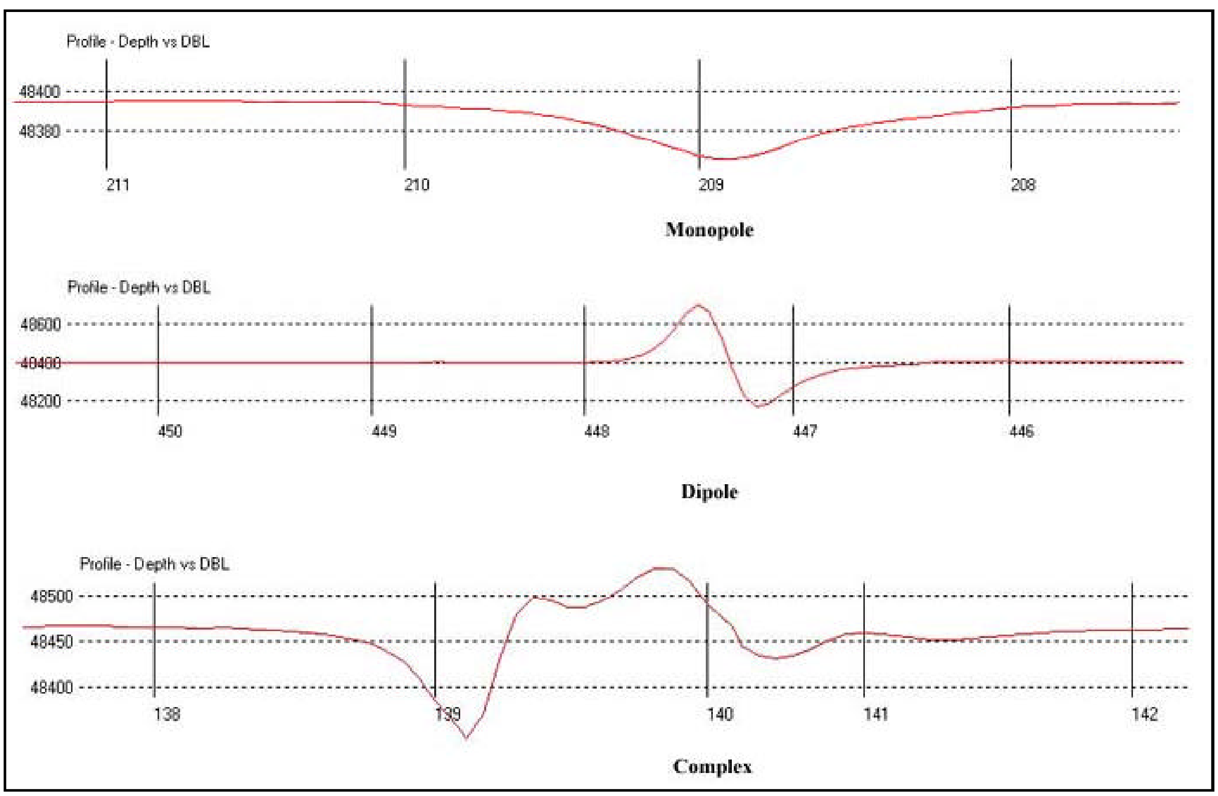

Figure 34. Examples of magnetic anomalies: Monopole, dipole, and complex characters.

Historic shipwreck and vernacular watercraft magnetic signatures should tend to exhibit a complex nature with multiple magnetic peaks over a large area and detection across multiple survey lines. Pearson et al. reported in their 1991 study of remote sensing in a riverine environment that, "the amplitude of magnetic anomalies associated with shipwrecks vary considerably, but, in general, the signature of large watercraft, or portions of watercraft, range from moderate to high intensity (>50 gammas) when the sensor is at distances of 20 ft or so" (1991:70). They continued, "data suggest that at a distance of 20 ft or less watercraft of moderate size are likely to produce a magnetic anomaly (this would be a complex signature, i.e., a cluster of dipoles and/or monopoles) greater than 80 or 90 ft across the smallest dimension…" (1991:70). Conversely, as Pearson and Saltus stated, "even though a considerable body of magnetic signature data for shipwrecks is now available, it is impossible to positively associate any specific signature with a shipwreck or any other feature" (1990:32).

Tuttle et al. included a table of diver-identified shipwrecks, single objects, and multiple objects with their corresponding magnetic sizes and durations to test the suggested criteria of 50-gamma/80-ft for identifying possible cultural resources (2001:47). As indicated in Table 1, reproduced from Tuttle et al. (2002:47), all shipwrecks met or surpassed the criteria while most single objects did not. The pipeline, however, did meet the criteria but would appear as a linear magnetic anomaly on a contour map and would be easy to identify and discount. Two of the multiple objects examples do adhere to the 50-gamma/80-ft criteria. Tuttle et al. argued that if these targets had to be prioritized in terms of potential significance based on the suggested criteria, they would be categorized as potentially significant (2001:47).

Table 1. Compilation of Magnetic Data from Various Sources (from Tuttle et al. 2001:47).

Vessel (Object)	**Type & Size**	**Magnetic Deviation**	**Duration (ft)**	**Reference**
SHIPWRECKS				
J.D. Hinde	129-ft. wooden sternwheeler	573	110	Gearhart and Hoyt 1990
Utina	267-ft. wooden freighter	690	150	James and Pearson 1991
Mary Somers	iron-hulled sidewheeler	5000	400	Pearson et al. 1993
Gen. C.B. Comstock	177-ft. wooden hopper dredge	200	200	James et al. 1991
Mary	234-ft. iron-hulled sidewheeler	1180	200	Hoyt 1990
El Nuevo Constante	126-ft. wooden collier	65	250	Pearson et al. 1991
James Stockton	55-ft. wooden schooner	80	130	Pearson et al. 1991
Homer	148-ft. wooden side-wheeler	810	200	Pearson and Saltus 1993
modern shrimp boat	segment 27x5 ft.	350	90	Pearson et al. 1991
Confederate obstructions	numerous vessels with machinery removed and filled with construction rubble	110	long duration	Irion and Bond 1994
SINGLE OBJECTS				
pipeline	18-in. diameter	1570	200	Duff 1996
anchor	6-ft. shaft	30	270	Pearson et al. 1991
iron anvil	150 lbs.	598	26	Pearson et al. 1991
engine block	modern gasoline	357	60	Rogers et al. 1990
steel drum	55 gallon	191	35	Rogers et al. 1990
pipe	8 ft. long x 3 in. diameter	121	40	Rogers et al. 1990
railroad rail segment	4-ft. section	216	40	Rogers et al. 1990

Table 1. Compilation of Magnetic Data from Various Sources (from Tuttle et al. 2001:47) (*continued*).

MULTIPLE OBJECTS

anch or/wire rope	8-ft. modern stockless/large coil	910	140	Rogers et al. 1990
cable and chain	5 ft.	30	50	Pearson et al. 1991
scattered ferrous metal	14x3 ft.	100	110	Pearson et al. 1991

Other factors, besides the apparent success of the 50-gamma/80-ft criteria, must be considered for interpretation of magnetic anomalies. Historic use of the waterway must be considered. As such, a substantial amount of modern debris scattered throughout the navigable channel of the waterway must be anticipated. This modern debris, depending on their magnetic intensity, can create such a large disturbance in the ambient magnetic field that any buried historic cultural resources nearby could be masked and rendered undetectable. Any cultural resources, such as shipwrecks or remains of vernacular watercraft, located nearby would be essentially invisible to the magnetometer alone. Other recent activities that can reduce the ability to detect historic submerged cultural resources within the project area include canal dredging and construction of land-based structures. Steel shore reinforcements, powerlines, cable or pipeline crossings, along a navigable channel can create magnetic interference, making detection of historic cultural resources in their vicinity nearly impossible (Damour et. al., 2005: 137).

Problems Encountered During the Remote Sensing Survey

Overall, remote sensing and DGPS devices operated successfully throughout the survey. No interference between magnetic or acoustic devices was observed. The only problems encountered during survey included strong prevailing north winds. Maintaining a constant speed on southbound transect lines proved to be quite challenging. In order to maintain steerage, the airboat pilot had to increase speed on southbound transect lines. Another problem included crossing cross ditches within the project area. In the northern portions of the project area, many cross ditches and levees had to be crossed. In doing so the airboat pilot had to compromise the bearing and "walk" the airboat across associated levees. Side-to-side movement caused magnetic spikes in the data when crossing the perpendicular ditches and levees, however, these instances were noted and the "bad" data was edited during post-processing.

South Pecan Island Canals

As previously mentioned the South Pecan Island magnetometer survey consisted of surveying two existing canals. Each canal was given the designating name as East Canal, the existing conveyance channel, and West Canal, the new proposed conveyance channel. A total of 38 anomalies comprising 24 targets were recorded (Figures 35-39). Magnetic data recorded during the course of the survey was analyzed and interpreted based on the 50-gamma/80-foot criteria, which have been established by numerous cultural resources remote-sensing surveys. Targets and anomalies that did not meet or exceed the 50-gamma/80 ft were interpreted as modern debris. All targets recorded throughout the survey do not represent potential archeological resources and no further research is recommended.

The ambient magnetic field of the overall project area was 48,160 gammas. This ambient level fluctuated within a one hundred gammas throughout the survey, with a lower ambient reading to the south and higher ambient reading to the north. All recorded magnetic targets and anomalies are organized by their respective canal and sequentially numbered. Table 2 includes a list of magnetic anomalies with each anomaly referenced to the Target Number.

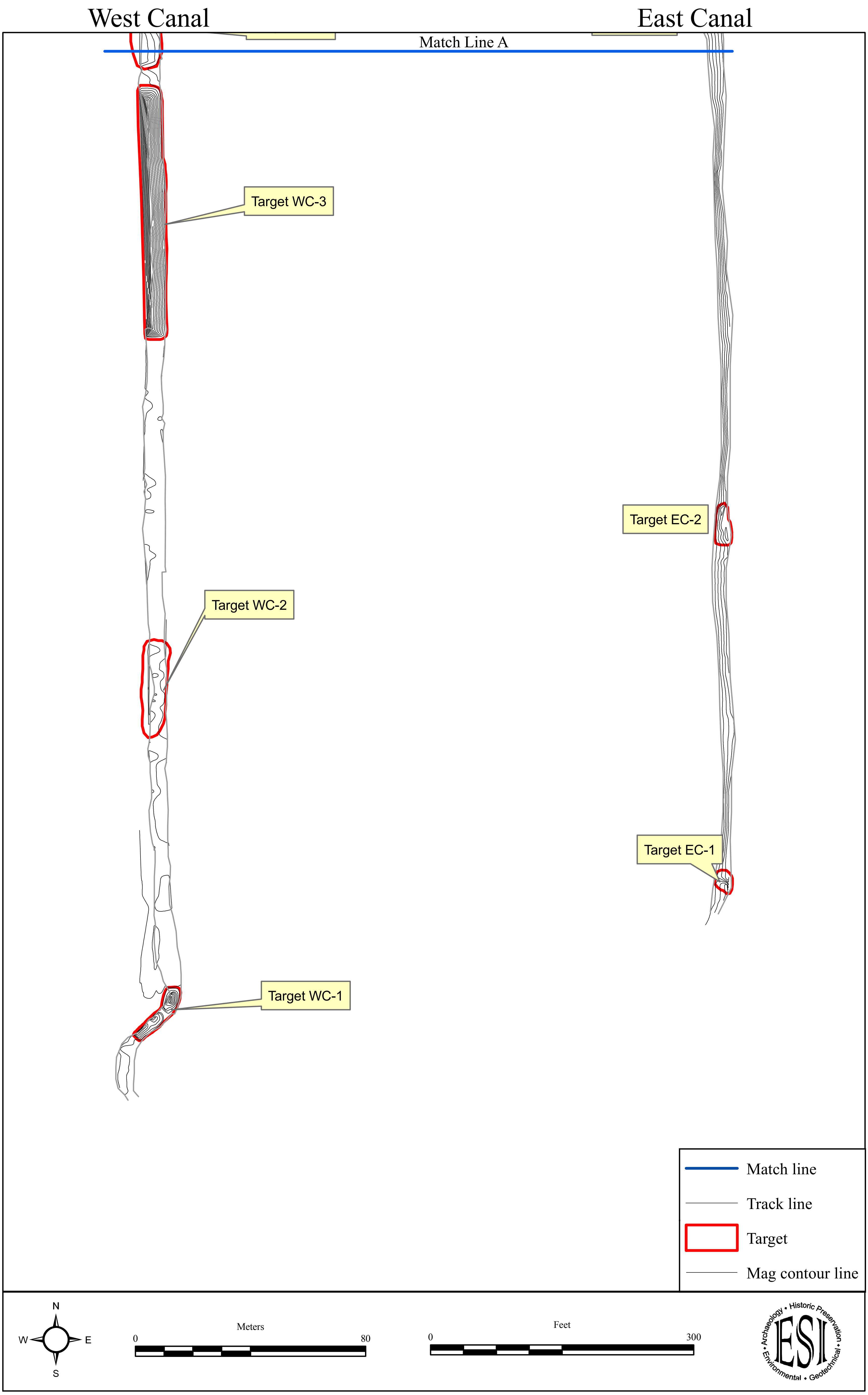

Figure 35. Pecan Island remote sensing survey, segment 1 of 5.

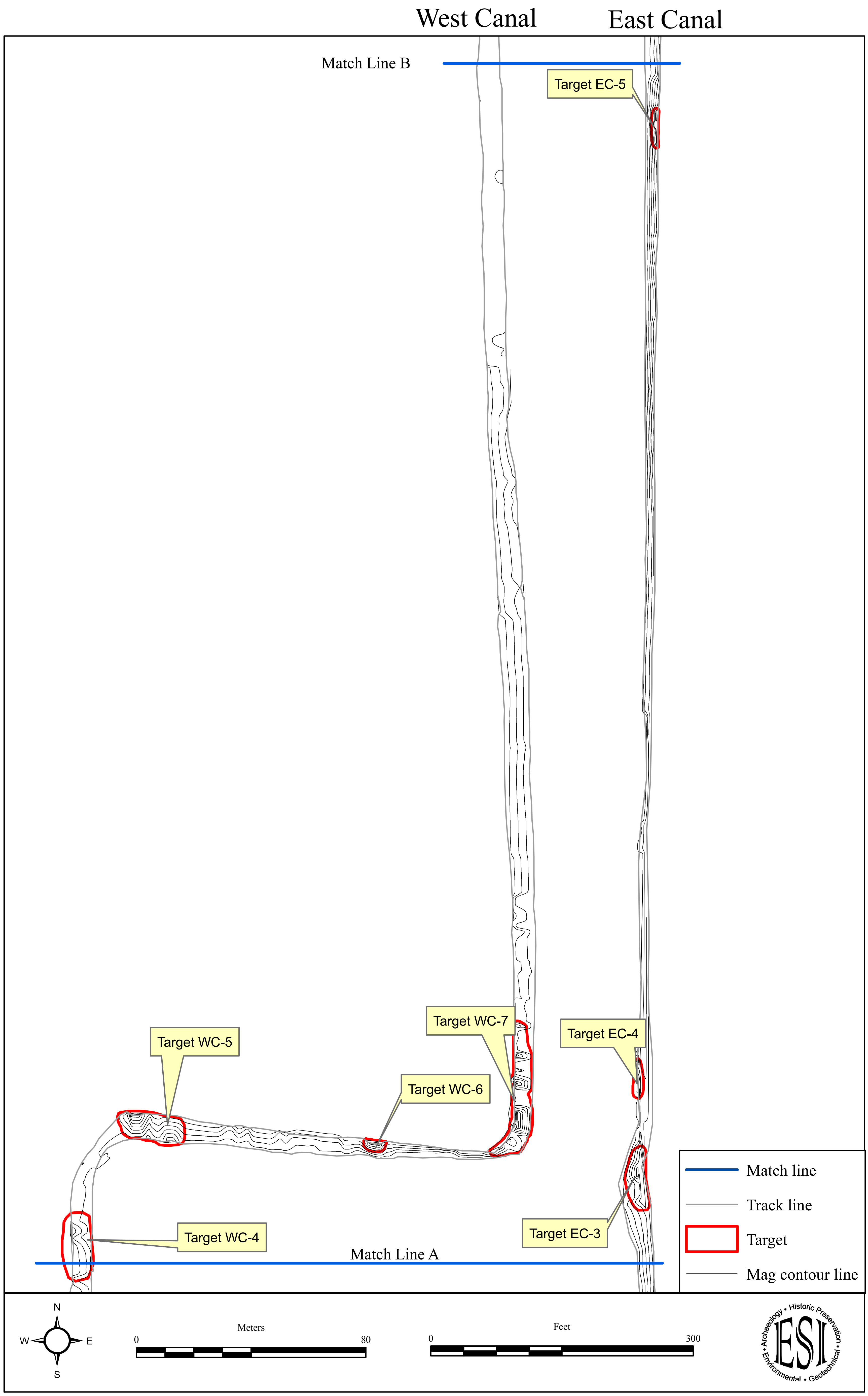

Figure 36. Pecan Island remote sensing survey, segment 2 of 5.

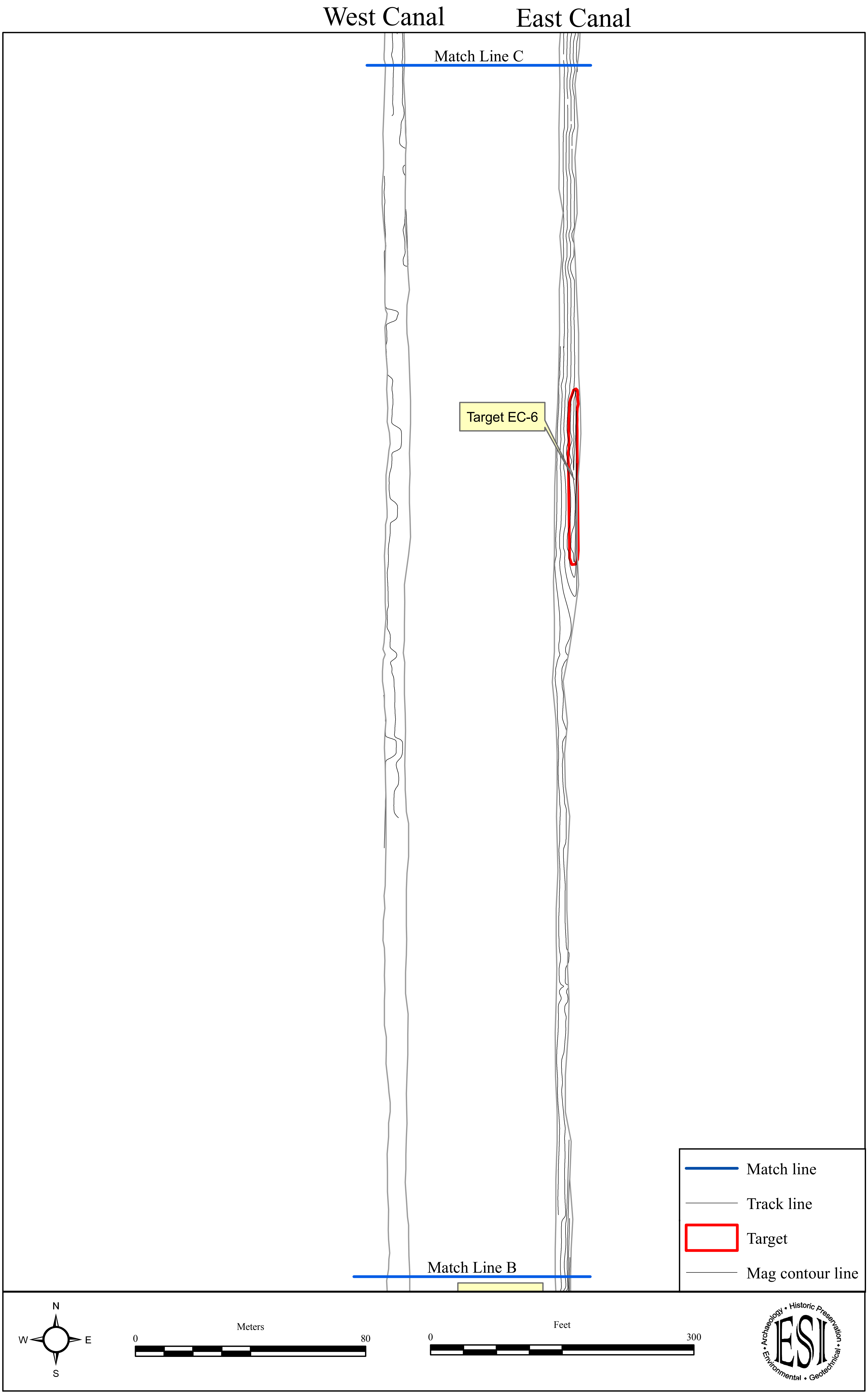

Figure 37. Pecan Island remote sensing survey, segment 3 of 5.

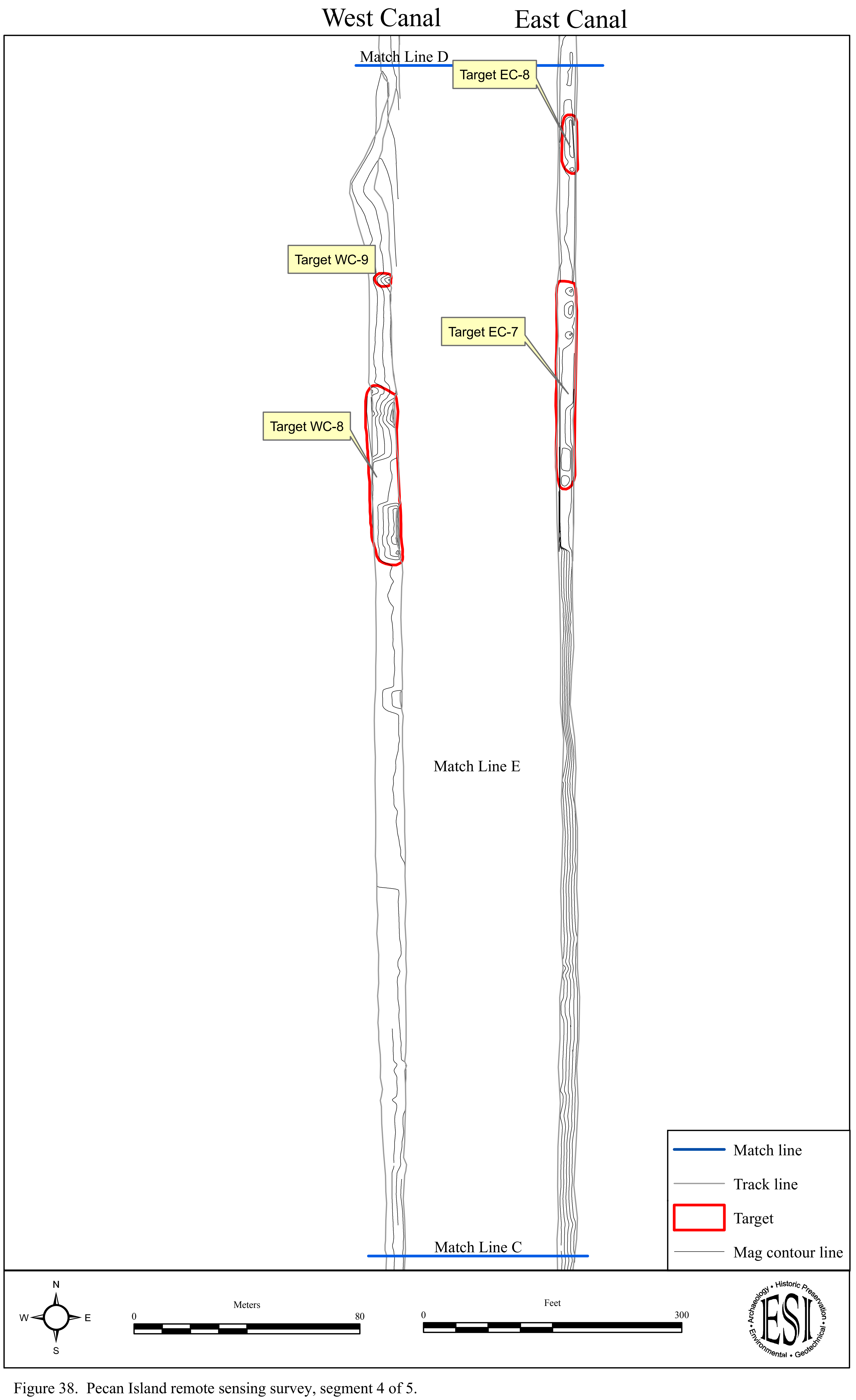

Figure 38. Pecan Island remote sensing survey, segment 4 of 5.

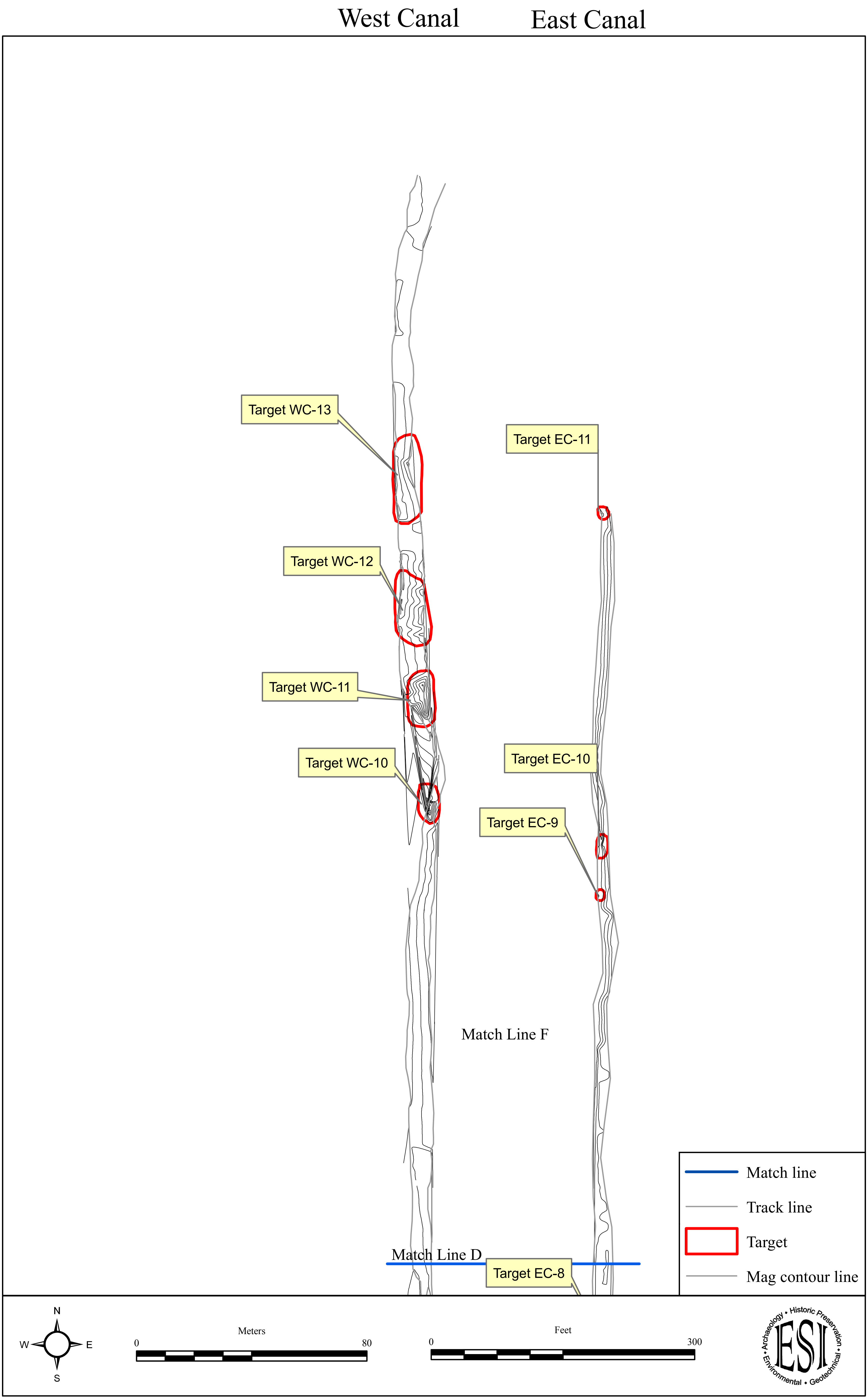

Figure 39. Pecan Island remote sensing survey, segment 5 of 5.

Table 2. Recorded Magnetic Anomalies.

Waterway	Target #	Anomaly #	X	Y	Size	Character	Duration	Source
East Canal	EC-1	1	548099.76	3280964.3	1118	Monopole	30ft (9.14 m)	Data spike from nearby pumping station
	EC-2	1	548099.59	3281084.84	69	Monopole	16 ft (4.89 m)	Unidentifiable
	EC-2	2	548098.34	3281093.44	103	Dipole	11.6 ft (3.56 m)	Unidentifiable
	EC-3	1	548092.86	3281283.31	305	Dipole	73 ft (22.52 m)	Section of corragated tin roof
	EC-4	1	548092.89	3281311.89	78	Monopole	11 ft (3.37 m)	Unidentifiable
	EC-4	2	548092.47	3281322.52	83	Monopole	10.5 ft (3.2 m)	Unidentifiable
	EC-5	1	548098.99	3281644.79	458	Dipole	19.2 ft (5.8 m)	Unidentifiable
	EC-5	2	548099.36	3281652.68	35	Monopole	13.7 ft (4.19 m)	Unidentifiable
	EC-6	1	548101.83	3281925.89	118	Complex	101.5 ft (30.95 m)	Crab pot
	EC-6	2	548102.2	3281965.47	48	Complex	89.4 ft (27.26 m)	Unidentifiable
	EC-7	1	548100.54	3282402.28	1049	Complex	241 ft (73.52 m)	Pipeline crossing
	EC-8	1	548101.66	3282484.63	88	Monopole	68 ft (20.73 m)	Section of corragated tin
	EC-9	1	548098.72	3282640.89	96	Dipole	10.5 ft (3.31 m)	Unidentifiable
	EC-10	1	548098.88	3282656.62	61	Dipole	25 ft (7.75 m)	Crab pot
	EC-11	1	548100.21	3282773.36	409	Monopole	14 ft (4.14)	Unidentifiable
West Canal	WC-1	1	547896.55	3280913.33	240	Complex	41 ft (12.5 m)	Unidentifiable
	WC-1	2	547906.64	3280924.04	290	Complex	28 ft (8.8 m)	Unidentifiable
	WC-2	1	547898.77	3281033.23	84	Dipole	91 ft (27.77 m)	Unidentifiable
	WC-3	1	547898.05	3281199.49	7822	Complex	289.5 ft (88.26 m)	Unidentifiable (linear oject)
	WC-4	1	547896.63	3281263.72	40	Monopole	69 ft (21.04 m)	Unidentifiable
	WC-5	1	547918.11	3281304.36	435	Dipole	33.6 ft (10.25 m)	Unidentifiable
	WC-5	2	547930.26	3281296.11	354	Dipole	29.5 ft (9m)	Unidentifiable
	WC-6	1	548001.4	3281294.36	128	Dipole	27 ft (8.25 m)	Crab pot
	WC-7	1	548045.09	3281292.97	22	Monopole	15.4 ft (4.73 m)	Ferrous scatter
	WC-7	2	548048.53	3281295.95	41	complex	8.7 feet (2.66 m)	Ferrous scatter
	WC-7	3	548051.36	3281301.46	149	Dipole	32 ft (9.74 m)	Ferrous scatter
	WC-7	4	548051.36	3281315.6	134	Complex	17 ft (5.21 m)	Ferrous scatter
	WC-7	5	548051.05	3281325.46	26	Dipole	12.3 ft (3.76) m	Ferrous scatter
	WC-7	6	548051.13	3281335.74	52	Dipole	6.8 ft (2.06m)	Ferrous scatter
	WC-8	1	548035.71	3282366.3	1775	Complex	207 ft (63.1 m)	Pipeline crossing
	WC-9	1	548036.94	3282436.76	40	Monopole	15.28 ft (4.66 m)	Unidentifiable
	WC-10	1	548039.89	3282672.92	1517	Complex	45 ft (13.71m)	Unidentifiable
	WC-11	1	548035.46	3282704.82	23	Dipole	19.55 ft (5.96 m)	Unidentifiable
	WC-11	2	548038.36	3282710.4	112	Dipole	49.21 ft (15 m)	Unidentifiable
	WC-12	1	548037.6	3282738.3	20	Monopole	67 ft (20.48 m)	Unidentifiable
	WC-12	2	548030.8	3282745.72	42	Complex	73.58 ft (22.43 m)	Unidentifaible
	WC-13	1	548032.06	3282783.88	121	Monopole	107 ft (32.65 m)	Unidentifiable

The Target Number can be a grouping of anomalies or a single anomaly. For example, East Canal has a magnetic Target EC-1 and Anomaly #1 with subsequent targets and anomalies numbered EC-2, EC-3, EC- 4, etc., X, Y coordinates, Size, Character, Duration (ft/m), and tentative source identification.

East Canal. East Canal extends 6,717 ft (2,047.3 m) north from LA Highway 82 to White Lake. The first 500 ft (152.4 m) of the canal from Highway 82 was inaccessible to conduct the magnetometer survey due to obstructive debris deposited from Hurricane Rita. Archaeologists conducted a pedestrian survey along each bank line in this section of the canal and revealed no evidence of cultural resources. At the time of the survey, the canal had been completely drained exposing the canal floor and in some areas of the canal had been recently deepened by excavation. Due to the low water conditions in the canal, the magnetometer survey was confined to bottom banks of the canal (Figures 40 and 41). Copious amounts of modern debris were observed including sheets of corrugated tin, hot water heater, crab pots, crawfish pots, and metal pipes on the exposed canal floor.

East Canal contained 16 anomalies comprising of 11 targets (Figures 34-38). All targets and anomalies in the East Canal are interpreted as modern debris deposited from the subsequent Hurricane Rita (2005). Three anomalies recorded in this canal meet or exceed the 50-gamma/80 ft criteria for possible cultural resources; however, due to the lack of water retained in the canal several magnetic anomalies could be identified. Target EC-3, Anomaly 1 is a 305-gamma anomaly with a dipole signature and duration of 73 ft (22.52 m) (Figure 36). The source of this target was a section of corrugated-tin roof likely deposited from the subsequent hurricane. Target EC-6, Anomaly 1 is a 118-gamma anomaly with a complex signature and duration of 101.5 ft (30.95 m) (Figure 37). Crab pots were observed at this location. Target EC-7, Anomaly 1 is a 1049-gamma anomaly with a complex signature (Figure 38). A marked pipeline crosses the canal at this location. All remaining targets and anomalies in East Canal do not meet the 50-gamma/80 ft criteria for possible cultural resources and are interpreted as modern debris. No further research is recommend for the East Canal.

West Canal. West Canal extends 1,732 ft (527.9 m) north from LA Highway 82. It then turns east for 478 ft (145.6 m). From here it extends north for 5,072 ft (1545.9 m) to White Lake. Its total length is 7,374 ft (2247.5 m). The first 400 ft (121.9 m) from Highway 82 of this canal was inaccessible to conduct the magnetometer survey due to a barbed-wire fence crossing canal as well as obstructive debris deposited from the subsequent hurricane. Archaeologists conducted a pedestrian survey along each bank line in this section of the canal and revealed no evidence of cultural resources. The remaining 6,974 ft (2125.6 m) of the canal retains a substantial amount of water and is free of obstructions (Figure 42).

Twenty-two anomalies comprising of thirteen targets were recorded in the West Canal (Figures 34-41). All targets in the West Canal are interpreted as modern debris deposited both by human action and subsequent Hurricane Rita. Four targets and anomalies recorded in West Canal meet or exceed the 50-gamma/80ft criteria for possible cultural resources. Target WC-2 Anomaly 1 is an 84-gamma anomaly with a dipole signature and duration of 101.5 ft (30.95 m) (Figure 35). Its source is unidentified. Target WC-3, Anomaly 1 is a 7,822-gamma anomaly with a complex signature and duration of 289.5 ft (88.26 m) (Figure 35). It is a submerged linear object situated on the west side of the channel. It retains the characteristics of pipe or steel cable. Target WC-8, Anomaly 1 is a 1775-gamma anomaly with a complex signature with duration of 207 ft (63.1 m) (Figure 38). A marked pipeline crosses the canal at this location. Target WC-13, Anomaly 1 is a 121-gamma anomaly with a monopole signature and duration of 107 ft (32.65m) (Figure 39). Its source is unidentified. Though the discussed targets and anomalies meet or exceed the 50-gamma/80 ft criteria for possible cultural resources, review of historic maps revealed that the canal was never used as a navigable waterway. All targets and

Figure 40. Photograph, facing north, showing the low-water levels in the East Canal.

Figure 41. Photograph, facing south, showing the low-water levels in the East Canal.

Figure 42. Photograph, facing south, showing the West Canal.

anomalies, save Target 8 (pipeline), represent modern debris. No further research recommended for this canal.

Summary of Anomalies. A total of 24 magnetic targets (composed of 38 individual anomalies) were recorded. The East Canal contains 16 anomalies comprising 11 magnetic targets. In the East Canal, Targets EC-3, EC-6, EC-7 meet or exceed the 50gamma/80ft criteria. Target EC-3 and EC-6 were identified as modern debris. Target EC-7 is a pipeline crossing. West Canal contains 22 anomalies comprising 13 targets. Targets WC-2, WC-3, WC-8, and WC-13 meet the 50-gamma/80 ft (24.38 m); however, are interpreted as modern debris. Target WC-8 is a pipeline that crosses the project area. All targets recorded do not represent potential cultural resources. No further investigations are recommended for the proposed freshwater conveyance channels.

CHAPTER 8
RECOMMENDATIONS

In February 2008, Earth Search, Inc. (ESI), conducted Phase I submerged cultural resources survey of two proposed 1.7 mile (mi) (40.07 kilometer [km]) freshwater conveyance canals in Pecan Island, Vermillion Parish, Louisiana. Field investigations of the two canals utilized a Geometrics 858 terrestrial magnetometer interfaced with a Trimble AG114 DGPS unit deployed from the bow an airboat. A total of 2.66 miles (4.28 km) of canalized waterway were surveyed. A total of 24 magnetic targets (composed of 38 individual anomalies) were recorded. The East Canal contains 16 anomalies comprising 11 magnetic targets. In the East Canal, Targets EC-3, EC-6, EC-7 meet or exceed the 50gamma/80ft criteria. Target EC-3 and EC-6 were identified as modern debris. Target EC-7 is a pipeline crossing. West Canal contains 22 anomalies comprising 13 targets. Targets WC-2, WC-3, WC-8, and WC-13 meet the 50-gamma/80 ft (24.38 m); however, are interpreted as modern debris. Target WC-8 is a pipeline that crosses the project area. All targets recorded do not represent potential cultural resources. No further investigations are recommended for neither of the proposed freshwater conveyance channels.

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