Phase I Remote-Sensing Submerged Cultural Resource Survey of an Offshore Borrow Site and Temporary Pipeline Corridor Located off Cameron Parish, Louisiana

Oyster Bayou Marsh Restoration Project

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Abstract

Altered hydrology, drought stress, saltwater intrusion and hurricane induced wetland losses have caused the Oyster Bayou area of Cameron Parish, Louisiana to undergo interior marsh breakup. In order to mitigate those impacts the State of Louisiana Coastal Protection and Restoration Authority and the National Marine Fisheries Service plan to restore 510 acres of saline marsh, nourish 90 acres of existing saline marsh habitat and create 14,140 feet of earthen terraces. Material for the restoration will come from an offshore borrow site in the Gulf of Mexico and be piped ashore. Coastal Planning and Engineering, Inc., a CB&I Company, is the consulting geotechnical engineering firm for the project. In order to determine the effects of project related dredging on potentially significant submerged cultural resources, CB&I contracted with Tidewater Atlantic Research, Inc. of Washington, North Carolina to supervise the conduct of an archaeological and geotechnical remote-sensing survey of the proposed borrow area and temporary pipeline corridor. The overall survey areas comprise 1158.32 acres. Analysis of the magnetic and acoustic data identified a total of 97 magnetic anomalies and 37 acoustic target images within the borrow area and temporary pipeline corridor. A total of 31 anomalies and 8 sonar target images have been identified as having a potential association with shipwreck remains. Those magnetic anomalies and sonar targets are isolated by seven buffers designed to protect material generating the signatures from proposed dredging and pipeline deployment activities. If the buffered sites cannot be avoided, additional investigation should be undertaken to identify and assess the significance of material generating the signatures in terms of the eligibility criteria for inclusion on the National Register of Historic Places. The remaining 66 magnetic anomalies and 29 sonar target images are associated with charted pipelines or appear to be associated with modern debris such as fish and crab traps, dredge pipes and pontoons, pilings, logs, small diameter rods, cable, wire rope, chain or small boat anchors or are outside of the final borrow site perimeters. No additional investigation of those sites is recommended in conjunction with the proposed dredging. Examination of the sub-bottom profiler records identified no evidence of shell middens, relict channel confluences or lagoon complexes considered to be associated with prehistoric habitation.

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Preface

The submerged cultural resource remote-sensing survey of the Cameron Parish Oyster Bayou Marsh Restoration project offshore material borrow site and temporary pipeline corridor was carried out by Coastal Planning and Engineering, Inc., a CB&I Company (CB&I) of Boca Raton, Florida and Tidewater Atlantic Research Inc. (TAR) of Washington, North Carolina. CB&I is the consulting geotechnical engineering firm for the restoration project. In order to determine the project's effects on potentially significant submerged cultural resources, CB&I contracted with TAR to supervise the conduct of an archaeological and geotechnical remote-sensing survey of the proposed borrow site. Gordon P. Watts served as the project Principal Investigator and field research associated with the remote-sensing was carried out under the supervision of Matthew Thompson. CB&I personnel included Chris Dougherty and Beau Suthard. Senior historian, Robin Arnold carried out the historical background investigation. This document was prepared by Dr. Watts and Ms. Arnold. All personnel associated with the conduct of historical and literature research, supervision of survey operations, data analysis and report preparation meet, or exceed, the minimum standards of the U.S. Department of Interior.

Introduction

Altered hydrology, drought stress, saltwater intrusion and hurricane induced wetland losses have caused the Oyster Bayou area of Cameron Parish, Louisiana to undergo interior marsh breakup. In order to mitigate those impacts the State of Louisiana Coastal Protection and Restoration Authority and the National Marine Fisheries Service plan to restore 510 acres of saline marsh, nourish 90 acres of existing saline marsh habitat and create 14,140 feet of earthen terraces. Material for the restoration will come from an offshore borrow site in the Gulf of Mexico and will be piped ashore.

The potential source material for nourishment has been identified as a borrow site in the coastal waters immediately south-southwest of Calcasieu Pass. In order to determine the proposed project's effects on potentially significant submerged cultural resources, CB&I contracted with TAR to supervise the conduct of a submerged cultural resource remote sensing survey of the proposed borrow site and temporary pipeline corridor.

The investigation was designed to provide accurate and reliable identification, assessment and remote-sensing documentation of submerged cultural resources in the project area. The survey methodology was developed in terms of the criteria established to comply with the criteria of the National Historic Preservation Act of 1966 (Public Law 89-665), the National Environmental Policy Act of 1969 (Public Law 11-190), Executive Order 11593, the Advisory Council on Historic Preservation Procedures for the protection of historic and cultural properties (36 CFR Part 800) and the updated guidelines described in 36 CFR 64 and 36 CFR 66. The results of the investigation will furnish CB&I the Louisiana Coastal Protection and Restoration Authority and the National Marine Fisheries Service with the archaeological data required to comply with state and Federal submerged cultural resource legislation and regulations.

Work performed consisted of a background literature survey, historical research and cartographic investigation. The field investigation included a remote-sensing survey of the proposed borrow site and a temporary pipeline corridor to transport material to the Oyster Bayou site. The remote-sensing survey was carried out between 8 and 13 March 2013. To reliably identify anomalies associated with submerged cultural resources, survey equipment included both magnetic and acoustic remote-sensing employing a cesium magnetometer, sidescan sonar, and sub-bottom profiler. Bathymetric data was generated using a survey grade precision depth recorder. Navigation and data collection was accomplished using differential global positioning and computer survey software.

Analysis of the magnetic and acoustic data identified a total of 97 magnetic anomalies and 37 acoustic target images within the borrow area and temporary pipeline corridor. A total of 31 anomalies and 8 sonar target images have been identified as having a potential association with shipwreck remains. Those magnetic anomalies and sonar targets are isolated by seven buffers designed to protect material generating the signatures from proposed dredging and pipeline deployment activities. The remaining 66 magnetic anomalies and 29 sonar targets are associated with charted pipelines or appear to be

associated with modern debris such as fish and crab traps, dredge pipes and pontoons, pilings, logs, small diameter rods, cable, wire rope, chain or small boat anchors or are outside of the borrow site design perimeters. Examination of the sub-bottom profiler records identified no evidence of shell middens, relict channel confluences or lagoon complexes considered to be associated with prehistoric habitation.

If the buffered sites cannot be avoided, additional investigation should be undertaken to identify and assess the significance of material generating the signatures in terms of the eligibility criteria for inclusion on the National Register of Historic Places (NRHP). No additional investigation of the remaining 66 magnetic anomalies and 29 sonar targets is recommended in conjunction with proposed dredging or pipeline deployment activities. All those appear to be associated with small single objects and/or modern debris.

Project Location and Survey Areas

Material for the Oyster Bayou Marsh Restoration project has been identified as a borrow site south southwest of Calcasieu Pass off Cameron Parish. To transport dredged material to the Oyster Bayou Marsh Restoration project site a temporary pipeline corridor will be necessary. The center of the borrow site is located approximately 3 nautical miles offshore and 1.5 nautical miles west of the Calcasieu Pass entrance channel. The temporary pipeline will extend from the western perimeter of the dredge site northwest to the beach off Oyster Bayou (Figure 1).

Charted water depths in the dredge site survey area ranged from 13 to 18 feet mean low water (MLW). In the pipeline corridor survey area depths ranged from 5 to 14 feet mean low water (MLW). The borrow area surveyed is 1.27 square miles encompassing 812.8 acres of bottomland. The pipeline corridor survey area is .358 square miles encompassing 229.2 acres of bottomland.

Geographical coordinates in Louisiana South State Plane, NAD 83, U.S. Survey Foot for points that define the perimeter of the borrow site (Figure 2) are:

CORNER	X	Y
A	2632595	449851
B	2638489	449851
C	2638469	443765
D	2633242	443805
E	2632601	444320

Geographical coordinates in Louisiana South State Plane, NAD 83, U.S. Survey Foot for points that define the perimeter of the pipeline corridor (Figure 2) are:

CORNER	X	Y
1	2622477	463952
2	2633024	447784
3	2632599	447488
4	2622038	463685

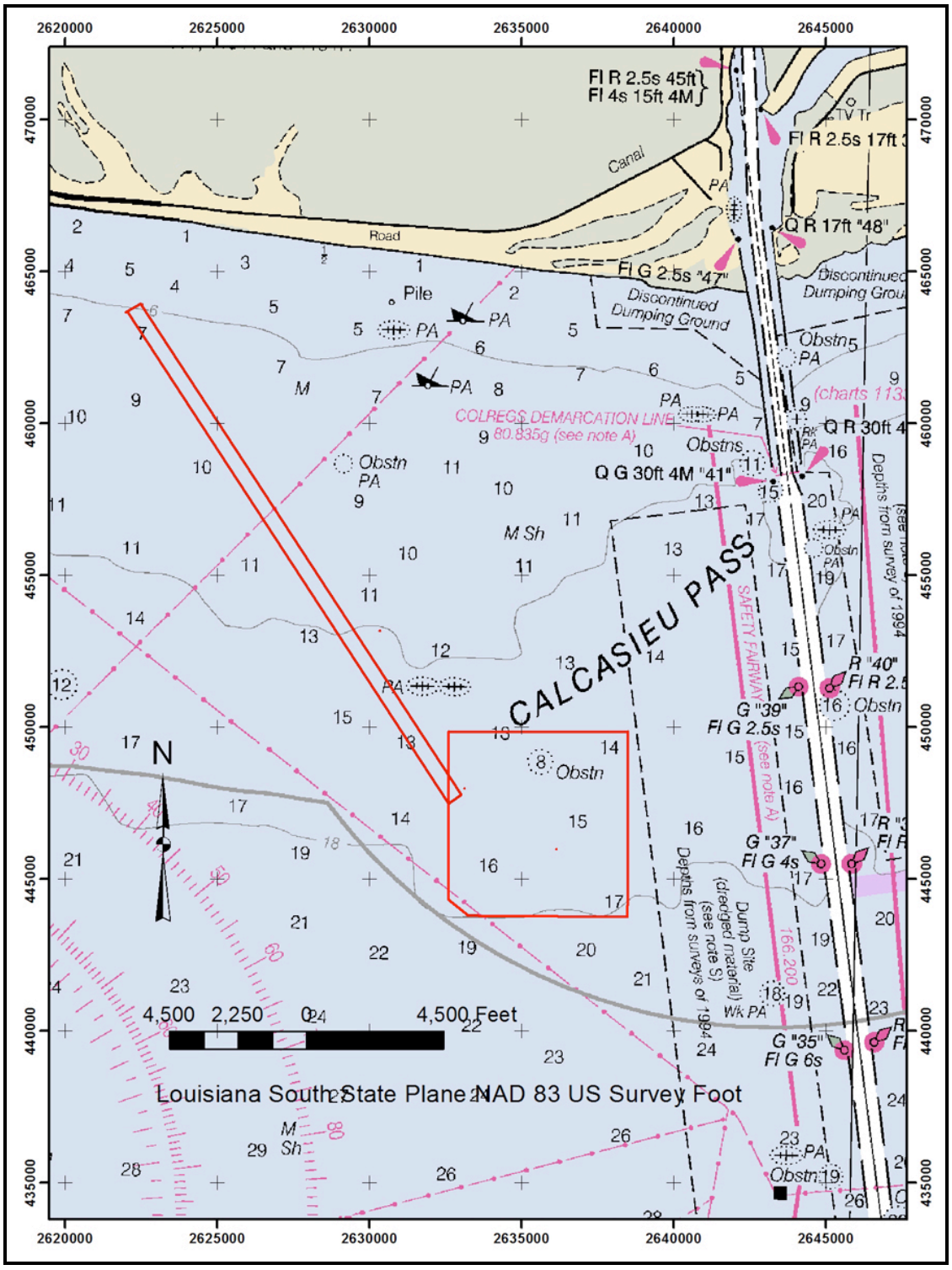

Figure 1. Project location map (NOAA Chart 11341).

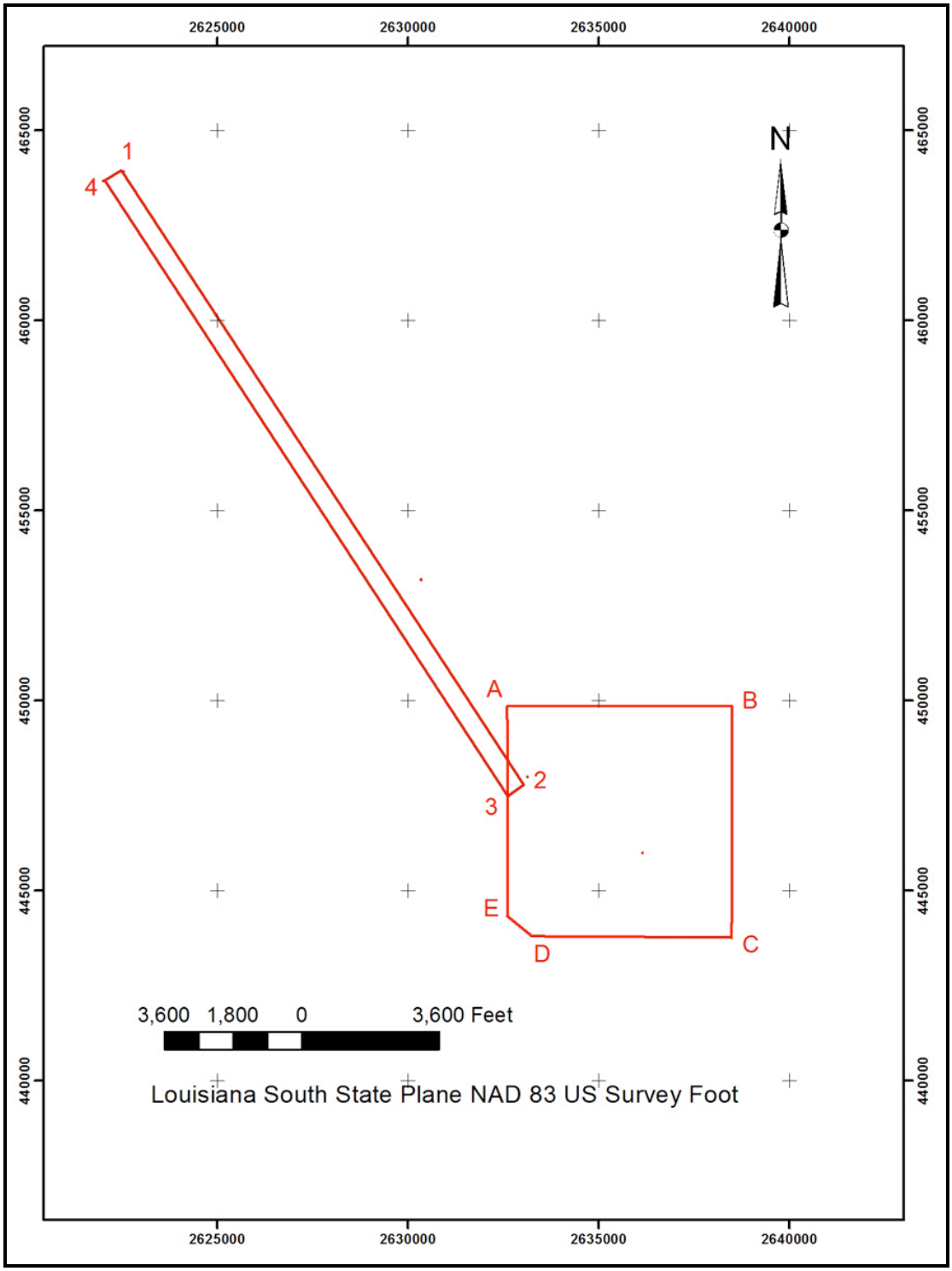

Figure 2. Perimeter points for the borrow area and pipeline corridor.

Environmental Background

The Oyster Bayou Marsh Restoration project lies in the Mississippi Deltaic Plain Physiographic Region. Rees (2010:15) remarked that the coastal prairies of southwest Louisiana are Pleistocene terraces dissected by the Calcasieu and Mermentau drainage basins. Due to "human-induced hydrologic alterations caused by navigation corridors", separate basins have evolved since the initial Federal dredging commenced ca. 1873 (Gammill et al. 2002:xi).

Gammill (et al. 2002:65) suggests that the Calcasieu-Sabine Basin "consists of two semi-distinct hydrologic units, the Calcasieu River basin and the Sabine River basin, which is continuous between Louisiana and Texas. Fresh, intermediate, and brackish marshes dominate" the estuary that lies between the eastern shore of the Sabine River to Louisiana State Highway 27.

The survey areas are located in the shallow inshore waters where depths range from 6 to 24 feet below MLW water. In the survey area, the bottom surface slopes generally to the south and consists of mud, silt and unconsolidated sand.

Geological Setting

The geological environment in the project vicinity, northern Gulf of Mexico, is dominated by the sedimentary geology and geomorphology of the Mississippi River Delta Plain. Since the Late Jurassic, Mississippi River alluvium has been forming coastal Louisiana. A sedimentary pile over 15 km in thickness accumulated during the Mesozoic and Cenozoic (Coleman et al*.,* 1991). Along the northern margin of the Gulf of Mexico Basin, Tertiary and Quaternary sedimentation prograded the shelf edge by 300 km. The rate of progradation was approximately 5 to 6 km per ka (thousand years).

Quaternary glacio-eustatic fluctuations were accompanied by marine regressions and transgressions. The last glacial advance (Last Glacial Maximum [LGM]) occurred during late Wisconsin time about 18,000 to 20,000 years ago. Sea level during the LGM was about 394 to 426 ft (120 to 130 m) lower than present sea level (Saucier 1994).

As the shoreline regressed seaward across the continental shelf, Pleistocene sediments were exposed to subaerial weathering and erosion. During Quaternary lowstands, rivers flowed seaward across the shelf to lowered base levels (as determined by a falling sea level). Shelf gradients induced intricate channel networks that cut into Pleistocene sediments (Figure 3). Late Pleistocene and Holocene marine transgressions, resulting from deglaciation (glacial retreat) caused a landward shift in deltaic sedimentation and shoreface erosion (Berryhill 1986). During sea-level rise, estuaries were infilled, subaerial landforms were submerged and eroded and exposed sediments were reworked (Saltus et al. 2003).

The Calcasieu survey area lies offshore of the Chenier Plain of southwestern Louisiana (Figure 3). The Chenier Plain represents a strand plain that includes long and narrow beach ridges separated by mud flats. Those features are formed by "alternating suspended sediment deposition and wave erosion of sandy mud leaving the chenier ridges stranded as winnowed bed load sand and shell deposits" (Owen 2008:34).

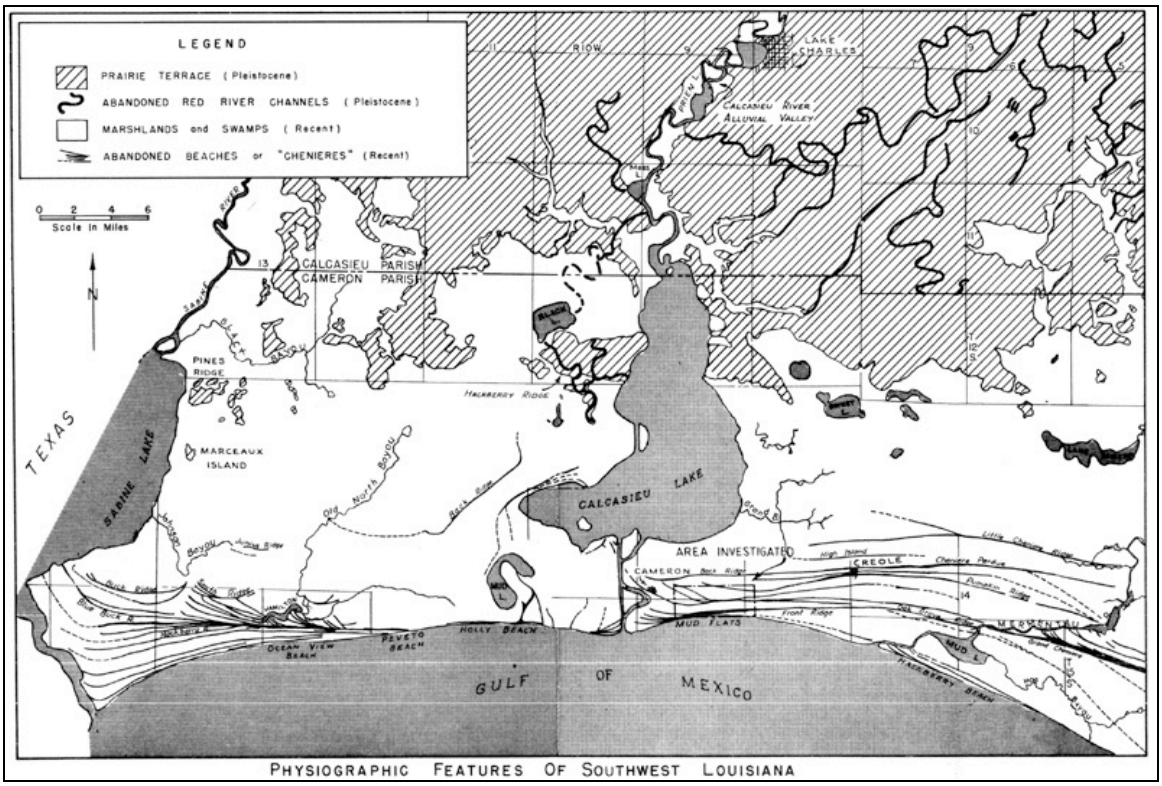

Figure 3. Physiographic features of Cameron Parish (LeBlanc 1949).

The physiographic and stratigraphic features of Cameron Parish are associated with geological events that occurred during late Pleistocene and Recent epoch. Although Quaternary marine transgressions and regressions impacted near-surface geology in the project area, the primary influence has been sedimentation associated with avulsion and shifting of Red River channels and the filling and deltaic formation associated with the Calcasieu River valley. The Calcasieu entrenched valley system was created during the last Ice Age (LeBlanc 1949). Hayes and Kennedy (1903:13-14) remarked that:

> The surface features of the Gulf Coastal Plain are extremely simple. In the immediate vicinity of the coast and for 15 or 20 miles inland in the parishes of Vermillion and Cameron…the general level is scarcely more than 3 or 4 feet above the average tides of the Gulf. At a few points, such as Grand Chenier and Hackberry Island, in Cameron Parish, La….there are pronounced elevations, of a few hundred acres in extent, rising to heights of from 40 to 50 feet above the level of the coast marshes. Bordering the marsh along its northern edge is a second belt, largely prairie land, whose surface

> rises gradually toward the northwest, at an average rate of from 10 inches to a foot per mile…The third or inner belt of country belonging to the Coastal Plain rises comparatively rapidly from the second, and has a more broken and generally timbered surface, with numerous small rounded hills. The general elevation of this belt does not appear to exceed 175 to 200 feet above sea level.

Today the Chenier Plain of Cameron Parish is an active environment. The eastern section is accumulating prograding mudflats at a rapid rate. In the central part erosion is contributing to chenier formation. Slow regressive beach ridge formation characterized the western portion of the Cameron Parish Gulf of Mexico shoreline (Owen 2008:34).

Climate

The Oyster Bayou project area lies in the Louisiana Gulf Coast subtropical zone. This Louisiana Gulf Coast area has been characterized by mild winters and hot humid summers. Average temperatures ranging from 54 degrees in January/February to 81 degrees in July/August. Rainfall is heaviest during the storm season between April and September and annually averages 59 inches. The storm season is characterized by summer thunderstorms and hurricanes that sporadically pass through the area. Winds in southwestern Louisiana are predominately southeasterly but shift sporadically to the north for periods during the winter months (Matthews 1983).

Tides/Currents

The inshore waters of the Gulf Coast off Cameron Parish are influenced by both local weather and the general patterns of the Gulf of Mexico. In the Open Gulf, the Loop Current flows into the Gulf of Mexico between the Yucatan Peninsula and Cuba. It flows north toward the Mississippi Delta before heading east-northeast toward the Cape San Blas region of Florida. The loop is completed when the current heads southeast before turning east and flowing through the straits between Cuba and the Florida Keys (Garrison et al. 1989).

Littoral currents in the project area are influenced by shoreline trends, regional winds and to a degree, eddies associated with the Loop Current. During the year from September to May counter clockwise circulation dominates the pattern on the Gulf Coast Continental Shelf. That flow is driven by prevailing easterly winds. During the summer months from June through August, winds prevail from the southwest resulting in a reverse of the inshore currents along the Gulf Coast (Blumberg and Mellor 1981; Andrews 1978). With the exception of periods of extreme weather currents along the Gulf of Mexico continental shelf are generally about one half knot (Garrison et al. 1989).

As the borrow area is located in the vicinity of a Calcasieu Pass, tides also influence the water column environment. Normally, the lunar tidal range is approximately two feet in the Cameron region. However, winds frequently have a greater impact on the tide than the

moon. Strong winds out of the south can significantly increase both tide heights and currents. Winds from the north can also impact tide elevations, reducing the amount of water flowing into the shallow bays behind the barrier islands. Wave patterns and heights are also a factor of weather. While wave heights of one meter or less represent the norm, storms can generate swells in excess of three meters (McGrail and Carnes 1983). Due to the combined impact of the lunar influence and weather, currents in the area are strong enough to create shoals in the vicinity of the passes (Matthews 1983).

Research Methodology

Literature and Historical Research

Wreck-specific information was reviewed in sources that include: *Statistical and Chronological History Of The United States Navy, 1775-1907* (Neeser 1909); *Disasters to American Vessels, Sail and Steam, 1841-1846* (Lockhead 1954); *A Guide to Sunken Ships in American Waters* (Lonsdale and Kaplan 1964); *The Encyclopedia of American Shipwrecks* (Berman 1972); *Shipwrecks of the Civil War, The Encyclopedia of Union and Confederate Naval Losses* (Shomette 1973); *Shipwrecks in the Americas* (Marx 1983); *Merchant Steam Vessels of the United States 1790-1868, "The Lytle-Holdcamper List"* (Mitchell [ed.] 1975 & supplements I (1978), II (1982) III (1984); *Official Records of the Union and Confederate Navies in the War of the Rebellion* (U.S. Navy Department 1903a-1903b, 1905a-1905b, 1908, 1921), and *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies (*U.S. War Department 1882-1883, 1886, 1889a-1889b).

Additional wreck-specific information was queried in premium digital sources that include: Newspaper Archive, Newspaper.com, Fold 3, Questia, Accessible Archives, and *The New York Times* archives. Maritime records associated with Calcasieu and Cameron parishes included a survey of annual reports produced by the U.S. Army Corps of Engineers, the U.S. Lighthouse Board, the U.S. Coast Survey, the U.S. Geological Survey, and the U.S. Steamboat Service. Historical maps and charts preserved in collections of national and regional online sources were reviewed for submerged cultural resources data applicable to the project area.

The Louisiana Cultural Resource Management Bibliographic Index (Louisiana Division of Archaeology) database was queried to carefully review report abstracts related to previous surveys conducted in the survey area. The NRHP database was also queried to ascertain if documented cultural resources were recorded in the project area. This query related that only two eligible resources (standing structures) are currently listed in the NRHP for Cameron Parish.

A careful review of documents described in "Guide to the W. T. Block, Jr. Papers" and held by the Archives and Special Collections Department, Frazar Memorial Library, McNeese State University [Lake Charles, Louisiana] provided critical Southwest Louisiana research avenues. The scope and scholarly quality of Mr. Block's numerous articles assisted the historical research phase immeasurably.

In the course of the fieldwork, two Cameron Parish libraries were visited to ascertain if shipwreck related sources and relevant archives were available. Librarian Julie Carlson was interviewed and graciously related numerous historical sources to consult and also suggested local individuals that should be consulted. Captain Kent Carlson (K&J Hunting & Fishing Lodge) was interviewed who was able to provide pertinent details related to modern shipwrecks in the project area.

Cultural Background

The prehistory of Louisiana is divided into five stages based on archaeologically recognized cultural aspects. These five stages, Paleo-Indian (ca. 12,000 to 8,000 B.P.), Archaic (ca. 8,000 to 3,500 B.P.), Gulf Formational (ca. 4,500 to 2,000 B.P.), Woodland (ca. 2,000 to 800 B.P.) and Mississippian (ca. 800 to 300 B.P.), conform to general developmental trends that have been documented archaeologically across the southeastern United States. Each of these stages is further sub-divided by distinct subsistence and settlement patterns and/or artifact assemblages prevalent during certain time periods and usually representing regional preferences.

Few archaeological sites have been located that pre-date the Tchula period of the late Gulf Formational stage in the coastal zone south of New Orleans. Those sites are on salt dome structures and remnant natural levees of the Teche complex. The natural levees associated with the eastern portion of this complex possibly were habitable between about 4,500 and 3,500 B.P. (Saucier 1994). Kniffen (1936) outlined four types of sites that were found in the coastal zone of southeast Louisiana: earthen mounds, shell mounds, shell middens and wave-washed shoreline deposits. Beavers (1977) and Gagliano (Gagliano et al. 1979) noted that most sites are located at the junction of two bodies of water; be they bayou and bayou, bayou and bay or bayou and lake.

In the southern portion of the Terrebonne Basin these older natural levees either are lacking or are deeply buried. Using core and seismic data Penland and Suter in 1983 identified a possible Teche delta complex revinement surface approximately 30 – 32 feet below sea level beneath Isle Dernieres (Pearson 2001:7). The oldest landforms in or near the current study area consist of barrier islands, which are estimated to be approximately 600 - 800 years old (Pearson 2001:10).

For the purpose of this report the discussion of prehistoric sequences will start with the Tchula period in Louisiana, which is the earliest culture likely to be encountered in the current project area. Earlier occupations of the area unquestionably occurred, but any sites would be so deeply buried by Holocene deposits that the chances of encountering these during dredging would be a remote possibility.

Late Gulf Formational Stage (ca. 3,000 to 2,000 B.P.)

The Late Gulf Formational stage (ca. 3,000 to 2,000 B.P.) contrasts significantly with the preceding Poverty Point period of the Archaic stage. During this period, small, low earthen

mounds were favored over the monumental earthworks of the past. The extensive trade networks developed during the Poverty Point period declined and local resources were emphasized. Gibson (1974) originally proposed that the decline of the Poverty Point culture was caused by a breakdown in the hierarchy. His reasoning stemmed from observations that exotic goods increased at the Poverty Point Site (16WC5), while decreasing at regional centers and their peripheral hamlets. This was viewed as the result of the elite taking more and giving less. At approximately the same time that the Poverty Point Site was abandoned, the Tchefuncte culture arose in the Lower Mississippi Valley and along the coast.

Tchula Period (ca. 2,500 to 2,000 B.P.)

Ford and Quimby (1945) defined the Tchefuncte culture from investigations at the Tchefuncte Site (16ST1) on the north shore of Lake Pontchartrain. The cultural period is referred to as the Tchula period (ca. 2,500 to 2,000 B.P.), named for a town near the Jaketown Site (22HU505), where a substantial number of Tchefuncte ceramics were recovered (Ford et al. 1955). Subsequent excavations at Bayou Jasmine (16SJB2), Beau Mire (16AN17), Morton Shell Mound (16IB3), Big Oak Island (16OR6), Little Oak Island (16OR7) and other sites contributed in establishing attributes of the culture and defining regional phases (Byrd 1994; Neuman 1984; Shenkel 1974, 1982; Weinstein and Rivet 1978). The artifact assemblage of the Tchefuncte culture was very similar to that of the preceding period. First, baked clay Poverty Point objects, while still manufactured, were less abundant and restricted to a few forms during the Tchula period (Ford and Quimby 1945). Next, while exotic lithic materials are not as common on Tchefuncte sites, worked shell and bone artifacts appear in relatively high frequencies (Ford and Quimby 1945; Kidder and Barondess 1982; Shenkel 1974). Last, the Tchefuncte people are identified as the first culture in Louisiana to manufacture ceramic in quantities indicative of everyday usage (Ford and Quimby 1945; Neuman 1984).

Throughout the southeast fiber-tempered ceramics were being replaced by sand, grit and clay-tempered ceramics (Walthall 1980). Weinstein (1995) states that the present evidence suggests that the untempered Tchefuncte ceramic tradition and its northern equivalent, Tchula ceramics, developed out of the Wheeler fiber-tempered ceramic tradition. This reasoning stems from the fact that early Tchefuncte ceramics at Beau Rivage (16LY5) and early Tchula ceramics in the Yazoo Basin contain decorations identical to those found on Wheeler ceramics in the same deposits.

Subsistence during the Tchula period combined the utilization of shellfish, fish, turtle, alligator, large and small mammals and native cultigens (Byrd 1994; Shenkel 1982). One of the more notable features of the Tchula period along the coast is their large *Rangia* shell middens. Most of these middens are several meters thick, attesting to their heavy consumption of shellfish. At the Morton Shell Mound (16IB3) in southern Louisiana, Byrd (1994) found evidence of squash and gourd suggesting that small-scale agriculture also was practiced during this period.

As originally defined by Ford and Quimby (1945), Tchula period sites contain Tchefuncte Incised, Tchefuncte Stamped, Tammany Punctated, Lake Borgne Incised and Orleans Punctated ceramics, along with Pontchartrain and Macon projectile points. Socketed bone points also were produced and are more common at coastal sites than at inland sites. Tchefuncte Stamped and Tchefuncte Incised ceramic types occur in higher frequencies than the other decorated ceramic types. In the Pontchartrain Basin, Tchefuncte sites generally are restricted to the shores of Lakes Pontchartrain, Borgne and Maurepas, and the lower portions of the bayous and rivers that drain into these lakes (Ford and Quimby 1945; Smith et al. 1983). Along natural levees and adjacent terraces of the Mississippi River and its tributaries from approximately Baton Rouge to the head of Bayou Lafourche late Tchula sites exhibit thinner ceramics. In this region Tammany Punctated sherds occur more frequently than the other types, while Tchefuncte Stamped sherds are a minority (Weinstein and Rivet 1978).

Hays and Weinstein (1999), after a reexamination of ceramic sherds recovered from the Bayou Jasmine site (16SJB2), have designated a new ceramic type for the Tchula period. Chene Blanc Plain is described as "relatively thick, well-made sherds with nonlaminated [*sic*] pastes that contain specks of hematite, bone, possibly shell and sometimes grog" (Hays and Weinstein 1999). Chene Blanc Plain, *var. Chene Blanc* was identified in the upper portion of the Bayou Jasmine midden, thus a late Tchula type. Chene Blanc Plain, *var. Fountain* was found to occur in the very top portion of the midden, indicating a very late Tchula or very early Marksville association.

Carbon samples from the Bayou Jasmine site (16SJB2) recently submitted by Hays (1995) yielded uncalibrated dates from ca. 140 B.C. (2,140 B.P.) to ca. 980 B.C. (2,980 B.P.). Most of these uncalibrated radiocarbon dates ranged between ca. 630 B.C. (2,630 B.P.) and ca. 880 B.C. (2,880 B.P.). If these dates are upheld, the currently recognized temporal span of the Tchefuncte culture will need readjusting. These radiocarbon dates also could substantiate Gibson's (1974) original theory that the Tchefuncte people actually were the Poverty Point people that had migrated into the Mississippi River floodplain during the waning decades prior to the abandonment of the Poverty Point site ca. 700 B.C. (2,700 B.P.). In fact, Hays and Weinstein (1999) agree that the Tchefuncte culture has ties to the Poverty Point culture, but the relationship is not wholly understood. Gibson (1995) notes that the occurrence of Tchefuncte-like ceramics in Poverty Point cultural contexts at the type site (16WC5) could mark the appearance of ceramics in the Lower Mississippi Valley, but widespread manufacture of ceramic vessels did not occur until the Tchula period.

An unnamed phase of the late Tchula period occurs in Assumption and Terrebonne Parishes (Weinstein 1995). Coastal Environments (CI) identified two sites (16TR211 and 16TR212) of this phase located on subsided natural levees that were assumed to have been dated post-Tchula in age (Weinstein and Kelley 1992). Ceramics recovered from these sites included Lake Borgne Incised, *vars. Cross Bayou* and *Lake Borgne*, Orleans Punctated, *var. Boothe*, Tammany Punctated, *vars. Brittany* and *Tammany*, Tchefuncte Incised, *var. Bayou Braud* and Tchefuncte Plain, *var. Tchefuncte*.

Although Tchefuncte culture sites have been located all along the Mississippi in Louisiana, Mississippi and Arkansas, two coastal sites are located in the southwest. The Grand Lake site covers a large area east of Lake Calcasieu. The Sabine Lake site extends from western Cameron Parish across the border into Texas. To date no Tchefuncte culture sites have been identified in the vicinity of Lake Calcasieu (Hayes and Weinstein 2010:104-106).

Woodland Stage (ca. 2,000 - 800 B.P.)

Typically, the Woodland stage (ca. 2,500 to 800 B.P.) in the Southeast is seen as a time when ceramics composed a significant portion of the artifact assemblage, native inhabitants practiced ceremonial burials and plant husbandry or agriculture was practiced to some degree (Walthall 1980). While several criteria have been used to define the Woodland stage in the Southeast, it is generally considered that those three traits together define the period.

The Early Woodland period does not occur in southern Louisiana, as it does in other parts of the Southeast. The transitional Tchefuncte culture (ca. 2,500 to 2,000 B.P.) flourished instead (Green 1999). The Tchefuncte were the first peoples in Louisiana to produce pottery in quantity, however monumental earthen mound construction, ritual interments and agriculture were not common (Ford and Quimby 1945; Neuman 1984).

Marksville Period (ca. 2,000 to 1,600 B.P.)

The first true Woodland culture in Louisiana was the Marksville culture (ca. 2,000 to 1,600 B.P.). The Marksville culture, named for the Marksville site (16AV1) in Avoyelles Parish, originally was described as the southern expression of the Hopewell culture, which was located primarily in Illinois and Ohio (Ford 1936; Toth 1988). Toth (1988) argues that the origins of the Marksville culture appeared during the Tchula period. This argument primarily stems from the presence of rocker-stamping, and other ceramic traits that occur on late Tchefuncte ceramics and are present on early Marksville period ceramic wares. Accordingly, the transformation of the Tchefuncte culture into the Marksville culture was initiated by the Hopewellian intrusion into the Lower Mississippi Valley (Toth 1988). While there has been little doubt as to the similarity of Marksville decorative motifs and vessel forms to those of the Hopewell, influences in ceramic decorations also can be correlated with coeval cultures to the east (Neuman 1984; Walthall 1980). Walthall (1980) notes that these ceramic traditions, Swift Creek, Porter and Santa Rosa cultures in southern Alabama and Georgia, and northwest Florida, were also the result of Hopewell interaction. The most compelling evidence of the ties that these cultures had to the Hopewell culture manifest itself in exotic trade goods and ceremonial objects. Copper and mica artifacts identical to those recovered from Hopewell sites have been found at the numerous sites of the same time period with similar ceramic decorations and forms (Neuman 1984). Zoomorphic pipes, typically associated with the Hopewell, also appeared at sites in the Southeast during this same period (Walthall 1980).

The Marksville culture is seen as having a highly organized social structure demonstrated by the presence of burial mounds for the elite containing special items apparently manufactured expressly for internment with the burials. Several Marksville sites also

exhibit log tomb burial chambers similar in construction to those found on Hopewell sites (Toth 1988).

Subsistence during the Marksville period was similar to prior periods. In southeast Louisiana, Marksville sites generally were located on natural levees and terraces along the lakes, rivers and bayous. Gagliano (1964) suggests that the Marksville practiced a cyclical seasonal pattern. During the summer, sites on or adjacent to lakes and streams were occupied to take advantage of shellfish, turtles, alligators, fish and mammals. Permanent or semi-permanent camps were occupied in the uplands and on the Prairie terrace during the fall and winter in order to exploit available nuts and acorns, as well as local fauna.

No phases have been designated for the Marksville period in the present study area. Ceramics recovered from Bayou Cutler and other sites in the area indicate that both the early and late Marksville period are represented. Early Marksville ceramics found on these sites consist of Baytown Plain, *var. Marksville*, Churupa Punctated, *vars. Boyd*, *Hill Bayou* and *unspecified*, Indian Bay Stamped, *var. Cypress Bayou*, Mabin Stamped, *vars. Mabin*, *Point Lake* and *unspecified*, Marksville Incised, *var. Sunflower*, Marksville Stamped, *vars. Marksville* and *Old River* and crosshatched rims (Gagliano et al. 1979). Late Marksville ceramics include Baytown Plain, *var. Satartia* and Marksville Incised, *var. Yokena* (Gagliano et al. 1979).

Coles Creek Period (1,200 to 800 B.P.)

By circa 1,300 B.P., the cultural traits that define the Coles Creek culture had taken shape. Coles Creek sites appear to be larger, more numerous and more complex than earlier sites. The emergence of a chiefdom-like society could be implied from the complexity of the Coles Creek mound system. A sizable labor force must have been necessary to build, maintain and utilize these mounds and it could be assumed that a central authority figure controlled the labor force (Muller 1983). Evidence for the elite residential or mortuary structures often said to be associated with Coles Creek mounds remains elusive prior to ca. 1,000 B.P. (Fritz and Kidder 1993; Smith 1975; Steponaitis 1983). Nevertheless, both the form of the platform mounds and their arrangement around plazas are possibly indicative of Meso-American influence (Willey 1958; Williams and Brain 1983). The general population occupied the region surrounding the large ceremonial centers (Neuman 1984).

The Coles Creek ceramic complex consisted primarily of simple rectilinear designs usually present on the upper half of the vessel. French Fork Incised, a ceramic type originating during the Troyville period, was an exception (Phillips 1970; Springer 1977). Interestingly, Coles Creek designs suggest that the culture had contact with the Weeden Island culture along the Northwest Florida Gulf Coast (Willey 1949). French Fork Incised motifs are identical to those found on Weeden Island Incised vessels. Other parallels can include Evansville Punctated and Carabelle Punctated; Hollyknowe Ridged Pinched and Tucker Ridged Pinched; Mazique Incised and Carabelle Incised and Pontchartrain Check Stamped and Wakulla Check Stamped. These ceramic decorative parallels were not temporal, suggesting the infusion of these decorative motifs into the Coles Creek culture as their popularity was waning with the Weeden Island culture. Another less common decoration

along the coast during the Coles Creek period, with parallels in the Swift Creek and Weeden Island cultures of Florida, was complicated stamping (Brown 1980, 1982, 1984; Neuman 1981). Brown (1984) assigned the sherds recovered from the Morgan site (16VM9) to the Gainesville Complicated Stamped ceramic type, typically found in the Gainesville Lake area of Mississippi and Alabama (Jenkins 1981). Saunders and Stoltman (1999) decided that a new ceramic type, Cameron Complicated Stamped, was warranted after petrographic studies of the ceramic pastes indicated that they were of local manufacture during the Coles Creek period. Cameron Complicated Stamped has been recovered from the Bayou Cutler I site (16JE3) north of the current study area.

Only limited archaeological evidence has been found to support the theory of subsistence based on maize agriculture during the Coles Creek period (Kidder 1992a). Archaeological efforts have resulted in the recovery of only the smallest amounts of maize from Coles Creek midden deposits. Tooth enamel decay indicative of the consumption of maize was thought to be attributed to the consumption of starchy foods other than maize (Kidder 1992b; Steponaitis 1986). Evidence now available suggests that the growth and consumption of maize was not widespread in the Lower Mississippi Valley until after the Coles Creek period, ca. 800 B.P. (Fritz and Kidder 1993; Kidder 1992b). A better example of subsistence in the Lower Mississippi Valley during this time period can be demonstrated by the faunal remains recovered from the St. Gabriel Site (16IV128), a late Coles Creek/early Plaquemine site in Iberville Parish. These remains included both large and small game such as bear, deer, opossum, rabbit, squirrel, raccoon and alligator. Evidence of several native species of waterfowl, fish and turtle were also recovered. Botanical remains recovered included maize, honey locust, persimmon and grape (Woodiel 1993). Ramenofsky (1989) found evidence of intensive usage of acorns during the Coles Creek period and also notes that the use of acorns increased over time.

A large majority of inland Coles Creek sites have been found to occur along stream systems and particularly on the natural levees of old cutoffs and inactive channels. Soils in these locations would provide nutrients for agriculture (Neuman 1984). Small Coles Creek sites consisted mostly of hamlets with no mounds, while the larger Coles Creek sites contain one or more mounds. Coles Creek mounds typically are larger, and exhibit more building phases than the earlier Marksville burial mounds. Plazas are associated with multiple mound sites (Gibson 1985). Shell middens are the most common forms of Coles Creek period sites in the coastal zone. These middens are commonly on higher portions of natural levees (Springer 1974) along bayous and streams, and along lake shorelines.

The Coles Creek period in southeast Louisiana is divided into three phases: Bayou Cutler, Bayou Ramos and St. Gabriel. Kniffen (1936) designated the Bayou Cutler phase (ca. 1,300 to 1,150 B.P.) of the early Coles Creek period based on his examination of materials from the Bayou Cutler I site (16JE3) in Jefferson Parish. Phillips (1970), relying on information supplied by McIntire (1958), interpreted the ceramics described by Kniffen as endemic of this phase to include Coles Creek Incised, *vars. Coles Creek* and *Chase*, Beldeau Incised, Chevalier Stamped, Pontchartrain Check Stamped, *var. Ponchartrain*, Evansville Punctated, *var. Rhinehart*, Mazique Incised, *var. Mazique* and several varieties of French Fork Incised.

The Bayou Ramos phase (ca. 1,150 to 1,000 B.P.) was described by Weinstein from information obtained during excavations at the Bayou Ramos I site (16SMY133) in St. Mary Parish. The ceramic assemblage of the Bayou Ramos phase consists of Avoyelles Punctated, *var. Avoyelles*, Beldeau Incised, *var. Beldeau*, Coles Creek Incised, *var. Mott*, Mazique Incised, *var. Mazique* and Pontchartrain Check Stamped, *var. Tiger Island* (Weinstein et al. 1978). Bayou Ramos phase sites primarily occur west of the Terrebonne Basin.

St. Gabriel (ca. 1,000 to 800 B.P.) was established by Brown (1985) based on Woodiel's (1980, 1993) excavation of the St. Gabriel site (16IV128) in Iberville Parish. Woodiel concluded that the St. Gabriel site (16IV128) contained a very late Coles Creek occupation just prior to changes that would define the Plaquemine period. Ceramics typical of the St. Gabriel phase include Addis Plain, *var. Addis*, Coles Creek Incised, *var. Hardy*, Evansville Punctated, *var. Wilkinson,* Harrison Bayou Incised, *var. Harrison Bayou*, Mazique Incised, *var. Manchac* and small amounts of Plaquemine Brushed, *var. Plaquemine* (Brown 1985; Weinstein 1987; Woodiel 1980, 1993).

Archaeological findings suggest that by the end of the Coles Creek period the population had increased and became more socially and politically complex. Large-scale mound construction occurs. The implication of the reemergence of a chiefdom-like society is evidenced by the return of long-distance trade of a scale not seen since the Poverty Point period (Muller 1983). The introduction of sociopolitical and material concepts into the Lower Mississippi Valley from the established Mississippian traits associated with Cahokia in southeastern Missouri (Kelly 1990) possibly initiated the transformation of Coles Creek cultural traits into what is now recognized as the Plaquemine culture about 800 B.P.

In the Chenier Plain physiographic province of southwestern Louisiana, Coles Creek populations constructed platform mounds on the remnant beach features (Roe and Schilling 2010:162). At Bayou Grand Cheniere a ridge was built late in the Coles Creek period. The ridge bounded the western portion of a plaza. Excavations at the Bayou Grand Cheniere site suggests that this and other Coles Creek sites were used and expanded over periods of several centuries (Roe and Schilling 2010:160-161).

Mississippian Stage

During the late prehistoric period, Mississippian influence radiated from the middle Mississippi River Valley across the Southeast (Haag 1971). Mississippian sites in Louisiana typically are located along the Mississippi River and the southeastern coast (Neuman 1984). Mississippian culture continued to influence the lifeways of indigenous southern Louisiana populations until contact with European cultures.

The consistent variation of Mississippian sites suggests that the Mississippian culture was a complex, non-egalitarian, stratified society. Larger sites contain flat-topped, truncated pyramidal mounds facing onto a central plaza which probably served, at least in part, as

platforms for the residences of high-status families. Low-status families occupied single room, rectangular wattle-and-daub buildings (Walthall 1980).

The cultivation of maize, beans, squash and pumpkins; gathering of local plants, nuts and seeds; and fishing and hunting of local faunal species served as the basis of Mississippian subsistence. Terrestrial faunal remains from Mississippian sites indicate that approximately 70 percent of the animals consumed were deer, raccoon, squirrel or turkey. These animals utilized both maize and mast for their own dietary needs and were the hunted game (Neumann 1989). Increased consumption of opossum is evident (Neumann 1984). A byproduct of the swidden horticulture practiced during this time was the growth of persimmon groves on the abandoned fields; persimmons were exploited heavily by both human and animal populations.

The inclusion of shell tempering in the Mississippian pottery enabled potters to create larger vessels. Typical Mississippian ceramic vessels include globular jars, plates and bottles, and loop- and strap-handled pots. These vessels were decorated by engraving, negative painting and incising. Modeled animal heads and anthropomorphic images were also used to decorate ceramics. Chipped and ground stone tools; shell items such as hairpins, beads and gorgets and mica and copper artifacts are a few of the items recovered from Mississippian sites (Neuman 1984; Steponaitis 1983; Walthall 1980).

Plaquemine Culture (ca. 800 - 300 B.P.)

Previously thought to be a transitional phase from the Coles Creek culture to a pure Mississippian culture (Neuman 1984) recent investigations categorize the Plaquemine culture (ca. 800 to 300 B.P.) as Mississippian (Kidder 1988, 1990). The intensification of agriculture, sociopolitical structure and religious ceremonialism suggests the development of a complex social hierarchy.

Plaquemine subsistence was probably based mainly on agriculture and supplemented by native plants and animals. Kidder (1992a) notes that the Emerson Site (16TE104), a late Plaquemine site in the Tensas Basin yielded a large volume of maize, but the quantity of acorn remains from the site indicate that this resource was intensely utilized. In the coastal zone, Williams (1999) identified substantial amounts of *zea maize* associated with late Plaquemine cultural deposits at the Discovery Site (16LF66).

Settlement patterns, economic organization and religious practices of the Plaquemine peoples continued in the tradition of the earlier Coles Creek period. Sites are typically characterized as ceremonial sites with multiple mounds surrounding a central plaza, with dispersed villages and small hamlets (Neuman 1984; Smith et al. 1983). According to Gregory (1969), Plaquemine sites are generally found in lowland areas, including swamps and marshes. Numerous *Rangia cuneata* shell midden sites in the coastal zone contain Plaquemine components, not unlike the preceding Coles Creek period. Identified Plaquemine sites in the region include 16JE2, 16JE45, 16LF29, 16LF31 and 16LF37 (Neuman 1977).

Plaquemine ceramic decorations demonstrate their Coles Creek tradition, while late Plaquemine ceramics reflect an interaction with cultures to the north and east (Kidder 1999; Phillips 1970). Typical early Plaquemine ceramic types included Leland Incised, Coles Creek Incised, *var. Hardy*, L'Eau Noire Incised, Anna Incised and Plaquemine Brushed (Quimby 1951). The inland Plaquemine culture apparently had evolved into a true Mississippian culture by ca. 550 B.P. (Kidder 1988). In the coastal zone of Louisiana, the Plaquemine culture adopted fewer Mississippian cultural traits. Kidder (1990, 1999) notes that Mississippian ceramics represent a minority of the ceramics found on Plaquemine sites in this region dating to the same time period. The Plaquemine culture also did not adopt shell tempering to the same degree as other indigenous cultures in the Southeast. Instead, the Plaquemine people continued utilizing grog as a tempering agent.

Two phases have been established for the Plaquemine culture along the coastal region of Louisiana. The early Plaquemine culture is represented by the Barataria phase. The Barataria phase (ca. 800 to 500 B.P.) was created based on excavations at the Fleming site (16JE36) in Jefferson Parish (Holley and DeMarcay 1977). Ceramics defining the Barataria phase include Anna Incised, *vars. Anna* and *Evangeline*, Carter Engraved, L'Eau Noire Incised, *vars. L'Eau Noire* and *Bayou Bourbe*, Mazique Incised, *var. Manchac*, Maddox Engraved and minor amounts of Plaquemine Brushed (Weinstein 1987). Ceramic decorations also include Southern Cult motifs, particularly on L'Eau Noire Incised vessels. The Delta-Natchezan phase (ca. 500 to 300 B.P.) represents the late Plaquemine culture in the region (Phillips 1970). Ceramics during this phase include early Plaquemine types, along with Addis Plain, *vars. Addis* and *Greenville*, Fatherland Incised, *vars. Bayou Goula* and *Fatherland*, Maddox Engraved, *var. Emerald*, Mazique Incised, *var. Manchac* and Plaquemine Brushed (Brain 1988; Phillips 1970; Weinstein 1987). The latter two types generally occur in minor frequencies. Another trait of the late Plaquemine culture is the occasional presence of Moundville Incised and Pensacola Incised, indicating some form of contact with Mississippian societies to the east (Kidder 1999).

Historical Contact Period

Sixteenth-Century Overview

After the Spanish Crown planted settlements on the Great Antilles (Hispaniola and Puerto Rico) expeditions were raised "to make discoveries on the coasts of the Gulf of Mexico" (Du Pratz 1774:1). The Spanish were the first Europeans to lay claim to the Mississippi Delta and northern Gulf of Mexico. In 1519, Admiral Alonzo Álvarez de Pineda explored and mapped the northern Gulf for the Spanish Governor of Jamaica. Ten years later, Pánfilo de Narváez, the sixth governor of La Florida, led another expedition of five vessels and 400-armed men to the Gulf. Due to mistreatment of the natives, Narváez and his men were continuously harassed as they reconnoitered the region. Eight years later, four survivors of the original party of 400 reached Mexico.

One of those survivors, Alvar Núñez Cabeza de Vaca, wrote an account of the expedition including a detailed description of the Mississippi River and the southern Louisiana coastline. In "The First Europeans In Texas, 1528-1536", Davenport and Wells

(1918:111) provided a scholarly account of De Vaca's harrowing shipwreck on the Texas coast that "affords our only glimpse of prehistoric Texas and its aboriginal inhabitants". The article may also shed light on the "habits and customs" of the native population that lived concurrently along the coastal plain of southwestern Louisiana (Davenport and Wells 1918:112, 135, 141).

Descriptions of sixteenth-century vernacular watercraft utilized by the indigenous people encountered by the Spanish were insightful. The shipwrecked Europeans learned to use these canoes and crude rafts to catch fish and oysters and to collect edible roots among the marshes that were scooped up from the water with wooden implements (Davenport and Wells 1918:116). An interpretation of De Vaca's memoir suggested that:

> These Indians lived in lodges made of matting and floored with oyster shells. The women did the hard work. The men went entirely naked, but the women covered parts of their bodies with a 'kind of wool which grows on trees.' The young girls dressed in deer skins. Hides were used to sleep in, but these were rare, being obtained only by chance. These Indians were very liberal with each other and of very good disposition. They had no maize, since they did not cultivate the soil. The land was very healthful, and temperate, except when the north wind blew in winter (Davenport and Wells 1918:116).

By 1539, Hernando de Soto arrived on the west coast of Florida to establish a colony and search for gold. De Soto landed in the Tampa Bay area and, recognizing the futility of finding gold there, marched his men northward. His quest for gold brought him through the entire southeast and possibly as far west as Texas. The conquistador left a legacy of destruction and violence in his quest for gold that ended in May 1543 with his death near the Mississippi River. Spain's interest in the northern Gulf of Mexico waned as it became evident that the region held little in the way of conventional treasure and other sources of traditional sixteenth-century wealth.

Wilds (et al. 1996:75) postulated that preceding the Contact Period, Louisiana aboriginals "found seeps where a strange liquid bubbled to the surface; [and] some believed it had medicinal qualities. Furthermore, "survivors of De Soto's ill-fated expedition" theoretically discovered an oily spring "and used the thick exudate to seal the hulls of the boats they were building to take them to Mexico" (Wilds et al. 1996:75).

Seventeenth-Century Overview

By 1682, while Spain vacillated for myriad reasons, the French commenced exploratory ventures down the Mississippi River launched from their outposts along the Great Lakes. In April of that year, Réné Robert Cavalier, Sieur de la Salle descended the historic waterway and along the shores of the Gulf of Mexico, the Frenchman claimed the vast territory for his monarch, Louis XIV. More specifically: "the seas, harbors, ports, bays, adjacent straits, and all nations, peoples, provinces, cities, towns, villages, minerals,

fisheries, streams and rivers within the extent of Louisiana" were pronounced as rightful possessions for the French Crown (Nuzum 1971:31).

Despite the fact that the Truce of Ratisbon (or Truce of Regensburg) was signed 15 August 1684, tensions between Charles II and Louis XIV were still quite unresolved. The truce merely concluded the War of the Reunions and was not considered a definitive or "permanent" peace. Dunn (1917:20) related that:

> Under these circumstances it is not surprising that the Spanish government was willing to give serious consideration to a project which had as its object the defence [sic] and development of the unoccupied territory between Florida and New Mexico.

With the knowledge that the French clearly intended to plant the Mississippi region, Spanish "Crown advisors were able to recognize La Salle's intrusion for what it was: a dire threat that could result in the loss of the Indies" (Weddle 1991:52). Weddle (1991:42) suggested that the Spanish in Mexico had meanwhile "already launched efforts to 'pluck the thorn', meaning to locate La Salle. Extant maps were examined to calculate the French explorer's whereabouts, and one Spanish admiral [Palacios] estimated the elusive site to be "in 30º north latitude, 145 leagues from Tampico, 190 from Veracruz, and 120 from Apalache" [modern Louisiana coastline lying between Lake Calcasieu and Vermilion Bay].

Juan Enríquez Barroto was elected to oversee the critical search, and was accompanied by Admiral Palacios's own experienced pilot, Antonio Romero. The veteran mariners set sail from Veracruz to Cuba, where they took possession of "a frigate of the Armada de Barlovento" (Weddle 1991:42). Barroto and his company departed Havana on 3 January 1686 aboard the *Nuestra Señora de la Concepción y San Joseph,* and possibly reached the Suwannee River by some eight days later (Weddle 1991:43-44).

The Chandeleurs were passed on 27 February, and Breton Island was sighted a few days later. On 4 March 1686, after being "becalmed" near the Mississippi Delta, the expedition resumed its southward course and apparently chose to not enter "the mouth of a mighty river" as a heavy storm commenced (Weddle 1991:44-45). With low provisions, after being blown across the Gulf to Campeche Bay, Barroto elected to steer toward Veracruz arriving on 13 March 1686. Within days, a military panel decided that the maritime expedition should be postponed until "two shallow-draft barks" could be constructed to better reconnoiter the northern Gulf's shoreline (Weddle 1991:45). Over the next several months, "the search area had been narrowed, [as] knowledge of the Gulf shore broadened" (Weddle 1991:47).

By 13 September 1686, a Spanish ship arrived in Veracruz with "quicksilver for the mines" under the command of Conde de la Monclova (and the new viceroy). The nobleman also brought a royal decree that "came with explicit orders and firm resolve that no effort should be spared to find and root out the French intruders" (Weddle 1991:51). In early December, the two barks were ready and manned (each) with 65 "soldiers and sailors"; the "best of the Armada de Barlovento" (Weddle 1991:52).

Designed by Admiral Francisco Navarro, the 60-foot *Nuestra Señora del Rosario* (Our Lady of the Rosary), and *Nuestra Señora de la Esperanza* (Our Lady of Hope) were each mounted with six bronze swivel guns and each "towed canoes for exploring in shallow water" (Weddle 1991:52-53). The captains of the "Two Ladies" were instructed to sail only during daylight hours, "keeping within sight of land and entering all 'bays, bars, and river mouths' to take soundings and [to] sketch the coastal outline" (Weddle 1991:53).

The Spanish barks departed Veracruz on Christmas Day 1686, and had reached Aransas Pass by 20 March 1687. A few days later, the expedition made landfall at Cedar Bayou (between San Jose and Matagorda islands-where La Salle had landed soldiers some two years before). Near this location, the Spanish encountered aboriginals who were in possession of parts of an iron gun carriage, hinges, a French hatchet, a bilge pump and other items representing wreckage from a French vessel weighing some 300 tons (Weddle 1991: 55-56). On 3 April, the hull of a French vessel was discovered "three leagues to windward" of Punta de Culebras. The Spanish carried artillery pieces found at the wreck back to the "Two Ladies" (Weddle 1991:56). With three symbolic French fleurs-de-lis on the poop deck the *Belle* was identified, and all "usable items" on La Salle's bark were salvaged.

On 15 April 1687 the "Two Ladies" reached the Río Dulce (Sabine River), and then sailed:

> [P]ast groves of pine timber along the low, flat coast, to anchor at Johnson's Bayou in southwestern Louisiana. The coast inclined almost due east, leveling out about 29º 46'. Enríquez noted the change at noon on the sixteenth, when latitude 29° 47' was observed. Level savannas covered with tall marsh grass extended along the shore, which seemed better than any since Maupate…The *piraguas* came to rest at sundown in front of a small river, the Calcasieu, where (Atákapa) Indians appeared on the beach. On the next day the Two Ladies crossed the shallow bar to ascend the river half a league to some native huts. Received royally, the sailors found the native women easily seduced with trinkets (Weddle 1991:58).

After first a fruitless search related to the account of a shipwreck at the Sabine, and, secondly, by the success of discovering Galveston Bay, the Spanish proceeded on their historic expedition. An attempt to re-enter Calcasieu Pass on 28 April 1687 may have been hindered by heavy winds (Weddle 1991:59-60).

In late 1698, Pierre Le Moyne, Sieur d' Iberville departed from Brest, France with five ships and more than 200 men to reconnoiter along the northern coast of the Gulf of Mexico. After encountering Spaniards at Pensacola Bay, they continued their expedition and navigated westward along the Gulf coastline. Although they had intended to establish settlements along the Mississippi, its swampy, inhospitable shoreline deterred the Le Moyne party. Soon thereafter, the French explorers set up an encampment called Fort de Maurepas (contemporary Ocean Springs, Mississippi) (Nuzum 1971:32).

In 1699, Pierre sent his brother, Jean Baptiste Le Moyne, to conduct further exploratory missions along the Mississippi. During his travels he visited "la Fourche des Chetimachas" along the upper Laforche Bayou near present-day Donaldsonville. Lands were granted along the Mississippi in the hopes of establishing a colony, but the general anxiety about aboriginal attacks and meager support from France precluded its execution (Goodwin et al. 1998:61). French colonization of the region finally began at the turn of the eighteenth century. The premise of settling the Mississippi was not abandoned, and by 1718, New Orleans was founded. This riverfront settlement grew slowly, spreading along the banks of the river.

Eighteenth-Century Overview

Dutchman Antoine Simon Le Page Du Pratz arrived in Louisiana in late August 1718, and over the course of his 16-year inhabitation, he left excellent eyewitness accounts of lower Mississippi River Indians, vernacular watercraft and descriptions of its coast (Du Pratz 1774:302). Du Pratz suggested that "Oque-Loussas" were "a small nation situated northwest from the Cut Point" taking its name from the appearance of "Black Water" found in the murky lakes near their villages (Du Pratz 1774:302).

Du Pratz offers this contemporary description of the construction of early-eighteenth-century vernacular watercraft utilized by these Indians:

> The conveniences for passing rivers would soon be suggested to them by the floating of wood upon the water. Accordingly one of the methods of crossing rivers is upon floats of canes, which are called by them Cajeu, and are formed in this manner: They cut a great number of canes, which they tie up into faggots, part of which they fasten together sideways, and over these they lay a row crossways, binding all close together, and then launching it into the water. For carrying a great number of men with their necessary baggage, they soon found it necessary to have other conveniences; and nothing appeared so proper for this as some of their large trees hollowed; of these they accordingly made their pettyaugres [sic], which as I mentioned above are sometimes so large as to carry ten or twelve ton weight. These pettyaugres are conducted by short oars, called Pagaies,[sic] about six feet long, with broad point, which are not fastened to the vessel, but managed by the rowers like shovels (Du Pratz 1774:343).

In regard to skin canoes, he also related these details:

> They choose for the purpose branches of a white and supple wood, such as poplar; which are to form the ribs or curves, and fastened on the outside with three poles, one at bottom and two on the sides, to form the keel; to these curves two other stouter poles are afterwards made fast, to form the gunnels; then they tighten these sides with cords, the length of which is in proportion to the intended breadth of

> the canoe: after which they tie fast the ends. When all the timbers are thus disposed, they sew on the skins, which they take care previously to soak a considerable time to render them manageable (Du Pratz 1774:69).

In calculating the abundant natural resources found in Louisiana, Du Pratz recognized the great potential of the territory's verdant and diverse timber stands. He remarked:

> The quality of the timber is a great inducement to build docks there for the construction of ships: the wood might be had at a low price of the inhabitants, because they would get it in winter, which is almost an idle time with them. This labour would also clear the grounds, and so this timber might be had almost for nothing. Masts might be also had in the country, on account of the number of pines which the coast produces; and for the same reason pitch and tar would be common. For the planks of ships, there is no want of oak; but might not very good one be made of cypress? this [sic] wood is, indeed, softer than oak, but endowed with qualities surpassing this last: it is light, not apt to split or warp, is supple and easily worked; in a word, it is incorruptible both in air and water; and thus making the planks stouter than ordinary, there would be no inconvenience from the use of cypress. I have observed, that this wood is not injured by the worm, and ship-worms might have the same aversion to it as other worms have. Other wood fit for the building of ships is very common in this country; such as elm, ash, alder, and others. There are likewise in this country several species of wood, which might sell in France for joiners work and fineering [sic], as the cedar, the black walnut, and the cotton-tree. Nothing more would therefore be wanting for compleating [sic] ships but cordage and iron. As to hemp, it grows so strong as to be much fitter for making cables than cloth (Du Pratz 1774:179).

In late February [or early March] 1722, a "most violent tempest" struck the Louisiana territory wreaking destruction for three days (Du Pratz 1774:30). The hurricane was preceded by loud howling winds "for eight days running", which "frightened the entire province" (Du Pratz 1774:30). The storm was recognized at that time as "the most furious ever felt" and the storm surge reached 15 feet in some locations (Du Pratz 1774:30-31). In regard to the geographical extent of the territory, Du Pratz related that Louisiana was "bounded to the west by St. Bernard's Bay, where M. de la Salle landed; into this bay a small river falls, and there are some others which discharge their waters between this bay and Ascension bay; the planters seldom frequent that coast" (Du Pratz 1774:116).

By May 1733, Bienville referred to 'Loupelousas' [*aba lusa*-trans. "black hair" or "black head"] that were entrenched at an insignificant post, which later developed into the important and extensive Opelousa District (Swanton 1911:363). That region encompasses the modern parishes of Cameron, Calcasieu and St. Landry (Swanton 1911:363-364). The "next particular reference" to these aboriginals was attributed to Baudry de Lozieres during the 1790s (Swanton 1911:364).

Distinguished anthropologist John R. Swanton provided an excellent description of the Atakapa Group. In his Smithsonian Institution sponsored work entitled *Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf Mexico*, Swanton (1911:36) related that:

> The name of this tribe is Chotaw, signifying 'man-eater,' and indicates the unsavory reputation which the tribe had acquired among Mississippi river people. Many of the early maps designate southwestern Louisiana and the entire Texas coast as a country occupied by 'wandering cannibal tribes,' and Atakapa itself is often thought to have been employed in a general, indefinite sense. As a matter of fact, however, it is never known to have been applied to any Indians except those between Vermilion and Galveston bays, i.e., to those constituting what is now called the Atakapan linguistic stock. In a political sense it came to designate a district embracing the present parishes of St. Mary, Iberia, St. Martin, Lafayette, and Vermilion. From this it might seemas if the Atakapa had once occupied the entire region, but according to the best evidence St. Mary and eastern parts of Iberia and St. Martin were in Chitimacha territory. On the other hands, the Atakapa extended much beyond these limits to the westward over what are now the parishes of Calcasieu, Cameron, Acadia, and parts of St Landry, then included in the district of Opelousas. As the Atakapa country lay at some distance from the first centers of colonization, it was not encroached upon to any great extent until late in the eighteenth century. At that time there appear to have been three main bands of Atakapa in Louisiana occupying the same number of principal river valleys.

The three distinctive bands appeared to be concentrated geographically as such; 1) eastern most group-Vermilion River (remnants observed there in nineteenth century), 2) Mermentou River [Island of Lacasine-abandoned 1799] (last observed remnant ca. 1836), and 3) the Calcasieu that lived along a waterway and its lakes, which later bore the tribal name (Swanton 1911:35, 361-362; Griffin 1974:8-9). Calcasieu is widely attributed to an aboriginal word that means "crying eagle". Early maps of the region also used the monikers *Culeashue* or Bayou *Quelqueshue* (Louisiana Legislative Council 1964:7; Hebert 1999:85). Nardini (1999:77) suggested that:

> At Natchitoches in 1773 Commandante De Mezieres kept contact with all of this vast area by assigning traders to establish trading posts among the different Indian tribes and suppliers were assigned to each trader: Pierre Bison was sent to the Calcasieu Indians, [and] the supplier was Reme Poissot.

Circa 1790, Daniel Johnson migrated to the region and settled the site known popularly as Johnson's Bayou. Johnson was followed to the remote location by his daughters and their husbands; Solomon and Reuben Barrow, Henry Griffith, and Henry Orr. Most of these individuals re-settled to homesteads lying along the Trinity River but Griffith returned to Johnson's Bayou. Nardini (1999:83) remarked that "outlaws of the Strip dealt

in horse stealing, cattle rustling, counterfeiting, or any other form of crime that might strike their fancy". Apparently stealing slaves and cattle rustling were not overlooked, however, and some citizens complained to U.S. officials. As a consequence, Lieutenants Augustus McGee and Zebulon M. Pike (b. 1779, d. 1813) were ordered to disperse "the bandits of the Neutral Strip" (Nardini 1999:83).

In April 1795, Pedro Joseph Piernas *first* "proposed his 'project of a new settlement on the Río de Calcasieu' to the Barón de Carondelet, governor-general of Louisiana and West Florida" (Weddle 1995:196). The Spaniard's description of the region relates one of the better extant late-eighteenth-century views of the Calcasieu. Piernas found the land to be 'the most beautiful, agreeable, and pleasant country of all Louisiana'. By late August 1796, Commandant General Pedro de Nava issued an order to prohibit foreigners from *entering* Texas, "even citizens of Louisiana, unless they carried satisfactory passports" (Chipman and Joseph 2010:223). Two years later, according to Holmes (1968:163), "Calcasieu Promoter: Joseph Piernas" issued this announcement: 'In consequence of the faculties granted me…I authorise [sic] Calvin Adams to Bring two hundred Irish and Dutch Catholic families by the river Missippi [sic] to the river Calcuciuc'.

Many families migrated from the Carolinas and Tennessee into Louisiana [modern Cameron and Calcasieu parishes] during the late 1700s. Waak (2005:39) related that the "movement west was probably part of the continued pioneering spirit of citizens of the United States during the early days of independence from Europe". Others may have elected to homestead in the territory due to its "long history of tolerance for 'free people of color'", and specifically, the tolerance for mixed-race people and marriages (Waak 2005:38-39).

Another appealing aspect for the exodus into southwest "Louisiana" was "the ability to be outside the realm of traditional law and mores" provided by the Neutral Zone [alternately Neutral Strip or No-Man's-Land] that came into "legal" existence in the early nineteenth century (Waak 2005:39). This ambiguous moniker generally referred to the remote area located between the Sabine and Arroyo Hondo rivers, which Spain and the United States jointly established circa 1806. For over a century, the Arroyo Hondo would be called other names, that include; Rio Hondo, Quelqueshoe, Calcasue, and Calcasieu. A colorful description of settlers coming there in the late-eighteenth century to early-nineteenth century follows:

> Escaped criminals, whom the officer of the law had no intention of following, bandits, runaway slaves, vagabond French traders with their Indian concubines, English traders ditto, and others unclassified; men from God-Knows-Where flocked to this genuine no-man's-land, between the Quelqueshoe and the Rio Sabinas. This was the period of incubation of the Redbone [sic]; and the environment in which he grew (Webster Talma Crawford quoted in: Waak 2005:40).

In mid-November 1795, "Jacinto Mora was granted 207,360 acres on the east side of the Sabine River, twenty-five leagues distant from the village of the Lady of the Pillar" [Los Ormegas or Nacogdoches TX] (TSPC 1890a:466). Part or all of the Mora tract was "sold" to "Ed Murphy, William Barr, Samuel Davenport and L. Smith" in July 1805 (TSPC 1890a:466). At that date, some "residents on the Rio Hondo" included members of the John [and M.] Yocum, James Wilson, Philip [A., Anthony & Benjamin] Winfree, James Walker, Nicholas Jacks, Hugh McNeely, Jacob Leahy, Thomas Arthur, Thomas Gray, Green Cook, Edmund Quirk, Joseph Montgomery, Samuel Holmes, Benjamin Billis, David Case, Jacques Lepine, widow La Lena Paded, Manual Gonzales, Jean Baptiste Perrot, Jose Maria Procella, Jose Reus, Antonia De la Sarda, John Cortez, Widow Ganissieu Parrierd, Robert McDonald, Manuel Cherion, Hugh McGuffin, Jose Antonia Rodriquez, John Maximillian, Widow Interest Toval, and Guilliam Bebee (TSPC 1890a:467).

One speculates that the diversity of these surnames suggests that Americans, Creole, French, Spanish and Mexicans were living and interacting along the Calcasieu with some aspect of harmony. By 1819, these and other Rio Hondo River settlers had proved their claims, and were able "to renew" the same after the 1832 survey (TSPC 1890:467).

The future of the desolate region, strategically situated between these two rivers flowing into the Gulf, was greatly affected by three treaties motivated by the quest for Colonial expansion, and international rivalry and intrigue. The first was popularly [English trans.] called *Treaty of Friendship, Limits, and Navigation Between Spain and The United States*, and was signed on 27 October 1795. Thomas Pinckney signed this document on behalf of the United States at San Lorenzo el Real, while a contingent of several Spanish noblemen acted for Charles III of Spain (Yale Law School [YLS] 2008a).

Nineteenth-Century Overview

Treaty of San Ildefonso (October 1800)

The second, of these treaties, was called the *Preliminary and Secret Treaty between the French Republic and His Catholic Majesty the King of Spain, Concerning the Aggrandizement of the Infant Duke of Parma in Italy and the Retrocession of Louisiana.* The treaty's preamble included this critical phrase [English trans.]: "…and the French Republic on its part having long since made known to his Majesty the King of Spain its desire to be again placed in possession of the colony of Louisiana" (YLS 2008b).

Two articles of the treaty expressly addressed the issue of Louisiana, and follow in their entirety [English trans.]:

> ARTICLE 3[.] His Catholic Majesty promises and undertakes on his part to retrocede to the French Republic, six months after the full and entire execution of the above conditions and provisions regarding His Royal Highness the Duke of Parma, the colony or province of Louisiana, with the same extent that it now has in the hands of Spain

> and that it had when France possessed it, and such as it ought to be according to the treaties subsequently concluded between Spain and other states. ARTICLE 4[.] His Catholic Majesty will give the necessary orders for the occupation of Louisiana by France as soon as the territories which are to form the arrandizement [sic] of the Duke of Parma shall be placed in the hands of His Royal Highness. The French Republic may, according to its convenience, postpone the taking of possession; when that is to be executed, the states directly or indirectly interested will agree upon such further conditions as their common interests and the interest of the respective inhabitants require (YLS 2008b).

Louisiana Purchase Treaty (April 1803)

The third accord, *Treaty Between the United States of America and the French Republic*, was co-signed by Robert R. Livingston, James Monroe and Barba Marbois on 30 April 1803 at Paris. This treaty naturally referred to *Article 3* of the former document and stated that the French government had "an incontestable title to the domain and to the possession" of Louisiana and ceded the same "with all its rights and appurtenances" (YLS 2008c). With respect to the people currently living there, Article III of the Louisiana Purchase treaty stipulated that:

> The inhabitants of the ceded territory shall be incorporated in the Union of the United States and admitted as soon as possible according to the principles of the federal Constitution to the enjoyment of all these rights, advantages and immunities of citizens of the United States, and in the mean time they shall be maintained and protected in the free enjoyment of their liberty, property and the Religion which they profess (YLS 2008c).

In regard to Spain and the Aboriginal Nations, *Article VI* stipulated that:

> The United States promise to execute Such treaties and articles as may have been agreed between Spain and the tribes and nations of Indians until by mutual consent of the United States and the said tribes or nations other Suitable articles Shall have been agreed upon (YLS 2008c).

This article, crafted to address Indian tribal land titles, was especially important due to the fact that:

> There never was any instance of the Government of Spain taking land from the Indians, especially their villages. Even when the Indians had abandoned some old villages because their hunting was exhausted, and had established new ones by the Grant of the Spanish Government, their villages deserted were always considered as their property, subject to their disposal and the Inhabitants never suffered to settle there, but where always driven off. There was no time fixed

> in which a Deed must be presented for approbation. It could be presented in one year, or a hundred years, and it would always receive the Sanction of Government (Dart 1922:137).

The Spanish boundary commissioner, the Marqués de Casa Calvo, arrived in New Orleans during early 1803, and learned from the Interior Provinces chief military officer that the only professional [deemed accurate] map of the area in question was the one produced by Joseph de Evía circa 1785. Specifically, "the boundaries of that captaincy-general had been reckoned from a point between the mouths of the Calcasieu and Mermento [sic] rivers in a straight line through the vicinity of Natchitoches to the Red River and north beyond the Missouri, which was as a far as the Indian tribes had been subdued" (Marshall 1914:20). Due to a misinterpretation of another survey conducted by Manuel de Saleedo, the former governor of Louisiana believed that the Spanish-French boundary commenced near Natchitoches and ran south to the sea [Gulf]. To further confuse the matter, the French had considered that their jurisdiction extended to the Sabine due to a Spanish withdrawal from Adaes [25 miles west of Natchitoches] (Marshall 1914:20).

Nonetheless, on 10 April 1805, 12 "counties" were formed from the newly acquired Orleans Territory, namely; Orleans, German Coast, Acadia, Lafourche, Iberville, Pointe Coupee, Attakapas, Opelousas, Natchitoches, Rapides, Ouachita, and Concordia. Within two years, "the [U.S.] territorial legislature supplanted those counties with nineteen parishes" that reflected the influence of the Roman Catholic Church, namely; Orleans, St. Bernard, Plaquemines, St. Charles, St. John the Baptist, St. James, Ascension, Assumption, Interior Lafourche, Iberville, Baton Rouge, Pointe coupee, Concordia, Ouachita, Rapides, Avoyelles, Natchitoches, St. Landry, and Attakapas (Wilds et al. 1996:199).

At the time of the U.S. acquisition of Louisiana, Hare Browse Trist was the U.S. collector of customs for Port Gibson, Mississippi. Trist was soon transferred to New Orleans, where he became the *first United States* collector of its vital port *(The Louisiana Historical Quarterly (TLHQ)* 1922:125). Eminent Louisiana [and Calcasieu resident] historian William Theodore Block, Jr. suggested that the earliest *documented* sail vessels navigating the Calcasieu River were probably associated with the notorious Lafitte brothers, and New Orleans port records seem to support this assumption.

One of Louisiana's earliest political [and social] quagmires was the extent to which the U.S. Government would exercise its jurisdiction in relation to the "foreign" slave trade. Clearly, the Abolition Act of 1808 could be applied to the citizens of this new U.S. territory, according to many circles. However, the first territorial governor, William C. C. Claiborne recognized that slavery was an integral factor in "Louisiana's economic transition", and he could scarcely enforce the act or "mitigate the movement of foreign slaves into the region" (Obadele-Starks 2007:15-16).

New Orleans would soon develop into a principal commercial hub, and veteran slave traders quickly adapted to service this new center of trade. Obadele-Starks (2007:16) remarked that:

> Implementation of the Abolition Act of 1808 in Louisiana was beset by several obstacles including under-resourced custom houses, the emergence of free and enslaved African sailors and seamen as co-participants in the foreign slave trade, the competing commercial and political interests of foreign nations, and the advent of prominent slave traffickers and smugglers in the region. The combination of these issues laid the foundation on which the foreign slave trade was able to survive well into the nineteenth century.

During the War of 1812, Engineer Antoine Labay may have conducted a survey in the Calcasieu territory with the assistance of Louisiana militiaman and private Placide la Bauve (Pierson 2003:67). Labay and La Bauve served in the De Clouet Regiment (Pierson 2003:67). This regiment may have been commanded by a descendant of Frenchman Alexandre de Clouet de Piettre who resided [bred large family] in the Attakapas region during the late eighteenth century. If so, the 1812-circa military hero De Clouet was the direct descendant of one of Governor Bienville's favored soldiers and a long-line of famous French surveyor-engineers as well (Boyd 1887:17).

The famous Bowie brothers, James and Rezin, joined an American regiment in the late stages of the quasi-Naval war, and settled near New Orleans after its conclusion. Eventually, the Bowies "eagerly joined filibustering expeditions, including General James Long's campaign to wrest the upper Texas coastline away from the Lafittes" (Obadele-Starks 2007:62). James and Rezin partnered in 1819 to organize sugar plantations and over the course of the next eight years, "the brothers owned and developed several valuable estates in the La Fourche, the Rapides, and the Opelousas districts" (Williams 2010:96).

James [popularly known as Jim] and Rezin introduced the first steam mill to grind sugar cane in the state at "Arcadia", and later sold the successful plantation for $90,000 [$1.4 million today] (Williams 2010:96). At this juncture, the Bowie brothers [joined now by John J. of Arkansas] added a maritime venture to their varied commercial interests, described as such:

> They fitted out small boats at the mouth of the Calcasieu and the Sabine Rivers, and from 1818 to 1821, they engaged in the slave trade. Jean Lafitte and his privateers were, at this time, harrying all commerce on the Gulf. They would capture slave ships—mostly under the Spanish flag—and would carry their prized to Galveston Island where Lafitte had established a regular pirate colony. From this station many slaves were sold into the United States, sometimes directly to planters, but more often through agents such as the Bowies. John J. Bowie said that they paid Lafitte a dollar a pound for negroes, or an average of $140 per head, and then transported their purchase, by means of their small boats, to the mouth of either the Calcasieu, or of the Sabine. Thence on foot, through the swamps of East Texas and Louisiana, they'd make their way to a custom house official (Williams 2010:96).

In regard to the Bowie-Lafitte enterprise conducted in southwestern Louisiana, Ernest Obadele-Starks (2007:62) related these relevant details:

> They were part of a growing contingent of land speculators and slave buyers intent upon clearing the way to increase their personal prosperity through the foreign slave trade. To accommodate the needs of sugar planters and cotton growers, the Bowies often directed the movement of slave coffles between Louisiana and Mexico, stashing them in areas along the Sabine River, where they had constructed barracks. As Louisiana landowners, the Bowies made no distinction between the illegal distribution of recent African captives and seasoned slaves, nor did they distinguish between the illegal overland and foreign introduction of slaves into the United States. They purchased slaves from the Lafittes in Texas, landed them at their plantation in Vermilion Bay, Louisiana, then transported and sold them in St. Landry Parish. Many of their transactions violated the federal laws of the United States and also those of Mexico. Their familiarity with the terrain allowed them to shuttle their slaves to points near the offices of United States marshals.

Circa 1817, the John Jacob Ryan, Sr. family migrated from Perry's Bridge (Vermillion Parish) to the shores of Lake Charles. The patriarch ultimately became a successful planter and livestock producer in that extremely remote section of the United States. In the antebellum period, his son (Jacob Ryan) "established the second saw mill built in southwestern Louisiana, the first one having been erected by Charles Sitting about twelve miles up the [Calcasieu] river" (*AL* 30 December 1899e:32). A son (Isaac) of Jacob Ryan apparently became acquainted with the Bowie brothers, in the course of shipping rough lumber with his father to Galveston and regional landings, and developed a deep respect for Jim Bowie. Isaac Ryan eventually followed the charismatic Bowie to Texas, and to the Alamo, where the 24-year old former Lake Charles resident died during the ensuing historic siege of 6 March 1836 (Williams 2010:120, 159).

Other 1820-era homesteaders settling in southwestern Louisiana [contemporary Cameron Parish] may have included disaffected members of the former Lafitte posse. After the Lafitte brothers *elected* to leave Galveston permanently (May 1820), some of their followers took up fishing along the Sabine (Obadele-Starks 2007:65). In 1818, G. Mason Graham was ordered by President James Monroe to ascertain why French General François Antoine Charles Lallemand had armed French colonists in Texas (The Southern Publishing Company [TSPC] 1890:570).

The former Bonapartist officer [and close friend of Napoleon] had only recently escaped from Malta, and journeyed to Texas via New Orleans. Graham, the former U.S. secretary of war, commenced the quasi-military commission in June of that year arriving at the Sabine River only to learn that Lallemand had transported the French to Galveston Island. Graham then removed to the Calcasieu River with his "single servant", where "he met

two men in command of a small schooner engaged in smuggling supplies from Lafitte into Louisiana" (TSPC 1890:571). Graham then:

> [E]ngaged them to take him to Galveston Island, where he negotiated with both Gen. Lallimand and Lafitte, inducing them to break up their respective establishments and retire from the territory within a reasonable length of time, during which they were each, and their respective followers, to be granted the protection of the United States Government (TSPC 1890:571).

The *Treaty of Amity, Settlement, and Limits, Between the United States of America and the King of Spain* was signed on 22 February 1819, which clearly identified the boundary line [article 3] between the two countries, namely as:

> West of the Mississippi, shall begin on the Gulf of Mexico, at the mouth of the Sabine, in the sea, continuing North, along the Western bank of that river, to the 32d degree of latitude where it strikes the Rio Roxo of Natchitoches, or Red River…All the island in the Sabine, and the said Red and Arkansas river, throughout the course described, to belong to the United; but the use of the waters, and the navigation of the Sabine to the sea, and of the said rivers Roxo and Arkansas, throughout the extent of the said boundary, on their respective banks, shall be common to the respective inhabitants of both nations (Gales and Seaton 1828:56-57).

Those "international" boundaries were proscribed by Melish's *Map of the United States* "improved to the first of January, 1818". By December 1819, a small force of U.S. soldiers was stationed on the "western border of Louisiana", and the number apparently remained constant until tensions in Texas escalated to a fever pitch by 1845 (Fulmore 1902:38). A report submitted to the U.S. Treasury on 1 November 1824 (by the South Western Land District register and receiver) in response to "An act providing for the execution of the titles to land in that part of Louisiana, situated between the Rio Hondo and the Sabine river" identified numerous claimants living in the disputed area (Gales and Seaton 1828:1039). Within several months, President John Quincy Adams and [then] Secretary of State Henry Clay shrewdly attempted, through negotiation with Mexico, "to acquire the whole or a large part of Texas" (Smith 1911:8).

When the bloody revolution in Texas erupted during 1835, Coahuila was swept up in a state of anarchy (controlled by a powerful Santa Anna general), and "it remained for Texans either to abandon their homes and fly across the Sabine, or to remain and resist" (Fulmore 1902:35). Most of course remained, and in the aftermath of the decisive battle of San Jacinto where Santa Anna was defeated, "ninety-eight per cent" of those fighting there either were "already settled in Texas or remained in the Republic after the Revolution" (Fulmore 1902:29).

By mid-May 1836, news heard about Texas, through "a gentleman" who had recently left the Calcasieu from "Perkin's Ferry"*, alarmed citizens in even faraway Gettysburg, Pennsylvania (*The Adams Sentinel* [*TAS*] 16 May 1836:3). The source related that

Texans were "flocking in through that direction to the United States" as "so much apprehension has seized the minds of the people, that they drive their cattle across the Sabine, and offer them for almost any price" (*TAS* 16 May 1836:3). The report also suggest that many of General Houston's men were abandoning their posts near the Trinity River and were "seeking refuge in the United States" (*TAS* 16 May 1836:3). *[Jesse and Lucinda Perkins lived in "Calcasue [sic] Parish" in 1835, and may have managed the ferry and/or owned the site where it operated (Waak 2005:32)]

Other contemporary settlers living in the region were Joshua Perkins (ca. 1830) and Hiram Ours, who applied for a legal claim to a tract he acquired from Jordan Perkins [or Jerry Jourdan Perkins] (Waak 2005:32, 52). Gilbert Swett [or Sweat] may have arrived in the land east of the Sabine River about 1804 with Joshua Perkins (Waak 2005:52). Joshua Perkins was listed on an 1830 court transcript as "f.m.c", which suggests that he was "free man of color" (Waak 2005:53).

A Baptist minister that was linked to the aforementioned Perkins family arrived at the lower Calcasieu at this time and apparently attracted new settlers. This particular influx rested "on the force and charisma of Reverend Joseph Willis" (Waak 2005:40). Willis was "born a slave and was of mixed-race parentage" but his racial makeup was disputed (Waak 2005:40). Another quality that enticed settlers was that mixed-race people and the marriages between different races were generally accepted in the remote region. Even more so, another "reason for the appeal of [southwestern] Louisiana was the ability to be outside the realm of traditional law and mores" (Waak 2005:39).

A U.S. force may have occupied the east bank of the Sabine shortly after the Perkins, Ours, and Swetts carved out homesteads in the remote region. By way of his *Executive Order of December 20, 1838*, President Martin Van Buren established the Fort Sabine Military Reservation. Civilian and military provisions were certainly being carried on the Calcasieu River regularly. Marine intelligence published by *The Daily Picayune* (*TDP*) on 23 October 1839 confirmed that the schooner *Emily* had just arrived in New Orleans from the Calcasieu River under the command of Captain "Lafitte". Other vessels sailing from the west into the Port of New Orleans included the schooner *American Trader* from Galveston and the Mexican schooner *Atrevido* from Campeachy. On this date, the schooner *Jolly Sailor* cleared for Galveston (*The Daily Picayune* [*TDP*] 23 October 1839:2).

On 30 June 1840, *TDP* announced that the schooner *Emily* cleared for Calcasieu under the command of Master Bilboa (*TDP* 30 June 1840a:3). In late August of that year, the newspaper related that the schooner *Temperance* also cleared New Orleans for the Calcasieu. The master for this vessel was identified as a Mr. Gillett (*TDP* 30 August 1840b:2). The *Temperance* returned to New Orleans in February 1841 from Calcasieu, now under the command of a Captain Dois (*TDP* 18 February 1841a:2). Outbound from the Calcasieu, Master Gillett would bring the *Temperance* back to New Orleans by 15 August 1841 (*TDP* 15 August 1841b:2). Three days later, Captain Gilbert cleared the Crescent City for Calcasieu at the helm of the *Temperance*, while Captain Rines sailed the brig *Emilio* to its destination of Vera Cruz (*TDP* 18 August 1841:2).

The Erection of Calcasieu Parish (1840)

As the *Temperance* navigated in and out of Calcasieu River during the two-year period, a long-standing political debate had evolved resulting in the decision to erect a new parish in the state. Thus, Louisiana legislators created Calcasieu Parish in 1840 from a section of St. Landry Parish (Marr 1895:82). Although the small community of Lake Charles was made the parish seat some 12 years later, the town was not incorporated until 1867 (Marr 1895:282).

Early Antebellum Period

In early August 1844, the schooner *Fur Trader* arrived at the Port of New Orleans under the command of Captain Cobb. The vessel had cleared Galveston, stopped at Calcasieu, and had sailed onto New Orleans "in ballast, to John Comegys & Co." (*TDP* 7 August 1844:3). Shipping intelligence collected by the New Orleans customs house for 11 June 1846 related that the schooner *Tom Hicks* had arrived from the Calcasieu under the command of Captain Lambert (*TDP* 11 June 1846a:3). Under the banner, "Receipts From The Interior", published by *TDP* on that same date, an excerpt remarked: "CALCASIEU—Per schr Tom Hicks: 20 bales cotton and a lot of hides to order" (*TDP* 11 June 1846b:3).

Less than two months later, the Port of New Orleans reported that the *Swan* had arrived "5 days from Calcasieu, in ballast to master" (*TDP* 6 August 1846c:3). This schooner, arriving on or before Thursday, 6 August 1846, was piloted by a Captain Callagin (*TDP* 6 August 1846c:3). Other maritime news for early winter 1846 relating to the project area suggested that "the high-pressure U.S. steamer Wm. R. McKee, [was] between the Calcasieu and Sabine, standing to the westward" by 1 December (*TDP* 5 December 1846d:2). This information was sent via Captain Baker of the U.S. steamer *Monmouth* who was cruising by the vessel toward his station off Brazos Santiago (*TDP* 5 December 1846d:2).

The Monroe Doctrine and the Calcasieu Region

The Monroe Doctrine (introduced December 1823) was crafted "to encourage free seas and open trade", and any disruption of maritime commerce "undermined this most-cherished concept" (Obadele-Starks 2007:71). Just as "smugglers and traffickers manipulated Mexican antislave-trade laws" in the vicinity of the project area, President James Monroe focused on his groundbreaking policy to suppress foreign slave trade (Obadele-Starks 2007:71). This "policing of depredations", according to Monroe, "required 'a particular kind of force,' one that would be needed to pursue the violators into areas where they found sanctuary" (Obadele-Starks 2007:71).

American antislave-trade navy vessels cruising the African coast under President Monroe's directive included the *Cyane*, the *Alligato*r, the *John Adams*, and the *Shark* (Obadele-Starks 2007:71). Regional politics and judicial actions interfered with the

"disproportionate attention" to Africa, so the "revenue cutter *Lynx* was the lone American vessel sent to negotiate the foreign slave trade along the Western Gulf South, with special emphasis on the Sabine and Calcasieu Rivers in Louisiana" (Obadele-Starks 2007:71).

Transporting slaves into the region called *Coahuila y Texas* was a risky enterprise, and "American immigrants often routed their cargoes through the Sabine River, which served as the boundary between Louisiana and Mexico" (Obadele-Starks 2007:83). Consequently, the entrance to the Sabine evolved into a popular illicit refuge, attracting pioneers such as Henry Griffith of Johnson's Bayou, who "supplemented his income by selling beef to slave traffickers and smugglers" hiding there (Obadele-Starks 2007:83).

According to historical sources, the Spanish ship *Elizabeth* eluded authorities and docked at Sabine Pass for six weeks, before its master offloaded 200 slaves "stolen from an admiralty court in Barbados" (Obadele-Starks 2007:83). In another case, smuggler Monroe Edwards used the Sabine for his own illegal transshipments. Edwards headed extensive slave-trading operations linking ports in Africa, the Caribbean, Latin America and the United States. He was also credited with the creation of a vile slave mart on the west end of Galveston Bay during this period. Not surprisingly, the number of slaves entering the new State of Texas through southwest Louisiana (and especially originating from New Orleans) increased (Obadele-Starks 2007:117). Waak (2005:40) related that:

> Spain and the United States reached an agreement to establish a neutral area between the Sabine River and the Arroyo Hondo River. The Arroyo Hondo would later be called the Rio Hondo, the Calcasieu, or Quelqueshoe. Ownership of the land in this area would not be established until 1824 and then ratified by the Louisiana House of Representatives in 1836. Thus, for a period of roughly twenty years, the area was open for settlement.

In the face of the unique political and social Gordian knot that prevailed there, maritime shipping that passed by flourished. Circa 1838, the steamers *Columbia* and *New York* became "the pioneers of the [Charles] Morgan line in the Gulf of Mexico, running from New Orleans to Galveston" (Morrison 1903:438, 466). In 1856, Arnold Harris and Charles Morgan sold the *Charles Morgan*, the *Louisiana*, the *Mexico*, and the *Perseverance* to the Southern Steamship Company of New Orleans. Previously, these steamboats had been run to ports in Texas and Mexico (Morrison 1903:455-456).

By 1846, the U.S. Treasury cutter *Woodbury* was tasked to reconnoiter the coast of Calcasieu Parish (present-day Cameron Parish). This cutter mounted four 12-pounder medium guns on truck carriages, in addition to one long French-made brass pivot, eight-pounder gun (*Le Courrier de la Louisiane* (*LCL*) 14 May 1846:3). *Le Courrier de la Louisiane* (*LCL*) reported in mid-May 1846 that the *Woodbury* was temporarily stationed at New Orleans while its commander was being investigated. Editor Jerome Bayon related that the "Court of Inquiry" should be brief, suggesting that "the cutter could really render very beneficial service" both in the Mississippi, and by "cruising on the coast between Cat Island to the eastward and the mouth of the Sabine in the west" (*LCL* 14 May 1846:3). Bayon added that:

> In fact, she would hardly be competent to the duties required of her within those limits, but would need the assistance of another vessel of the same class, and a small steamer besides (*LCL* 14 May 1846:3).

In February 1848, the Louisiana Legislature's upper house "adopted the resolution requiring the State Engineer to make a survey of Calcasieu river [sic]" (*TDP* 24 February 1848:2). Shipping reports reviewed from this period indicate that a brisk trade already existed between New Orleans and the state's most southwestern river.

Marine intelligence collected from New Orleans port for late May 1850 confirmed that the schooner *Tom Hicks* was still navigating between the Calcasieu River and that flourishing commercial center. However, at this date, Master Kefer was piloting the schooner that arrived in New Orleans after completing a five-day voyage from the Calcasieu. The customs collector noted that the: "Towboat Yankee, Miller, from the Passes—towed down and to sea 25th inst., barks Mariana, J Goodhue and brig Amerika—brought up bark Wm M Harris, schrs E S Leeper and Tom Hicks" (*TDP* 1 June 1850a:3). Commercial advice printed by *TDP* verified that the schooner *Tom Hicks* imported "26 hhds sugar to Fisk & Steever" from some point on the Calcasieu (*TDP* 1 June 1850b:3).

In July 1853, the New Orleans firm of "W. & D. URQUHART, 138 Common street [sic]" advertised for a "light draught Schooner to bring a Mill and Engine from Calcasieu Pass" (*TDP* 17 July 1853a:3). Contemporary marine news remarked that the schooner *C. C. Keyser* had arrived in New Orleans in tow of the steamer *Ocean* piloted by Captain Chapman (*TDP* 17 July 1853b:3). A local commodity report related that the inbound Calcasieu cargo brought in by Captain Welch was comprised of "87 bbls bone black [to] A Fisk—4 bls wool [to] J B Bellosq [sic]—[and] 50 hides to master" (*TDP* 17 July 1853c:3). The 17 July edition of *TDP* also stated that the steamship *America* (inbound from Sabine Pass) conveyed 233 bales of cotton to Payne & Harrison, 67 bales of cotton to D. R. Carroll, and 250 head of cattle "to order" (*TDP* 17 July 1853c:3).

Antebellum Period

In early March 1854, "E. T. Haskell, 27 Front Levee, near Bienville street" placed a "New" advertisement in *TDP*, which expressed this desire: "WANTED TO FREIGHT—A little schooner, carrying about 300 barrels, for the Calcasieu River; or want [sic] to ship to said river" (*TDP* 8 March 1854:1). By this date, a thriving village was situated up the river at Lake Charles. Several entrepreneurs operated successful lumbering businesses there. Circa 1855, Schlesweg-Holstein native Daniel Johannes Goos and his German wife Katherine Moeling arrived at "Charlestown" increasing the number of Lake Charles's white families to six (Allured et al. 2012:11). At the time, the other "white" residents were reported to be members of the "Sallier, Ryan, Hodges, Pithon, and Bilbo" families (Allured et al. 2012:11).

A Pennsylvania newspaper remarked on far-flung Calcasieu and Sabine Pass during early April 1859. The *Sunbury American* told readers that the revenue cutter *Henry Dodge*,

commanded by Captain Harby, "had arrested at sea, near Sabine Pass, a desperado named McCormick, who was accused of committing a most cold blooded murder near the Sabine" (*Sunbury American [SA]* 2 April 1859:2). This paper also announced that a "large amount of lumber, for railroad use in Texas, continues to be received in Galveston from the Calcasieu (La.) saw mills" (*SA* 2 April 1859:2).

De Bow's March 1859 journal related details about the antebellum atmosphere of Calcasieu Parish remarking that the population numbered 3,457 whites, 1,069 enslaved blacks, and 353 free blacks (De Bow 1859a:356). This number excluded native Calcasieu that were "nearly extinct" with some of the tribal members "scattered over the parish, but still preserving their peculiar habits and customs" (*Galveston News* [*GN*] quoted in: De Bow 1859b:602).

In regard to the rivers, De Bow mentioned that Calcasieu, Sabine and Mentaur [sic] were "all navigable for steam or sail vessels of light draught", and that up to seven million feet of pine and cypress was sawed along those rivers to be shipped to Texas annually (*GN* quoted in: De Bow 1859b:602-603). At press time, five mills were operating on the Calcasieu with two new ones poised for activity. The journal indicated that if "State aid" removed the bars at the mouths of each stream, larger vessels could enter these waterways and could "compete successfully with Mobile and Pensacola in the lumber trade" (*GN* quoted in: De Bow 1859b:603). Furthermore, the editor said that:

> The soil along the coast and about the rivers is very rich, producing corn, cotton and cane in abundance, and peculiarly well adapted near the mouths of the Mentaur [sic] and Calcasieu River to the successful cultivation of the Sea Island cotton. The sweet and Irish potato [sic] grow finely, and yield an abundant return for the planting (*GN* quoted in: De Bow 1859b:603).

Prior to the onset of the American Civil War the water depth at Calcasieu Pass averaged from only five feet to six and half feet, and this shallow depth prevented many vessels from entering the river (Hebert 1999:85). The most far-sighted observation pertaining to antebellum Calcasieu Parish follows:

> There are several mineral and some chalybeate springs, and there is also a spring near the Calcasieu River producing a substance similar to petrolium [sic] and sulphur [sic], and which possess considerable curative powers in chronic cutaneous diseases (*GN* quoted in: De Bow 1859b:603).

TDP (6 July 1860:3) reported in early July 1860 that the "late [U.S.] Congress" had appropriated $7,500 for a lighthouse at the mouth of Calcasieu river" [sic]. Just a few years earlier, the National Park Service (n.d.) related that the Sabine Pass Lighthouse was constructed on the Louisiana side of the waterway. When completed the octagonal brick structure was some 75 feet high, and featured a third order, Fresnel lens (National Park Service n.d.).

American Civil War Era (1861-1865)

Over the course of the Civil War, Louisiana enlistments in the Confederate Army [excluding re-enlistments] reached at least 56,000. That number, however, does not reflect information on muster rolls burned at Shreveport at the time of General E. Kirby Smith's surrender in May 1865. Historical sources do relate that some 600 engagements occurred in the state, and that the Confederate Army was comprised of infantry, artillery, cavalry and militia further composed of at least 980 military companies (Booth 1922:369, 379).

At the onset of the American Civil War, some sources relate that Unionists [and like-minded war profiteering elements] largely controlled the area that comprised Calcasieu Pass. Despite this influence, Confederates constructed a small fort near Calcasieu Pass early on during the national conflict (Cotham 2004:178). Booth (1922:383) reported that five Confederate Cavalry units operated in the vicinity of the river, namely; the *Calcasieu Rangers* (Captain W. E. Ivey), the *Calcasieu Volunteers*, *Company A* (King's Special Battalion, Infantry [King]), the *Calcasieu Tigers, Company B* (King), the *Calcasieu Invincibles, Company C* (King), and the *Calcasieu Guards, Company D* (King).

In late May 1861, Assistant Secretary of the Navy Gustavus Fox received this provocative letter from a prominent New Yorker regarding President Lincoln's newly-imposed naval blockade of Confederate ports:

> The growing discontent created in the public mind by the extraordinary and disheartening delays of the Navy Department will undoubtedly soon result in meetings of the People, who will declare their want of confidence in the competency of the present Secretary, and his principal assistant. A month has elapsed since the Blockade proclamation was published, and at this time as well as can be ascertained, every Port, south of the Chesapeake, except Pensacola, is still open. The Blockade is on paper merely. We shall be disgraced, by the presence of a British Fleet, off the Ports in the Gulf, before they will be invested by us! (Thompson and Wainwright, vol. I, 1920:359).

Federal blockaders would soon report some limited success off Louisiana's most remote coastal parish. The 30 July 1861 *Shreveport Daily News* (*SDN*) edition advised its readers that:

> Our outside visitors have been in a state of quiescence since of last, except that yesterday morning they captured a lumber vessel from Calcasieu, called T. J. Chambers, and Thursday the schooner Tom Hicks, with lumber from the above place (*Shreveport Daily News* [*SDN*] 30 July 1861:1).

Aboard the USS *South Carolina* off Galveston, Commander James Alden transmitted this message on 28 August 1861 to Gulf Blockading Squadron headquarters (Fort Pickens):

> SIR: Your letter of the 11th instant, requesting me to furnish you with the particulars of the capture of the two schooners, the *General T. J. Chambers* and the one scuttled, the *Tom Hicks*, is received. The last named was captured off the port on the 9th of July, loaded with lumber, 27 tons burden; Charles Wells, captain; owned at Calcasieu Bay, La.; from this port and bound for Port Lavaca. The *General T. J. Chambers* was captured off this port on the 12th of July, lumber loaded, 46 tons burden; Jacob Hanson, captain; owned at Galveston, from Calcasieu Bay, bound to Galveston (USND 1903a:578).

A brief note was enclosed by Alden, which related that the lumber taken off the *Tom Hicks* was transferred to the USS *South Carolina* prior to the Calcasieu schooner being "scuttled" by U.S. navy crewmen (USND 1903a:578). Another Calcasieu vessel was seized and destroyed by Federal blockaders [maybe *South Carolina*] within weeks of the *Tom Hicks* affair. In this instance, the schooner *Anna Ryan* belonging to "Capt. J. Ryan" was "burned" on Sunday evening, 13 September 1861 (*TDP* 16 September 1861:1). *TDP* (16 September 1861:1) reported these details:

> She was nearly new, cost about $7000, and was almost all the captain possessed. She was a lumber vessel, and was captured, with a load of lumber, a good distance out at sea, when on her way, not for this blockaded port, but for Indianola. Capt. R. was taken with her, and frankly stated his position to Capt. Alden and that the loss of the vessel would be a heavy blow to him. To which the other replied that he would see about it, or words to that effect.

An early wartime event that suggested the importance of the Calcasieu River occurred during this period. On 12 August 1861, Patrick Henry Donegan was arrested by Louisiana authorities on the basis that he was operating as a spy for "the National Government" (*TNYT* 2 September 1861). Donegan was previously employed by the U.S. Treasury to make "tidal observations" at Calcasieu but had been cautioned in May 1861 to "resign" by "State authorities". At the time of his detention, Donegan was in possession of an official draft for $80 [$2,015 present day], which was paid by the U.S. Treasury (*TNYT* 2 September 1861).

Confederate military strength, at Calcasieu, was disclosed in early December 1861 by Confederate Major-General Mansfield Lovell to Confederate Secretary of War Judah P. Benjamin. The former asserted that:

> Commencing at Calcasieu Bay, we have one company with two 42-pounders, which are now being put up, and will prevent foraging parties from reaching the cattle-grazing prairies around the head of that lake. At Grand Chenier there is a company of militia that I am furnishing with one 6-pounder gun (USND 1921:649).

On 15 January 1862, Major-General Lovell updated Secretary Benjamin in regard to the former's military department's defensive capabilities and also about his efforts to raise independent companies in Louisiana, as such:

> In my letter of the 13th instant the powder in this department was placed, in round numbers, at 115,000 pounds. A considerable quantity of this is not cannon powder, and, by reference to the letter of the 5th ultimo, you will see that there are more than 300 heavy guns in this department, scattered from Calcasieu to Pearl River….There is not a single 10-inch gun in this department…I have collected (by purchase mainly) about 900 small-arms, half of which are double-barreled shot-guns. After perfecting as far as possible the arming of the war men, I should propose to exchange the shot-guns for some miserable muskets and carbines in the hands of twelve-months' troops (USWD 1882:808).

By February 1862, Southern military leaders recognized that in the "lower parishes, near the coast, fear of invasion caused heavier stress to be placed upon militia or local defense companies than upon units to serve the Confederacy" (Winters 1963:74). Despite that worry, U.S. Navy Admiral David Dixon Porter (1886:345) observed many year later that:

> The Federal officers had to exercise great watchfulness in guarding against the people [southwest Louisiana and Texas] they had to contend with, for they were a brave, hardy set of men, regardless of danger, and amply supplied with small-arms and field-artillery to withstand any attack that could be made upon them by the combined forces of our Army and Navy.

Among the many new military companies formed in early 1862 for Confederate service were the Carrollton Guards of Jefferson Parish, who joined General Pierre Gustave Toutant Beauregard's command (native of St. Bernard Parish). A Confederate commissary-general "collected" about 16,000 "head of poor cattle" in Calcasieu Parish during May 1862 "for fattening" but this massive herd never reached its destination (General Beauregard's camp) (Roman 1883:398). After receiving training at Camp Overton (Opelousas), the Calcasieu Invincibles prepared to leave for New Orleans and active duty early by April 1862 (Winters 1863:75).

In mid-March 1862, the USS *Santiago de Cuba* stood off the Texas coast in an attempt to intercept a river steamer loaded with cotton coming out of Sabine River. After failing to capture the vessel, Commander Daniel B. Ridgely elected to change course and steamed toward the east (USND 1903b:196). That decision proved fortuitous as another blockade-running steamer was located and destroyed by the *Santiago de Cuba.* Back at his Key West station on 28 March, Ridgely filed this report on that event plus details about Sabine and Calcasieu shipping:

> Standing off the land in a southerly direction, when out of sight of the land I changed the course along the coast of Louisiana toward Calcasieu. In four hours we saw the smoke of a steamer coming to the eastward from the Sabine River. We made chase after her and in three hours came up with a large river steamer loaded with cotton. We opened on her with the rifle and 32-pounders, when she ran in

> shoal water, was fired and abandoned. In a few minutes she was enveloped in flames and burned for twelve hours. I saw in the Sabine River four schooners and several river steamers, arriving and departing up and down the river. At Calcasieu I saw three schooners and one river steamer (USND 1903b:197).

In addition to attracting foreign and Southern blockade runners and Confederate forces, the harsh terrain and isolation afforded by Calcasieu Parish's natural environment appealed to those seeking a sheltered railway. In the midst of wartime activities, the New Orleans & Texas Railroad Company persevered in its quest to link "New Iberia, on the Teche, to Orange, on the Sabine" [some 117 miles] via "the prairies of Calcasieu" (*TDP* 30 March 1862:2). A spokesman for the railway interest suggested that the Calcasieu was "a region of country perfectly healthy and well provisioned, being adjacent to the great stock and grain-growing region of Texas; and safe from invasion, the coast of the Gulf being lined by an impenetrable marsh" (*TDP* 30 March 1862:2).

The Case of the Schooner *Baigorry*

After sailing from Calcasieu Pass, the schooner *Baigorry* was captured by the US brig-of-war *Bainbridge* on 9 June 1862 some 100 miles off Havana "laden wholly with cotton" (Atherley-Jones 1907; Silver 1998:218). At the time of the controversial seizure in international waters, the *Baigorry* "was owned by foreigners who were residents of New Orleans" (Silver 1998:218). As an aside, Saint-Étienne-de-Baïgorry is located in the Pyrénées-Atlantiques region of southwestern France. Lengthy litigation concerning *The Schooner Baigorry* became part of precedent-setting case law known as the *End-of-Blockade Cases* (Silver 1998:218).

The case eventually reached the U.S. Supreme Court by appeal [U.S. District Court for the Southern District of Florida] and was argued on 3 February 1865, and decided on 8 March of that year. Chief Justice Chase's delivery of the majority opinion revealed these details:

> The Baigorry and cargo were owned by residents of New Orleans, claiming to be subjects of Great Britain and France. She was employed in the trade of the enemy, plying between Havana and ports of Louisiana, and finding entrance as she could, by running the blockade. The cotton with which she was laden was shipped, according to the testimony of the mate, at Calcasieu Pass, between the 27th of April [1862] and the 3d of May; but she did not sail, if the master be [sic] credited, till the 26th of May. Calcasieu Pass and all the neighboring region was in possession of the rebels, and the establishment of the blockade was well known to the officers of the schooner. The master says that he saw no blockading vessels off Calcasieu when he went in or when he came out. The mate, in answer to the same interrogatory, says nothing of what he saw when the schooner entered the Pass, but asserts that he saw no blockader when he came out. But the master says also, that he saw blockading ships as he was going towards the coast of Louisiana in February,

> and also saw a steamer passing along the coast while the schooner was at Calcasieu.

The lawfulness of the vessel's June 1862 detention was later argued before the U.S. Supreme Court in relation to the Federal Blockade, which was first proclaimed by President Lincoln on 19 April 1861. The legal standing of the statewide blockade of Louisiana became questionable, however, after Commodore Farragut captured the forts below New Orleans in late April 1862, and General Butler occupied that city by 6 May. These momentous events were then followed by Lincoln's 12 May proclamation that "the blockade of the port of *New Orleans* should cease" after 1 June 1862.

Several weeks after the *Baigorry*'s seizure, Commander Emmons of the USS *Hatteras* reported the destruction of the English schooner *Richard O. Bryan* near Galveston, and a subsequent encounter with a suspicious steamer anchored near Lake Calcasieu (USND 1905a:88). In the second instance, Emmons sent boats [July 1862] to divert the steamer but found that it belonged to a "foreigner" and "a Union man" named Goss [probably Daniel Johannes Goos] who had "a family of 13 daughters" (USND 1905a:88). By his own account, longtime Louisiana resident Goss had "but lately removed here [Calcasieu], to get out of the way of the rebels", and gave the Union commander "fresh provisions" with compensation (USND 1905a:88).

In Emmons's 25 July 1862 blockade duty journal, he further remarked:

> Farther east [of Calcasieu River], but west of my station, I overhauled the stern-wheel steamer Indian No. 2, that was bound from the Sabine to Berwick and New Orleans, and stood for me with the white flag flying. From her crew, I learned that the Confederate steamer Victoria, that escaped the De Soto in the Barataria Bay some months since, entered the Sabine under English colors just before they left, having on board guns, powder, etc., and that there was a schooner lying there loaded with cotton, ready for sea, also with English papers (USND 1905a:88).

By mid-August 1862, the USS *Hatteras* was stationed at Berwick Bay, where its commander sought advice about a vessel recently taken near the Calcasieu River. USN Captain George Emmons related these facts:

> I have overhauled a schooner called the *George Washington* (but no name painted) in a bayou leading into Lake Calcasieu, which has a regular license and clearance from our provost-marshal at New Orleans to get a load of cotton and 'return,' but the people [at Calcasieu] about told me that when she got her cargo from the interior the captain intended to take her to Havana. She was not worth taking without this cargo, and it is for you [Admiral D. G. Farragut] to judge whether, under the circumstances, I should have been justified in taking her with it (USND 1905a:155-156).

A Federal dispatch transmitted in late September 1862 reported "notes and observation upon Galveston and coast adjacent", which touched on Confederate movements at Calcasieu (USND 1905a:213). The relevant portion of Commander William Walker's letter follows:

> Along the coast, southwardly, from Pass San Luis to Corpus Christi, are about 2,000 men, chiefly mounted rangers, called the Coast Guard; a similar body of men, numbers unknown, are on duty to the eastward, extending so far as I know to Lake Calcasieu. These rangers constantly transmit intelligence of the movements of the blockading squadron, and according to circumstances warn off or encourage the approach of vessels engaged in violating the blockade,[sic] Hence, unless when vessels of the blockading squadron are anchored close in to the ports or inlets of the coast, they should keep out of sight from the land (USND 1905a:213-214).

U.S. Navy forces waged an assault on Confederates ensconced at Sabine Pass within days of that message, and on 2 October 1862, the USS *Kensington* was anchored "Off Calcasieu Lake". Its master, Frederick Crocker, related to superiors that the town up the Sabine River had been taken and that "the battery (consisting of four guns, two of 8,000 pounds and two smaller) [were] entirely destroyed" without loss of Federal lives (USND 1905a:217-218). The steamer *Kensington* and the schooner *Rachel Seaman* had arrived off Sabine Pass on the morning of 23d of September, where they joined the mortar schooner *Henry Janes* [sic] (Captain Pennington) at anchor. After the town officially surrendered, Crocker steamed up to the mouth of the Mermentau River [50+/- miles east of Sabine], and entered it with "a strong boat expedition" with the intent to destroy "an unfinished battery and several steamers" (USND 1905a:218). Crocker found:

> [T]he battery deserted and destroyed, and that the steamers, two of them, had run the blockade loaded with sugar only the week before; one still remained, but was up the river and could not be reached in boats. The next day we anchored near the mouth of Calacasieu [sic] Lake and took a sloop. We also obtained information of a steamer and two schooners that lay up the lake, and afterwards saw the steamer moving. We immediately commenced to fit the launch with masts and sails, with which to go after her. The next day I returned to Sabine, where I found that Captains Hooper and Pennington had executed my orders by going up to Taylor's Bayou and destroying a large railroad bridge, thus cutting off all communication with Sabine Pass and rendering our position secured against a land attack. The next day I chased and captured the British Velocity, from Sisal, Mexico, loaded with salt, cotton bagging, and large quantities of rope. I sent her in to anchor at Sabine. The next day (yesterday [1 October 1862]), having complete my launch, I started for Calcasieu Lake, and off this place captured the British schooner Adventure, also from Sisal, and loaded with the same cargo (USND 1905a:218).

Crocker's expeditions up the Calcasieu continued for several days, and utilizing his re-fitted launch, he and his landing party of two officers and twelve men [plus one howitzer]

captured the steamer *Dan* above Lake Calcasieu. Returning to the town of "Charleston, on Lake Charles", Crocker "burned a large schooner lying there", and "levied on the town a contribution of sweet potatoes and beef" (USND 1905a:224). The 112-ton *Dan* was built circa 1858 at Calcasieu (USND 1971:VII:218).

At this point, Crocker had been some "80 miles up the Calcasieu" for three days, and had not been in communication with other U.S. Navy personnel. Crocker "was informed by Union men, plenty of whom I found" that a Rebel force had collected just above the mouth of the Calcasieu to attack his vessel as it steamed downriver to the Gulf (USND 1905a:225). Crocker (USND:1905a:225-226) related his subsequent actions as such:

> I seized upon ten or twelve of the inhabitants of the place and posting them around the man at the wheel, who was exposed, made the best of my way down the river. I found one other large schooner, which I also burned, and thus destroyed all the navigation in that place, besides teaching the people a lesson they will not soon forget. As soon as I reached a place of safety I released the prisoners. I should have mentioned before, that on my way up I captured Colonel Nathaniel Clifton, the commander of all the rebel forces in that vicinity, and now hold him a prisoner…On reaching the mouth of Calcasieu River we found it too rough to cross with steamer, and having heard that the *Rachel Seaman* was in danger, I left the prize steamer [*Dan*] there with the crew and howitzer and hastened to [Sabine Pass]…Leaving my party on the *Velocity* in charge of Acting Master Taylor, on the 9th [October 1862] I returned to Calcasieu for the prize *Dan*, and found they had taken the sloop *Eliza*, from Vermilion Bay, loaded with 15 hogsheads sugar; the sugar was unloaded and the sloop destroyed. On the 10th and 11th it blew a hard norther [sic], but we succeeded in moving the *Dan* to this place [Sabine Pass] in safety, where she now lies.

A contemporary list, prepared by U.S. captain Frederick Crocker, identified eight watercraft seized during the Sabine Pass expedition. Information for these vessels follows in Table 1.

NAME	TYPE	OWNER	WHERE TAKEN	DISPOSITION
Velocity	Schooner	British	Sabine Pass	Armed for service
Adventure	Schooner	British	Pensacola	Adjudication
Dart	Schooner	British	Pensacola	Adjudication
West Florida	Schooner	British ["loyal"]	Pensacola	Secret USN trade
Dan	Steamer	Confederate	Sabine Pass	Armed for service
Conchita	Schooner	Confederate		"burned at Calcasieu'
Mary Ann	Schooner	Confederate		"burned at Calcasieu'
Eliza	Sloop	Confederate		"burned at Calcasieu'

Table 1. U.S. Navy list of vessels taken during 1862 Sabine Pass expedition. (USND 1905a:227).

In early February 1863, a leading northeastern U.S. paper remarked that:

> We have another bad item of news, this morning, from Texas. The Sabine Pass, on the extreme southeastern point of the Texas border, which our troops took possession of some months ago, has been recaptured by the rebels, and its garrison, guns and supplies captured, together with a United States gunboat and an unknown schooner. We suppose MAGRUDER will now proclaim the blockade at that point broken, and Sabine City open to the commerce of the world. The occupation of Sabine Pass was important as obstructing the trade which is carried on from Texas to Louisiana, and to the Cotton States this side of the Mississippi, and also that from Eastern Texas to and through Mexico (*TNYT* 7 February 1863).

In view of the decisive Confederate victory just miles from the mouth of the Calcasieu River, the paper's editor suggested that Union forces were now driven out from their "last foothold" in Texas. The New York journal also predicted that: "With the Harriet Lane, the Morning Light, the Alabama and the Florida, which are all supposed to be all near that part of the Gulf of Mexico, the rebels will be able to get up a very respectable force to operate against our blockaders" (*TNYT* 7 February 1863).

While stationed at his Sabine Pass headquarters in late April 1863, Confederate Lieutenant-Colonel W. H. Griffin suggested that "Calcasieu Parish, La." be added to the "eastern subdistrict of Texas", which was under his own command (USND 1905b:153). Griffin also related that a Federal gunboat had recently landed seven men on the Louisiana side of Sabine Pass, where they entered the lighthouse "making observations". Griffin then placed a Confederate unit of 30 men "in the light-house and the dwelling house near it", and when the Federal force [from *New London* and *Cayuga*] returned a skirmish ensued. In the aftermath, Griffin elected to retain his troops, scouts, and pickets on the Louisiana side of the channel. At this time, Griffin advised his superiors that "all the beef, mutton, and pork used on the Federal gunboats" were "procured on Lake Calcasieu" and that Captain J. A. Ware [Confederate Cavalry] was keeping scouts on the alert for these "Federal depredators" (USWD 1886:403-404; USND 1905b:152).

Reporting from Bayou Plaquemine Brulé on 23 April 1863, Lieutenant Colonel S. A. Bean [Fourth Wisconsin Volunteers] remarked that a Confederate cavalry force of some 2,000 "were collecting transportation and burning cotton" on the previous day, and that:

> The enemy are now on the Mermenton [sic] River, crossing. The have to cross on ferries. After they are over the river and have gone 30 miles they come to the Calcasieu, over which there is no bridge, but two ferries, 4 or 6 miles apart. Now, Drexel, the guide, says a force may be sent so as entirely to cut them off, or that they can be overtaken before they can get over the Calcasieu (USWD 1886:345).

Until May 1863, U. S. Navy Admiral David Farragut's command included:

> The Mississippi River as far as Vicksburg, and all its tributaries below; also the coasts of Louisiana, Florida and Texas, extending from Pensacola on the east to the mouth of the Rio Grande, including that network of bays, streams, inlets, bayous, sounds, and island groups which extends from the mouth of the Mississippi as far west as Sabine Pass, and the difficult bars and channels leading to Galveston, Matagorda and Corpus Christi, where none but the smallest vessels could enter, and which afforded safe refuges for blockade-runners during the entire war (Porter 1886:345).

On 4 September 1863, U.S. Army Brigadier-General Godfrey Weitzel departed New Orleans aboard the steamer *Belvidere* in the company of the steamers *General Banks, Saint Charles, I. C. Landis* and the gunboat *Arizona.* In the vicinity of Berwick Bay, the convoy rendezvoused with U.S. Army gunboats *Clifton* and *Sachem*, where "sharpshooters" boarded three of the vessels to continue on to their collective destination of Sabine Pass (U.S. War Department [USWD] [ser. I, v. 26, pt. 1] 1889a:298).

A map produced in 1863 by J. H. Colton Company of New York referenced the location of a "U.S. Garrison" situated to the southeast of Sabine Lake in Calcasieu Parish [modern Cameron Parish]. The position of Sabine Point lighthouse was noted just a short distance to the southwest of the Union fort (J. H. Colton 1863). Conversely, a Confederate Army memorandum penned during October 1863 described the contemporary conditions of ferries, bridges and roads in the Calcasieu region. Details about relevant sites suggested that:

> From the Louisiana shore, opposite Sabine City, to Johnson's Bayou settlement, 12 miles. During dry seasons wagons can pass. From Johnson's Bayou settlement to Mud Pass Bridge, 6 miles. Roads tolerably good in dry season. From Mud Pass Bridge to mouth of the Calcasieu, 8 miles. Good road. From the mouth of the Calcasieu (right bank of the river) to Niblett's Bluff road, 31 miles. The road can be traveled with wagons at almost any time….The only road to Lake Arthur from the mouth of the Calcasieu, so far as can be ascertained, is via the Cheniere, along the beach. Distance from the mouth of the Calcasieu to the Cheniere, 15 miles. Road tolerably good….At the mouth of the Calcasieu there is no ferry. Men cross in canoes and horses have to swim. There is a steamboat, the T. J. Smith (of which the traitor Clay Smith is the owner), together with several schooners, sloops, flats, &c., lying on Lake Charles, which can be used in crossing troops, provisions, munitions of war, &c., over the river, and carrying them up and down from the mouth to Clifton's Ferry (USWD 1889b:337).

Destruction of the Schooner *Pushmataha* (October 1863)

According to the official *Civil War Naval Chronology* (USND 1971:III:145) a "boat crew" attached to the USS Cayuga "boarded and destroyed [the] blockade runner *Pushmataha* which had been chased ashore and abandoned off Calcasieu River" on 7 October 1863. The U.S. navy vessel's commander, Lieutenant Dana suggested that the

vessel "carried a cargo of a ram, claret, and gunpowder, and had been set on fire by her crew" (USND 1971:III:145). This record also related that "Dana chased ashore another schooner carrying gunpowder which was blown up before she could be boarded" (USND 1971:III:145).

By early 1864, blockade runners "were operating freely in and out of Western Gulf waters" despite the presence of the West Gulf Squadron's Third Division that was "assigned to the Texas and Western Louisiana coastlines" (Lisarelli 1999:62). By late April 1864, the commander of the tinclad *Wave* was instructed to proceed to Calcasieu Pass to meet the familiar Unionists [refugees] that frequently sold livestock and sundry goods to the U.S. Navy. In the conduct of this particular mission, Benjamin W. Loring was joined by the *Granite City* (Cotham 2004:178-179).

Battle of Calcasieu Pass (May 1864)

Upon reaching the entrance to the Calcasieu River, Loring ordered his gunners to fire a few shells into the "empty" Confederate fort, and then steamed up the river some two miles to negotiate with the locals for beef, etc. (Cotham 2004:179). Cotham (2004:179) remarked that:

> The Union sailors at Calcasieu Pass thought themselves perfectly safe. Between Sabine and Calcasieu Passes, they believed, was only impassable marsh. They went to sleep on the night of May 5, 1864, therefore, feeling perfectly secure. This would turn out to be a dangerous illusion.

Meanwhile, a Confederate force with four small artillery pieces and "about 350 sharpshooters from the Sabine Pass garrison, overwhelmed the Union landing party, and took the ships under fire on the morning of 6 May" (USND 1971:IV:57; Cotham 2004:179). The *Granite City*, under the command of Master C. W. Lamson, surrendered quickly as its boiler and steam drum took shot, and the *Wave* "shortly followed suit" (USND 1971:IV:57). By 10 May 1864, the USS *New London* also arrived off Calcasieu Pass and being unaware of the recent action, its commander proceeded to send a small boat over to the *Granite City*.

On the following morning, Master Lyman Wells dispatched yet another small launch to the *Granite City* under a flag of truce, suspecting that the Federal vessel had been seized by Confederate forces. The acting superior officer on the Federal transport boat observed a Confederate flag on the *Granite City*, and attempted to shoot the ensign but was killed by returning Rebel shot (USND 1971:IV:57). Admiral David Farragut was enraged by the U.S. Navy defeat at Calcasieu Pass and due to the shallow nature of the waterway was unable to send light-draft vessels to recapture the *Granite City* and the *Wave* (USND 1971:IV:57).

In the aftermath of the Battle of Calcasieu Pass, Confederate Colonel William H. Griffin and his Sabine Pass soldiers:

> [W]ere elated to learn that they had captured one of the only Union gunboats (the *Granite City*) that had escaped from Dowling's fire at Fort Griffin the previous year. A correspondent to a Boston newspaper concluded his account of this event by observing that 'The blow is a sad one to the squadron, and Sabine Pass seems to be an unlucky place to operate' (Cotham 2004:180).

During summer and fall 1864, numerous Federal vessels including the USS *Bermuda*, USS *Circassian*, and USS *Fort Morgan* were ordered to reconnoiter the Calcasieu. This Federal presence impeded some illicit Confederate and civilian maritime activity. The captain of the schooner *Julia* reportedly surrendered his blockade runner to the *New London* before November 1864. The crew of the *Julia* had for many months attempted to escape from up the Calcasieu River without success. During his debriefing, the vessel's captain told Federal blockaders "that other small schooners" built upriver at Lake Charles were waiting for the opportunity to run the blockade. The *Julia*'s master also related that the captured Federal *Granite City* was up the Calcasieu, and that Confederates were unable to take it out into the Gulf (*TNYT* 20 November 1864).

As of 1 January 1865, West Gulf Blockading Squadron stations included two vessels devoted to service off Calcasieu Pass. This strategic maritime position was guarded by the four-gun screw *Chocura* (Lieutenant R. W. Meade), and the five-gun screw *New London* (Master Lyman Wells). Over to the west, the five-gun screw *Pembina* (Lieutenant J. G. Maxwell) was assigned to a cruising ground at Sabine Pass (USND 1908:4-5). Within a few weeks, "heavy gales" attributed to the escape of Confederate shipping at Calcasieu Pass (USND 1908:16-17).

On the "dark, foggy, rainy" evening of 20 January 1865, the former U.S. Navy steamers *Granite City* and *Wave* eluded the crew of the blockader USS *Chocura* as the *Confederate* vessels slipped out of the Calcasieu River. At the time, the *Chocura* "was anchored in 14 feet of water as near the mouth of the Calcasieu as possible (2 miles)" (USND 1908:17; USND 1971:V:20). The *Granite City* purportedly was carrying no cargo, and the *Wave* was transporting lumber for a Rio Grande River port (USND 1971:V:20).

Commander Richard Meade of the *Chocura* later reported to his superiors that he "gave chase for 60 miles" but could not overtake the faster *Granite City* as his own boilers were leaky and disabled (USND 1971:V:20). Confederate records suggested that the 229-ton side-wheel steamer *Wave*, built circa 1863 (ex-*Argosy No. 2*), was used as a military transport vessel (USND 1971:VI:323). The *Granite City* (ex-*City of Dundee* b. 1862 at Dumbarton, Scotland) was first captured by the US *Tioga* in March 1863 off Eleuthera, and was then purchased by the U.S. Navy at prize court. Ironically, shortly after it eluded the *Chocura* on 20 January 1865, the 160-foot *Granite City* ran aground off Velasco, Texas and was destroyed by the US *Penguin* (USND 1908:17; Wise 1989:303).

Capture of the *Delphina* (22 January 1865)

Commander Meade was able, however, to capture the blockade-runner *Delphina* just two days later. The story of the *Delphina* attracted national attention as *The New York Herald* related that the schooner "with one hundred and seventy bales of cotton on board" was "driven ashore and burned" (*The New York Herald* 19 February 1865). Meade's 24 January 1865 report submitted to the U. S. Navy commodore [West Gulf Blockading Squadron] related these details:

> I have the honor to report the complete success (without casualty) of an expedition, consisting of the launch, first cutter, and 40 men from this vessel, under my personal command, organized for the cutting out or destruction of a three-masted schooner lying in the second bend of the Calcasieu River, about 2½ miles from its mouth…The prize proved to be the schooner *Delphina* with a cargo of 180 bales of cotton. We made effort to get her afloat by carrying out her anchor and lightening her of her deck load, but all our exertions were of no avail. The norther caused the water to fall so fast that in an hour she was in 1 foot water, and our launch having grounded, I deemed it best not to expose our people to an attack by the enemy in overwhelming force, and therefore fired the prize and returned to the ship [USS *Chocura*] with the prisoners (USND 1908:19).

Years later, in David Dixon Porter's *The Naval History of the Civil War*, the U.S. Navy admiral remarked only *once* of the Calcasieu River in his comprehensive work. In that instance, Porter (1886:777) remarked of the capture of the *Delphina*, as such: "On January 24th [sic], 1865, quite as clever an affair took place off Calcasieu River, by a cutting-out expedition, under Lieutenant-Commander Richard W. Meade, which was a complete success without any casualties".

Postwar Accounts of the Disposition of Captured Vessels & Prizes

In response to a postwar request from the 40th Congress (second session) Secretary of the Navy Gideon Welles submitted a comprehensive list of "vessels and property captured or destroyed by the navy of the United States" during the conflict (U.S. Navy Department [USND] 1868:1). In regard to the project area and local navigation area, Secretary Welles confirmed seizures identified in the following table.

NAME	CLASS	CARGO	DATE	WHERE	CAPTOR	DISPOSITION	REMARKS
Troy	Schooner	Cotton	13 AUG 1862	Sabine Pass	*Kensington*	New York	Condemned
Corse	Schooner	"Drugs, &c"	11 NOV 1862	Sabine Pass	*Velocity, Dan, Kensington,* and *Rachel Seaman*	Key West	Condemned
Unknown	Schooner	Salt	10 APR 1863	Sabine Pass	*New London*	Philadelphia	
Blue Bell	Sloop	"Sugar,	2 JUL	Sabine	*Cayuga*	Key West	

		&c"	1863	Pass			
Revenge	Schooner	Sugar	23 JUL 1863	Calcasieu	*Owasco*		Destroyed
Concordia	Schooner		5 OCT 1863	Calcasieu Pass	*Granite City*		Destroyed

Table 2. Postwar account of prize vessels seized at Calcasieu and Sabine Pass. (USND 1868:5, 7-8, 27, 30, 36).

Volume two of *Statistical And Chronological History of the United States Navy*, compiled by Yale Fellow Robert Wilden Neeser, related Civil War Era naval action off Calcasieu River and the proximate Gulf coast. For clarity, relevant information is displayed in the following table.

PRIZE	SEIZURE	TYPE	POSITION	CARGO	CAPTOR	DISPOSITION	REMARKS
Tom Hicks	9 JUL 1861	Schooner (27 tons)	Off Galveston	Lumber	USS *South Carolina*	"Vessel sunk"	"Confederate" (Master Wells)
Eliza	OCT 1862	Sloop	"Calcasieu and Sabine Pass, Texas"		U.S. vessels *Rachel Seaman* & *Kensington*		
Mary Ann		Schooner					
Conchita		Schooner					
Dan		Schooner					"armed"
Concordia	5 OCT 1863	Schooner	"Calcasieu Pass"		USS *Granite City*		British

Table 3. U.S. Navy seizures in the project vicinity. (Neeser 1909:322-323, 370-371, 416-417).

Immediate Postwar and Reconstruction Era

In early July 1865, *The Galveston Daily News (TGDN)* (9 July 1865) published a "New" advertisement for a local retailer offering the following commodity: "LANDING FROM CALCASIEU CYPRESS LUMBER-Superior quality and well seasoned. Also, Plaster-ing LATHS and FENCE PICKETS. For sale by B. S. PARSONS, Galveston." This interstate trade apparently flourished, as by 26 August 1865, the same lumber interest advised readers that he:

> B. S. PARSONS, HAS RESUMED THE *Lumber and Commission Business*, IN GALVESTON, TEXAS: HAS ON CALCASIEU PINE AND CYPRESS LUMBER; Pickets, Laths, Shingles, Primed and Glazed Sash, and will soon receive Dressed Flooring and Colling, Northern White Pine, &c., &c [sic]. Consignments solicited, and orders filled for all kinds of building materials (*TGDN* 26 August 1865b).

Several weeks later, a powerful storm struck the coastline, and its damaging effect at Calcasieu was noted by *TNYT*, as such:

> We saw a gentleman who informed us that during the storm, which swept the Gulf coast on the 30th of September, the buildings at Calcasieu Pass were all destroyed but one, and all the people were drowned except one man, who saved himself by getting on top of a

> house. There were twenty-four lives lost. At Sabinetown [sic] everything was swept away, and the residents to the number of sixty-one were drowned. The water rose twenty feet above the surface of the ground at Calcasieu Pass (*Vermillionville* [sic] *Advertiser* 30 September 1865 quoted in: *TNYT* 18 October 1865).

In the aftermath of the hurricane, the lumber mills situated upriver apparently were not greatly affected. Ads placed by "B. S. PARSONS & CO., at Sanford's former Yard" continued to appear in *TGDN* every week throughout the fall, and grew in size with much larger lists of inventories. By 12 November 1865, one described tongued and grooved dressed flooring and ceiling lumber, assorted lengths of planks, clapboards, scantlings, joists, sills, shingles, laths, pickets, and "wharf and bridge planks, sleepers, &c." for sale (*TGDN* 12 November 1865c). Relevant highlights from this announcement read:

> GALVESTON LUMBER DEPOT, TEN CARGOES FROM ST. JOHN'S, BANGOR, New York, Calcasieu and Sabine, containing ONE MILLION AND TWO HUNDRED THOUSAND FEET WHITE PINE, SPRUCE, HEMLOCK, Cypress and Yellow Pine LUMBER…And a large assortment of…Calcasieu Yellow Pine Lumber; and White Pine Sash, Blinds and Doors Will soon be added to the stock (*TGDN* 12 November 1865c).

These Texas-based advertisements regularly continued into the next year, and due to the popularity of Calcasieu lumber, other dealers like "ALPHONSE KENISON" commenced to sell the southwestern Louisiana commodity at his "Market Street yard". On 3 April 1866, Kenison related that "MORE LUMBER NOW LANDING AT DIFFERENT WHARVES" specifically "100,000 feet ASSORTED CALCASIEU PINE [and] 80,000 Cypress Shingles" (*TGDN* 3 April 1866a:4). In related maritime news, vessels anchored at the Port of Galveston on 4 April 1866 included: "Schooner Revenge, Calcasieu, discharging", "Schooner Susan, Calcasieu, discharging", "Schooner Rosario, Calcasieu, do", and the "Sloop Cometa, Calcasieu" (*TGDN* 4 April 1866b:3). On the following day, the paper's "Marine Intelligence" column confirmed the former and also noted that the 51-ton schooner *Mary Lee* had cleared the port on 3 April for "Calcasieu" under the command of Captain Ginnerz (*TGDN* 5 April 1866c:3).

The Sabine Pass beacon was illuminated as the 1865 Christmas holiday commenced (Harrison and Bowman 1997). Despite this greatly anticipated and modern improvement, a tragic maritime mishap occurred off the pass in late December or shortly after the onset of New Year 1866. In its column entitled "News From Other Ports", *The Cincinnati Enquirer* reported on 7 February 1866 that:

> We are informed by the keeper of the light-house at Sabine Pass, now in this city, that the steamer Colonel Chandler, Captain Richard Wade, which cleared from this port December 23, for Galveston, *via* Atchafalaya River, encountered a strong gale when off Sabine Pass, (date not given,) during which she broke in two and was totally lost. The Captain and pilot took one of the small boats and attempted to make the shore, but were never see alive afterward. The body of the

> pilot was picked up on the beach a few days after the disaster; but that of the Captain had not been found when our informant left. The balance of the crew clung to a portion of the wreck and were finally washed ashore (*The Cincinnati Enquirer* [*TCE*] 7 February 1866b:4).

A previous account of the shipwreck identified the deceased pilot as "Curtiss" but offered no other additional details about the steamer (*TCE* 2 February 1866a:4). However, the "boat *Colonel Chandler*" was being utilized by the U.S. Army's Southern Division Headquarters (New Orleans, Louisiana) as of 26 April 1865. On that date, Brigadier-General Sherman ordered Assistant Quartermaster F. W. Perkins to instruct the captain of the *Colonel Chandler* "to be on the lookout for a party of the rebel crew of the ram *Webb,* reported to have passed into the canal on their way to the Gulf, near Fort Livingston" (USND 1908:154-155). The *Colonel Chandler* may have been so named to posthumously honor Lieutenant-Colonel George W. Chandler (hero of Kenesaw Mountain) or Lieutenant Colonel John G. Chandler, "U.S. Army, Acting Chief Quartermaster" (Louisiana and Trans-Mississippi departments).

A letter to the editor, and its thought-provoking enclosure, published by *TDP* (6 May 1866:2) commented on "The Louisiana Deposits of Petroleum" manifested in Calcasieu Parish. From his New Orleans office, President W. G. Swan of Louisiana Petroleum and Coal Oil Company contacted the newspaper inviting interested investors to examine an anonymous report, of which an excerpt follows:

> In reply to your [Swan] question as to what I know about the coal oil region of Calcasieu parish, I will say that I have known the oil springs in that parish (being the same which your company propose to work) for many years. I have been upon the ground frequently, and have seen the oil flowing spontaneously from the springs spreading itself over the surrounding country. I have noticed that when the wind was high and the waters of the Gulf much agitated, the flow of oil was much more abundant than when the weather was calm. Gas is continually escaping from the earth near the springs, and when the neighboring marsh is covered with water, the gas can be seen constantly arising from it and can be easily gathered as it comes up. The natural flow of oil from these springs amounts, I suppose, to as much as three or four barrels per day, and more. I saw these springs in the year 1861, when specimens of the oil were taken by me to New York to be tested. It was pronounced coal oil, and only was ascertained the real value of these springs, although the existence of petroleum in quantities at that locality has been known since the discovery of the country. The Indians formerly resorted to the springs for the oil, which they used as an ointment to cure ulcers, sores and rheumatic pains. In 1861 a company was about being organized, with a capital of $150,000, to work these wells, and a large portion of the stock was taken, but the war coming on rendered the prosecution of the enterprise impossible. It is supposed by many practical men that there is an immense wealth of oil and other mineral deposits in the locality referred to (*TDP* 6 May 1866:2).

Addressing the Louisiana General Assembly on 28 January 1867, Governor James Madison Wells provided a bleak "situation of the State", as such:

> I regret I cannot congratulate you on the auspices of your assembling. The year that has just closed, while bountiful in its blessings of peace, and compared to other sections of country, also in health, was not fruitful to us in its rewards to industry. A large extent of our most fertile lands have been submerged by the breaking of the levees; families have been driven from their homes; horses, cattle and crops have been destroyed, and the liberality of the National Government had to be invoked, to supply food to the starving. Upon this disaster, came the excessive rains and the army worm, which cut off more than one-third of the cotton crop, so that few, if any, of those engaged in planting have cleared expenses, while the large majority have lost heavily. These calamities, repeated in two successive years, combined with the derangement of labor, could not otherwise than operated as a discouragement to the agricultural interests of the State. Depressing as was their tendency, however, I cannot believe that our people will permit their energies to be paralyzed. We have the most fertile lands on the globe, a genial climate, and the seasons cannot always prove unpropitious (Wells 1867:3).

On 7 March 1868, the State Constitutional Convention adopted the new 22-page constitution for Louisiana (State Constitutional Convention [SCC] 1868:1). The instrument provided that Calcasieu Parish would receive one representative, and that the parish should join Lafayette and St. Landry in one district. Two senators would represent this new district (1868:5). Articles 144 and 146, respectively, related that a militia (comprised of able-bodied men between the ages of 18 to 45) would be organized by the legislature; and could be called by the governor to active service under certain circumstances (1868:18). Article 148 remarked that:

> The ordinance of secession of the State of Louisiana, passed twenty-sixth of January, eighteen hundred and sixty-one, is hereby declared to be null and void. The Constitution adopted in eighteen hundred and sixty-four, and all previous constitutions in the State of Louisiana, are declared to be superseded by this Constitution (SCC 1868:19).

Nineteenth-Century Geological Study of Calcasieu Parish

During the immediate antebellum era, a geological investigation suggested that the State of Louisiana could extract sufficient quantities of oil "from Calcasieu Parish alone to meet the needs of the Confederacy; however, no effort was made to begin production" (Wilds et al. 1996:75). In the year after the conclusion of the American conflict, "the state's first well, also in Calcasieu Parish, turned out to be a dry hole" (Wilds et al. 1996:75). These series of events were perhaps explained by a spring 1866 news-story. A letter to the editor, and its thought-provoking enclosure, published by *TDP* (6 May

1866:2) commented on "The Louisiana Deposits of Petroleum" manifested in Calcasieu Parish. From his New Orleans office, President W. G. Swan of Louisiana Petroleum and Coal Oil Company contacted the newspaper inviting interested investors to examine an anonymous report, of which an excerpt follows:

> In reply to your [Swan] question as to what I know about the coal oil region of Calcasieu parish, I will say that I have known the oil springs in that parish (being the same which your company propose to work) for many years. I have been upon the ground frequently, and have seen the oil flowing spontaneously from the springs spreading itself over the surrounding country. I have noticed that when the wind was high and the waters of the Gulf much agitated, the flow of oil was much more abundant than when the weather was calm. Gas is continually escaping from the earth near the springs, and when the neighboring marsh is covered with water, the gas can be seen constantly arising from it and can be easily gathered as it comes up. The natural flow of oil from these springs amounts, I suppose, to as much as three or four barrels per day, and more. I saw these springs in the year 1861, when specimens of the oil were taken by me to New York to be tested. It was pronounced coal oil, and only was ascertained the real value of these springs, although the existence of petroleum in quantities at that locality has been known since the discovery of the country. The Indians formerly resorted to the springs for the oil, which they used as an ointment to cure ulcers, sores and rheumatic pains. In 1861 a company was about being organized, with a capital of $150,000, to work these wells, and a large portion of the stock was taken, but the war coming on rendered the prosecution of the enterprise impossible. It is supposed by many practical men that there is an immense wealth of oil and other mineral deposits in the locality referred to (*TDP* 6 May 1866:2).

In regard to the subterranean treasures of Calcasieu Parish, the Louisiana governor informed the state legislature that "Senator J. B. Robertson" had volunteered to conduct "a geological exploration" of the parish and its "surrounding country at his own expense" in 1866. The chief executive remarked with confidence that "his report will show sufficient data, to prove the existence of coal and valuable minerals in that section of the State" (Wells 1867:15). This statement would prove prophetic, in light of the abundant natural resources found in southwestern Louisiana.

Robertson's visionary survey coincided with a national trend developing in the nation's capital, whereby, the Federal government realized the economic merits in identifying the resources of its states and territories. Due to the efforts of Robertson and others of his ilk, the first director of the U.S. Geological Survey (USGS) recalled circa 1880 that:

> Eighteen hundred and sixty-seven, therefore, marks, in the history of national geological work, a turning point, when the science ceased to be dragged in the dust of rapid exploration and took a commanding position in the professional work of the country (King 1880:4).

The following year, 1868, was remarkable in that, "the oozing of petroleum and escape of gas from sulphur [sic] springs in a small marsh [in Calcasieu Parish] first attracted attention" (Hayes and Kennedy 1903:133). Meanwhile, the Calcasieu River was also receiving national attention in regard to the potential for more shipping on the waterway. A U.S. revenue steamer captain submitted a detailed account of Calcasieu River activities to his superior in early November 1869, which was published by the *New Orleans Republican* (*NOR*). Anchored off Sabine Pass, Master E. A. Freeman of the *Wilderness* remarked:

> I found a Customhouse Inspector at the mouth of the river, who is appointed by the Collector of the Customs of the Teche District. He was on a horseback tour from Lake Charles, sixty-five miles up the river. To be of any use whatever, this officer should be stationed at the mouth of the Calcasieu, and be provided with a suitable boat, etc. There are thirty-three vessels regularly trading between Calcasieu and Galveston, and other gulf ports, carrying lumber, and bringing back groceries, dry goods, etc. Four steamers are employed in towing and lightering. Five new schooners are in process of building (*NOR* 1 November 1869).

Erection of Cameron Parish (1870)

Cameron Parish was erected on 16 March 1870 as portions of western Vermillion and southern Calcasieu parishes merged to create the state's most southwestern political entity. Diamond (1973) suggested that the new Louisiana parish was named to honor Robert Alexander Cameron who served with distinction in the Red River Campaign. Other unsubstantiated reports suggested that the parish was formed as a political favor for a friend of "carpet-bag" Governor Henry Clay Warmouth named Colonel George W. Carter. Carter ostensibly could not be elected in his own parish due to unknown circumstances. Yet another tradition suggested that the parish was named to honor Simon Cameron of Pennsylvania.

The earliest official business was the appointment of six justices of peace, and the transfer of "Certain Public Records" from the two parent parishes (Marr 1895:83). During the same year, Louisiana legislators also granted the "privilege to establish" a ferry at Calcasieu Pass to Jere V. Smith (Marr 1895:209). In the same period, the U.S. Congress passed legislation that provided for the "abandonment of Fort Sabine [Louisiana] and other military reservations in different States", and a significant portion of the Fort Sabine reservation was described as "clearly swamp land".

A statutory-mandated [enacted March 1803] abstract prepared by Secretary of War William Belknap was submitted to the U.S. Senate (43d Congress, 1st Session) in April 1874. *Executive Document No. 41* (USWD 1874[No. 41]:1-2) reported "the militia force of the United States" and 1872/1873 aggregates for three Gulf States are shown in Table 4. An attached remark made by U.S. Army Adjutant-General E. D. Townsend, official compiler of the statistics, related that omitted entries for Alabama and Mississippi [and

one each for Florida and Texas] had been "repeatedly" requested in vain from "State authorities" (USWD 1874[No. 41]:2).

MILITIA FORCE	FLORIDA	LOUISIANA	TEXAS
GENERAL OFFICERS	6	9	12
GENERAL STAFF OFFICERS	34	50	9
REGIMENTAL, FIELD, & STAFF OFFICERS	47	29	163
COMPANY OFFICERS	253	106	2,019
TOTAL COMMISSIONED OFFICERS	340	194	2,203
TOTAL NON-COMMISSIONED OFFICERS, MUSICIANS, PRIVATES, ETC.	-------	2,278	72,390
AGGREGATE	340	2,472	74,593
NUMBER OF MEN AVAILABLE FOR DUTY (UNORGANIZED)	25,363	111,289	-------

Table 4. Militia force of Reconstruction-Era Gulf States (USWD 1874:[No. 41]:2).

Cotton would emerge as Cameron Parish's prominent cash crop after the war, and the long-established ports of New Orleans and Galveston were poised to accept this "new" commodity. Local schooners were also used to transport lumber, oranges and sugar syrup to these rebounding markets. Circa 1874, Captain Daniel Goos operated a thriving mill and shipyard on the Calcasieu River that repaired and supplied local and transient vessels navigating the waterway (Neville 1874). The Goos enterprises and other riverfront industries were undoubtedly bolstered by a much desired construction project that commenced in the late-Reconstruction Era.

Initial Federal Work at Calcasieu Pass (1873-1874)

Historical sources confirmed that the "first examination of Calcasieu Pass was made by Capt. C. W. Howell, Corps of Engineers, in 1871" (USWD 1906:3). By early 1872, the U.S. Congress considered a crucial navigational project that eventually affected both newly formed Cameron Parish and the entire coastal region. On 10 June, the body authorized the sum of $15,000 to improve Calcasieu Pass. The work commenced in May 1873 and continued at intervals until its completion on 14 January 1874 (U.S. Army Corps of Engineers [USACE] 1874:721). In the annual *Report of the Chief of Engineers* submitted to the secretary of war later that same year, the following description of the project was conveyed:

> There has resulted from the work a straight channel, 60 feet wide and 6 ½ feet deep, at mean low-tide, from the deep water in Calcasieu Pass to the deep water in Calcasieu Lake, as shown by the accompanying tracing. Vessels drawing 6½ feet loaded have now free access from the Gulf to and from the important lumbering-region about the head of Calcasieu Lake, whereas, before improvement, the route was only open to vessels drawing more than 3½ feet, by lightering over the bar improved. Since completion of the work, a period of nearly six months, no material filling of the channel excavated has been observed…A larger class of vessels has engaged in the trade of Calcasieu Pass, since its improvement, without resort to lightering. These have been able to make three trips in the time before required for two trips. A direct trade with

> Mexican ports has been started. The freights on lumber to Galveston and adjacent ports have been decreased $2 per M. In Galveston the price of first-quality lumber has been reduced from $6 to $7 per M. By the old system of lightering over Calcasieu Bar, what was first-quality lumber at the mills [up river] became filled with grit and reached market deteriorated in value, which is not the case now (USACE 1874:721).

Prior to the opening of the first Federal channel, a "new" vessel arrived on the scene causing great excitement for the residents of the new parish. Reprinting a story initially published by the *Lake Charles Echo*, *TDP* (29 August 1873:2) related:

> This long expected craft (the Ramos) arrived here last Tuesday, and has commenced her regular semi-weekly trips between Lake Charles and Leesburg. The Ramos is a neat looking, newly painted propeller, commanded by Capt. Thomas R. Reynolds, whose genial company is of itself a great inducement to step aboard of his vessel. The approaching wild fowl season, with the abundance of oysters and redfish at Calcasieu Pass, will soon give the Ramos a good passenger list. She has made one trip already from Leesburg to Lake Charles, in six hours, actual running time. All her trips are by daylight. We congratulate our friends in Cameron parish on the advent of our mail and traveling accommodations.

On 5 November 1876, Lieutenant C. D. Sigsbee steamed from Delaware aboard the *Blake* arriving off Cape Romano (Florida) by 16 November. The U.S. coast surveyors then commenced to take a series of line soundings in the Gulf of Mexico over the course of several weeks. By 2 January 1877, the steamer *Blake* proceeded to Ship Shoal where Federal hydrographers:

> [S]tarted a line to pass due south, on which soundings were completed on the 4th of January. This line was continued to latitude 27° 11', and then turned due west, soundings being carried in that direction somewhat to the westward of the meridian of Calcasieu Pass, and along that meridian to the neighborhood of Calcasieu entrance. On the line going westward, although most of the hydrography during the season had been prosecuted in heavy weather, occurred the only cast that was attended with the loss of any wire, and in that instance the loss was due to the drawing of a splice, and not break of the wire. The weight of thirty-four pounds used in sounding was in all other cases drawn up with the wire in depths not greater than seven hundred fathoms (U.S. Coast Survey 1880:42).

In early April 1878, *The New York Times* (*TNYT*) published a story, with choice excerpts from the New Orleans *Democrat,* describing an assault on the timber industry at Calcasieu. The New York journal related that the Louisiana paper:

> [F]elicitates itself that Congress has allowed only $5,000 for the payment of the 'spies and pimps' now in the employment of the 'distinguished Prussian who presides over the Interior Department,' and who is now engaged in crushing out one of the most thriving industries of South-western Louisiana (*TNYT* 3 April 1878).

Despite its sarcastic tone, the story provided relevant information about the contemporary timber industry operating along the Calcasieu. Specifically, the article commented that 92,000 logs were recently cut [perhaps illegally] from Government lands and then rafted down the river to "numerous saw-mills". At some point, the logs were confiscated by the Federal government and sold at public auction (*TNYT* 3 April 1878).

By April 1879, the "swift-running propeller" *Ramos* was still carrying the U.S. mail from Lakes Charles to Leesburg. A news-story published by *TNYT* on 26 May reported the loss of the vessel, and the more tragic loss of its passengers:

> During a thunder-storm yesterday [24 May 1879] afternoon a whirlwind struck the small mail propeller *Ramos*, in the Calcasieu River, a short distance below this place [Lake Charles]. The boat was instantly capsized, and immediately sank in about 30 feet of water. There were eight persons on board at the time—the Captain [Benjamin Moss], engineer, and six passengers (*TNYT* 26 May 1879).

Late-Nineteenth-Century Navigation and Shipping

The U.S. Geological Survey was established in early spring 1879, and in the following year, Director Clarence King presented the agency's initial report to the U.S. Department of Interior (USDI) (King 1880:3). In its foreword, Director King remarked that:

> Prior to the above enactment [3 March 1879], and at irregular intervals since the early years of this century, the national government had made various attempts to acquire and diffuse information on the geological structure and mineral resources of the United States. Geologists were dispatched to report upon certain fields of mineral industry, and to nearly every military exploration or international boundary survey was attached some one more or less competent to delineate and describe the geological features of the land traversed. Instances of success in this line of expeditionary geological reconnaissance may be found in the reports of the Pacific Railroad and Colorado River surveys, executed under the Corps of Engineers of the Army, and those of Mexican boundary surveys….Up to 1867, geology was made to act as a sort of camp-follower to expeditions whose main object was topographical reconnaissance. Charged with definite objects and missions, the leaders of these corps have tolerated geology rather as a hindrance than a benefit. In consequence, such subsidiary geological work amounts to little more than a slight sketch of the character and

> distribution of formations, valuable chiefly as indicating the field for future inquiry. In the year 1867, however, Congress ordered the geological exploration of the fortieth parallel, a labor designed to render geological maps of the country about to be opened up by the Union and Central Pacific Railroads, then in process of construction. In this work, geology was the sole object. For the first time a government geologist found himself in the independent command, able to direct the movements and guide the researches of a corps of competent professional assistants (King 1880:4).

Although there were no specific references to southwestern Louisiana, King concluded his report about unexplored and remote areas of America, and remarked that: "we have shown a power, unprecedented in the slower past, to discern, to seize, and to utilize the national wealth with which the United States is so liberally endowed" (King 1880:75).

Over time, the initial navigational channel completed in 1874 required maintenance dredging due to siltation. Consequently, Federal engineers supervised re-dredging efforts in 1882-1883 and again in 1886-1887. Furthermore, in order to protect the third dredge project, revetments of piles and planks were constructed on each side of the channel by the end of fiscal year 1887. Supplementary work was commenced during that term, and completed by 1888 for "excavation of a channel through the bar at the mouth of the river" (USWD 1906:3).

A June 1880 maritime story of a curious nature identified a schooner that regularly sailed between "Lufkin's slip" [Galveston] and Calcasieu River landings. Captain J. B. Rodgers reported that he had encountered "a field of green turtles, some of them being as large as an ordinary-sized round table" during one of his frequent trips to the Louisiana river (*TGDN* 2 July 1880 quoted in: *TNYT* 7 July 1880). From his vantage point on the *James Andrews*, as he anchored during a terrible squall between the Sabine and Calcasieu rivers, Rodgers observed hundreds of turtles lying on their backs as Spanish mackerel leapt through the air in their midst (*TGDN* 2 July 1880 quoted in: *TNYT* 7 July 1880).

In early 1883, Leesburg customs collector T. F. Monroe summarized the maritime activity of vessels plying along coastal Cameron Parish and the mouth of the Calcasieu River. Vessels entering/clearing the waterway were comprised of 58 schooners (aggregate of 1,970 tons) with some featuring more that one hatch to better accommodate lumber. Some 232 crewmen served aboard the schooners to primarily transport "merchandise" up the river, which was replaced by outbound cargoes of lumber (USWD 1883:1128). Collector Monroe also compiled commercial statistics for the U.S. Army Corps of Engineers that identified goods shipped annually on the river (Table 5).

ARTICLES SHIPPED	NUMBER	VALUE
Sawed lumber (feet)	38,000,000	$760,000.00
Cypress shingles	6,000,000	$ 24,000.00
Rice (barrels)	2,108	$ 14,390.00
Return freight (packages)		$528,000.00
	TOTAL	$1,326,390.00

Table 5. Leesburg ca. 1883 customs statistics. (U.S. War Department 1883:1128).

U.S. Army engineer W. S. Davis included this report with his own reconnaissance survey of "The Pass" conducted 23 March 1883. On that date, Davis boarded the local mail steamer at Lake Charles and proceeded downriver to Leesburg. From there, the Federal engineer "took soundings, at short intervals, from the bow of the steamer, and sketched the topography as accurately as [he] could" (USWD 1883:1127).

Davis's official report submitted to the U.S. Congress included information regarding the contemporary timber industry at Lake Charles, too. At this port, 11 large lumber mills jointly produced a maximum of 398,000 feet of sawn logs with some plants having the capacity to plane up to 120,000 feet of boards per day. Three shingle mills there had a daily combined output of 105 cypress shingles. Also, one rice mill at Lake Charles could clean 30 barrels of rice per day. Davis concluded his 1883 annual report with this staggering observation; that the estimated amount of pine growing in the Calcasieu River region was 4,120,000,000 feet (USWD 1883:1128).

October 1886 Hurricane

In early October 1886, white residents of Johnson's Bayou included members of the Sam Brown, Turner, Locke, Ferguson, Radford Berry, Alfred Lambert, Burwick, Shalwalley, Stiverner, George Striever, Franshall [or Franchet], Franeswar, Gallier [or Gallon], Smith, Marion Lukes, Charles Blanchet, Tamer, Wagly, Degard, and Toochakk families. Black residents included members of the Henry Johnson, Jack Lewis, and Dick Hambrick families. At the conclusion of the hurricane that commenced on 12 October, most of these people were among the dead or missing (*TNYT* 15 October 1886a; *TNYT* 17 October 1886c; *TNYT* 18 October 1886d). In the aftermath of the hurricane, *TNYT* published this informative story that also sheds light on the region's pre-storm status:

> The village of Johnson's Bayou, La., which was swept away by the storm on Tuesday last, is a high ridge on the seacoast, and the bayou from which it takes its name runs through the inhabitable parts of that section of the settlements in which is also situated the Post Office station known as Radford. They are in Cameron Parish, on the Louisiana shore, six miles east of Sabine Pass. The bayou is 19 miles in length and varies from one to four miles in width. Ridges face the Gulf 12 feet above the sea level, and in the rear is a dense and impenetrable marsh. The population on last Tuesday morning numbered 1,200 soul; to-day 85 of that number are counted with the dead….Radford was very thickly settled and populous. It boasted its cotton gin and cotton and cane plantations. It was the head of navigation, and its stores were many, principally those run by J. Paveto, who also operated the gin and turned out annually 800 bales of cotton produced in that section. The other stores were owned by A. B. Smith & Co. and J. Griffith, general merchandise dealers, and other small merchants constituted the commercial community. Cotton and sugar are the chief products of the ridges, which are composed of the richest and most fertile grazing country, and the parish had 8,000 head of cattle and horses, owned by a thriving

> community. Communication with the outer world was through two steam vessels, both owned in Johnson's Bayou and Radford, while a fleet of trading vessels plied the waters of the bayou *(TNYT* 17 October 1886c).

The epic storm commenced at 4PM, and by 10PM, the first ridge (12 feet above sea level) was inundated by 10 feet of swirling seawater (*TNYT* 17 October 1886c). The steamers *Lamar* and *Emily P*. were loaded with provisions at New Orleans on 14 October and were dispatched to Johnson's Bayou with volunteers seeking to assist the homeless (*TNYT* 15 October 1886a). Intelligence originating from Orange, Texas on the following day related that the *Emily* had arrived from Johnson's Bayou with 62 storm survivors. From New Orleans, *TNYT* also advised that: "Previous accounts have not been exaggerated. The relief party report fearful devastation" (*TNYT* 16 October 1886b).

At nearby Sabine Pass, the pre-storm population of 200 was reduced by "nearly one-third", which prompted Beaumont (Texas) citizens to outfit relief parties. Transported there by the East Texas Railway and by an unnamed vessel, witnesses viewed a dismal scene. Newspaper sources related that: "The damage to property is very great. The wharf property of the town was owned by New-York capitalists, who also own the adjoining lands and were aiming to make Sabine Pass an important port on the Gulf coast" (*TNYT* 15 October 1886a). Within five days of the hurricane, Orange residents organized more relief parties as reported by *TNYT*:

> Two steamers and two schooners and about 25 small boats are doing active work in gathering up the suffering and burying the dead from Sabine Pass and the bayou. The steamer Lamar left to-day with a new crew and relief men for Sabine Pass. Various committees are on the go all the time attending to the needs of the afflicted. The ladies of Orange have turned out en masse in clothing the naked and furnishing delicacies for the sick. The physicians are in constant demand, and respond promptly. Officers of boat are at heavy expense, but have offered their services free in furnishing crews, &c. (*TNYT* 18 October 1886d).

The storm surge, from the October 1886 hurricane, rushed inland approximately 20 miles and killed 150 people at Sabine and practically destroyed the town. Spokespeople for *Lighthouse Digest* remarked that "[e]verything at the lighthouse was blown away except the tower with its 18 inch thick walls and its eight buttresses" (Harrison and Bowman 1997).

Late-Nineteenth-Century Development

During this era, Kansas banker Jabez B. Watkins organized the North American Land and Timber Company and soon thereafter, purchased "some million and a half acres of prairie land in Cameron, Vermilion, Acadia, and Calcasieu parishes" (Daniel 1986:40). Watkins [and his English financiers] envisioned a bold plan "to drain the marshland and set up an agricultural paradise in the lowlands" incorporating vast canals to provide

irrigation and transportation of crops by barge, and to support mechanized plows (Daniel 1986:41).

Eventually Watkins solicited the assistance of agricultural expert and college president [and preacher] Seaman Knapp. Knapp visited the Gulf Coast and quickly moved his family to Lake Charles to assist Watkins's "land promotion scheme" (Daniel 1986:41). Knapp became known as the "father of the rice industry", and ultimately established the U.S Department of Agriculture's extension system, which revolutionized the American farming industry (Allured et al. 2012:18).

The "only relics of the first homes on the Rio Honda [sic] were explored in 1886 by Surveyor Vandegaer" (*TSPC* 1890a:467). There were contemporary structures situated in the parish capital. The *Lake Charles Echo* remarked in mid-September 1888 that Leesburg boasted "a court house, jail, and one or two stores, but not a saloon in the parish". The editor suggested that since there were no bills of indictment for the preceding term of district court, some residents felt that *no* lawyers were needed (*Lake Charles Echo* quoted in: Perrin 1891).

As of 1 July 1891, according to the *Official Register of the United States*, there were only eight Cameron Parish communities offering U.S. postal services. The "townships" and their respective postmasters were: Cameron (Mrs. H. I. Henry), Hackberry (Mary L. Elender), Grand Chenier (Alcide Miller), Grand Lake (Fenelon Derouen), Johnsons Bayou (F. Erbelding), Lakeside (P. K. Millar), Radford (August Pavel), and Shellbank (Ferdinand Pavel). Annual compensations ranged from $201.73 for Postmistress Henry (Cameron) to $12.64 for Postmaster Pavel (Radford) (USDI 1892:583-586).

Despite the erection of Cameron Parish 20 years earlier, the *Southwest Louisiana Biographical and Historical* referred to the "body politic" as "comparatively young", and so remarked of its measured growth:

> Cameron has not yet had her day. She must await the future and abide her time in patience. She will doubtless, at some near day, be a busy place in canning fish, oysters and shrimp. Her parish seat, Leesburg, is right on the Gulf of Mexico, at the mouth of the Calcasieu River, and it must be that in the development that awaits that country Cameron will be greatly benefited by a situation that now seems like isolation. If deep water ever comes to the mouth of the river, Leesburg will be a great place by reason of that alone. When the immigrant takes hold of the coast marsh (as he will before the next quarter of a century), with its prodigiously fertile soil, then Cameron parish will come to the front. Great will be the crops of sugar cane, rice, sea-island cotton, oranges, vegetables, etc., while the gulf will afford cheap and delicious food for the agriculturist and an inexhaustible supply for manufacturing or preserving canned goods. So the sea and the land will both pour out their bounteous treasures to this, thus far, disregarded parish. This coast marsh country ought to have more said about it than has been. The entire front of Louisiana is on the Gulf of Mexico. Her south boundary is

> water, and her whole length from east to west is gulf coast (Commission of Immigration of Louisiana quoted in: Perrin 1891).

A map published in 1896 by Rand & McNalley showed only eight small settlements or townships situated in Cameron Parish. These were identified as Johnsons Bayou, Cameron, Creole, Grand Chenier, Hackberry, Shell Bank, Grand Lake, and Lakeside [extreme northeast] (Rand & McNalley 1896).

The *Westlake Herald* reported in early autumn 1898 that a canal would be excavated to run from the Calcasieu River to the head of Lacasine Bayou. Described as "[o]ne of the biggest schemes yet in the way of canal building", the artificial waterway could provide water to more than 250,000 acres of land (*Westlake Herald* in: *The Louisiana Planter and Sugar Manufacturer* [*TLP&SM*] 10 September 1898:175). As the cultivation of rice in that region was accelerating, planters and farmers looked forward to the possibility of irrigation for rice and under produce. Additionally, the canal could accommodate "steamboats and lighters" (*TLP&SM* 10 September 1898:175).

Another promising industry was also sparking interest in the region for investors and residents. "Starting in the coastal plains of Texas and Louisiana in the 1890s," visionaries like Anthony Lucas commenced to utilize rotary rigs whereby they drilled through soft shales and clays; and 'made good mud' (Wilds et al. 1996:76; Gow 2005:212). Lucas [Anton Luchich] pioneered oil-drilling operations with "the newfangled rotary-drill methods" circa 1899 in south Louisiana and nearby southeast Texas (Gow 2005:139; Weissenbacher 2009:558). His efforts were richly rewarded two years later, when the captain's "Spindletop" dry well erupted near Beaumont initiating the first historical oil boom (Gomez 1998:40; Gow 2005:139).

> On Jan. 10, 1901, the drill was still grinding patiently at 1,000 ft. The drilling machine was clanking monotonously. Lucas was sniffing the white slush for signs of gas. All of a sudden the earth began to spit. First sludge fizzed up. Then gas whistled out. Then hundreds of feet of pipe began to climb right up out of the hole. Finally out shot the last sections of pipe borne aloft by a six-inch column of sand, rock and brown-black oil. The greasy geyser roared into the air, spattering pipe, drill, derrick and machinery all around. It reached a height of 200 feet and then, wavering gracefully in the wind, cascaded to the bare ground. That was the greatest oil gusher America had ever seen (*LIFE* 1941:41).

The ultimate success of the Spindletop venture rested on one critical fact. Lucas had been convinced that the "big, low mound in the swampy plain" masked an enormous salt deposit. The engineer [Gratz Polytechnic School graduate], and former Austrian naval officer, was confident "that salt was a geological indicator of petroleum" (O'Neil 1969:66; Gow 2005:139). Due to the amazing triumph of Lucas, like-minded entrepreneurs and investors looked to southwestern Louisiana to investigate the potential for oil deposits there.

Traditional industries like lumber manufacturing continued to provide jobs for Cameron Parish residents, as well. The lumber barge *Calcasieu* was built at Lake Charles during 1895, and was still in local service by 30 June 1919. At the later date, the 239-ton unrigged barge was homeported at Galveston (USDC 1920:362). In late October 1896, the *Starke* was sailed to Lake Charles from its homeport of Milwaukee in order to take on a cargo of "Calcasieu" grade timber. The 209-ton, 124-foot schooner was built circa 1876, by Sandy Allen, at the same Michigan port (*Port Huron Daily Times [PHDT]* 31 October 1896). According to a Canadian newspaper (*PHDT* 31 October 1896), new owners of the *Starke* intended that their vessel would "go into the lumber trade along the coast of Central America", which correlated with the *Starke*'s detour to southwestern Louisiana.

An autumn 1899 edition of *American Lumberman* (AL) reported that timber interests in the Calcasieu River region were organizing to lobby for navigational improvements on the southwestern Louisiana waterway to promote their industry. The 11 November journal related that:

> The many obstructions in the Calcasieu river [sic] are proving thorns in the sides of white oak stave people, and an organized effort is on foot to have the stream cleaned out so that the staves can be floated down the river to Lake Charles. W. B. McGraw, of Lone Pine, La., who is one of the leading men in the white oak stave business, is at the head of the movement (*American Lumberman* [*AL*] 11 November 1899a:36).

In the same article, mention was made that the Fischer Lumber & Manufacturing Company, of New Orleans, was loading cottonwood aboard a schooner outbound for Boston markets. This lumber interest previously concentrated on the export of cypress but elected to turn its attention to the hardwood species as a consequence of "securing a tremendous contract" (*AL* 11 November 1899a:36). The magazine's same New Orleans source advised readers the demand for lumber from Mexico was noticeably increasing, and that "heavy shipments have been made to Progresso of late" (*AL* 11 November 1899a:36).

The Thanksgiving 1899 edition of *AL* further related the busy nature of northern Gulf navigation operating off coastal Cameron Parish. Sources stationed at New Orleans remarked that:

> The demand from Mexico has shown no appreciable decrease and the mills of this section [Calcasieu River] consider the Land of the Montezumas [sic] one of their best fields….Several vessels of large carrying capacity have been chartered during the past week to load cargoes for export at Sabine Pass during the next few months. The Lutcher & Moore Lumber Company is just completing the cargo of the schooner *Monnegan*, destined for Philadelphia; is loading the schooner *Andrew Adams* for Perth Amboy, N.J., and will begin this week to load the schooner *John R. Bergen* for Philadelphia. The cargo of the *Adams* consists of material for the Northwestern

> Elevated Railway of Chicago. The Orange and Wingate Lumber Companies are loading the schooner *Carrie A. Norton* for Philadelphia and are daily expecting the Russian bark *Slamat* to load for Buenos Ayres (AL 25 November 1899b:35).

Just before the Christmas season commenced, *Slamat* was indeed loaded with lumber at Sabine Pass, in addition to the schooners *D. H. Rivers*, *John R. Bergen*, and *R. W. Hopkins*, all bound for Philadelphia. Sabine Export Company expected to load lumber aboard the steamer *Mediana* at this time, and barring difficulties all of these vessels would be passing by the mouth of the Calcasieu before the end of December 1899 (*AL* 16 December 1899c).

In the interim, "local" vessel *J. M. Innis* was sold to "Senor Juan A. Hernandez". Before the Brownsville, Texas man acquired the three-masted schooner, Lutcher & Moore Lumber Company of Orange, Texas had operated the *Innis*. A regional competitor located up the Calcasieu River concurrently completed extensive renovations at its Lake Charles mill. Under new management by a Houston firm, Lake City Lumber constructed a blacksmith shop, large drying shed, and a new set of runways to better load lumber on queuing vessels (*AL* 30 December 1899d).

In an interesting and unrelated trend, state scientists began taking a look at the unique biology of the northern Gulf of Mexico at this time. The authorization for a biological station to be situated on Gulf waters "within the confines of Louisiana" was first enacted by the state legislature during its 1898 session. On 1 December 1899, Governor M. J. Foster and Professors B. C. Caldwell and H. A. Morgan adopted a site located at the mouth of the Calcasieu to serve this purpose. Eventually, Cameron and Calcasieu officials pledged monies and some 90,000 feet of lumber to construct a station there on 10 acres of land donated by the "late Hon. S. P. Henry".

Within just days, as part of its funding for river and harbor improvements, the U.S. Congress appropriated $160,000 [$4.3 million today] for the "mouth and passes of Calcasieu River" (*TNYT* 5 December 1899). The body also approved funding for fixed aids to navigation in the December 1899 session, and $80,000 was earmarked for the Sabine Bank Light Station, in addition to $40,000 for the Sabine Pass light and fog station (*TNYT* 5 December 1899).

Twentieth-Century Overview

Calcasieu Biological Station

During a regular session of the General Assembly convening in May 1900, Louisiana lawmakers appropriated $5,000 to "complete, equip and maintain the Biological Station established at the mouth of the Calcasieu river under Act 182 of 1898" (Louisiana General Assembly [LGA] 1900:96). The only other act that exclusively affected the governance of Cameron Parish included the appointment of an additional justice of the peace and constable for the remote area (LGA 1900:33).

Louisiana's House of Representatives revisited the issue of the Calcasieu Biological Station during its 1904 assembly. Legislators expanded and protected the station's jurisdiction with this language:

> The water bottom around the Biological Station, situated in the Parish of Cameron, near the mouth of the Calcasieu river, shall be reserved for experimental purposes to the following extent, to-wit: to a distance of a quarter of a mile above said Station to the full extent of the river, and down the river to the Gulf to the full extent of said river, and to a distance of one mile east and west of the mouth of the river and extending to the full limit in the Gulf. Should it be subsequently found that any of said reserve water area is unnecessary for the experimental purposes, and upon notification to that effect by the Director of said Biological Station, said unnecessary area shall be opened to rental (LGA 1904:420).

A 1906/1907 report compiled by the Louisiana superintendent of public education related specific details about the existing infrastructure of the station and information about vessels utilized by resident or visiting Gulf and riverine scientists. Contributor and station director B. H. Guilbeau remarked that:

> The laboratory is located at the mouth of Calcasieu Pass, near the Gulf of Mexico, Cameron Parish, Louisiana. The United States jetties, which extend into the gulf for more than a mile and a half, the extensive marshes, mud flats, sandy beach, wharfs, the open gulf, and the river with its large natural oyster reefs, offer excellent opportunities for the study of life. FACILITIES. The station laboratory is large enough to accommodate eighty (80) students and investigators working at one time. It is well equipped with tables, dark room, aquaria, water and all necessary apparatus. The station owns a large schooner, two gasoline launches and a number of rowboats, and is well equipped with seines, trawles [sic], dredges and nets for collecting (Louisiana Department of Public Education [LDPE] 1908:132).

In Director Guilbeau's concluding remarks, he advised the governor and Louisiana assemblymen that interested parties could board the steamer *Rex* [*Borealis Rex* b. 1886] at Lake Charles to then reach the station downriver. At this time, the *Rex* carried U.S. mail from the first location to Cameron each Monday, Wednesday and Friday (LDPE 1908:133; Gomez 1998:63).

Status of Calcasieu River Navigation (1900)

In its 1900 annual report submitted to the U.S. Treasury, the Light-House Board (LHB) related that the following construction project had been completed at the entrance to the Calcasieu River:

> A boat-house was built on the bank of the river. A 2-foot plank walk extends around the inside. A plank walk, 1,540 feet long and 8 feet wide, was built from the keeper's dwelling to the boathouse. A platform was built adjoining the tower, and a covered way was built between the tower and the kitchen. Excavation was made under the kitchen and 90 feet of mud sill put down. Six pine pillars were put under the foundations and braced to the sills and pillars. Various minor repairs were made. Ditched were dug to carry water inside the premises; sand was wheeled from the river bank and the grounds inside the fence were filled up and graded so water will not stand on them (U.S. Light House Board [USLHB] 1900:130-131).

To the extreme southwest boundary of Cameron Parish [and the state], the LHB reported that at "Sabine Pass Jetty beacon, entrance to Sabine Pass, Louisiana" a 45-foot wharf extension was constructed "on six galvanized pipe piles and two wooden piles"; the latter being "protected by yellow metal" (USLHB 1900:131). More repairs were made to another "Eighth District" site, "Sabine Pass on Brandt Point, east side of the entrance to Sabine Pass", where the "keeper's dwelling was repaired in addition to various other repairs" (USLHB 1900:131). In its discussion of the entrance to Sabine Pass, the board remarked about relevant marine construction materials, navigational aids, and contemporary regional shipping, as such:

> The protecting mat of the east jetty extends out about 4 miles, and the nearest light to its entrance is a small beacon light about 1½ miles inside the end, too far inside to serve as a guide to the entrance of the jetty. Sabine Pass as a port of entry has grown rapidly. The receipts for 1896 and 1897 show an increase from $199,042 in 1896 to $475,288 in 1897. It appears from the records that 99 vessels entered and cleared during 1897, that there were 403 trips made, and that 104,333 was [sic] the net registered tonnage (USLHB 1900:131).

Four third-class nun buoys and one and one third-class can buoy were established "in Sabine Pass, Louisiana and Texas" during 1900, according to the same government report (USLHB 1900:134). Tendering service was provided at this location and at the mouth of the Calcasieu River by at least three LHB vessels; *Pansy, Arbutus*, and *Clover* (USLHB 1900:135-136). The 343-ton (gross) iron twin-screw steamer *Pansy* (built 1878):

> [C]ared for the buoys, delivered fuel, provisions, and supplies to the light-houses, and conveyed the inspector on his quarterly visits of inspection to the lights…A 25-foot whaleboat was furnished. The tender steamed about 10,640 miles, [July 1899 to June 1900] and consumed some 710 long tons of coal (USLHB 1900:135).

Among its other eighth district duties, the 400-ton (gross) twin-screw *Arbutus* engaged in running supplies to the Calcasieu light-station and assisted with official inspections at Calcasieu and Sabine passes. Built in 1879, the wooden steamer steamed 8,527 miles during the fiscal year and consumed 480 tons of coal (USLHB 1900:135). The new 268-ton wooden schooner *Clover*, built circa 1899, was employed after its launch to deliver

materials to light-stations including Calcasieu and Sabine Pass and assisted [platform, etc.] with repairs to these and other eighth-district stations (USLHB 1900:136).

The steel twin-screw *Magnolia* was used to tender, replace and/or recover buoys, and to deliver supplies, cords of wood, coal, fuel, and fresh water to stations including Calcasieu and Sabine in 1904 [also construction date]. The 550-ton steamer also conveyed the lighthouse board inspector during routine and emergency audits. As of June 1906, the lighthouse tender *Ivy* was also engaged by the Eighth District to deliver repair materials to the Calcasieu and Sabine Bank light stations. This "steel twin-screw steamer of 550 tons gross burden" was built in 1904 (USLHB 1906:90-91).

Four separate incidents investigated by U.S. steamboat inspectors in 1907 related information about a few current vessels navigating along Cameron Parish and in the Calcasieu River. On 11 November 1907, while "entering [outbound from river] Sabine Pass, about 200 feet from [the] dock, [the] steamship *Florida* struck some submerged object and was damaged" (U.S. Steamboat Inspection Service [USSIS] 1908:366). The vessel's captain was able to proceed to New Orleans, where Federal agents inspected the *Florida* (USSIS 1908:366). A few days later, the master of the *Minnie Gorgas* was charged "with drunkenness on duty" at Galveston as a consequence of a three-day binge (USSIS 1908:368).

Prior to his alleged alcohol induced stupor, Captain Thomas Moore was under contract to steam to Calcasieu. After an investigation Moore was cleared of the charges. Less than two weeks later, a drunken steerage passenger aboard the *Lampasas*, outbound from Galveston, jumped overboard while the steamer headed for its destination of New York. At the time of the accident, the *Lampasas* was some 30 miles east-southeast of the Texas port (USSIS 1908:368). The *Lampasas* appeared to have regularly navigated in the northern Gulf of Mexico since being built in 1880 for the Galveston-New Orleans-Key West-New York circuit (Morrison 1903:468; *The Summary* 30 June 1906).

Early-Twentieth-Century Oil Production

In their official capacity, Federal geologists Hayes and Kennedy (1903:9) astutely observed that contemporary journalists and other sources and elsewhere, which have been more or less fanciful, not to say grotesque, and which have cast a shade of discredit upon geology by those who do not take the pains to discriminate".

> Immediately after the discovery of the Spindletop oil pool by Capt. A. F. Lucas in January, 1901, there was widespread demand for information regarding the geology of the Gulf Coastal Plain in Texas and Louisiana. Very little was known concerning the formations underlying this region, for owing to the lack of exposures it had presented an extremely uninviting field for investigation (Hayes and Kennedy 1903:9).

In order to alleviate the deficiency of even basic knowledge regarding the potential massive oil reserves of this region, the U.S. Geological Survey (USGS) tasked two

prominent scientists to compile relevant information for the Federal Government. Former Texas state geologist William Kennedy joined U.S. geologist Charles Willard Hayes to lead this progressive study to promote "the interests of the oil-producing industry" and ultimately "to assist in the economic exploitation of the oil fields" (Hayes and Kennedy 1903:9, 13). The federally- sponsored project commenced in June 1901 and concluded the end of 1902.

At this time, three prime elevations in Louisiana appealed to oil prospectors. One was located in Cameron Parish at Hackberry Island, and two in Calcasieu Parish [Vinton and Sulphur] (Hayes and Kennedy 1903:48, 131). The Hayes-Kennedy study published in 1903 related that only one well was being drilled in Cameron Parish at press time (Hayes and Kennedy 1903:131). That well, located on Hackberry Island, was owned by the Louisiana and Texas Oil Company (L&TOC) and reached [1903] a depth of 1,457 feet (Hayes and Kennedy 1903:132).

Like all novel and unqualified industries, fledgling oil prospectors needed investors, and their early twentieth-century campaigns to raise capital were often less than honest. Such was the case in southwestern Louisiana and East Texas in the post-Spindletop gusher era, whereas:

> When new companies were rapidly springing up, it was usual to find the companies investing money in drilling machinery, and the alluring sentence that the work had actually begun on the company's holdings 'by the erection of a derrick' appears in many of the prospectuses issued at that time. This was chiefly for the purpose of inducing people to buy stock" (Hayes and Kennedy 1903:169).

During 1916, the U.S. General Land Office reported on the disposition of the "Fort Sabine abandoned military reservation" that was comprised of "mostly unsurveyed" swampland in Cameron Township (General Land Office [GLO] 1916:41). The government author related that "[c]onsiderable interest attaches to these lands because of their nearness to the Beaumont [Texas] oil fields" (GLO 1916:41-42).

"Special investigations" of "oil and gas indications in Louisiana" were conducted by the USGS in 1915/1916 and included studies near the community of Cameron (Smith 1916:64). By 1917, USGS scientists identified 26 "useful minerals", including petroleum, presented in significant amounts in Louisiana. A "small quantity of oil from wells on Hackberry Islands" was the single resource found in Cameron Parish at that time (Schrader et al. 1917:145). However, in regard to statewide statistics, the aggregate for 1914 "was 14,309,435 barrels, valued at $12,886,897, and there were about 1,000 productive wells at the beginning of that year" (Schrader et al. 1917:145).

Early-Twentieth-Century Philanthropic Endowments

During mid-autumn 1914, the pioneering philanthropic John D. Rockefeller Foundation acquired the 85,000-acre tract known as Grand Chenier located in Cameron and

Vermillion parishes. According to its secretary, the philanthropic organization planned to establish a "Winter refuge and preserve for migratory birds on the northern shore of the Gulf of Mexico" (*TNYT* 4 October 1914). At this time, the Rockefeller legacy to protect fowl in Louisiana was the second largest [monetary] in U.S. history. The new Rockefeller sanctuary was in close proximity to two large tracts, also designated for bird welfare, which were owned by fellow benefactors E. A. McIlhenny and "Mrs. Russell Sage" (*TNYT* 4 October 1914).

Placed eventually under the protection of the Louisiana Conservation Commission [*ACT No. 71*, approved 6 July 1920-House Bill No. 184 (LGA 1920:84-86)], these three preserves would "be inclosed [sic] ultimately in one great bird reserve covering 500 square miles, with a 75-mile frontage on the Gulf Coast". *The New York Times* described the location of the "Vast Aviary", as such:

> On the land are many shallow ponds, several bayous and lakes, and abundant forests to afford the birds protection against storms. As a feeding ground also the tract is said to be excellent. It is expected that myriads of migratory songbirds, woodpeckers and shore birds will find a safe haven in the preserve. For years these birds, particularly robins, ducks and geese, have been slaughtered by the thousand for the markets of New Orleans, St. Louis, Cincinnati and Chicago, for they have not been protected in the Winter by the game laws of Louisiana. They will, however, be protected the year round in the preserve, and it is hoped that bird instinct will impel great numbers of them to rest and feed each Winter in the preserve (*TNYT* 4 October 1914).

Early-Twentieth-Century Shipping and Navigation Issues

In his annual report submitted to the secretary of war for the fiscal year ended 30 June 1912, the chief engineer provided "a comparative statement of receipts and shipments" for the mouth [and pass] of the lower Calcasieu River. At the time, the river was described as "an important stream" and the pass connecting the Gulf and Lake Charles was determined to be " about 7 miles long" with a maximum depth of eight feet. Due to the shallow state, the maximum draft that could be carried from the Gulf to Lake Charles was about six feet at low water (USACE 1912:661, 664). The following table shows the tonnage carried on the waterway for a ten-year period that commenced in 1901. The gain or loss amount reveals tonnage change from the previous year.

CALENDAR YEAR	SHORT TONS	NET GAIN	NET LOSS
1902	148,483	9,438	----------
1903	194,155	45,672	----------
1904	226,216	32,061	----------
1905	295,067	68,851	----------
1906	314,235	19,168	----------
1907	355,795	41,560	----------
1908	360,252	4,457	----------

1909	554,551	194,299	----------
1910	387,873	----------	166,678
1911	404,805	16,932	----------

Table 6. Tonnage carried on Calcasieu (1901-1911) (USACE 1912:664).

"Business briefs" reported by *TGDN* on 1 May 1913 provided interesting maritime news about neighboring Cameron Parish. At that time, according to the Galveston paper:

> Six large barges and two stern-wheel steamers built and launched near Pass Calcasue [sic] will soon be ready for sea and will leave for Tampico, Mexico, calling at Galveston en route for final inspection as to fitness and loading. Captain T. J. Anderson, consulting engineer and maritime architect, of this city [Galveston] returned Wednesday morning from Calcasue [sic], bringing with him photographs showing the barges as they are being made ready for the trip. Two of the barges, smaller in size than the others, are 'nested' on another pair, being loaded in such a manner that there is in reality a double barge. On one of the other barges, there will be placed the Stern-wheel steamer Major Slack, and on the sixth barge the steamer Kirby, known in Galveston waters, will be loaded (*TGDN* 27 February 1983:122).

A USWD report submitted to Congress in May 1917 addressed the contemporary conditions at the mouth of the Calcasieu River and at Calcasieu Pass. This report remarked that the existing channel was protected by jetties jutting into the Gulf for 1.5 miles with a center depth that measured from 8.5 to 18.9 feet at mlw with a width of 900 to 1,100 feet between the jetties. Furthermore, the report remarked that the "condition of the jetties is practically unchanged; very little, if any, of the stone has been washed away by wave action. The entrance is marked by floating buoys, a lighthouse, and a range light" (USWD 1917:8).

In regard to Calcasieu Pass, the 1917 report stated that from mile zero to mile seven, the width ranged from 700 to 1,000 feet, with water depth ranging from 12 to 31 feet. It also reported that the river's banks were:

> [G]enerally open marsh and prairie, rising gradually to 3 or 4 feet at mile 7. At mile 21/2, left bank, is the town of Cameron, situated on a ridge, or cheniere. Cameron has a population of 200 and is the seat of Cameron Parish. The back country population is about 1,000. At mile 4 is the entrance to West Pass and foot of St. Johns Island. The main channel is to east of this island (USWD 1917:8-9).

A description of commerce carried on the Calcasieu River confirmed that the bulk consisted of logs, wood, and sand with the remainder being miscellaneous articles (Table 7). In addition to the items listed below, 50 light barges (16,000 total tons) were shipped in 1914, 12 barges (3,840 total tons) in 1915, and 18 barges (8,640 total tons-built and building) in 1916 (USWD 1917: 12).

ARTICLES	UNITS	VALUE	HAUL DISTANCE
Brick	20,000	$150	45 miles
Cement	100 tons	$1,200	45
Coal	655 tons	$2,620	40
Corn	1,000 bushels	$980	35
Cotton	100 bales	$5,000	5
Cotton seed	600 sacks	$540	5
Feed, ground	225 tons	$6,750	35
Fish	30 tons	$6,000	50
Fertilizer	50 tons	$1,530	45
Furs	1 ton	$530	40
Gravel	270 tons	$270	40
Hides	10 tons	$1,000	40
Iron & steel	750 tons	$45,000	35
Livestock	13,650 head	$682,400	50
Lime	100 barrels	$100	45
Lumber	1,273,000 feet	$31,825	30
Logs	157,230,203 feet	$1,965,378	15
Miscellany	3950 tons	$395,000	35
Molasses	3 tons	$150	25
Oysters	28 tons	$700	50
Potatoes	150 sacks	$300	20
Rice	56,537 sacks	$407,040	40
Rosin	162 barrels	$1,280	40
Sand	20,000 tons	$20,000	25
Salt	25 tons	$75	25
Shells	8850 tons	$7,080	25
Shingles	73,000	$475	40
Sugar	1,500 barrels	$24,000	50
Wood	20,025 cords	$80,100	40
Total		**$3,687,473**	

Table 7. Calcasieu River Freight 1914-1916. (USWD 1917:12).

Writing for a 1920 spring edition of *Motor Boat*, Robert Morgan (1920:15) remarked on his own cruising experience on the Calcasieu, as such:

> This river is navigable for boats drawing four to six feet of water for 132 miles inland from its mouth, and forms a delightful route for a cruise through some of the finest agricultural sections of the South. Near Calcasieu Pass is Cameron, the parish seat, and a few miles south of Cameron is the state gulf biological station, always an interesting spot.

World War II Period to Postwar Period (1939-1950)

With regard to the status of Calcasieu River and pass, the USACE annual report submitted in 1941 remarked that:

> Maintenance by Government plant and hired labor consisted of the operation of gages and salininty observations from Lake Charles, La., to the Gulf of Mexico at a cost of $1,804.51; the dredging of 1,325,322 cubic yards of material by the U.S. hopper dredge *Benyaurd* [or *Benyuard*] from the bar and jetty channels of Calcasieu Pass at a cost of $50,739.49; the dredging of 2,268,550 cubic yards of material (USACE 1941:865).

Reporting to the Louisiana chief executive, the LDC reported that oil and gas production in the state set a new record in the 1940-1941 biennium. Specifically, oil production "showed a 15 per cent increase over the previous 1938-39 biennium, and natural gas production showed an increase of 44 per cent over the previous biennium" (LDC 1941:9). The same state agency also revealed that the West Hackberry Dome located in Cameron Parish has increased salt brine production from 187,835 short tons in 1940 to 233,846 short tons in 1941. Described as "the fourth-largest salt-producing state" in America, Louisiana produced "2,471,731 short tons of rock salt and brine valued at approximately six million dollars" in 1940/1941 period (LCD 1941:149).

A World War II news-story promoting motor travel along the Gulf Coast related some contemporary maritime activities on the Calcasieu River. Laughlin (1941) advised travelers that:

> Lake Charles was formerly a deep-South Louisiana town, sleeping beside placid Calcasieu Lake and creepy bayous shadowed by moss-hung cypress. A few years ago Lake Charles woke up, realized that lake and bayous offered an outlet to the sea and backed this venture of deepening a channel and building docks with its own money. This enterprise has paid many times over. Ships now load rice, flour, lumber and manufactured goods at Lake Charles and sail via channel, lake and Gulf to all ports of the world still open to American shipping. Realizing the importance of this shipping, the Federal Government is now helping to finance another channel which will cut in half the distance from Lake Charles to the sea.

According to Diamond (1973), Cameron Parish achieved national prominence in 1946 after:

> [T]he petroleum industry erected its first drilling rig in the Gulf – which sport fishermen called a million dollar 'artificial reef'. As the number of drilling and production platforms spread along the coast, the state developed a sport fisheries that is unexcelled anywhere along the Atlantic, Pacific and other states bordering the northern Gulf of Mexico[.] State anglers and non-resident tourist-fishermen

> are lucky in that the offshore oil operations have provided thousands of 'reefs' to attract fish. In many coastal states, attempts have been made to create similar structures with old automobiles and other debris. Such reefs are costly, present hazards to navigation and are detrimental to shrimp trawling operations. With its entire coastline flanked by rigs, resembling steel spiders marching even farther into the Gulf, it is only natural that Cameron Parish, and, in fact, all Louisiana fishermen, have a far-flung bonanza along the coast.

In 1947, "[t]he first true offshore drilling platform, (almost) out-of-sight of land" was built some 12 miles off the coast of Louisiana in shallow water (Weissenbacher 2009:399). During the 1950s, "jack-up rigs were introduced to operate in water depths up to about 100 meters" (Weissenbacher 2009:399).

Postwar Period to Early Modern Period

Within 10 years, Cities Service Company utilized six cavities in the Hackberry salt dome to collect propane butane, and this successful venture made the firm a principal local employer for decades. To support this favored industry, construction of the first paved road on Hackberry (Highway 27) finally commenced in 1954 (Lowery 2004). The Federal government began storing crude oil in these enormous underground cavities during 1975 in an effort to circumvent potential Middle East oil embargos. By 1991, U.S. Government Strategic Petroleum Reserves stored at Hackberry amounted to "750 million barrels" (Lowery 2004).

In late May 1953, floodwaters from the swollen Calcasieu, Sabine and Mermentau rivers threatened parts of the region with inundation up to five feet of swirling water (*Miami Daily News* 21 May 1953). A newspaper report published 25 May remarked that: "While Lake Charles [pop. 50,000] and its submerged air force base got ready to mop up, the coastal town of Cameron, braced for a water assault at the mouth of the Calcasieu" (*Toledo Blade* [*TB*] 25 May 1953).

The Ohio paper stated that 25 oil wells operated within 10 miles of the small community, and that they were protected by individual levees. In regard to the population living on the remote coastline ridge, the *Toledo Blade* related "The people of Cameron [pop. 2000], who live on hunting, fishing and oil, are hardy souls and aren't worried" (*TB* 25 May 1953). As of 1957, Cameron Parish reportedly produced 13.3 million barrels of oil, which accounted for "approximately 7 percent of south Louisiana's total production" (Gomez 1998:63). Reserves were "conservatively estimated at 210 million barrels" (Gomez 1998:63).

Hurricanes Audrey (June 1957) and Carla (1961)

Category 4 hurricane Audrey struck Cameron Parish on 27 June 1957, and at least 518 people were killed as its 20-foot "storm surge completely inundated thousands of acres of low-lying bayou-country" (Longshore 2008:292). Longshore (2008:292) also related that

some 1900 buildings were decimated with another 19,000 "seriously damaged, making Audrey one of the most destructive early season hurricanes in Louisiana history". The American Red Cross, military personnel and other groups, including Texas policemen from Houston, Beaumont and Port Arthur, traveled to the stricken coastal strip as quickly as they could by water. The ship *LaFourche* escaped damage as it was anchored upriver at Lake Charles (Bracker 1957). The *Congressional Record* reported that the 91-foot USCG buoy tender *Bluebonnet* brought the first hurricane survivors to Lake Charles (U.S Congress 1957:11922; Golin 2010:4).

Four years later, the entirety of Cameron Parish was severely damaged by Hurricane Carla as it struck the coasts of Louisiana and Texas in September 1961. Cameron was one of six Louisiana parishes deemed a "disaster area". In the aftermath of that storm, President John F. Kennedy asked the U.S. Congress to appropriate $55,000,000 [$417 million today] for the recovery efforts (*TNYT* 22 September 1961).

In the interim period between the two hurricane events, the population of Cameron Parish had reached nearly 7,000 with most living in a decidedly rural atmosphere. Agriculture interests cultivated crops including corn, rice, sweet potatoes, peaches, pears, plums, grapes and figs. Tree nuts, especially pecans, were also harvested for profit in the parish. In this period, sales of livestock and their diverse byproducts including dairy commodities and eggs supplemented the income of farmers (Gremillion 2004).

In an unusual demographical comparison, the entire population of Cameron Parish was living in a 1,444 square-mile area compared to that of Orleans Parish with a population of 627,525 (living in a 199-square-mile area) (LCC 1964:252). Not surprisingly, Cameron Parish "was noted for the abundance of its wild life and fisheries, including shrimp, muskrats and other fur-bearing animals, ducks, geese, herons, curlews, snipe, and plovers" (LLC 1964:294).

In order to assist Louisiana shrimpers and fishermen operating in the Gulf, a state representative solicited help from offshore oil producers to better mark underwater construction sites during June 1967. This widespread concern was due to the frequent loss of fishing nets and other gear, when trawlers passed over submerged wells associated with the industry (*Lake Charles American Press* 19 June 1967:3).

By the early 1970s, Cameron Parish ranked sixth in the state in the aggregate value of mineral production. Diamond (1973) suggested that production of natural gas increased 36 percent to a total of 252 billion cubic feet during just one year (1972/1973) which made Cameron Parish the highest producer in the state. As of 1973, natural gas and petroleum (oil) was the most important mineral resource in the parish, as well as the State of Louisiana (Diamond 1973).

Discovery of *El Nuevo Constante*

In November 1979, shrimper Curtis Blume cruised out of Port Bolivar, Texas to a site located approximately one mile offshore of Cameron Parish. When Blume settled on a

fishing spot usually avoided by local shrimpers, the try-net from the 80-foot *Lady Barbara* snagged on "something heavy" (Pearson and Hoffman 1995:3-4). As Blume pulled the net aboard the vessel, he discovered "three large copper disks, each about twenty inches across and weighing seventy or eighty pounds" (Pearson and Hoffman 1995:4). Eventually, the ingots were recognized to be historical artifacts possibly associated with a potential Spanish shipwreck that might lay off Rockefeller Wildlife Refuge. As a consequence, Blume and other interested parties organized as Free Enterprise Salvage (FES), and the entity commenced a recovery operation at the prospective site. In summary:

> The discovery of gold and silver ingots heightened their interest and intensified their search, and they began to use a barge-mounted dredge bucket at the site to recover materials more expeditiously. The dredging removed many of the ballast stones that covered the wreck and produced a large quantity of artifacts, including pieces of ship's timbers, heavily rusted iron bolts, spikes, and nails, pieces of leather, glass, pottery, and turtle shell, as well as cannon balls and more ingots of gold, silver, and copper (Pearson and Hoffman 1995:5).

As the historic site certainly rested in state waters, officials turned to the newly formed Louisiana Archaeological Survey and Antiquities Commission (created 1975) to oversee the activities in regard to salvage of the cultural resource. In the following month, August 1980, Coastal Environments, Inc. (CEI) was designated by the state "to direct the archaeological and historical investigations of the shipwreck", while FES pursued its legal salvage rights (Pearson and Hoffman 1995:6).

Saltus and Pearson (2010:308) related that despite "the long and intensive history" of watercraft utilized off the coast of Louisiana, the "first significant" investigation of a historic shipwreck occurred off Cameron Parish in 1980 with the discovery of the British-built ship, *El Nuevo Constante*, To date, the vessel "is the only colonial period shipwreck in the state to receive intensive study". The wreck of the Spanish ship was submerged in 18 feet of water, which mud and clays turned into a "soup" like atmosphere. As visibility was literally zero, the archaeological team called for assistance from the North Carolina state underwater archaeologist, Gordon Watts. Watts had extensive experience in working on wrecks in low to zero visibility and "his expertise proved useful in developing a plan of approach" (Pearson and Hoffman 1995:109). The resultant early September 1980 diver investigation of the wreck conducted by Allen Saltus, Bill Spencer, and Watts (with assistance from FES divers) confirmed that:

> The lower hull of the vessel was largely intact and sitting upright with the stern toward shore. Portions of the hull and frames projected above the mud, as did piles of ballast stone, which covered much of the wreck. The several large depressions shown on the side-scan record adjacent to the wreck were examined and proved to be the result of the recent finders' dredging efforts. Two iron cannons were found outside the hull. (One iron cannon and two large,

> wrought iron anchors had been raised previously by the salvagers). The keelson of the vessel was located and found to be intact along much of its length (Pearson and Hoffman 1995:109).

During the course of *El Nuevo Constante* investigations, archaeologists examined a section of Cameron Parish's shoreline located adjacent to the wreck site. The primary goal of this survey was to find remnants of camps, which were established by the shipwreck survivors and Spanish salvors. Pearson and Hoffman (1995:102-103) related that:

> A large quantity of prehistoric Indian ceramics and several historic artifacts were recovered from the beach and mud flat area in front of the beach. The prehistoric artifacts are just being eroded out of the shoreline and indicate a large and partially intact cultural deposit. One historic item, a small clay bowl, was identical to several recovered from *El Nuevo Constante*. All of the historic material found on shore, however, was extensively wave washed, and there is no evidence of in situ remains. The site of the survivors' camp has been destroyed.

The Alvenus *Shipwreck (1984)*

Shortly after noon, on 30 July 1984, the *Alvenus* grounded as it motored in the Calcasieu Ship Channel in the vicinity of Buoys No. 19 and No. 20. The pilot of the British tanker suggested that he was unaware that the vessel had struck the side of the channel. Some 5,000 tons of crude oil was driven along the coast toward Texas causing "an 85-mile long slick" reaching to a point some 10 miles south of Galveston (King 1984). According to another news outlet, the 690-ton tanker was carrying nearly 14.7 million gallons of oil when it grounded "about 10 miles offshore from Calcasieu Pass, and about 40 miles south of Lake Charles" (*The Lewiston Daily Sun* 1 August 1984:33).

In the aftermath of the accident, "approximately 2.7 million gal[lons] of viscous Venezuelan Merey and Pilon crude oil" were discharged through the vessel's fractured tanks (Alejandro and Buri 1987). The owners of the *Alvenus* estimated damages of $4.9 million for the vessel, and the cargo loss [Conoco] was estimated at some $1.7 million. At the time, the incident marked "the largest oil spill from a ship ever encountered in the Gulf of Mexico" (Alejandro and Buri 1987). As of late June 1989, the *Alvenus* shipwreck ranked number six [of ten cases] among the nation's worst maritime oil spills (*TNYT* 25 June 1989).

The 1990 U.S. Census reported that 9,260 residents lived in Cameron Parish. This aggregate broken down by communities follows; Johnson Bayou, Constance Beach & Holly Beach (778), Cameron (2,051), Creole & Oak Grove (1,379), East Creole, Chenier Perdue, & Little Chenier (459), and Grand Chenier (916) (Gomez 1998:34).

According to Gomez (1998:175), "Cameron Parish plays a major role in the state's menhaden industry, landing nearly one-third of the Louisiana harvest". Conducting business from its Cameron headquarters, Zapata Protein operates a fleet of 14 pogy boats, and the industry leader's "fleet hauled in approximately 230 million pounds" of menhaden during 1992 alone (Gomez 1998:175). After processing the small fish, the meal-like protein is added to food for livestock and poultry or can be utilized as attractive bait for crawfish and crabs (Gomez 1998:175).

Summary of Twentieth-Century Navigational Improvements

Circa 1900, "about 3,000 tons of granite capping blocks" were displaced from both Calcasieu Pass jetties due to storm damage (Sargent and Bottin 1989:50). During 1904 and 1905 the east jetty was extended 600 feet seaward, and both jetties were repaired utilizing "21,000 tons of riprap stone, [and] 5,000 sq yd of mattress" in addition to the resetting of 52 granite capping stones (Sargent and Bottin 1989:50).

During 1940, the west jetty required repairs, and was also extended 2,600 feet seaward to parallel the east jetty. Within two years, "approximately 220,000 tons of stone" was committed to repair the east jetty, and this project was modified to increase the crown elevation of both jetties by several feet. Extensions were comprised of 5 to 10-ton cover stones and 25 pound to 4-ton core stones "placed atop fascine mats ballasted with riprap" (Sargent and Bottin 1989:50).

By 1963, both jetties had been repaired with the most extensive work conducted at their landward and seaward extents. The cost of repair for the east jetty totaled nearly $99,000 and required 5,000 tons of riprap and 4,000 tons of armor stone. Repairs for the west jetty totaled $48,000 and required 3,000 tons of new stone, and this amount included labor costs to re-arragne 1,500 tons of existing stone. The 1962/1963 Federal work "made the effective lengths of the east and west jetties 8,200 and 7,700 ft, respectively" (Sargent and Bottin 1989:50-51).

In 1984, 28,000 tons of stone was used to repair the landward section of the west jetty at a cost of $492,000. Eighty-five percent of the new stone ranged from 200 to 3,500 pounds. The modification was necessary to prevent the continued erosion acerbated by runoff from the Calcasieu River (Sargent and Bottin 1989:51).

Contemporary Cameron Parish

In July 2005, the USACE-New Orleans District revealed its management plans for a potential 20-year dredging project of Calcasieu Pass and Calcasieu River. At that date, there was not a sufficient amount of dredged material to support long-term maintenance of the Cameron Parish sites. This problem evolved over several years as some disposal sites had "substantially eroded into adjacent water bodies", while other sites had been lost due to commercial development or to the revocation of private sector landowners who

formerly allowed placement of dredge material on their properties (*The Waterways Journal* [*TWJ*] 2005a).

A related story suggested that the Calcasieu River ship channel supported approximately 13,000 jobs in southwest Louisiana, and that nearly "55 million tons of petroleum and energy products move[d] up and down the river annually (Atkinson 2005). Without dredging [and disposal of sediment], the river was becoming too shallow to allow the passage of large ships necessary to support the industries transporting those goods (Atkinson 2005).

Hurricane Rita (24 September 2005)

On 24 September 2005, Hurricane Rita made landfall as a Category 3 storm directly striking the Cameron Parish coast south of Lake Charles. As the locks at Calcasieu were submerged and inoperable, the U.S. Coast Guard closed the port and waterway at and leading into Lake Charles (*The Waterways Journal* [*TWJ*] 2005b).

"Almost all of the town of Cameron was heavily damaged—many buildings, including a two-story brick school were destroyed. Only ~1600 of the 3600 homes in Cameron Parish were considered repairable" (Ashmore and Owen 2008:51). As with Hurricane Audrey in 1957, the Cameron Parish Courthouse survived the fury of Rita. The small coastal community of Constance Beach was likewise decimated by Hurricane Rita. Geologists related that the 14.9-foot storm surge that struck this location on the morning of 24 September 2005 was the hurricane's highest recorded surge (Ashmore and Owen 2008:53).

The thriving "Louisiana Riviera" community of Holly Beach existed there before Hurricane Rita destroyed all 580 beach cabins as well as stores, motels, churches, and every other human structure here [except for the water tower] leaving only broken concrete slabs, piling stumps, and electrical transformers" (Ashmore and Owen 2008:52-53).

In the immediate aftermath of Hurricanes Katrina and Rita, Port of New Orleans president and American Association of Port Authorities (AAPA) chairman Gary P. LaGrange testified before the U.S. Senate remarking that 20-plus AAPA ports [inc. Lake Charles-Calcasieu waterway] were severely impacted. In regard to New Orleans, as of 28 September 2005, the port operated at just twenty percent of its normal capacity (LaGrange quoted in: *TWJ* 2005c).

In describing the magnitude of the hurricanes' cumulative effect on Louisiana's waterborne economy, LaGrange eloquently stated that:

> This nation is heavily dependent on maritime trade. America's ports are our gateways to the world and a critical component in the nation's economic health and national defense. When ports are impacted, there is a quick and sizable ripple effect throughout the

> economy. U.S. ports and waterways handle over 2 billion tons of cargo annually. Much of that commerce flows through the impacted ports in Louisiana, Texas, Alabama and Mississippi. These ports are heavily linked to this nation's petroleum, grain and farm products, fruit, poultry, coffee, chemical and steel trades. The Port of New Orleans serves as the focal point for waterborne transportation of cargo to 28 states. That cargo activity supported $37 billion in economic benefits to the country and generated $2.8 billion in federal tax revenue (LaGrange quoted in: *TWJ* 2005c).

Local Maritime Interests

In September 2010, "LEEVAC Shipbuilding and Repair Calcasieu, LLC" was opened at Lake Charles by its parent firm, LEEVAC Industries of Jennings. The new shipyard was located at the Lake Charles LNG plant's turning basin, and featured 1600 feet of bulkhead to service "all types of vessels" with easy access (17 miles) to and from the Gulf (LEEVAC Industries 2013).

Due to the steady increase of deepwater permitting for the oil and gas industry, as of November 2012, there were more deepwater rigs in the U.S. Gulf than before the April 2010 Macondo disaster (Buls 2013:34; Pike 2013:52). One estimate suggests that some "12 to 15 deepwater rigs" may be installed in the Gulf by November 2014 (Pike 2013:52). Furthermore, 49 deepwater fields are expected to open over the course of the next five years (Pike 2013:53).

As a result, shippers will require more supplies, such as "mud to cement to casing to drill pipe" carried to greater distances in the Gulf (Pike 2013:53). Christian Vaccari, president of LEEVAC Shipyards Jennings, recalled the time when 180-foot offshore supply vessels (OSVs) were considered large. Speaking from his shipyard located just 72 miles northeast of Cameron, Vaccari related that industry leaders now wanted vessels ranging from 270 to 310 feet in length (Buls 2013:34). In the aftermath of the Macondo incident, over twenty per cent of the active fleet of OSVs left Gulf waters (Pike 2013:53).

In February 2012, Apollo Environmental Strategies of Beaumont, Texas commenced the expansion of the West Calcasieu Port barge basin. The $3.1 million project called for the construction of 800 linear feet of shoreline to accommodate 25 to 30 barge slips. The extension would allow the basin to service up to 90 shallow-water barges (*TWJ* 2012a).

At the request of the Louisiana legislature in May 2012, economist James Richardson reported that the state's maritime community created over 396,000 jobs annually. Richardson also related that one in five jobs in the state were connected to maritime industries, and these jobs resulted in personal earnings of $19.5 billion in the same period (*TWJ* 2012b). His study, co-sponsored by the Louisiana Ports Association and the Louisiana Department of Transportation, also revealed that the port system served as "a launch pad for the state's five major industries (oil and gas, transportation, warehousing, agriculture and manufacturing)" (*TWJ* 2012b).

An example of the integration of four of these industries came to fruition with the new LNG export facility proposed by Cheniere Energy. Receiving approval from the Federal Energy Regulatory Commission, the Houston-based concern proceeded to move ahead with the facility at Sabine Pass (Cameron Parish) in April 2012 (*TWJ* 2012c).

In the contemporary period, West Cameron Port (WCP) supports enumerable oil and gas exploration industries and affiliated petro-chemical service industries. WCP is also the base of operations for numerous seafood harvesting fleets. In addition, two large LNG interests are located on waterways within WCP with a third site permitted for construction. Freight flowing through WCP includes: "Baroid, Coal, Sweet and Sour Crude, LNG (expected to start within the District this year at the Cameron LNG facility in Hackberry, LA), Bulk Grain [and] Rice" (WCPC n.d.:44). The WCP commission owns nearly 160 acres on Monkey Island and on the western side of the ship channel that is leased to Gulf Coast Development (WCPC n.d.:45).

Cameron Parish Wildlife Refuges

According to the Cameron Parish Tourism Commission (CPTC), this section of Southwestern Louisiana offers residents and tourists several destinations to observe wildlife in their natural habitats and to partake in activities such as hunting, fishing, crabbing, birdwatching, and camping. The principal sanctuaries and motoring trails include Cameron Prairie National Wildlife Refuge, Lacassine National Wildlife Refuge, Pintail Wildlife Drive, Rockefeller Wildlife Refuge, and Sabine National Wildlife Refuge (Cameron Parish Tourism Commission [CPTC] n.d.:a).

Due to the effects of coastal erosion, the Rockefeller Refuge established circa 1920 is currently [2013] comprised of 76,000 acres (decrease of approximately 10,000 acres). However, the preserve offers tourists visiting Cameron Parish the opportunity to enter "the highest alligator nesting" density area in the United States (CPTC n.d.:b). Located approximately eight miles south of Hackberry, Sabine National Wildlife Refuge is "comprised of 125,00 acres of protected marshland" and "is the largest coastal marsh refuge on the Gulf of Mexico" (CPTC n.d.:c).

In *Southwest Louisiana: A Treasure Revealed,* author Jeanne Owens (2011:147) summarized the contemporary atmosphere of the project area with this comment:

> Despite the ravages of the storm events and a relatively unforgiving environment, Cameron Parish still boasts some of the most breathtaking and unique scenery in Louisiana. Although the Parish has a progressive eye on its promising future, it still retains a strong embrace of its ancestral beginnings that has made it one of American's [sic] last frontiers.

Nature and Scope of the Underwater Archaeological Record

There are only few well-documented watercraft, which have been investigated in Louisiana. One of the first is the Spanish Frigate *El Nuevo Constante*. *El Nuevo Constante* was wrecked off shore of Cameron Parish in 1766. The British-built vessel was enroute from Veracruz, Mexico to Spain with the New Spain Fleet. A hurricane drove the ship ashore off Grand Cheneir. Discovered by commercial fishermen, the wreck was partially salvaged before being archaeologically investigated and documented (Pearson and Hoffman 1995).

Remains of a prehistoric canoe were discovered in the coastal marsh of Cameron Parish. The vessel was located east of Sabine Lake. The two surviving fragments were fashioned from a cypress log and measure 21-feet in length. Radiocarbon dating of the wood placed the age of the log from which it was created at A.D. 1490.

While no inundated prehistoric sites have been identified in the project area, discovery of what appears to be a shell midden in association with the relict channel of the Sabine River reinforces the hypothesis that early sites exist offshore in conjunction with relict landforms. In the project area those resources, if they exist, could be deep in sediments deposited since the Pleistocene (Saltus and Pearson 2010:316-317). Prehistoric sites in shallow sediments [near-shore] likely date the formation and recent inundation of the Chenier Plain which formed between 3,000 and 4,000 years ago (Rees 2010:15). Wet prehistoric and historic sites along the Louisiana coast confirm that the inundation process remains active today (Saltus and Pearson 2010:316-317).

A survey of historical and archaeological literature and archival background research confirmed considerable evidence of maritime activity in the northern Gulf of Mexico. The patterns of maritime activity in the vicinity of the proposed project include navigation associated with colonization, development, agriculture, logging, trade, shipbuilding, commerce, warfare, transportation and fishing. Documented navigation covers the entire history of European activity from the earliest exploration in the first decade of the sixteenth century. As the scope of European settlement increased dramatically in the eighteenth century the intensity and regularity of maritime activity reflected that development. By the nineteenth century a complex web of commercial enterprise connected the ports of the Gulf Coast of the United States with the world. Prior to the American Civil War, New Orleans was second only to New York in the volume of maritime commerce. That trend continued throughout the twentieth century as trade, transportation and fishing developed to support expanded navigation. Clearly, the historical record confirms that waterborne transportation, communication, trade and fishing dominated life in the Cameron region of Louisiana.

As a consequence of those international, national and regional maritime activities, the Gulf Coast of Louisiana has been identified as a high probability area for shipwreck resources. Human error, storms and warfare have resulted in the loss of ships in every period of Gulf Coast history. Coastal Louisiana has been recognized as a high probability area for shipwrecks and shipwreck preservation (Garrison et al. 1989; Terrell 1990). Statistical

probability suggests that most shipwrecks in the project area would date from the post-World War II period and could be associated with the coastal trade, fishing or oil and gas industries (Pearson et al. 2003:II:4-58). However, the limitations of extant historical records cannot preclude the distinct possibility of much earlier wrecks in the area. In addition, small coastal and fishing vessels lost in the area might never have been reported.

Historical research confirms that between the prehistoric canoe and historic vessels like *El Nuevo Constante*, the potential for shipwrecks and derelict vessel remains is high in the study area. Current National Oceanic and Atmospheric Administration (NOAA) chart 11357 and the *Underwater Obstruction Removal Program* (UORP) database identify 8 shipwrecks and 6 obstructions within three nautical miles of the borrow site center and an obstruction within the perimeter of the borrow site survey area (Figure 4). In addition, the Louisiana Department of Natural Resources' Sonris database lists one abandoned oil well adjacent to the borrow area on its west side. The presence of charted wrecks in the vicinity of the Oyster Bayou borrow site reinforces the high potential for shipwrecks established by the Bureau of Ocean Energy Management (BOEM) (Garrison et al. 1989). The charted wrecks clearly illustrate that vessel navigation in the Gulf of Mexico vicinity of Calcasieu Pass remains a hazardous enterprise.

Because the project area has a high documented potential for shipwreck sites, magnetic and acoustic anomalies identified during the survey should be given careful consideration. The patterns of navigation identified by historical research confirms that the spectrum of vessels employed in the vicinity of the project includes everything from small coastal craft to international merchant and warships. While larger and more modern vessels generate a more readily detectable magnetic and acoustic signature, small coastal craft can be very difficult, if not impossible, to detect. For that reason serious consideration must be given to each anomaly. Signature analysis is further complicated by the fact that in the northern Gulf of Mexico, the bottom is littered with modern debris. It can be difficult, if not impossible, to determine whether an anomaly represents a shipwreck, a coastal vessel or modern debris. While pipelines and wells can frequently be identified using charts and geographic information systems, much of the bottom surface debris is undocumented. The complex nature of signature analysis has been addressed by Saltus (1982), Gearhart (1988), Garrison et al. (1989), and Anuskiewicz (1992).

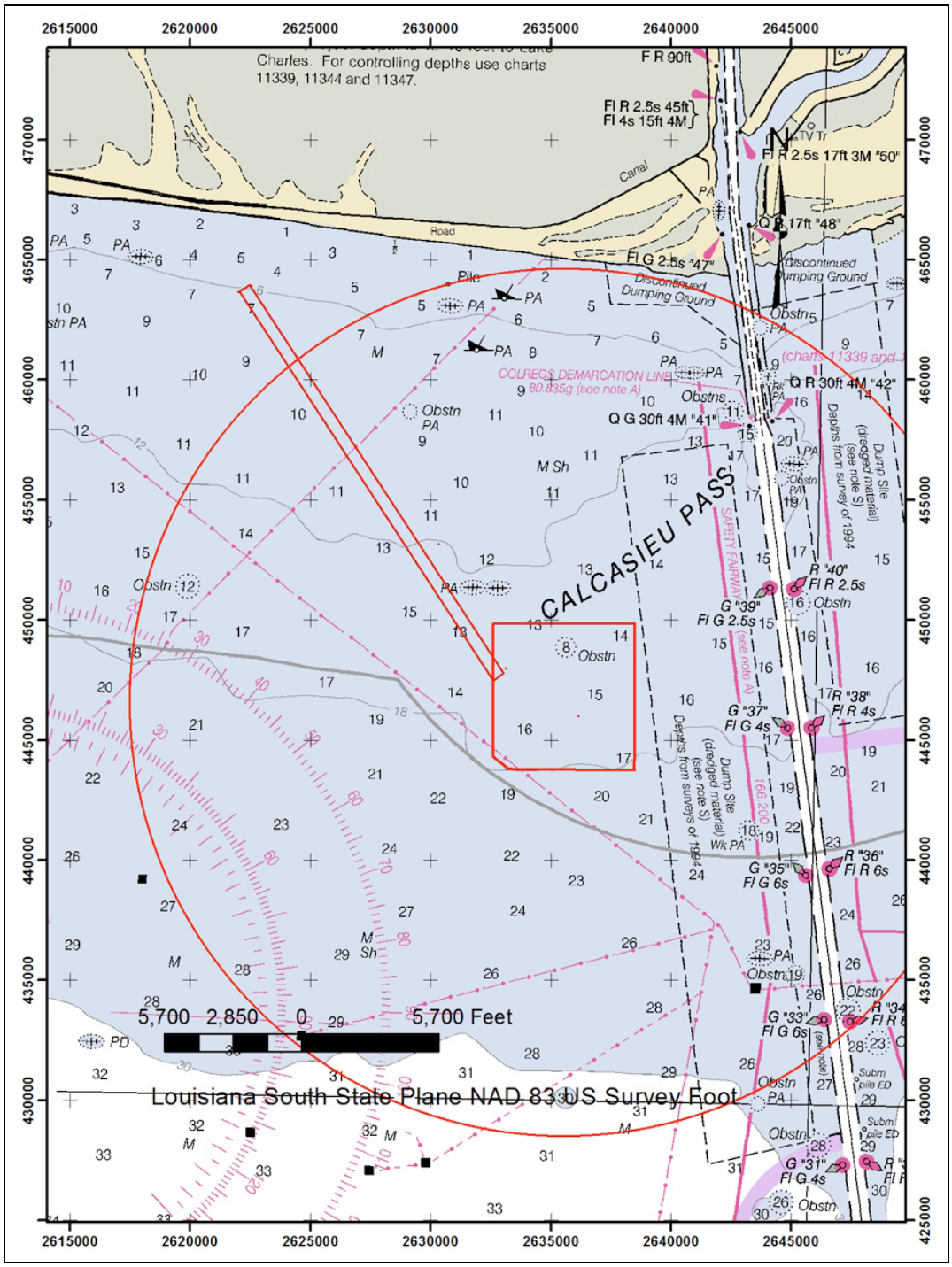

Figure 4. Three nautical mile perimeter with shipwrecks and obstructions (NOAA Chart 11341).

Remote Sensing Survey

Remote-sensing surveys designed to identify submerged cultural resources are perhaps most frequently carried out in response to priorities for protection and management. They are designed to address two primary questions; 1) are there submerged cultural resources in a given area, and, 2) are those submerged cultural resources eligible for nomination to the NRHP. While most surveys are generated by such practical issues as are dictated by the 106 Review and Compliance process, the data they collect frequently contributes to the body of knowledge associated with important historical and anthropological questions. One of the more obvious of those issues regards developing and testing models for the spatial and temporal distribution of shipwrecks. A more specific example of research design issues often unspecified for Phase I surveys relates to the identification of shipwrecks that provide both clues to historical events and answers, or raises anthropological questions associated with human activity surrounding the vessel's construction and use.

The remote-sensing survey of the borrow area and pipeline corridor off Cameron Parish was designed to identify potentially significant submerged cultural resources that could be impacted by proposed dredging. The survey methodology and equipment was based on standards identified by the U.S. Department of the Interior and Louisiana State Historic Preservation Office. A combination of state-of-the-art seismic, magnetic and acoustic remote-sensing equipment was employed to generate sufficient data to reliable identify cultural material such as shipwreck sites.

Survey Methodology

The remote-sensing survey of the proposed project borrow site was designed to identify potentially significant submerged cultural resources that could be impacted by proposed dredging. The survey methodology and equipment was based on standards required by Federal and SHPO guidelines. A combination of state-of-the-art magnetic, acoustic and seismic remote-sensing equipment was employed to generate sufficient data to reliable identify cultural material such as shipwreck sites. Remote-sensing data collection was controlled by the onboard computer (Figure 5 and Figure 6) running precision survey software and connected to a differential global positioning system. Data was collected on survey lanes spaced 100 feet apart (Figure 7). That lane spacing was designed to provide complete lateral coverage with the sonar system and a representative sampling with the seismic and magnetometer systems.

Figure 5. Computer navigation system located at the research vessel helm.

Figure 6. Navigation and Sonar Computers on Survey Vessel Bridge.

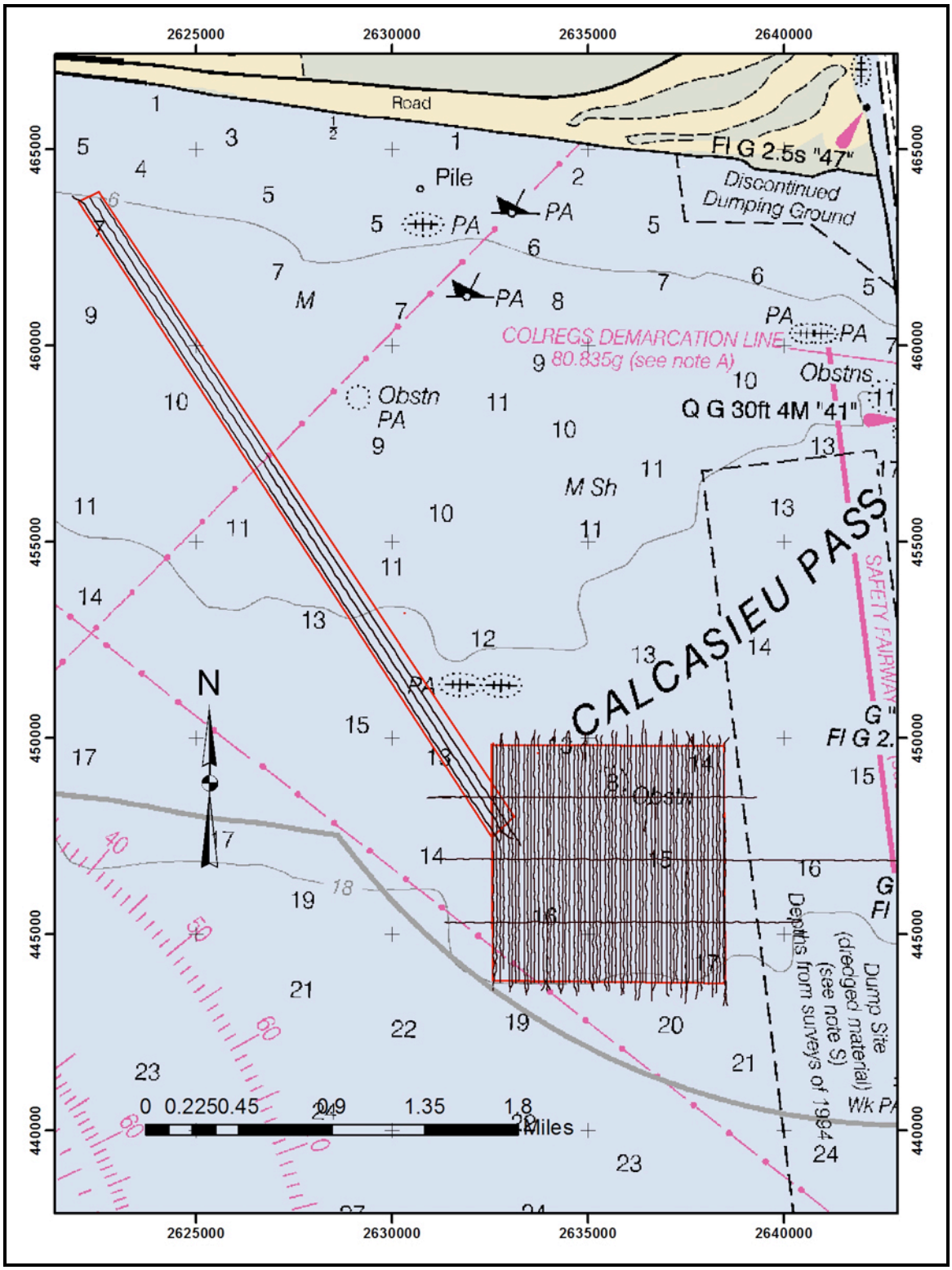

Figure 7. As run survey tracklines (NOAA Chart 11341).

Magnetometer

An EG&G Geometrics G-882 marine cesium magnetometer, capable of plus or minus 0.001 gamma resolution, was employed to collect magnetic data in the survey areas (Figure 8). The cesium magnetometer provides a scalar measurement of the earth's magnetic field intensity expressed in gammas. To produce the most comprehensive magnetic record, data was collected at 10 samples per second. Because of shallow water the magnetometer sensor was towed just below the water surface at a speed of approximately 3 to 4 knots. Magnetic data were recorded as a data file associated with the computer navigation system. Data from the survey were contour plotted using QUICKSURF computer software to facilitate anomaly location and definition of target signature characteristics. All magnetic data were correlated with the acoustic remote-sensing records.

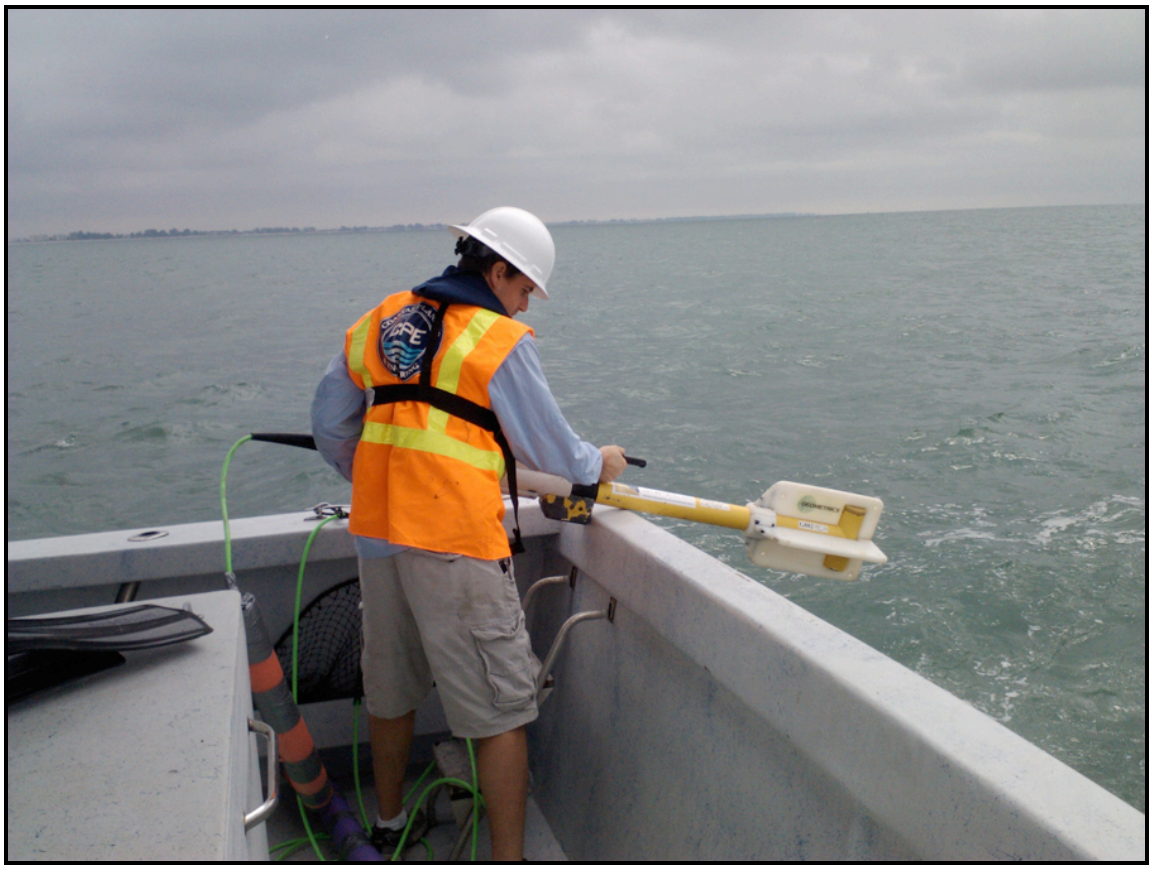

Figure 8. Geometrics 882 Cesium Vapor Magnetometer.

Sidescan Sonar

An EdgeTech 4200-FS sidescan sonar system (Figure 9) was employed to collect acoustic data in the survey area. The 4200-FS uses full-spectrum chirp technology to deliver wideband, high-energy pulses coupled with high-resolution and superb signal to noise ratio echo data. The sonar package included a portable laptop configuration running DISCOVER acquisition software and a 120/410 kHz dual frequency towfish running in high definition mode. Dual frequency provided a differential aid to

interpretation. Due to shallow water in the survey area the sidescan sonar transducer was deployed and maintained between 2 to 3 feet below the water surface. Acoustic data were collected using a range scale of 50 meters (164 feet) to provide a combination of +250% coverage and high target signature definition. The digital sidescan data was merged with positioning data via the computer navigation system and logged to disk for post processing.

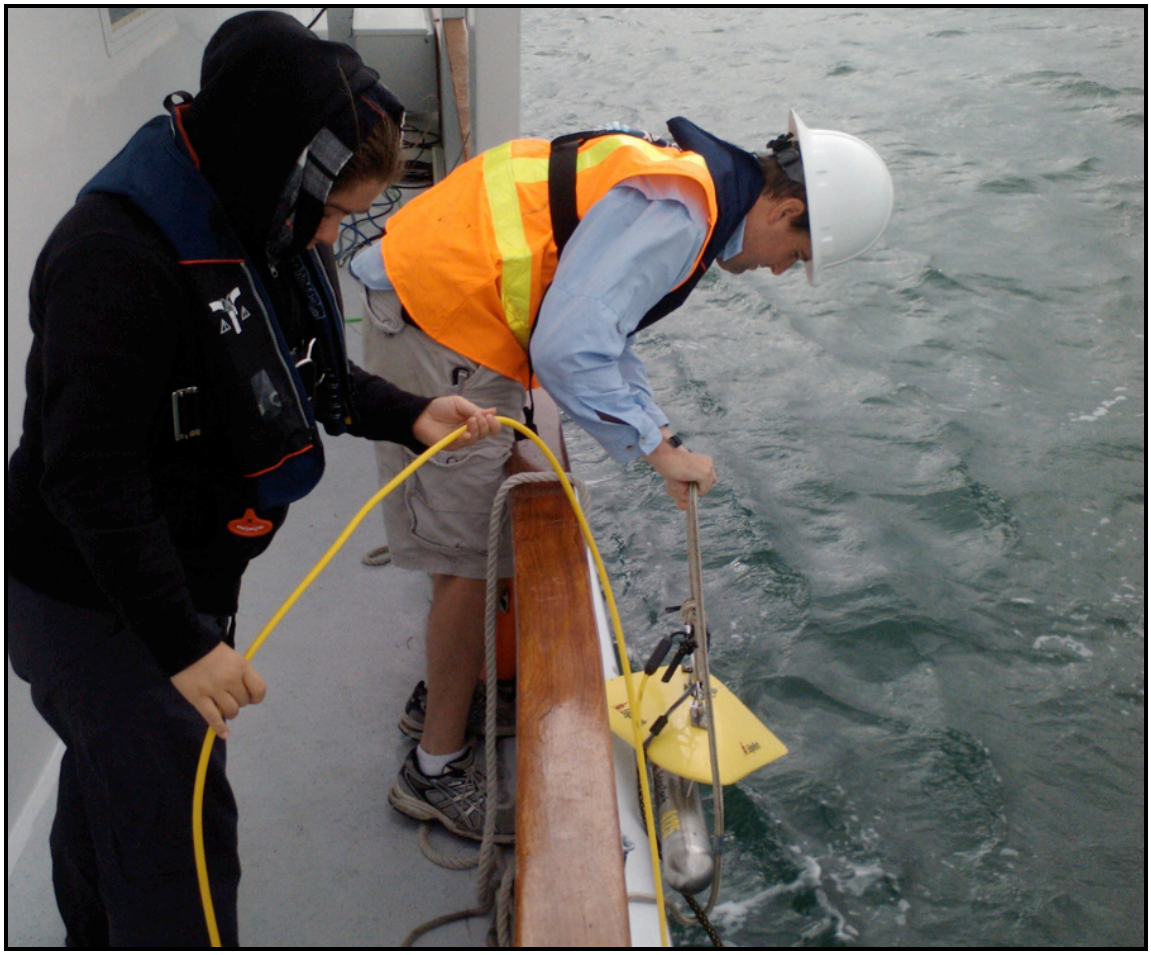

Figure 9. EdgeTech 4200-FS sidescan sonar system.

Sub-Bottom Profiler

An EdgeTech 512i towfish (Figure 10) and Full Spectrum Sub-Bottom Topside Unit was employed to collect seismic data in the survey areas. The sub-bottom profiler sends an acoustic signal through the ocean bottom to record surface and subsurface geological features. Each distinct layer in the bottom sediment is indicated as a surficial trace, which is recorded in an electronic format onboard the survey vessel. The chart shows the presence of the sediment surface and other distinct layers or features within the sediment, such as buried river channels. The topside unit was utilized to control the 512i towfish and to display and archive the data, which was merged with positioning data via the computer navigation system. The area was surveyed using the 2 KHz to 12 KHz 20ms FM pulse setting. The pulse repetition rate was typically six pulses per second.

Figure 10. EdgeTech 512i Sub-bottom Profiler Towfish.

Positioning and Data Collection

A TRIMBLE differential global positioning system (DGPS) was used to control navigation and data collection in the survey area. That system has an accuracy of +/- three feet, and can be used to generate highly accurate coordinates for the computer navigation system. The DGPS was interfaced with HYPACK 2009, a state-of-the-art navigation and hydrographic surveying system. On-line screen graphic displays include the pre-plotted survey lines, the updated boat track across the survey area, adjustable left/right indicator, as well as other positioning information such as boat speed, quality of fix and line bearing. Navigation fixes (shot points) were recorded 10 times a second (approximately one fix every 0.9 feet) along all survey lanes. All data obtained were recorded on the computer's hard disk and transferred to an external hard drive to provide a backup of the raw survey data. Data generated were correlated to remote-sensing records by DGPS to facilitate target location and anomaly analysis. All data were plotted to Louisiana State Plane, South Zone, NAD 83, U.S. Survey Foot.

Data Analysis

To ensure reliable target identification and assessment, analysis of the magnetic and acoustic data was carried out as it was generated. Using QUICKSURF contouring software, magnetic data generated during the survey was contour plotted at 10-gamma intervals for analysis and accurate location of the material generating each magnetic

anomaly. Magnetic targets were isolated and analyzed in accordance with intensity, duration, areal extent and other signature characteristics. Sonogram signatures associated with magnetic targets were analyzed on the basis of configuration, areal extent, elevation, target intensity and contrast with background and shadow image.

Data generated by the remote-sensing equipment was developed to support an assessment of each magnetic and acoustic signature. Analysis of each target signature included consideration of magnetic and sonar signature characteristics previously demonstrated to be reliable indicators of historically significant submerged cultural resources. Sub-bottom data was also assessed for relict channels and the potential for prehistoric resources. Assessment of each target included recommendations for additional investigation to determine the exact nature of the cultural material generating the signature and its potential NRHP significance. Historical evidence was developed into a background context to identify potential shipwrecks. These data were then used to identify possible correlations with magnetic targets. A magnetic contour map of the survey area was produced to aid in the analysis of each target.

To ensure reliable target identification and assessment, analysis of the magnetic and acoustic data was carried out as it was generated. Using QUICKSURF contouring software, magnetic data generated during the survey was contour plotted at 5-gamma intervals for analysis and accurate location of the material generating each magnetic anomaly. Magnetic targets were isolated and analyzed in accordance with intensity, duration, areal extent and other signature characteristics. Sonogram signatures associated with magnetic targets were analyzed on the basis of configuration, areal extent, elevation, target intensity and contrast with background and shadow image.

Data generated by the remote-sensing equipment was developed to support an assessment of each magnetic and acoustic signature. Analysis of each target signature included consideration of magnetic and sonar signature characteristics previously demonstrated to be reliable indicators of historically significant submerged cultural resources. Sub-bottom data was also assessed for relict channels and the potential for prehistoric resources. Assessment of each target included recommendations for additional investigation to determine the exact nature of the cultural material generating the signature and its potential NRHP significance. A magnetic contour map of the survey area that illustrates the earth's magnetic background field and anomalies created by cultural material was produced to aid in the analysis of each target.

Signature Analysis and Target Assessment

While no absolute criteria for identification of potentially significant magnetic and/or acoustic target signatures exist, available literature confirm that reliable analysis must be made on the basis of certain characteristics. Magnetic signatures must be assessed on the basis of three basic factors. The first factor is intensity and the second is duration. The third consideration is the nature of the signature; e.g., positive monopolar, negative monopolar, dipolar or multi-component. Unfortunately, shipwreck sites have been

demonstrated to produce each signature type under certain circumstances. Some shipwreck signatures are more apparent than others.

Large vessels, whether iron or wood produce signatures that can be reliably identified. Smaller vessels, or disarticulated vessel remains, are more difficult to identify. Their signatures are frequently difficult, if not impossible, to distinguish from single objects and/or modern debris. In fact, some small vessels produce little or no magnetic signature. Unless ordnance, ground tackle or cargo associated with the hull produces a detectable signature, some sites are impossible to identify magnetically. It is also difficult to magnetically distinguish some small wrecks from modern debris. As a consequence, magnetic targets must be subjectively assessed according to intensity, duration and signature characteristics. The final decision concerning potential significance must be made on the basis of anomaly attributes, historical patterns of navigation in the project area and a responsible balance between historical and economic priorities.

Acoustic signatures must also be assessed on the basis of several basic characteristics. Perhaps the most important factor in acoustic analysis is the configuration of the signature. As the acoustic record represents a reflection of specific target features, wreck signatures are often a highly detailed and accurate image of architectural and construction features. On sites with less structural integrity signatures often reflect more of a geometric pattern that can be identified as structural material. Where hull remains are disarticulated the pattern can be little more than a texture on the bottom surface representing structure, ballast or shell hash associated with submerged deposits. Unfortunately, shipwreck sites have been demonstrated to produce a variety of signature characteristics under different circumstances. Like magnetic signatures, some acoustic shipwreck signatures are more apparent than others. Large vessels, whether iron or wood, produce signatures that can be reliably identified.

Smaller vessels, or disarticulated vessel remains are inevitably more difficult. Their signatures are frequently difficult, if not impossible, to distinguish from concentrations of snags and/or modern debris. In fact, some small vessels produce little or no acoustic signature. As a consequence, acoustic targets must be subjectively assessed according to intensity of return over background, elevation above bottom and geometric image characteristics. The final decision concerning potential significance of less readily identifiable targets must be made on the basis of anomaly attributes, historical patterns of navigation in the project area and a responsible balance between historical and economic priorities.

Analysis of the Survey Data

Analysis of the magnetometer data identified a total of 97 anomalies (Figure 11; Appendix A). A total of 31 magnetic anomalies were determined to have a potential association with historic shipwreck remains. Those anomalies are isolated by seven conforming buffers (Figure 12). Those buffers are designed to protect material generating the signatures from proposed dredging activity. Conforming buffers were created using 200-foot radii circles centered on each anomaly or each anomaly in a

cluster. Anomalies in the pipeline corridor were developed based on 100-foot radii buffers as no dredging will disturb those sites.

Analysis of the acoustic data confirmed over 200% coverage and identified a total of 37 sonar target images (Figure 13; Appendix B & Appendix C). A total of eight sonar target images were associated with wreck remains or material generating potentially significant magnetic anomalies. Those targets are included in Buffer B and Buffer D.

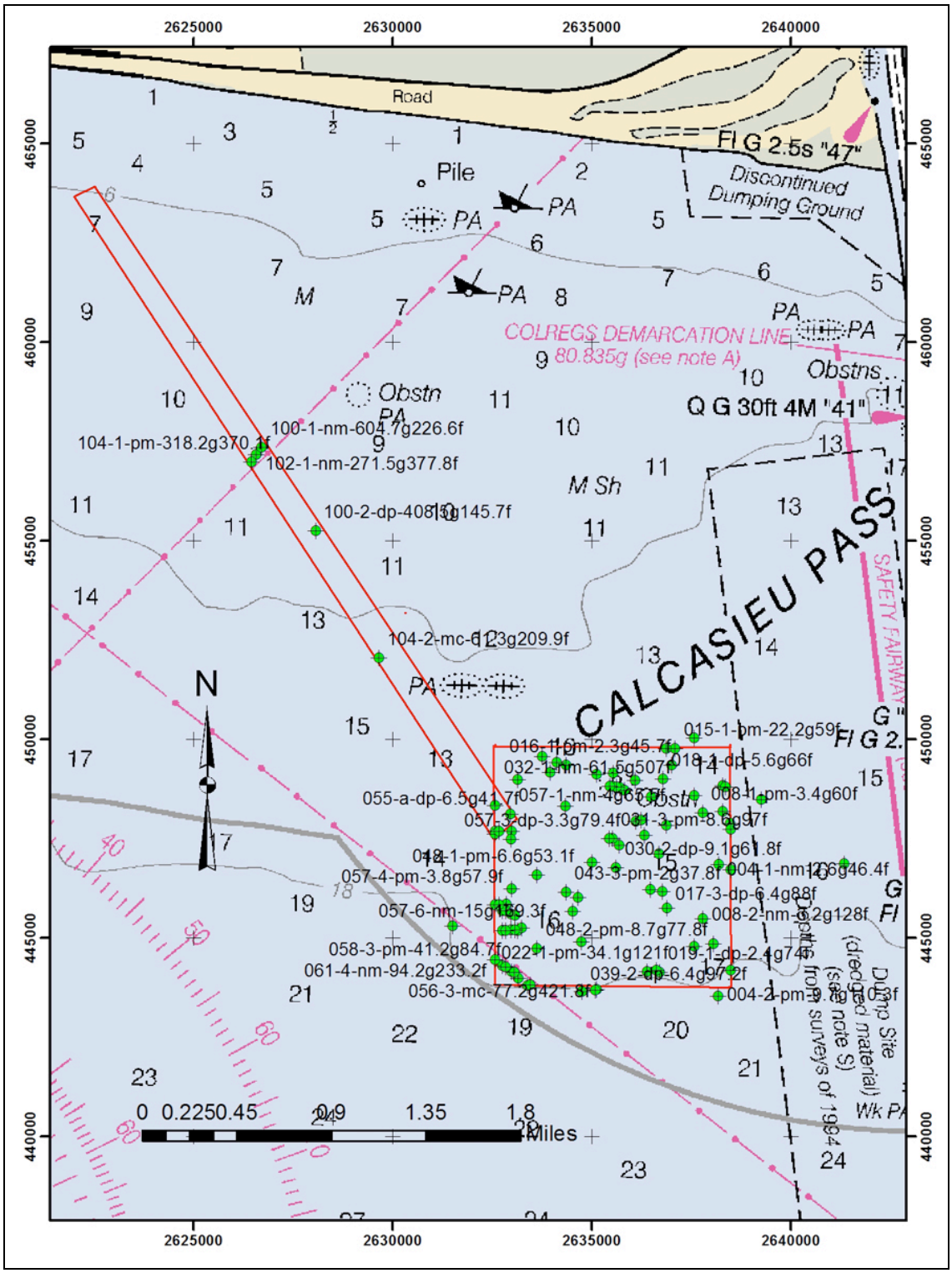

Figure 11. Magnetic anomalies identified during the remote sensing survey (NOAA Chart 11341).

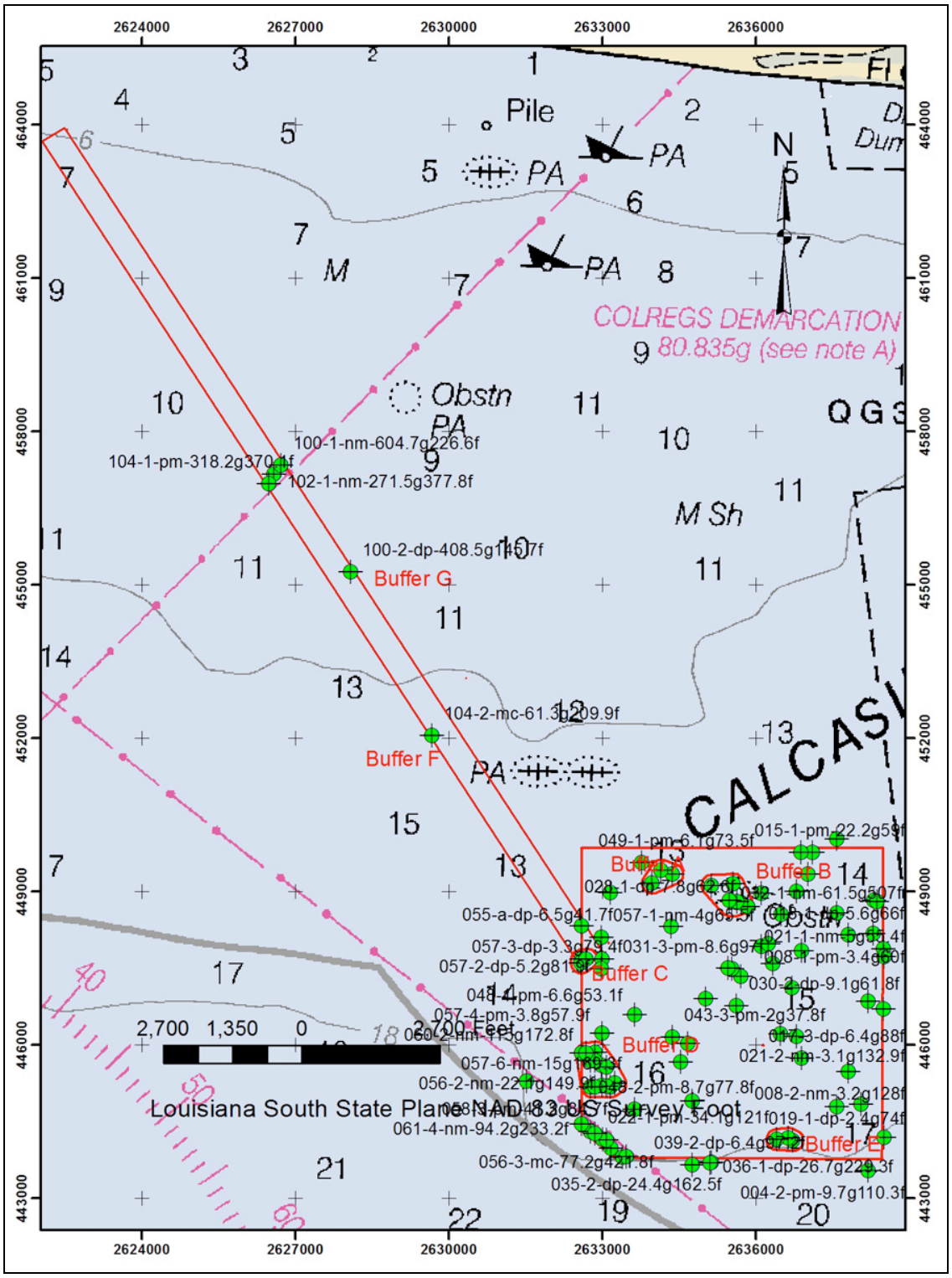

Figure 12. Buffers established to protect material generating potentially significant anomalies and clusters (NOAA Chart 11341).

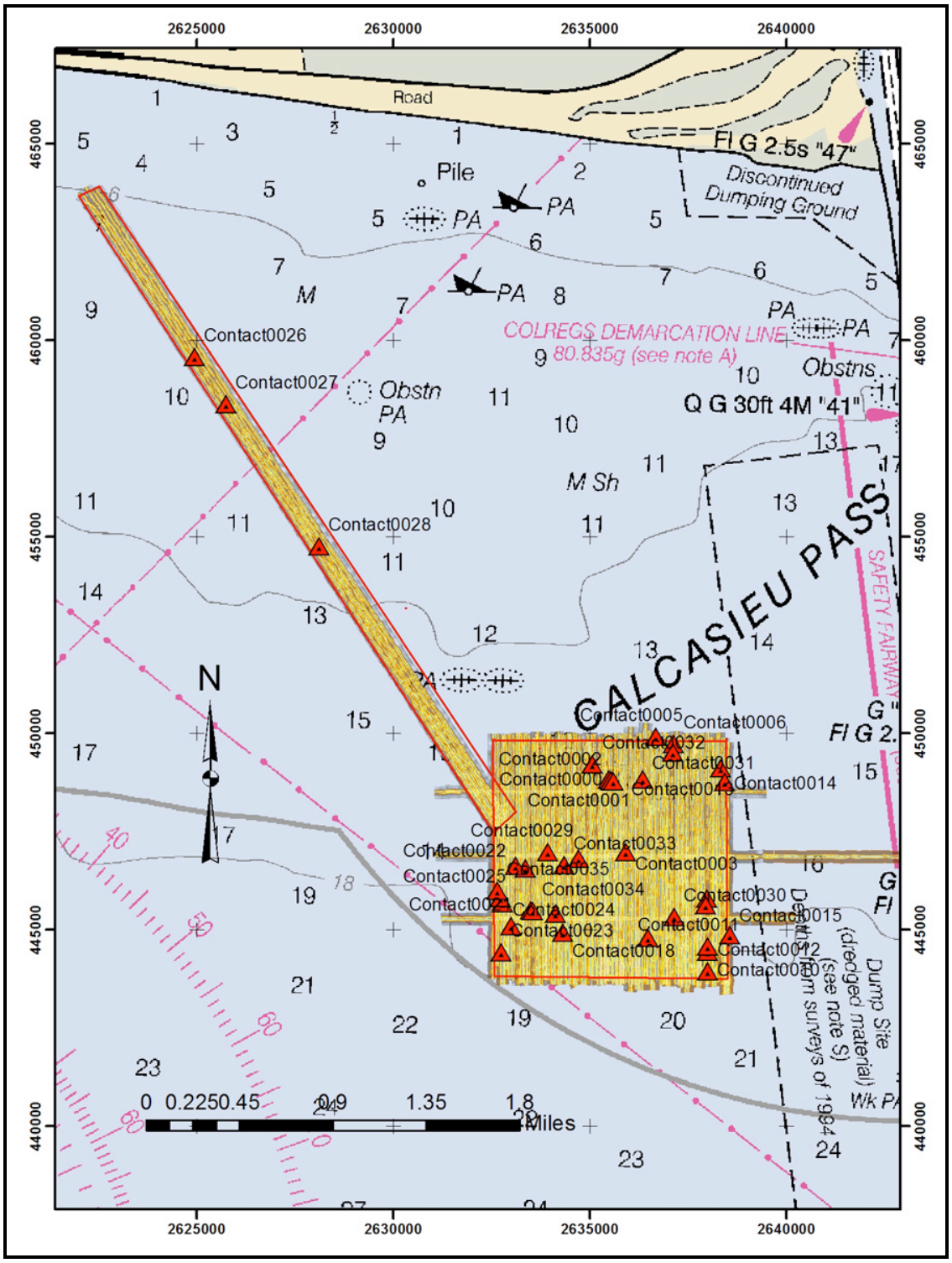

Figure 13. Sonar coverage mosaic with targets identified (NOAA Chart 11341).

Buffered Anomalies and Sonar Targets

Buffer A

Buffer A is recommended to protect material generating anomalies 043-1-dp-3.5g151.4f, 045-1-pm-5.5g323.2f and 047-1-nm-4.1g306.7f (Figure 14). Although of low intensity, each of the anomalies is of long duration. The long duration multi component nature of the signatures suggests a complex of ferrous objects. Similar signatures have previously been associated with the wooden hull remains of early or small vessels. No Sonar targets were identified in Buffer A.

Buffer B

Buffer B is recommended to protect material generating anomalies 028-1-dp-7.8g62.6f, 029-1-nm-18.4g257.1f, 030-1-nm-108.4g257.2f, 031-2-mc-187.3g276.6f, 031-1-pm-22.9g79.8f, 032-1-nm-61.5g507f and 035-1-mc-15.6g145.6f (Figure 15). They range from 7.8 gammas to 187.3 gammas in intensity and from 62.6 feet to 507 feet in duration. Signatures include dipoles, positive monopoles and multicomponent characteristics. Buffer B includes sonar four sonar targets, Sonar 0000, Sonar 0001, Sonar 0002 and Sonar 0032. Those images include a complex of structure and inter-related objects. Together the cluster of anomalies and sonar image suggest a complex of ferrous objects of varying size in association with structural remains that could represent hull structure, fasteners, rigging, ground tackle, equipment and possibly weapons. Similar signatures have previously been associated with the wooden hull vessel remains. Material generating the anomalies and sonar images in Buffer B are geographically associated with an obstruction charted on NOAA Chart 11341 (Figure 16). Similar signature clusters have previously been associated vessel remains. Location of the scatter at the site of a NOAA charted obstruction reinforces the recommendation to buffer the cluster.

Buffer C

Buffer C is recommended to protect material generating anomalies 060-1-nm-9.4g157.4f, 061-2-dp-254.1g139.3f and 104-3-dp-18.5g143.3f (Figure 17). They range from 9.4 gammas to 254.1 gammas in intensity and from 139.3 feet to 157.4 feet in duration. Signatures include dipolar and negative monopolar characteristics. Although two of the anomalies are of low intensity one is high. All three of the anomalies are of long duration. The long duration multi component nature of the signatures suggests a complex of ferrous objects. Similar signatures have previously been associated with vessel remains. No Sonar targets were identified in Buffer C.

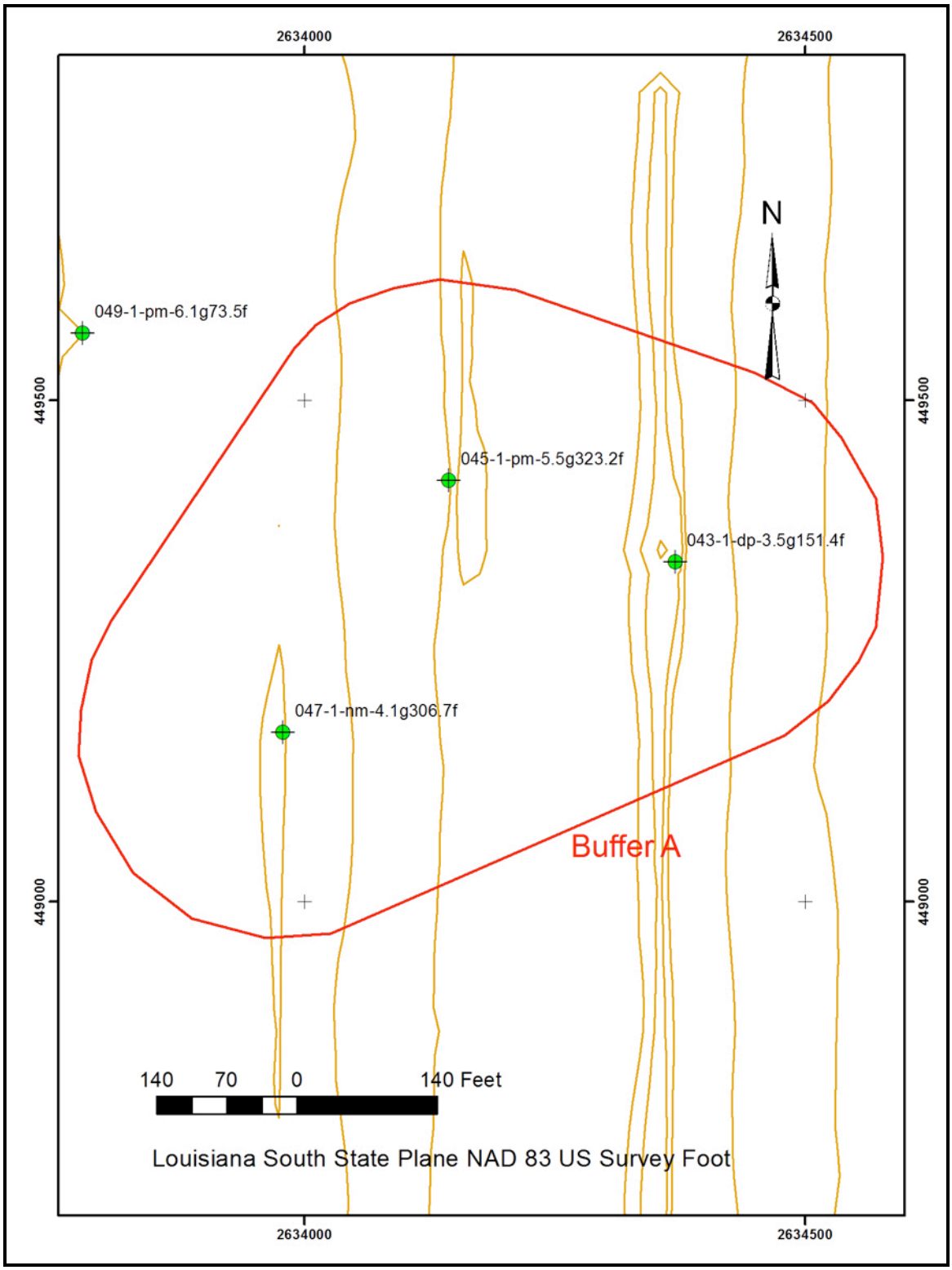

Figure 14. Buffer A magnetic anomalies.

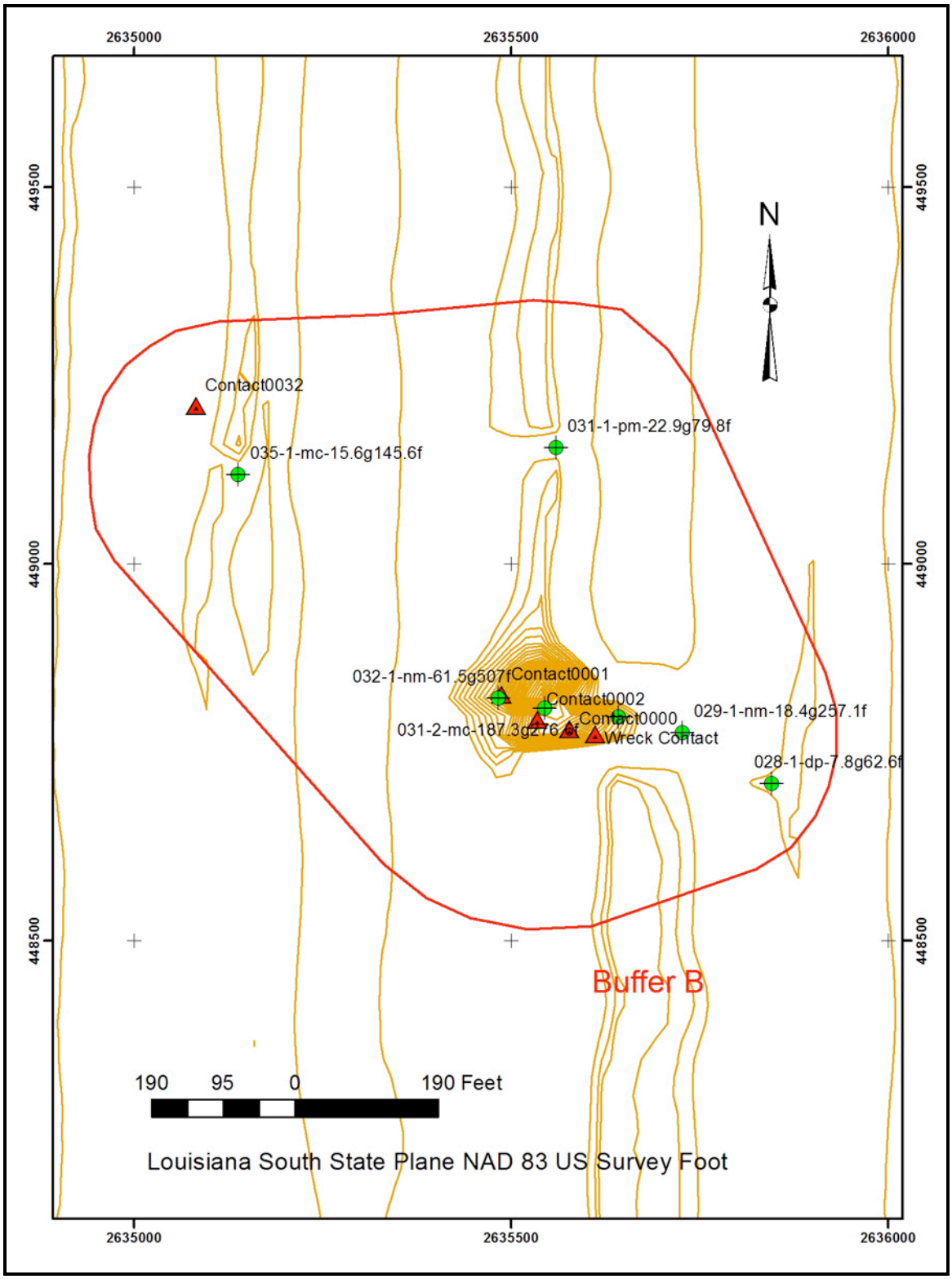

Figure 15. Buffer B anomalies and sonar targets.

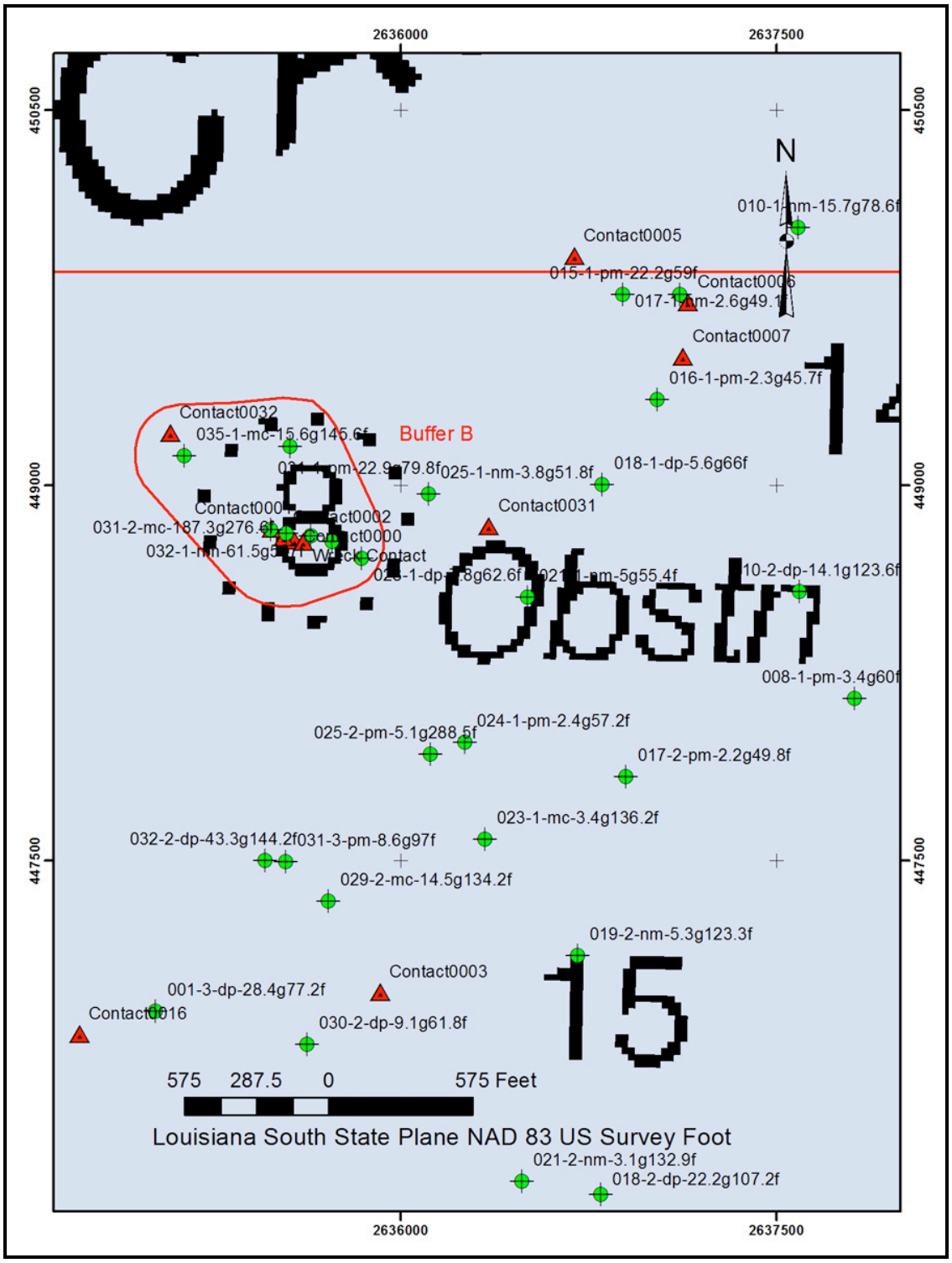

Figure 16. Buffer B over obstruction on NOAA Chart 11341.

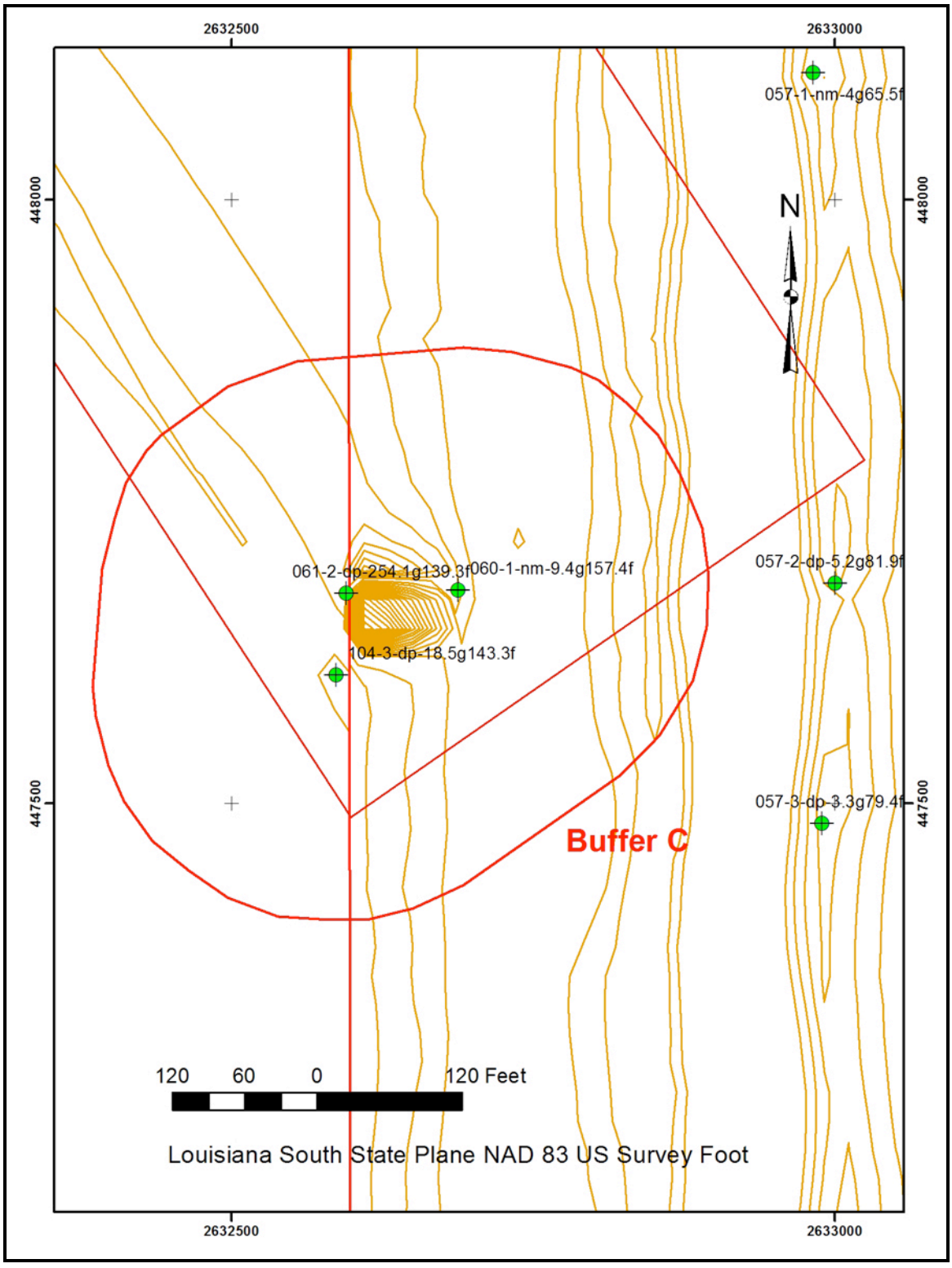

Figure 17. Buffer C anomalies.

Buffer D

Buffer D is recommended to protect material generating anomalies 054-1-dp-11.9g234.3f, 055-1-pm-44.7g148.3f, 056-1-mc-10.6g162.9f, 056-2-nm-22.1g149.9f, 057-5-dp-32.4g170.7f, 057-6-nm-15g169.3f, 058-1-dp-10.8g50.2f, 058-2-dp-111g121.5f, 058-3-pm-41.2g84.7f, 059-1-pm-9.1g141.7f, 059-2-nm-187.8g180.9f, 060-2-nm-115g172.8f and 061-3-pm-30.9g127.7f (Figure 18). They range from 10.6 gammas to 187.8 gammas in intensity and from 50.2 feet to 234.3 feet in duration. Signatures include dipoles, positive and negative monopoles and multicomponent characteristics. Buffer D includes sonar targets Sonar 0021, Sonar 0024, Sonar 0025 and Sonar 0035. Those images include a complex of linear features. Together the cluster of anomalies and sonar targets suggest a complex of ferrous objects of varying size in association with structural remains that could represent hull structure, fasteners, rigging, ground tackle, equipment and possibly weapons. Similar signature clusters have previously been associated vessel remains. Location of the scatter at the site of a NOAA charted obstruction reinforces the recommendation to buffer the cluster.

Buffer E

Buffer E is recommended to protect material generating anomalies 019-1-dp-2.4g74f, 020-1-nm-4.3g107.3f and 022-1-pm-34.1g121f (Figure 19). They range from 2.4 gammas to 107.3 gammas in intensity and from 74 feet to 121 feet in duration. Signatures include dipolar and negative and positive monopolar characteristics. Although two of the anomalies are of low intensity one is high. All three of the anomalies is of long duration. The moderate duration multi component nature of the signatures suggests a complex of ferrous objects. Similar signatures have previously been associated with early and small vessel remains. No Sonar targets were identified in Buffer E.

Buffer F

Buffer F is recommended to protect material generating anomaly 104-2-mc-61.3g209.9f (Figure 20). The multicomponent moderate intensity signature suggests a complex of ferrous objects. Similar signatures have previously been associated with small vessel remains. No Sonar targets were identified in Buffer F. The buffer radius is 100 feet as no dredging is planned for the temporary pipeline corridor and pipe placement can be shifted to avoid the site.

Buffer G

Buffer G is recommended to protect material generating anomaly 100-2-dp-408.5g145.7f (Figure 21). The high intensity broad dipolar signature suggests a large single or complex of small ferrous objects. Similar signatures have previously been associated with vessel remains. No Sonar targets were identified in Buffer G. The buffer radius is 100 feet as no dredging is planned for the temporary pipeline corridor and pipe placement can be shifted to avoid the site.

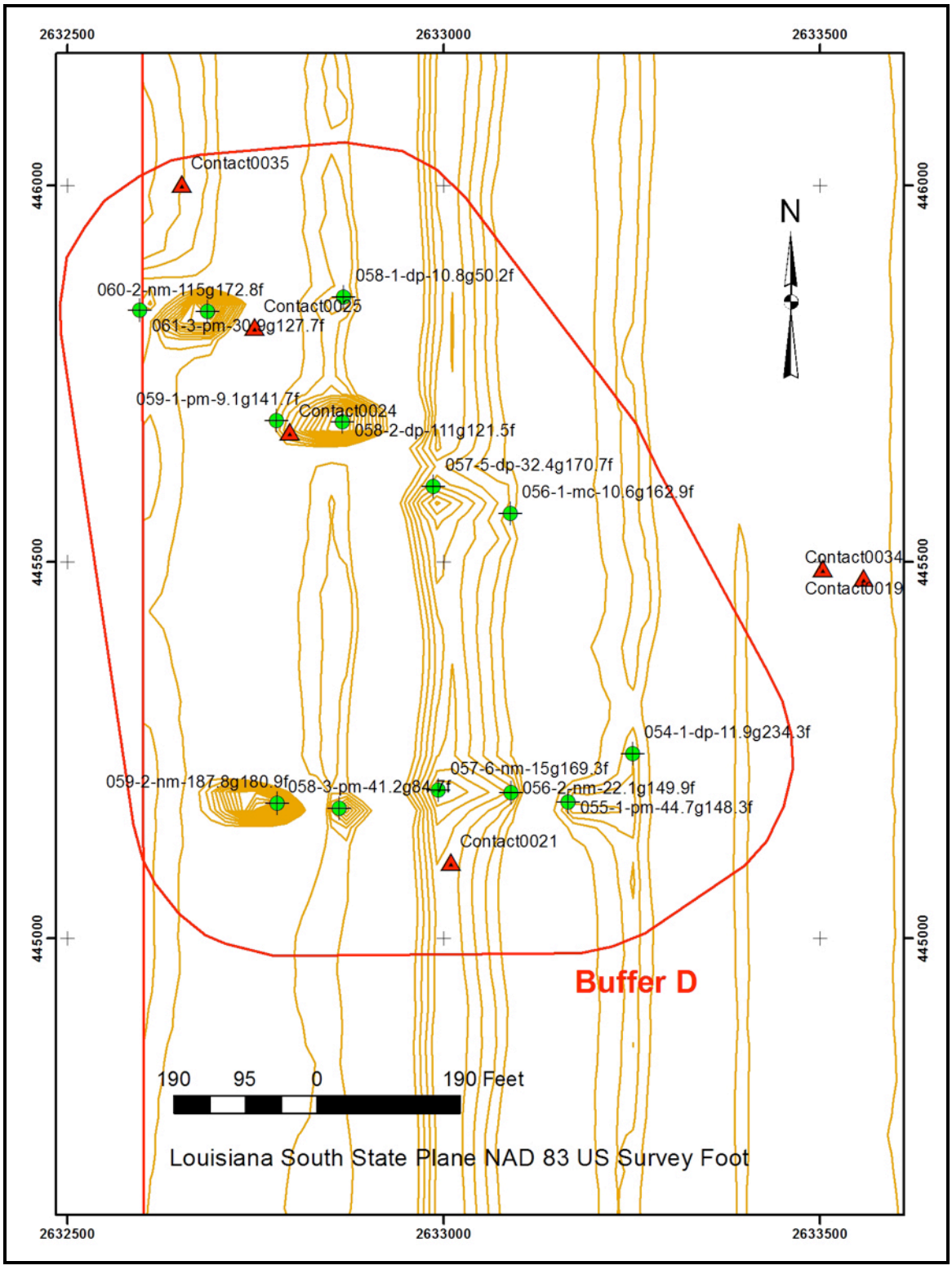

Figure 18. Buffer D anomalies and sonar targets.

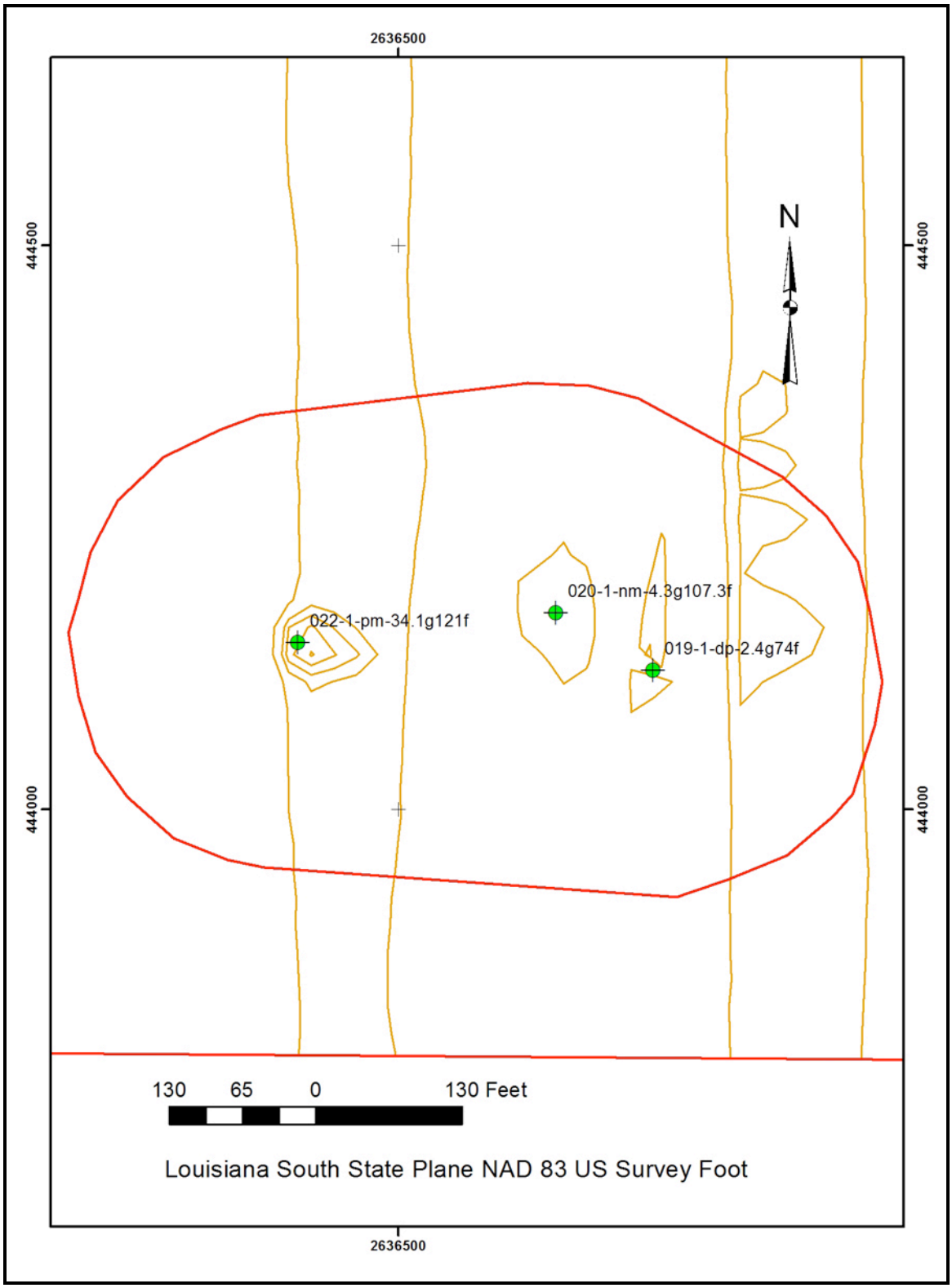

Figure 19. Buffer E anomalies.

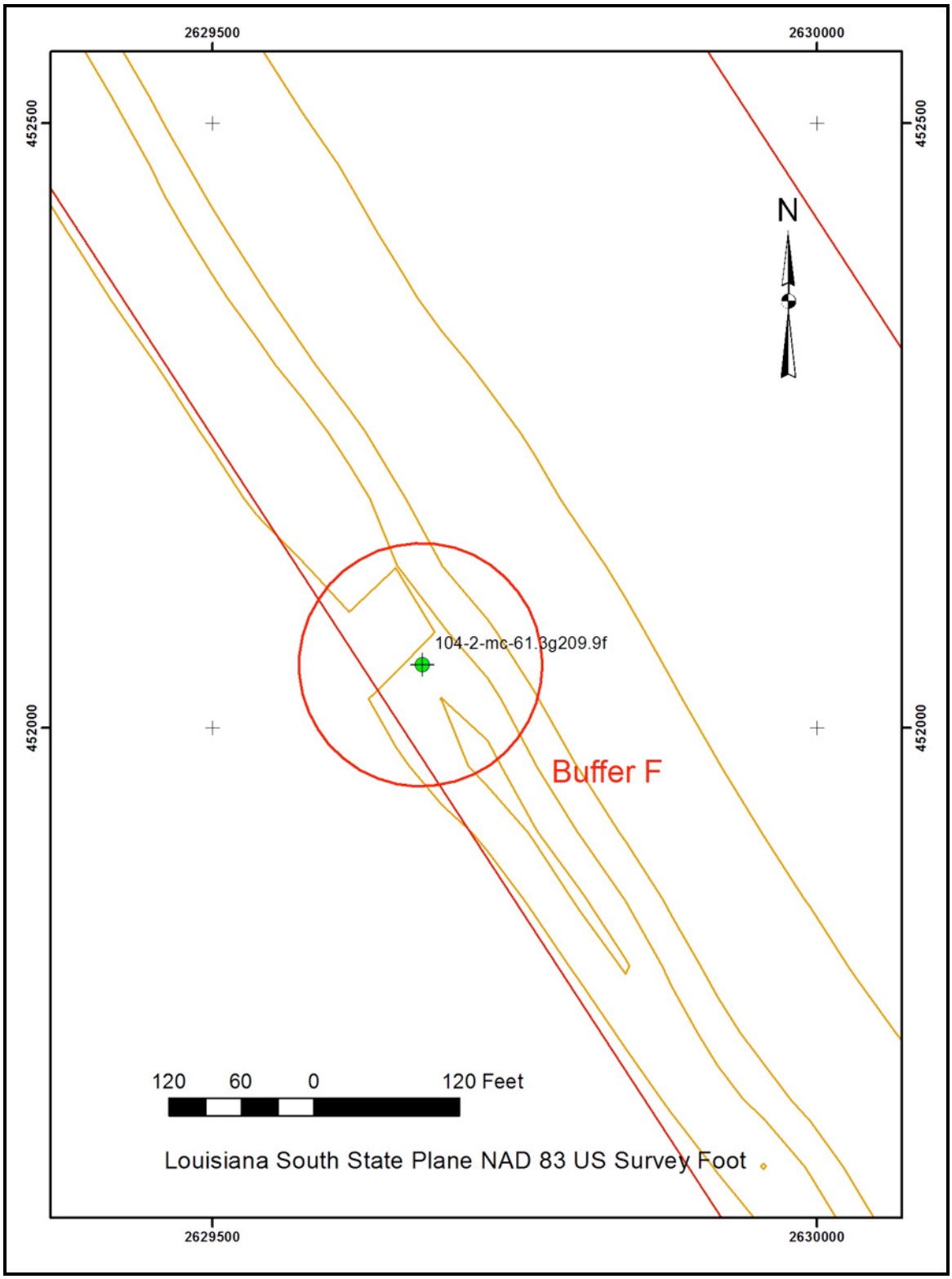

Figure 20. Buffer F anomalies.

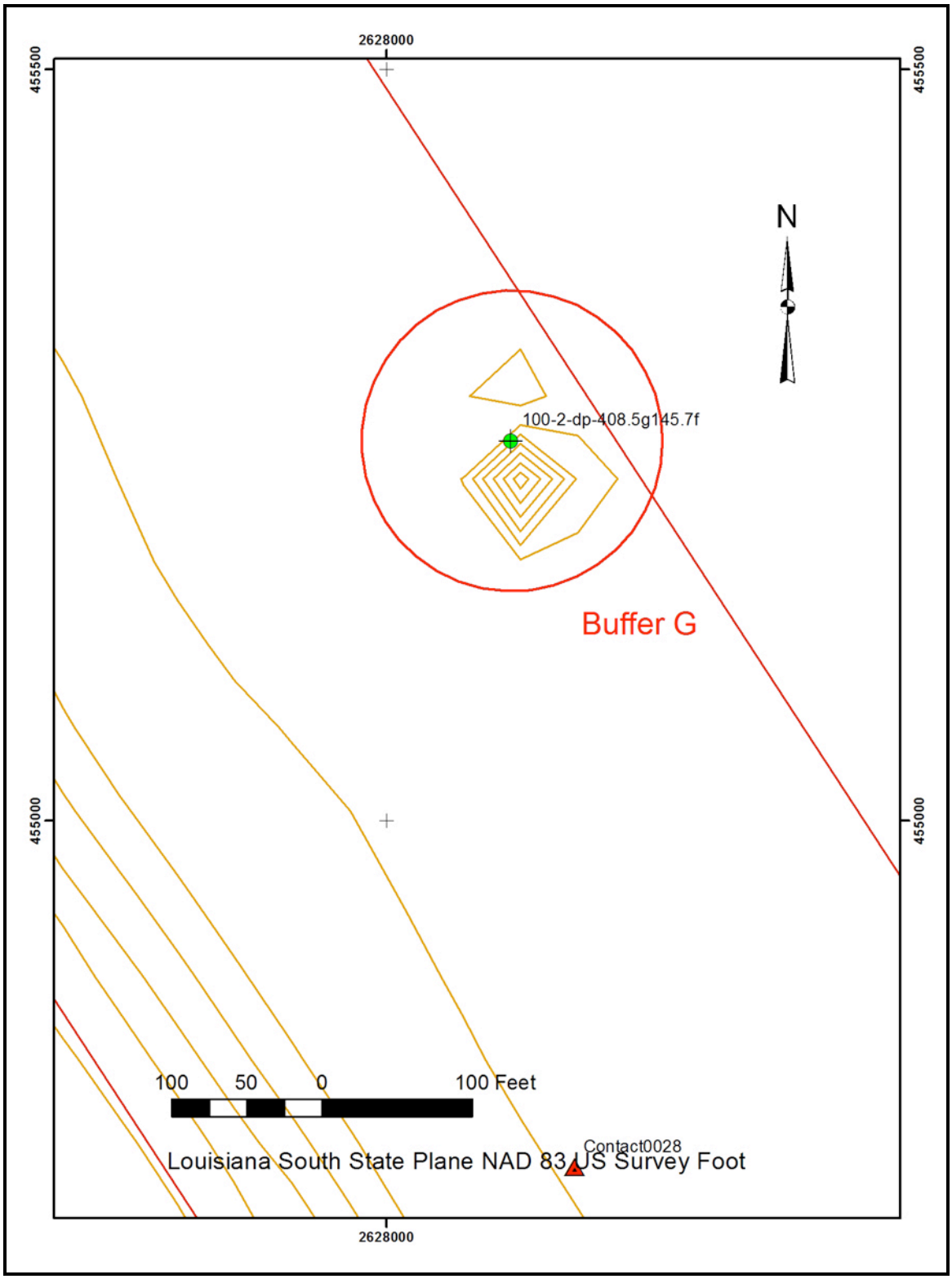

Figure 21. Buffer G anomalies.

The remaining magnetic 66 anomalies and 29 sonar targets do not appear to be associated with potentially significant shipwreck remains. Of the 66 magnetic anomalies, 8 are associated with a charted pipeline transecting the southwest corner of the borrow site and 3 are associated with a second charted pipeline transecting the proposed temporary pipeline corridor. Another 11 are located outside the borders of the borrow site. The remaining 44 appear to be associated with modern debris such as fish and crab traps, dredge pipes and pontoons, pilings, logs, small diameter rods, cable, wire rope, chain or small boat anchors.

Likewise 29 sonar targets do not appear to be associated with potentially significant shipwreck remains. One is associated with the charted pipeline transecting the southwest corner of the borrow site and three are located outside the borders of the borrow site. The remaining 25 appear to be associated with modern debris such as fish and crab traps, dredge pipes and pontoons, pilings, logs, small diameter rods, cable, wire rope and natural bottom surface features or scars caused by trawling or vessel traffic.

Analysis of the sub-bottom profiler data produced no evidence of relict channels, levees, hummocks or shell middens that might be associated with inundated prehistoric habitation sites. A sample of the sub-bottom record from the borrow site characterizes the data in that area (Figure 22). A sample of the sub-bottom record from the northwest end of the temporary pipeline corridor characterizes the data in that area (Figure 23).

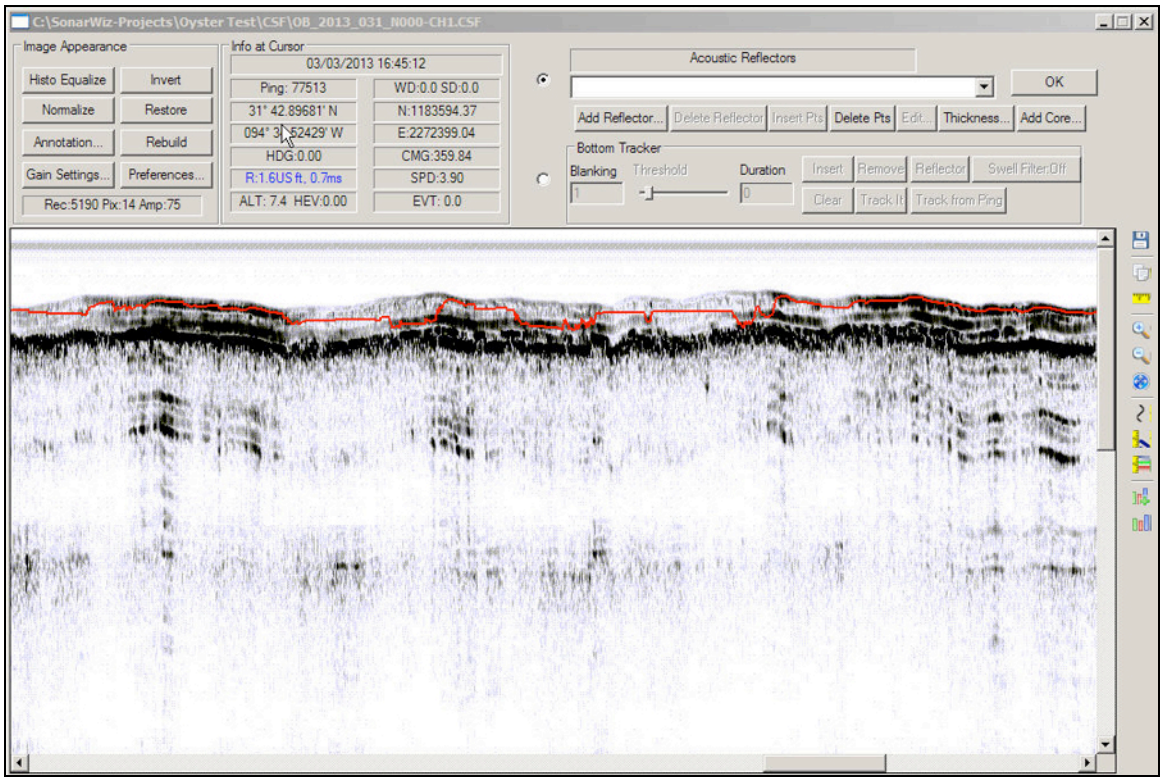

Figure 22. Sub-bottom profiler record sample from the borrow site.

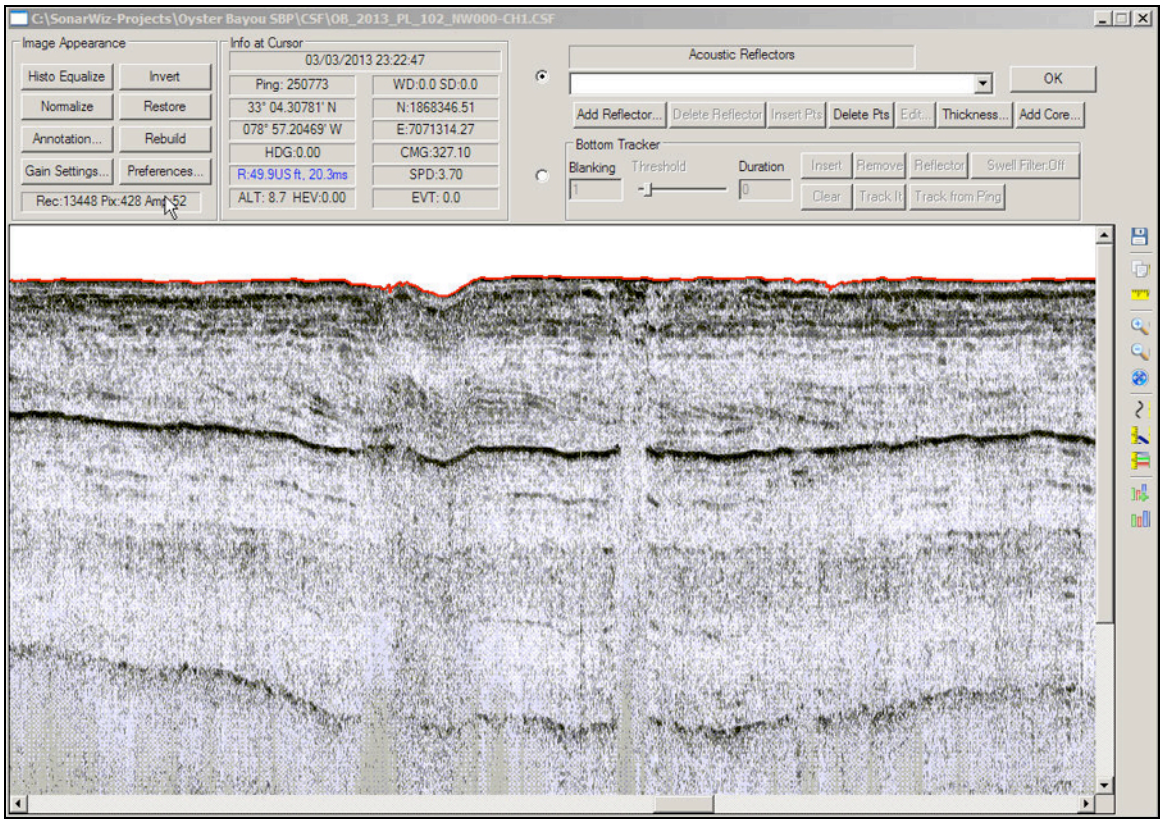

Figure 23. Sub-bottom profiler record sample from the temporary pipeline corridor.

Conclusions and Recommendations

Literature and historical research has confirmed that the maritime traditions of Louisiana's southwestern coastline reflect the entire spectrum of navigation in the Gulf of Mexico. Documented shipwrecks in northern Gulf date from the earliest decades of the sixteenth century. They reflect the patterns of maritime activity associated with colonization, development, agriculture, industry, trade, shipbuilding, commerce, warfare, transportation and fishing. As the scope of European settlement increased dramatically in the eighteenth century, the intensity and regularity of maritime activity reflected that development. The historical records confirm that waterborne transportation, lumbering, trade and fishing activities have dominated life in the Cameron Parish region of Louisiana.

As a consequence of those international, national and regional maritime activities, the Gulf Coast of Louisiana has been identified as a high probability area for shipwreck resources. Human error, storms and warfare have resulted in the loss of ships in every period of Gulf Coast history. Coastal Louisiana has been identified as a high probability area for shipwrecks and shipwreck preservation. Statistical probability suggests that most shipwrecks in the project area date from the post-World War II period and were associated with the coastal trade, fishing or oil and gas industry (Pearson et al. 2003, II:4-58). However, the limitations of extant historical records cannot preclude the distinct

possibility of earlier wrecks in the area. In addition, small coastal and fishing vessels lost in the area might never have been reported.

Because the Calcasieu Pass area of Cameron Parish project area has a high documented potential for shipwreck sites, magnetic anomalies and acoustic targets identified during the survey have been given careful consideration. The patterns of navigation identified by historical research confirms that the spectrum of vessels employed in the vicinity of the project includes everything from small coastal craft to international merchant and warships. While larger and more modern vessels generate more readily identifiable magnetic and acoustic signatures, small coastal craft can be difficult to detect and identify. For that reason, serious consideration must be given to each anomaly. Unfortunately, maritime activity and natural resource utilization in this region has also produced a considerable volume of modern debris. It can be difficult, to determine whether some anomalies represent a shipwreck, a coastal vessel or modern debris. While pipelines and wells can frequently be identified using charts and geographic information systems data, much of the bottom surface debris is undocumented.

Analysis of the remote-sensing data associated with the two Cameron Parish survey areas identified a total of 31 magnetic anomalies and 8 acoustic targets considered, individually or in clusters, to be potentially significant. Those anomalies and associated sonar targets have been isolated by seven buffers. Avoidance of those buffers is highly recommended to protect material generating the remote sensing signatures. Anomalies and targets within Buffer B are associated with a NOAA charted obstruction and the remote-sensing signatures verify exposed structure on the bottom surface. In the remainder of the buffers, the association of remote-sensing signatures with vessel remains are not so readily apparent. However, individually or as clusters, they do share characteristics with previously identified shipwreck sites. As indicated on NOAA Chart 11341 (Figure 16), the Calcasieu Pass vicinity has a high density of vessel remains and unidentified obstructions.

In light of the historical, cartographic and remote-sensing data generated by research on the Oyster Bayou Marsh Restoration Project, restricting dredging and pipeline deployment operations within the buffered sites is strongly recommended. In the event that avoidance of the buffered sites is possible, no additional investigation is recommended in conjunction with the project as proposed. If any of the seven buffered sites cannot be avoided, archaeological diver investigation should be undertaken to identify and assess the significance of material generating the magnetic and acoustic signatures and determine the necessity for mitigation of project related impacts to the resource.

Unexpected Discovery Protocol

In the event that any project activities expose prehistoric or historic cultural material not identified during the remote-sensing survey, the dredging company under contract to CB&I should be required to immediately notify the designated point of contact for the Louisiana Coastal Protection and Restoration Authority, the National Marine Fisheries

Service, and the Louisiana State Historic Preservation Officer. Notification should address the location, where possible, the nature of material exposed by the project activities, and options for immediate archaeological inspection and assessment of the site(s).

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Appendix A

Magnetic Anomalies

Appendix A
Magnetic Anomalies

Designation	Line Number	Target Number	Signature Type	Gammas	Duration in Feet	X Coordinate	Y Coordinate	Analysis	Sonar Association
043-1-dp-3.5g151.4f	43	1	Dipolar	3.5	151.4	2634370.6	449339	Potentially Significant/Buffer A	No Sonar Contact
045-1-pm-5.5g323.2f	45	1	Positive Monopolar	5.5	323.2	2634144.7	449420.3	Potentially Significant/Buffer A	No Sonar Contact
047-1-nm-4.1g306.7f	47	1	Negative Monopolar	4.1	306.7	2633978.8	449168.8	Potentially Significant/Buffer A	No Sonar Contact
028-1-dp-7.8g62.6f	28	1	Dipolar	8.8	62.6	2635845.6	448708	Potentially Significant/Buffer B	Sonar Contact Wreck
029-1-nm-18.4g257.1f	29	1	Negative Monopolar	18.4	257.1	2635727.2	448775.4	Potentially Significant/Buffer B	Sonar Contact Wreck
030-1-nm-108.4g257.2f	30	1	Negative Monopolar	108.4	257.2	2635642.5	448796.1	Potentially Significant/Buffer B	Sonar Contact Wreck
031-2-mc-187.3g276.6f	31	2	Multicomponent	187.3	276.6	2635544.3	448807.9	Potentially Significant/Buffer B	Sonar Contact Wreck
031-1-pm-22.9g79.8f	31	1	Positive Monopolar	22.9	79.8	2635559.3	449154.4	Moderate Single Object/Buffer B	Sonar Contact Wreck
032-1-nm-61.5g507f	32	1	Negative Monopolar	61.7	507	2635483	448821.4	Potentially Significant/Buffer B	Sonar Contact Wreck
035-1-mc-15.6g145.6f	35	1	Multicomponent	15.6	145.6	2635137.9	449118	Complex Small Object(s)/Buffer B	Sonar Contact Wreck
060-1-nm-9.4g157.4f	60	1	Negative Monopolar	9.4	157.4	2632688.2	447676.3	Potentially Significant/Buffer C	No Sonar Contact
061-2-dp-254.1g139.3f	61	2	Dipolar	254.1	139.3	2632595.2	447673.9	Potentially Significant/Buffer C	No Sonar Contact
104-3-dp-18.5g143.3f	104	3	Dipolar	18.5	143.3	2632586.7	447606	Potentially Significant/Buffer C	No Sonar Contact
054-1-dp-11.9g234.3f	54	1	Dipolar	11.9	234.3	2633251.6	445244.7	Potentially Significant/Buffer D	Sonar Contact 021
055-1-pm-44.7g148.3f	55	1	Positive Monopolar	44.7	148.3	2633166.4	445180.6	Potentially Significant/Buffer D	Sonar Contact 021
056-1-mc-10.6g162.9f	56	1	Multicomponent	10.6	162.9	2633089	445564.3	Potentially Significant/Buffer D	Sonar Contact 024 & 025
056-2-nm-22.1g149.9f	56	2	Negative Monopolar	22.1	149.9	2633089.8	445193.2	Potentially Significant/Buffer D	Sonar Contact 021
057-5-dp-32.4g170.7f	57	5	Dipolar	32.4	170.7	2632986.8	445599.9	Potentially Significant/Buffer D	Sonar Contact 024 & 025
057-6-nm-15g169.3f	57	6	Negative Monopolar	15	169.3	2632993.9	445196.5	Potentially Significant/Buffer D	Sonar Contact 021
058-1-dp-10.8g50.2f	58	1	Dipolar	10.8	50.2	2632867.6	445851.4	Potentially Significant/Buffer D	Sonar Contact 024 & 025
058-2-dp-111g121.5f	58	2	Dipolar	111	121.5	2632866.3	445686.2	Potentially Significant/Buffer D	Sonar Contact 024 & 025
058-3-pm-41.2g84.7f	58	3	Positive Monopolar	41.2	84.7	2632861.7	445172.1	Potentially Significant/Buffer D	Sonar Contact 021
059-1-pm-9.1g141.7f	59	1	Positive Monopolar	9.1	141.7	2632778.1	445687.8	Potentially Significant/Buffer D	Sonar Contact 024 & 025
059-2-nm-187.8g180.9f	59	2	Negative Monopolar	187.8	180.9	2632779.5	445178.6	Potentially Significant/Buffer D	Sonar Contact 021
060-2-nm-115g172.8f	60	2	Negative Monopolar	115	172.8	2632686.8	445832.6	Potentially Significant/Buffer D	Sonar Contact 024 & 025
061-3-pm-30.9g127.7f	61	3	Positive Monopolar	30.9	127.7	2632596.8	445834.7	Potentially Significant/Buffer D	Sonar Contact 024 & 025
019-1-dp-2.4g74f	19	1	Dipolar	2.4	74	2636726.2	444123	Potentially Significant/Buffer E	No Sonar Contact
020-1-nm-4.3g107.3f	20	1	Negative Monopolar	4.3	107.3	2636640.1	444174	Potentially Significant/Buffer E	No Sonar Contact
022-1-pm-34.1g121f	22	1	Positive Monopolar	34.1	121	2636410.9	444147.5	Potentially Significant/Buffer E	No Sonar Contact
104-2-mc-61.3g209.9f	104	2	Multicomponent	61.3	209.9	2629674.2	452052.1	Large Complex Object(s)/Buffer F	No Sonar Contact
100-2-dp-408.5g145.7f	100	2	Dipolar	408.5	145.7	2628083.1	455252.5	Large Single Object/Buffer G	Sonar 0028 Possible Assoc.

Appendix A
Magnetic Anomalies

Designation	Line Number	Target Number	Signature Type	Gammas	Duration in Feet	X Coordinate	Y Coordinate	Analysis	Sonar Association
001-3-dp-28.4g77.2f	1	3	Dipolar	28.4	77.2	2635022	446896.6	Small Single Object	No Sonar Contact
001-4-nm-6.1g83.4f	1	4	Negative Monopolar	6.1	83.4	2638510.8	444182.4	Small Single Object	No Sonar Contact
001a-1-nm-8.5g39.7f	1	1	Negative Monopolar	8.5	39.7	2638498.4	447876	Small Single Object	No Sonar Contact
002-1-nm-7.5g65.9f	2	1	Negative Monopolar	7.5	65.9	2638378	448802.5	Small Single Object	Sonar 0014
003-1-pm-4.9g70.2f	3	1	Positive Monopolar	4.9	70.2	2638309.3	448827.5	Small Single Object	Sonar 0014
003-2-dp-32.3g122.7f	3	2	Dipolar	32.3	122.7	2638304.5	448179.3	Moderate Single Object	No Sonar Contact
004-1-nm-2.6g46.4f	4	1	Negative Monopolar	2.6	46.4	2638203.3	446852	Small Single Object	No Sonar Contact
005-1-dp-7.9g83.5f	5	1	Dipolar	7.9	83.5	2638069	444841.9	Small Single Object	No Sonar Contact
008-1-pm-3.4g60f	8	1	Positive Monopolar	3.4	60	2637814.1	448146.2	Small Single Object	No Sonar Contact
008-2-nm-3.2g128f	8	2	Negative Monopolar	3.2	128	2637810.8	445480	Small Single Object	No Sonar Contact
010-2-dp-14.1g123.6f	10	2	Dipolar	14.1	123.6	2637594.1	448574	Small Single Object	No Sonar Contact
010-3-dp-74.4g147.9f	10	3	Dipolar	74.4	147.9	2637591.5	444787.3	Moderate Single Object	No Sonar Contact
015-1-pm-22.2g59f	15	1	Positive Monopolar	22.2	59	2637115.7	449761.6	Small Single Object	Sonar 0006 Possible Assoc.
016-1-pm-2.3g45.7f	16	1	Positive Monopolar	2.3	45.7	2637026.2	449341.4	Small Single Object	No Sonar Contact
017-1-nm-2.6g49.1f	17	1	Negative Monopolar	2.6	49.1	2636888.8	449763.8	Small Single Object	No Sonar Contact
017-2-pm-2.2g49.8f	17	2	Positive Monopolar	2.2	49.8	2636900.3	447835.4	Small Single Object	No Sonar Contact
017-3-dp-6.4g88f	17	3	Dipolar	6.4	88	2636901	445740.4	Small Single Object	No Sonar Contact
018-1-dp-5.6g66f	18	1	Dipolar	5.6	66	2636806.1	449002.6	Small Single Object	No Sonar Contact
018-2-dp-22.2g107.2f	18	2	Dipolar	22.2	107.2	2636800	446163.4	Small Single Object	No Sonar Contact
019-2-nm-5.3g123.3f	19	2	Negative Monopolar	5.3	123.3	2636707.9	447119.5	Small Single Object	No Sonar Contact
021-1-nm-5g55.4f	21	1	Negative Monopolar	5	55.4	2636507.2	448552.4	Small Single Object	No Sonar Contact
021-2-nm-3.1g132.9f	21	2	Negative Monopolar	3.1	142.9	2636484.2	446215.7	Small Single Object	No Sonar Contact
023-1-mc-3.4g136.2f	23	1	Multicomponent	3.4	136.2	2636337.9	447583.3	Complex Small Object(s)	No Sonar Contact
024-1-pm-2.4g57.2f	24	1	Positive Monopolar	2.4	57.2	2636257.2	447971.1	Small Single Object	No Sonar Contact
025-1-nm-3.8g51.8f	25	1	Negative Monopolar	3.8	51.8	2636112.2	448966	Small Single Object	No Sonar Contact
025-2-pm-5.1g288.5f	25	2	Positive Monopolar	5.1	288.5	2636119.9	447924.1	Moderate Single Object	No Sonar Contact
029-2-mc-14.5g134.2f	29	2	Multicomponent	14.5	134.2	2635712.9	447337.2	Complex Small Object(s)	No Sonar Contact
030-2-dp-9.1g61.8f	30	2	Dipolar	9.1	61.8	2635627.3	446764.6	Small Single Object	No Sonar Contact
031-3-pm-8.6g97f	31	3	Positive Monopolar	8.6	97	2635541.2	447494.9	Small Single Object	No Sonar Contact
032-2-dp-43.3g144.2f	32	2	Dipolar	43.3	144.2	2635459.7	447497.9	Small Single Object	No Sonar Contact
039-1-pm-13.9g107f	39	1	Positive Monopolar	13.9	107	2634761.3	444901.5	Small Single Object	No Sonar Contact
									No Sonar Contact
040-1-dp-86.3g154.9f	40	1	Dipolar	86.3	154.9	2634670.3	446019.9	Moderate Single Object	No Sonar Contact
041-1-dp-13.5g116.5f	41	1	Dipolar	13.5	116.5	2634535.9	445656.9	Small Single Object	No Sonar Contact
043-2-pm-2.5g58.2f	43	2	Positive Monopolar	2.5	58.2	2634356.1	448316.8	Small Single Object	No Sonar Contact
043-3-pm-2g37.8f	43	3	Positive Monopolar	2	37.8	2634371.7	446153.8	Small Single Object	No Sonar Contact
048-1-pm-6.6g53.1f	48	1	Positive Monopolar	6.6	53.1	2633635.5	446583.6	Small Single Object	No Sonar Contact
048-2-pm-8.7g77.8f	48	2	Positive Monopolar	8.7	77.8	2633643.8	444733.4	Small Single Object	No Sonar Contact
049-1-pm-6.1g73.5f	49	1	Positive Monopolar	6.1	73.5	2633779	449566.8	Small Single Object	No Sonar Contact
055-a-dp-6.5g41.7f	55 a		Dipolar	6.5	41.7	2633165.7	448977.7	Small Single Object	No Sonar Contact
057-1-nm-4g65.5f	57	1	Negative Monopolar	4	65.5	2632982.6	448105.5	Small Single Object	No Sonar Contact
057-2-dp-5.2g81.9f	57	2	Dipolar	5.2	81.9	2633000.6	447682.3	Small Single Object	No Sonar Contact
057-3-dp-3.3g79.4f	57	3	Dipolar	3.3	79.4	2632989.9	447483.4	Small Single Object	No Sonar Contact
057-4-pm-3.8g57.9f	57	4	Positive Monopolar	3.8	57.9	2633004	446228.5	Small Single Object	No Sonar Contact
061-1-nm-10.4g50.4f	61	1	Negative Monopolar	10.4	50.4	2632598.3	448324.5	Small Single Object	No Sonar Contact

Appendix A
Magnetic Anomalies

Designation	Line Number	Target Number	Signature Type	Gammas	Duration in Feet	X Coordinate	Y Coordinate	Analysis	Sonar Association
052-1-dp-232.5g226.8f	52	1	Dipolar	232.5	226.8	2633477.7	443807.7	Pipeline	No Sonar Contact
053-1-mc-112.1g389.5f	53	1	Multicomponent	112.1	389.5	2633402.9	443799.7	Pipeline	No Sonar Contact
055-2-nm-264.3g380.7f	55	2	Negative Monopolar	264.3	380.7	2633171	443976.3	Pipeline	No Sonar Contact
056-3-mc-77.2g421.8f	56	3	Multicomponent	77.2	421.8	2633082.5	444136.8	Pipeline	No Sonar Contact
057-7-dp-119.3g347.8f	57	7	Dipolar	119.3	347.8	2633006.1	444151	Pipeline	No Sonar Contact
058-4-dp-373.3g214.8f	58	4	Dipolar	373.3	214.8	2632865.8	444257.5	Pipeline	No Sonar Contact
059-3-dp-139.2g393.3f	59	3	Dipolar	139.2	393.3	2632770.1	444296.7	Pipeline	No Sonar Contact
061-4-nm-94.2g233.2f	61	4	Negative Monopolar	94.2	233.2	2632596.7	444447.8	Pipeline	No Sonar Contact
100-1-nm-604.7g226.6f	100	1	Negative Monopolar	604.7	226.6	2626723.1	457344.5	Pipeline	No Sonar Contact
102-1-nm-271.5g377.8f	102	1	Negative Monopolar	271.5	377.8	2626589.1	457169.6	Pipeline	No Sonar Contact
104-1-pm-318.2g370.1f	104	1	Positive Monopolar	318.2	370.1	2626480.9	456982.5	Pipeline	No Sonar Contact
010-1-nm-15.7g78.6f	10	1	Negative Monopolar	15.7	78.6	2637587.6	450029.7	Out of Borrow Area	No Sonar Contact
001-1-dp-15g76.5f	1	1	Dipolar	15	76.5	2644166.9	446855.1	Out of Borrow Area	No Sonar Contact
001-2-nm-18.3g57.4f	1	2	Negative Monopolar	18.3	57.4	2641358.6	446863.1	Out of Borrow Area	No Sonar Contact
001-2-pm-13.2g90.5f	1	2	Positive Monopolar	13.2	90.5	2638510.6	447724.2	Out of Borrow Area	No Sonar Contact
001-3-dp-22g120.6f	1	3	Dipolar	22	120.6	2638506	446705.8	Out of Borrow Area	No Sonar Contact
002-1-pm-311.8g193.5f	2	1	Positive Monopolar	311.8	193.5	2639279.4	448474.7	Out of Borrow Area	No Sonar Contact
003-1-dp-218.1g169.2f	3	1	Dipolar	218.1	169.2	2631530.1	445290	Out of Borrow Area	No Sonar Contact
004-2-pm-9.7g110.3f	4	2	Positive Monopolar	9.7	110.3	2638199.2	443535.9	Out of Borrow Area	No Sonar Contact
035-2-dp-24.4g162.5f	35	2	Dipolar	24.4	162.5	2635144.4	443695.9	Out of Borrow Area	No Sonar Contact
036-1-dp-26.7g229.3f	36	1	Dipolar	26.7	229.3	2635113.7	443680.9	Out of Borrow Area	No Sonar Contact
039-2-dp-6.4g97.2f	39	2	Dipolar	6.4	97.2	2634767.8	443648.1	Out of Borrow Area	No Sonar Contact

Appendix B

Acoustic Target Table

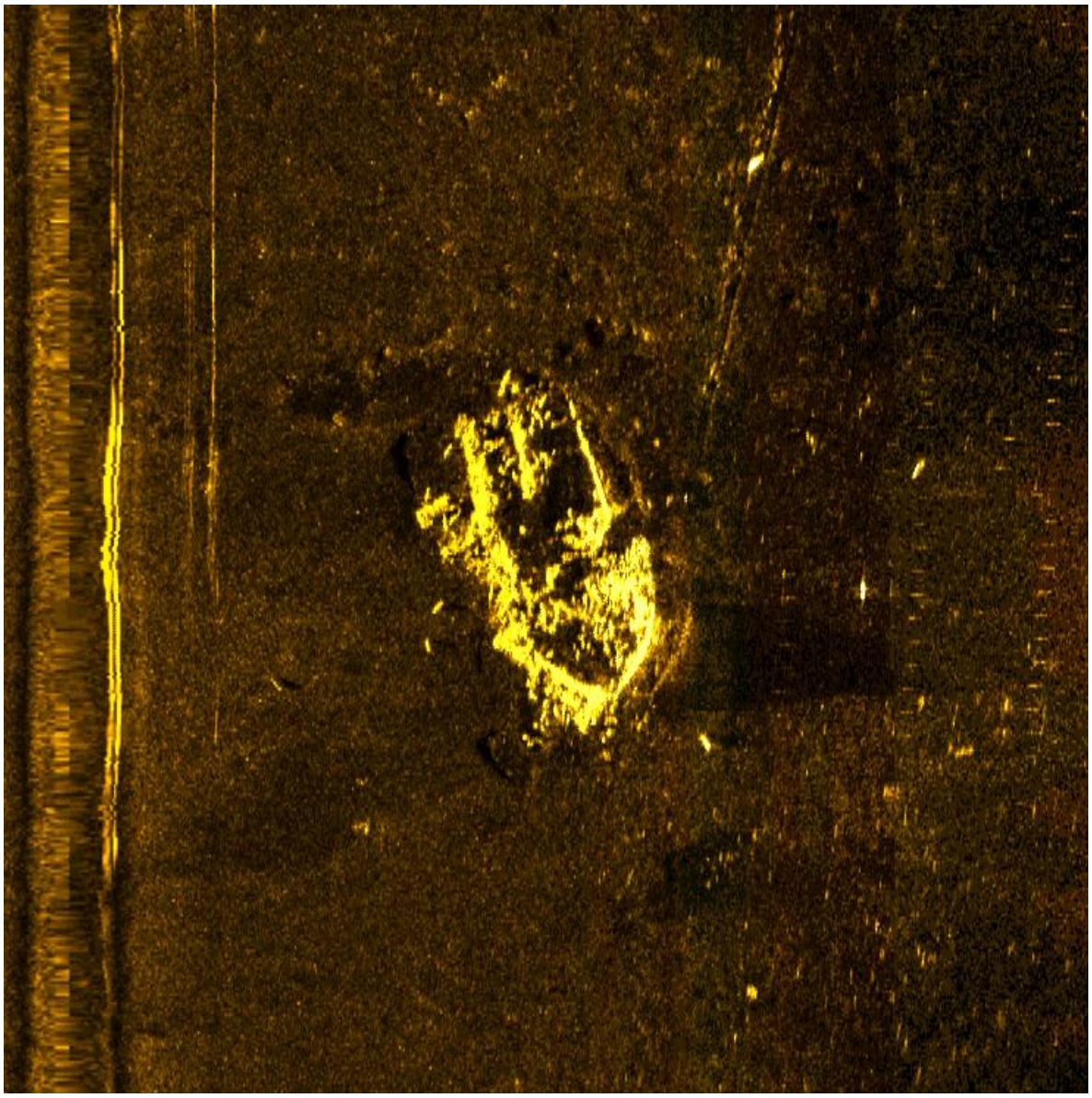
Appendix B
Sonar Targets

Name	X Coordinate	Y Coordinate	Characterization	Anomaly Association
Wreck Contact	2635609	448773	Wreck	Buffer B Cluster
Sonar 000	2635577	448780	Wreck	Buffer B Cluster
Sonar 001	2635487	448827	Wreck	Buffer B Cluster
Sonar 002	2635534	448793	Wreck	Buffer B Cluster
Sonar 021	2633005	445100	Linear Feature	Buffer D Cluster
Sonar 024	2632790	445673	Possibly Cable or Chain	Buffer D Cluster
Sonar 025	2632745	445811	Short linear Feature	Buffer D Cluster
Sonar 035	2632652	446002	Short Linear Features	Buffer D Cluster
Sonar 004	2636489	444802	Linear Feature	None
Sonar 006	2637155	449737	Small Rectangular Feature	015-1-pm-22.2g59f
Sonar 007	2637132	449516	Small Linear Object	None
Sonar 008	2637995	445804	Short Linear Feature	None
Sonar 009	2637962	445631	Small Bottom Scatter	None
Sonar 010	2637927	444711	Small Rectangular Feature	None
Sonar 011	2638013	444574	Small Rectangular Feature	None
Sonar 012	2638016	443943	Small Rectangular Feature	None
Sonar 013	2638346	449108	Small Linear Object	None
Sonar 014	2636489	444801	Small Linear Object	003-1--pm-4.9g70.2f
Sonar 016	2634798	446804	Linear Feature	None
Sonar 017	2634133	445412	Small Surface Features	None
Sonar 018	2634317	444921	Linear Feature	None
Sonar 019	2634316	444522	Linear Feature	None
Sonar 020	2633372	446567	Linear Feature	None
Sonar 022	2633124	446622	Short Linear Features	None
Sonar 026	2624793	459475	Bottom Surface Feature	None
Sonar 027	2625764	458381	Surface Feature Scatter	None
Sonar 028	2628137	454777	Bottom Surface Feature	None
Sonar 029	2633933	446982	Linear Feature	None
Sonar 030	2637148	445367	Rectanglar Feature	None
Sonar 031	2636353	448836	Short Linear Feature	None
Sonar 032	2635080	449209	Small Rectangular Feature	035-1-mc-15.6g145.6f
Sonar 033	2634355	446649	Short Linear Feature	None
Sonar 034	2633558	445478	Short Linear Feature	None
Sonar 023	2632752	444424	Linear Feature	Pipeline
Sonar 003	2635589	446979	Short Linear Features	Out of Area
Sonar 005	2636691	449919	Linear Feature	Out of Area
Sonar 015	2638550	444875	Bottom Surface Scatter	Out of Area

Appendix C

Sonar Contact Images

Report Oyster Bayou Sonar Targets
Generated on: 04/08/2013 03:12:42 by SonarWiz.MAP targetReportGen2 V3.15.06

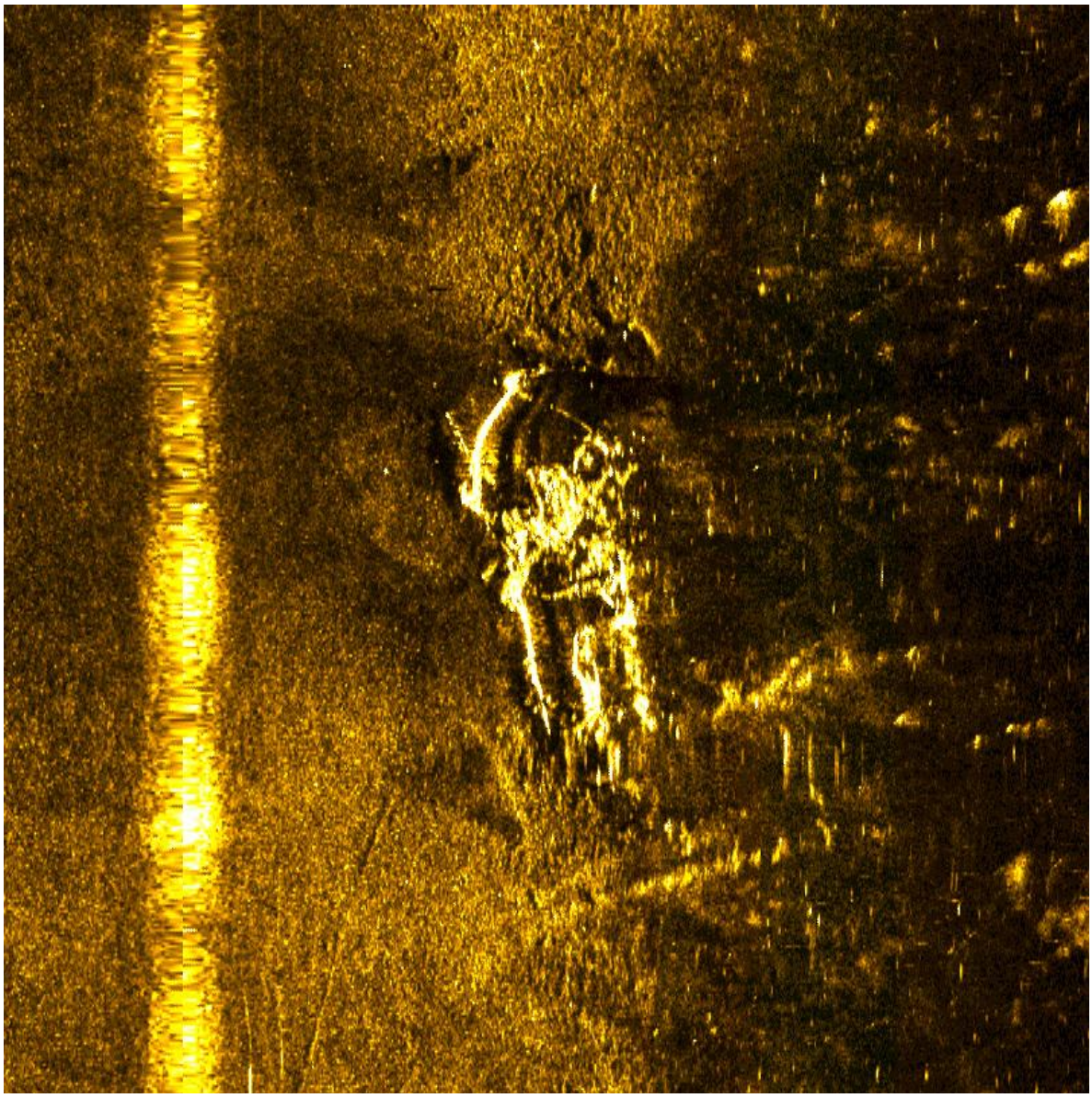


Contact0000

- Sonar Time at Target: 3/4/2013 9:44:32 AM
- Click Position
  29.7183310414 -93.3661586947 (WGS84)
  29.7181060236 -93.3660042102 (NAD27LL)
  29.7183310414 -93.3661586947 (LocalLL)
  (X) 2635595.97 (Y) 448785.51 (Projected Coordinates)
- Map Projection: LA83-SF-MOD
- Acoustic Source File: C:\SonarWiz-Projects\Oyster_Bayou_2013_SSS\JSF\OB_2013_031_N.jsf
- Ping Number: 118328
- Range to target: 21.73
- Fish Height: 3.19
- Heading: 37.500 Degrees
- Event Number: 0
- Line Name: OB_2013_031_N
- Water Depth: 2.68

Dimensions and attributes

- Target Width: 0.00
- Target Height: 0.00
- Target Length: 0.00
- Target Shadow: 0.00
- Mag Anomaly:
- Avoidance Area:
- Classification1:
- Classification2:
- Area:
- Block:
- Description:

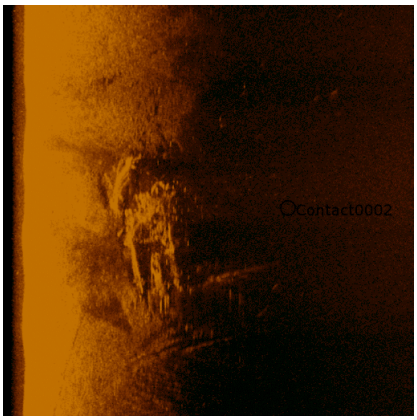
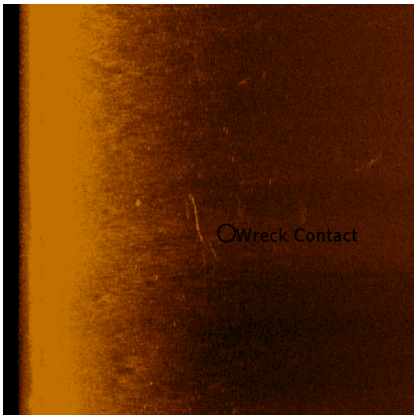
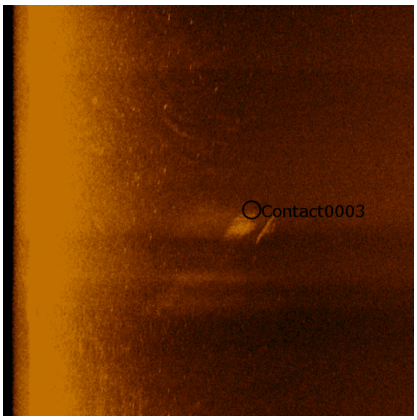


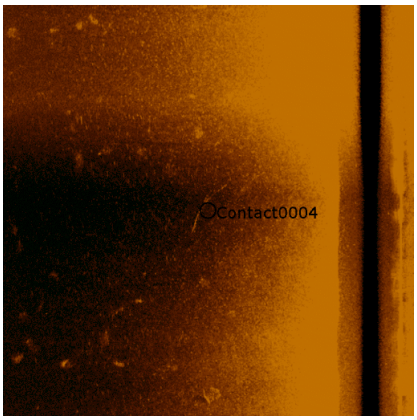
Contact0001

- Sonar Time at Target: 3/7/2013 6:07:51 PM
- Click Position
  29.7183579671 -93.3661670210 (WGS84)
  29.7181329503 -93.3660125368 (NAD27LL)
  29.7183579671 -93.3661670210 (LocalLL)
  (X) 2635593.50 (Y) 448795.35 (Projected Coordinates)
- Map Projection: LA83-SF-MOD
- Acoustic Source File: C:\SonarWiz-Projects\Oyster_Bayou_2013_SSS\JSF\OB_2013_030_S.jsf
- Ping Number: 206102
- Range to target: 16.62
- Fish Height: 2.41
- Heading: 139.190 Degrees
- Event Number: 0
- Line Name: OB_2013_030_S
- Water Depth: 3.41

Dimensions and attributes

- Target Width: 0.00
- Target Height: 0.00
- Target Length: 0.00
- Target Shadow: 0.00
- Mag Anomaly:
- Avoidance Area:
- Classification1:
- Classification2:
- Area:
- Block:
- Description:

Target Image	Target Info	User Entered Info
	**Contact0002** * Sonar Time at Target: 03/07/2013 18:07:50 * Click Position (Lat/Lon Coordinates) 29.7183494568 -93.3663482666 (WGS84) * Click Position (Projected Coordinates) (X) 2635534.75 (Y) 448793.38 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_030_S.jsf * Ping Number: 206087 * Range to Target: 34.54 US Feet * Fish Height: 0.00 US Feet * Heading: 137.890 degrees * Event Number: 0 * Line Name: OB_2013_030_S	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Wreck Contact** * Sonar Time at Target: 03/04/2013 09:44:30 * Click Position (Lat/Lon Coordinates) 29.7182998657 -93.3661117554 (WGS84) * Click Position (Projected Coordinates) (X) 2635611.25 (Y) 448773.94 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_031_N.jsf * Ping Number: 118308 * Range to Target: 24.19 US Feet * Fish Height: 0.00 US Feet * Heading: 33.900 degrees * Event Number: 0 * Line Name: OB_2013_031_N	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0003** * Sonar Time at Target: 03/07/2013 17:54:29 * Click Position (Lat/Lon Coordinates) 29.7133655548 -93.3650436401 (WGS84) * Click Position (Projected Coordinates) (X) 2635919.00 (Y) 446973.41 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_028_N.jsf * Ping Number: 194590 * Range to Target: 30.15 US Feet * Fish Height: 0.00 US Feet * Heading: 36.200 degrees * Event Number: 0 * Line Name: OB_2013_028_N	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:



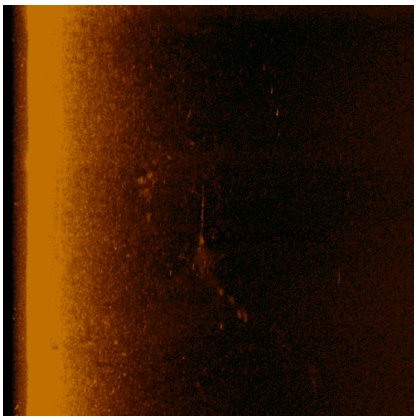
Contact0004

* Sonar Time at Target: 03/07/2013 17:03:57
* Click Position (Lat/Lon Coordinates)
  29.7074184418 -93.3631286621 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2636486.25 (Y) 444800.50
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_022_S.jsf
* Ping Number: 151099
* Range to Target: 19.71 US Feet
* Fish Height: 0.00 US Feet
* Heading: 148.100 degrees
* Event Number: 0
* Line Name: OB_2013_022_S

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



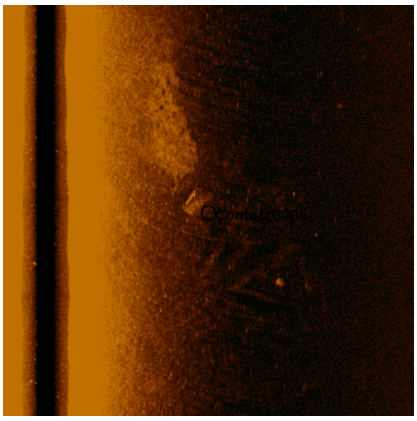
Contact0005

* Sonar Time at Target: 03/07/2013 16:46:31
* Click Position (Lat/Lon Coordinates)
  29.7214946747 -93.3627624512 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2636694.75 (Y) 449916.75
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_020_N.jsf
* Ping Number: 136099
* Range to Target: 25.37 US Feet
* Fish Height: 0.00 US Feet
* Heading: 34.790 degrees
* Event Number: 0
* Line Name: OB_2013_020_N

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



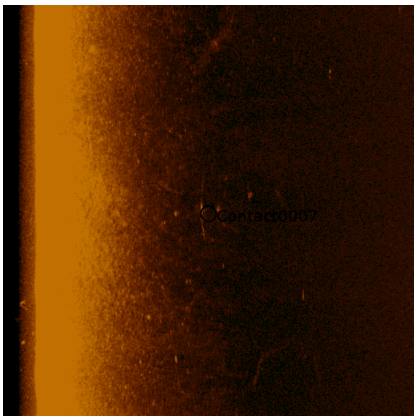
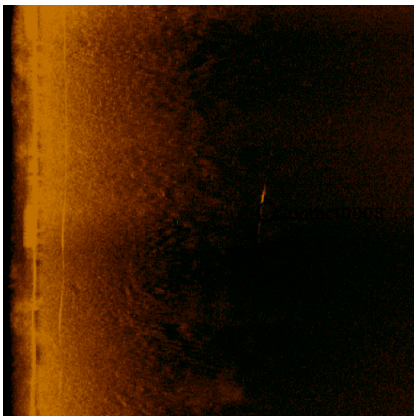
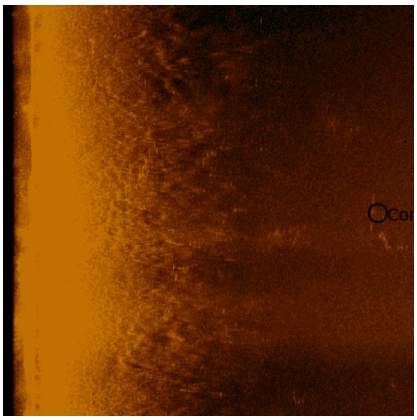
Contact0006

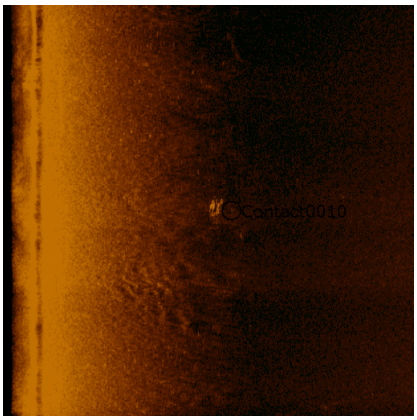
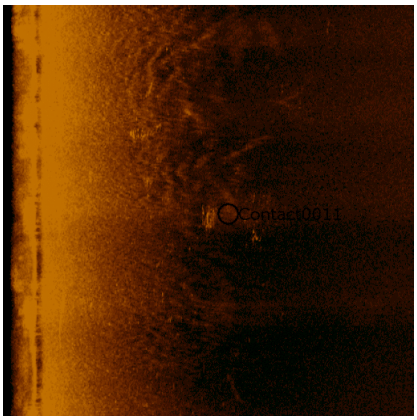
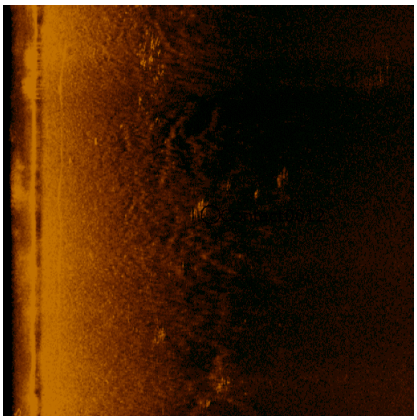
* Sonar Time at Target: 03/07/2013 15:29:42
* Click Position (Lat/Lon Coordinates)
  29.7210102081 -93.3613204956 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2637148.75 (Y) 449732.63
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_014_S.jsf
* Ping Number: 69978
* Range to Target: 19.80 US Feet
* Fish Height: 0.00 US Feet
* Heading: 146.100 degrees
* Event Number: 0
* Line Name: OB_2013_014_S

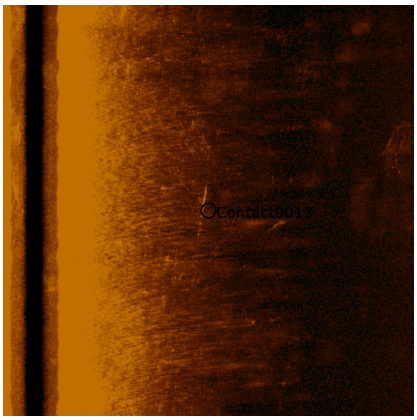
Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:

	**Contact0007** * Sonar Time at Target: 03/07/2013 15:30:19 * Click Position (Lat/Lon Coordinates) 29.7204093933 -93.3613662720 (WGS84) * Click Position (Projected Coordinates) (X) 2637129.25 (Y) 449513.94 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_014_S.jsf * Ping Number: 70509 * Range to Target: 24.10 US Feet * Fish Height: 0.00 US Feet * Heading: 146.390 degrees * Event Number: 0 * Line Name: OB_2013_014_S	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0008** * Sonar Time at Target: 03/03/2013 08:00:46 * Click Position (Lat/Lon Coordinates) 29.7102451324 -93.3584442139 (WGS84) * Click Position (Projected Coordinates) (X) 2637993.00 (Y) 445802.06 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_005_S.jsf * Ping Number: 10853 * Range to Target: 32.00 US Feet * Fish Height: 0.00 US Feet * Heading: 139.690 degrees * Event Number: 0 * Line Name: OB_2013_005_S	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0009** * Sonar Time at Target: 03/03/2013 08:01:11 * Click Position (Lat/Lon Coordinates) 29.7097702026 -93.3585357666 (WGS84) * Click Position (Projected Coordinates) (X) 2637960.50 (Y) 445630.16 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_005_S.jsf * Ping Number: 11222 * Range to Target: 45.46 US Feet * Fish Height: 0.00 US Feet * Heading: 145.800 degrees * Event Number: 0 * Line Name: OB_2013_005_S	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:

	**Contact0010** * Sonar Time at Target: 03/03/2013 08:03:48 * Click Position (Lat/Lon Coordinates) 29.7064971924 -93.3583221436 (WGS84) * Click Position (Projected Coordinates) (X) 2638008.25 (Y) 444439.13 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_005_S.jsf * Ping Number: 13473 * Range to Target: 27.71 US Feet * Fish Height: 0.00 US Feet * Heading: 141.800 degrees * Event Number: 0 * Line Name: OB_2013_005_S	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0011** * Sonar Time at Target: 03/03/2013 08:03:31 * Click Position (Lat/Lon Coordinates) 29.7068729401 -93.3583374023 (WGS84) * Click Position (Projected Coordinates) (X) 2638005.25 (Y) 444575.38 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_005_S.jsf * Ping Number: 13226 * Range to Target: 27.32 US Feet * Fish Height: 0.00 US Feet * Heading: 143.890 degrees * Event Number: 0 * Line Name: OB_2013_005_S	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0012** * Sonar Time at Target: 03/03/2013 08:04:52 * Click Position (Lat/Lon Coordinates) 29.7051258087 -93.3582763672 (WGS84) * Click Position (Projected Coordinates) (X) 2638013.75 (Y) 443940.09 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_005_S.jsf * Ping Number: 14381 * Range to Target: 25.17 US Feet * Fish Height: 0.00 US Feet * Heading: 138.100 degrees * Event Number: 0 * Line Name: OB_2013_005_S	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:



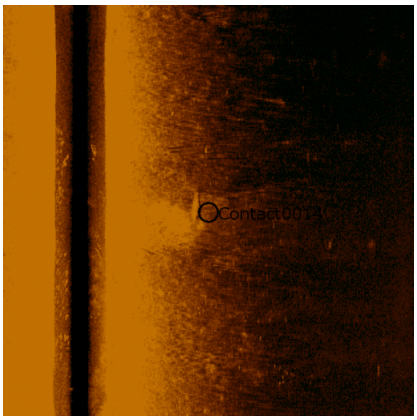
Contact0013

* Sonar Time at Target: 03/03/2013 07:39:49
* Click Position (Lat/Lon Coordinates)
  29.7193641663 -93.3575057983 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2638348.75 (Y) 449112.69
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_003_N.jsf
* Ping Number: 37535
* Range to Target: 21.17 US Feet
* Fish Height: 0.00 US Feet
* Heading: 32.700 degrees
* Event Number: 0
* Line Name: OB_2013_003_N

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



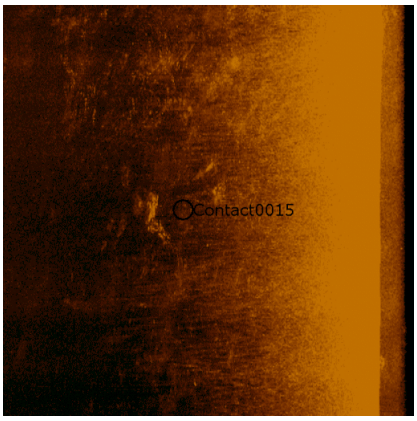
Contact0014

* Sonar Time at Target: 03/03/2013 07:08:46
* Click Position (Lat/Lon Coordinates)
  29.7184085846 -93.3571929932 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2638442.75 (Y) 448763.31
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_001_S.jsf
* Ping Number: 10823
* Range to Target: 15.61 US Feet
* Fish Height: 0.00 US Feet
* Heading: 143.390 degrees
* Event Number: 0
* Line Name: OB_2013_001_S

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



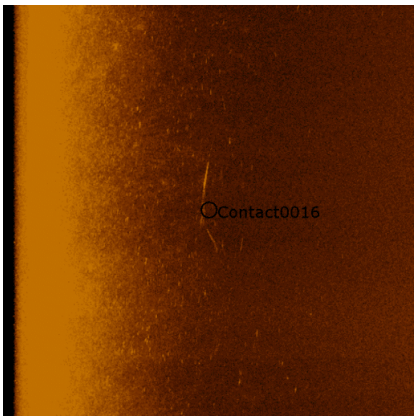
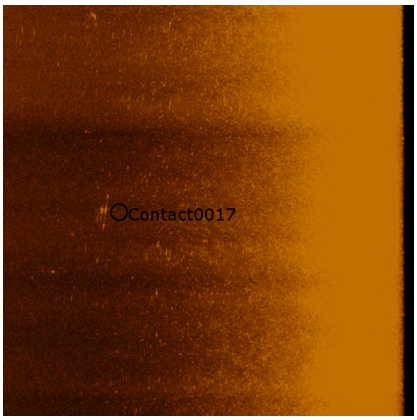
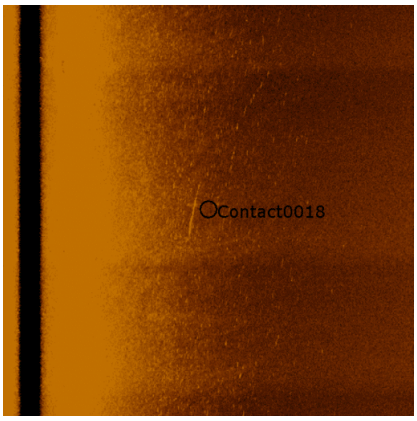
Contact0015

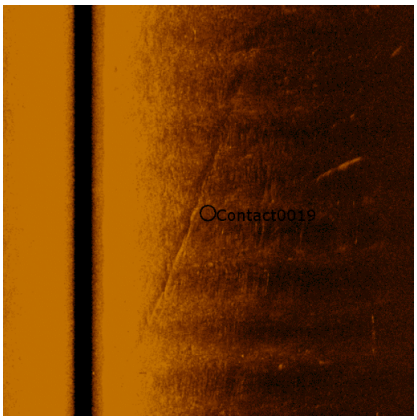
* Sonar Time at Target: 03/03/2013 07:17:20
* Click Position (Lat/Lon Coordinates)
  29.7077045441 -93.3565597534 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2638574.25 (Y) 444868.03
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_001_S.jsf
* Ping Number: 18183
* Range to Target: 28.00 US Feet
* Fish Height: 0.00 US Feet
* Heading: 145.800 degrees
* Event Number: 0
* Line Name: OB_2013_001_S

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:

	**Contact0016** * Sonar Time at Target: 03/07/2013 19:58:10 * Click Position (Lat/Lon Coordinates) 29.7128448486 -93.3688125610 (WGS84) * Click Position (Projected Coordinates) (X) 2634718.25 (Y) 446805.50 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_040_N.jsf * Ping Number: 301055 * Range to Target: 24.88 US Feet * Fish Height: 0.00 US Feet * Heading: 28.200 degrees * Event Number: 0 * Line Name: OB_2013_040_N	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0017** * Sonar Time at Target: 03/07/2013 20:33:50 * Click Position (Lat/Lon Coordinates) 29.7089862823 -93.3705749512 (WGS84) * Click Position (Projected Coordinates) (X) 2634134.25 (Y) 445412.50 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_044_N.jsf * Ping Number: 331750 * Range to Target: 35.80 US Feet * Fish Height: 0.00 US Feet * Heading: 38.500 degrees * Event Number: 0 * Line Name: OB_2013_044_N	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0018** * Sonar Time at Target: 03/07/2013 20:32:34 * Click Position (Lat/Lon Coordinates) 29.7076492310 -93.3699569702 (WGS84) * Click Position (Projected Coordinates) (X) 2634322.25 (Y) 444923.06 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_044_N.jsf * Ping Number: 330667 * Range to Target: 21.66 US Feet * Fish Height: 0.00 US Feet * Heading: 36.290 degrees * Event Number: 0 * Line Name: OB_2013_044_N	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:



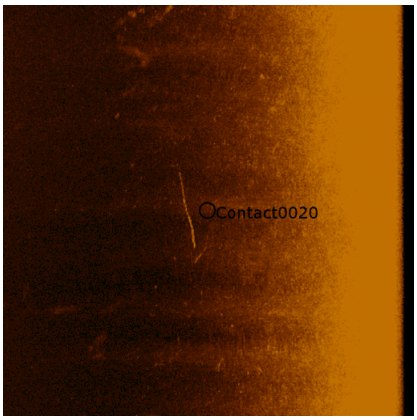
Contact0019

* Sonar Time at Target: 03/08/2013 07:04:59
* Click Position (Lat/Lon Coordinates)
  29.7091712952 -93.3725585938 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2633505.00 (Y) 445491.50
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_052_N.jsf
* Ping Number: 25298
* Range to Target: 15.22 US Feet
* Fish Height: 0.00 US Feet
* Heading: 25.000 degrees
* Event Number: 0
* Line Name: OB_2013_052_N

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



Contact0020

* Sonar Time at Target: 03/08/2013 07:07:57
* Click Position (Lat/Lon Coordinates)
  29.7121276855 -93.3730087280 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2633381.25 (Y) 446568.25
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_052_N.jsf
* Ping Number: 27863
* Range to Target: 24.88 US Feet
* Fish Height: 0.00 US Feet
* Heading: 26.500 degrees
* Event Number: 0
* Line Name: OB_2013_052_N

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:

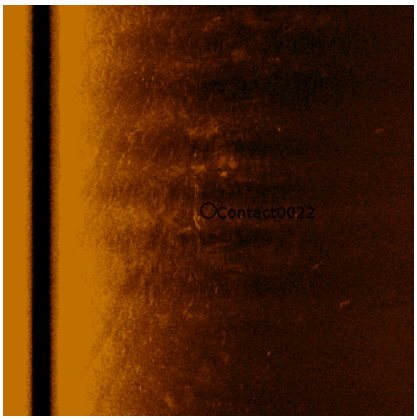
Contact0021

* Sonar Time at Target: 03/08/2013 07:45:17
* Click Position (Lat/Lon Coordinates)
  29.7080764771 -93.3740997314 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2633010.00 (Y) 445101.78
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_056_N.jsf
* Ping Number: 59987
* Range to Target: 15.71 US Feet
* Fish Height: 0.00 US Feet
* Heading: 38.200 degrees
* Event Number: 0
* Line Name: OB_2013_056_N

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



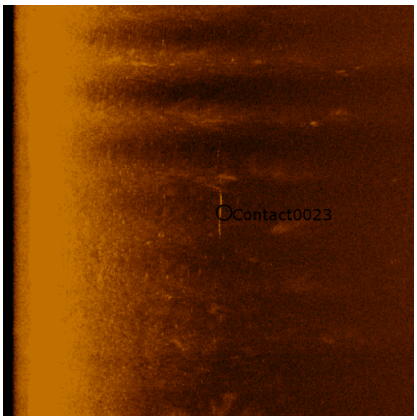
Contact0022

* Sonar Time at Target: 03/08/2013 07:49:41
* Click Position (Lat/Lon Coordinates)
  29.7122612000 -93.3738098145 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2633129.50 (Y) 446621.94
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_056_N.jsf
* Ping Number: 63778
* Range to Target: 20.29 US Feet
* Fish Height: 0.00 US Feet
* Heading: 37.000 degrees
* Event Number: 0
* Line Name: OB_2013_056_N

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



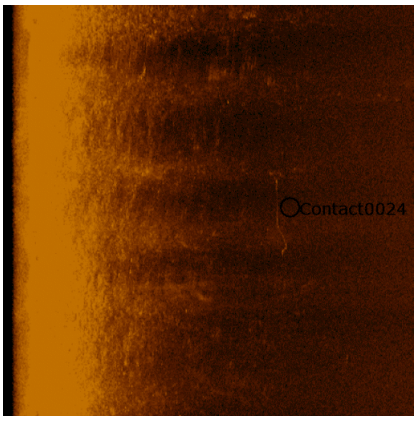
Contact0023

* Sonar Time at Target: 03/08/2013 08:22:30
* Click Position (Lat/Lon Coordinates)
  29.7062034607 -93.3748626709 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2632754.25 (Y) 444425.41
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_060_N.jsf
* Ping Number: 1219
* Range to Target: 26.83 US Feet
* Fish Height: 0.00 US Feet
* Heading: 36.090 degrees
* Event Number: 0
* Line Name: OB_2013_060_N

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



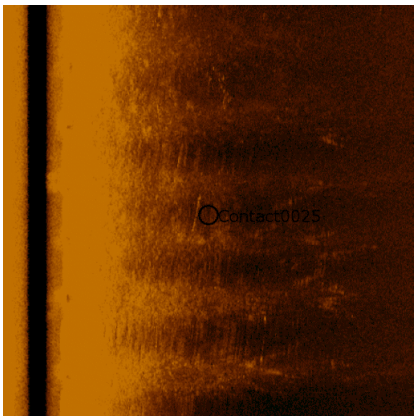
Contact0024

* Sonar Time at Target: 03/08/2013 08:25:31
* Click Position (Lat/Lon Coordinates)
  29.7096366882 -93.3748016357 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2632796.00 (Y) 445673.25
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_060_N.jsf
* Ping Number: 3809
* Range to Target: 34.83 US Feet
* Fish Height: 0.00 US Feet
* Heading: 38.400 degrees
* Event Number: 0
* Line Name: OB_2013_060_N

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



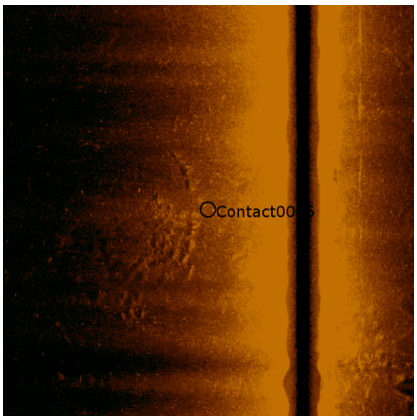
Contact0025

* Sonar Time at Target: 03/08/2013 08:25:50
* Click Position (Lat/Lon Coordinates)
  29.7100181580 -93.3749618530 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2632749.25 (Y) 445812.72
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_060_N.jsf
* Ping Number: 4087
* Range to Target: 20.78 US Feet
* Fish Height: 0.00 US Feet
* Heading: 27.790 degrees
* Event Number: 0
* Line Name: OB_2013_060_N

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



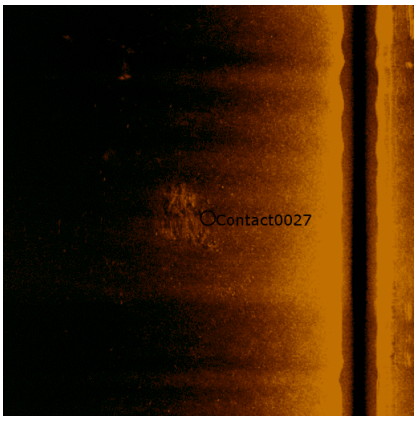
Contact0026

* Sonar Time at Target: 03/08/2013 09:46:47
* Click Position (Lat/Lon Coordinates)
  29.7475109100 -93.4002685547 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2624961.00 (Y) 459588.72
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_PL_103_SE.jsf
* Ping Number: 73743
* Range to Target: 11.51 US Feet
* Fish Height: 0.00 US Feet
* Heading: 120.000 degrees
* Event Number: 0
* Line Name: OB_2013_PL_103_SE

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



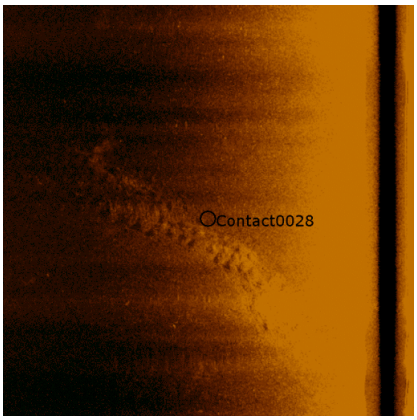
Contact0027

* Sonar Time at Target: 03/08/2013 09:51:05
* Click Position (Lat/Lon Coordinates)
  29.7442169189 -93.3976974487 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2625755.50 (Y) 458376.56
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_PL_103_SE.jsf
* Ping Number: 77447
* Range to Target: 18.34 US Feet
* Fish Height: 0.00 US Feet
* Heading: 129.600 degrees
* Event Number: 0
* Line Name: OB_2013_PL_103_SE

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



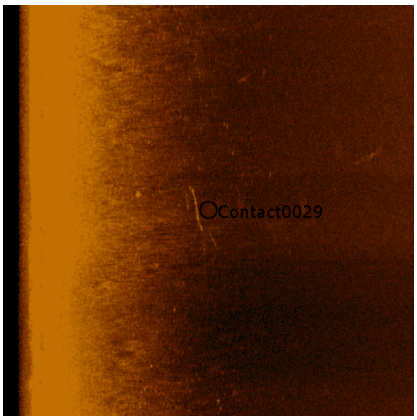
Contact0028

* Sonar Time at Target: 03/08/2013 10:02:36
* Click Position (Lat/Lon Coordinates)
  29.7344169617 -93.3900299072 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2628125.50 (Y) 454769.41
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_PL_103_SE.jsf
* Ping Number: 87368
* Range to Target: 21.76 US Feet
* Fish Height: 0.00 US Feet
* Heading: 115.300 degrees
* Event Number: 0
* Line Name: OB_2013_PL_103_SE

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



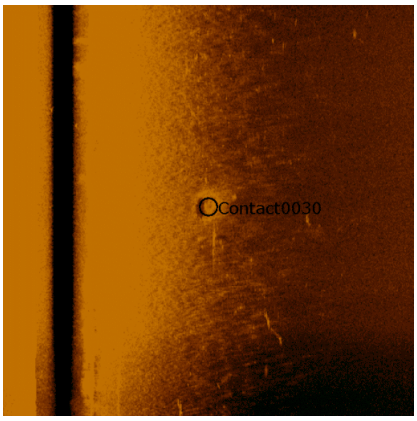
Contact0029

* Sonar Time at Target: 03/02/2013 10:42:12
* Click Position (Lat/Lon Coordinates)
  29.7132892609 -93.3712768555 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2633939.50 (Y) 446981.38
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_TIE_001.001.jsf
* Ping Number: 81726
* Range to Target: 24.19 US Feet
* Fish Height: 0.00 US Feet
* Heading: 257.200 degrees
* Event Number: 0
* Line Name: OB_2013_TIE_001.001

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:



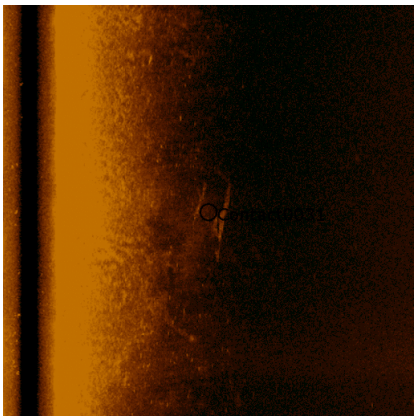
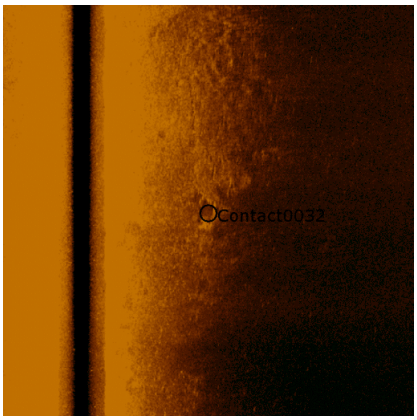
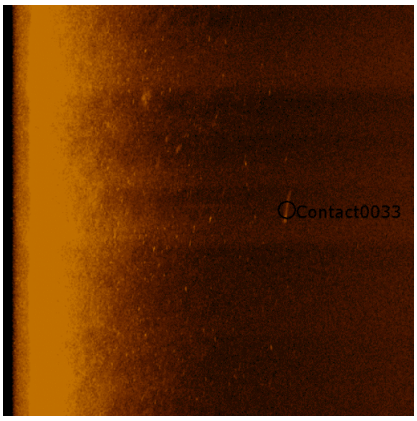
Contact0030

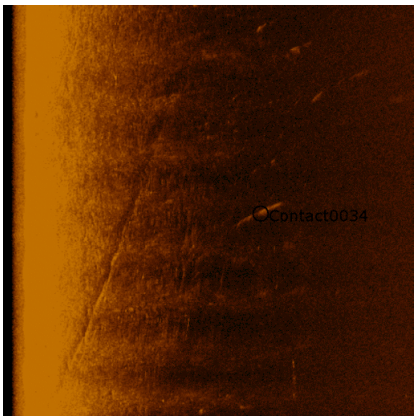
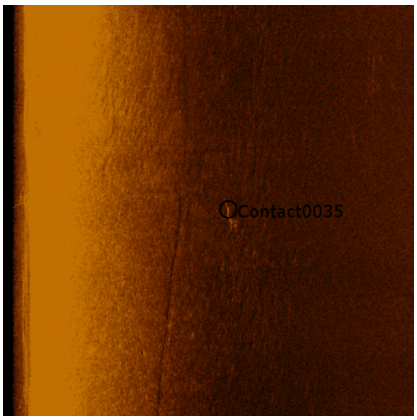
* Sonar Time at Target: 03/02/2013 11:43:44
* Click Position (Lat/Lon Coordinates)
  29.7088985443 -93.3610382080 (WGS84)
* Click Position (Projected Coordinates)
  (X) 2637160.50 (Y) 445326.94
* Map Proj: LA83-SF-MOD
* Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_TIE_003.jsf
* Ping Number: 13623
* Range to Target: 17.66 US Feet
* Fish Height: 0.00 US Feet
* Heading: 297.600 degrees
* Event Number: 0
* Line Name: OB_2013_TIE_003

Dimensions and Attributes

* Target Height: = 0.0 US Feet
* Target Length: 0.0 US Feet
* Target Shadow: 0.0 US Feet
* Target Width: 0.0 US Feet
* Mag Anomaly:
* Avoidance Area:

* Classification 1:
* Classification 2:
* Area:
* Block:
* Description:

	**Contact0031** * Sonar Time at Target: 03/07/2013 16:53:27 * Click Position (Lat/Lon Coordinates) 29.7185096741 -93.3637771606 (WGS84) * Click Position (Projected Coordinates) (X) 2636353.50 (Y) 448836.75 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_022_S.jsf * Ping Number: 142064 * Range to Target: 21.76 US Feet * Fish Height: 0.00 US Feet * Heading: 139.690 degrees * Event Number: 0 * Line Name: OB_2013_022_S	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0032** * Sonar Time at Target: 03/07/2013 19:23:38 * Click Position (Lat/Lon Coordinates) 29.7194728851 -93.3678054810 (WGS84) * Click Position (Projected Coordinates) (X) 2635081.50 (Y) 449210.00 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_036_N.jsf * Ping Number: 271333 * Range to Target: 15.41 US Feet * Fish Height: 0.00 US Feet * Heading: 32.090 degrees * Event Number: 0 * Line Name: OB_2013_036_N	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0033** * Sonar Time at Target: 03/07/2013 20:37:00 * Click Position (Lat/Lon Coordinates) 29.7123985291 -93.3699417114 (WGS84) * Click Position (Projected Coordinates) (X) 2634355.75 (Y) 446649.72 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_044_N.jsf * Ping Number: 334473 * Range to Target: 34.44 US Feet * Fish Height: 0.00 US Feet * Heading: 30.290 degrees * Event Number: 0 * Line Name: OB_2013_044_N	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:

	**Contact0034** * Sonar Time at Target: 03/08/2013 07:04:56 * Click Position (Lat/Lon Coordinates) 29.7091407776 -93.3723907471 (WGS84) * Click Position (Projected Coordinates) (X) 2633558.75 (Y) 445479.19 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_052_N.jsf * Ping Number: 25255 * Range to Target: 31.22 US Feet * Fish Height: 0.00 US Feet * Heading: 23.000 degrees * Event Number: 0 * Line Name: OB_2013_052_N	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0035** * Sonar Time at Target: 03/04/2013 15:27:20 * Click Position (Lat/Lon Coordinates) 29.7105350494 -93.3752746582 (WGS84) * Click Position (Projected Coordinates) (X) 2632652.25 (Y) 446002.38 * Map Proj: LA83-SF-MOD * Acoustic Source File: E:\Oyster Bayou\SSS\OB_2013_061_N.jsf * Ping Number: 250879 * Range to Target: 27.32 US Feet * Fish Height: 0.00 US Feet * Heading: 39.290 degrees * Event Number: 0 * Line Name: OB_2013_061_N	**Dimensions and Attributes** * Target Height: = 0.0 US Feet * Target Length: 0.0 US Feet * Target Shadow: 0.0 US Feet * Target Width: 0.0 US Feet * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description: