# *A CULTURAL RESOURCES SURVEY FOR THE SMITH POINT 3-D SEISMIC PROJECT IN CHAMBERS COUNTY TEXAS*

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# A CULTURAL RESOURCES SURVEY FOR THE

# SMITH POINT 3-D SEISMIC PROJECT IN CHAMBERS COUNTY, TEXAS

Permit Application Number

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BVRA Project Number 06-01

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## ABSTRACT

A cultural resources survey of a portion of the Smith Point 3-D seismic project in Chambers County, Texas was performed by Brazos Valley Research Associates (BVRA) in May and June of 2006. Fifteen source points selected for drilling by Yuma Exploration and Production Company of Houston, Texas in high probability areas were shovel tested. No archaeological sites were found, and no artifacts were collected. Copies of this report are on file at the Texas Historical Commission (THC), United States Army Corps of Engineers, Galveston District (COE), the Texas Archeological Research Laboratory (TARL), BVRA, Dixie Environmental Services Co., Inc. (DESCO), and Frontline Geoservices, Inc. This work was performed under COE application permit number SWG 05-06-012.

## ACKNOWLEDGMENTS

The authors and the staff at DESCO are grateful to the following persons for their assistance. Nicole Minnichbach, archaeologist for the COE, Galveston District; William A. Martin, archaeologist at the THC, Archeology Division; and Steve Hoyt, State Underwater Archeologist for the THC discussed the project with the Principal Investigator prior to the earlier avoidance plan and the current field survey. Other informants include Kevin Ladd, Director of the Wallisville Heritage Park, C. R. Ebersole and Sheldon Kindall, promoters of the Galveston Bay survey discussed in this report, and William Louis Fullen, the Principal Investigator for surveys conducted on Smith Point and Frankland Point. The Project Archaeologist was assisted in the field by Brad LaPoint, John Cox, and George Cozart who also provided project area maps. The file search wsaa perfomed by Jean Hughes, Records Conservator at TARL. Figure 1 was drafted by Lilli G. Lyddon of LL Technical Services, and Jennifer McMillan and Nora Rogers assisted with editing and report production.

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## INTRODUCTION

Yuma Exploration and Production Company, Inc. of Houston, Texas received a permit from the General Land Office (GLO) and the COE, Galveston District for permission to conduct a 3-D Seismic Survey in a 14,000-acre tract in south-central Chambers County, Texas (Figure 1). The permittee for this project is Frontline Geoservices of Katy, Texas. Contact persons are Mark Hartman and Jeff Sleder.

Earlier, an avoidance plan was conducted in order to identify previously recorded archaeological sites and high probability areas (Moore 2006). This plan was submitted to the COE and THC for approval. The client decided that strict avoidance of all high probability areas was not practical. Therefore, DESCO was retained to make arrangements for conducting a cultural resources survey of all source points within high probability areas. No drilling was to occur within any of the known archaeological sites. The current cultural resources survey was initiated in order to fulfill requirements of the National Historic Preservation Act (16 U.S.C. 460), Section 106 with COE permit SWG-05-06-012.

The major portion of the project area is located in Galveston Bay, East Bay, and Trinity Bay; and the inland portion occupies two land masses referred to on the topographic maps as Smith Point and Frankland Point. To the north of Smith Point is Morgan Point, a low marshy area in Galveston Bay separated from the main portion of Smith Point by a man-made channel. There are no major streams or rivers on the mainland of Smith Point. The western portions of Smith Point and Frankland Point are low marshy areas below the five-foot contour interval. Although the inland areas are higher in elevation, they rarely rise above the 10-foot contour interval. Other land masses consist of the Vingt-et-un Islands and several unnamed islands (Figure 1). The project area is depicted on a composite of four USGS 7.5' topographic quadrangles. They are Smith Point (2994-321), Lake Stephenson (2994-312), Oak Island (2994-313), and Umbrella Point (2994-324). Figure 2 depicts the project area on topographic quadrangles Smith Point and Lake Stephenson.

The purpose of the seismic survey was to provide a high-resolution image of subsurface geological features that will allow the client to effectively evaluate the hydrocarbon reserves underlying the project area. The client plans used a high velocity energy source consisting of Pentalite with a charge size of 5.5 pounds. The depth of the charges in the bays was 60 feet below mud line, and the depth of the charges on land was 60 feet below the existing land surface. All shot holes were four inches in diameter. The distance between shots was 310 feet, the distance between shot lines will be 1240 feet, and the distance between receiver lines was 1760 feet.

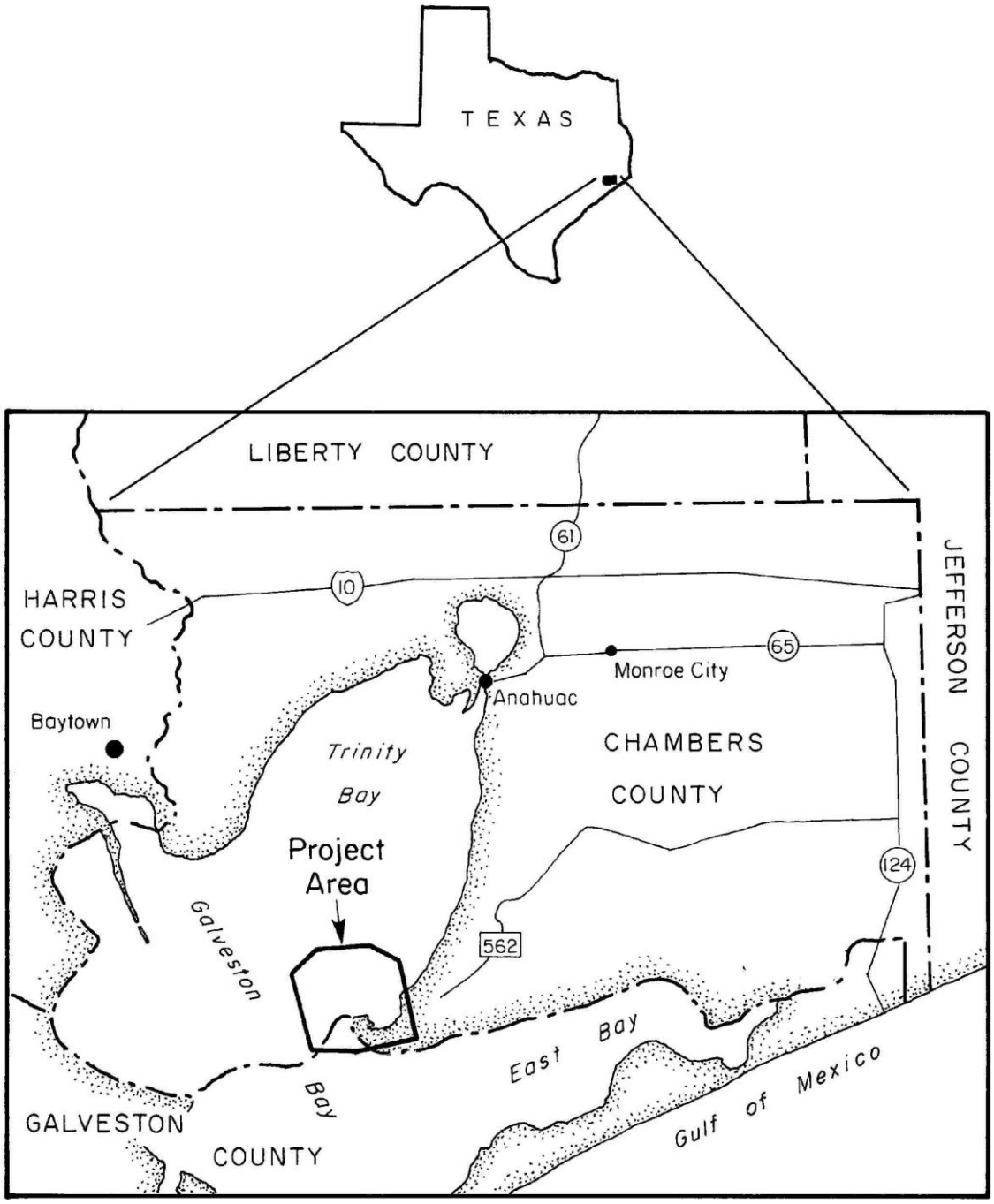


Figure 1. General Location Map

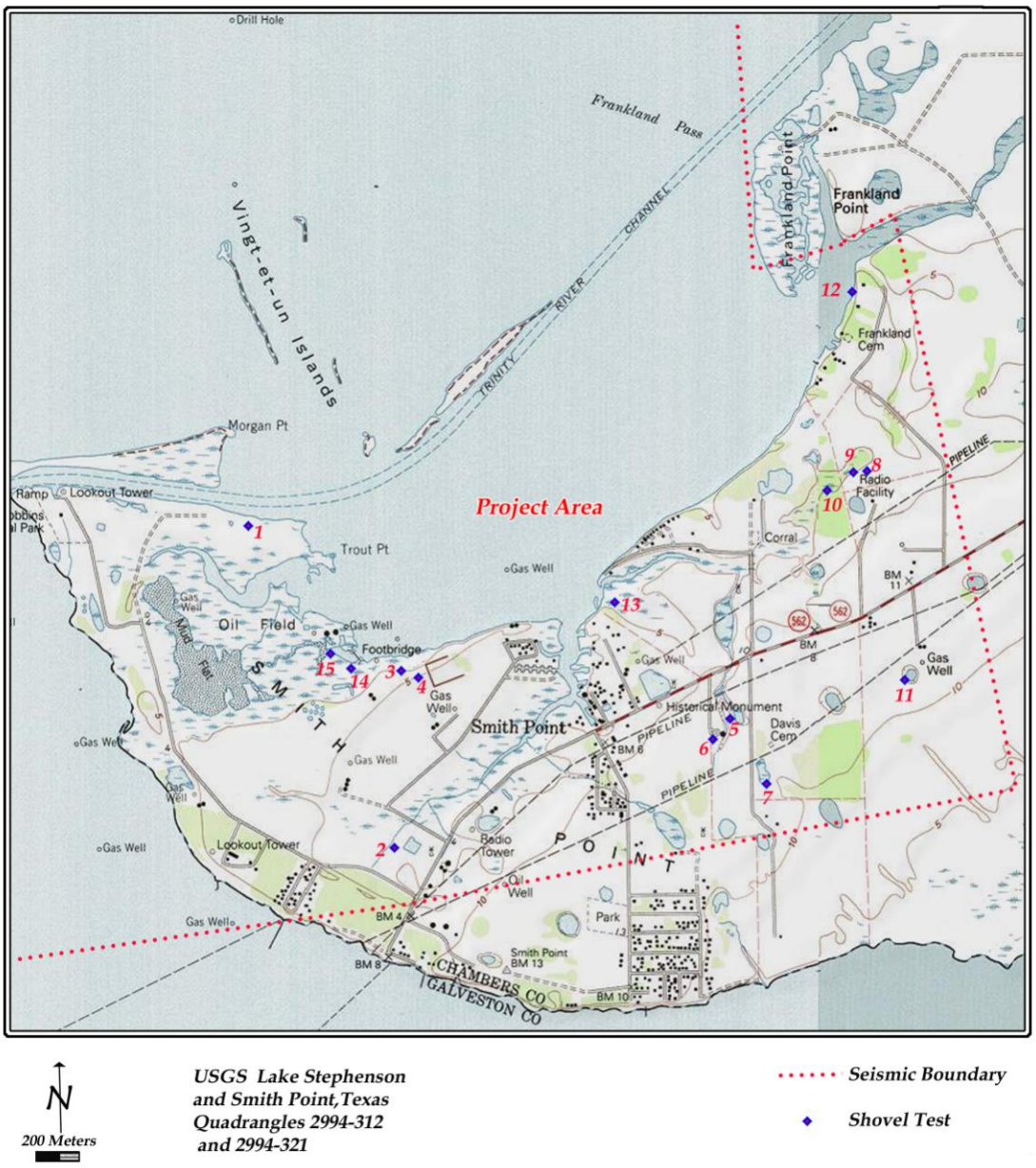


Figure 2. Project Area on Topographic Map

On land, the point spacing was 220 feet. No air guns were used in the bays. In the bays, the equipment used consisted of airboats, airboat drills, flat boats, and pontoon drills. On land, the equipment used consisted of buggy drills with cane tires and all terrain vehicles. Airboats and airboat drills were used in marsh areas.

More detailed information regarding the methodology, sequence of work, and equipment is provided in Appendix I (*Description of Seismic Operations: Transition Zone, Methodology, Sequence of Work, and Equipment).*

DESCO was retained by Frontline Geoservices to work with a professional archaeologist to identify any cultural resources that may be present in the area of the fifteen relocated source points prior to drilling. In order to fulfill this requirement, DESCO hired BVRA, a private archaeological consulting firm, to act as a subcontractor to perform this service. William E. Moore is the owner of BVRA and primary investigator for this project. Edward P. Baxter was the Project Archaeologist, and he supervised the field survey.

## ENVIRONMENTAL SETTING

### General

Chambers County is located in the extreme southeastern part of Texas. It is bordered on the south by Trinity Bay, Galveston Bay, East Bay, and the Gulf of Mexico. Jefferson County is on the east, Liberty County is on the north, and Harris County is on the west. Chambers County covers a total area of 560,000 acres; of which 381,517 acres is land and 178,483 acres is water. The area is a nearly level, featureless plain that has very little dissection, although the Trinity River and several bayous have shallow channels and furnish some drainage.

### Project Area

The project area is located at the southern tip of the county and is surrounded by East Bay. Soils at Smith Point belong to the Stowell-Clodine association. These are acid and alkaline sandy and loamy soils. According to the soil survey for Chambers County (Crout 1976:6), this association is slightly above sea level and has few natural drainage ways. Stowell soils are found on sandy ridges about 2 to 10 feet above sea level, and Clodine soils are located in depressions about 1 to 3 feet above sea level. Specific soil types on Smith Point are Clodine sandy clay loam (Cd), Harris clay (Ha), Ijam soils (Im), and Veston soils (Ve).

Smith Point is a low-lying area with little relief above the surrounding bay. Figure 3 depicts the highest elevations or uplands, and Figure 4 depicts the lower elevations.

Figure 3. View of Project Area Lowlands

Figure 4. View of Project Area Uplands

## ARCHAEOLOGICAL BACKGROUND

The project area is located in the Southeast Texas Cultural-geographical region as defined by Biesaart et al. (1985:Figure 15) and the Southeast Texas Archeological Study Region as defined by Kenmotsu and Perttula (1993:Figure 1.1.2). In 1985, this region contained 1630 known archaeological sites – 8.06% of the state. At that time, there were 240 recorded sites in Chambers County – the second highest number of sites in the region behind Harris County with 300 known sites. According to Biesaart et al. (1985:119-120), the majority of the sites recorded in 1985 were Late Prehistoric (n=177). One site was known to be Late Archaic, and 34 sites were simply described as General Archaic. No sites dating to the Paleo-Indian period had been documented in the county. Today, there are at least 375 sites in Chambers County. The majority of these sites have been recorded as a result of development projects (residential and commercial) and oil and gas production. The Houston Archeological Society (HAS) has played an active role in the area as well. The significance of the area is reflected in the number of sites listed in the National Register of Historic Places (n=13) and designated as a State Archeological Landmark (n=3). Site disturbance is a major problem in this part of Texas with 156 sites affected by erosion disturbance and 100 sites affected by construction. In 1985, 40 sites had been vandalized, and 14 sites were listed as destroyed.

## RESULTS OF ARCHIVAL RESEARCH

The background search revealed several archaeological surveys have been conducted in the project area and vicinity. These investigations were performed by the COE, Galveston District, HAS members, archaeological firms, and the Chambers County Heritage Society. Within the project area there are 10 recorded prehistoric shell middens, 1 recorded prehistoric site (type unknown), 1 historic 20th century shipwreck, 1 historical monument, and 5 cemeteries. Table 1 provides information for the recorded archaeological sites. The cemeteries, shipwreck, and historical monument are discussed in detail below.

### Archaeological Surveys

In the 1950s, Richard B. Worthington and Wayne B. Neyland, HAS members, visited Smith Point. They documented shell middens, collected artifacts, took notes, and reported their findings to TARL. Worthington and Neyland visited three of the sites in the current project area. These are 41CH2, 41CH147, and 41CH149. It is not known if they examined the entire shoreline of Smith Point.

41CH2 is the first site at Smith Point to receive a trinomial. This was done following a revisit by E. Raymond Ring in 1960. According to the site card, only a few "water worn" sherds were visible by Ring, and the site had largely eroded into the bay. No site form or formal report is on file at TARL.

According to the site card for 41CH147, a trinomial was issued based on its plotting on the topographic map by Wayne B. Neyland in 1957. There is no original site form. The site card and revisit form by C. R. Ebersole are very incomplete. No formal report is on file at TARL. There is a collection of artifacts from this site at TARL.

41CH149 received a trinomial based on its plotting on the topographic map by Wayne B. Neyland in 1958. The original site form and site revisit form by C. R. Ebersole are very incomplete. No formal report is on file at TARL.

In 1979, Jack C. Hudson (1979) conducted a literature search in association with an archaeological survey in Galveston County. In his report he mentions the current status of sites 41CH147 and 41CH149. Regarding site 41CH147, he describes it as an area consisting of "shell and human bone scattered over an area about one mile in length" (Hudson 1979:M-31). He states that its current condition is "unreported." Regarding site 41CH149, he describes it as a site on Smith Point containing potsherds. He states that its current condition is "unreported." Hudson did not visit these sites in person.

Table 1 Archaeological Sites in the Project Area

| Site | Age* | Type | Size ($m^2$) | Potential** | Reference |
|---|---|---|---|---|---|
| 41CH2 | P | unknown | unknown | unknown | Hudson 1979 |
| 41CH147 | P | shell midden | unknown | unknown | Fullen, et al. 1992 |
| 41CH149 | P | shell midden | 150 | unknown | Fullen et al. 1992 |
| 41CH276 | H | shipwreck | 96 | SAL | Fullen 1987 |
| 41CH277 | P | shell midden | 720 | SAL | Fullen 1987 |
| 41CH279 | P | shell midden | 6000 | SAL/NRHP | TARL site form |
| 41CH340 | P | shell midden | 1750 | none | TARL site form |
| 41CH341 | P | shell midden | 2875 | none | TARL site form |
| 41CH342 | P | shell midden | 5000 | none | TARL site form |
| 41CH343 | P | shell midden | 1875 | none | TARL site form |
| 41CH344 | P | shell midden | 1000 | none | TARL site form |
| 41CH345 | P | shell midden | 1250 | none | TARL site form |

*P = Prehistoric
*H = Historic
**SAL - State Archeological Landmark
**NRHP - National Register of Historic Places

In 1983, William Louis Fullen of Texas Heritage Services and members of the Chambers County Heritage Society surveyed 325 meters along the southern shoreline of Smith Point in an attempt to identify and assess archaeological sites in the area (Fullen et al. 1992). Prior to the field survey, a literature search, study of the available remote sensing data for the project area, and interviews with local citizens familiar with the history of the area were performed. The historic research was conducted by Jean Epperson and Kevin Ladd. Following these tasks, a formal archaeological survey was conducted.

The area examined is defined by Fullen et al. (1992:8) as "the beach area from the high tide mark to the water's edge beginning at the west fence of the Abshier Camp and extending along the beach 325 meters to the west as shown on Figure 2" (Figure 5). The area surveyed is not plotted on the topographic map at TARL or at the THC.

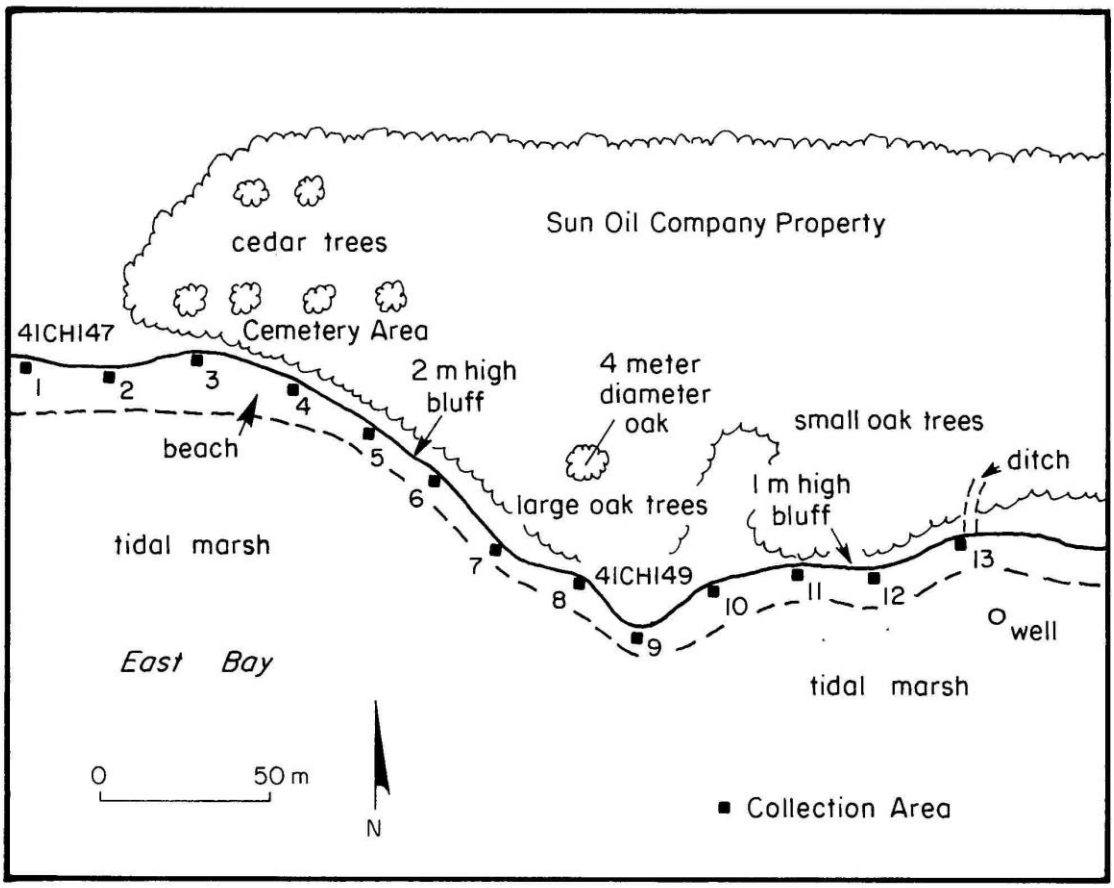


Figure 5. Area Surveyed by William Louis Fullen in 1983
(Reproduced with permission of Texas Heritage Services)

The survey crew was aware of the presence of previously recorded prehistoric sites 41CH147 and 41CH149 and that a historic homestead and family cemetery were in the area. In order to identify areas of high artifact concentrations, a controlled surface collection was made in 13 areas along the beach (Figure 2). Artifacts belonging to the Smith family homestead were found on the beach during the 1983 visit, but the exact location of the site was believed to be under the waters of East Bay. Since the crew was not able to delineate the boundaries of this site, a TARL number was not assigned.

In 1984, members of the Chambers County Heritage Society returned to the area and collected more artifacts and located the wooden remnant of a well that was in the tidal marsh on the east end of the project area. The extensive collection of artifacts found on the beach by the Abshier family was given to Mr. Fulllen who turned over all of the artifacts from this project to the Wallisville Heritage Park for curation. According to Kevin Ladd (personal communication to William E. Moore on March 7, 2006), these artifacts are still at this facility.

The distribution of pre-1836 ceramics and post-1836 ceramics and the distribution of certain glass artifacts indicate that the Smith home site was in the vicinity of collection areas 6 through 13 (Figure 5). According to Fullen et al. (1992:81), “it is probable that significant historical cultural resources remain in the higher ground adjacent to these areas.” Although portions of the small family cemetery were still intact when visited by Fullen, some of the graves had already been removed to another location in Anahuac**.**

During the survey by Fullen, the remnants of two previously recorded prehistoric shell middens (41CH147 and 41CH149) were located and assessed. It was determined that very little remained of site 41CH147 due to erosion, and this site was described as being too disturbed to warrant further work. Site 41CH149, however, was found to be only partially disturbed. Fullen states that it is possible that significant portions of this site remain in the higher ground adjacent to collection areas 7-9 (Figure 5). He also believes this site may be eligible for listing in the National Register of Historic Places or for designation as a State Archeological Landmark.

Between 1980 and 1984, William Louis Fullen visited the north shore of Smith Point during his informal Smith Point Archaeological Survey for the Wallisville Heritage Park. During this time, he recorded 41CH279, a very large shell midden that was eroding into the cove.

In 1986, William Louis Fullen (1987) of Texas Heritage Services conducted a cultural resources survey prior to construction of the Marina del Oro by a private developer. During this study he conducted a 100% Pedestrian Survey of Frankland Point which included the shoreline and inland areas. Although he found no sites on the shore at Frankland Point, he believes that there may be some buried cultural materials due to recent deposition (personal communication from William Louis Fullen to William E. Moore on March 7, 2006).

This study recorded two sites, 41CH276 and 41CH277. Site 41CH276 is the remains of the *Queen,* a historic shipwreck in Frankland Pass (see discussion above). Site 41CH277 is a *Rangia* shell midden that produced one flake and four ceramic sherds. The site was examined through shovel testing and water screening. The environmental setting is described as a bench on an upland terrace adjacent to a salt marsh. The soils are clay loam and sand on top of Pleistocene clay. This site was found to be intact, and it was recommended that this site be designated as a State Archeological Landmark.

In the 1990s, an informal survey of Galveston Bay and vicinity was conducted by members of HAS led by C. R. Ebersole. The survey crew examined the shore in a boat and stopped at all areas where shell middens or cultural materials were visible. Each site location was plotted on a topographic map, and a site form was completed and submitted to TARL. Some of these forms contain only minimal data and were not useful in the writing of this report.

No shovel testing was performed, and no report was written. Artifacts collected are curated at the Wallisville Heritage Park Museum in Wallisville, Texas. Within the project area, eight, shell middens were recorded along the shoreline of Smith Point. They are 41CH279, 41CH340, 41CH341, 41CH342, 41CH343, 41CH344, 41CH345, and 41CH346. Many of these sites were disturbed due to dredging and erosion. Some of the sites recorded by Ebersole had been visited by HAS members earlier.

Investigations by archaeologists from the COE Galveston District are depicted on the topographic maps for Smith Point and Lake Stephenson. Not one of these surveys located archaeological sites. At the time of this writing, no information was available regarding these surveys except the map plotting and COE project number. Six COE surveys were conducted on the mainland of Smith Point. Four have COE project numbers (16220, 17661, 17708, and 17_23), and two are identified only by date (1979 and 1987). In Galveston Bay, there are four areas depicted with COE numbers. These are 17289, 17437, 17459, and ST 135.

Several major studies have been carried out that are especially relevant to this project. They are the Wallisville Lake salvage project that was started by Harry J. Shafer (1966) and J. Richard Ambler (1967) and continued by other archaeologists such as Kathleen Gilmore (1974) and Lawrence Aten's (1983) monumental work linking geomorphological and historical information to the interpretation of shell midden archaeology.

## Historical Markers and Monuments

In 1979, a monument was erected in memory of Sarah Ridge Pachal Pix, a Cherokee Indian who moved to Smith Point circa 1820. She died in 1891 and is buried in McNeir Cemetery. In the spring of 2006 a ceremony will be held to dedicate a marker for the McNeir Cemetery.

## Cemeteries

### Davis Cemetery

This is a local family cemetery where the bodies of the Andy Davis family are buried. An iron fence currently encloses it, but no headstones are present. The THC historic cemetery number is CH-C087.

### Frankland Cemetery

This is a local family cemetery where the bodies of the Charles Frankland family are buried. An iron fence currently encloses it. There are approximately eight graves present (personal communication from Joe Whitehead to William E. Moore on March 7, 2006). The THC historic cemetery number is CH-001.

### Heiman Cemetery

This is a small family cemetery where the members of the Henry Heiman family were buried. According to a local informant, (Candy Abshier), the remains of the Heiman family were moved to the Anahuac Cemetery. She said that the only graves left behind were those of paupers and persons not related to the Heiman family (Fullen et al. 1992).

In 1952, when the Abshiers bought the property, most of the graves had washed into the bay. According to Ann Abshier, the cemetery is now completely in the bay and artifacts from the burials are occasionally found on the shore (personal communication from Ann Abshier to William E. Moore on March 7, 2006). The Heiman Cemetery is also referred to as the Altman Cemetery, since Fanny Heiman (a daughter of Henry Heiman) married Theodore Altman.

The cemetery is not on the THC list of historic cemeteries. Its approximate location is depicted in a sketch map prepared by Fullen during his visit to the area in the 1960s (Figure 5). A field assessment by Fullen et al. (1992) indicated the family homestead was to the east of the cemetery. Fullen believes that the cemetery was probably established at a later date (personal communication from William Louis Fullen to William E. Moore on March 8, 2006).

### McNeir Cemetery

This is a small family cemetery where the bodies of the William McNeir family are buried. According to Joe Whitehead, there are approximately eight graves present (personal communication from Joe Whitehead to William E. Moore on March 7, 2006). The THC has been designated it as a State Historic Cemetery. The THC historic cemetery number is CH-C005.

### Robbins Cemetery

This small family cemetery was originally located in a pasture overlooking Trinity Bay. According to Bob Wheat and Joe Whitehead (personal communication to William E. Moore on March 7, 2006) it washed away as a result of storms such as Hurricane Carla in 1961. It is not on the THC list of historic cemeteries. This is where the Asa W. Robbins family is buried.

## Shipwrecks

Site 41CH276 is the remains of the *Queen*, a historic shipwreck in Frankland Pass. It was built in the 1880s and sank in the 1915 storm. It was originally a 20-ton vessel (sail and engine) that had been stripped of engine and superstructure and was being used as a shell barge. The study by Fullen (1987) found the hull to be intact. It was recommended that the wreck be avoided during construction of the marina. According to the records at TARL regarding the *Queen* is listed as Shipwreck Number 1159 and Shipwreck Number 2176. Shipwreck Number 1159 is located just to the north of 41CH279. Since site 41CH276 and 41CH279 are incorrectly plotted on the TARL maps, BVRA believes there is no other recorded shipwreck in the area of Shipwreck Number 1159.

## Historic Home Sites

John M. Smith established his home site at Smith Point in the latter part of 1832 or early 1833. According to the 1834 census of the Anahuac Precinct, John Smith resided with his wife, a large household of children and relatives, and 28 slaves. The Smith family abandoned the home site in 1836 when Mr. Smith fled to Louisiana because his son (William M. Smith) killed his son-in-law, Moses Alfred Caroll (Epperson 1995). John Smith and his son William were indicted for murder so he left the area.

The site probably remained uninhabited until 1850 when the John Hampshire family moved to Smith Point and purchased the property or even later when Henry Heiman bought the property from the Hampshires. Apparently, the Heiman family occupied the site until the death of Henry Heiman in 1919.

## Historic Settlements

The town of Smith Point overlooks East Bay and Trinity Bay on Farm-to-Market-Road 562 twenty miles from Galveston in southern Chambers County. Spanish troops landed there enroute to reinforcing the troubled settlement at *Atascosito* in 1805. It is believed that the area was named for John Smith who signed a petition in 1827 protesting Mexico's failure to grant title to land claimants in the *Atascocito* district. The Smith Point post office was established in 1876. Water transportation remained the chief mode of travel for Smith Point settlers until the advent of the automobile. About 50 residents lived at Smith Point during the 1930s. Fishing and ranching provided the chief means of support for local inhabitants until 1944 when oil was discovered.

Numerous offshore and onshore oil and gas wells have been brought in since that time, and the oil and gas industry remains active today. Several gas wells and pipelines are depicted on the topographic map Smith Point. The post office at Smith Point was discontinued in 1943; however the area continued to be inhabited, mainly by seasonal residents and small fishing firms. In 1990, the population was 150. The above information was taken from The Handbook of Texas Online.

A United States Coast Survey of Smith Point dated 1851 shows no settlements or roads. Two cleared areas are believed to represent early homesteads, and the one near the south shore may be the site of the former residence of John M. Smith. A photocopy of this figure appears in the report by Fullen et al. (1992:31) as Figure 4.

## Sites Listed in the National Register of Historic Places

No sites listed in the National Register of Historic Places are present in the project area. However, some of the known sites may be eligible for listing.

## State Archeological Landmarks

At least two sites (41CH149 and 41CH276) may be eligible for designation as a State Archeological Landmark.

## METHODS

### Pre-Field Methods

As part of the avoidance data for the Smith Point 3-D Seismic Survey, the Principal Investigator visited TARL on the campus of The University of Texas at Austin and the map room at the THC, Archeology Division. At TARL, all relevant topographic maps were checked for the presence of previously recorded prehistoric and historic sites and areas surveyed. The topographic maps on file at the THC were also checked for data that may not be present on the maps at TARL. Mr. Moore also conducted a search of the Texas Historic Sites Atlas. This is a restricted online program that contains site data for the entire state.

Mr. Moore discussed this project with Nicole Minnichbach, archaeologist for the COE, Galveston District; William A. Martin, archaeologist at the THC, Archeology Division, Steve Hoyt, State Underwater Archeologist for the THC; Jean Hughes, Records Conservator at TARL; Kevin Ladd, Director of the Wallisville Heritage Park; C. R. Ebersole and Sheldon Kindall, promoters of the Galveston Bay Survey; and William Louis Fullen, the Principal Investigator of cultural resources surveys on Smith Point and Frankland Point. Local informants interviewed include several members of the Chambers County Historical Commission: Bob Wheat (President); Jean Epperson, Ben Nelson. Residents of Smith Point contacted include Ann Abshier, and Joe Whitehead.

### Field Methods

The field survey was conducted by the Project Archaeologist during the months of May and June 2006. Mr. Baxter visited 15 source points and excavated a minimum of one shovel test at each point. All excavated earth was passed through ¼ inch hardware cloth, and notes documenting the tests were kept on a shovel test log (Appendix I). Figure 6 depicts the approximate location of each test. The survey was documented through field notes and photos taken with a digital camera. Locational data was obtained using a hand-held GPS.

## RESULTS AND CONCLUSIONS

The archaeological survey of a portion of the Smith Point 3-D seismic survey area was negative in terms of locating prehistoric and historic sites that will be affected by the drillers. Although some source points were located in areas that seemed to be likely settings for archaeological sites, not one site was found. Based on past work at Smith Point, the majority of prehistoric sites are located along the shore, and many have been significantly affected by erosion and wave action. Historic sites can be found inland as well as near the shore. Prehistoric sites in this area were often occupied seasonally when oyster shells were available.

The areas most likely to contain significant prehistoric sites are the shorelines along the mainland where Indians gathered to collect and eat *Rangia* shell and the inland bays where they consumed the brackish water clams. As they discarded the used shells, large middens accumulated. This was a seasonal practice, and they camped on or near the shell heaps until they moved to other areas. Evidence for campsites consists of pottery, animal bone, flakes, and flint tools such as arrow points. Since the prehistoric Indians probably traversed the entire area now known as Smith Point, any elevated landform above water is likely to contain evidence of their presence.

The designation of the above-mentioned areas as likely settings for archaeological sites is based on past surveys in similar terrain in Chambers County and vicinity. The shoreline along Smith Point, for example, contains several large shell middens recorded during the Galveston Bay Survey by HAS member C. R. Ebersole and others. Since the entire shoreline was not examined through shovel testing, it is possible that sites were missed. Shell middens along the coastal shorelines of Texas and other states bordering the Gulf of Mexico are a common occurrence. A recent survey by archaeologists from Prewitt and Associates (Gadus and Moss 2001), for example, documented shell middens along the Gulf Intracoastal Waterway from High Island to the Brazos River Diversion Channel in Brazoria, Chambers, and Galveston counties. Although no prehistoric sites are recorded on the inland portion of Smith Point, the possibility of their presence cannot be discounted since professional archaeologists have not systematically examined this area. A review of the site records at TARL revealed the presence of archaeological sites along the margins of inland lakes in Chambers County just to the east of the project area.

Historic accounts of Indian activity in the area suggest that the area was intensively utilized during different seasons of the year. Explorers such as *Cabeza de Vaca* observed the local Indians moving about the area where they subsisted on various foods and animals that were available at that time. He noted that in the winter they inhabited an island (possibly Galveston Island) where they ate roots and fish and slept on mats on shells with a few skins for cover. In the spring they returned to the mainland or seashore where they collected berries and oysters. In the summer they moved back to the island where they ate wild potatoes along with a few buffalo and deer (Gilmore 1974:Table 1). Although there is no large island in the project area that approaches the size of Galveston Island, the practice of moving based on seasonal availability of certain resources must be considered for the Smith Point area as well. Certainly, the Indians who lived in the Smith Point area had seasonal and/or permanent camps throughout the project area.

Joe Whitehead is a resident of Smith Point who has identified most of the prehistoric sites in the area. He believes that most of the large campsites on the point have been largely destroyed due to erosion and construction. His grandfather's house once was located on top of a midden that was virtually destroyed by the storm of 1875. Very little remains of that site today. Although artifacts are still found in some of the shell middens, these once extensive sites have all but disappeared into the waters of the surrounding bays. He states that very little of the known sites extend very far inland (personal communication from Joe Whitehead to William E. Moore on March 7, 2006).

## RECOMMENDATIONS

The project has been completed, and no evidence of an archaeological site was found at any of the 15 source points. Therefore, no recommendations are necessary.

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# APPENDIX I

## DESCRIPTION OF SEISMIC OPERATIONS, TRANSITION ZONE, METHODOLOGY, SEQUENCE OF WORK, AND EQUIPMENT

# DESCRIPTION OF SEISMIC OPERATIONS

## Transition Zone

Methodology, Sequence of Work, and Equipment

The general technique of this type of geophysical exploration is referred to as the seismic reflection method. This method utilizes an energy source, which sends acoustic energy into the earth. This energy is reflected from subsurface layers and recorded at the surface with an instrument used to transform seismic energy into electrical impulses (geophones; aka receivers). A "source" line is a series of shot-hole (or shot point) locations positioned in a directional line. A "receiver" line is a series of geophone locations positioned in a directional line. The source lines combined with the receiver lines compose a grid upon the earth's surface. Computers process the collected data to create an image of the subsurface geology. The shot-hole method generates seismic waves created by the detonation of explosive charges placed 60-100 feet below the surface. The seismic waves are recorded by geophones placed at the surface, which transfer the data electronically via cable or a wireless method to a recording instrument which stores the data to media. The data is then processed for interpretation.

There are five phases of field operations associated with a geophysical 3-D seismic survey located within a coastal zone (transition zone) environment:

Phase 1: Planning and Permitting
Phase 2: Surveying
Phase 3: Drilling
Phase 4: Recording
Phase 5: Clean-up and Reclamation

An explanation of the activities associated with each of the above phases follows.

**Phase 1: Planning and Permitting**

The initial phase includes typical planning tasks associated with developing the program such as Title research, Ownership verification, Acquiring oil & gas leases, Lease options, Regulatory permits and Permitted access for geophysical operations on surface and mineral estates within the 3D seismic project. These tasks are usually underway anywhere from four to eighteen months prior to the actual surveying phase. The timeline is dependent on the size and/or complexity of the project. The planning and permitting phase is essential to the success of the project, public relations are established and the project completion date is created due to the negotiated lease, option and permit expiration dates.

**Phase 2: Surveying**

Prior to actual survey production Hazard/Access survey crews will traverse the area locating, surveying and mapping the culture (pipelines, houses, oil/gas wells, water wells, bird rookeries, nesting areas, archeological sites, etc.) and access routes within the project area. These crews will also contact the area utility and pipeline companies to ensure that all buried utilities have been identified and located prior to any ongoing operations. Once an adequate portion of the area is mapped, several survey crews will begin the "production" surveying. The crews will navigate to and mark the proposed shot-point and receiver sites with a GPS survey system capable of sub-meter accuracies (in some cases sub-centimeter systems are used). GPS is the method of choice due to the availability of open sky in coastal areas, which enables the system to receive the necessary satellite data. Source and receiver lines are placed in a grid pattern throughout the entirety of the project area except in cases where shot-points are offset away from sensitive areas. Shot-point locations are placed at safe/required distances from any identified culture. Surveyors place cane poles, wooden lathe, PVC pipe or buoys, (as markers) at each shot-point and receiver location. Survey crews use airboats to access marsh areas and operate from small skiffs in large bodies of open water. During all phases, airboat travel is restricted to open water and the source/receiver lines only. In marsh areas airboats are required to offset their path of travel along the source/receiver lines in order to minimize impacts to vegetation and substrate in the area.

**Phase 3: Drilling**

Drill crews follow the designated access routes established by the survey crews to access the shot-holes. Shot-Hole locations, hazards, access routes and culture are identified on maps generated by the survey crew and distributed to each drill crew. An individual drill crew consists of two to four men, depending on the type of equipment being used. Shot-holes are generally drilled to depths of 60-100 feet, and loaded with 5-10 pound explosive charges. The diameter of the drilled hole is three to four inches in size. Since the drilled holes are located in a wet environment that exposes the holes to moving water, the hole will only be open until the drill pipe is removed. The holes collapse and fill in on their own; therefore, no plugging is required. The small amount of material displaced from the drilling of the hole dissipates over the surrounding marsh in vegetated areas and causes only slight increases in turbidity for short periods of time in open water areas.

Only experienced and certified individuals handle the explosives, and all charge loading activities are performed under the supervision of an experienced field supervisor. The refueling of equipment is conducted over an approved absorbent material. This material is packed out with other equipment and refuse.

Several types of equipment may be used for drilling within the transition zone (coastal) areas due to the variability of water depths and terrain. All utilize water to circulate the displaced material and hollow, thin walled drill casing.

***Airboat Drill***

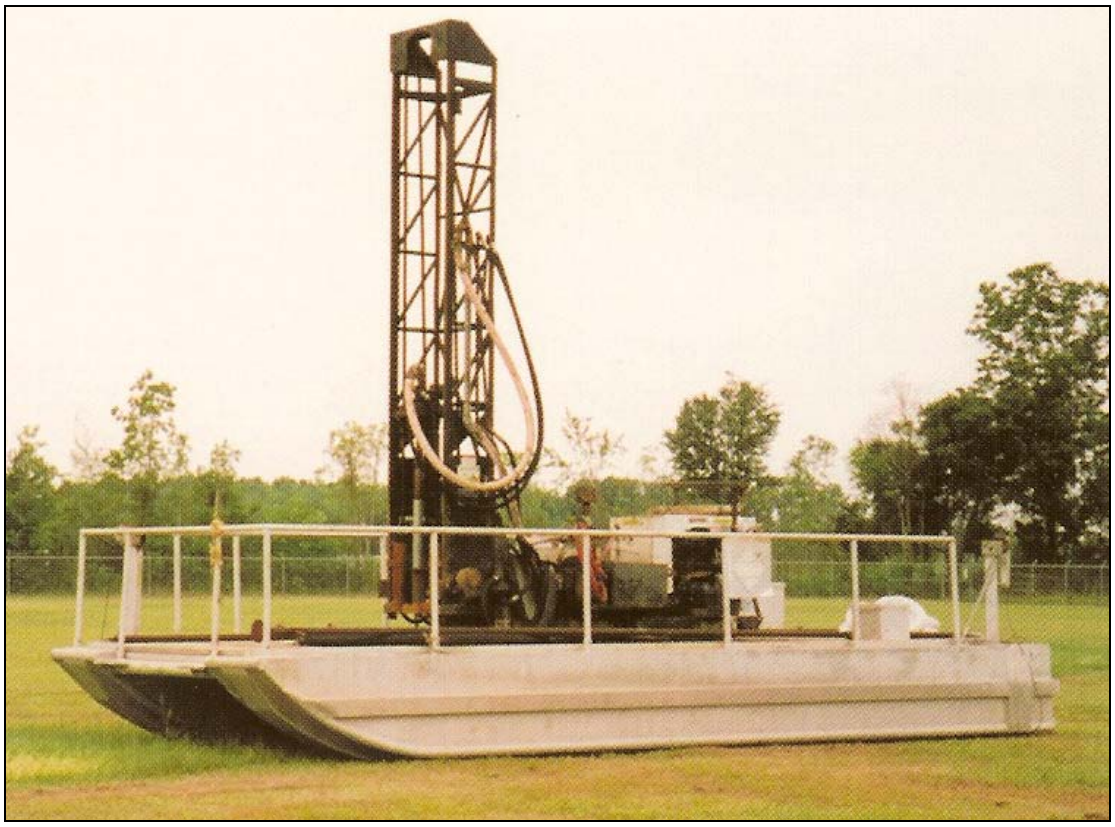
Airboat drills can be used in vegetated marsh or in open water up to 10-12 feet in depth. This vessel can move between source points in marsh areas under proper operating procedures with little damage to the vegetation and substrate. Each airboat drill is accompanied by a support airboat, which provides access to and from the field for crews and equipment. The support boats are also used to set up centrifugal pumps (three to five horsepower) to pump water to the airboat drills via hoses in areas where standing water is not available due to low tides and small hand dug water pits are not allowed. Sections of 100-foot lengths of fire hose are connected together to cover the necessary distances.

**Airboat drill and a support airboat drilling in open waters**


**Airboat drill and a support airboat drilling in marsh**

***Pontoon-Mounted Drill***

The Pontoon drill is capable of drilling to depths of greater than 100 feet. It is used in open water areas that are too deep or too rough for the airboat drill. Like the airboat drills in open water, the pontoon drills lower two spuds into the substrate in order to hold the drilling rig in place. The pontoon drills have longer spuds than the airboat drills, which provide more stability in rough water. A support boat also accompanies this drill. The support boat generally is a flatboat with outboard engines that moves the pontoon rig between shot-point locations. The support boat is also used to move equipment and crews to and from the field.



**Pontoon drill**

***Jack-up Drill***

This drilling rig is capable of drilling to depths of greater than 100-feet. It is used in open water that is greater than 10-15 feet in depth. The Jack-Up drill is a self-powered barge

with hydraulic spuds. The drill navigates to each shot-point location then lowers its hydraulic spuds into the substrate in order to level and hold the drilling rig in place.

**Jack-up drill drilling in open waters**

**Phase 4: Recording**

Recording crews follow the designated access routes established by the survey crews to access the receiver and source lines. Receiver points, shot-hole locations, hazards, access routes, culture and operational restrictions/instructions are identified on maps generated by the survey crew and distributed to the recording crew. Geophones and cables are laid out along the receiver lines using airboats in marsh areas, and flatboats in open water. A helicopter may be used to move equipment from staging areas to the various boats in the field to minimize surface impacts and decrease the amount of time required for transport. A shooter or multiple shooters each equipped with a backpack-mounted electronic shooting system travel along the source lines in an airboat (in open water a skiff or flat boat) and connects to each detonating cap wire lead that is attached to each explosive charge. The charges are remotely detonated at each shot-point, one at a time and the resulting energy wave is recorded by the recording instrument, which is mounted on a

jack up barge or vessel located near the active part of the 3D survey. All explosive charges are discharged at safe distances (IAGC guidelines) from pipelines and other applicable installations to avoid unnecessary risk of damage by concussion or otherwise.

Each shot is recorded into the active recording patch. On average the active patch or spread consists of six to eight receiver lines. These have to be laid out and active for the recording of each shot. As the project proceeds from one end of the seismic grid to the other, geophones and cables that are placed on the receiver lines that are no longer active (behind the shooting operations) will be picked up and moved to receiver lines ahead of the shooting operations to enable the project to proceed. In essence, operations "roll" from one side of the project to the other.

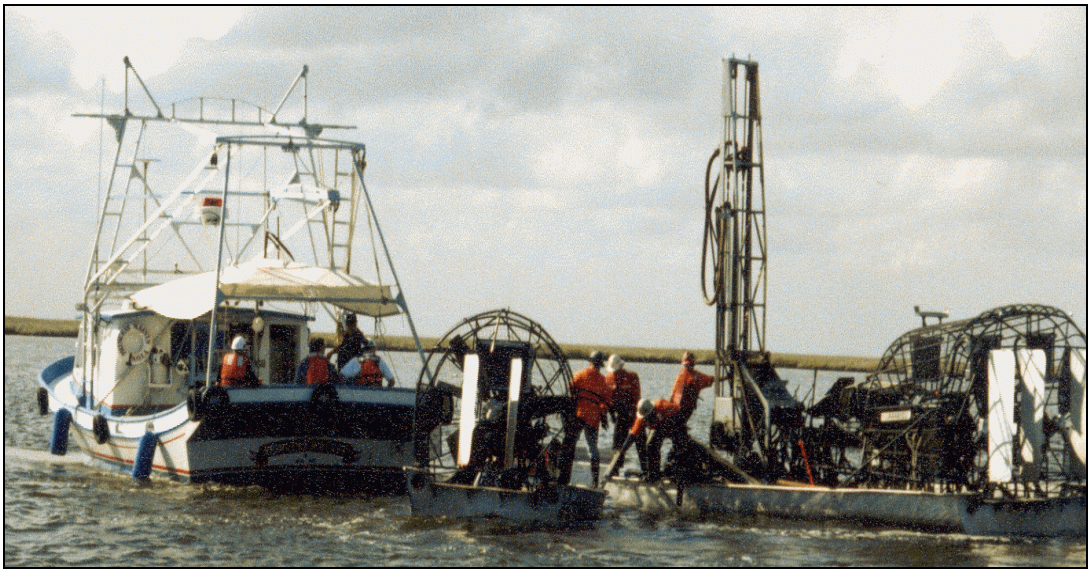

**Flatboat laying out recording equipment**

**Phase 5: Clean up and Reclamation**

This phase is initiated when Phase 4 begins, and continues through the completion of the project. When recording operations are completed, the geophones, cable, survey markers, and all other equipment and materials are removed from the project area.

## ACCESS EQUIPMENT

All access to the project areas is accomplished by boat or helicopter. Several types of boats are used. Airboats are used to survey, support drilling crews, layout and pickup equipment, and transport crews into the field. Outboard flatboats are used to supply airboats with equipment and fuel, transport equipment and crews, and layout and pickup equipment in open and rough waters. Skiffs are used to survey in open water, and support crews in the field with equipment and supplies.



**Airboat drill, support airboat, and support skiff**

Helicopters are utilized by some companies to move equipment (through the use of a long line cable) from the staging area to crews in the field to minimize surface impacts and increase crew production.

**Helicopter picking up equipment from a flatboat**

## Appendix II. Shovel Test Log*

| Shovel Test | | Depth (cm) | Comments |
|---|---|---|---|
| 1 | 581/132 | 30 | coastal salt grass (wet, brown Beaumont clay) |
| 2 | 557/105 | 30 | coastal salt grass (wet, brown Beaumont clay) |
| 3 | 573/118 | 30 | coastal salt grass (wet, brown Beaumont clay) |
| 4 | 573/117 | 100 | clay (0-30 cm);<br>sand mixed with some shell hash (30-100 cm) |
| 5 | 589/112 | 100 | upland pasture (brown sand) |
| 6 | 589/113 | 100 | upland pasture (brown sand) |
| 7 | 589/110 | 100 | upland pasture (brown sand) |
| 8 | 613/122 | 100 | upland pasture (brown sand) |
| 9 | 613/123 | 100 | upland pasture;<br>brown sand (0-90 cm) and tan sand (90-100 cm) |
| 10 | 613/125 | 60 | tan clay loam and tan-orange clay;<br>Chinese tallow forest |
| 11 | 605/115 | 100 | upland pasture (brown sand) |

*All tests were negative