Louetta Road Phase 1 Archeological Survey Harris County, Texas

August G. Costa

Michael Hogan

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Texas Antiquities Permit 8388

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Principal Investigator

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MOORE ARCHEOLOGICAL CONSULTING, INC.

Report of Investigations Number 684

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Prepared for

Spirit Environmental
and
Harris County Engineering Department

Moore Archeological Consulting, Inc.
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ABSTRACT

From May 1st to 4th of 2018, Moore Archeological Consulting, Inc., conducted an intensive pedestrian cultural resources survey of a project area (totaling approximately 21.8 acres) on both banks of Little Cypress Creek in northwestern Harris County, Texas. This project precedes anticipated development in the form of roadway, bridge, and detention basin construction sponsored by Harris County Precinct 3 (HCP3) and Precinct 4 (HCP4). This development will connect Louetta Road from its existing termini of Telge Road to the east and Stablewood Farms Drive to the west. Depth of impact due to construction within the project area is likely to be deeper than one meter in many areas. This along with the perceived potential for deeply buried archeosediments along Little Cypress Creek necessitated deep testing via backhoe trenching. Our project goals were to locate and identify cultural materials, sites, or historic properties within the proposed area of potential effects (APE), and to prepare management recommendations regarding any identified resources. This work was conducted for Spirit Environmental and Harris County Engineering Department under Texas Antiquities Permit Number 8388. Field investigations were conducted by Principal Investigator August G. Costa and Project Archeologist Stephanie Orsini, with assistance from Michael Hogan and Cassady Holt. These investigations consisted of surface and sub-surface (shovel testing and backhoe trenching) examination. Thirty-three shovel tests (n=33) and six backhoe trenches were excavated during this work. All sub-surface probes were negative for material culture. No standing structures or cultural resources of import were observed during these investigations. No archeological sites were observed during these investigations. No further archeological work is recommended. Paper records will be curated at the Center for Archaeological Research at the University of Texas-San Antonio. In the event that archeological deposits or features should be encountered during construction, work should cease in the immediate vicinity and the Archeology Division of the Texas Historical Commission contacted for further consultation.

INTRODUCTION

From May 1st to 4th of 2018, Moore Archeological Consulting, Inc. (MAC), conducted an intensive pedestrian cultural resources survey of a linear project area (totaling 21.8 acres) approximately 4,360 linear feet (0.88 linear miles, 1.4 km) long crossing Little Cypress Creek in northwestern Harris County, Texas. This project precedes planned construction of a roadway, a bridge, and a small detention basin. This development will connect Louetta Road from its existing termini of Telge Road to the east with Stablewood Farms Drive to the west. Depth of impact due to construction within the project area is likely to be deeper than one meter in many areas. Consequently, this investigation assumed that deep impacts will be the norm within the proposed area of potential effects (APE), especially near the bridge installation site. The proposed APE can be found on the Cypress (300963) USGS topographical map (Figure 1).

This undertaking is sponsored by Harris County Precinct 3 (HCP3) and Precinct 4 (HCP4) and falls under the regulatory oversight of the Antiquities Code of Texas (Texas Natural Resource Code, Title 9, Chapter 191, and Title 13, Chapter 26, of the Texas Administrative Code). This work was carried out by MAC on behalf of Spirit Environmental and the Harris County Engineering Department (HCED) under TAC permit 8838. Field investigations were conducted by Principal Investigator August G. Costa and Project Archeologist Stephanie Orsini, with assistance from Michael Hogan and Cassady Holt. These investigations consisted of surface and sub-surface (shovel testing and backhoe trenching) examination. Thirty-three shovel tests (n=33) and six backhoe trenches were excavated during this work. The objectives of the investigation were to locate and identify cultural materials, sites, or historic properties within the APE, and to prepare management recommendations regarding any identified resources.

This following short format report serves to document this “no-find” cultural resources survey. A brief discussion of the project area’s setting and local culture history is followed by a description of the field methods employed during this survey follow by the results. The report is concluded with a discussion and recommendations for future work. Paper records from this project will be curated at the Center for Archaeological Research at the University of Texas-San Antonio.

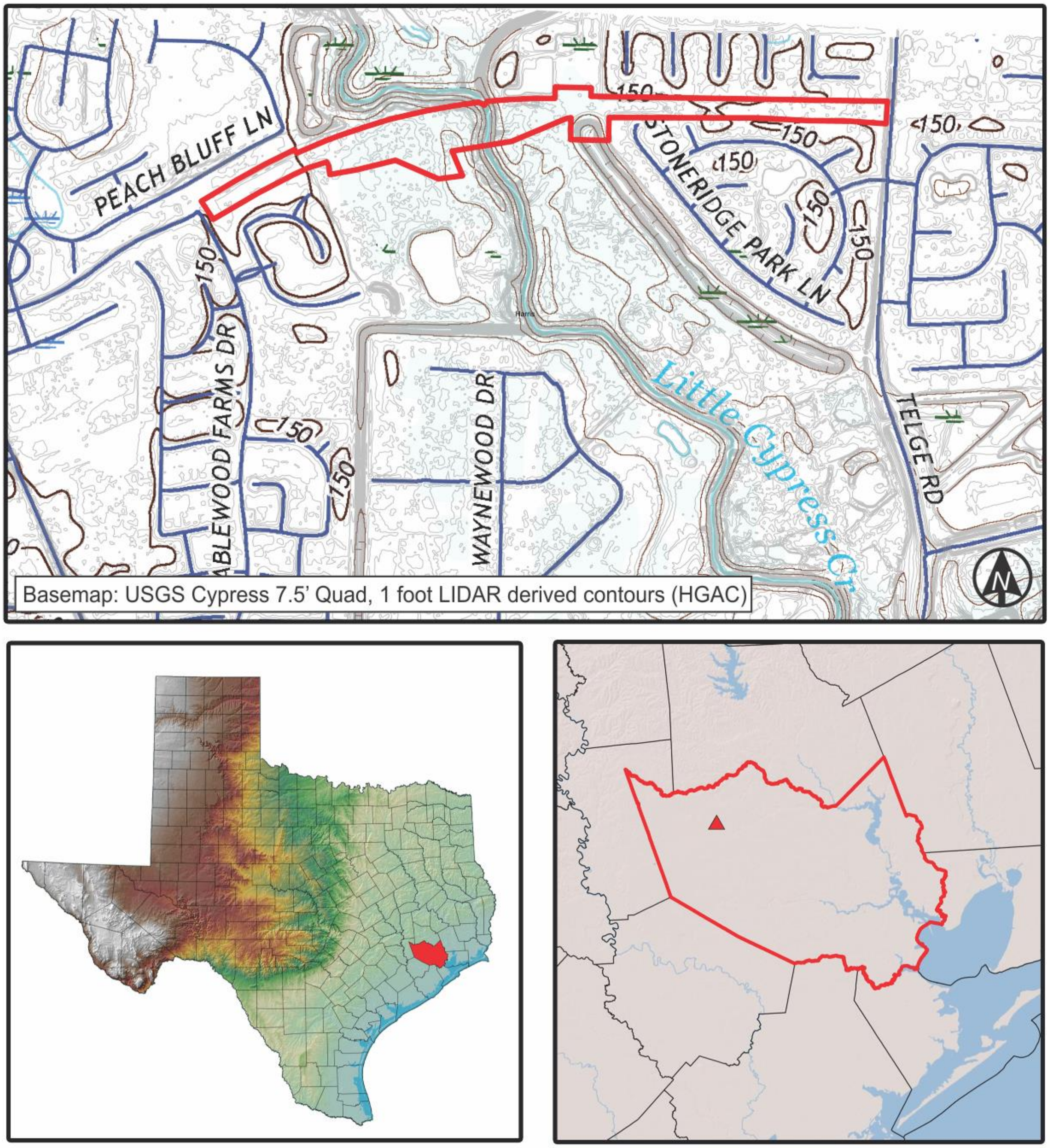


Figure 1. Project area location (APE is red outline) in Harris County, Texas.

ENVIRONMENTAL BACKGROUND

Soils and Geology

Harris County is located within the West Gulf Coastal Plain physiographic province (Hunt 1974). In the Texas region, the surface topography of the plain is characterized by relatively flat topography that dips slightly towards the Gulf of Mexico. Geologically, the project area lies atop the Lissie Formation (Ql), a surface outcrop (coastwise terrace), that extends from Alabama to southern Texas (Abbott 2001:15). The Lissie consists of a series of clayey, loamy, and sandy deposits laid down during a series of glacial and interglacial events in the early part of the Pleistocene Epoch. Lissie deposits have been altered by pedogenic processes and include large carbonate concretions, iron rhizoliths, concretions, and amorphous segregations. The presence of both substantial ferric and calcic segregations, frequently in the same profile, implies that pedogenic trajectories in the Lissie deposits are complex (Abbott 2001:15). The recent Holocene age alluvium of Little Cypress Creek is inset into the older Lissie deposits within the APE.

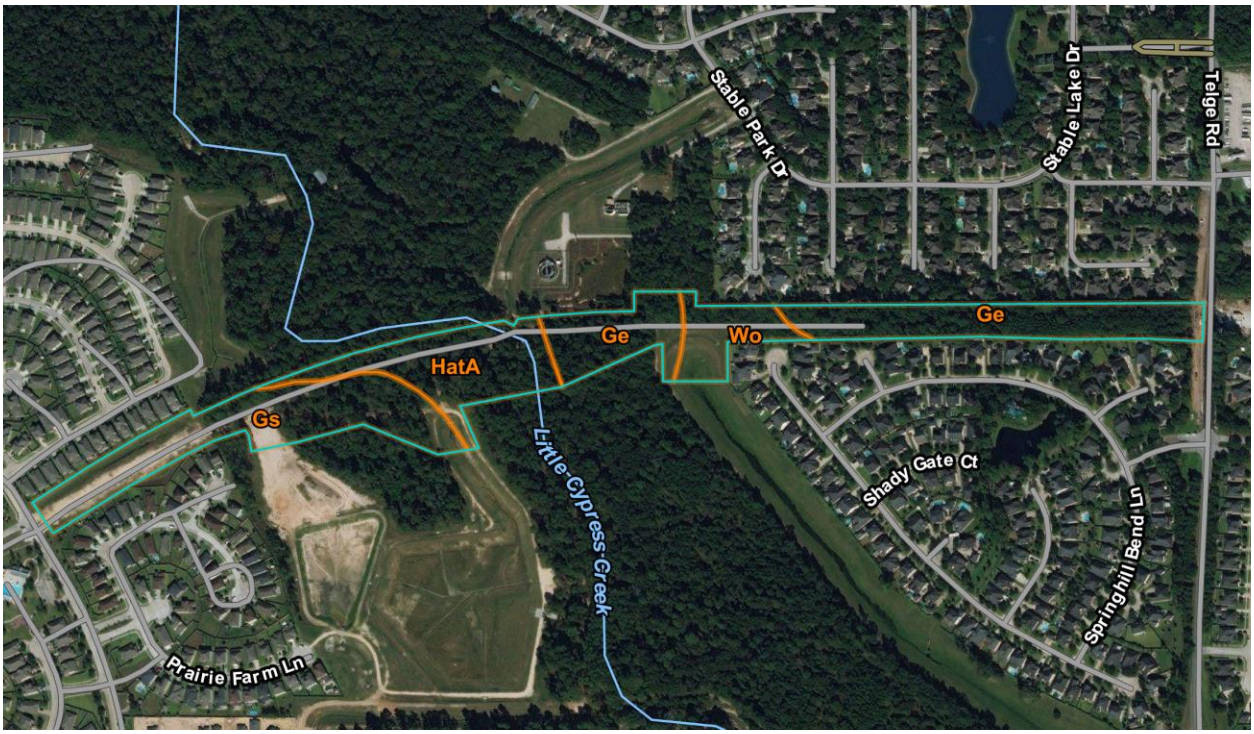


Figure 2. USDA-NRCS soil map of project APE. Soil unit symbols indicated in Table 1 below. Note: Ge and Gs both indicate the Gessner soil complex (Soil Survey Staff 2018).

The project area includes four mapped soil units as depicted on the USDA-NRCS Web Soil Survey (Figure 2 and Table 1). On the floodplain, away from Little Cypress Creek's active channel, the APE is dominated (68%) by the Gessner Series Loam. Gessner soils consist of poorly drained, loamy alluvium; with a low to moderate geoarcheological potential (Abbott 2001). Wockley fine sandy loam (<10%) is also mapped on the eastern bank of Little Cypress Creek within the project corridor. Wockley soils are somewhat poorly drained, loamy ancient alluvium; with a low geoarcheological potential (Abbott 2001). The main part of the active creek channel is occupied by the Hatliff-Pluck-Pian Complex, which includes very immature, well-drained sandy alluvial soils from natural levees and point bars.

Table 1. Soil Series within APE.

Map Unit Symbol	Map Unit Name	Acres in APE	Percent of APE
Ge & Gs	Gessner fine sandy loam, 0 to 1 percent slopes, occasionally ponded	7.9	68.30%
HatA	Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded	4.8	22.00%
Wo	Wockley fine sandy loam, 0 to 1 percent slopes	2.1	9.60%
Totals for APE		**21.8**	**100.00%**

Climate

The project area falls within the Subtropical Humid region, which is noted for its warm summers (Larkin and Bomar 1983). The modern climate of Harris County is complex and is influenced by systems originating from the Pacific, Gulf of Mexico, and its southward position on the northerly Jet Stream. The confluence of these systems, however, is moderated by generally warm, moist air from the Gulf of Mexico that results in mild winters and relatively cool summer nights (Wheeler 1976). From 2005 to 2015, the mean annual temperature in Houston, Texas, was 21^{o} C (70^{o} F), with a mean annual precipitation of 127 centimeters (49.74 inches). Summer temperatures are hot; the daily mean temperatures in the summer averages to 29^{o} C (84^{o} F). Average winter temperatures are mild; the daily mean winter temperatures average to 13^{o} C (55^{o} F). The highest recorded temperature was 43^{o} C (109^{o} F) in 2011 and the lowest recorded temperature was -15^{o} C (5^{o} F) in 1930. Mean monthly rainfall records for Houston vary from 8 centimeters (3.2 inches) in February to 15 centimeters (5.92 inches) in June. Annual rainfall records range from a low of 62 centimeters (24.57 inches) in 2011 to a high of 180 centimeters (71.19 inches) in 2001. Freezing temperatures and snow are infrequent in Houston (NOAA 2016).

Hydrology

The project area occupies a linear corridor on either bank of Little Cypress Creek (see Figure 1). Little Cypress Creek is an intermittent tributary stream of Cypress Creek in Harris County. Little Cypress Creek drains a small portion (~15% or 130 km^{2}) of the larger Cypress Creek Watershed (HFCD 2018). This stream joins the main channel of Cypress Creek about 4 km (2.5 miles) southeast of the APE.

Flora and Fauna

Harris County lies within the Austroriparian biotic province (Blair 1950). Not determined by a marked physiographic break, the western boundary of this province is loosely identified by the distribution of pine and hardwood forests on the eastern Gulf coastal plain. The county is situated within the pine-oak subdivision of the Austroriparian province (Tharp 1939). Blair (1950) lists the dominant floral species of the pine-oak forest subdivision as loblolly pine (*Pinus taeda*), yellow pine (*Pinus echinata*), red oak (*Quercus rubra*), post oak (*Quercus stellata*), and blackjack oak (*Quercus marilandica*). Hardwood forests are found on lowlands within the Austroriparian and are characterized by such trees as sweetgum (*Liquidambar styraciflua*), magnolia (*Magnolia grandiflora*), tupelo (*Nyssa sylvatica*), water oak (*Quercus nigra*), and other species of oaks, elms, and ashes, as well as the highly diagnostic Spanish moss (*Tillandisia usneiodes*) and palmetto (*Sabal glabra*).

Blair (1950) and Gadus and Howard (1990) identify the following mammals as common within the Austroriparian province: white-tailed deer (*Odocoileus virginianus*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), opossum (*Didelphis virginiana*), eastern mole (*Scalopus aquaticus*), eastern pipistrelle bat (*Pipistrellus subflavus*), eastern red bat (*Lasiurus borealis*), fox squirrel (*Sciurus niger*), eastern gray squirrel (*Sciurus carolinensis*), southern flying squirrel (*Glaucomys volans*), pocket gopher (*Geomys breviceps*), slender harvest mouse (*Reithrodonomys fulvescens*), white-footed mouse (*Peromyscus leucopus*), marsh rice rat (*Oryzomys palustris*), cotton rat (*Sigmodon hispidus*), packrat (*Neotoma floridana*), eastern cottontail *(Sylvilagus floridanus*), and swamp rabbit (*Sylvilagus aquaticus*). Bison (*Bison bison*) were present in the area at various times in the past (Lohse et al. 2014; Patterson 1992). Common turtles include eastern box turtle (*Terrapene carolina*), as well as snapping turtle (*Chelydra serpentinia*), mud turtle (*Kinosteron spp.*), river cooter (*Chrysemys concinna*) and diamondback terrapin (*Malaclemys terrapin*). Common lizards include green anole lizard (*Anolis carolinensis*), eastern fence lizard (*Sceloporus undulates*), skink (*Leiolopisma laterale*), broad-headed skink (*Eumeces laticeps*), six-lined racerunner (*Cnemidophorus sexlineatus*), and eastern glass lizard (*Ophiosaurus ventralis*). Birds, snakes and amphibians are also present in considerable numbers and diversity.

CULTURAL BACKGROUND

Southeast Texas Prehistory

The project area is located within the Southeast Texas archeological region (Patterson 1995; Story et al. 1990). Various syntheses of the archeology of Southeast Texas and the Upper Texas Coast are currently available for interpreting the chronology, culture history, and lifeways of prehistoric and historic Native Americans (Aten 1983, 1984; Patterson 1985, 1995, 1996; Ensor 1990, 1991, 1995, 1998; Shafer 1988; Shafer et al. 1975; Story 1981; Story et al. 1990).

Several researchers have compiled chronological frameworks to describe the cultural histories of the area (Aten 1983; Ensor 1990; Patterson 1995; Ricklis 2004; Shafer et al. 1975; Story et al. 1990). Most of these divide human occupation into four broad stages: Paleoindian, Archaic (Lithic), Late Prehistoric (Ceramic), and Historic (Table 2). The stages are based on a proposed sequence of economic strategies as they are revealed through the archeological and/or historical record. These proposed shifts in dominant lifeways consider cultural, economic, and technological factors to provide a heuristic model useful for attempting to understand ancient and early historic populations. While the dates assigned to the period interfaces are based on "absolute" dating methods, they represent a generalized time range for the implied cultural evolution. All ages, listed in the following discussion, are presented as uncalibrated radiocarbon years before present (B.P.) with approximately equivalent calibrated (calendar) years before present presented afterwards in parentheses (cal B.P.).

Table 2. Generalized culture history for Southeast Texas (modified from Aten 1983).

Time Period	**uncalibrated radiocarbon years before present (B.P.)**	**calibrated (calendar) years before present (cal B.P.)**
Historic	post 250 B.P.	post 230 cal B.P.
Late Prehistoric-Woodland	3,000 B.P.-250 B.P.	3,200-230 cal B.P.
Late Ceramic	1150-250 B.P.	1000-230 cal B.P.
Early Ceramic	1850-1150 B.P.	1700-1000 cal B.P.
Archaic		
Late Archaic	3,000-1600 B.P.	3,200-1500 cal B.P.
Middle Archaic	7,000-3,000 B.P.	7,850-3,200 cal B.P.
Early Archaic	9,000-7,000 B.P.	10,200-7,850 cal B.P.
Paleoindian	12,000-9,000 B.P.	13,800-10,200 cal B.P.

Aten (1983:141-142) has divided the archeology of the Upper Texas Coast into three periods: (1) Paleoindian (12,000 B.P. to 9,000 B.P., ca. 13,800-10,200 cal B.P.), (2) Archaic (9,000 B.P. to 3,000 B.P., ca. 10,200-3,200 cal B.P.), and (3) Late Prehistoric-Woodland (3,000 B.P. to 250 B.P., ca. 3,200-230 cal B.P.). These broad periods very generally correspond with periods of major environmental change, i.e. (1) Late Glacial, (2) post-Pleistocene adaptations with concomitant economic reorientation and population increase, and (3) cultural adaptation to essentially modern environmental conditions (Aten 1983:141-142). However, environmental studies, particularly those involving the Holocene (starting about 10,000 B.P or 11,500 cal B.P.), have shown that climates and environments over this period often changed very abruptly in terms of both temperature and precipitation fluctuations (Anderson et al. 2007; Mayewski et al. 2004). Such changes often had major implications for local and regional populations.

Other researchers working in Southeast Texas have put forth a number of prehistoric sequences or artifact chronologies based on the available archeological data. The sequence proposed by Story et al. (1990) parallels those put forth by other researchers (Ensor 1990, 1998; Ricklis 2004; Shafer 1988). Projectile point sequences outlined and proposed by Patterson (1985, 1990, 1995, 1996) diverge somewhat from the above chronologies in that a wider range of types from Central Texas are proposed as being an integral part of the Southeast Texas sequence. In addition, Patterson's beginning and ending dates, as well as the length of each period's duration and/or overlap for particular dart point/arrow point forms, often deviate from estimates by the above researchers. This review will consider the sequences proposed by Story et al. (1990) Ensor (1990, 1998) and Ricklis (2004) for the Upper Texas Coast. A simplified alternative model for the later Holocene prehistory of Southeast Texas is also presented.

For the last 80 years the Clovis prehistoric technological complex, defined by a unique stone, bone, and ivory tool kit, has been considered the first archeological culture to emerge in North America (Collins 2002; Haynes 2002). Evidence of archeological horizons stratigraphically underlying Clovis components are now well documented at many sites in the Americas (Adovasio et al. 1978, 1990; Collins 2014; Dillehay et al. 1997; Lowery et al. 2010; Goebel et al. 2008; Wagner and McAvoy 2004; Waters et al. 2011), including the Gault and Debra L. Freidkin sites in Central Texas (Collins and Bradley 2008; Waters et al. 2011). The archeological community has generally viewed Clovis as a highly mobile, specialized hunter-gatherer lifeway that spread across much of the Americas in less than one thousand years after humans first migrated from Beringia through the ice-free corridor between the Laurentide and Cordilleran Ice Sheets (Haynes 1964; Kelly and Todd 1988).

This conventional wisdom, however, does not agree with archeological material lately brought to light (Collins 2002, 2007; Dillehay 1997). Traditional models emphasize the heavy reliance that these groups placed on the hunting of the large mammals of the Pleistocene. Plant foods and small game undoubtedly supplemented this diet and may have played a more prominent role than previously thought in Paleoindian diets (Black and McGraw 1985; Patterson 1995). The estimated time range for Clovis occupation in Texas has been pushed back based on data from the Aubrey site near Denton (Ferring 2001) and the Wilson-Leonard site in Central Texas (Collins 1998). A time range from 11,500 to 10,900 B.P. (ca. 13,500-12,900 cal B.P.) is now estimated for initial Clovis occupation of North America by many Paleoindian researchers. Based on adjusted radiocarbon dates, Waters and Stafford (2007) have presented a reduced date range that significantly restricts the Clovis time range to 11,050 to 10,800 B.P. (just before 13,000-12,800 cal B.P.), although this date range would reclassify well-documented Clovis sites such as Aubrey and Fin del Mundo as pre-Clovis (Ferring 2001; Sanchez et al. 2014). Although many pre-Clovis sites have been proposed and are gaining increasing acceptance, research has yet to identify continental horizons defined by internally consistent, shared technologies such as characterizes the Clovis interval.

Traditionally, it has been thought that Clovis and Folsom points were followed in time by unfluted lanceolates such as Plainview, Golondrina, and Angostura. Notched and unnotched Dalton and San Patrice points occur in Southeast Texas and neighboring areas and follow this early lanceolate tradition into the Early Holocene. However, work at the Wilson-Leonard site, near Austin in Central Texas, has produced evidence that a very early, stemmed form, called Wilson, follows the Clovis/Folsom occupations. An undefined component intervenes between the Wilson and Clovis occupations at Wilson-Leonard from 11,000-10,000 B.P. (ca. 12,800-

11,500-cal B.P.) that most closely resembles Plainview or Folsom types (Collins 1998). The Wilson period occupation (10,000-9500 B.P. or about 11,500-10,400 cal B.P.) was in turn followed by such lanceolates as St. Mary's Hall and Golondrina/Barber/Angostura, which date from about 9,500 B.P. to 8,800 B.P., or about 10,400-9,900 cal B.P. (Collins 1998:281). Plainview points are rare at Wilson-Leonard and may predate the St. Mary Hall's occupation, as noted above.

In general, due to a paucity of older well-stratified sites, the Paleoindian stage remains poorly defined in Southeast Texas. Most Paleoindian evidence in Southeast Texas is represented by isolated surface finds of Clovis points or comes from other poorly resolved contexts. Paleoindian points are occasionally found in later prehistoric archeosediments commingled with younger materials in the region (Ricklis 2004). The McFaddin Beach site (41JF50) represents the most robust evidence of Paleoindian occupation in Southeast Texas. The McFaddin assemblage is one of the largest known concentrations of Clovis points in Texas (and the nation [Bever and Meltzer 2007]), yet the primary context of these artifacts remains a mystery as the actual site (or sites) is deflated and possibly submerged somewhere offshore in the Gulf of Mexico (Costa 2017; Hester et al. 1992). Other known Clovis sites such as Timber-Fawn (41HR1165) are small, isolated occurrences that provide very little data (Crook 2016).

Most Paleoindian occurrences in Southeast Texas can be attributed to the later Paleoindian period. These are primarily indicated by the occurrence of San Patrice/Pelican points and less frequently by Plainview and Angostura finds. Folsom points are scarcely known from Southeast Texas. Prevalent Late Paleoindian San Patrice and Pelican points (coeval and related to the Dalton Cluster of the Eastern Woodlands [Ensor 1986]) are thought to be related to Webb et al.'s (1971) types A and B, which have also been termed Keithville, varieties A and B (Story et al. 1990; Webb et al. 1981). Expanding-stem point forms, sometimes dubbed "Early Stemmed," appear to follow San Patrice in the Transitional Late Paleoindian to Early Archaic from at least 9,450 B.P. up to about 7,950 B.P. (ca. 10,400-8,800 cal B.P.). The relationship of stemmed Wilson points to corner-notched and side-notched forms further east, such as those reported at the Crawford site in Polk County (Ensor and Carlson 1988), at 41FB19 (Patterson et al. 1987), and elsewhere (Patterson 1990; Story et al. 1990), is unclear. Minimally, the two forms represent distinct hafting technologies that likely represent other significant social and economic adaptations between these two periods. Goodyear (1982) suggests that the early corner/side-notched forms, along with San Patrice points, most likely represent a widespread regional notched haft technology that is somehow associated with Early Holocene climatic events, an interesting proposition that should be evaluated through additional research.

These types in general are followed during the Early and Middle Archaic periods by such expanded-haft cluster types as Trinity, Yarbrough, and Carrollton, in addition to Evant, Wells, Hoxie, and Calf Creek Horizon types that include Bell and Andice. These point types are believed to date from circa 7,950 B.P. to 3,900 B.P. (ca. 8,800-4,400 cal B.P.) (Ensor 1990, 1998; Story et al. 1990), but they are very poorly dated. One significant reason for this lack of temporal precision is related to the generally poorly stratified nature of Southeast Texas deposits. Thin clay and sandy mantles commonly overlie earlier Pleistocene basal deposits; careful review of these upper strata indicates that they commonly lack significant time depth. The implication is that later, Holocene-age sediments may have been deposited onto and then eroded from landforms over and over, resulting in a general absence of well-stratified deposits. Additionally, bioturbation, for instance from rodent or insect activity, is a major factor for site disturbance.

This combined with the generally acidic nature of these soils, which results in very poor organic preservation, means that older, intact, and potentially datable deposits are scarce in the region. Most sites with earlier remains tend to show these components as seemingly mixed deposits.

Still, these expanded-haft cluster forms along with the straight to slightly contracting stemmed Central Texas types Bulverde and Wells/Morrill (Ensor 1998; Ensor and Carlson 1988; Patterson 1996) are also thought to fill a long temporal gap in the Southeast Texas Archaic sequence from about 7,950 B.P. to 3,900 B.P. (ca. 8,800-4,400 cal B.P.). Other Central Texas types, such as Williams, Lange, Pedernales, and Travis, also occur in the area (Ensor 1990, 1998; Howard et al. 1991; Patterson 1995, 1996). Around 3,900 B.P. (ca. 4,400 cal B.P.), the late Middle Archaic to early Late Archaic Palmillas type was introduced, along with occasional Ensor and Ellis points, and followed by the more ubiquitous Kent and Gary points during the Late Archaic/Early Ceramic periods (Ensor 1990, 1998; Story et al. 1990). Excavations at the Eagle's Ridge shell midden (41CH252), when coupled with data from Aten et al.'s (1976) Harris County Boy's School (41HR80) excavations, suggest that Kent points may be confined to the regional Late Archaic period, from 2,800 B.P. (ca. 3,000 cal B.P.) to the beginning of the Early Ceramic (Clear Lake) period along the Upper Texas Coast around 2,400-2,200 B.P. (ca. 2,500-2,210 cal B.P.) (Ensor 1998). Ensor (1998) suggests that Kent points occur as a regional lithic tradition focused on the exploitation of local quartzites and silicified wood gravels. This marks a distinct technological shift from earlier groups who used a larger proportion of high-quality cherts for biface manufacture, from Paleoindian through Middle Archaic times. A similar pattern has been observed throughout East Texas with the use of non-local exotic cherts prevalent during the Middle Archaic (Ensor and Carlson 1988; Fields 1995; Gadus et al. 1992; Pertulla and Bruseth 1994).

While no one culture adhered strictly to the use of a single raw material, there was apparently a shift from long-distance regional chert procurement at the end of the Middle Archaic period to localized procurement during the Late Archaic and Early Ceramic periods at Eagle's Ridge and, by inference, much of the Upper Texas Coast (Ensor 1998). Farther to the north and east at the Alabonson Road (41HR273) site (Mueller-Wille et al. 1991), the percentage of silicified wood and quartzite versus chert used to make Kent points was the highest of all projectiles (about a third), even though chert was still the predominate material used in biface manufacture. This trend of an increase in chert use from east to west in Harris County has been noted by several researchers (Moore 1995; Patterson 1996) and appears to be a direct function of availability and ease of procurement.

Gary points appear to have been introduced at Eagle's Ridge and other Upper Texas coastal-margin sites around the end of the Late Archaic period (2,400-2,200 B.P., ca. 2,500-2,210 cal B.P.). Gary points are generally more finely flaked than Kent points and are closely related technologically. Some might argue that the separation between the two is arbitrary. While Kent and Gary points share a close technological history (Ensor 1998; Patterson 1996; Weber 1991), and are closely associated, with the initial formation of the Mossy Grove tradition (Moore 1995), data from these Texas coastal-margin sites demonstrates clearly that stratigraphic/chronometric separation may be feasible at some sites (also see Story et al. [1990:222] for a similar opinion). Further, the data from Eagle's Ridge clearly indicates that Kent points have a rather restricted temporal duration at that site since expanded-haft cluster forms predominate to the virtual exclusion of Kent points in the lower portion of the midden. While some local variation may exist in the temporal distribution of these types in Southeast Texas, especially between inland

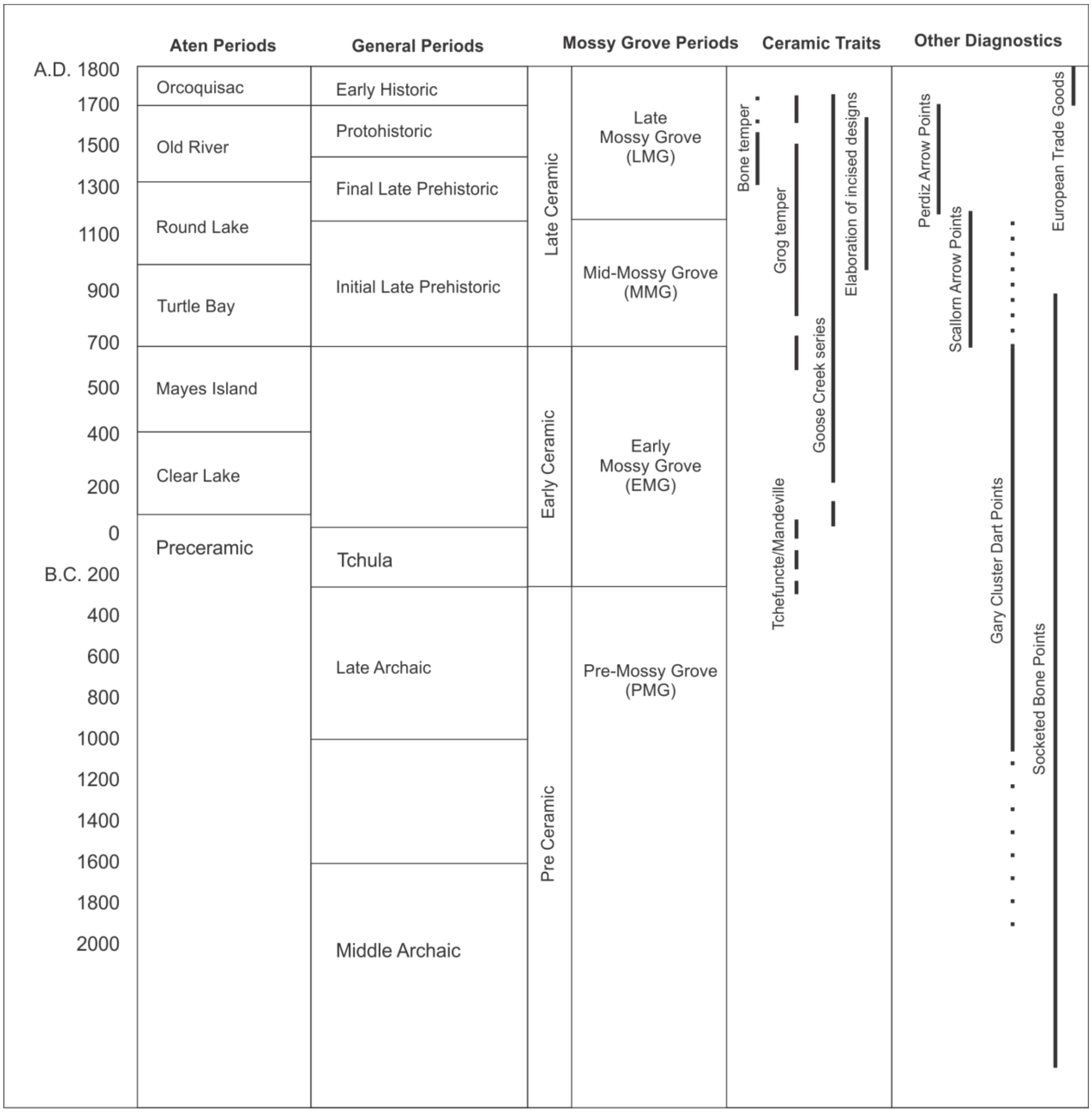
and coastal sites, the preponderance of evidence to date suggests the above general sequence likely occurred over much of the area (Story et al. 1990). The question of dart point extension into the Late Prehistoric period and co-occurrence with arrow points is unresolved. Gary dart point types often occur in the final stages of the Southeast Texas prehistoric sequence, suggesting that atlatl-propelled projectile systems may have persevered long after the adoption of archery.

Story et al. (1990) have noted a very generalized sequence for inland post-Archaic or Late Prehistoric sites. Story refers to this as the Mossy Grove Tradition, which later formed the core of Moore's (1995) dissertation. Story et al. (1990) breaks with Aten (1983) and Shafer et al. (1975) who referred to post-Archaic remains in Texas as Woodland. Southeast Texas has a unique culture history that does not fit with Woodland as commonly conceptualized elsewhere, as evidenced by the absence of plant domesticates. Ensor and Carlson (1988) highlight the similarities between Goose Creek pottery and Gulf Formational (Tchula period) sandy-paste and sand-tempered ceramics of Louisiana and the greater Southeast in terms of decorative modes and paste composition (Walthall and Jenkins 1976; Weinstein 1986). In fact, a developmental sequence from the Tchula period types Tchefuncte Plain and O'Neal Plain (Walthall and Jenkins 1976; Weinstein and Rivet 1978) to Goose Creek Plain, *var. Anahuac* and *Goose Creek Plain*, var. *Goose Creek* (i.e., var. *unspecified*) has been postulated by Ensor (1995, 1998) based on work at the Eagle's Ridge shell midden on the Upper Texas Coast.

Archeological research at inland Mossy Grove sites has led to a two-fold division into an Early Ceramic period and a Late Ceramic Period (Ensor 1987; Ensor and Carlson 1991; Fields et al. 1983; Howard et al. 1991; Story et al. 1990; Winchell and Wootan-Ellis 1991). The Early Ceramic period is marked by an initial Tchula Horizon starting around 200 B.C. and lasting until A.D. 1, characterized by a small proportion of untempered, contorted-paste Tchefuncte Plain pottery. Subsequent, post-Tchula, Early Ceramic period sites are typically characterized by sandy-paste Goose Creek Plain pottery, and Gary points. On the whole, the Early Ceramic period lasts from about 2,200 B.P. to 1,300 B.P. (ca. 200 B.C. to A.D. 700). The succeeding Late Ceramic period, which lasts from about 1,300 B.P. to 250 B.P. (ca. A.D. 700 to approximately 1750), is characterized by both sandy paste-Goose Creek ware and grog-tempered Baytown ware, as well as a variety of arrow point forms such as Scallorn, Alba, and Perdiz. Other aspects of post-Archaic period lithic technology are less well understood in Southeast Texas; however, there appears to be an overall decrease in flake size from the Early Ceramic period to the Late Ceramic period (Ensor 1987; Ensor and Carlson 1988; Patterson 1985, 1995, 1996).

A Late Prehistoric period is often recognized in Southeast Texas following the general established chronological framework for Texas archeology. This differentiates Late Ceramic period assemblages in which evidence for the use of bow and arrows is apparent. Ricklis (2004), drawing heavily on the coastal record in the Upper Texas coast, recognized an Initial Late Prehistoric (like the Central Texas Austin phase) characterized by Scallorn, Alba, and Catahoula arrow points, followed by a Final Late Prehistoric (like the Central Texas Toyah phase) characterized by the presence of bison, Perdiz arrow points, blade technology, beveled knives and drills/perforators made on flakes with expanded bases.

The Late Prehistoric chronology is useful to an extent, but like the Woodland appellation, it masks some important regional distinctions. Pottery is much more abundant in Southeast Texas than in the central parts of the state during the Late Prehistoric. This implies significant differences in the lifeways and mobility of Mossy Grove vs. other Late Prehistoric Texans. In sum, the later Holocene prehistoric record of Southeast Texas is unique relative to patterned trajectories of neighboring regions. As such, it is best to model local culture history in its own unique way. The last 2,000 years or so of Southeast Texas prehistory is most clearly understood according to three Mossy Grove phases corresponding to ceramic and lithic technological and social developments. An Early Mossy Grove (EMG) phase (synonymous with Early Ceramic/Tchula) begins with the appearance of ceramics following diffusion from the Lower Mississippi Valley. This lasts until the introduction of the bow and arrow (likely also from the east) which marks the Mid-Mossy Grove (MMG) phase (synonymous with Initial Late



Prehistoric or Austin phase). This is followed by a Late Mossy Grove (LMG) phase (synonymous with Final Late Prehistoric or Toyah phase) in which bison-hunting cultures, which employed late-style arrow points (mainly the Perdiz type), were common up to the earliest arrival of Europeans (Figure 3).

Figure 3. Revised culture history of Southeast Texas

Archeological site distribution across the inland coastal prairie of Southeast Texas indicates that sandy, well-drained, elevated soils along creeks and bayous were favored locales that were repeatedly occupied (Ensor 1987; Ensor et al. 1983; Fields et al. 1986; Freeman and Hale 1978; Moore 1995, Patterson 1985). The upland valley margins or scarps where older geologic deposits crop out above the floodplain were commonly utilized by Indigenous peoples (Ensor et al. 1983; Fields et al. 1986; Hall 1981; Moore 1995). The occurrence of sites far removed from a dependable water source on the upland prairie is rare (Ensor et al. 1983; Fields et al. 1986; Moore 1995). However, sites in the Greens Bayou drainage of eastern Harris County have shown a tendency to be located at greater distances from large streams than farther west in Harris County (Ensor et al. 1990; Sanchez 2003). This suggests that a relatively stable environment has been in place across Southeast Texas for the past 4,000 years, as noted above. The redundancy in site patterning noted by researchers along inland drainages is likely tied to intensive exploitation of the narrow band of riparian woodland that borders each stream (Ensor 1987). This patterning may also be linked to elevated preservation potential of sites located within these floodplain environments.

Data from the Alabonson Road site (41HR273), as well as other inland sites, suggest that minimally a dichotomous breakdown of sites into longer-term residential base camps and shorter-term extractive sites is evident (Ensor and Carlson 1991; McReynolds et al. 1988a; Moore 1995). Moore (1995) further indicates that evidence of hunter-gatherer logistical activities (Binford 1980) within the riparian zone may indicate a more complex pattern of resource extraction and scheduling of day-to-day activities than would be expected in a pure forager model, and that a three-tier system of residential base camps, residential bases, and locations or temporary extractive locales may best fit the observed data (Moore 1995:189-190). Establishing criteria that enable the archeologist to empirically separate and/or test the validity of these hypothetical site types should be a major goal of on-going research.

The Upper Texas Coast mortuary sub-region is represented by several pre-Mossy Grove to Late Mossy Grove (i.e. Late Archaic to Late Prehistoric) sites. These include the Ernest Witte site (41AU36) and associated sites within the lower Brazos River Valley (Hall 1981), Dimond Knoll (41HR796) on Cypress Creek, the Bowser site (41FB3), the Albert George site and others on Big Creek (41FB13), the Piekert site (41WH14), Shy Pond (41BO13/15), Shell Point (41BO2), Jamaica Beach (41GV5), Mitchell Ridge (41GV66), Harris County Boys School (41HR80/85/86), Spanish Moss Site (41GV10/53), the Galena sites (41HR62), the Kobs (41HR7) and Doering (41HR5) sites in Addicks Reservoir (Wheat 1953), Alabonson Road (41HR273), and the Redtail site at Peggy Lake (41HR581). Burials were also encountered in Jefferson County at Blackhill Mound (41JF24) and the Gaulding site (41JF27) (Aten and Bollich 2004). Mortuary sites in Southeast Texas range from massive cemeteries to isolated burials of one to a few individuals. The mortuary program reflected in burial style and grave goods found in Southeast Texas is relatively constant from pre-Mossy Grove to post-Mossy Grove historic times. Burials consist primarily of extended and flexed inhumations with infrequent bundle and cremation burials. No regular pattern of burial orientation has been noted. Burials in Southeast Texas are occasionally found with accompanying grave goods, which often include items such as ochre, bifacial tools and points, groundstone objects such as boat stones, geometrically incised bone objects, shell-bead necklaces and pendants, as well as glass beads in the protohistoric and historic periods near the end of the Mossy Grove Tradition.

While there is evidence of long-term stability in environmental conditions since the onset of the Late Holocene, there also exists paleoenvironmental and archeological data that suggest short-term environmental fluctuations. For example, the occurrence of bison-kill sites across Southeast Texas (McReynolds et al. 1988b), often in association with Perdiz arrow points, the presence of prairie soils in now-heavily-wooded areas (Ensor et al. 1990), and pollen data indicating climatic fluctuation (Beck et al. 2001), all suggest such change. Both Patterson (1985) and Ensor (1987) have posited that populations became more mobile during the Late Mossy Grover (Late Ceramic) period at inland sites, possibly related to a drier climate and the expansion of prairies and prairie species.

Regarding the coastal situation, Aten (1983) has subdivided the coastal Mossy Grove sites into five prehistoric periods (Clear Lake, Mayes Island, Turtle Bay, Round Lake, and Old River) and three protohistoric sub-periods (Old River [protohistoric], Early Historic Orcoquisac, and Late Historic) that span approximately 2,000 years along the Upper Texas coast. These are primarily defined by a multi-site (coastal shell middens) seriation of different types and varieties of Mossy Grove Tradition pottery. The earliest of these is the Clear Lake period from 2,350 B.P. to 1,525 B.P. (ca. 2,200-1,450 cal B.P.) based on radiocarbon dating of early pottery assemblages. Tchefuncte, Goose Creek, and Alexander series ceramics predominate, along with a minority of incised sherds. Gary dart points are often associated with Clear Lake period middens, as are socketed bone projectile points (Story et al. 1990). Data from the Eagle's Ridge shell midden (Ensor 1998) suggest that Aten's (1983) subdivision of the Clear Lake period into an early and late period based on varying amounts Goose Creek Plain, *var. Anahuac* and Tchefuncte Plain, *var. Mandeville* (sometimes referred to as Mandeville Plain) pottery is correct. However, some need for refinement is in order based on data from Eagle's Ridge. At this site, plain and stamped sherds with Mandeville paste and plain, incised, and stamped sherds with Tchefuncte paste dominate the early portion of the Clear Lake period from 2,400 or 2,200 B.P. to 2,000 B.P. (ca. ~2,350-1,950 cal B.P.) or slightly later. Goose Creek Plain, *var. Anahuac* dominates the latter portion of this period from 2,000 B.P. to 1,600 B.P. (ca. 1,950-1,500 cal B.P.) or slightly later (Ensor 1998). Goose Creek Plain, *var. Goose Creek* (Aten's *var. unspecified*) predominates in post-Clear Lake contexts at Eagle's Ridge with a very small percentage of decorated ware along with a few arrow points.

Aten (1983) has noted that in the subsequent Mayes Island period from 1,525 to 1,300 B.P. (ca. 1,450-1,200 cal B.P.) the ceramic assemblage consists almost entirely of Goose Creek Plain, *var. unspecified* (i.e. *var. Goose Creek*) with minor amounts of Goose Creek Incised. It has been surmised that stone dart points may have disappeared but that socketed bone points continue into this period (Story et al. 1990). The next period, Turtle Bay, runs from 1,300 to 1,050 B.P. (ca. 1,200-950 cal B.P.). It is characterized by an increase in Goose Creek Red-Filmed and an elaboration of incised design motifs on Goose Creek Incised pottery (Aten 1983; Ensor 1995). It has been postulated that the bow and arrow first came into use during this period, along the Upper Texas coast, and that socketed bone points fell out of use.

Baytown-related grog-tempered ceramics (Phillips 1970) first appear around 950 B.P. (850 cal B.P.) and mark the beginning of the Round Lake period (Aten 1983). Sandy-paste Goose Creek ceramics decline during this period. The *Phoenix Lake* variety of Baytown Plain, which is characterized by a dense grog-tempered paste, is thought to predominate by the end of this period at about 600 B.P. (ca. 500 cal B.P.). The appearance of Caddoan pottery in Southeast Texas around 950-650 B.P. (850-550 cal B.P.) has been used to suggest the presence of extended trade networks or migration during this time (Aten 1983). Perdiz arrow points are common and microlithic drills, or perforators, become more visible in the archeological record.

The final prehistoric period has been termed the Old River period by Aten (1983). It lasts from about 600 B.P. until 250 B.P. (ca. 590-230 cal B.P.) and is characterized by an increase in Goose Creek sandy-paste pottery and the decline of Baytown grog-tempered ceramics (Aten 1983). During this period, bone-tempered pottery is introduced and Perdiz arrow points become more pervasive (Aten 1983; Ensor 1995; Story et al. 1990). The Old River (prehistoric) period is followed by the Old River (protohistoric) period, the Early Historic Orcoquisac period and the Late Historic period (Aten 1983).

The subject of Mossy Grove coastal settlement patterning has been discussed by several researchers (Aten 1983; Ensor 1987, 1998; Gadus and Howard 1990; Moore 1995; Patterson 1995, 1996; Story et al. 1990). Most would agree that, beginning with the Late Archaic period or certainly by 2,000 years ago, two distinct settlement systems were in place—a coastal settlement pattern and an inland pattern (Aten 1983; Ensor 1998; Ensor and Carlson 1991; Moore 1995; Patterson 1995, 1996; Story et al. 1990). The establishment of modern environmental conditions by 4,000 years ago over Southeast Texas seems to coincide with the establishment of an inland/coastal settlement dichotomy. Articulating different site types between coastal and inland settings and defining their range and variation has been somewhat problematic. Gadus and Howard (1990), based on work at Peggy Lake, suggest that longer-term residential camps and shorter-term extractive camps (littoral harvesting stations) were present on the coast. This mirrors somewhat the longer-term Type I sites and shorter-term Type II sites defined for inland site types (McReynolds et al. 1988a). Story et al. (1990) describes a minimum of three site types in coastal settings: (1) bay-margin or barrier island camps, (2) shorter-term sites used in transit between major sites (hunting/foraging camps), and (3) inland riverine camps that served as places to exploit fresh-water stream, woodland, and upland prairie species (Story et al. 1990:268).

Patterson (1995, 1996) has postulated that a 15-mile-wide strip along the coast was exploited by local populations and formed the basis of a littoral settlement pattern. Prior to the Late Archaic period, there is evidence that population densities were lower and that the need for social mechanisms to deter group movement between inland and coastal areas was diminished (Aten 1983). Evidence from Eagle's Ridge suggests that such movement did occur on a regular basis during the Early to Middle Holocene and that population densities were lower (Ensor 1998). The question of degree of interaction between coastal and inland groups, the position of group territories or boundaries, and how specific site types may relate to one another are unclear. Site patterning in Southeast Texas could also represent seasonal differences in settlement style by dynamic groupings of related populations (as opposed to separate inland and coastal populations).

Southeast Texas History

In the 1500s, numerous French and Spanish expeditions explored the northern Gulf of Mexico. Spain's first interest in Southeast Texas began in 1519, when Francisco de Garay, the Governor of Jamaica, mapped the Gulf Coast by ship from Florida to Tampico. The Spanish became aware of French activity in the region and began to increase their presence in the area surrounding Jefferson County, establishing several missions, including San Francisco de los Tejas in northeastern Houston County in 1690 (Moore and Heartfield 1982). Spanish attempts to evangelize the Caddoans and plains tribes largely failed and the missions in East Texas were abandoned by the mid-1690s (Fehrenbach 2000; Moore and Heartfield 1982).

Although Indigenous peoples, including the Atakapa, Akokisa, Bidai, Karankawa, and Tonkawa, occupied parts of Southeast Texas (Figure 4), it wasn't until the early eighteenth

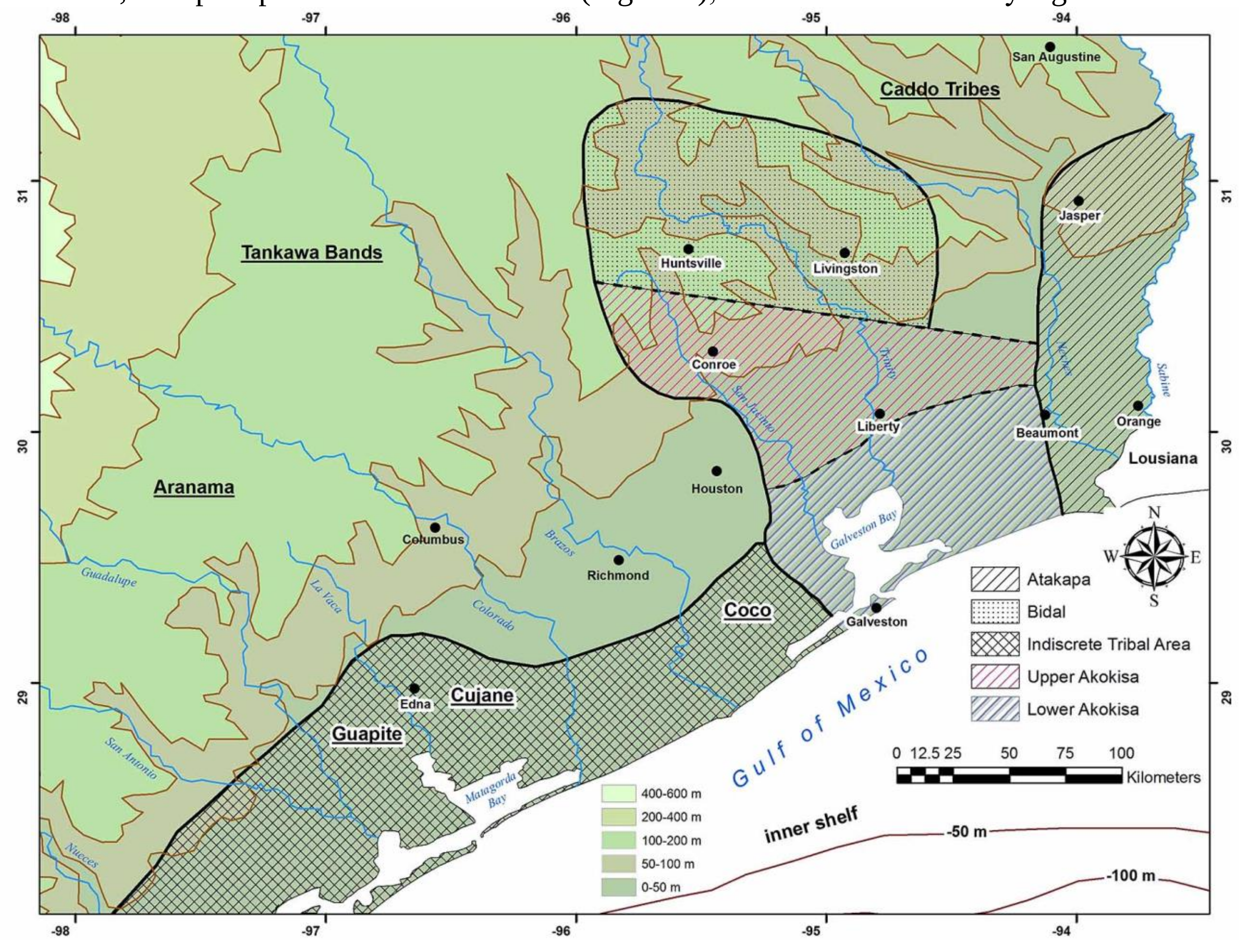


Figure 4. Reconstructed territories of native groups in the early eighteenth century (modified from Aten 1983).

century that European settlements became firmly established (Aten 1983; Patterson 1995). Competition between the Spanish and the French resumed in 1715 after France established Natchitoches in western Louisiana, encroaching on Spanish territory.

Spanish forces captured a French trading post established near the Trinity Delta (Chambers County) in 1754. Two years later the Spanish returned to this location and built Presidio San Agustin de Ahumada and Mission Nuestra Senora de la Luz del Orcoquisac. This Spanish settlement complex has been named "El Orcoquisac" after the Akokisa (Atakapan-speaking) groups who lived in this area.

After a few years, the situation at El Orcoquisac began to unravel. Leadership in the presidio was sorely lacking and the Spanish were unable to provide local native peoples with any economic value. By 1764, many Spanish soldiers had deserted the presidio. A military insurrection resulted in partial burning of the settlement. A hurricane destroyed the mission in 1766 and severely damaged the presidio. The presidio was later rebuilt in an adjacent location.

By 1771, Spanish leadership ordered the abandonment of the El Orcoquisac complex, due to its ineffectiveness and lack of strategic importance.

Europeans were largely absent in Southeast Texas for a time following the desertion of El Orcoquisac. The ruins at El Orcoquisac were used for several years afterwards as a meeting place by local native peoples. 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). The Spaniard's description of the region relates one of the best, extant late-eighteenth-century published accounts of the remote area adjacent to modern Jefferson County (Holmes 1968). Piernas found the land to be "the most beautiful, agreeable, and pleasant country of all Louisiana".

In the 1780s, Alabama-Coushatta tribes began migrating westward into Texas from Louisiana and other parts of the Southeast. In 1803, the French sold the Louisiana Territory to the United States, and shortly after, in 1813, the Sabine River was designated as the western border of United States (Moore and Heartfield 1982). In 1805, the United States and Spain made an agreement that the land between the Arroyo Honda and the Calcasieu and Sabine Rivers would be neutral ground. This resulted in mixed settlement of Spanish, American, French and Indigenous groups.

Mexico gained independence from Spain in 1821, and with a change in government, came a change in settlement patterns in Southeast Texas. The Mexican government, unlike the Spanish, encouraged Americans to settle in the area by offering land grants and empowering people to organize the colonization. Stephen F. Austin was most prominent among such facilitators. Austin played a major part in settling hundreds of white families in East Texas and unifying the newly settled population (Moore and Heartfield 1982). Tensions between the newly arrived Texans and Mexican government grew over the course of several years culminating in the Texas Revolution in 1835. Just prior to the revolution, Jefferson County was established as a Mexican municipality. The Texas Declaration of Independence was signed on March 2, 1836, at Washington-on-the-Brazos, designating Texas as a Republic. Within that same year, boundaries were established for both Liberty and Harris Counties by the Texas Congress (Moore and Heartfield 1982). In the following years, Texas saw a major population increase of Anglo-American settlers (Moore and Heartfield 1982).

Texas became the twenty-eighth state of the United States in 1845. Americans from all around the south began pouring into the new frontier lands. The Board of Land Commissioners offered land grants, enabling many small farms, large ranches, and plantations to be established along local waterways, such as the Trinity River. An influx of slaves came along with the influx of Americans. The increased population of African American slaves almost exclusively occurred in the southeastern frontier of Texas, as this area was best suited for the planation-style farming of cotton, sugar cane, and other crops given its lush soils and muddy rivers (Fehrenbach 2000). In 1861, Texas voted to join the Confederacy in the American Civil War. Although Texas saw little military action in the war; battles in Southeast Texas included the Confederate loss and recapture of Galveston in 1862-1863, and a failed Union attempt to capture Sabine Pass in 1863 (Moore and Heartfield 1982).

By 1870, Texas was once again part of the United States. For the next decade, Texas was in the era of Reconstruction, with all authority residing in Washington, D.C. During that time, the Texan economy was severely depressed and lacked transportation infrastructure to grow much beyond the local subsistence level. Many plantations continued to operate along the waterways of

Southeast Texas with convict laborers leased from the Texas prison system. In 1872, railroads connected the region to more distant locales increasing commercial farming, with cotton being the primary crop. Cattle farming also increased significantly, nearly doubling by the 1900s (Moore and Heartfield 1982). Industrialization began to flourish in the 1880s, not only with cotton, but also flour milling and lumber. Oilfields were also discovered by the early 1900s in the Beaumont area and drove Texan industrialization for the foreseeable future. In 1890, the first oil refinery was built in Corsicana, which led to the production of natural gas, hitting its height with the discovery of the panhandle gas field in 1927. Petroleum products became the base of Texas economy (Moore and Heartfield 1982).

Historic Land Use

An examination of various historical maps and numerous aerial photographs from 1944 to the present suggest that most of the tract was heavily forested until the early 1990s (Drake 2017). Disturbance to the western and easternmost portions of the APE have likely occurred within the past 25 years in association with housing development (i.e., "Stable Gate, Stable Wood Farms, Park Creek, and the Reserve at Park Creek") and flood control measures (spill ways, water detention basins) in the immediate vicinity of the APE. Channelization to Little Cypress Creek is evident upstream of the current APE as early as 1978.

PREVIOUS INVESTIGATIONS

Prior to beginning field investigations, Moore Archeological Consulting, Inc., performed a background investigation of archeological and historical literature relevant to the project area. The current assessment supplements a recent desktop review produced by Spirit Environmental (Drake 2017), which was completed on behalf of HCED and Aguirre & Fields. Literature examined for this project includes site inventory records on file at the Texas Archeological Research Laboratory (TARL), previous archeological investigative reports on file at the Texas Historical Commission (THC) and Moore Archeological Consulting, Inc. and other published literature pertinent to the current project.

The archival background search determined that no previously recorded archeological sites are located in, or within the APE. However as noted by Drake (2017), previously recorded (but now destroyed) historic site 41HR1003 lies within 500 meters of the western edge of the APE. Site 41HR1003 consists of structural ruins and surface artifacts dating to the early 20th century, representing an early homestead. Though the structure has been demolished, archival research indicated a homestead existed at the site in 1915.

Other sites historic sites within a few miles downstream of the APE include 41HR750 and 41HR392. Site 41HR750 is the Becker/Roeder Cemetery, located 1.9 km (1.2 miles) south-east of study area. The cemetery was in use from 1866-1923 and was used by early German immigrants to the area. This cemetery is known by local residents as "Becker cemetery" and the road leading to it bears the same name. On the USGS 7.5-minute Cypress quad map, it is marked as "Roeder cemetery." Members of both the Roeder and Becker families are buried in the cemetery. Site 41HR392 consists of an historic homestead dating to the 19th and 20th centuries. It appears to be one of the oldest houses left in the area and may be typical of other early structures. It is a frame structure, one-story with attic, and has some additions to the rear (Stoddart and Mangum 2014).

A review of previous archeological investigations in north-west Harris County revealed only a limited amount of work has been conducted in the area. In 2005, a survey conducted by MAC at the confluence of Little Cypress Creek with Cypress Creek identified numerous prehistoric occupation sites, several of which were recommended for further investigation (Ensor 2006). The downstream area below the confluence with the main branch of Cypress Creek includes numerous prehistoric sites like the Meyer Park site (41HR991) and National Register Ceramic Period site investigated by MAC in 2009 (Driver 2011).

Upstream from the current project area sites appear scarce, although archeological survey has been comparatively limited. A June 2005 survey of an area a few miles upstream of the current APE resulted in the identification of one new prehistoric site (41HR996), though no further work was recommended as the site consisted of isolated debitage only (Mangum and Moore 2005). Another MAC survey was conducted in September 2005 in a nearby tract to the south and included both shovel testing and backhoe trenching. A single flake was recovered but was determined to be an isolated find (Driver et al. 2005). In 2008, archeologists from MAC conducted a cultural resource survey of a proposed bridge erosion prevention project at Telge Road and Little Cypress Creek (Driver 2009). No archeological or historic sites were discovered.

In 2011, archeologists from Gulf Coast Archaeology Group, LLP carried out a Phase I cultural resources survey of a linear easement and proposed detention basin located just south of the current APE (Garcia-Herreros and Noel Enderli 2011). No cultural resources were observed. Another “no-find” survey was carried out by MAC to the east of the current APE and on the same Louetta Rd. alignment (Stoddard and Mangum 2014). This work occurred prior to the most recent Louetta Rd. construction segment on the eastern edge of the current project area.

FIELD METHODS AND RESULTS

Fieldwork was conducted from May 1-4, 2018 and consisted of an intensive pedestrian survey and backhoe trenching. Pedestrian survey included systematic shovel testing and visual examination for surface exposure of cultural materials. The project area covered approximately 22 acres. Shovel tests were excavated throughout the project area following THC standards for area surveys. Based on the APE, a minimum of 30 (40 cm x 40 cm) shovel tests were needed to meet THC survey standards.

A total of 33 shovel tests were excavated during the survey, all with negative results for cultural material (Figure 5). Each shovel test was excavated in 10 cm arbitrary levels, to intact sterile clay subsoil (Bt horizon), and screened through ¼" mesh. The shovel tests were recorded on Moore Archeological Consulting shovel test forms, using PDF Viewer on an iPad, in the field. Each shovel test was recorded on a Geo-series 7X Trimble GPS unit. Shovel test locations were laid out ahead of time in ArcGIS. Field photos were recorded on MAC photo log sheets. Visual survey was conducted over 100% of the project area tracts.

The APE is a 22-acre tract connecting the two dead ends of Louetta Road at Telge Road in the east and Stablewood Farms Drive in the west. This is a wooded area centered on Little Cypress Creek (Figure 6) with housing developments flanking each branch of the planned right of way. The west end of the tract is the intersection of Louetta and Stablewood Farms Drive and the east end is the intersection of Louetta and Telge Road. The majority of the tract is covered in a wooded area (composed primarily of pines) with a number of dirt paths. Thirty shovel tests were excavated in the wooded area, seventeen on the west side of the creek and thirteen on the east side (Figure 7). Many shovel tests showed evidence of recent flooding and evidence of recent disturbance. The only cleared area is approximately 100 meters of mowed grass on the west end of the tract (Figure 8). Two shovel tests were excavated in this open area and both were heavily disturbed with about 20cm of fill on top. One shovel test was placed on a sandbar within the Little Cypress Creek to ascertain whether active stream processes are adding or removing cultural materials from the project area. No cultural materials were found in any of the 33 shovel tests excavated.

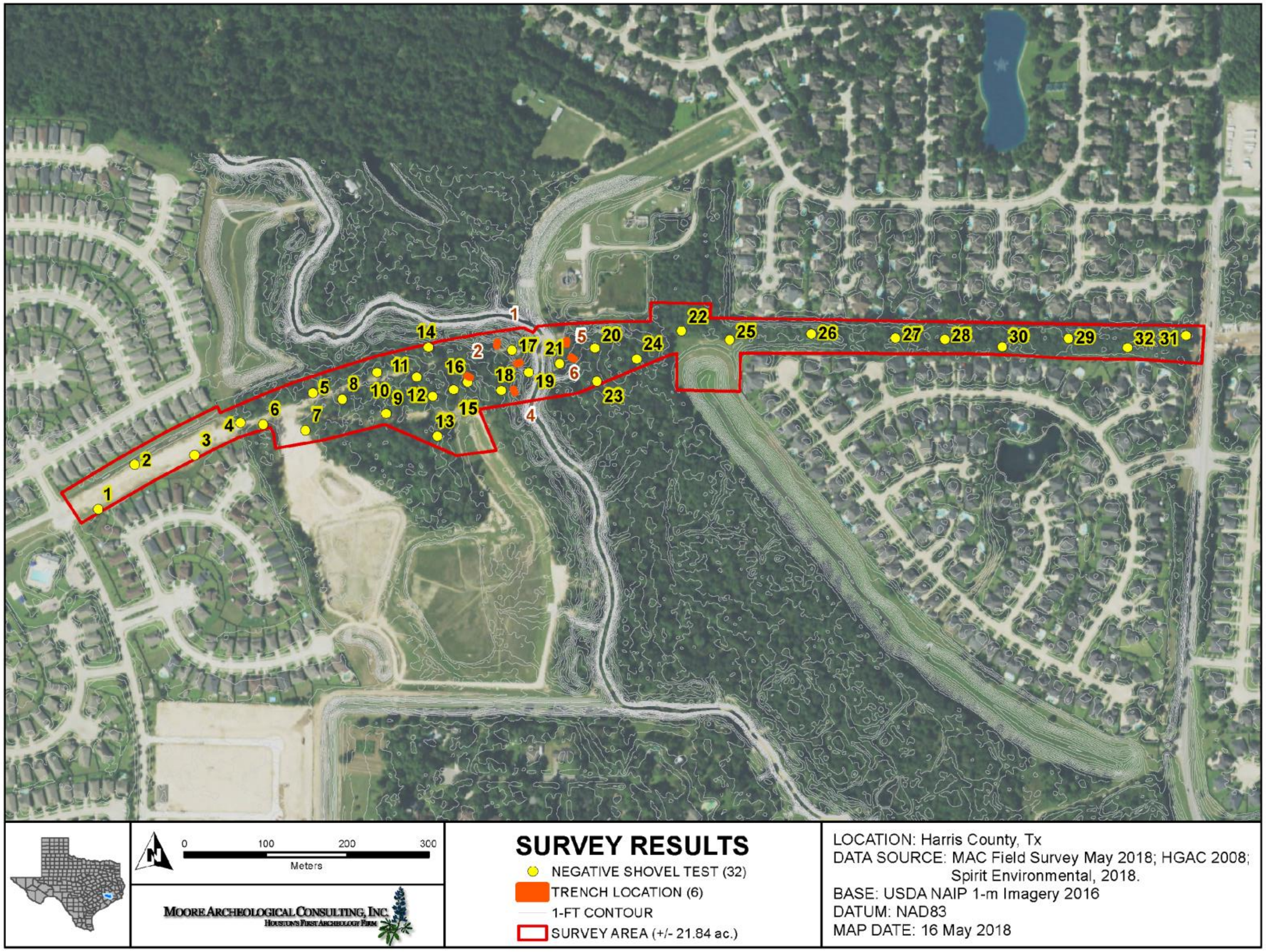


Figure 5. Project APE with shovel tests and backhoe trenches indicated.

Figure 6. Sandy channel of Little Cypress Creek within project area facing south -southwest. Shovel Test 33 was located on that sandy bank in the foreground.


Figure 7. Wooded linear area on eastern branch of APE. Facing north northwest.


Figure 8. Cleared part of APE looking west toward Stablewood Farms Dr.

Backhoe Trenching Results

Deep testing for archeological materials was carried out on the west and east sides of Little Cypress Creek within the APE to identify any deeply buried cultural resources (Figure 9). The western bank of the APE includes a broad meander loop and associated point bar deposits with greater presumed preservation potential for deeply buried archeosediments. Accordingly, four of the six backhoe trenches completed were situated along the west bank.

Trenches were dug to a maximum safe depth (approximately 2 meters) and 3-5 meters in length. The trenches were stepped to meet OSHA requirements. The trench locations were mapped using a Geo-series Trimble GPS Unit. The soils and stratigraphy in each trench were documented with iPAD tablets using MAC digital trench forms. Detailed orthophotos of each trench profile were produced using Agisoft Photoscan. Once completed each backhoe trench was backfilled. No cultural materials were identified during excavation of the backhoe trenches.

The banks of the Little Cypress creek in the project area are dominated Hatliff-Pluck-Kian complex and Gessner Series soils (USDA 2018). Most soils observed during geotrenching were consistent with the Hatliff Series, which are deep loamy, well drained and developed in Holocene alluvium parent material. The soils observed appear consistent with cumulic soils in dynamic near channel environments where soil formation is only weakly expressed (AB, Bw, Bt, Bg horizons) and often interrupted by relatively unweathered sandy flood drapes (C, AC). Many of the geotrench and shovel test profiles observed within the APE revealed evidence of a widespread recent flood deposit (i.e. a 5-15 cm fine sugary sand drape), possibly associated with flooding caused by tropical storm Harvey. Other salient trench profile observations include widespread apparent disturbance in the form of cut and filled area. Apparent disturbed horizons (e.g. ^Bw, ^AB) in which sub-soil and top soil elements intermingled in non-natural ways (e.g. clay masses and root mats inverted and concentrated in non-conformable ways). Although no modern materials (aggregates, bottles, 21st century trash) was observed in profile, the preponderance of trenches were suggestive of superficial anthropogenic disturbance (from 0 to 50 centimeters below surface - cmbs) with heavy machinery within the APE. No material culture evidence was observed in the deep trenching undertaken here. Geological and pedological observations for trenches 1-6 are described and illustrated below (Tables 3-8).

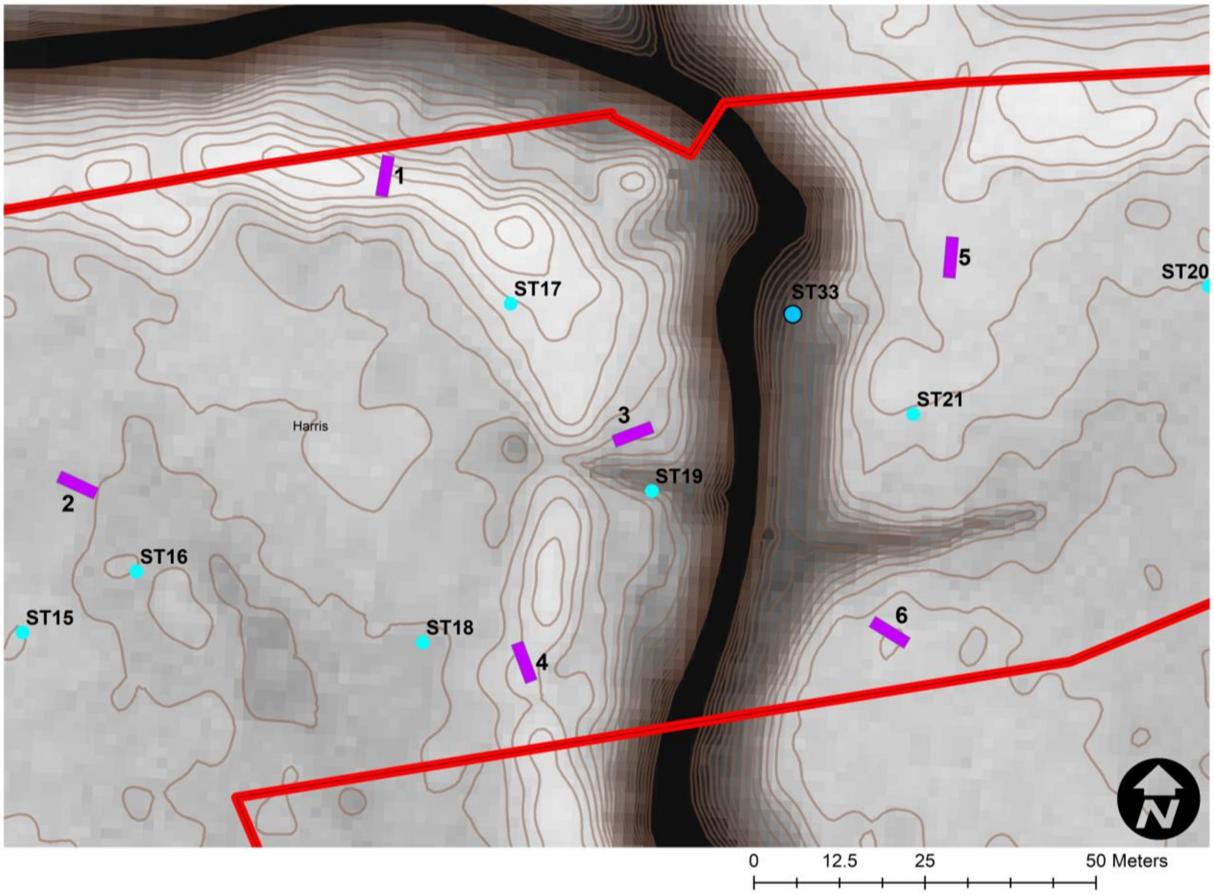


Figure 9. Close up of shovel tests (blue) and backhoe trenches (purple) near Little Cypress Creek. APE in Red (Basemap derived from HGAC 2008 LIDAR, 1 ft contours).

Table 3. Backhoe Trench 1 description.

Trench 1

3 meters long, 2 meters wide, 1.9 meters depth, East Wall
10° azimuth, N3321674, E243083 (UTM NAD 83, Zone 15N).

Zone	Horizon	Geologic Unit	Munsell	Texture	Description
1 (0-10 cm)	A		10YR4/2	Silty Loam	Common coarse and fine roots, loose, loose, very fine and massive. Dark melanized organic horizon. Clear smooth boundary.
2 (10-80)	Bw		10YR5/4	Silty Clay Loam	Very friable. Weak, fine, granular structure. Many distinct 10YR6/2 irregular mottles. Common medium distinct 10YR5/8 irregular redox concentrations in matrix with clear boundary. Clear wavy lower boundary.
3a (80-120) 3b (120-140)	A/C 2Bw	Holocene Alluvium	10YR6/4	Sandy Loam to Silty Clay Loam	Sandy (A/C) alluvium in top 40cm grading to Bw below. Friable, structureless at top to weak fine granular at base. Lower part has many coarse distinct irregular mottles (10YR5/8). Common coarse distinct 10YR5/8 irregular Fe redox masses in matrix with diffuse boundaries. Clear wavy boundary.
4a (140-160) 4b (>190)	2A/C 3Bw		10YR5/4	Sandy Loam to Silty Clay Loam	Friable to firm. Massive to weak fine granular structure. Lower part has many coarse distinct irregular mottles (10YR5/8). Common coarse distinct 10YR5/8 irregular Fe redox masses in matrix with clear boundaries.

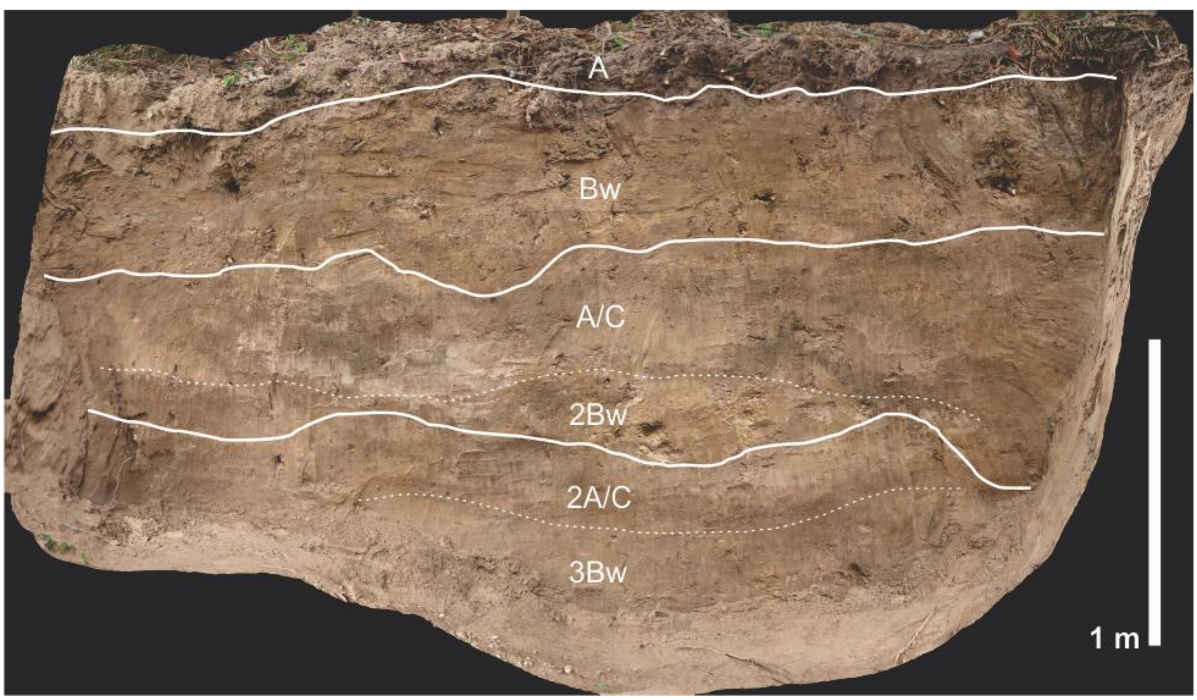


Table 4. Backhoe Trench 2

Trench 2					
3.7 meters long, 2 meters wide, 1.8 meters depth, Northeast Wall *115° azimuth*, N3321628, E243037 (UTM NAD 83, Zone 15N).					
Zone	**Horizon**	**Geologic Unit**	**Munsell**	**Texture**	**Description**
1 (0-15 cm)	C	Holocene Alluvium	10YR6/3	Fine Sand	Loose, fine sugary sand. Recent sand drape deposit, thickest on eastern margin of trench. Very abrupt, smooth boundary.
2 (15-30)	A		10YR4/2	Silty Clay Loam	Friable. Weak, fine, granular structure. Overlain on western margin of trench by clayey disturbed ^Bw material. Abrupt smooth lower boundary.
3	AB		10YR5/2	Silty Loam	Friable. Weak very fine granular structure. Common medium faint irregular 10YR5/4 mottles. Clear wavy boundary.
4	2AB Bg		10YR5/3	Silty Clay Loam	Firm. Weak fine granular structure. Many sand filled burrows lined with dark clay. Grades from darker organic rich sub-horizon in upper 25cm to a partly reduced matrix in the lower part. The Bg sub-horizon has many very coarse faint irregular 10YR6/6 redox masses in the matrix with clear boundaries.

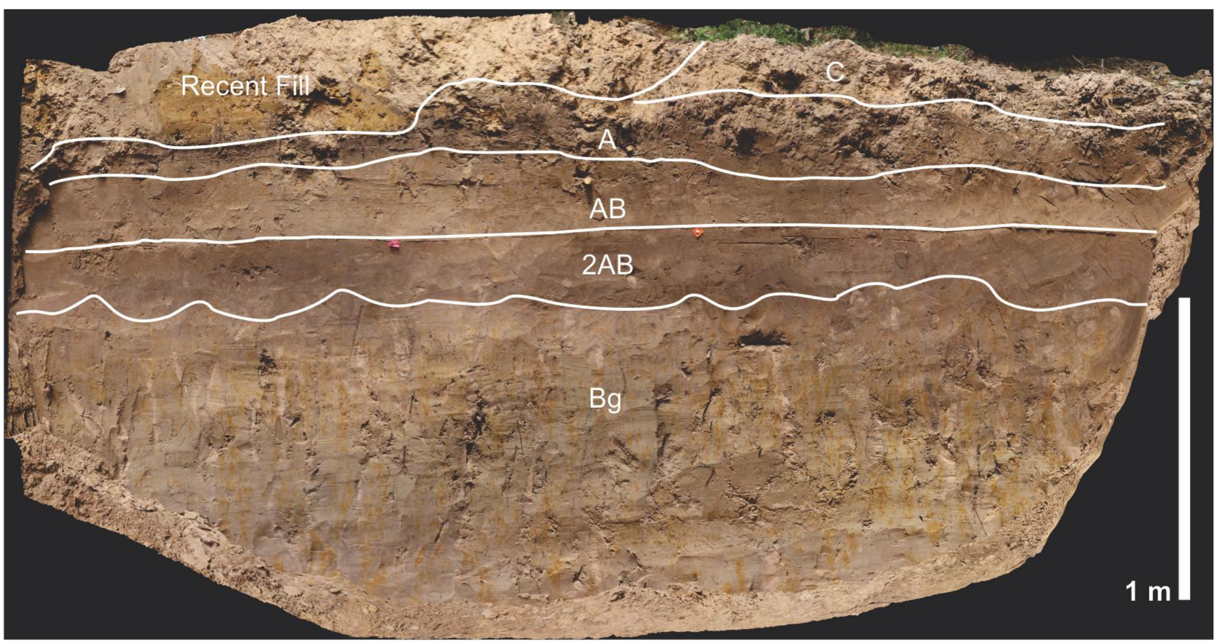


Table 5. Backhoe Trench 3

Trench 3					
3 meters long, 3 meters wide, 2.35 meters depth, North Wall *69° azimuth*, N3321635, E243120 (UTM NAD 83, Zone 15N).					
Zone	**Horizon**	**Geologic Unit**	**Munsell**	**Texture**	**Description**
1 (0-15 cm)	C	Holocene Alluvium	10YR7/3	Fine Sand	Loose, structureless, fine sugary sand. Recent sand drape deposit, thickest on eastern margin of trench. Very abrupt, smooth boundary.
2 (15-65)	A AB		10YR4/4	Silty Loam	Very friable. Weak, fine, granular structure. Cut and filled by clayey disturbed ^Bw material. Clear smooth lower boundary.
3 (10-55)	ˆBw		10YR6/3	Silty Clay Loam	Firm. Moderate medium subangular blocky structure. Many coarse distinct 10YR5/6 irregular redox concentrations in matrix with clear boundaries. Abrupt smooth boundary.
4 (65-130)	Bg		10YR5/3	Silty Loam	Friable. Weak fine granular structure. Grades downward at 100 cmbs to lighter sandy loam with less clay. Common coarse distinct irregular very friable 10YR5/6 finely disseminated redox concentrations with clear boundaries in matrix. Gradual smooth boundary.
5 (130-220)	2C1		7.5YR7/3	Fine Sand	Loose structureless alluvium with narrow band of clayey loam at 180 cmbs. Massive otherwise.
6 (>220)	3C2		10YR4/2	Sandy Clay Loam	Very friable, structureless melanized sand. Wet and likely near water table.

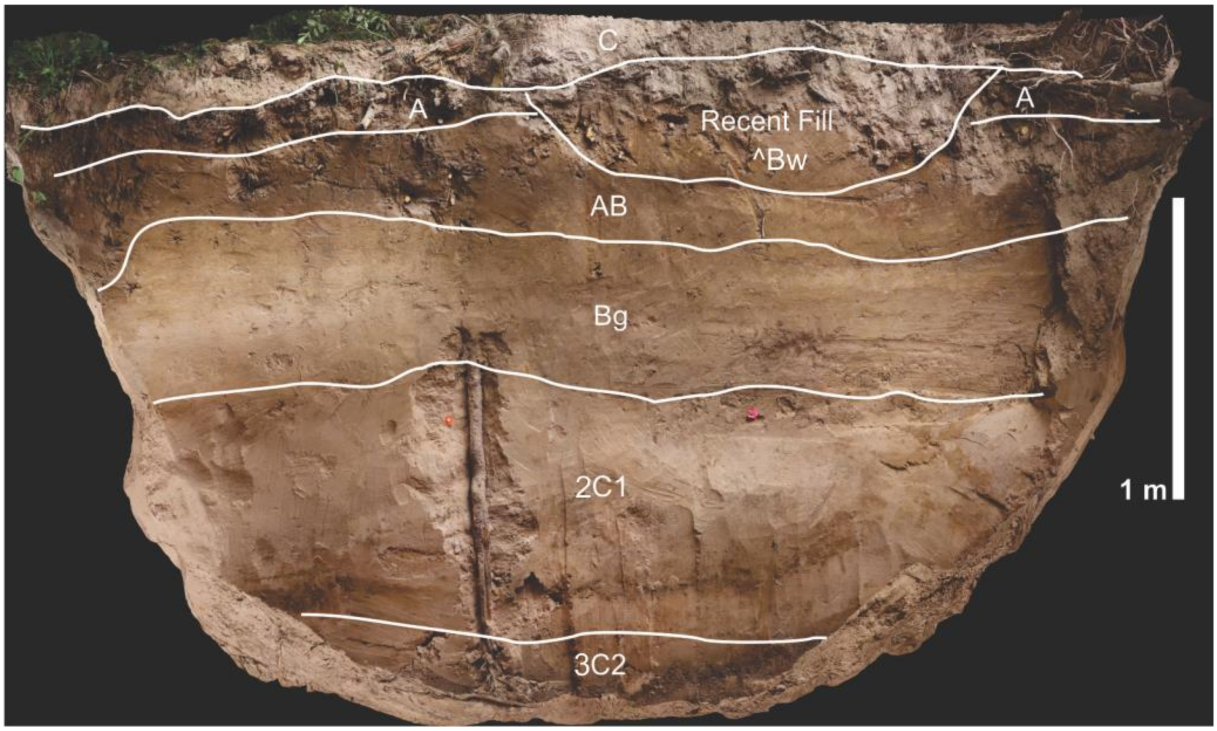


Table 6. Backhoe Trench 4

Trench 4					
3 meters long, 3 meters wide, 2 meters depth, Southwest Wall *340° azimuth*, N3321602, E243102 (UTM NAD 83, Zone 15N).					
Zone	**Horizon**	**Geologic Unit**	**Munsell**	**Texture**	**Description**
1 (0-10 cm)	A	Holocene Alluvium	10YR5/6	Silty Loam	Loose, structureless, Recent root dense organic rich A-Horizon. Abrupt, smooth boundary.
2 (10-50)	AB		10YR5/4	Silty Loam	Friable. Weak, fine, granular structure. Clay lamellae dispersed throughout. Clear wavy lower boundary.
3 (50-135)	Bw *^ABw*		7.5YR7/6-10Y4/2	Silty Clay Loam	Disturbed horizon- clay rip ups in sandy matrix with patches of carbon rich material. Friable to firm, moderate fine subangular blocky structure. Common medium distinct 10YR5/4 clear irregular very friable redox masses in matrix. Clear smooth boundary.
4 (135-150)	Bw2 *^ABw*		10YR5/2	Silty Clay Loam	As above, but darker and more clayey. Very abrupt smooth boundary.
5 (150-170)	C		10YR6/3	Fine Sand	Very friable structureless sugary sand alluvium. Very abrupt smooth boundary.
6 (>200)	C2		7.5YR5/3	Fine Sand	Very friable, structureless sugary sand alluvium.

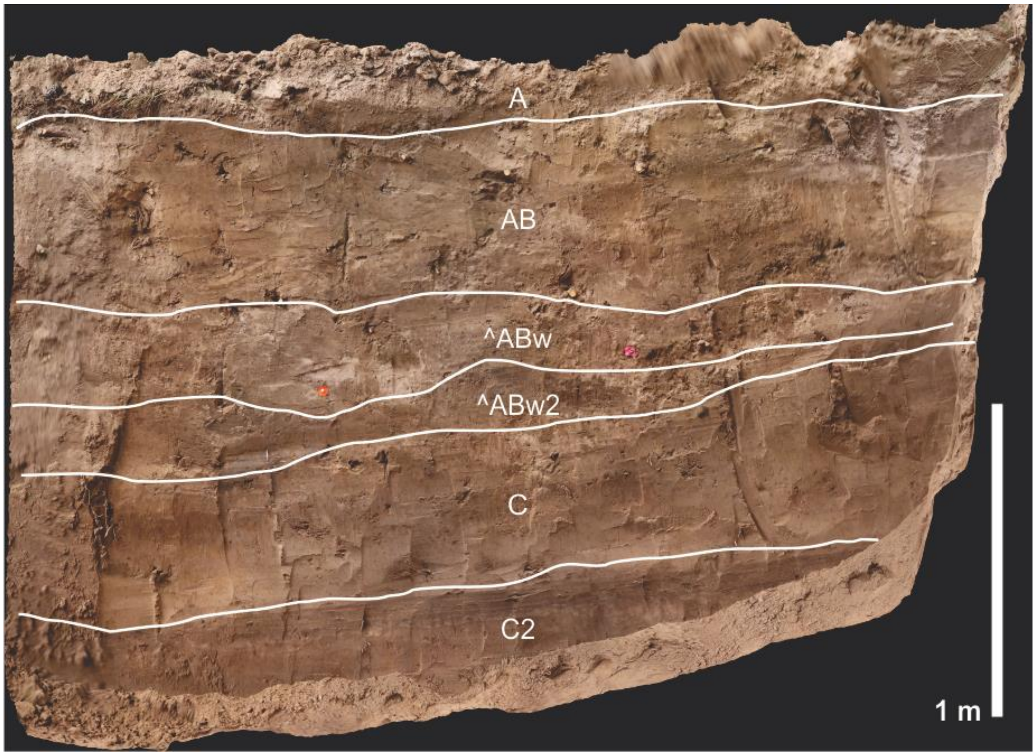


Table 7. Backhoe Trench 5

Trench 5					
3.7 meters long, 2 meters wide, 1.8 meters depth, East Wall *185° azimuth*, N3321663, E243164 (UTM NAD 83, Zone 15N).					
Zone	**Horizon**	**Geologic Unit**	**Munsell**	**Texture**	**Description**
1 (0-100 cm)	ˆAB	Holocene Alluvium	10YR5/4	Clay Loam	Very friable. Moderate medium granular structure. Disturbed AB horizon with numerous clay loam "rip ups" and commingled organics (root mat). Many very coarse distinct 10YR6/2 cylindrical reduced matrix bodies with diffuse boundaries. Common medium distinct irregular 7.5YR5/6 very friable redox masses with sharp boundaries in matrix. Few medium Fe/Mn concretions in matrix. Abrupt, irregular boundary.
2 (100->180)	Bt		10YR5/3	Sandy Clay Loam	Upper boundary is truncated. Firm. Moderate medium subangular blocky structure. Many extremely coarse distinct irregular 10YR6/2 reduced matrix bodies with clear boundaries. Many extremely coarse prominent irregular 7.5YR5/6 very friable redox masses in matrix with clear boundary.

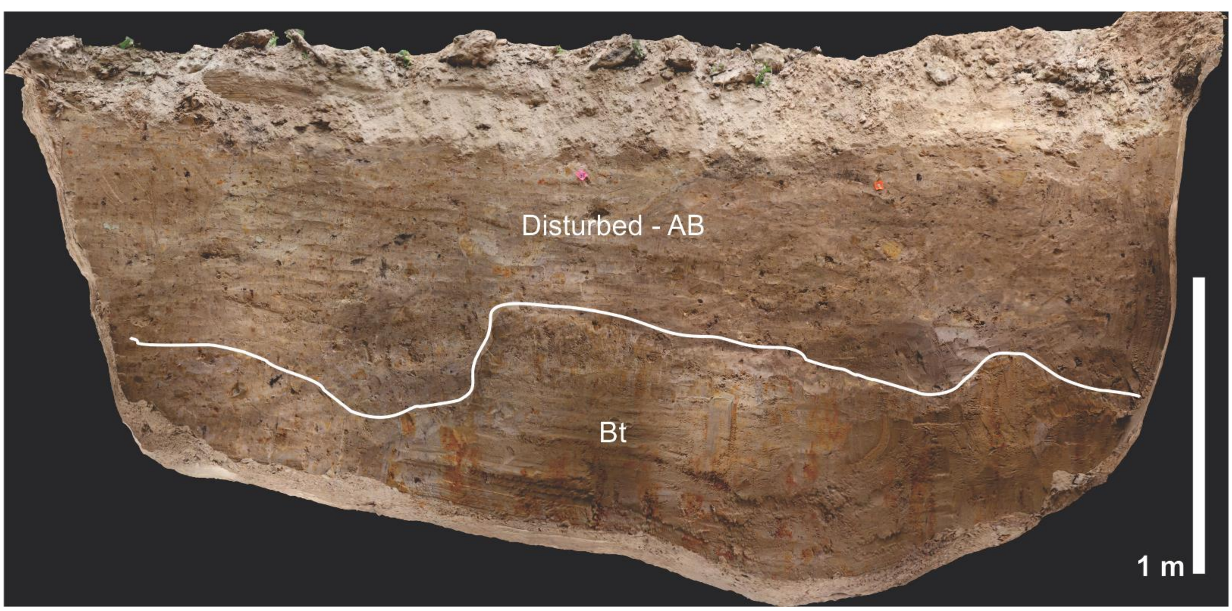
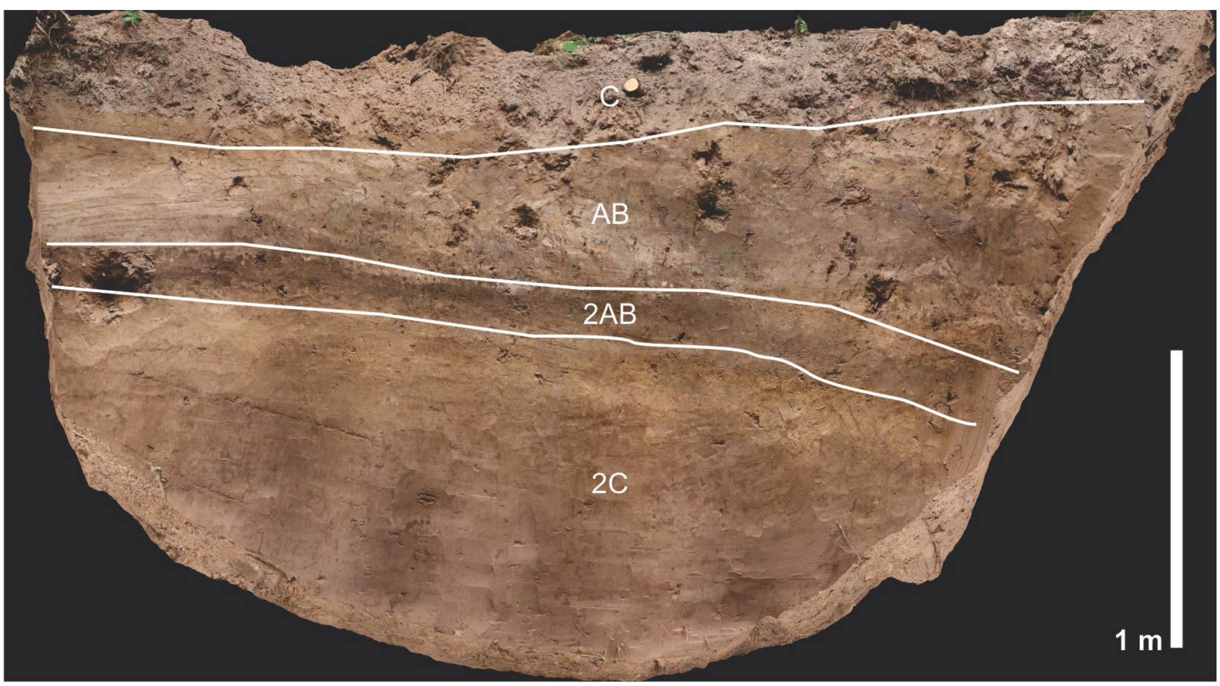


Table 8. Backhoe Trench 6

Trench 6					
3 meters long, 2 meters wide, 1.8 meters depth, South Wall *122° azimuth*, N3321607, E243156 (UTM NAD 83, Zone 15N).					
Zone	**Horizon**	**Geologic Unit**	**Munsell**	**Texture**	**Description**
1 (0-50 cm)	C	Holocene Alluvium	10YR7/4	Sandy Loam	Clear fresh loose, structureless alluvium. Mixed some, silty-to sandy loam. Not sugary sand as other flood drapes in APE. Abrupt, smooth boundary.
2 (25-50)	ˆAB		10YR5/4	Sandy Clay Loam	Common very coarse distinct 10YR5/2 cylindrical clay ball mottles. Common medium prominent irregular 7.5YR5/6 redox masses in matrix with clear boundary.
3 (50-70)	2AB		10YR4/3	Silty Clay Loam	Friable. Weak medium granular structure. Truncated at top of horizon. Leached zone at 75 cmbs (10YR5/3) with few medium firm distinct Fe/Mn concretions. Bt horizon is more developed on western edge of trench. Gradual smooth boundary.
4 (70-180)	2C		10YR5/4	Fine Sand	Very friable, structureless. Unmodified alluvium.



CONCLUSIONS AND RECOMMENDATIONS

On May 1-4, 2018, Moore Archeological Consulting conducted an intensive pedestrian survey and deep backhoe trench-testing of approximately 22 acres following the alignment of proposed Louetta Road and Bridge construction along Little Cypress Creek in northwestern Harris County, Texas. The investigations were conducted for Spirit Environmental and the Harris County Engineering Department under Texas Antiquities Permit Number 8388. The objectives of the investigation were to locate and identify cultural materials, sites, or historic properties within the proposed impact area, and to prepare management recommendations regarding any identified resources. A total of 33 shovel tests and 6 deep backhoe trenches were excavated. A 100% visual survey was also conducted within the project area. Thirty-three shovel tests (n=33) and six backhoe trenches were excavated during this work. All sub-surface probes were negative for material culture. No standing structures or cultural resources of import were observed during these investigations. No archeological sites were observed during these investigations. No further archeological work is recommended. Paper records from these investigations will be curated at the Center for Archaeological Research at the University of Texas-San Antonio. In the event that archeological deposits or features should be encountered during construction, work should cease in the immediate vicinity and the Archeology Division of the Texas Historical Commission contacted for further consultation.

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ST #	Status +/-	Depth (CMBS)	Profile Description	Location Description	Excavator
1	Negative	0-15	10YR6/4 loamy clay, rigid, mottled with 10YR7/8 golf ball sized gravel	Manicured lawn near end of Louetta road, southeast side of road	Holt and Orsini
		15-30	10YR6/2 loamy sand, loose		
		30-100	10YR4/3 loamy sand, loose		
2	Negative	0-10	10YR5/4 silty clay loam, friable, A/B, Disturbed, compact, mottled	open grassy mud tracks near adrainage ditch	Costa and Hogan
		10-18	10YR4/4 silty clay loam, rigid, A/B, disturbed, compact, mottled		
		18-30	10YR3/2 clay loam, Bt, intact		
3	Negative	0-8	10YR6/4 silty loam, friable, A/B, disturbed	grassy field	Costa and Hogan
		8-30	10YR6/2 silty clay loam, firm, Bt, intact but truncated with 10YR8/1 grey mottoes, firm, Bt, 5cm across		
4	Negative	0-10	10YR5/8 clay, rigid, disturbed, redox staining throughout	grassy field edge of access road	Orsini and Holt
		10-35	10YR5/8 clay, rigid, disturbed, redox staining throughout		
		35-100	10YR2/2 loamy sand, loose, some redox staining		
5	Negative	0-4	10YR5/3 loam, friable, O, intact	just inside tree line north of dirt road	Costa and Hogan
		4-8	10YR7/4 fine sand, loose, E, intact, alluvial flood drape		
		8-30	10YR4/3 fine sand, loose, A/E, intact		
		30-85	10YR4/4 fine sand, loose, E, intact, increasing Fe/Mn concretions at depth		
		85-95	10YR4/6 sandy clay loam, firm, Bt, intact		
6	Negative	0-40	10YR5/4 sandy clay, firm, with 10YR6/8 and 10YR6/1 mottling	grassy field	Orsini and Holt
		40-100	10YR5/1 silty clay, mottled with 2.5YR3/4, very moist		
7	Negative	0-3	10YR5/2 clay loam, firm, O	Grassy area near clearing. Adjacent to waterlogged area	Costa and Hogan
		3-18	10YR6/4 clay loam, firm, C, disturbed		
		18-28	10YR3/2 clay loam, firm, A, natural profile		
		28-50	10YR4/2 sandy loam, friable, A/E		
8	Negative	0-5	10YR4/4 clay loam, firm, disturbed	south of dirt road. Heavy brush and low grass. Pine trees nearby	Costa and Hogan
		5-30	10YR6/4 silty loam, friable, A/E, intact		
		30-50	10YR6/4 fine sand, loose, E, intact		
9	Negative	0-15	10YR5/4 sandy clay, firm	grassy field	Orsini and Holt
		15-50	10YR4/4 sandy loam, friable		
		50-100	10YR6/3 fine sand, loose, moist		

ST #	Status +/-	Depth (CMBS)	Profile Description	Location Description	Excavator
10	Negative	0-4	10YR6/4 silty loam, loose, C, disturbed	north of dirt trail, low grass, nearby pine trees.	Costa and Hogan
		4-8	10YR5/6 sily clay loam, firm, disturbed		
		8-60	10YR4/4 fine sand, loose, A/E, intact but truncated		
		60-80	10YR4/4 sandy clay, firm, E, intact		
11	Negative	0-5	10YR7/3 sand, friable	Near pine trees just south of access road	Orsini and Holt
		5-95	10YR5/4 sand, loose		
		95-100	10YR7/4 clayey sand		
12	Negative	0-10	10YR5/3 loamy sand, loose	pine tree cover, lots of fallen trees.	Orsini and Holt
		10-100	10YR6/4 sand, loose		
13	Negative	0-3	10YR4/3 silty loam, friable, O, intact	wooded area between dirt path and flood control canal	Costa and Hogan
		3-20	10YR5/4 silty loam, friable, A/E, intact		
		20-45	10YR4/3 silty clay loam, friable, E, intact		
14	Negative	0-2	10YR6/4 fine sand, loose, intact	Wooded area near dirt road. Has been partially cleared	Costa and Hogan
		2-40	10YR5/4 silty loam, friable, A/E, mottled		
		40-90	10YR5/3 silty loam, friable, E, mottled		
15	Negative	0-15	10YR6/6 clay, rigid, disturbed, likely result of push from two track directly E of ST	on edge of flooded path just north of detention basin	Orsini and Holt
		15-40	10YR4/2 silty sand, friable, disturbed, likely result of push from two track directly E of ST		
		40-100	10YR6/3 sand, friable		
16	Negative	0-2	10YR6/4 silty loam, friable, O	Wooded area	Costa and Hogan
		2-10	10YR6/4 fine sand, loose, C		
		10-20	10YR4/3 silty clay loam, firm, A		
		20-45	10YR5/3, friable, Bt, mottled		
		45-80	10YR6/3 fine sand, loose, E, intact		
17	Negative	0-10	10YR5/3 sandy silt, firm, roots and rocks throughout	wooded area	Orsini and Holt
		10-100	10YR5/4 silty sand, friable, roots and rocks throughout		
18	Negative	0-15	10YR4/4 clayey silt, friable	tall trees, palmettos, not much brush, about 10m west of little cypress creek	Orsini and Holt
		15-100	10YR6/3 silty sand, loose		
19	Negative	0-10	10YR6/3 fine sand, loose, C	on right, west bank of creek on looting path	Costa and Hogan
		10-15	10YR5/3 fine sand, friable, C		
		15-30	10YR6/3 fine sand, loose, C		
		30-55	10YR5/3 sandy loam, friable, A/C		

ST #	Status +/-	Depth (CMBS)	Profile Description	Location Description	Excavator
20	Negative	0-100	10YR6/3 silty clay, loose, some calciumt concretions starting at 40cmbs	in a clearing in woods, lots of poison ivy	Orsini and Holt
21	Negative	0-3	10YR5/3 silty loam, loose, intact	wooded area east of creek. Pine trees nearby.	Costa and Hogan
		3-25	10YR6/4 clay loam, firm, Bt, mottled, large number of roots (incomplete ST)		
22	Negative	0-100	10YR5/3 sandy loam, friable	Just north of linear flood control ditch. In woods	Orsini and Holt
23	Negative	0-4	10YR3/2 silty loam, loose, O, intact	wooded area, large number of pine trees	Costa and Hogan
		4-24	10YR4/4 silty loaam, friable, A/E, intact		
		24-100	10YR5/4 fine sand, friable, E, intact		
24	Negative	0-30	10YR5/3 silty loam, loose	wooded area directly west of trail	Orsini and Holt
		30-95	10YR4/2 silty loam, friable		
		95-100	10YR6/3 sandy clay loam, friable		
25	Negative	0-2	10YR6/2 silty loam, loose, O, intact	low grass, south of flood control, pine trees just to the north	Costa and Hogan
		2-20	10YR6/3 silty clay loam, friable, A/B, mottled		
		20-50	10YR5/3 silty clay loam, friable, E, intact		
26	Negative	0-10	Heavily mottled and disturbed clay	In a narrow wooded strip between two houses on the east side of the project area	Orsini and Holt
		10-100	10YR5/4 loamy sand, loose		
27	Negative	0-2	10YR2/2 silty loam, loose, O, intact, Large number of iron manganese concretions throughout	In a narrow wooded strip between two houses on the east side of the project area	Costa and Hogan
		2-20	10YR4/3 silty loam, friable, A/E, mottled, Large number of iron manganese concretions throughout		
		20-55	10YR4/4 silty clay loam, friable, E, intact, Large number of iron manganese concretions throughout		
		55-70	10YR6/3 sandy clay loam, friable, E, intact, Large number of iron manganese concretions throughout		
28	Negative	0-100	10YR5/4 loamy sand, some clay inclusions last 5cm	In a narrow wooded strip between two houses on the east side of the project area	Orsini and Holt
29	Negative	0-3	10YR3/2 silty loam, loose, O, intact	In a narrow wooded strip between two houses on the east side of the project area	Costa and Hogan
		3-30	10YR5/4 silty loam, friable, A/E, intact		
		30-70	10YR5/4 silty clay loam, friable, E, mottled		

ST #	Status +/-	Depth (CMBS)	Profile Description	Location Description	Excavator
30	Negative	0-70	10YR5/4 silty sand, iron concretions throughout	In a narrow wooded strip between two houses on the east side of the project area	Orsini and Holt
		70-80	10YR5/4 sand clay loam,mottled, iron concretions throughout		
31	Negative	0-4	10YR3/2 silty loam, loose, O, intact	Just west of Telge road. Wooded area	Costa and Hogan
		4-20	10YR5/2 silty loam, friable, A/E, mottled		
		20-65	10YR4/3 silty clay loam, friablem E, intact		
32	Negative	0-100	10YR5/4 sandy loam, loose, the last 15cm are compact	Just west of Telge road. Wooded area	Orsini and Holt
33	Negative	0-100	10YR7/4 fine sand, loose, C	On sand bar within little cypress creek	Hogan