GEOARCHAEOLOGICAL INVESTIGATIONS AT THE MCNEILL-GONZALES SITE (41VT141), VICTORIA COUNTY, TEXAS

A Thesis

by

MICHAEL JOHN AIUVALASIT

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

May 2006

Major Subject: Anthropology

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Approved by:

Chair of Committee,	Michael R. Waters
Committee Members,	David L. Carlson
	Brian Willis
Head of Department,	David L. Carlson

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ABSTRACT

Geoarchaeological Investigations at the McNeill-Gonzales Site

(41VT141), Victoria County, Texas. (May 2006)

Michael John Aiuvalasit, B.A., The University of Texas at Austin

Chair of Advisory Committee: Dr. Michael R. Waters

The McNeill-Gonzales site is a stratified multi-component prehistoric site in Victoria County, Texas. The site is located in approximately 2 meters of fine sand that mantle a fluvial terrace of the Guadalupe River. Geoarchaeological investigations were conducted at this site to determine the stratigraphy of the archaeological deposits, the processes that led to the formation of the site, and the integrity of the archaeological deposits. Three Holocene deposits of fine sand are mantling the tread and slope of a Pleistocene fluvial terrace of the Deweyville Formation. Granulometric studies and the stratigraphic position of the sands suggest the deposits are eolian in nature. Artifacts from the Late Paleoindian period (10,000 B.P.) to the Historic period were found in generally good stratigraphic position and made possible the correlation of the three deposits of fine sand across the site. There is evidence of bioturbation across the entire site and disturbance by colluvial action on the southeastern slopes of the site; however, intact human burials, hearth features, and artifacts in stratigraphic position indicate that secondary processes have not completely compromised the integrity of the archaeological deposits.

ACKNOWLEDGEMENTS

As with any archaeological project, this work owes a great debt to a number of individuals. First I must thank my advisor, Dr. Michael Waters, whose considerable knowledge and pragmatic approach kept me focused on completing my research. Next I thank the remainder of my committee: Dr. David Carlson for his help with the archaeological section, and Dr. Brian Willis for entertaining the questions of an archaeologist pretending to be a geologist. Other faculty members have provided assistance, whether in instruction or help during my research. I would like to thank the late Dr. Robson Bonnichsen, Dr. Vaughan Bryant, Dr. Alston Thoms, and Dr. Vatche Tchakerian. A special thank you goes to Dr. Thomas Hallmark and his lab director Mrs. Donna Prochaska for the training and lab time to process soil samples at the Soils Characterization Lab in the Department of Soil and Crop Sciences.

The McNeill family deserves special appreciation from not only me but also the entire archaeological community. Not only are they protecting an important site on their property, but encouraging and facilitating archaeological research. Three generations of the McNeill family have been gracious hosts to me and other researchers. Without their support this project would not have been possible.

Mr. James Bluhm deserves special gratitude for all his work in discovering the site, developing a strong working relationship with the McNeil family, directing the test excavations at the site, and promoting the site to the archaeological community. His efforts on this and other archaeological projects as a Texas Historical Commission Steward deserve recognition from both the public and archaeological community.

I would like to thank the rest of the THC stewards and volunteers who have done a tremendous job excavating and processing artifacts at the site. Special thanks go to Mr. Bill Birmingham, Mr. Nelson Marek, Mrs. Pat Braun, and especially Mrs. Helen Shook.

Other researchers outside A&M provided significant help. Mr. Wes Miller and Ms. Amanda Bragg of the National Resources Conservation Service (NRCS) deserve special thanks for bringing out a coring truck to excavate deep cores during some inhospitable weather. I thank Dr. Steven Forman of the University of Illinois at Chicago for analyzing my OSL samples. Dr. Charles Frederick, Dr. Bob Ricklis, and Dr. Ken Brown gave valuable perspectives on research issues of the region. I appreciate the advice Dr. Chris Caran and Dr. Steven Black have given me throughout my developing career in archaeology.

I would like to thank the Council of Texas Archeologists and the Texas Archeological Societies Donor's Fund for providing financial support for the OSL samples. Thanks go out to my archaeological colleagues who helped in the field: David Foxe, Robert Lassen, Jessi Halligan, Tim Riley and John and Adrianne Campbell. I also appreciate the help of the other researchers conducting work at the site: Matt Taylor, Dr. Jennifer Rice, and Dr. Michael Bever.

I have to thank my family for always supporting and encouraging the path I have found myself on. They raised me to follow my dreams, so I'm sticking to them. I must thank my new wife Leslie. I couldn't have completed this without her encouragement, strength, and love. She's going to be a much better wife than my thesis ever was.

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CHAPTER I

INTRODUCTION

The McNeill-Gonzales site (41VT141) is a stratified multi-component prehistoric archaeological site in Victoria Co., Texas. The site, located on private property, was accidentally discovered during removal of topsoil for commercial sale. The archaeological community discovered the site in 2003 when Texas Historical Commission (THC) Archaeological Steward, James Bluhm, traced the topsoil being sold with artifacts back to the property of its excavation. Upon learning that the topsoil removal was damaging an archaeological site, the landowner's suspended the borrow pit operation and THC stewards began salvage and test excavations at the site. The excavations and lab analysis by the THC Stewards recovered a number of prehistoric human burials and artifacts from the Late Paleoindian period (10,000 B.P.) to the Historic period. The THC Stewards have made their discoveries available for viewing to the larger archaeological community and the site has been acknowledged by visits from state archaeologists, the academic community, and cultural resource professionals for its potential to contribute to the archaeological knowledge of the region.

In the spring of 2004 the Texas A&M University (TAMU) Center for the Study of First Americans (CSFA) was contacted and a team of TAMU archaeologists and physical anthropologists visited the site. The team led by the late Dr. Robson Bonnichsen saw

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This thesis follows the style of *American Antiquity*.

great potential for the burials and archaeological findings from this site to provide evidence of the earliest inhabitants of the region, and Dr. Michael Waters encouraged my participation. The THC Stewards welcomed the involvement of the TAMU Department of Anthropology and since the summer of 2004 I have conducted geoarchaeological investigations at the McNeill-Gonzales site. Granulometric analysis was conducted during the summer and fall of 2005 in the Soil Characterization Labs at TAMU, and Dr. Steve Forman of the University of Illinois at Chicago analyzed OSL samples during the winter of 2006.

Project Goals

The goals of the geoarchaeological investigation are threefold: (1) to describe and interpret the cultural and natural stratigraphy at the site; (2) develop a chronology of these deposits; and (3) make interpretations of the archaeological record from these data. This study will determine how archaeological materials that span the Holocene became buried in an alluvial terrace that is identified as being Pleistocene in age. It is hypothesized that a combination of colluvial, eolian, and bioturbating processes led to the burial of archaeological deposits in a sandy mantle that overlays a paleosol and underlying fluvial deposits of the Pleistocene terrace. The sands of this potentially eolian sandy mantle are hypothesized to derive from the local reworking of fluvial deposits. Examining the complex relationships of sediments, soils, paleosols, and archaeological materials across the site and adjacent landforms through field and lab investigations tests these hypotheses. Conversely, if the deposits at the McNeill-Gonzales site do not correlate to sedimentological and stratigraphic models for deposition by eolian, colluvial, or fluvial transport than the deposits could only have been buried through a complex process of bio- and pedoturbation of Deweyville formation sediments.

The second goal of this project is to develop a chronological framework for the site by establishing stratigraphic relationships of deposits across the terrace from diagnostic artifacts. Previously reported archeometric dates of burials at the site, as well as the luminescence dating of sediments reported in this thesis will establish a chronology that further defines the stratigraphic context of the site. Specifically, if dates of sediments from below the paleosol in the fluvial sediments are Pleistocene in age and sediments from above the paleosol are Holocene than a model of site burial in Pleistocene sediments through bio- and pedo-turbation processes is untenable.

The ultimate contribution of the geoarchaeological research at the McNeill-Gonzales site is to interpret the stratigraphic and chronological data in order to understand the evidence of prehistoric human behavior at both a site and regional level. At this time analysis of the archaeological materials by the THC Stewards is ongoing, so limited data from the analyses of artifacts and the burials are available for interpretation. Observations of site integrity, and interpretations of paleo-landscapes are possible, and future excavations will benefit greatly from having a geoarchaeological model of the site to guide excavations.

Methods

A combination of field and lab work was required for this geoarchaeological investigation. Profiles exposed during topsoil excavation and test units excavated by the

THC Stewards were recorded using methods and terminology specified by the USDA Soil Survey Division Staff (1993), as well as common stratigraphic nomenclature. Hand augering, backhoe trenching, and mechanical coring were employed to examine subsurface portions of the site and adjacent areas. A map of the site was created using a transit, Sokkia Total Data Station (TDS) and Garmin Geko 201 GPS Receiver. Archaeological data from the THC Stewards excavations was used to provide the stratigraphic position of diagnostic artifacts across the site and densities of archaeological material by unit level in Excavation Area 4. Granulometric and limited chemical characterization of sediments was determined using the Soils Characterization Lab in the Agronomy Department of Texas A&M. Granulometric analyses methods followed Kilmer and Alexander (1949) and the Soil Survey Laboratory Staff (1996). Granulometric data was statistically analyzed in order to compare grain size distributions to models of soil formation and sediment deposition. Dr. Steve Forman of the University of Illinois at Chicago analyzed two sediment samples using Optically Stimulated Luminescence (OSL) to provide dates of the underlying fluvial deposits and colluvial deposits that contained scattered, undated artifacts. Pollen samples from the site were processed and analyzed in the Palynology Laboratory in the Department of Anthropology at Texas A&M to assess the potential for pollen recovery from the archaeological deposits.

The thesis is organized to facilitate the use of these data by the widest range of practitioners. First the physiographic, geological, environmental, and archaeological contexts are defined. This is followed by the description and interpretation of the stratigraphic units at the site. The stratigraphy of the archaeological deposits follows, with archaeological interpretations and implications for regional geomorphic studies concluding the work. In order to keep the body of the text free of copious tables and data the appendices contain the majority these data. The detailed core, auger, backhoe trench, excavation unit, and borrow pit exposure descriptions are found in Appendix A. Granulometric data are found in Appendix B. Artifact distributions of excavation units are found in Appendix C. The study of the potential to recover pollen from the Holocene deposits is found in Appendix D.

CHAPTER II

SITE SETTING

Geologic and Physiographic Setting

Regional Geology. The McNeill-Gonzales site is located in the southeastern portion of Texas (Figure 1). The geologic area is the south-central portion of the West Gulf Coastal Plain. The boundaries of this region are the Balcones Escarpment to the north and northwest, the Rio Grande and the Sierra Madre Oriental to the south and southwest, and the Gulf of Mexico to the south and southeast. The West Gulf Coast Plain extends east and northeast through Texas and Louisiana to the Mississippi River. The geologic deposits of the region range from the Late Mesozoic through the Cenozoic, and were deposited along the prograding margin of the Gulf of Mexico. Older layers were successively overlain by younger sediments, which created an arcuate pattern of deposits parallel to the Gulf Coast. The gently dipping beds of ancient littoral, estuarine, deltaic, and fluvial deposits form the rolling to level surfaces of the Coastal Plain. Parallel low ridges of resistant units, called cuestas, punctuate the plains. The cuestas have gentle slope gulfward to the southeast and steeper northwest-facing escarpments (Bryant et al. 1991: 17).

The Reynosa Plateau is the most coastward cuesta, expressed on the surface in Bordes-Oakville Escarpment on the northwest side and a low ridge on the eastern boundary called the Reynosa cuesta where the deposits dip below later Plio-Pleistocene deposits of the Willis and Lissie Formation (Price 1933). The Reynosa Cuesta derives

Figure 1. Regional map with sites mentioned in text (based on USGS 2001)

from the Goliad Formation, which are of Miocene age and contain thick caliche deposits that are resistant to erosion (Miller 1979: 87). The Guadalupe River forms the northern boundary of the Reynosa Plateau, and to the north, the Hockley scarp separates coastward Pleistocene Lissie Formation fluvial deposits from interior Plio-Pleistocene Willis Formation deposits (Thornbury 1965:63-65). The McNeill-Gonzales site is located on a terrace of the Guadalupe River just northeast of the Reynosa Plateau (Figure 2).

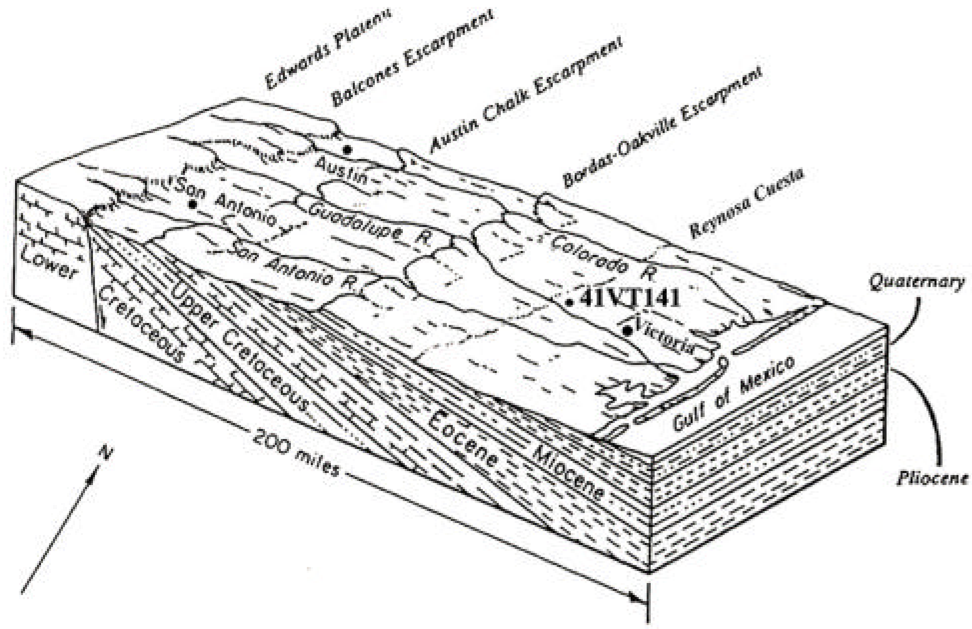


Figure 2. Regional geologic cross section (Hunt 1967 Figure 10.10, used with permission)

Late Quaternary Geology and Geomorphology. After the Guadalupe River passes the Reynosa Plateau it enters the level Coastal Plain deposits of fluvial, deltaic, and estuarine sediments that can be correlated to Pleistocene glacial cycles. Small exposures of the late Pliocene to early Pleistocene Willis Formation fluviatile deposits exist on the uplands to the north of the site (Figure 3.). The uplands immediately adjacent to the McNeill-Gonzales site are mapped as Lissie Formation, which are considered to be early to middle Pleistocene and consist of sandy fluvial deposits (Barnes 1987).

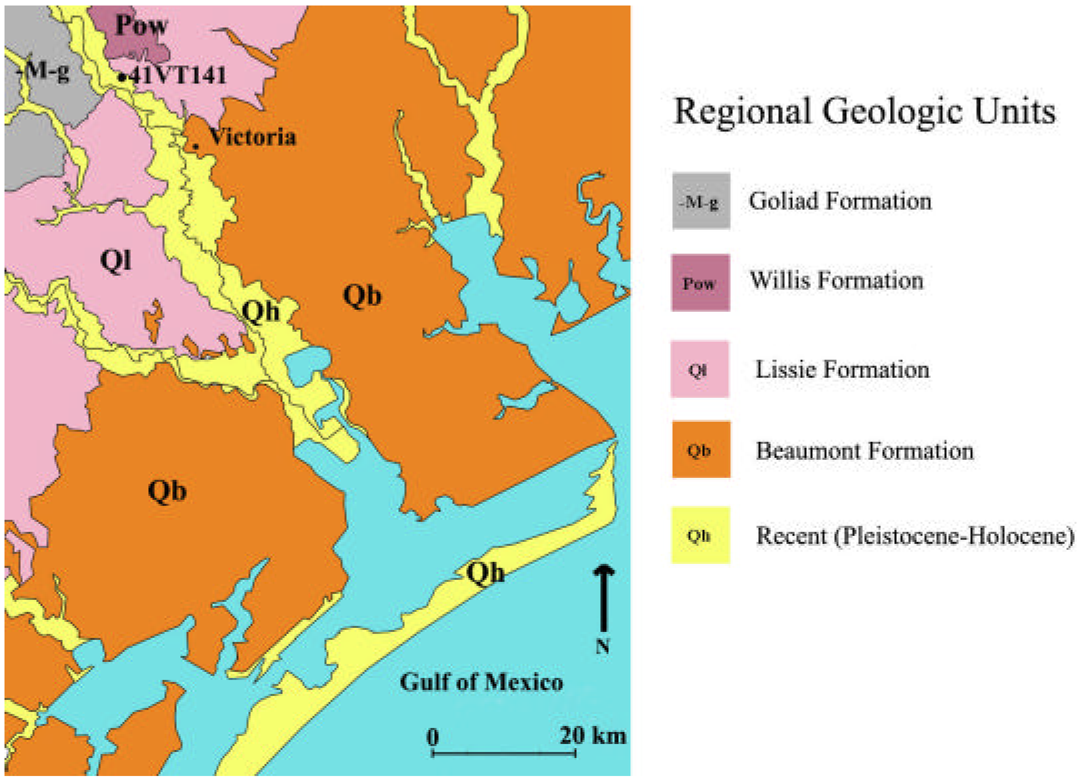


Figure 3. Region geologic units (Barnes 1987)

The uplands adjacent to the McNeill-Gonzales site are mapped as Lissie, however the soils are mapped as Lake Charles clay, which is widely considered to form in Beaumont Formation deposits (Barnes 1987, Miller 1979, Miller personal communication 2004). Because of this though the deposits are mapped as Lissie, the tested uplands in the project area will be considered Beaumont. The Beaumont Formation Pleistocene fluvial, estuary-marsh, and littoral deposits of dominate large portions of the Coastal Plain. Recent synthesis of chronometric data from across the Coastal Plain (Figure 4) has shown the Beaumont Formation to be diachronous, with deposits ranging from 116-74 ka to 74-30 ka (Otvos 2005). Locally, thermoluminescence dating of the Beaumont Formation along the margins of the Nueces River produced dates of 91.7 $\pm$ 7.9 ka and 71.9 $\pm$ 6.9 ka (Durbin et al: 1997: 122). The Guadalupe River is one of the numerous major drainages that have their source on the Edwards Plateau and drain across the Western Coastal Plain into the Gulf of Mexico. It flows approximately 230 miles (370 km) and drains an area of approximately 6,070 square miles (15,720 km^2). There are three post-Beaumont alluvial deposits associated with the Guadalupe River. According to Barnes (1987) they are: 1) Fluviatile terraces undetermined, which are fluvial deposits along the valley walls that could possibly correlate to any of the Pleistocene deposits; 2) the Deweyville Formation which consists of fluvial deposits with relict meanders of a much larger radius and curvature than the modern channel; and 3) Holocene alluvial deposits (Figure 5). Of these deposits the Deweyville Formation deserves the most attention because the McNeill-Gonzales site is situated on the slope of what is mapped as a Deweyville Terrace.

Luminescence dating is providing a clearer understanding of the Deweyville terraces across the Coastal Plain (Blum et al 1995, Durbin et al 1997, Sylvia and Galloway 2002, Otvos 2005). Synthesis of dates on a regional level from across the Gulf Coastal Plain suggests that the Deweyville terraces aggraded from between 60 and 18 ka, however the aggradation and incision sequences are not coeval between different valleys of the Coastal Plain. Otvos (2005) compared dates of samples from six localities across the Coastal Plain and found that typically a series of up to three post-Beaumont terraces with large arcuate relict meanders are cut into older valley margins. This

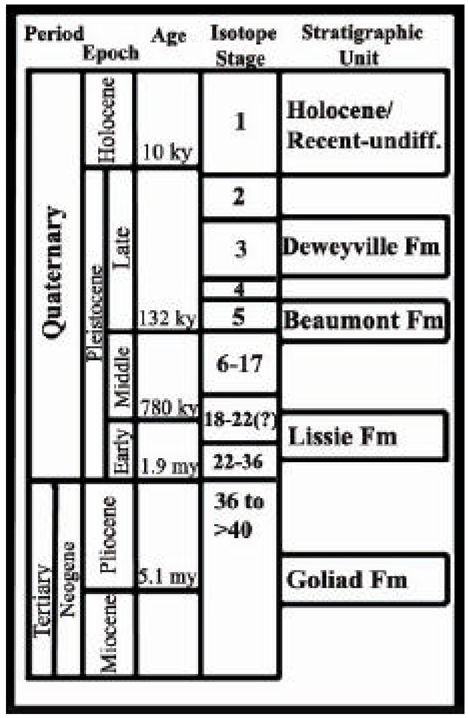


Figure 4. Regional geologic chronology (Durbin et al 1997, Otvos 2005, Barnes 1987)

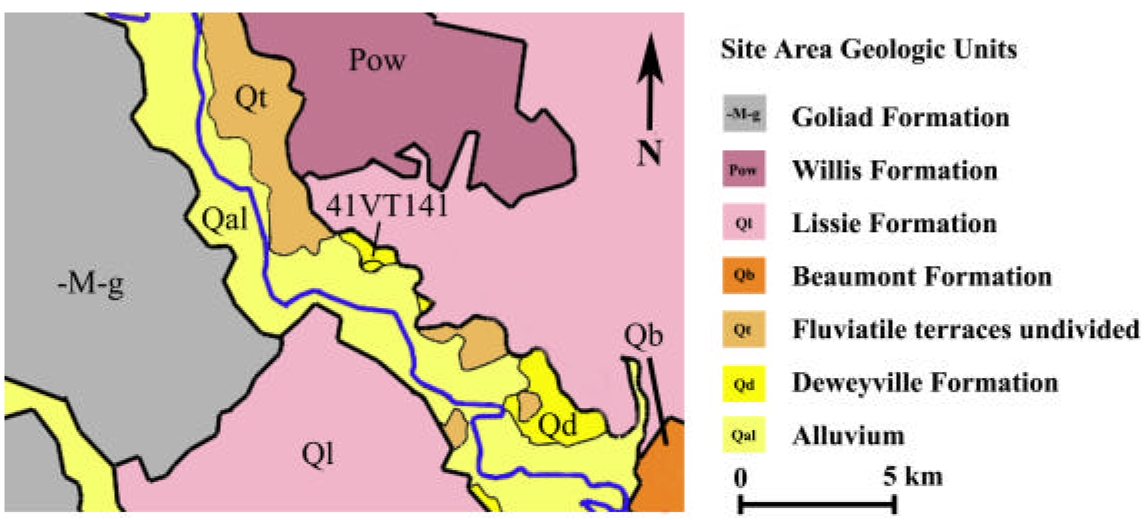


Figure 5. Local geologic setting (Barnes 1987)

confirms the ages presented in a local study of the Lower Nueces River, which is the next major river valley to the south of the Guadalupe River (Durbin et al: 1997, Durbin 1999). Durbin et al (1997: 122) dated the three periods of Deweyville terrace aggradation, which they classified as High Deweyville 60–47 ka; Middle Deweyville 43–40 ka; and Low Deweyville 35–31 ka. The only known published date for a Deweyville terrace on the Guadalupe River comes from geoarchaeological investigations at the Buckeye Knoll site, which is located approximately 30 km downstream from the McNeill-Gonzales site. Five dates of sediments below archaeological deposits in the terrace dated from between 49 and 53 ka correspond to the High Deweyville deposits of the Nueces River (Frederick and Bateman 2004: 10).

The formation of the Deweyville terraces occurred during the Wisconsonian (Isotope Stage 3) glaciation period of the Pleistocene. During this time sea levels dropped dramatically due to moisture being sequestered by glaciers. By the end of this period during the Last Glacial Maximum (LGM) at approximately 20 ka shorelines along the Gulf of Mexico dropped to the mid-shelf and edge of the continental shelf, approximately 200 to 300 km from the modern shoreline. Due to this change in base level, channels of the major drainages lengthened and down cut into the Beaumont Formation. During this cooler, drier period the preserved Deweyville terrace sediments are thick channel belt sands with few overbank mud deposits that commonly have a well-drained paleosol bounding the top of the deposits. The interglacial period, which ended the Pleistocene, caused a transgression of sea level and increase of inland moisture. Although the increase of inland moisture caused an increase in stream discharge, which caused some channel incision, rising sea level lowered stream gradients (Blum and Tornqvist 2000: 33). This caused the drainages to accommodate more sediments as muddy overbank deposits in the floodplain during the Late Pleistocene and Holocene. Aggradation led to the burial of some Low Deweyville terraces (Abbott 2001: 99). The high position of the Deweyville terrace at the McNeill-Gonzales site is inferred to be an older High Deweyville terrace and that younger Low Deweyville terraces may be buried in the modern floodplain.

Eolian deposits comprise another geomorphic landform of the Gulf Coastal Plain. There are two types of eolian landforms in the Gulf Coastal Plain: coastal zone dune fields of reworked littoral sediments, and thin sandy mantles and mounds located on high terraces, floodplains, and upland margins of streams (Abbott 2001: 50). There is little question about the eolian origin of the coastal dune fields, but the sandy mantle deposits are poorly understood. Debate on the depositional mechanisms of the mantle deposits exist because the process of their formation has not been observed, they typically lack intact bedding where disrupted by soil formation and bioturbation (Abbott 2001, Aten and Bollich 1981, and Heinrich 1993). Recent work by Otvos (2004) provides chronological and paleoclimatic interpretations for eolian features across the Gulf Coastal Plain. Optically stimulated luminescence (OSL), thermoluminescence (TL), and archaeological materials were used to date eolian deposits. Dune deposits ranged in age from post-Beaumont through the Holocene, and of these samples ten prairie mounds were dated. Of the samples collected from prairie mounds in Texas and southwestern Louisiana the majority dated from between 1,600 and 800 yr ago, but two samples dated to 6,000 yr and 3,000 yr ago. All samples were uncomformably resting on Beaumont or older surfaces (Otvos 2004: 114). Eolian deposits suggest a degree of aridity during the Late Holocene, which is supported by evidence of aridity during this time from faunal records of the Edwards Plateau of Central Texas and eolian features of Southern High Plains (Holliday 2002, Toomey et al 1993). Unfortunately Otvos did not sample any dunes from Deweyville Terraces or other features further inland that have questionable eolian origins, so currently there is no consensus on the ages, depositional mechanisms, and structure of these deposits observed in the interior Coastal Plain.

Soils. The soils of the McNeill-Gonzales site and the surrounding landforms have clear relationships to the area geology. All descriptions come from the Soil Survey of Victoria County (Miller 1979: 147) (Figure 6). The Beaumont-Lissie Formation uplands of clayey coastal marsh, deltaic deposits are mapped as Lake Charles (LaA) and Decosta (DaA) Series. The Lake Charles Series is classified as fine, montmorillonitic, thermic Typic Pelluderts. The Decosta Series are fine, montmorillonitic, hyperthermic Vertic Ochraqualfs. The gradual scarp of the Beaumont Formation has a complex series of soils that have mixture of properties of the clayey uplands and sandy deposits of the Deweyville Formation terrace. The soils of the scarp are mapped as Telferner (TeA and TeB), Dacosta-Contee Complex (DnA), and DaCosta and Telferner (DvC). Dacosta-Contee Complex (DnA) is described as being located in depressions of Beaumont uplands. The steepest slope of the scarp is mapped as DaCosta and Telferner (DvC). Telferner soils are fine sandy loams that are classified as fine montmorillonitic, hyperthermic Typic Albaqualfs.

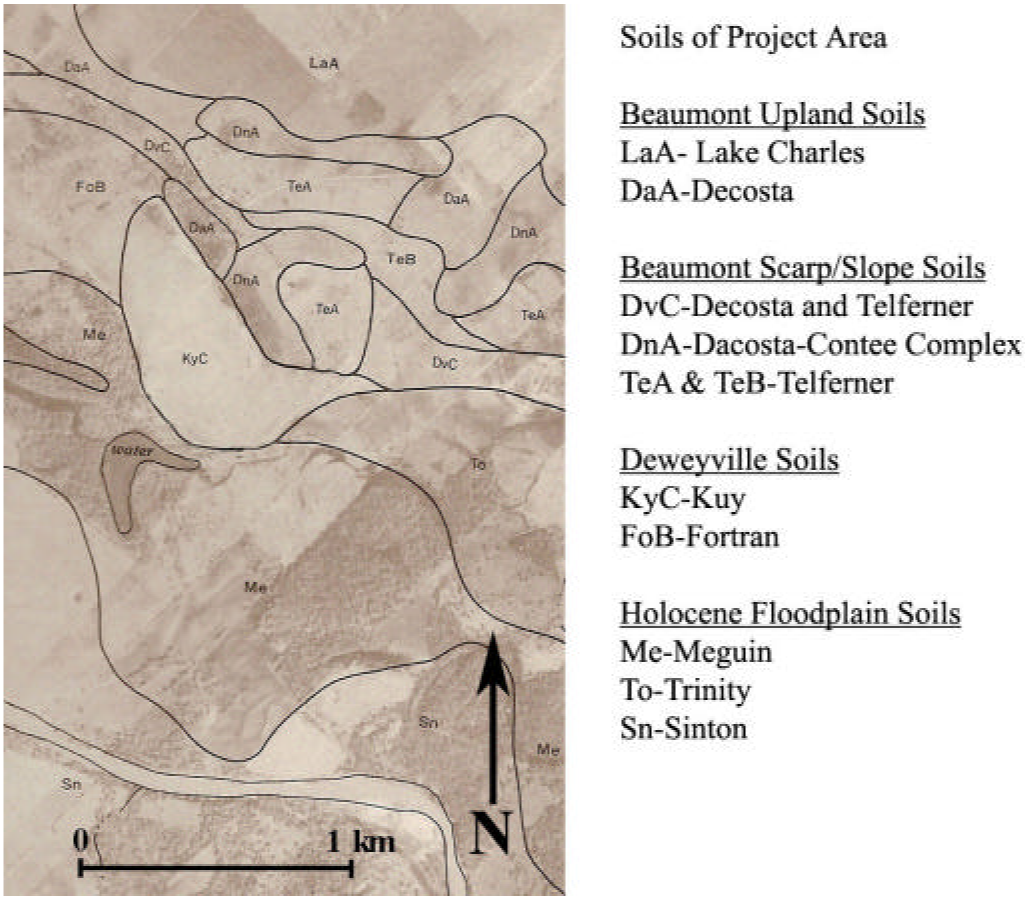


Figure 6. Project area soil series (Miller 1979)

The Deweyville Terrace is mapped as Kuy (KyC) loamy sand and Fortran (FoB) loamy fine sand. The Kuy series are deep loamy sands classified as loamy, siliceous, hyperthermic Grossarenic Paleudalfs, and though Fortran series are described as deep loamy fine sands that are classified as clayey, mixed, hyperthermic Grossarenic Paleudalfs. The floodplain of the Guadalupe River consists of three soil series, Meguin (Me), Sinton (Sn), and Trinity (To). Starting from the soils immediately adjacent to the Deweyville terrace, the Trinity (To) are occasionally flooded deep clays that are classified as very-fine, montmorillonitic, thermic Typic Pelluderts whereas the Meguin

(Me) occasionally flooded deep silty clays are classified as fine-silty, mixed, hyperthermic Fluventic Haplustolls. The Sinton (Sn) soils are developing along the active channel and overbank deposits of the Guadalupe River. They are classified as fine-loamy, mixed, hyperthermic Cumulic Haplustolls.

The soils of the McNeill-Gonzales site are mapped as Kuy series. Kuy soils are found on upland terraces along streams and make up only 1.2 percent of the soils of Victoria County. The surface A horizon is a slightly acid, light brownish gray loamy sand about 15 cm thick. The A21 horizon is slightly acid, light gray loam sand from 15 to 101 cm. The A22 horizon is from 101 cm to 130 cm and is mildly alkaline white loamy sand. The B2tg horizon is strongly acid, mottled, light gray sandy clay loam subsoil that was described to the depth of 203 cm. The soil is moderately well drained, with moderate permeability, and low available water capacity. There is a perched water table at a depth of 90 to 150 cm during rainy seasons. Surface runoff is very slow and the potential for water erosion is slight (Miller 1979: 22). Detailed descriptions of the site soils will be described in the next chapter.

Environmental Setting

Modern Climate and Biota. General interpretations of the environment are derived from the ecoregion systems interpretations of Omernik (1987), from local environmental data sets acquired from the USDA Soil Series guide for Victoria County (Miller 1979), and from a report on groundwater resources of Texas (Keese et al 2004). The region is considered a warm temperate climate, with a mean rainfall of 965 mm and a mean temperature of 21.2°C. The mean wettest month is September, and the mean driest month is March. The mean wettest month correlates to the period of the year when tropical storms from the Gulf of Mexico move in from the west. The average last freeze of the spring is March 6 and the average first freeze of the fall is November 12 (Miller 1979).

On a continental scale the Western Gulf Coastal Plain is a subregion of the Great Plains. This subregion is further divided into: the mid-Coastal Barrier Islands and Marshes along the San Antonio Bay, Northern Humid Gulf Coastal Prairies that form the level clayey uplands of the Beaumont and Lissie Formation, and the complex Floodplains and Low Terraces of the Guadalupe River. The vegetation types by region are: sea-oats and seacoast bluestem grasses in the mid-Coastal Barrier Islands and Marshes; smooth cordgrass with post oak motts in the Northern Humid Gulf Coastal Prairies; and predominantly deciduous hardwoods on the Floodplains and Low Terraces (Griffith et al 2004, Omernik 1987: Table 1, and Telfair 1999:19). Vegetation of the McNeill-Gonzales site is dominated by deciduous hardwoods along the edge of the terrace and a mixture of grasses and forbs on the level terrace surface. The deciduous species observed in the immediate vicinity of the site are *Quercus* (oak), *Prosopis* (mesquite), *Carya* (pecan), *Celtis* (hackberry), *Ehretria elliptica* (anaqua), and *Ulmus* (elm). The flowering forbs are typically *Asteraceae* (sunflower/daisy family), *Lupinus* (bluebonnet), *Urticia* (nettle), *Solanum* (nightshade), *Castilleja* (paintbrush), *Argemone* (prickly poppy), and numerous unidentified graminoids (grasses). A surface soil sample analyzed for a study of the potential to recover pollen from sediments recovered many of the species observed in the site area (Appendix D).

Within this region 250 edible taxa have been identified which could have been consumed or used by aboriginal peoples (Abbott 2001: 36). Floral resources can be divided into five categories: high protein masts such as hickory and pecan; seeds from amaranths and graminoids; fruits such as blackberries, mulberries, prickly pear tunas, mesquite beans and anaqua fruit; roots such as arrow root and wild onions; and greens such as prickly pear pads.

The faunal resources of the region are diverse and variable in their distribution. Waterfowl, mollusks, and fish are located in mid-Coastal Barrier Islands and Marshes Region. A number of species, such as black drum, redfish and sea trout come to the lower salinity waters of bays, lagoons and tidal passes of the to spawn and then spend their adulthood in deep waters (Ricklis 1996: 15). The McNeill-Gonzales site is much to far inland to directly exploit these resources, however it is well situated to exploit resources of the Coastal Prairies and the complex Floodplains and Low Terraces of the Guadalupe River. White-tailed deer, amphibians, freshwater fish, mussels, and squirrels are found in the bottomlands of the major rivers. The Coastal Prairies see deer and rabbit, as well as prairie chicken and doves. Bison were present historically on the Coastal Prairies (Ricklis 1996: 21, Telfair 1999:19-21). Deer are the dominant large game animal. The Coastal Prairies have the second highest deer population in the state. Data on modern deer populations shows an intraregional difference in deer populations of coastal and immediately interior counties (Texas Parks and Wildlife 2003).

Paleoenvironment. Abbott (2001) provides the most recent and comprehensive summary of paleoenvironmental conditions of the Western Gulf Coastal Plain.

Numerous lines of evidence augmented by data sets from adjacent regions are used to interpret past climates, and sea level change. These sources include: palynological records from bogs of the inner Gulf Coastal Plain; faunal assemblages (particularly microfaunal assemblages of Central Texas Caves); carbon and oxygen stable isotope data from sediments, human and faunal skeletal material and gastropod shell; geomorphic studies and mathematical models of large scale climate patterns (Abbott 2001: 26-30). Abbott lists potential sources of paleoclimatological data that are currently not being applied in the region, such as tree ring dating, phytolith and diatom studies, macrobotanical studies, and aquatic bivalve distributions (Abbott 2001: 30). Until the local paleoclimate record becomes more robust the interpretations will continue to rely heavily on proxy data from adjacent locales.

Pollen records from Central Texas bogs show that the Late Pleistocene Full Glacial period (16,000-12,000 B.P.) was cool and moist compared to modern climates. Taxa of cold-tolerant species that in modern environments are associated with mixed boreal/deciduous forests were recovered, and interpreted to indicate that the inner Gulf Coastal Plain had a vegetation cover of sheltered cold tolerant species in open prairies as opposed to full boreal forests (Bryant and Holloway 1985). Faunal assemblages of extinct megafauna from this period were recovered from an alluvial terrace of Blanco Creek at the Buckner Ranch site, in Bee County (Sellards 1940). The Late Glacial period (14,000-12,000 B.P.) was as cool as the previous period, but drier. Clovis occupations are found from this period across Central Texas and the Southern High

Plains (Abbott 2001: 31-32). During this time period sea level was up to 100 m lower than today, and approximately 200 km further out to sea (Ricklis and Blum 1997).

The Holocene climate is divided into Early (12,000-8,000 B.P.), Middle (8,000-4,000 B.P.), and Late (4,000 B.P. to the present). During the Early Holocene there was a warming and drying trend, though temperatures were cooler than today. Bousman (1998) interprets the cause of the cooler, drier temperatures to be an influx of glacial meltwater into the Gulf of Mexico from the Mississippi River between 12,000 B.P. and 10,000 B.P. This event corresponds to the Clovis archaeological period. The cooling of Gulf of Mexico water temperatures would have led to less evaporative moisture and precipitation. During the later part of the Early Holocene the glacial meltwater was diverted to the Atlantic, causing the Gulf of Mexico to warm. The warmer temperatures correlate to the Folsom archaeological period, and sea level rapidly raised to only 9 meters below the modern shoreline to approximately 30 km offshore (Blum et al 2002). A terrestrial shift from arboreal to grassland pollen occurs during this period, which suggests a change towards prairie-savannah vegetation similar to modern conditions (Abbott 2001: 32). This transition would have occurred during the Late Paleoindian period, which is reflected in subsistence, technological, and possibly social changes during the Paleoindian period. The Middle Holocene is considered warmer and drier than the previous period, and some researchers see evidence that the conditions would have been drier than modern conditions (Abbott 2001: 33). Drier conditions would result in less biomass and probably less expected prey than modern conditions. Sea level continued to rise, and there is evidence of sea level rising up to 2 meters above modern conditions at approximately. Sea level lowered after this point to near modern conditions towards the end of this period (Blum et al 2002). Middle Holocene correlates to the Early and Middle Archaic archaeological periods, during which it is expected to see greater diversity in resource exploitation. The Late Holocene is interpreted to see an increase in moisture and possibly a decrease in temperature relative to Middle Holocene conditions (Abbott 2001: 34). Using the modern analog for the Late Holocene it can be inferred that there was an increase in biomass and prey from the drier Middle Holocene. This period is known archaeologically as the Late Archaic 4000-1500 B.P. and the Late Prehistoric 1500 B.P.-to Historic. During this time period food resources should have increased, and larger game should have become more abundant, which is possibly evidenced by an increase in bison remains found at archaeological sites (Ricklis 1992).

Archaeological Setting

An abbreviated survey of the archaeological record of the Central Gulf Coastal Plain of Texas is presented below. See Hester 2004, Ricklis 2004a, 2004b for a more comprehensive synthesis of the archaeological research of the region (Figure 7).

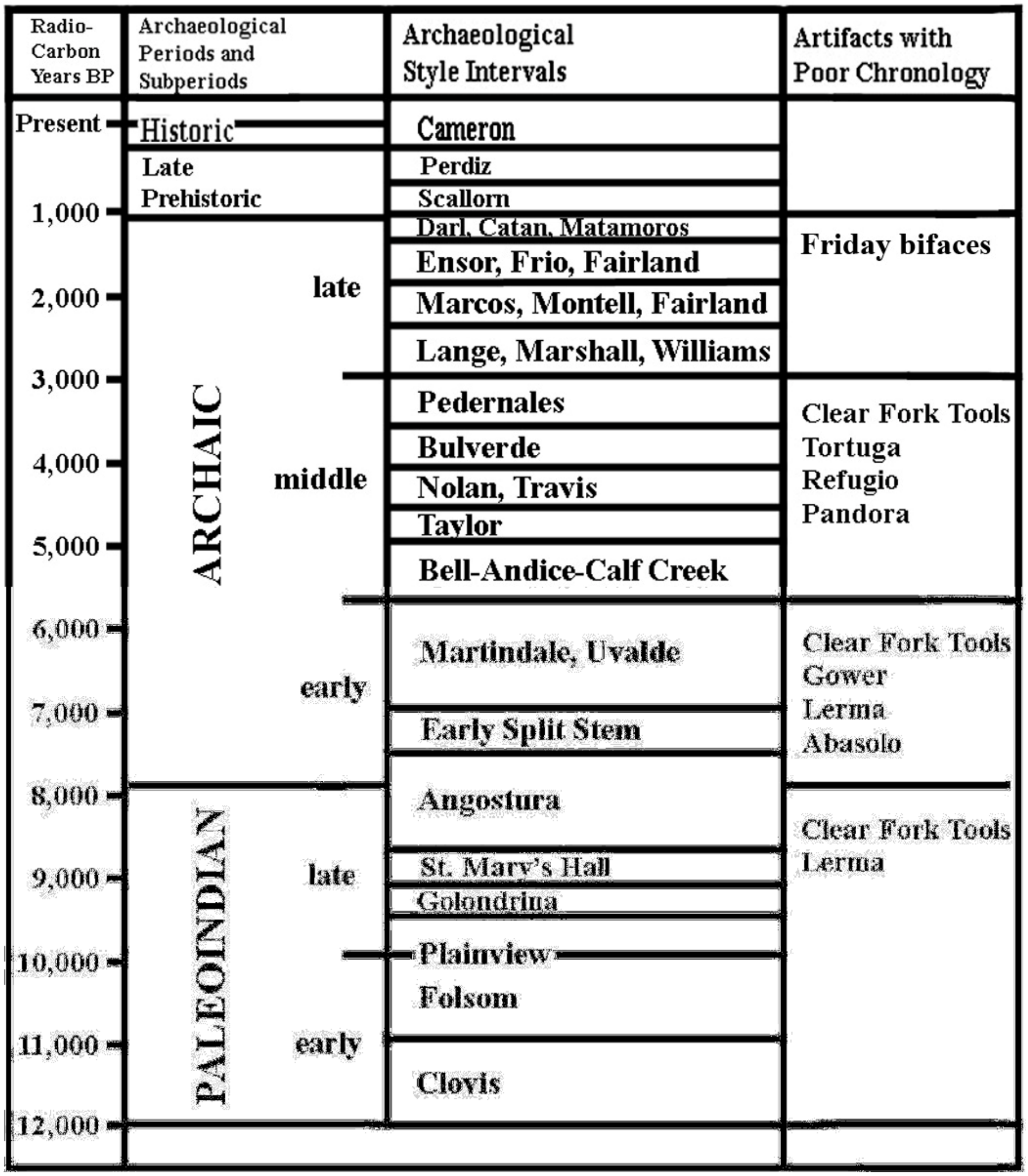


Figure 7. Regional archaeological chronology and diagnostic artifacts (based on Collins 2004, Hester 2004, Ricklis 2004a)

There are very limited data on Early Paleoindian period (12,000 to 10,000 B.P.) and limited data on the Late Paleoindian Period (10,000 to 8,000 B.P.) for the Central Gulf Coastal Plain compared to other regions of the state. Clovis and Folsom artifacts have only been recovered from sites of limited integrity, which include the Buckner Ranch (41BE2) paleontological site in Bee County, and Clovis artifacts and Pleistocene fauna washing ashore on McFaddin Beach (41JF50) (Sellards 1940, Hester et al 1992). Late Paleoindian points such as Golondrina and Angostura have been found with greater frequency and some have been excavated *in situ.* Examples are Buckeye Knoll (41VT98), the Johnston-Heller site (41VT14), and the McNeill-Gonzales site (41VT141) (Ricklis and Doran 2003, Birmingham and Hester 1976, Taylor 2005). Berger Bluff (41GD30) is a site that will be discussed later due to its proximity and similar geomorphic context to the McNeill-Gonzales site. It has a radiocarbon dated Late Paleoindian component with evidence of local faunal remains of riparian and upland taxa (Brown 1996).

The lack of Early Paleoindian archaeological data in the region is probably due to the lack of exploration, but also widespread submergence of sites caused by sea level rise (Ricklis 2004a, Ricklis and Weinstein 2005). Late Paleoindian sites are too few to allow a regional synthesis. In adjoining regions it appears that the Late Paleoindian period is characterized by a decrease in interregional mobility for the exploitation of large megafauna to one that exploited intraregional, local resources (Bousman et al 2004).

By 8,000 B.P. the initial widespread evidence of marine and geophyte food processing, as well as the cultural development of cemeteries signal the development of Archaic lifeways. There are few sites from the Early Archaic (8,000-6,000 B.P.), perhaps because many were inundated during sea level rise in the Early Holocene (Ricklis 2004a, Ricklis and Blum 1997). The change to a broader diet is seen archaeologically by the presence of shell middens for processing shellfish (primarily *Rangia)* in what would have been coastal environments, and burned rock middens in the interior plains for processing geophytes. Deer and other medium to small mammals make up the majority of the faunal assemblages.

Shellfish midden deposits from the Early Archaic have been excavated at coastal sites of Eagle Ridge (41GV53) and McKinzie (Ricklis1988, Ricklis 2004b). These sites would have been at the edge of the coastal estuaries forming in the inundated river valleys. These sites are much smaller than later shellfish middens, and are typically small scatters of shell and faunal material which could either represent small short term, logistical foray sites of an intensified population, or conversely are longer term occupational remains of a society with lower population densities (Ricklis 2004a). There have been few well-excavated Central Gulf Coastal Plain sites not immediately on the coast with Early Archaic components. The only interior sites suitable for comparison are at the extreme western margin of the Coastal Plain near the Balcones Escarpment. Burned rock middens at the Wilson Leonard site and the Richard Beene site provide examples of intensified exploitation of floral resources during the Early Archaic (Collins 1998, Thoms 2004).

One of the earliest cemeteries in North America, the Buckeye Knoll site, is located on the Coastal Prairie, and it suggests intensive local occupation during the Early Archaic period. Isotopic values of skeletal material indicate a mixed diet of both coastal and interior resources, which in turn indicates that during the Early Archaic mobility was not restricted as to prohibit movement from the coastal zones into the interior, but that local populations of the Early Archaic probably lived exclusively within the Coastal Plain (Ricklis and Doran 2003).

During the Middle Archaic (6,000-2,500 B.P.) the Archaic lifeways continued but with an increase in the number and size of inland sites on the northern portions of the upper Texas coast. This suggests increasing populations to the north, however in the central and southern Coastal Plains there appear to be fewer coastal sites. This may be a function of sea level rise reducing the productivity of central and southern Coastal Plain nearshore environments (Ricklis 2004a, Ricklis 2004b). Sites further inland suggest larger interior populations, as evidenced by large cemetery sites such as the Loma Sandia site, and a component of the Ernest Witte site (Taylor and Highley 1995, Ricklis 2004b).

The Late Archaic (2,500-1,500 B.P.) saw further signs of local intensification and reduced mobility with poorer quality, local lithic resources being more frequently used, increased numbers and sizes of coastal archaeological sites with thicker and larger shell midden components, and larger cemeteries. This increase in sites corresponds with the stabilizing of sea level and formation of productive estuary environments that appear to have been absent or submerged during the Middle Archaic. An example of resource intensification is an increase in coastal fishing, as evidenced by an exponential increase in fish remains recovered archaeologically along the Nueces and Corpus Christi Bays (Ricklis 2004a). Large Late Archaic cemeteries are found in a component of the Ernest Witte site, the Morhiss site, and the Blue Bayou site (Ricklis 2004a). Other data that suggests decreased mobility due to population pressures, include stable isotope ratios of human skelatons at the Blue Bayou site that show primarily non-marine resources dominating the diet at a site less than 20 kilometers from the coastline (Ricklis 2004a). This site is approximately as far inland as the Buckeye Knoll site, which suggests reduced mobility from mixed shoreline and interior diets during the Early Archaic to a more restricted diet and mobility pattern by the Late Archaic. Estuarine resources along the recently stabilized shoreline were heavily exploited during the Late Archaic. Facilitated by a greater number of well excavated sites with large artifact assemblages, Ricklis (1996) proposed there is enough evidence from the Late Archaic to postulate a seasonal adaptive pattern of exploiting estuarine resources in the fall and winter, and then moving to the immediately adjacent interior upland prairie environments during the spring and summer. This pattern seems to continue into the Late Prehistoric, and corresponds to the ethnohistorical record of the Karankawa (Ricklis 1996).

In comparison to the Archaic, the Late Prehistoric (1,500 B.P. to 400 B.P.) saw the incorporation of ceramic and bow and arrow technology, and an ever-increasing intensification of land use, with some new resources. The Late Prehistoric Period is characterized by Rockport Phase Ceramics. The Rockport Phase material culture consists of bone tempered, asphaltum decorated ceramics, hunting with the bow and arrow, and large sites with intensive marine exploitation. Bison becomes present on the Coastal Plain during the Late Prehistoric. Toyah Phase material culture from the Plains enters the interior of the Central Coastal Plain, though it is debated whether this is due to a migration of bison hunters into the region, or if it is an introduction of material culture associated with bison hunting (Ricklis 1992). Although there is archaeological evidence that people with coastal material culture hunted bison in the interior at the Melon site (41RF21), the ethnohistorical record of Cabeza de Vaca suggests it was not a regular occurrence (Ricklis 1996: 97, Kreiger 2002). Seasonal rounds of historically observed aboriginals of the region are hypothesized to have begun in the Late Archaic and continue through the Late Prehistoric, with population densities equivalent to ethnohistorical estimates.

Researchers are fortunate to have ethnohistorical evidence documenting indigenous populations of the Gulf Coastal Plain. It is a rich history since the earliest imperial Spanish and French explorations of Texas occurred on the coastal plain. The Western Gulf Coastal Plain was home to the historically documented Karankawa Indians, who lived along the Central Coast between the Colorado and the Nueces Rivers. The most comprehensive analysis of Karankawa culture is by Ricklis (1996). Ricklis develops a cultural ecology of the Karankawa that interprets seasonal exploitation of coastal and inland plant and animal resources within a 40 km of the coastline by synthesizing historical documents and the archaeological record. Fall and winter were spent on the coast exploiting the near-shore marine resources of bays and estuaries. The spring and summer saw a transition to inland resources, such as men hunting large mammals and women gathering floral materials such as seeds, fruits like prickly pear tunas and edible greens (Ricklis 1996: 23). The McNeill-Gonzales site is located approximately 30 km inland from the Karankawa territory, so the site area was probably a border area between the Karankawa and inland cultures. The Coahuiltecan are a poorly defined interior cultural group that consisted of numerous bands and small tribes. These tribes and small bands would have been located in the area of the McNeill-Gonzales site, but they experienced significant cultural upheaval during the historic period, and only a few sources, primarily Cabeza de Vaca, are considered representative of the inhabitants of the interior Coastal Plain. These groups had diverse land use patterns that exploited the full spectrum of possible food resources; that in comparison to the coastal environments were limited. *Opunita* fields, mesquite peas, roots, and occasional small game and amphibians, deer, as well as occasion bison seem to have made up the diet of interior inhabitants (Nunez 1993: 62-63).

Historically the area of the McNeill-Gonzales site has seen settlement by Spanish, Mexican, and Anglo-Northern Europeans. The Spanish transferred Mission Espiritu Santo de Zuniga from a location in modern Victoria, TX to a site on the west banks and terraces of the Guadalupe River immediately to the west of the McNeill-Gonzales site. The mission existed at this location from 1726 to 1747 and served local Coahuiltecan tribes called the Aranama and Tamique and some Karankawa who came inland from the coast (Ricklis 1996, Walter 1999). Ranching, hunting, gathering, and possibly farming would have occurred near the McNeill-Gonzales site during this time period. The Gonzales family acquired the property where the McNeill-Gonzales site exists in the mid to late nineteenth century, though they are unsure if it was a land grant or purchased property (Gonzales n.d.). For at least 125 years descendants of the Gonzales family have been ranching and farming the property in an area of Victoria County that has remained primarily agricultural.

CHAPTER III

STRATIGRAPHY

The archaeology of the McNeill-Gonzales site is best understood by placing the site in geologic context. This was accomplished by: studying maps, surface survey, examinations of exposures created by borrow pit operations, and subsurface testing. These studies facilitated the creation of a valley cross section (Figure 8, 9). The characterization of stratigraphic units was made possible by subsurface testing, profile descriptions, granulometric studies, radiocarbon dating, and luminescence dating (Figure 10). The identified stratigraphic units are presented (Figure 11) with descriptions of each unit's stratigraphic position, sedimentology, pedology, and chronology (Table 1). The units are compared to other described localities of similar stratigraphy to place the landforms of the McNeill-Gonzales site in a regional context. All of the detailed descriptions of site stratigraphy and lab analyses are found in the appendices.

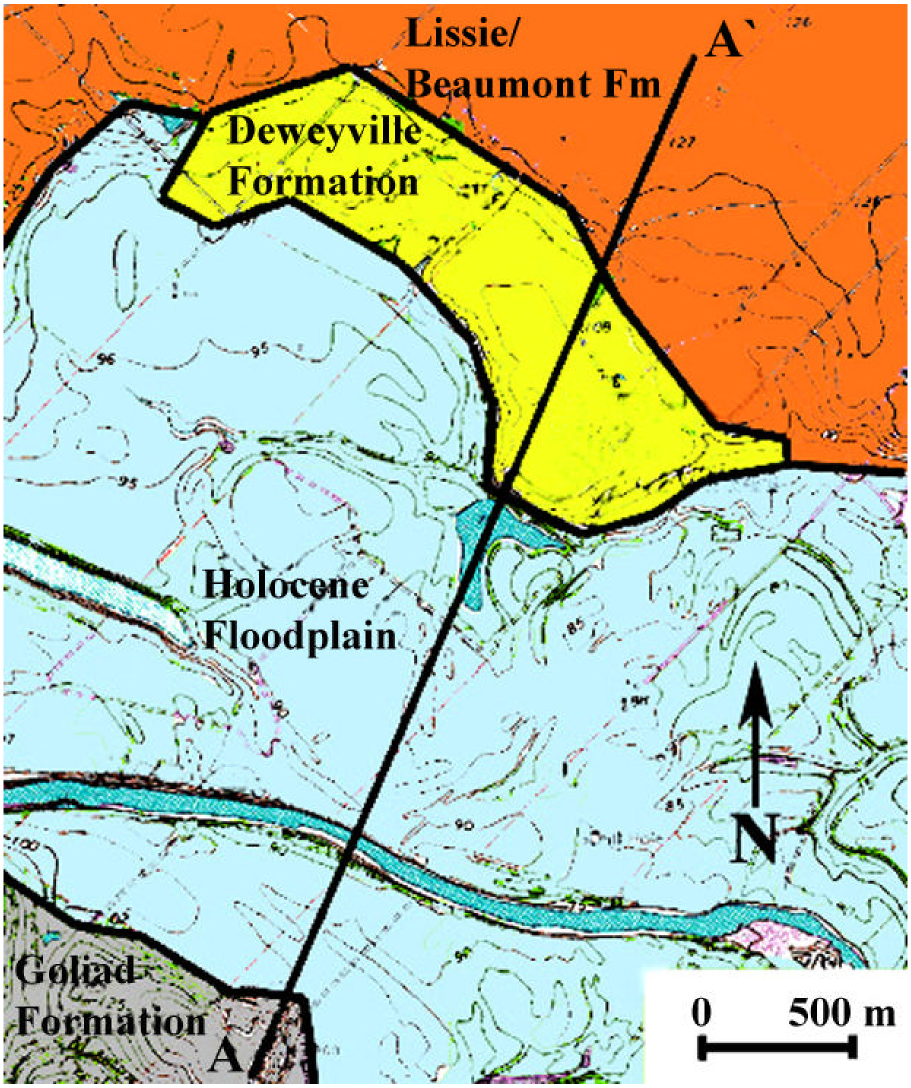


Figure 8. Project area cross section line

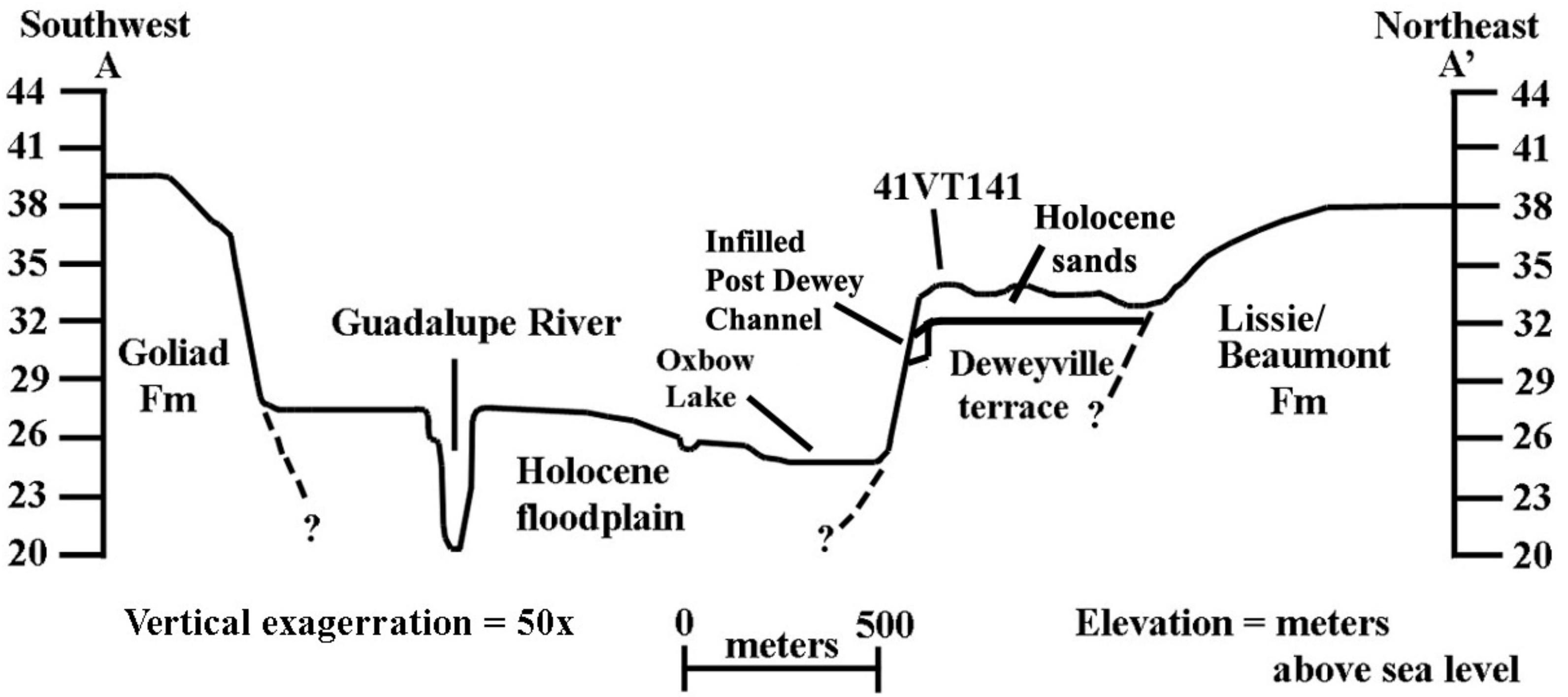


Figure 9. Geologic cross section of the project area

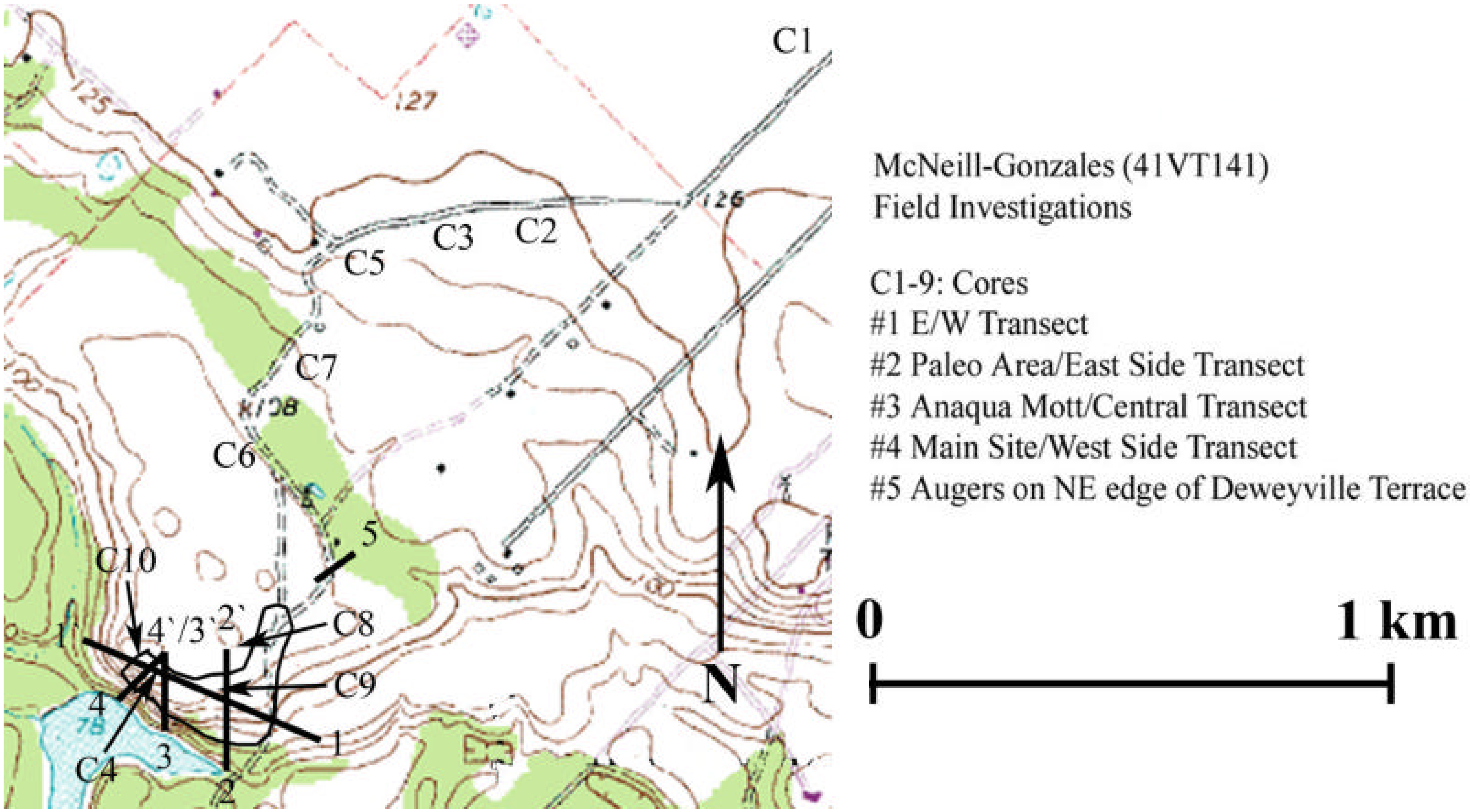


Figure 10. Tested surfaces in the project area

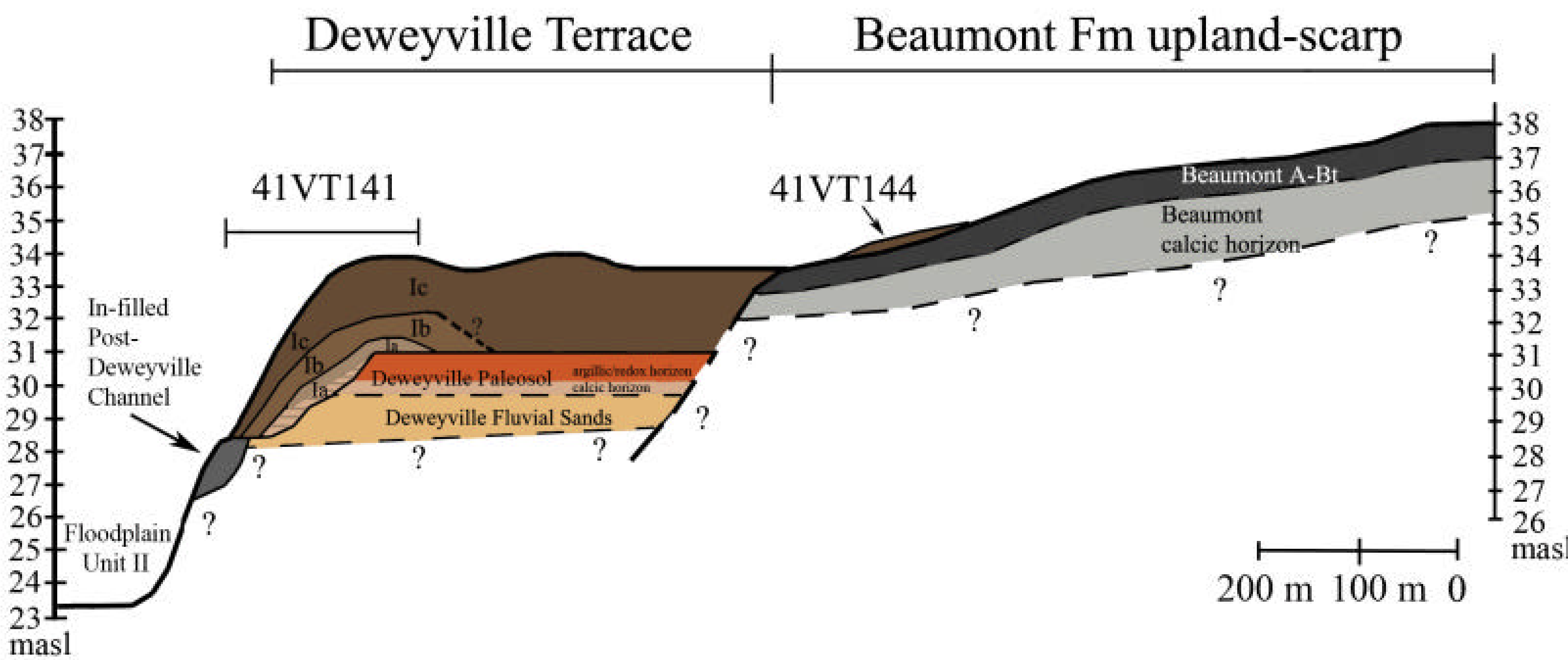


Figure 11. Project area cross section

Table 1. Project area geologic chronology

Depositional Unit	**Age**	**Source**	**Diagnostics**
Holocene Unit Ic	0-2,500 B.P.	Diagnostic Artifacts, AMS Dates (2020 B.P., 1730 B.P.)	Prehistoric: Perdiz, Scallorn, Marcos, Ensor, Fairland, Catan, Matamoros Aboriginal: Cameron Historic: Ceramics, Metal
Holocene Unit Ib	2,500-7,500 B.P.	Diagnostic Artifacts, AMS Date (3650 B.P.)	Pedernales, Refugio, Tortuga, Bell, Pandora
Holocene Unit Ia	7,500-10,000 B.P., 25,800 +/- 1630 yr (UIC1691IR) 23,700 +/- 1495 yr (UIC1691GR)	Diagnostic Artifacts, OSL Sample #2	Plainview, Golondrina, Angostura, Big Sandy, Saint Mary's Hall, Gower, Lerma, Abosolo, Uvalde Mixed date from Deweyville Terrace, and Ia colluvium
Deweyville Terrace	63,100 +/- 4000 (UIC1690GR)	OSL Sample #1	No cultural material
Beaumont Formation	70-90 ka	Regional Correlation	no cultural material

Beaumont Formation

The Beaumont Formation forms the northeastern margin of the Guadalupe River valley and rise approximately 5 meters above the Deweyville Terrace. These level clayey uplands were sampled with a truck mounted core rig (Figure 12). Though the uplands are mapped as Lissie Formation the cores generally corresponded with the mapped Lake Charles (Key West), Decosta, and Telferner Soil Series, which are considered soils of the Beaumont Formation. Core 1 was excavated on the level uplands of the Beaumont Formation. The profile consisted of a shallow 20 cm plow zone of very

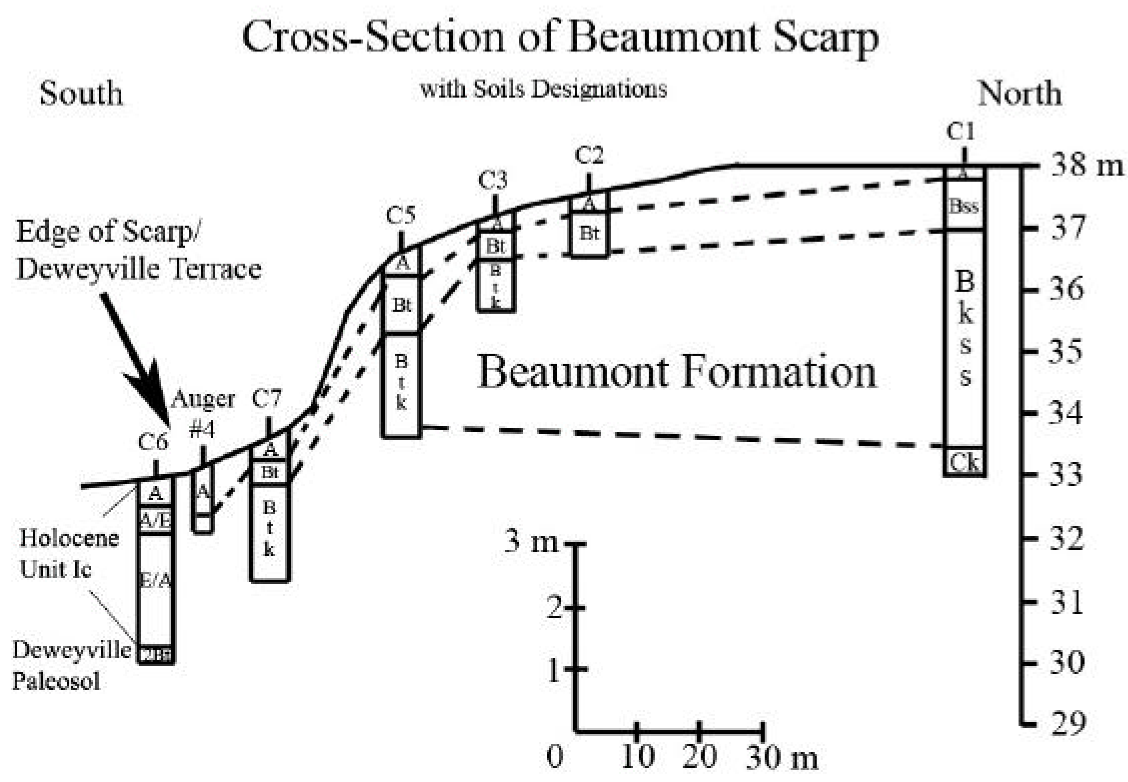


Figure 12. Cross section of the Beaumont scarp

dark gray clay, underlain by 80 cm of very dark gray clay. Below these clays to the limit of core 5 meters below the surface was a brownish yellow to light reddish brown silty clay to clay with common strong calcic soft masses and nodules.

Cores 2 and 3 had similar profiles on the same upland setting but were near the edge of the slope. Core 5 is on the convex portion of the gentle scarp of the Beaumont Formation. This exposure was like the previous exposures, except the clayey sediments above the underlying calcic horizons were reddish brown silty clay loams. Core 7 was located on the concave toeslope of the gently sloping escarpment. This core was quite similar to the profiles of Cores 1-3. Three augers (4, 10-4, and 10-5) located at the surface contact between the sandy deposits atop the Deweyville terrace and the Beaumont clays all had a sandy loam A horizon of the Holocene eolian sands mantling a shallow sandy clay loam to sandy clay like the Decosta Series description, but with a few red mottles of iron redox features. Archaeological site 41VT144 was found in this thin sandy mantle abruptly overlaying the Decosta Series soil along the edge of the terrace. The contact between the Deweyville Terrace and the Beaumont upland is quite abrupt, and augers and cores less than 20 meters away to the south of the contact (Core 7, Auger 10-3) have no evidence of Beaumont soils to the limit of exposure at approximately 3 meters. The cores and augers on the Beaumont surface show that the uplands are stable, have not seen severe erosion, and have experienced significant pedogenic alteration. Beaumont Formation deposits presumably dip below the Deweyville Terrace, but no augers on the Deweyville Terrace encountered any Beaumont sediments at depth.

Deweyville Formation

The Deweyville Terrace is an unpaired terrace on the northern margin of the valley that is 5 meters below the upland Beaumont formation and approximately 7 meters above the modern floodplain. It is between 26-33 meters above sea level, however portions of the upper 1-2.5 meters of the terrace have an eolian Holocene component. The area of the terrace is 0.5 km^2. Due to the abrupt contact with the Beaumont uplands the terrace appears to be erosional, however the lack of deep exposures of the Deweyville Terrace and few exposures of the contact with the

Beaumont Formation do not preclude it being a depositional terrace with limited erosion at the valley margins.

Sedimentological and Pedogenic Attributes. The Deweyville Formation deposits form the core of the alluvial terrace, with a mantling of Holocene sands that contain the archaeological deposits. Exposures that encountered the Deweyville Formation consist of three pedo/depositional units: a discontinuous buried paleosol here named the Deweyville Paleosol; light yellowish brown medium sands to gravelly fluvial sands; and a deeply buried calcic horizon. No exposures were extensive enough to determine bedding structure of the sands, but the presence of gravel lenses and coarser sands suggest these are fluvial deposits. Six samples from three exposures of sands were selected for particle size analysis (Auger 5-9, Paleo Profile Auger, Auger 5-36). The samples averaged 91.3% sand, are slightly gravelly (1.3%), and weakly alkaline with an average pH of 8.2. The average of the sand size fraction (0.0625-2.0 mm) for the six samples is moderately sorted fine skewed medium-fine sand.

Five exposures of the complete paleosol show variability in thickness from 75 cm to 175 cm. The paleosol has been truncated with no associated epipedon, and is laterally eroded at the edges of the terrace. The upper meter of the paleosol is an argillic dark gray sandy clay loam to clay loam with distinct common red mottles and a strong coarse blocky subangular structure. In four exposures (A5-9, A5-29, A5-40, C8) below the upper argillic portion of the soil is a lower horizon of dark gray sandy clay loam with common, distinct calcium carbonate nodules (Figure 13). In one exposure of the Deweyville Paleosol at the central portion of the terrace there is no calcic horizon, but

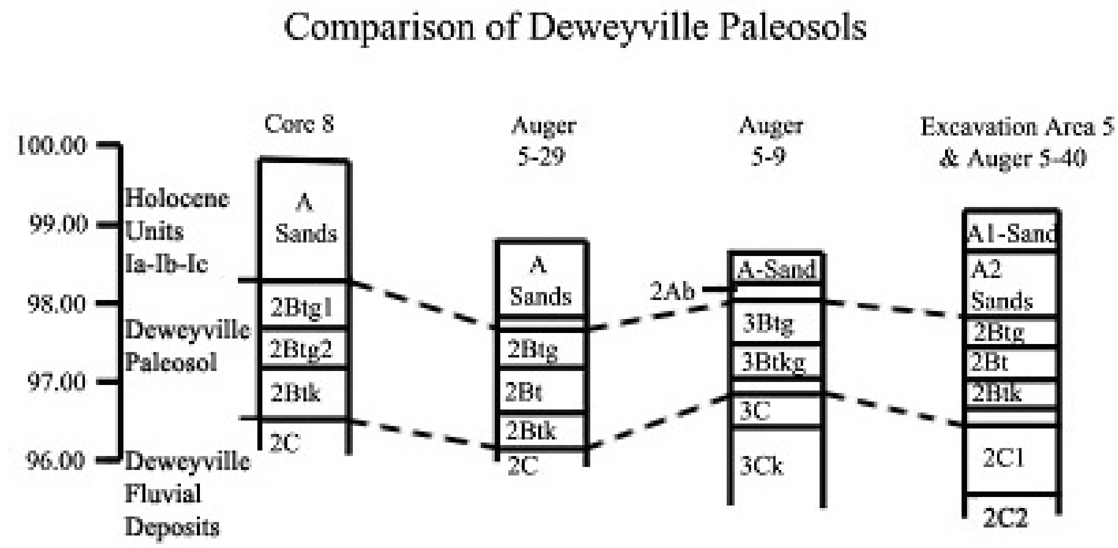


Figure 13. Comparisons of Deweyville Paleosol exposures

instead strong well-developed wavy clay lamellae that are up to 2 cm thick at 15 cm intervals that extend 1.4 m into the fluvial deposits (Figure 14). Particle size distributions for two samples of the Deweyville Paleosol were conducted (Excavation Area 4-Sample D9692, A5-9). The average particle size distribution of the two samples are 60.6% sand, and is classified as an extremely poorly sorted strongly fine skewed medium silt. The upper portion of the paleosol is acidic, with an average pH of 5.8. The red mottles are iron redox features that indicate seasonal wetting and drying. Water flows through the mantle of well-drained fine sands until it reaches the impediment of the buried paleosol. The active process of cyclical wetting and drying is probably causing the redox features, which considering the lower calcic horizon indicates a polygentic nature to the deposit. The thickness, well-developed redox features, calcic horizon, and age of the sandy parent material indicate it is a buried paleosol and not a soil formed solely from illuvial processes during the Holocene.

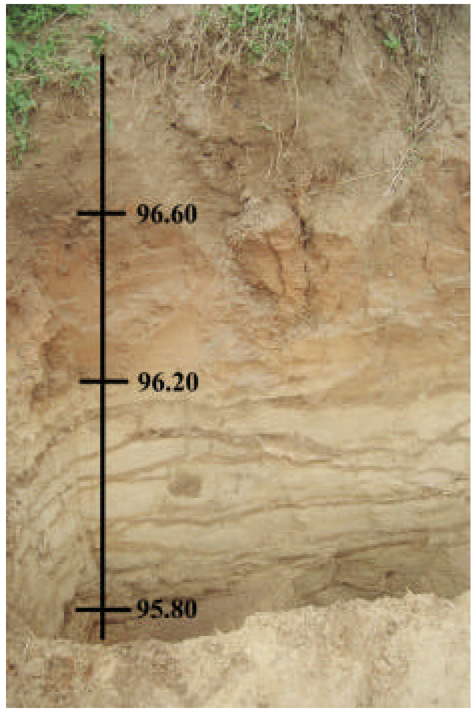


Figure 14. Exposure with Deweyville Paleosol between 96.60 and 96.20, clay lamellae in Deweyville fluvial sands below

The calcic portion of the Deweyville Paleosol that underlies the redox mottled sandy clay loam derives its calcic character from the accumulation of secondary carbonate. This has resulted in the formation of a Stage II calcic horizon with common nodules and soft masses (Birkeland 1999: 357). The standard model of carbonate formation (Birkeland 1999) would interpret that in this setting the intermittent saturation of sediments from water that flows through the mottled sandy clay loam was not sufficient to leach carbonates out, and they have accumulated below the mottled sandy clay as nodules and soft masses. The processes of calcification in the Gulf Coastal Plain has come into question by James Abbott, who contends that carbonate horizons found in this region do not allow the typical interpretations of climate and carbonate formation chronology. In this region carbonate horizons are typically found in the saturated phreatic zones as opposed to the vadose zone (Abbott 2001: Appendix II). The standard model of carbonate formation was developed in studies of carbonates in the only seasonally wetted vadose zone. Considering that in this context the upper clay horizon has led to the formation of a perched water table the carbonate development of the Deweyville Paleosol may not be accounted for in standard interpretations of carbonate formation. Unfortunately compared to the vadose models there have been little work on phreatic carbonates of humid regions, and little acknowledgement of this form of carbonate development in the United States (Abbott 2001).

The Deweyville Paleosol is not uniformly present across the Deweyville Terrace, particularly on the margins of the terrace where it has been eroded and colluvium and eolian sediments are unconformably resting on the fluvial sands of the Deweyville Formation. The relationship between the sandy mantle and the underlying Deweyville Formation will be discussed in detail in the section on Holocene deposits.

A final feature of the Deweyville Terrace is a deep calcic horizon located below the bedded fluvial sands. A strong, cemented gravelly to silty calcic horizon was only encountered on the southeastern portion of the terrace. The calcic horizon was encountered in Auger 1, Auger 2, Auger 5, the Paleo Area Excavation, Auger 10-6, and Auger 10-7. The thickness of the horizon was only exposed in a borrow pit cut near at the southeastern margin of the terrace (Figure 15). Here the calcic horizon is discontinuous with a thickness ranging from 40 to 80 centimeters, and is unconformably overlain by Holocene deposits with archaeological material. Fluvial deposits with small

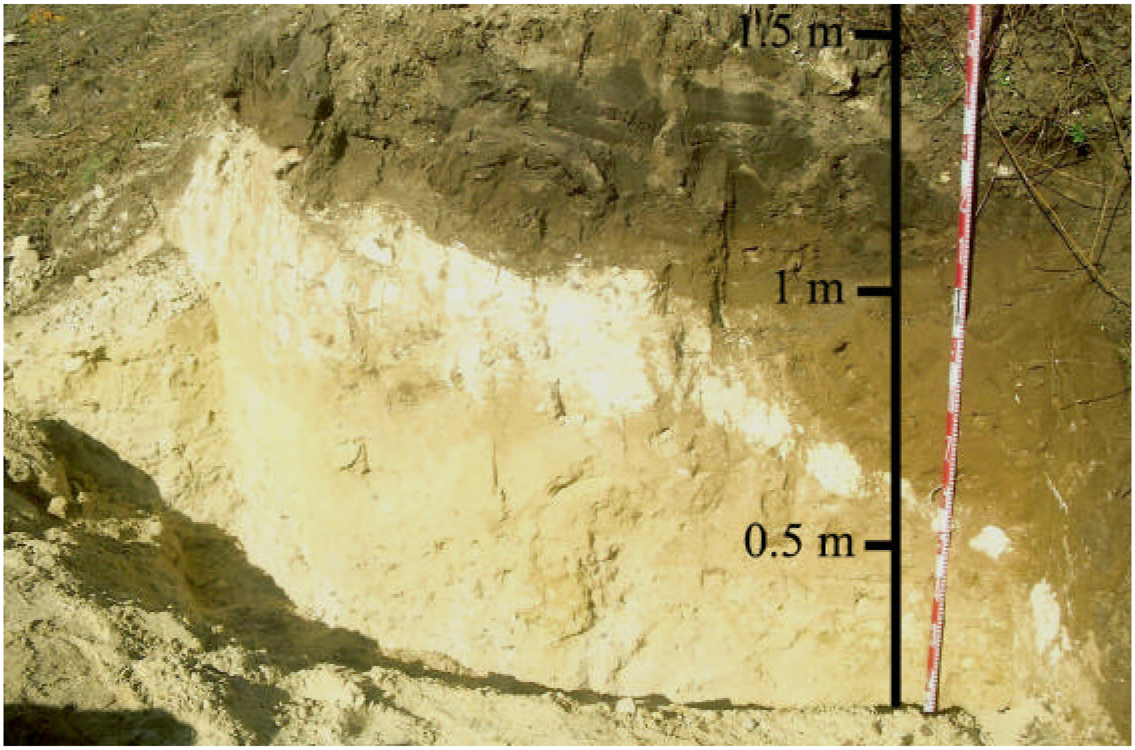


Figure 15. Exposure of deep calcic horizon in Deweyville Formation

boulder sized gravels underlie the calcic horizon, and though the horizon is primarily formed in silty sediments, portions of the calcic horizon have formed in the gravelly deposits. Only the auger furthest upslope (Auger 1) has an exposure of the calcic horizon buried deeply under fluvial sands of the Deweyville Terrace.

Chronometric Evidence. OSL sample #1 was collected from the fluvial sands below the Deweyville Paleosol in a deep exposure created by the borrow excavations (Figure 14). The sample was collected from medium sands between well-developed lamellae, 115 cm below the top of the buried paleosol. Methods outlined by Jain et al (2003) for the analysis of multiple aliquots were used after single aliquot sample did not produce a finite age. Multiple aliquots were analyzed by three excitation methods, blue light, green light, and infrared. Of these three methods only the green light stimulation of quartz minerals produced a finite age. Blue light produced an estimation of >26,700 ± 1900 yr (UIC1690BL), while infrared excitation of Feldspars produced an estimation of >50,400 ± 3200 yr (UIC1690IR). The green light stimulation produced a finite age of 63,100 ± 4000 yr (UIC1690GR), which gives age estimation at the 2-sigma age range of 55,100-71,100 yr. Corroborating evidence of this age is the complete lack of prehistoric artifacts in any exposures or subsurface tests below the paleosol, and the similar ages reported by other researchers.

Correlations to Other research. The deposits of this terrace correlate to other descriptions of Deweyville Formation deposits, and in particular descriptions of deposits labeled 'High Deweyville'. The Buckeye Knoll site (41VT98) has a similar stratigraphy. Fine well-sorted sands with archaeological deposits overlie a buried truncated paleosol (Frederick and Bateman 2004). Like the McNeill-Gonzales site there were instances where the upper mantling sands were resting directly on the underlying fluvial deposits of the Deweyville Formation. They were able to date the deposits by OSL, and conduct granulometric analyses of the lower fluvial sands and buried paleosol. In their samples they were not able to discern any textual difference between the underlying sands and the sandy mantle, but a series of OSL dates identified a clear difference in age between the deposits. The underlying deposits all dated between 49 and 53 ka while the upper deposits were Holocene in age (Frederick and Bateman 2004: 10).

In a geomorphic study of the Nueces River Durbin (1999) recorded numerous Deweyville Terraces he described as Holocene sandy A-E soil horizons mantling a buried paleosol with red mottling and calcic nodules, and underlying bedded fluvial deposits. Although he did not date the upper sands, and did not address the depositional mechanisms for the upper mantling sands, samples from the lower fluvial deposits produced the 60-47 ka dates for the 'High Deweyville' (Durbin 1999, Durbin et al 1997). A geomorphic survey for the proposed Lake Creek Reservoir in Montgomery County, Texas recorded numerous instances of eolian sands mantling Deweyville terraces (Mandel 1987). Mandel recorded profiles that conformed to the A-E sandy mantle with a buried paleosol with red mottles, though he was not able to directly date the Deweyville terraces or the mantling sands. Finally, in a geoarchaeological model of the distribution of archaeological sites in the Houston area, Abbott (2001: 99) identifies deposits on the San Jacinto River where sand sheets overlie a truncated Pleistocene soil on Deweyville Terraces.

Infilled Channel, Possibly Low Deweyville

Along the southern and eastern margins of the Deweyville Terrace there is evidence for a buried paleochannel inset into the High Deweyville Terrace and partially buried by later Holocene colluvium and sandy mantle. This feature is present along a low table of sediments that exists at the margin of the terrace before its steep scarp onto the Holocene floodplain. The buried, infilled channel was encountered in Augers 5-5, 5-6, near the burial area, Auger 5-28 near the Anaqua Mott Area and backhoe trenches 2 and 3 on the far southeastern edge of the terrace. The sediments of Augers 5-5 and 5-6 consisted of dark grayish brown weakly calcic silty clay that was relatively uniform to the maximum depth of the augers. Backhoe trenches 2 and 3 had clay to sandy loam sediments with only minimal carbonate filaments. The facies relationship between these deposits, the Deweyville Formation deposits, and the Holocene colluvium and sandy mantle is quite abrupt, with completely different profiles existing within 5 to 10 meters of the silty clay to sandy-clayey loam sediments. Auger 5-6 and Trench 3 were attempts to identify a southern facies relationship with the other side of the channel, but it appears this facies is completely eroded away.

Holocene Deposits

The Holocene deposits are located on the terrace tread, the slopes of the terrace, and the Holocene floodplain. The deposits mantling the Deweyville Terrace are sediments deposited by colluvial and eolian mechanisms that have since undergone post-depositional processes such as pedogenesis, erosion, and bioturbation. This has created a complex stratigraphy that required extensive subsurface testing to correlate stratigraphic units across the terrace. These correlations are in a general project area cross section (Figure 11), and a series of cross sections that encounter archaeological deposits at the edge of the terrace (Figures 16, 17, 18, 19). There are three stratigraphic units identified on the Deweyville Terrace. The Holocene deposits of the floodplain were only minimally examined because investigations focused on the archaeological deposits. Many localities with Holocene deposits are found where erosion of the Deweyville Terrace created depressions and steep grades that then became filled with sediments during the Holocene. Localized erosion is evident from instances of the truncation of the Deweyville Paleosol, the complete removal of the argillic portion of the Deweyville Paleosol leaving only the calcic horizon, and examples of Holocene sands unconformably resting on sands of the Deweyville Formation. The most dramatic examples of erosion are where the buried Deweyville Paleosol has been completely eroded down to the fluvial deposits or the deep buried calcic horizon. Subsequent alluvial and colluvial deposits rest unconformably on these eroded surfaces. Evidence for erosion was found primarily along the margins of the terrace, however an ancient gully or depression was identified at the southern portion of the central part of the terrace. Here profiles created by borrow pit operations and auger 5-22 found no evidence of the Deweyville Paleosol and the fine sands of the Holocene deposits are unconformably above coarser fluvial deposits. Augers and profiles approximately 30 m to the east and west of auger 5-22 have evidence of the paleosol. Due to the localized nature of this erosion it may represent a gully that eroded only a portion of the terrace, and then infilled during the Holocene with colluvium and eolian sediments.

In other locations on the south and east portions of the terrace the argillic portion of the Deweyville Paleosol has been eroded to expose the underlying calcic component of the paleosol. This erosion was widespread across these portions of the terrace, which suggests a larger scale erosion event like scouring by fluvial processes. These calcic soils were then exposed to the surface during early portions of the Holocene, and were prehistoric living surfaces. Later Holocene deposits then mantled these portions of the terrace; however the deposits are not nearly as thick as the sandy deposits that filled the gully in the central portion of the terrace.

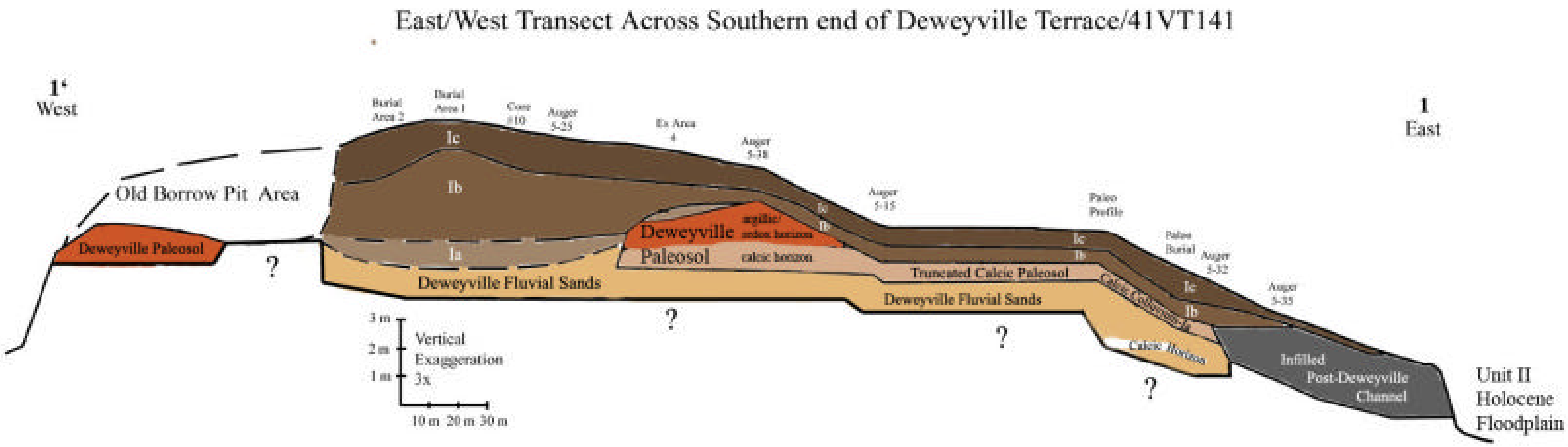


Figure 16. East - West cross section of the southern edge of the Deweyville terrace

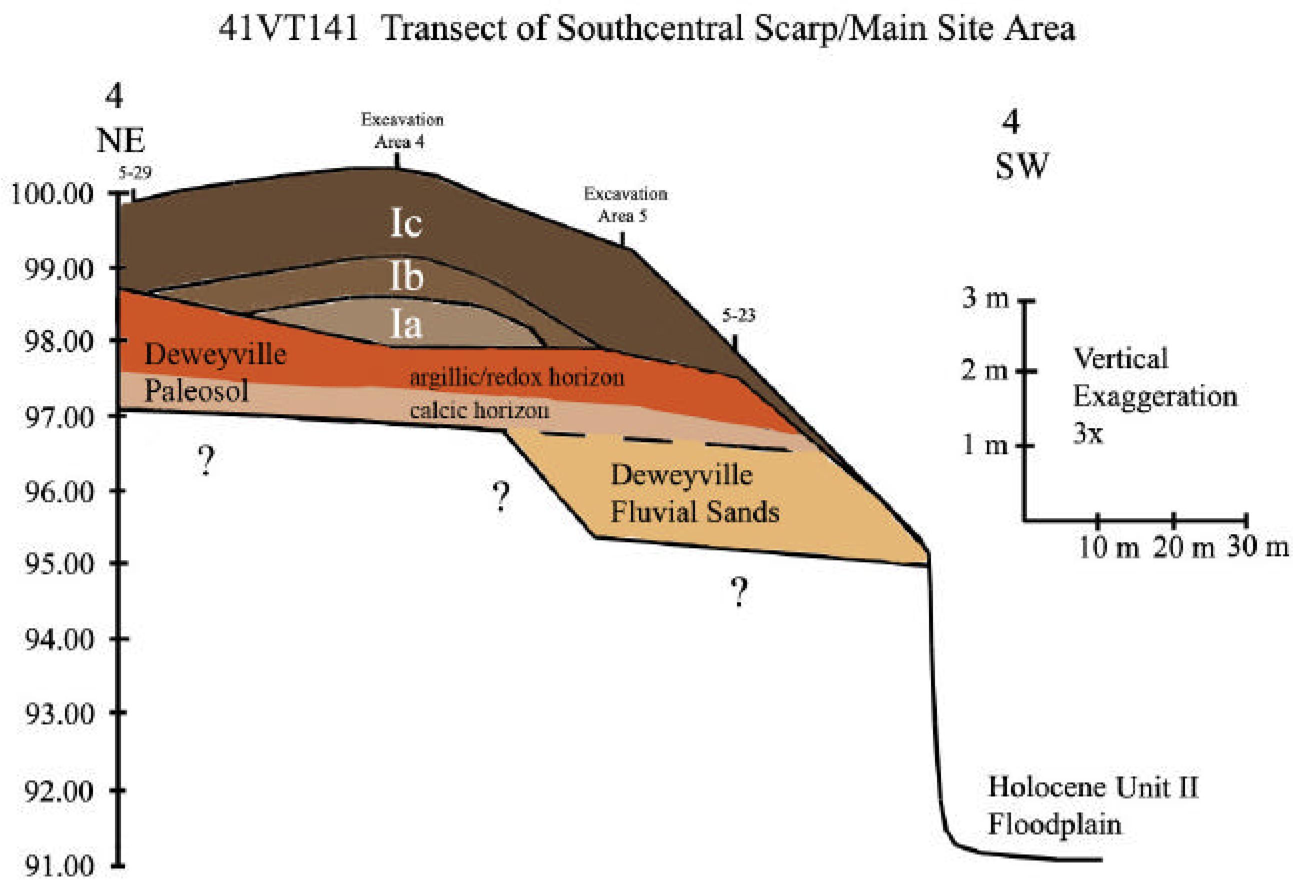


Figure 17. Transect through Main Site Area

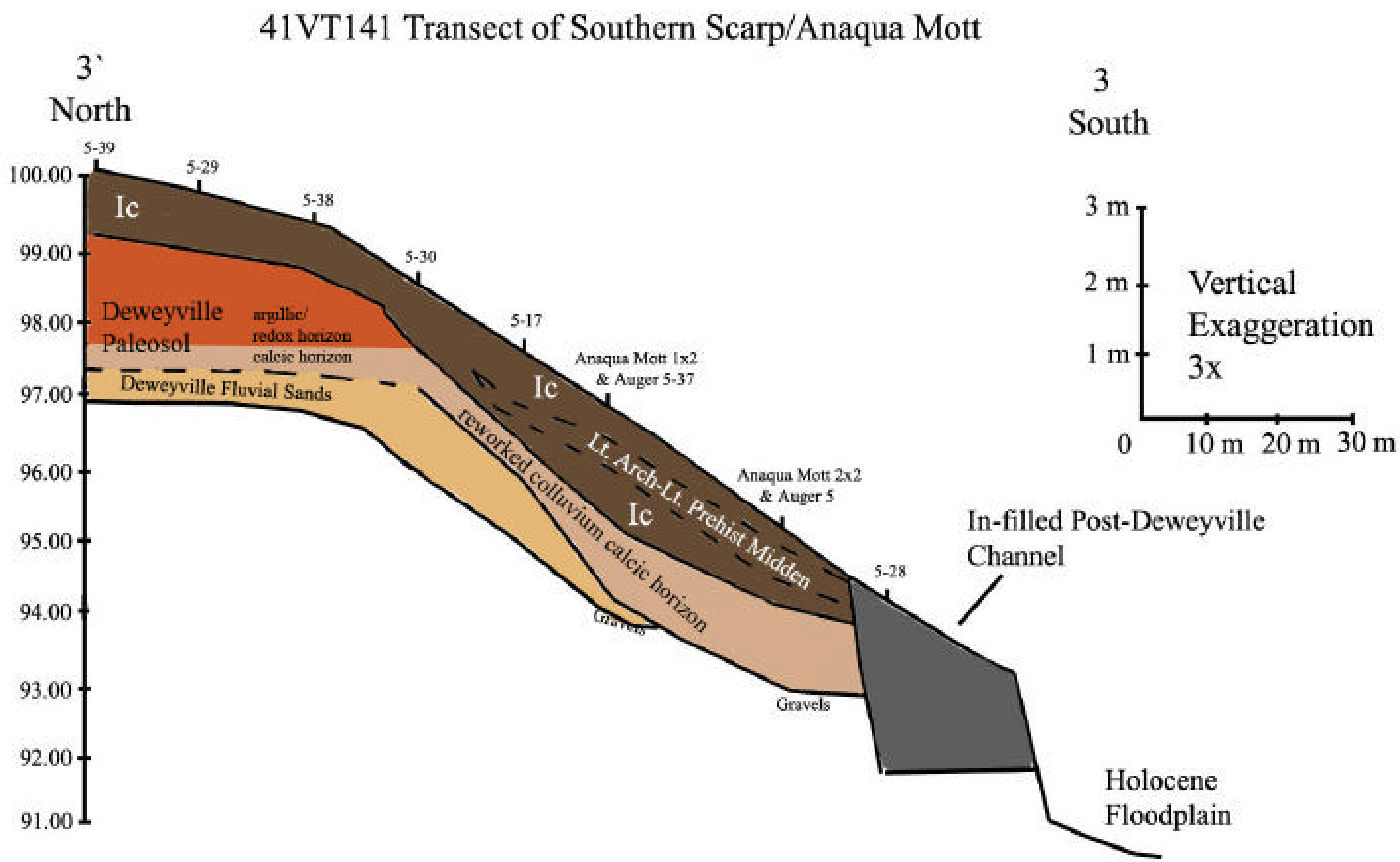


Figure 18. Transect through Anaqua Mott

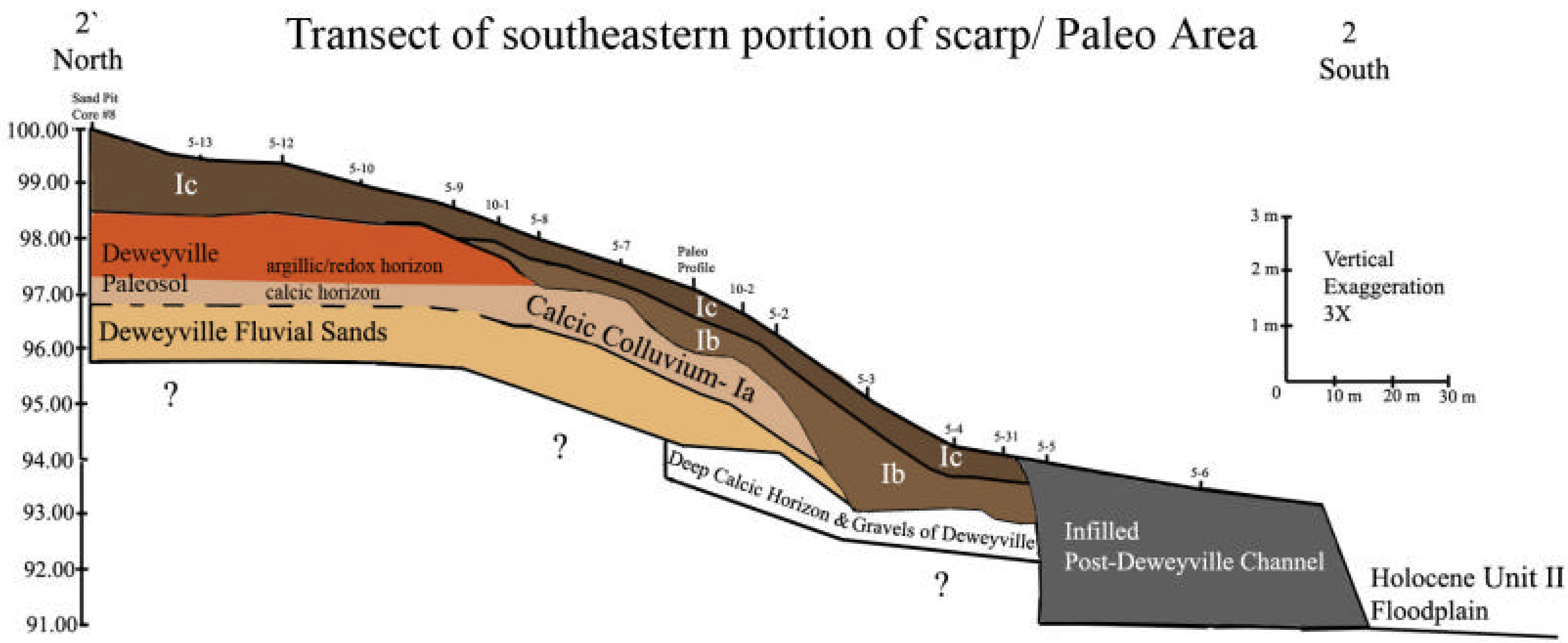


Figure 19. Transect through Paleo Area

Evidence of the buried Deweyville Paleosol being truncated comes from the lack of an epipedon in augers, profiles, and cores. A deep pit on the terrace has an extensive lateral profile of the contact between the paleosol and Holocene deposits. The contact is abrupt and irregular with no evidence of an illuvial Bt horizon welded to the buried paleosol. Because the paleosol is actively experiencing illuviation and gleying in some locations it was impossible to discern the topography of the upper portion of the buried paleosol in these locations. The mechanism for the truncation of the paleosol and its epipedon is unknown, but eolian deflation or water erosion by gullying of the epipedon could have stripped upper horizons leaving the endopedon susceptible to further localized erosion.

The first period of Holocene deposits (Ia) are relatively thin sand deposits that began filling depressions along the southern scarp; and exposed calcic portions of the Deweyville Paleosol reworked as colluvium along the southeastern scarp edge. This unit was identified atop the buried Deweyville paleosol in the central portion of the site and at the southeastern portion of the terrace in the reworked calcic colluvium. Much of this depositional unit has undergone pedogenesis with clay illuviation. The next Holocene deposit (Ib) is a sand deposit of varying thickness that continued to fill low-lying portions of the terrace scarp. This deposit is more uniform across the terrace scarp, slope, and it may mantle the terrace tread. The deposits have a weak but distinct paleosol, which is found across the entire scarp and slope of the southern portion of the terrace. The final period of Holocene deposition on the terrace tread and slope (Ic) is a sandy deposit that forms the modern surface. These deposits are mollic with a darkened

A horizon along the terrace edge that loses its dark color upslope on the terrace tread. On the terrace tread up to the edge of the terrace scarp these deposits have a weak albic endopedon with distinct clay lamellae. The southeastern portion of the terrace has only a thin mantling of Ic deposits and no endopedon. The Holocene floodplain deposits (II) were not systematically studied, however it was observed that the floodplain deposits along the terrace edge are fine overbank deposits.

Sedimentological and Pedogenic Attributes. The Holocene deposits have many similarities: the obliteration of primary bedding structure by biological and pedological processes; the sediments are uniform fine sands, and the deposits of the terrace edge are much darker in color than the sediments further upslope. The lack of bedding structure is evidenced in excavation unit profiles and exposures across the site. Bioturbation as evidenced by modern roots, infilled root casts, ant hills, insect tunnels, and human activities have led to the destruction of bedding structures, however the primary form of disturbance is due to the activity of gophers. Gopher mounds are quite common across the terrace (Figure 20). The building of gopher mounds was primarily observed occurring in the early spring when vegetation is at its lowest, and potentially a large volume of sediment is moved. This has caused a homogenization of the deposits and translocation of artifacts, which hinders the interpretation of depositional processes and integrity of the archaeological deposits. Though there is variability in burrow depths, it is reported that gophers typically do not burrow deeper than 60 cm (Johnson 1989), so the disturbance by gophers should be limited to the upper portions of each Holocene depositional unit. The impact of bioturbation on the archaeological stratigraphy and

Figure 20. Photo of gopher mounds

integrity of the deposits will be discussed in the next chapter as well, but it should be said here that there is evidence for burial by sedimentation and not predominately by biomantle formation.

The evidence for burial by sedimentation comes from the preservation of intact archaeological features and human burials; diagnostic artifacts that were found in a stratigraphically consistent manner with the regional chronology; and a physiographic position on a slope that would be subject to primarily aggradational processes. Features consistent with pedogenesis and artifact redistribution by biomantling were relatively limited in the Holocene deposits on the terrace surface, with only limited evidence of artifact translocation to the base of the deposits to form stone lines as defined by Johnson (2002), or the wholesale mixing of diagnostic artifacts.

Holocene Unit Ia. Holocene Unit Ia is located immediately above the variously eroded Deweyville Formation deposits along the southern edge of the terrace and has varying degrees of pedogenic alternation. In excavation unit exposures on the terrace tread the unit is aggradational, has seen weak clay illuviation, and the partial obliteration of a weak paleosol at the top of the unit. The remnant A horizon is a 10 cm thick dark grayish brown loamy fine sand, with evidence of infilled root casts below the A horizon. The underlying illuvial horizon is 45 cm thick and texturally a sandy loam to sandy clay loam. This aggradational portion of Unit Ia is weakly acidic (pH 6.2) and has a similar particle size frequency clustered around fine sands like subsequent sand deposits of the Holocene. It is assumed this unit exists at the base of the infilled gully on the southwestern portion of the terrace, though this was not identified in Auger 5-22.

Unit Ia as identified on the southeastern portion of the terrace consists of sediments from the truncated Deweyville Paleosol that was reworked during the Holocene as colluvial slopewash. Along this portion of the terrace the argillic portion of the Deweyville Paleosol was truncated, exposing underlying sandy calcic horizon. The edge of the terrace was laterally eroded, creating a relatively steeper grade. Portions of the exposed calcic horizon were mobilized and locally redeposited downslope. These sediments retained the calcic nodules that developed when the unit was overlain by the argillic horizon of the Deweyville Paleosol, which is still preserved further upslope. The deposits are approximately 50 cm thick loamy fine sands that have experienced clay illuviation from Unit Ib. They are weakly alkaline (pH 8.2) like the calcic deposits and sands of the underlying deposits of the Deweyville Formation.

Holocene Unit Ib. Unit Ib is found across the southern edge of the Deweyville Terrace and possibly on portions of the terrace tread. In all locations along the scarp the deposit is aggradational in low portions with a paleosol developed at the top of the deposit. The deposits are thickest on the central and western edges of the terrace, where it filled the paleo-gully and mantled Unit Ia with a dark gray fine sand. The deposits are approximately 75 cm thick and are texturally similar to the aggradational deposits of Ia in this portion of the site. The paleosol is manifested by an abrupt change in soil structure from the structureless massive sands of Unit Ic to a weak coarse blocky subangular structure. On the southeastern portion of the site Unit Ib is a 40 to 60 cm mantle of dark grayish brown fine sandy loam. This deposit lies directly on the reworked colluvium of Unit Ia and is found across the southeast portion of the terrace. During a period of stability this deposit developed into a paleosol with medium weak blocky angular structure.

The unit may be present on the terrace tread, but unfortunately this is hard to determine without chronological control on the terrace tread. The paleosol loses its structure in exposures upslope of the scarp edge, making direct correlation difficult. One possibility for correlation is that the upper Unit Ic unit has an albic horizon with clay lamellae that does not extend to the depth of Unit Ib in exposures at the scarp edge where the paleosol is extant. If the pedogenic process of clay lamellae formation is uniform between the scarp edge and the terrace tread than it suggests that the sands below the depth of clay lamellae can be at least no younger than unit Ic.

Holocene Unit Ic. The final depositional unit of the terrace is Unit Ic. The uniformity of the deposit, the texture, and its position on the landscape gives it the greatest likelihood to be entirely eolian. As opposed to the two lower units that fill low portions along the edges of the terrace scarp this deposit is of uniform thickness across much of the terrace. The surface of the unit on the terrace tread is nearly level with a slightly irregular dome like topography (Figure 21). There are approximately 5 to 8 low domes no more than 50 cm high and approximately 40 m in diameter across the surface of the Deweyville Terrace. The stratigraphy of the deposit on the terrace tread consists of A1-A2 soil horizons of brown fine sands approximately 85 cm thick, underlaid by a 90 cm elluvial E horizon of brown loamy fine sand with clay lamellae for a total thickness of 175 cm. The lamellae are approximately 5 mm thick, bedded roughly horizontal, and are spaced approximately 10 cm apart (Figure 22). Below the E horizon is either a C-horizon of massive fine to medium sands or an abrupt contact with the Deweyville Paleosol. As the deposit nears the edge of the scarp the sediments become a very dark grayish brown and the clay lamellae become less pronounced. The sediments on the slope of the scarp lack clay lamellae, and across portions of the scarp a midden of prehistoric cultural debris formed. The deposit of the Ic on the slope of the scarp is thickest at the central portion of the scarp forming one of the low dome-shaped mounds, and is thinnest on the southeastern portion where it is just a thin mantle approximately

Figure 21. Photo of Deweyville Terrace tread

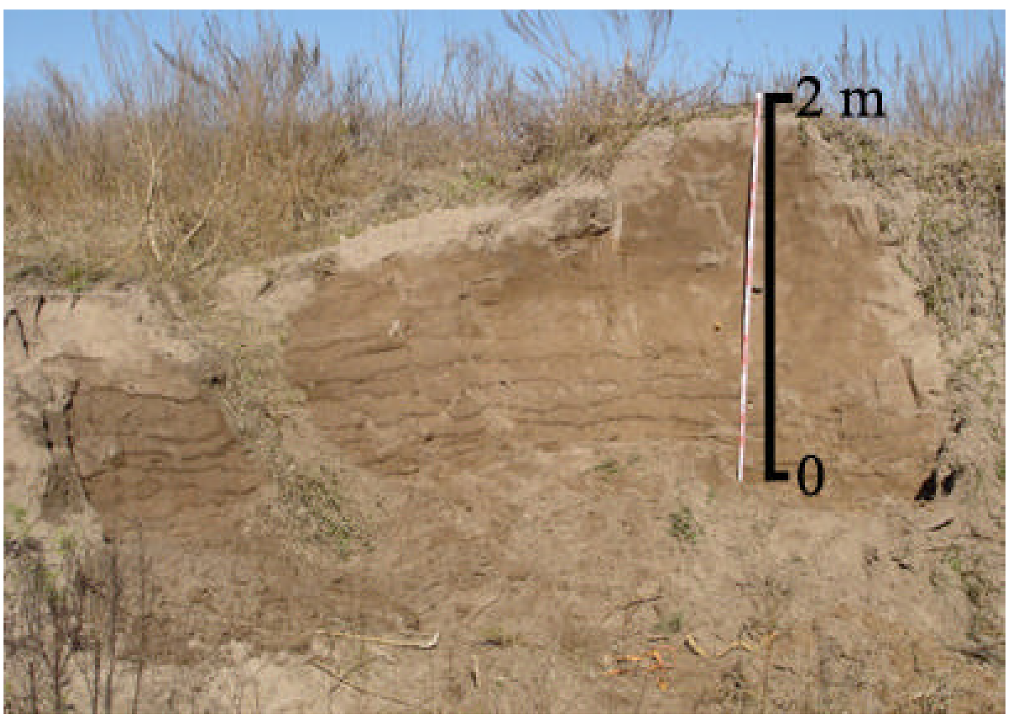


Figure 22. Photo of clay lamellae in Holocene Unit Ic

30 cm thick. The sediments are over 90% sand, with just over 60% of the sand fraction being fine sand. The sand fraction is moderately sorted and coarse skewed. All of the exposures have examples of bioturbation in the form of insect and rodent burrows, as well as floralturbation from roots.

Holocene Unit II. Holocene Unit II consists of the floodplain deposits of the Guadalupe River. These deposits were not studied because this investigation focused on the deposits of the Deweyville Terrace. The sediments of the floodplain are primarily overbank deposits that are dark gray silty clays to silty loams. The deposits of the floodplain near the base of the Deweyville terrace deposits have no similarities to the Holocene deposits mantling the terrace, which suggest very different inherited properties of the deposits, and that there is relatively little erosion of the sandy deposits from the terrace onto the floodplain. No subsurface excavations were conducted on the floodplain, so the geometry of the deposits or the potential for buried terraces younger than the Deweyville Terrace is unknown.

Chronometric Evidence. The chronometric data for the Holocene deposits comes from archaeological artifacts, radiocarbon dating of human burials, and OSL dating of sediments provide direct dates for the Holocene deposits. No effort was made to date Unit II.

Unit Ia is dated by diagnostic artifacts and an OSL date. Diagnostic artifacts date the Ia deposits on the south-central portion of the terrace, while an OSL date and diagnostic artifacts date the more complicated mixed deposits of Ia on the southeastern portion of the terrace. OSL Sample #2 is from the sandy colluvium of the reworked

Deweyville Paleosol on the southeastern portion of the terrace. The sample was collected from 1.6 m below ground surface. Though most of the cultural material of this unit is found above the sample there are scattered artifacts at the level of the sample and deeper in the profile. Like OSL Sample #1 the single aliquot method was not successful in producing a finite age. Instead multiple aliquots with infrared and green light excitation were used to date the sample. Both excitation methods produced finite ages. Infrared excitation of Feldspars produced an age of 25,800 ± 1630 yr (UIC1691IR), while green light excitation of quartz minerals produced an age of 23,700 ± 1495 yr (UIC1691GR). The two-sigma age ranges overlap with these samples, being 24,200-27,400 yr and 22,500-25,200 yr. These ages are much older than the earliest dated archaeological components in the region, and probably reflect the limitations of the aliquot method of OSL dating in depositional settings that have the potential for poor bleaching. In this colluvial setting not all of the sands may have been bleached during deposition, which would lead to poorly bleached or unbleached Deweyville sands being mixed with sands that were bleached later in time during the colluvial process. This would lead to a mixed value that would average paleodose rate between the age of the Deweyville sediments 55,000-71,000 yr and Holocene deposits at approximately 10,000 yr. Bioturbation could be another factor with the contribution of younger sediments into the older deposits. Considering these results future dating should apply the single grain OSL dating method, which has been shown to successfully identify sediment ages in poorly bleached, or mixed signature deposits (Bateman et al 2003).

The diagnostic artifacts are probably more reliable indicators of the age of Unit Ia. On the southeastern portion of the terrace the artifacts are primarily in the upper portion of the colluvial Ia unit with only scattered artifacts deeper in the colluvium where OSL Sample #2 was collected. On the south-central portion of the terrace unit Ia consists of aggrading deposits filling depressions atop the Deweyville Paleosol on the edge of the terrace tread. Diagnostic artifacts of the Late Paleoindian to the Early Archaic are found in Unit Ia. These artifacts date from between 10,000 to 7,500 B.P., and have some degree of stratigraphic separation during this 2,500-year period. Diagnostic artifacts from the Late Paleoindian period found in this unit were Plainview, Golondrina, Big Sandy, St. Mary's Hall, and Angostura. The Plainview and Golondrina were found towards the bottom of this unit, which suggest the initiation of occupation and deposition at approximately 10,000 B.P. The Early Archaic diagnostics were found higher in the profile, though Golondrina points were commonly found intermingled with these younger diagnostic artifacts. Early Archaic artifacts, which consisted of Gower, Abasolo, Uvalde, and Lerma dart points were typically in the upper portion of the deposit, and commonly mixed with the Late Paleoindian artifacts. These data indicate that the Ia deposits on the terrace tread experienced relatively slow aggradation deposit, which at its thickest is only 50 cm. The weak paleosol at the surface indicates that this unit had a period of stability and non-aggradation. The expression of Unit Ia on the southeastern portion of the scarp is more complicated because it is the result of colluvial action. Due to lateral movement incurred by colluvial processes the deposits should be time transgressive, with older deposits upslope and younger deposits downslope, however this could not be tested because systematic excavations in Unit Ia only occurred in one locality on the southeastern portion of the terrace.

Diagnostic artifacts and the radiocarbon date of a prehistoric burial provide a chronology of Unit Ib. The unit dates from the Early Archaic to slightly after the Middle Archaic, which spans from 7,500 to 2,500 B.P. This long period of deposition is represented at the site by fewer diagnostic artifacts than Unit Ia or Ic. Diagnostic artifacts recovered were Pedernales, Refugio, Tortuga, Pandora, and a Bell-like dart point. The Early Archaic artifacts were found in the lower portion of this approximately 60 cm thick deposit that suggests aggradation began around 7,500 B.P. A date from the top of this depositional unit comes from a burial in the southeastern portion of the terrace. The researcher analyzing the burial has not published the date, so to not publish the date before the researcher has an opportunity to the date is presented without the standard deviation age range. Bone collagen from the burial dated by AMS to 3,650 ^{14}C yr B.P. (Rice personal communication 2006). This burial appears to be excavated into older Ib deposits, though there were no older diagnostics near the burial to corroborate this. A paleosol developed in the upper portions of this unit, and the paucity of Middle Archaic artifacts and the absence of any artifacts from the earliest part of the Late Archaic suggest that this deposit stopped aggrading and was stable until 2,500 B.P. During the Late Archaic burials were excavated into this unit, which has further complicates the understanding of this unit.

Diagnostic artifacts, radiocarbon dating of two burials, and rates of pedogenesis date Unit Ic. Numerous diagnostic artifacts date this deposit to the Late Archaic, Late

Prehistoric and Historic periods. This unit, which is up to 1 m thick, was aggradational through this entire period, and there seems that there was no depositional hiatus between these archaeology periods. Late Archaic artifacts are found at the base of the deposit, and one burial from this period is excavated into the lower Ib unit. The bone collagen from two burials was dated. The burial excavated into Unit Ib was dated by AMS to 1730$\pm$40 ^{14}C yr B.P., while the other located at the base of Unit Ic dated to 2020$\pm$ 40 ^{14}C yr B.P. (Taylor 2005:23). Diagnostic Late Archaic artifacts recovered were Marcos, Fairland, Ensor, Darl, Catan, Matamoros dart points, and a Friday biface. This in conjunction with the burials dates the Late Archaic component from 2000 to 1000 B.P. The Late Prehistoric artifacts consist of Perdiz and Scallorn arrow points, and these are typically found in the upper portions of the unit, mixed with later historic aboriginal and European artifacts. European ceramics were found to a depth of 60 cm, which suggests the upper portion of this unit is mixed through bioturbation. The formation of clay lamellae is another indicator of age that in this setting helps correlate depositional units across the terrace. Though the rate of lamellae formation is varied and relative to locale conditions it is widely accepted that lamellae increase in thickness and frequency with time (Holliday and Rawlings 2006, Rawlings 2000). Clay lamellae are found in Ic deposits on the scarp edge in the central portion of the terrace, and in exposures on the terrace tread. The lamellae formation is comparable between these exposures, which indicates that deposits on the terrace tread could be Ic, and therefore is no older than 2000 B.P.

Depositional Origin of Holocene Sands. It has been hypothesized that the sands of the Holocene depositional units are eolian in origin. This is based on observations of a distinct textural difference between the underlying gravel deposits and the fine sands of the upper deposits, the sandy mantle topography of the Deweyville Terrace surface, and the Holocene artifacts recovered in stratigraphic context at the edge of the scarp of the McNeill-Gonzales site. Extensive field observations, particle size distribution studies, and radiometric dating tested this hypothesis. The results of the studies cannot entirely confirm that the sediments are eolian in origin, but it seems likely that they are. First there is a significant age differences between the Deweyville Formation deposits and the mantling sands. The OSL date of 63,100 $\pm$ 4000 yr (UIC1690GR), with a 2-sigma age range of 55,100-71,100 yr for the gravelly sands underlying the Deweyville Paleosol and the Holocene age cultural artifacts found above the Paleosol establishes that the Paleosol is a buried soil that formed, at least in part, on the ancient terrace surface. Therefore the sands that mantle the paleosol are required to be depositional and are not ancient Deweyville Formation deposits that have remained in place since the Pleistocene.

The sediment particle size and the very limited chemical study of soil pH suggest a distinct textual difference between the Deweyville sediments, modern overbank flood deposits of the Guadalupe River, and the Holocene sands. Determining the mode of transport by particle size analysis has always been questioned (Tucker and Vacher 1980, Boggs 2001: 72-74) however one method of determining mode of transport was applied to this setting. Leigh (2001) compiled a list of grain size attributes of eolian sand (Table 2). Sands from the Holocene sandy mantle, which were two samples from the terrace scarp and one from the terrace tread, modern Guadalupe River overbank deposits, and the underlying gravelly deposits of the Deweyville terrace are compared to these criteria. Of the three Holocene sandy mantle samples only the sample from the Sand Pit on the terrace tread met all the attributes of eolian sand (Table 3). The other two samples met all of the attributes except they were less than 90% sand. The sample from Excavation Unit 4 was 86.8% sand while the A horizon of the Paleo Profile was 83% sand. The average phi size of all the samples was fine sand.

The slightly finer particle size distribution of the samples from the terrace scarp can possibly be attributed to processes that occurred after initially being deposited by eolian processes. Colluvial action, increased human and biological activity, as well as extreme flooding events should be considered as possible sources of fine deposits. One point that should be made about the sample processing is that none of the samples

Table 2. Attributes of eolian sands (From Leigh 2001 Table 10.3, with kind permission of Springer Science and Business Media.)

Lack of >2 mm particles
> 2 mm particles comprise <0.02% of the total sample weight
1-2 mm particles comprise <1% of the total sample weight
1-2 mm particles comprise <2% of the < 2 mm sample weight
>90% sand or <0.063 mm particles (silt + clay) as <10% of the <2 mm sample weight
Phi coefficient of variance (CV) of 0.063-2.0 mm fraction is typically <55%

Table 3. Particle size attributes of Holocene sandy mantle

Mantling Sands 0.0625-2.0 mm sands	**AREA 4 AVERAGE**	**SAND PIT**	**PALEO PROFILE**	**3 SAMPLE AVERAGE**
Standard deviation (phi)	0.805	0.766	0.916	0.829
Average Particle Size (phi)	2.928	3.008	2.754	2.897
Skewness (phi)	-0.354	-0.339	-0.263	-0.318
Phi coefficient of variance	27.49	25.45	33.27	28.62
% Sand	86.84	92.8	83.3	87.65
1-2mm Sand	0.145	0.1	0.4	0.215
> 2mm particles	0	0	0	0

processed for particle size distributions were digested with hydrogen peroxide to remove the organic portion of the samples. The sediments on the terrace scarp and slope are very dark with suggests a higher organic content than terrace tread deposits. The higher organic content may derive from prehistoric cultural inputs such as human wastes and food possessing but more than likely the greater amount of biological activity occurring at the edge of the terrace over the millennia has contributed to this darker color and slightly higher clay content. The organics may have added a slight amount of weight to the fine clay fraction. Another possibility for the slightly higher clay content in one of the samples could be the addition of clay from flood deposits. During the flood of record in the late 1990's the landowner noted that floodwaters came slightly above the Deweyville terrace scarp on the far southeastern portion of the terrace. The scarp sample with the highest clay content was taken from this portion of the terrace and extreme but infrequent flooding could be a possible explanation for the slightly higher clay content.

The particle size distribution of the mantling sands was compared to overbank deposits of the modern Guadalupe River. Overbank deposits from a recent flooding of the Guadalupe River were collected from the T1 terrace of the deeply incised channel of the Guadalupe River. Interestingly the overbank deposits met all of Leigh's criteria for eolian sands. The deposits were 90% sand with a distinct lack of coarse >2 mm and coarse sand particles. The only distinct difference was that while the sandy mantle deposits are strongly coarse skewed the Guadalupe River deposits are strongly fine skewed. Though the average particle size for both deposits are fine sand the Guadalupe River sample has approximately 3 times the medium sand size fraction than the samples from the sandy mantle. The Deweyville Terrace deposits fluvial sandy deposits are distinctly different from the mantling sands, and the Guadalupe River overbank deposits. They are slightly gravelly (1.3%) moderately sorted fine skewed medium-fine sands. The gravels preclude an eolian origin for these deposits, which was expected.

These differences are further illustrated by a comparison of the fine to coarse sand fractions (Figure 23). The silt and clay fractions are not included in this comparison to negate the potential impact of illuvial clays skewing the frequency curve. The graph shows that samples from the Holocene sandy mantle are better sorted, finer, and are uniform in their sand fraction distribution. Samples from the Deweyville sands and the Guadalupe River overbank deposits are not as well sorted, and are slightly coarser textured. The similarities between the Deweyville sands and the Guadalupe River suggest a similar method of deposition, which is most certainly fluvial. The different curve of the Holocene mantling sands is additional evidence of that the mantle was deposited by a process other than fluvial.

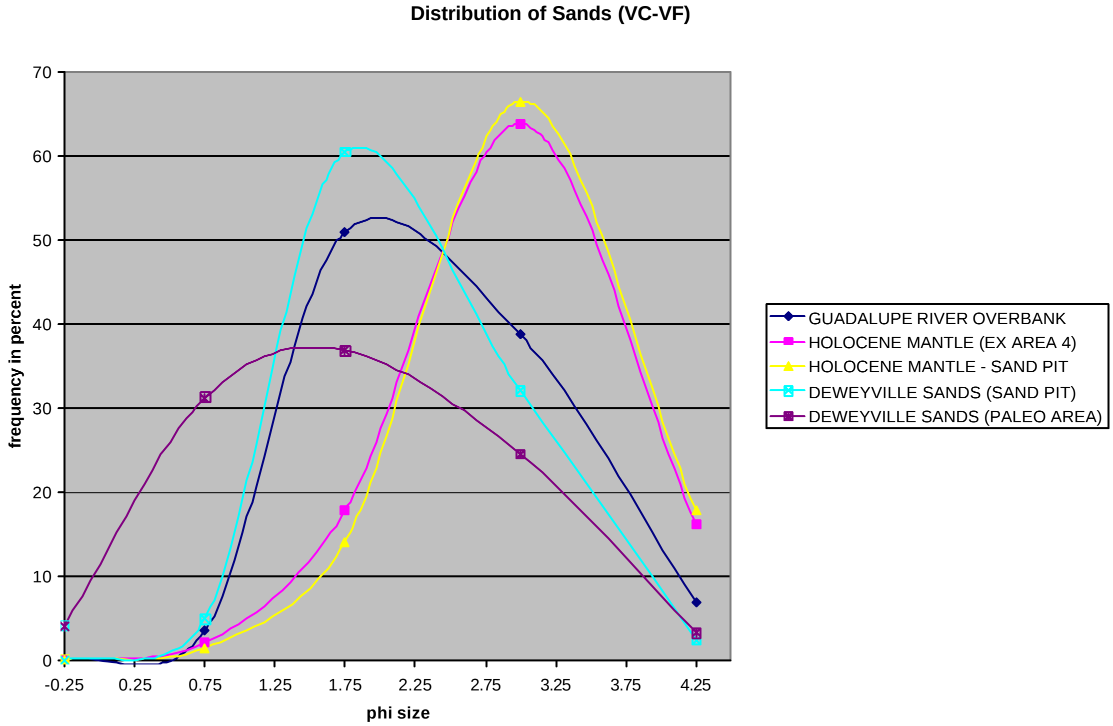


Figure 23. Comparison of sand fraction particle size distributions

Though the application of granulometric studies relative to Leigh's criteria provided ambiguous results the uniformity of the finely skewed fine sand deposits on the terrace suggests an eolian origin. Granulometric studies were only conducted at a few localities, but the particle sizes values of these samples largely reflect observations made at most exposures of the sandy mantle. This large body of uniform fine sands suggests deposition by an eolian process. Fluvial processes typically have greater variability in both the vertical and horizontal distribution in particle sizes. There is no fining upward sequence in mantling sand deposits and no significant differences laterally across the terrace. These circumstances in conjunction with the evidence presented earlier strongly suggest an eolian mode of deposition for these sands.

An unresolved concern is the sediment source of the mantling sands. There are four possible sources for the sands: localized eolian reworking of sands from the Deweyville Terrace that were exposed from below the eroded paleosol; sands transported from the Beaumont uplands down onto the terrace surface; fluvial sands from point bars of the Holocene floodplain transported upslope to the Deweyville Terrace; or sands deposited after long distance transport. The two modes of transport that can be immediately ruled out are transport from the Beaumont surface, and long distance transport. If long distance transport were the case much larger areas of the coastal plain would be covered in sand sheets. The sands that mantle the Deweyville Terrace are localized, and an examination of the soil series of Victoria County shows a limited area has sandy soils. The other argument is that the Beaumont surface once had a veneer of sand that eroded or deflated downslope onto the Deweyville Terrace. Holocene sand deposits do exist on the Beaumont Formation, but not in this setting. These deposits are known as the Ingleside Units and are considered relict barrier island features that are found much closer to the coast. Considering there are no relict sand features on the adjacent Beaumont uplands, no relict sand pedoturbated down vertic cracks into the Beaumont soil, and the sand does not mantle down the slope of the Beaumont onto the Deweyville Terrace there is little evidence that the sands derive from colluvial and eolian deflation from the Beaumont uplands.

This leaves localized reworking of the Deweyville Terrace sands and the deflation of Guadalupe River floodplain sand and the subsequent deposition on the Deweyville Terrace as possible sources of the Holocene eolian sands. There are ample source materials that the Guadalupe River traverses through on the interior Coastal Plain. Within 50 km upstream there are sandstone deposits of the Quaternary Willis Formation, Miocene Fleming and Oakville Formation, and there are numerous sandy formations further upstream (Barnes 1974). These deposits, in addition to sands residing in Quaternary fluvial terraces present numerous potential sediment sources for the Deweyville terrace, and for floodplain sands that could be mobilized by eolian processes. Deriving the sediment sources and depositional mechanisms will most likely only be resolved with an intensive regional study of multiple localities; however the applicability of some possible depositional mechanisms should be tested.

The localized reworking of Deweyville Terrace sands could have occurred in two ways. One mechanism would be if the Deweyville Paleosol were eroded to expose the underlying fluvial sands. After the exposure the sands could be entrained and redeposited above the paleosol. Evidence for the erosion of the Deweyville Paleosol exists along the margins of the terrace and in the paleo-gully on the south-central portion of the terrace. Situations like these could expose the sands, however considering that fluvial erosion would probably be necessary to erode the fine textured paleosol one would have to question if the climate would be arid enough and the surface void of vegetation to facilitate eolian transport. Another possible source could be the adjacent valley slope of the Deweyville terrace. Currently the terrace slope is heavily vegetated by deciduous hardwoods. If the slope wasn't vegetated and the underlying sands of the Deweyville Terrace were laterally exposed there is the potential that they could be entrained and redeposited on the surface of the terrace. This seems unlikely because it is hard to envision the large quantity of sand mantling the Deweyville Terrace could have been redeposited from the slope that seems to be depositing colluvium and sand sheets through the Holocene.

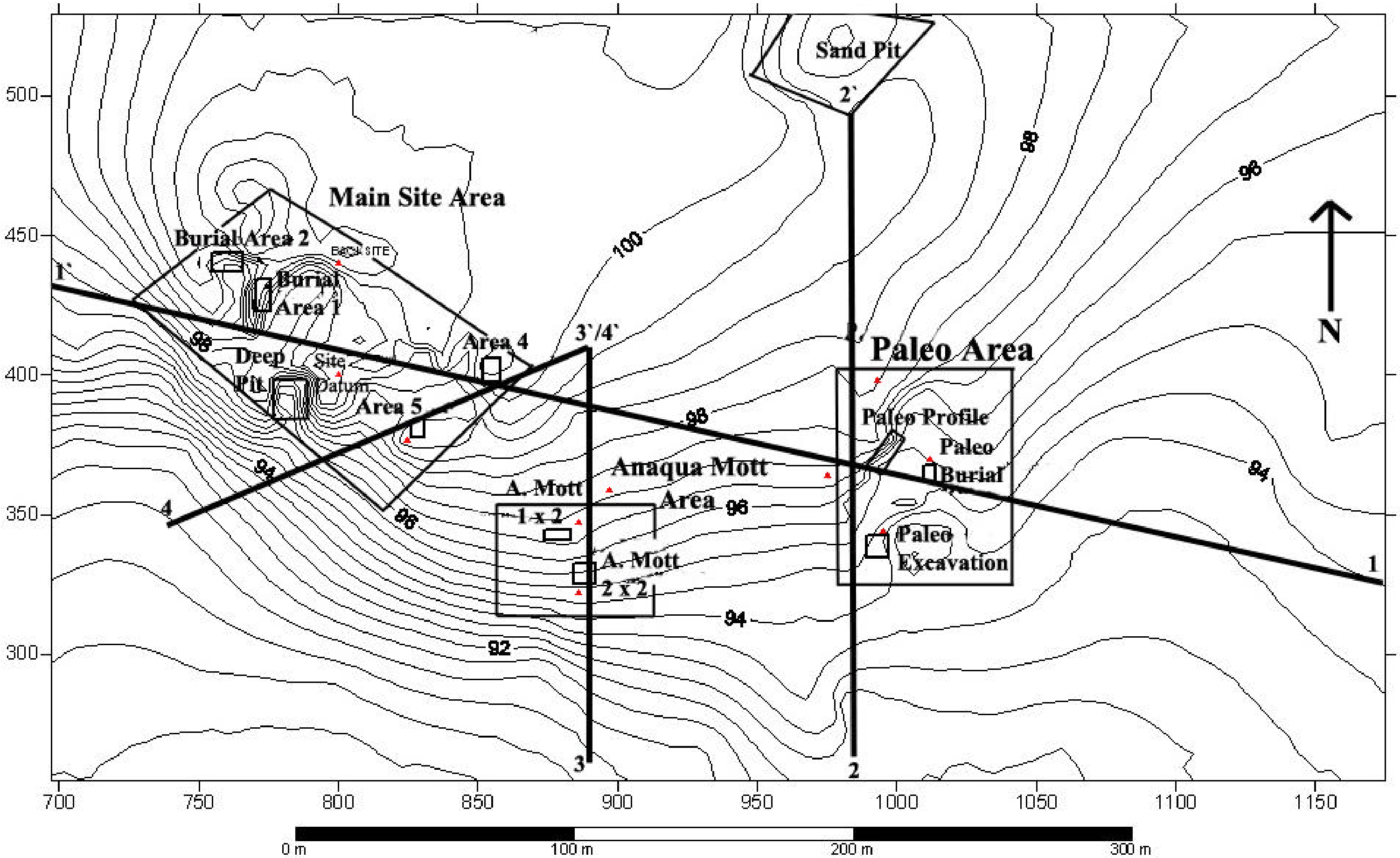
The deflation of floodplain sands and deposition onto nearby terraces is another distinct possibility. The Guadalupe River floodplain is not particularly wide at this portion of the drainage, and though the active channel is 1.1 km to the south of the Deweyville Terrace there are numerous examples of paleochannels on the northern margins of the valley. Channels with braided streams or large point bars located near the northern edge of the valley would be opportune sediment sources for eolian deflation. Because the current study did not conduct subsurface investigations on the modern floodplain the location, much less the age, of channels near the northern margins of the river valley it is not possible to directly correlate channels to possible depositional events.

CHAPTER IV

ARCHAEOLOGICAL STRATIGRAPHY

Site Stratigraphy

The site is located on the complex slope and tread of the southern and eastern sides of a Deweyville terrace. The total site area is approximately 44,500 m^2, however only approximately 20,000 m^2 of the site along the southern slope and tread has significant archaeological deposits in stratigraphic context. The geoarchaeological studies focused on four areas in the southern portion of the site (Figure 24). The *Main Site Area* is a dome shaped sandy mantle on the tread and crest-slope of the terrace. This westernmost portion of the site was disturbed by borrow pit operations, which created numerous exposures. The THC Stewards work on this portion of the site consisted of salvage excavation of Burial Areas 1 and 2 and Excavation Area 4 and Area 5. A deep pit with exposures of underlying Deweyville terrace deposits in the Main Site Area was also examined. The *Anaqua Mott Area* is on a gentle rectilinear slope both down slope and to the east of the Main Site Area. This area is disturbed and the THC Stewards excavated two test units: the Anaqua Mott 1 x2 unit and the Anaqua Mott 2 x2 m unit. The *Paleo Area* is located on the southeastern portion of the terrace further down the gentle rectilinear slope. Here borrow pit excavations created an upslope exposure named the Paleo Area Profile, and the bottom of the borrow pit exposed prehistoric surfaces. Two test units were excavated in the Paleo Area, the Paleo Area Excavation unit and the Paleo Area Burial unit. The final portion of the site examined was the *Sand Pit*.



Contour Interval 0.5 m ▲ Area Datums

Elevations and Coordinates relative to site datum N400 E800, ele. 100.00

Figure 24. Excavation area map

The sand pit is on the terrace tread in the open level sand fields. There were no excavations at this portion of the site. Only scattered lithic artifacts were recovered from exposures, but the borrow pit excavations provided extensive exposures of the upland sandy mantle of the terrace tread. Very limited subsurface testing has occurred in the northern and eastern portion of the site, but auger test and exposures in the sand pit suggests there is limited potential for intact, stratified archaeological deposits.

An important consideration and acknowledgement needs to be made regarding the archaeological data presented in this section of the thesis. The THC Stewards conducted the archaeological excavations at the site with their own goals and research objectives. They allowed me to use their archaeological data for my study. Their test excavations are completed they have begun to inventory and catalog the excavated material. There has been no detailed analysis of the artifacts and the designations of artifact types come only from their field and lab descriptions. Future analyses may show that diagnostic artifacts should be reclassified, which may impact the interpretations of the site stratigraphy.

Main Site Area. The burial areas were excavated as salvage excavations, and therefore unit records are less detailed. Due to the gap in time between the excavation of the burials and the geoarchaeological investigations Burial Area #2 was not accessible due to slumping of the unconsolidated walls of the deep pits. Profiles of Burial Area #1, adjacent borrow pit exposures, and a profile and auger of exposure adjacent to Burial Area #2 provide an outline of the cultural stratigraphy of this portion of the site. In the burial areas the fluvial deposits of the Deweyville Formation, as well as Holocene depositional Units Ib and Ic were encountered. There is some evidence for Unit Ia, but it appears to be mixed with the upper units, eroded, or non-existent.

Burial Area #1 consisted of excavations to a depth of 225 cm below ground surface (Figure 25). This portion of the Main Site Area was a slight knoll near the scarp of the Deweyville Terrace before the borrow pit excavations destroyed much of the knoll feature. The excavation encountered Holocene Unit Ib and Ic, which had an A1-A2-E/Bt-2Ab soil sequence. The A1-A2-E/Bt deposit correlates to Holocene Unit Ic while the 2Ab deposit correlates to Holocene Unit Ib. The upper cumulic A1-A2 horizons are combined 107 cm thick very dark grayish brown fine sand. Extensive evidence of bioturbation in the form of infilled rodent burrows exists in these units. Prehistoric lithic artifacts and one historic ceramic sherd were observed in these horizons. The E/Bt horizon consists of 50 cm of dark grayish brown fine loamy sand with very dark brown fine loamy sand lamellae. The lamellae are approximately 1 cm thick, and are found at 5 cm vertical intervals. They are wavy and discontinuous, and provide no evidence of bedding structure. There is weak medium blocky subangular structure, and fewer observed rodent burrows. Prehistoric artifacts were found in this level. Below this unit the 2Ab horizon is very dark grayish brown loamy fine sand, which correlates to Holocene Unit Ib. The deposit has a weak fine blocky subangular structure and the exposure is 60 cm thick. Prehistoric lithic artifacts and burned rock were observed in profile, and Burial #1 was recovered from this horizon. AMS was used to date bone collagen from this burial to 1730$\pm$40 ^{14}C yr B.P. (Taylor 2005:23). Considering that the

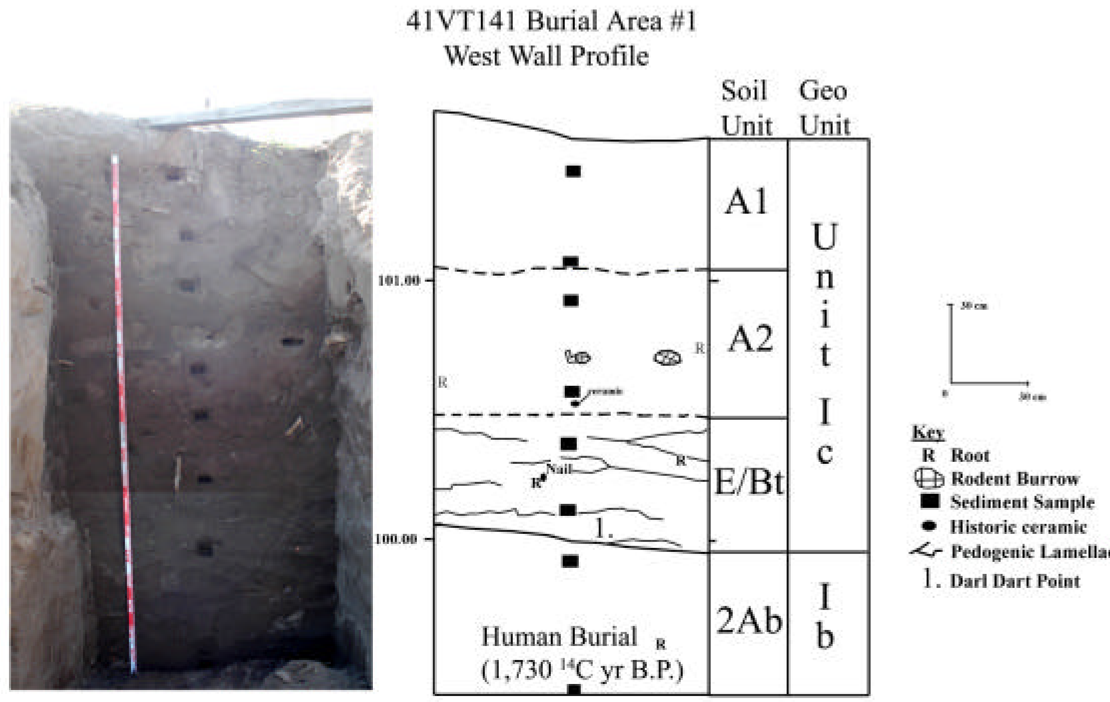


Figure 25. Burial Area 1 photo and profile

burial age is younger than the paleosol age it is likely that this burial was excavated into the 2Ab horizon from the upper horizons. The only diagnostic lithic artifact from the burial area was a Darl point found 50 cm above the burial, which dates to approximately 1,000 B.P., at the transition from the Late Archaic to the Late Prehistoric.

The stratigraphy of Burial Area #2 was not recorded directly because the unit was too unstable to record. The unit was 2 x 2 m in area and reached a depth of 2.35 m below surface. A flexed burial was recovered 1.7 m below surface and a bundle burial was recovered higher in the profile from 1.05 m below the surface. The flexed burial dated to 2020 $\pm$ 40 ^{14}C yr B.P. (Taylor 2005: 23). A dart point that conformed to some of the attributes of the Plainview point was found above the burial, which dates far earlier to the Paleoindian period. In limited observations it was found that burials were mixed with prehistoric occupational debris. There may be more than one possible cause for this mixing. Certainly bioturbation took place in these units as it did across the entire site, and the process of burying the individual would have disturbed sediments, but infilling sedimentation of the paleo gully in this location could have contributed to the mixing of archaeological deposits. These causes may explain why such an early point form was found above a Late Archaic burial.

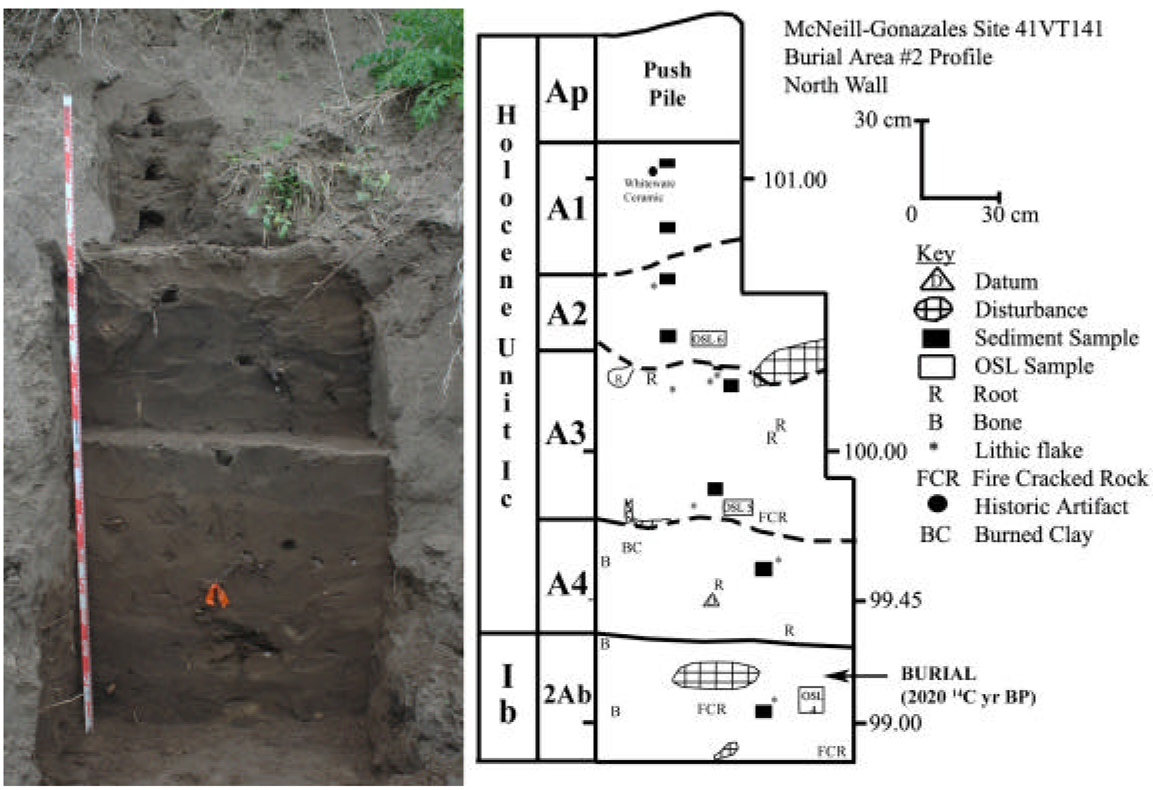


Figure 26. Burial Area 2 photo and profile

In order to record a representative profile of the area a nearby exposure was sectioned and described. Auger 5-22 was excavated to a depth of 2.75 m below surface to provide a more comprehensive exposure (Figure 26). Unfortunately no diagnostic artifacts were observed in the profile description, but the profile and auger description provide evidence of significant Late Holocene sedimentation. The profile consists of a thick cumulic A horizon over a weak 2Ab, underlain by a weak illuvial horizon above fluvial sands. Holocene Units Ib and Ic, and Deweyville Formation were recorded in this profile, and had a soil sequence of: Ap-A1-A2-A3-2Ab1-2Ab22-2Bt2-2BC-3C. Unit Ic was represented by soil sequence Ap-A1-A2-A3. The upper cumulic A horizons had one historic whiteware sherd and very common prehistoric lithic artifacts and animal bone. A few burned rocks and possible scattered human bone fragments were observed. The sediments are generally very dark grayish brown fine sand to fine loamy sand with very weak fine blocky subangular structure parting to single grain. The upper A horizons extend from the surface to a depth of 1.85 m. The flexed burial in the nearby excavation unit was recovered at what would be the base of this upper horizon dates to 2020 $\pm$ 40 ^{14}C yr B.P. (Taylor 2005: 23). This indicates that the Holocene unit Ib with the soil sequence of 2Ab1-2Ab2-2Bt2-2BC would have begun being deposited before 2000 B.P. The 2Ab1 horizon is approximately 110 cm thick and is identified by its darker very dark gray color and slightly more developed structure. Prehistoric artifacts continue in this horizon and considering this horizon is below the horizon that the flexed burial was found it suggests this paleosol corresponds to Holocene unit Ib. Below 2Ab1 there is a 25 cm thick brown sandy loam 2Ab2 horizon with prehistoric material. Below this horizon a weak argillic horizon of brownish yellow sandy loam to sandy clay loam was encountered. This horizon does not resemble the Deweyville Paleosol because there is no gleying, less overall clay content, no underlying calcic horizon, and the structure is not as strong as the Deweyville Paleosol. It may represent clay illuviation during the Holocene, as seen in the welded soil at the base of Excavation Area 4. No artifacts were observed in the auger from this approximately 1 m thick horizon. Below a 50 cm transitional 2BC horizon were gravelly medium to coarse sands of a 3C that correlate to other Deweyville Formation fluvial deposits across the site.

The Excavation Area 4 is located at the edge of the terrace tread, on the eastern side of the Main Site Area. The excavation was 3 x 2 m in area and reached a maximum depth of 2.35 m below surface. This excavation unit had the most complete record of the prehistoric occupation at the McNeill-Gonzales site. Diagnostic artifacts spanning the Late Paleoindian to the Historic Period were recovered from the excavation unit, and all of the Holocene depositional units and the contact with the Deweyville Paleosol were identified (Figures 27, 28). The soil sequence for this excavation unit is Ap-A1-AC-2Ab-3Ab-3AB-3Bt1-3Bt2-4Bt. Preliminary artifact counts for unit levels by weight; pollen studies by stratigraphic horizon; and a continuous particle size distribution study were conducted for this unit. The data from these studies is found in the appendices.

Holocene Unit Ia was found at the base of the excavation unit. It is approximately 80 cm thick, and is above the Deweyville Paleosol. The only expression of the paleosol at the top of Ia (3Ab) is in unit N398 E852. The remnant A horizon is a

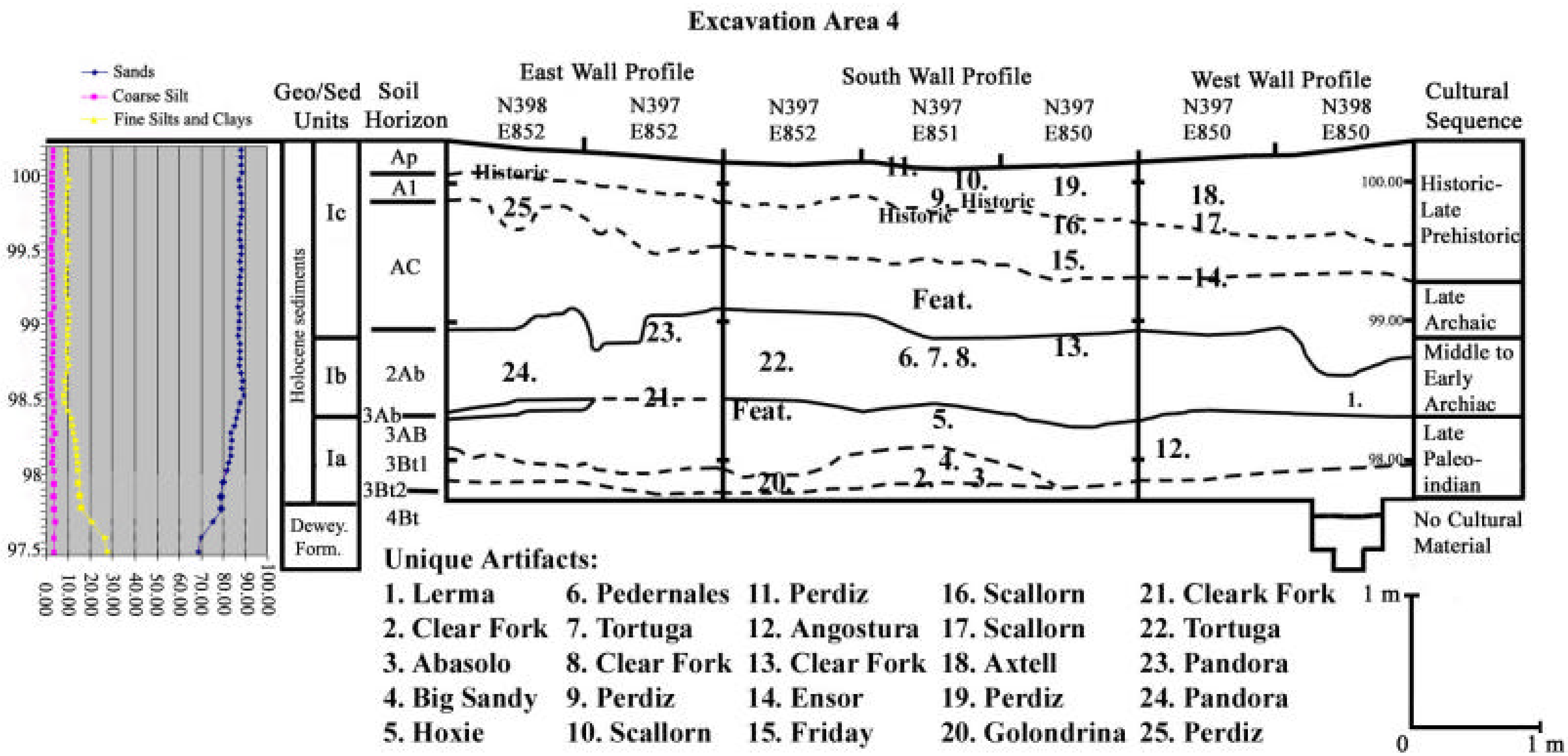


Figure 27. Excavation Area 4 profile and particle size analysis

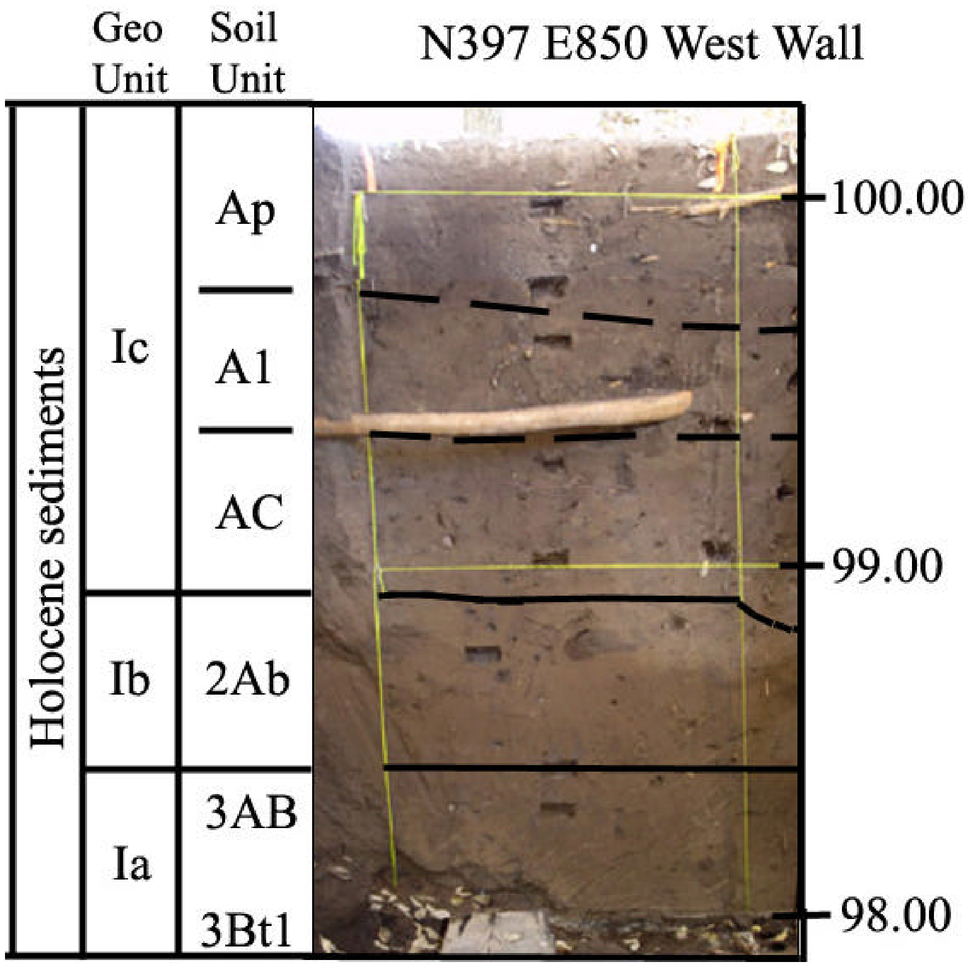


Figure 28. Photo of Excavation Area 4, Unit N397 E850, West Wall

10 cm thick dark grayish brown loamy fine sand. Evidence of bioturbation of this horizon and the lower horizon (3AB) are vertical root casts 2.5 cm wide, up to 20 cm long, filled with dark grayish brown sand from above horizon. Other units in Excavation Area 4 do not have a preserved A horizon, and instead the underlying 3AB horizon is directly overlain by the subsequent Ib depositional unit. As evidenced by the particle size distributions there is a textural break below the 3Ab horizon. The clay content

increases as an illuvial Bt horizon has formed in the Holocene sediments. This sandy loam to sandy clay loam is welded with the underlying Deweyville Paleosol (4Bt). The pollen samples (#3, #7) from this unit had practically no preserved pollen (Appendix D).

The prehistoric cultural material from unit Ia in Excavation Area 4 consists primarily of lithic artifacts and fire cracked rock. The diagnostic artifacts from Holocene Unit Ia are Clear Fork gouge tools and Angostura, Golondrina, Big Sandy, Lerma, Hoxie, and Abasolo points dart points that date to the Late Paleoindian and the very early Archaic period. The artifact densities are highest in the 3Ab and 3AB horizon, and then decrease with depth (Figure 29). Unit levels in these horizons have the greatest weight of fire cracked rock of the entire profile, which raises the possibility of this concentration deriving from a pedogenic stone line as opposed to cultural behavior. Closer review of the FCR distributions finds and average increase in FCR by level but large fire cracked rock concentration feature in one level of unit N397 E852 accounts for over half the FCR weight in level 20. This variability does not suggest the development of a uniform stone line. Another more definitive argument against the development of a stone line is that there is no spike in lithic artifact weight that corresponds to the increase in FCR. Lithic debitage does not increase in weight at these levels, which suggests the increased FCR weight is due to cultural processes and not pedogenic ones.

Holocene Unit Ib is an approximately 60 cm thick buried cumulic 2Ab horizon. The horizon is dark gray fine sand with a weak coarse blocky subangular structure. The particle size distributions reveal a very slight fining upwards sequence to this deposit; otherwise the uniform characteristics of the soils provide little to differentiate horizons.

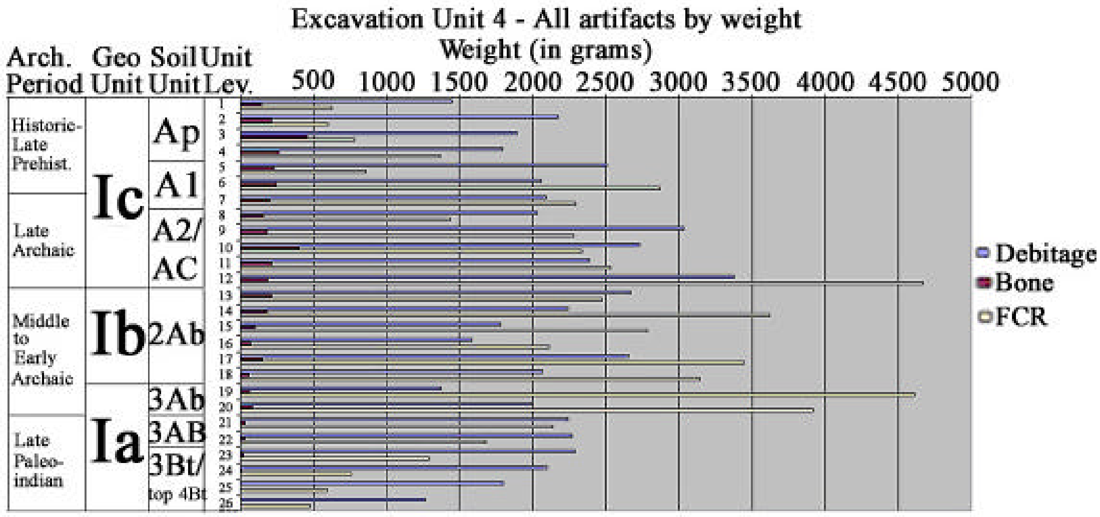


Figure 29. Excavation Area 4 artifact distributions by unit level

The pollen assemblage from this unit was nearly as poor as the samples from Unit Ia, with only a few *Populus*, ASTERACEAE, POACEAE, and FABACEAE *Mimosa-like* pollen recovered. Diagnostic prehistoric artifacts from this horizon date to the Middle Archaic. Pandora (2), Tortuga (2), and Pedernales, dart points were recovered, as well as Clear Fork gouges and bone tools. The concentration of artifacts decreases relative to later upper horizons, but there is still more lithic debitage by weight than lower Early Archaic/Late Paleoindian occupations.

Holocene Unit Ic is approximately 110 cm thick and is a mollic epipedon. The soil stratigraphy of this unit is an Ap-A1-AC, though the sediments are quite uniform and the AC horizon could be just as well described as an A2. More pollen was recovered from this unit than the lower two units, however pollen concentrations were still very low. ASTERACEAE was most prevalent, though approximately half the pollen grains observed were not identified because they were too degraded. The sediments are very dark gray loamy fine sand with massive single grained structure. Historic, Late Prehistoric and Late Archaic diagnostic artifacts were recovered from this unit. The Historic and Late Prehistoric artifacts are found in the upper 60 cm, while Late Archaic artifacts extend from the upper 60 cm to the base of the unit. Forged and square nails, as well as a clay marble and various historic ceramics were recovered. The Late Prehistoric diagnostic artifacts consist of indigenous pottery, Perdiz arrow points, and Scallorn dart points. One hearth was recorded in this upper portion of the horizon, and two hearths were recorded in the lower Late Archaic component. Marcos, Friday, and Ensor diagnostic points were recovered from the Late Archaic component. Artifact concentrations are highest in the lower A1 and AC horizons. There are clear examples of bioturbation in the form of large roots, infilled rodent burrows, and fine insect burrows. However though there are examples of bioturbation the three intact hearth features suggest that bioturbation has not been significant enough to totally obliterate the cultural context of unit Ic.

The Excavation Area 5 is located approximately 30 m downslope to the southwest of the Excavation Area 4**.** The stratigraphy of the unit is similar to Area 4, except Holocene Units Ia and Ib are not present in this unit. Instead two thick cumulic A horizons (A1-A2) that correlate to Holocene unit Ic were identified above the Deweyville Paleosol. The unit is 1 x 2 m in area and extends to a depth of 150 cm. An auger (# 5-33) was excavated to 230 cm below the bottom of the unit. Approximately 120 cm of deposits with diagnostic Late Archaic and Late Prehistoric artifacts unconformably overlie the Deweyville Paleosol (Figure 30). The upper A1 horizon is 54

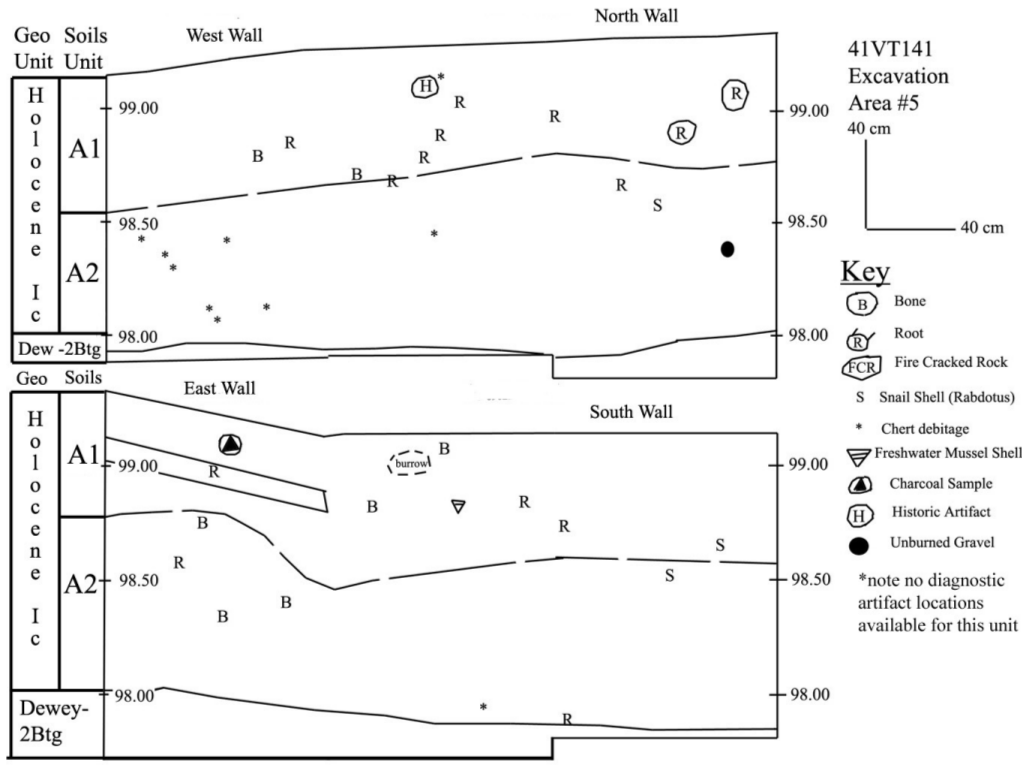


Figure 30. Excavation Area 5 profile

cm thick. A greater concentration of prehistoric artifacts observed in this horizon, and included lithic debitage and tools, animal bone, mussel shell, snail shell, and occasional charcoal. Some historic artifacts were also observed in this upper horizon. There are large roots in the profile and no bedding structure but otherwise there is little evidence of severe bioturbation. The underlying Deweyville Paleosol is 100 cm thick with both the argillic and calcic portions of the soil intact. Below are fine sands with gravelly components that correspond to the fluvial deposits of the Deweyville Formation.

Anaqua Mott. The two excavation units in the Anaqua Mott portion of the site encountered relatively shallow but quite concentrated archaeological deposits that date from the Late Archaic to the Late Prehistoric. These deposits form a midden approximately 40-50 cm thick from 20 to 30 cm below ground surface. Artifact concentrations decrease with depth until all artifact material ceases at a gradual unconformable contact with Deweyville calcic and fluvial deposits.

The Anaqua Mott 1 x 2 m unit (Unit N341 E883-883) is positioned approximately midslope of the Anaqua Mott area. This excavation unit was excavated to 140 cm below surface, and an auger (#5-37) continued another 260 cm below the bottom of the excavation unit (Figure 31). The profile including the auger data consists of Holocene Unit Ic and the Deweyville Formation, with a soil sequence of A1-A2-A3-AE-2C. Unit Ic is a thick cumulic mollic epipedon, and a weak elluvial horizon with a gradual boundary with underlying sands and deep calcic horizons of the Deweyville Formation. The archaeological materials are confined primarily to the upper horizons A1, A2, A3, and AE. A distinct midden has formed between 34 and 88 cm below the surface in horizons A2 and A3 with very dark brown organic rich loamy fine sands. The soil color of the midden is distinctly darker than the upper and lower horizons and has abundant charcoal wood fragments and stains, animal bone, snail shell, mussel shell, small fire cracked rock, and lithic artifacts. Diagnostic dart and arrow points from this midden date the deposit to the Late Archaic and Late Prehistoric (2,000-300 B.P.). According to THC Stewards records four Perdiz arrow points, one glass Cameron point, one Scallorn point, one Fairland, one Marcos, and two unidentified Triangular dart points were recovered. The majority of the diagnostic artifacts were recovered from the midden levels, but the Fairland and one of the Late Triangular dart point were recovered

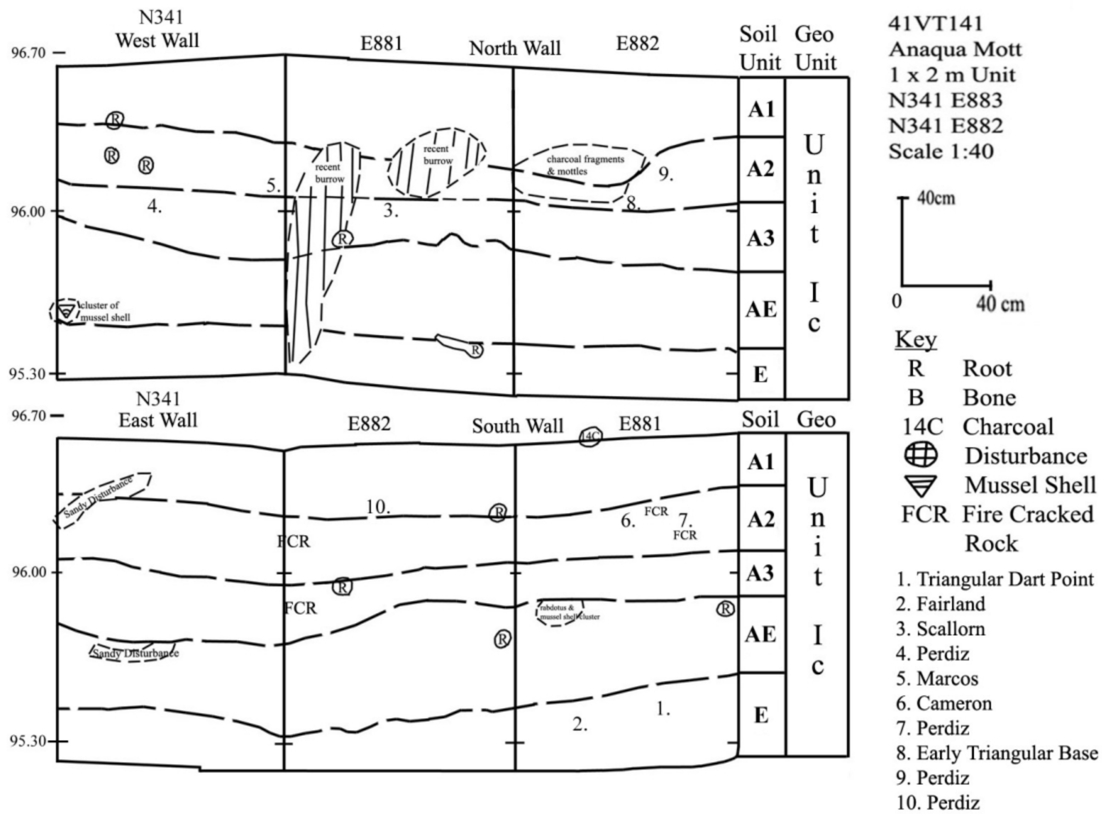


Figure 31. Anaqua Mott 1 x 2 m unit profile

from near the base of the excavation unit. The artifact densities observed in profile decrease with depth, and no earlier archaeological components were identified. Evidence of bioturbation in the form of roots and burrows infilled with sandy sediments throughout the profile demonstrates that the area has experienced some disturbance. Deweyville Paleosol is completely eroded exposing the underlying fluvial sands.

Anaqua Mott 2 x 2 m unit (Units N 324-325 E 886-887) is 17 m downslope of the Anaqua Mott 1 x 2 m unit. This excavation unit has a very similar stratigraphy to the 1 x2 m unit, but the Holocene depositional unit Ic mantling the Deweyville Formation is not as thick. It the 2 x 2 m unit was excavated to a depth of 94 cm and an auger (#5) continued 108 cm from the bottom of unit N324 E886. The archaeological deposits consisted of the Late Archaic to Late Prehistoric midden in Unit Ic which has a soil designation of A1-A2-A3-AE (Figure 32). The THC Stewards records show from this unit Perdiz, Darl, Fairland, a Pandora-like knife, and Scallorn points were recovered. These diagnostic artifacts were recovered from the midden levels of the unit, and unlike the Anaqua Mott 1x2 m unit there is not a Marcos component. This suggests a slightly younger age for this portion of the midden, as the diagnostics dating back to only 1800 B.P. The midden formed between 20 and 64 cm below ground surface. Like the midden

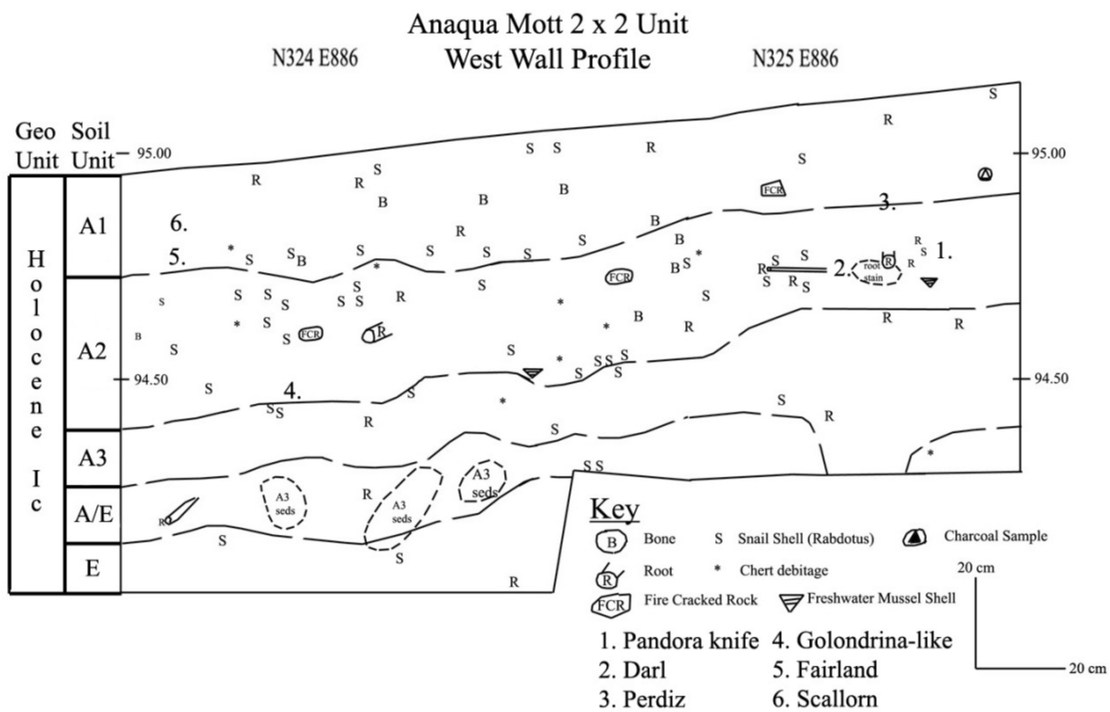


Figure 32. Anaqua Mott 2 x 2 m unit, west wall profile

deposits in the other unit the sediments are a darker color than the upper and lower horizons, with abundant prehistoric cultural material. A few scattered mussel shells and a proximal fragment of a Golondrina-like point were recovered at the base of the unit at the gradual contact with the 2Ck calcic soil deposits of the Deweyville Formation. Though the recovery of early artifacts was limited to the possible Golondrina point, it suggests the possibility of an earlier archaeological component below the midden. There is less evidence for disturbance in these excavation units, except for burrows in the AE horizon that are infilled with A horizon sediments from the upper levels.

Paleo Area. The Paleo Area is located on the southeastern margin of the terrace. The surface of the terrace is approximately 2-3 m lower in elevation than the Main Site Area. The Paleo Area has produced many intriguing early prehistoric artifacts, but the borrow pit excavations and subsequent erosion has been both a blessing and a curse for the geoarchaeological investigations (Figure 33). Numerous Late Paleoindian/Early Archaic diagnostic artifacts have been recovered from this portion of the site; however they have primarily come from disturbed contexts. Fortunately, two excavations conducted by THC Stewards in conjunction with geoarchaeological investigations have helped place some of these artifacts in context.

The Paleo Area Profile consists of the profile description of a large section of wall created by the borrow pit operations on the northwestern, upslope side of the Paleo Area (Figures 34, 35). This wall was described on three occasions. The first recorded the basic stratigraphy and collected samples for particle size analysis. The second description consisted of cleaning a large portion of the wall and a smaller section to the

Figure 33. Photo overview of Paleo Area. Profile is behind white shelter to right, Paleo excavation area under white shelter to the left

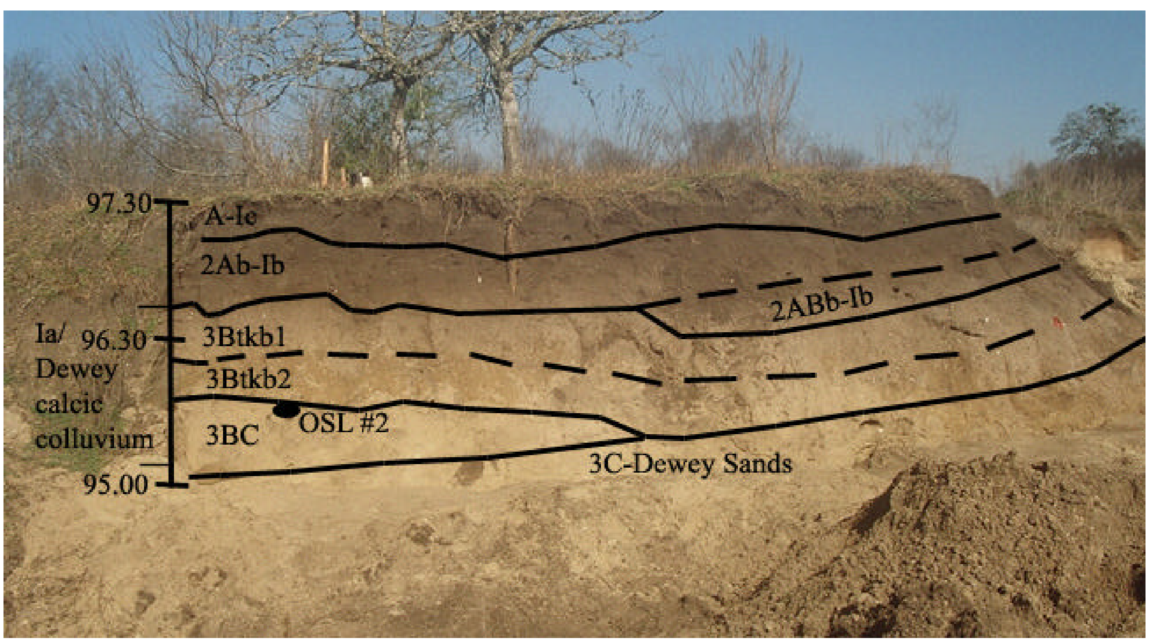


Figure 34. Photo of Paleo Area profile (with scale, soils and geo units)

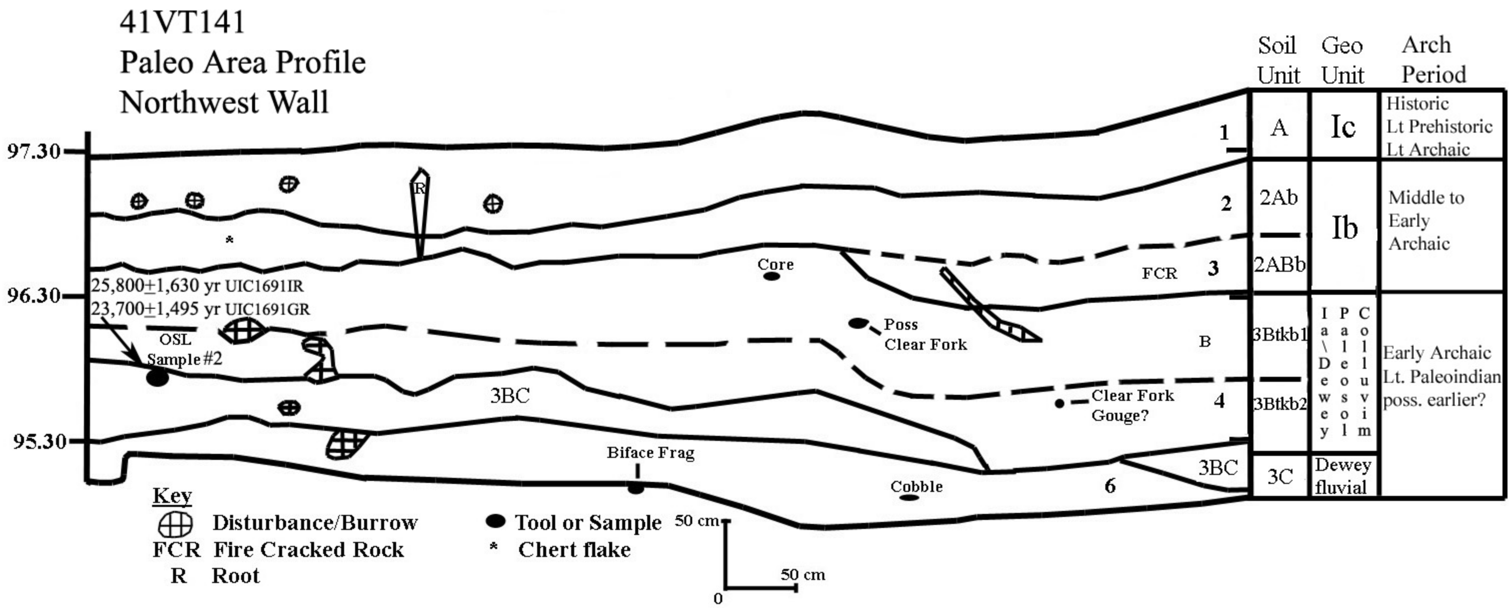


Figure 35. Paleo Area profile

north to examine the stratigraphy in a larger section and to assess artifact distribution of artifacts in the profile. The third description came during the collection of OSL samples. The stratigraphy recorded at this exposure formed the foundation for correlating the soils and sediments of this portion of the site. The profile and auger has evidence of Holocene Units Ia, Ib, Ic, and the Deweyville Formation. The soil horizon sequence is A-2Ab1-2AB-3Btkb1-3Btkb2-3BC-3C-3Bk. Holocene Unit Ic correlates to the very dark grayish brown loamy fine sand from 0-65 cm below ground surface. The A horizon was soft with massive to fine blocky subangular structure. Few prehistoric artifacts were observed in this unit, which is quite different from other examples of this unit in the Anaqua Mott and the Main Site Area that have abundant prehistoric artifacts. Below this horizon is a buried paleosol at the top of Holocene Unit Ib that can be correlated to the paleosol (2Ab) in Excavation Area 4 and the Burial Area #1 and #2. This 2Ab1 horizon is a dark grayish brown fine sandy loam found 65-100 cm below the ground surface. The horizon is firm when wet and has a weak coarse parting to fine blocky subangular structure. Prehistoric lithic artifacts are very common in this horizon, as are snail shells. The snail shells include *Rabdotus* and an unidentified species, and most are broken. This depositional unit continues with a 2Ab2 horizon from 100-138 cm below the ground surface, though it is not present across the entire profile. This horizon is a grayish brown fine sandy loam with weak fine blocky subangular structure. Few lithic artifacts were observed but numerous snail shells, both *Rabdotus* and the unidentified species, were observed. Though most of the snail shell was broken some of the *Rabdotus* were whole. Freshwater mussel shells were also observed in this horizon.

Unit Ia is found from 138-174 cm as a weak 2Btkb1-calcic horizon with prehistoric cultural material. This horizon correlates to the calcic portion of the Deweyville Paleosol that underlies the red gleyed sandy clay loam, however it was reworked during the early Holocene. As evidenced in this profile and adjacent augers the red paleosol is eroded away exposing the lower calcic horizon, which was then subsequently redeposited as colluvium then formed a prehistoric living surface. This 3Btkb2 horizon is a brown fine sandy loam with weak fine blocky subangular structure. There are common (15%) calcic filaments and fine soft masses. There are occasional lithic artifacts with a white to grayish patina, and numerous snail and freshwater mussel shell. One Clear Fork gouge tool was identified in the profile. The calcic horizon of Unit Ia continues as 2Btkb2 from 174-202 cm below ground surface. This light yellowish brown fine sandy loam sees a decrease in calcium carbonate, with only occasional large granule to small pebble sized calcic nodules. OSL sample #2 was collected from the top of this level, and produced dates of 25,800 ± 1630 yr (UIC1691IR), and 23,700 ± 1495 yr (UIC1691GR) with the two-sigma age ranges overlapping at 24,200-27,400 yr and 22,500-25,200 yr. This is probably the result of partially bleached, mixed sediments, and does not represent the true age of the sediments or cultural deposits. The artifact content of this horizon decreases, with no shells and only one flake of lithic debitage observed. The final horizon observed in profile is a very pale brown medium to fine grained sand that extends from 202 cm to the limit of the profile exposure at 250 cm. This sand has only very occasional granule sized calcic nodules. A biface fragment with significant calcic patina, as well as one chert flake of debitage was observed in this profile.

Considering the OSL date of from approximately 40 cm above these artifacts they can be explained either as artifacts translocated by bio-pedoturbation into the sandy substrate or artifacts deposited in portion of the fluvial sands that were reworked colluvially before the calcic horizon was redeposited above the sands. Only additional OSL dating using methods that can account for mixed bleaching of sediments, as well as additional excavation will be able to determine the nature and chronology of these scattered archaeological deposits. Auger #1 below the surface continued the exposure to a depth of and additional 40 cm. The Deweyville sands with very occasional calcic granules of soil horizon 3C continued to a depth of 280 cm below ground surface, with no additional prehistoric artifacts recovered. The sands became more gravelly and coarse with depth. The auger reached its maximum depth at 290 due to contact with impenetrable gravelly calcic sandy clay of the 3Ck horizon. This deep calcic horizon may correspond to deep calcic horizons encountered adjacent to the Paleo Area Excavation Unit, Auger #2 in the bottom of Paleo Burial Excavation Unit, and Auger #10-6 however these deep calcic horizons are found up to 1.5 m deeper in profile than the deep calcic horizon in the Paleo Profile.

The Paleo Area Excavation Unit is an area of 3 x 4 m that was excavated to a depth of approximately 65 cm below the truncated surface (Figures 36, 37). The excavation unit is 20 m to the south and down slope of the Profile exposure. The THC Stewards have not completed the artifact inventory of this excavation unit, so at this time only diagnostic artifacts and a general summary of artifact findings are available for stratigraphic interpretation. Approximately 50-75 cm of the A1 soil horizon that

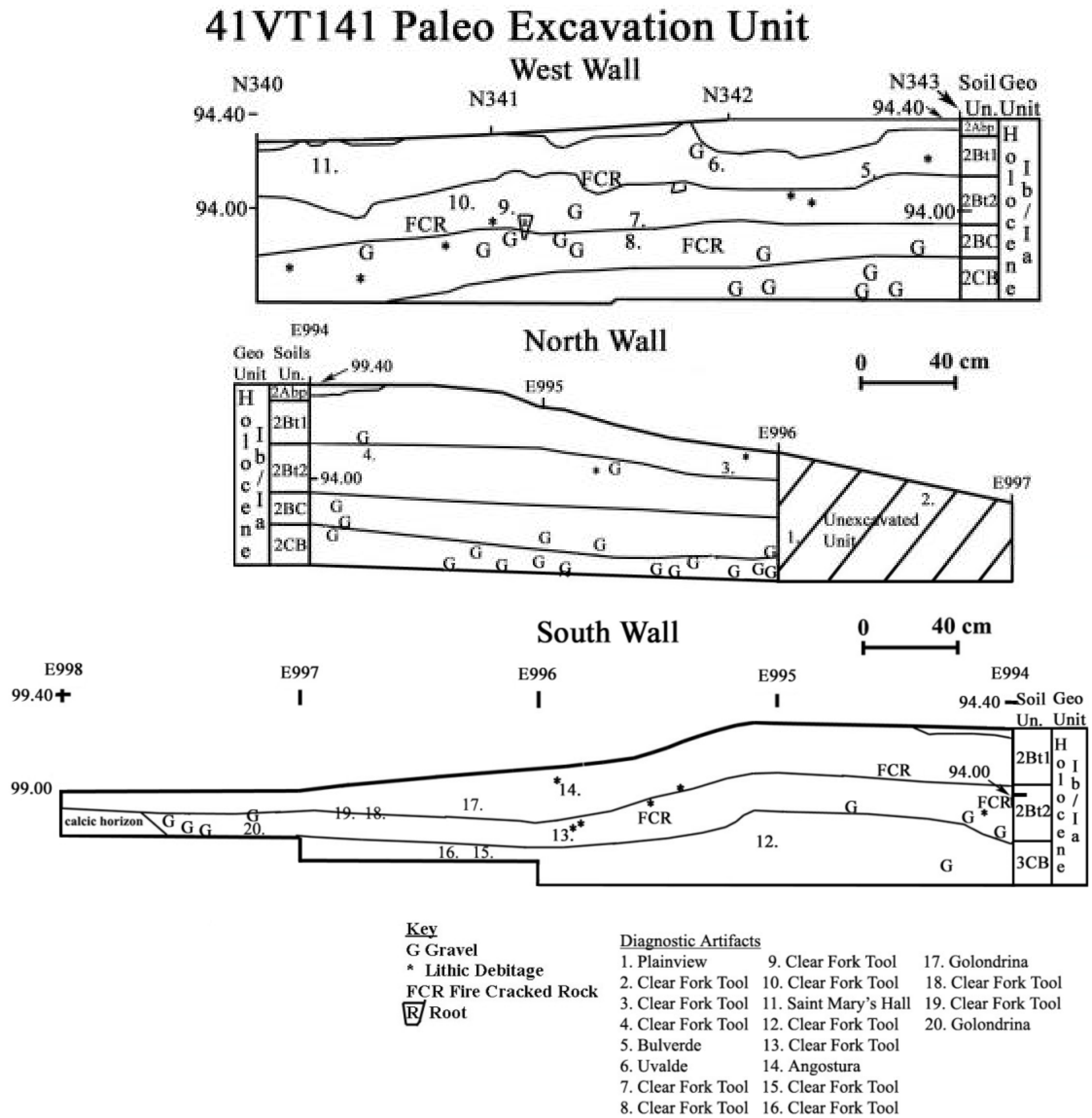


Figure 36. Paleo Area Excavation unit profile

Figure 37. Photo of Paleo Area Excavation unit (facing west wall)

correlates to Holocene unit Ic and the top of the 2Ab horizon that correlates to Holocene unit Ib were removed as part of the borrow pit excavations. The excavation units encountered 10-15 cm of disturbed sediments underlain by a soil horizon sequence of 2Bt1-2Bt2-2BC-2CB that were probably buried by slope wash as Holocene unit Ia. The 2Bt1 is approximately 15 cm thick very dark grayish brown sandy clay with strong coarse blocky angular structure. The THC Stewards recovered numerous diagnostic artifacts from this horizon. This horizon encountered one Clear Fork Gouge, Golondrina, Angostura, Uvalde, and Saint Mary Hall dart points, which date from the Late Paleoindian to the Early Archaic periods. Biface preforms, lithic debitage, and scattered burned rock were also observed in the profile and in excavation at this horizon. A Bulverde dart point and three Clear Fork Gouges were recovered at the contact between this horizon and the next lower horizon. If the field designation of the Bulverde point, which dates to the Late Archaic, holds after the analysis of diagnostic artifacts it will imply significant mixing of prehistoric components at this portion of the site. The 2Bt2 horizon is approximately 15 cm thick and consists of dark grayish brown sandy clay loam with moderate coarse parting to fine blocky subangular structure. This horizon produced four Clear Fork Gouges and another unidentified gouge tool. At the base of this horizon a Golondrina dart point was recovered. The 2BC horizon consisted of a 15 cm thick brown sandy loam with weak medium blocky subangular structure and approximately 1% small pebbles. A Plainview dart point and four Clear Fork gouge tools were recovered in this horizon. Below this horizon was a15 cm thick 2CB horizon only exposed in the northern upslope portion of the excavation unit. This horizon was a brown medium sandy loam with common small pebbles and few boulders at the base of the excavation unit with a massive structure. Very few artifacts were recovered from this unit with only one Clear Fork Gouge tool recovered. Based on the position of these gravels relative to gravels encountered in augers further upslope it is presumed that the gravels correlate to the gravel of the underlying fluvial deposits of the Deweyville Formation.

No features were recorded in these units, and field observations found many of the artifacts orientated at an angle with a general appearance of being disturbed or in secondary context. The stratigraphy of the diagnostic artifacts shows some mixing of Late Paleoindian, Early Archaic occupations, and possibly Late Archaic artifacts considering the recovery of the Bulverde point. Considering the unit location some degree of slope wash would have translocated artifacts before their burial by Holocene depositional units Ia and Ib. There is no evidence of the calcic portion of the Deweyville Paleosol, which is found upslope. Instead the remnants of a lower nearly entirely cemented calcic horizon of the Deweyville Formation are found immediately east of the excavation unit. In a nearby cut there is an example of the 2Btb soil unconformably above the calcic soil. There are no artifacts in the calcic soil or the fluvial deposits observed in profile below the calcic horizon.

Approximately 20 m to the southeast of the Paleo Area profile two human remains was recovered in salvage and test excavations. A 1 x 2 m unit was excavated to a maximum depth of 110 cm below ground surface (Figure 38). The original surface was truncated by borrow pit excavations, and based on a small island of the original surface to the south and natural ground surfaces to the southeast the original ground surface is estimated to be 40-60 cm above the current surface. The missing section would have included Holocene Unit Ic. A portion of Holocene Unit Ic is present, as is all of Holocene Unit Ib and a portion of the Deweyville Formation were identified in the section. Holocene Unit Ia may exist in this section below Ib. The excavation unit has a stratigraphy similar to the Paleo Area Profile, except the upper A-2Ab horizon is thicker at the burials and the calcic horizon is thinner than the Paleo Area Profile.

On the borrow pit surface badly disturbed and poorly preserved human remains were identified. These remains consisted of some scattered teeth, femur, and fragments of the tibia and fibia. These remains were not dated. In an effort to understand the stratigraphy of this portion of the site an auger was placed near the burial (Auger 2) and

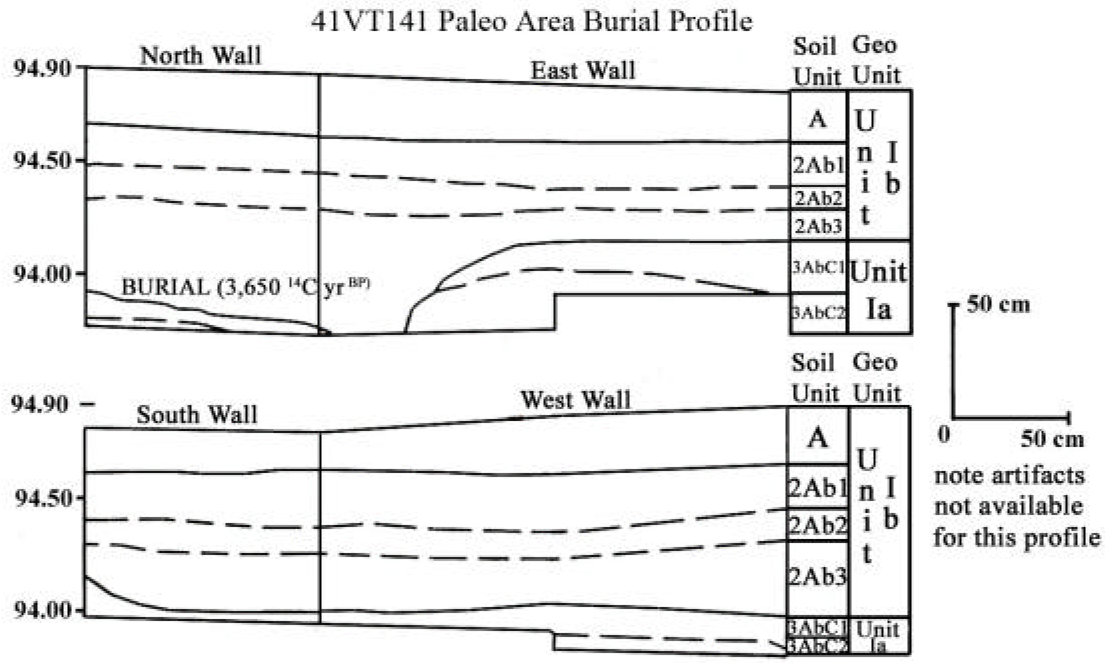


Figure 38. Paleo Area Burial unit profile

coincidentally human remains were recovered from a burial approximately 90 cm below surface. The THC stewards and physical anthropologist Dr. Jennifer Rice conducted test excavations to recover this burial. The truncated A horizon would have been approximately 60-80 cm thick, though only the bottom 18 cm are preserved as the upper albeit disturbed horizon of the unit. The sediments are a very dark brown fine sandy loam. The deposits are hard when dry but are massive and structureless. Snail shell fragments, lithics and unidentified bones were observed in profile. From 18-40 cm is the 2Ab1 horizon, which is the upper portion of Unit Ib. This horizon is very dark grayish brown fine sandy loam that is very hard when dry and very firm when moist. The horizon was observed as massive and structureless, however the profile was not disturbed to test ped structure to maintain the integrity of the profile wall. This unit had a dark greasy midden-like color and texture, and prehistoric lithics, shell, and FCR were observed in profile. Unit Ib continues below this soil horizon as 2Ab2 and 2Ab3 horizons that extend to a variable depth of 80-100 cm below ground surface. These horizons are very dark grayish brown fine sandy loams that are massive but soft in texture as opposed to the overlying 2Ab1 horizon. Prehistoric artifacts were observed in both horizons, though the upper 2Ab2 horizon had fewer prehistoric artifacts. The 2Ab3 horizon has more prehistoric artifacts than the upper horizon and appears to truncate lower horizons in the location of the burial. The burial was recovered from the base of this unit approximately 90-100 cm below ground surface. The burial was dated in a sample submitted by Dr. Jennifer Rice to Beta Analytic Inc. AMS dated the bone collagen sample to 3,650 ^{14}C yr B.P., making it the oldest dated burial of the site (Rice personal communication). Considering the evidence of the upper horizon truncating the lower horizon in the area of the burial the 3,650 ^{14}C yr B.P., date probably occured before the formation of the 2Ab1 paleosol. Below this horizon the excavation unit encountered dark grayish brown to grayish brown fine sandy loams that have a decrease in the amount of prehistoric artifacts. The 3AbC horizons are a transition between these Holocene Unit Ib and possibly Unit Ia depositional units and the lower reworked calcic horizon of the Deweyville Paleosol. The limit of the exposure of the excavation unit was 110 cm below ground surface; however Auger 2 extended the exposure by 65 cm. This transitional horizon continues for another 15 cm. Below the horizon is a 35 cm thick 3Bk horizon. This horizon correlates to the calcic paleosol portion of the Deweyville Paleosol. The deposit is a light brownish gray fine sandy loam with calcareous granules and calcium carbonate crusted large rounded pebbles. Observed mussel shell fragments suggest that this was once a living surface during the Holocene, or that Holocene artifacts were translocated down the profile through bio-pedoturbation. Below this horizon to the limit of the exposure at 175 cm below the ground surface is the weakly cemented buried calcic horizon, which is encountered upslope below the sandy Deweyville deposits and downslope to the southwest near the Paleo Area Excavation Units below the Holocene deposits. The deposit is pale yellow coarse sandy clay that is entirely calcified. No cultural material was observed in this horizon.

Sand Pit. The Sand Pit is an area approximately 40,000 m^2 on the tread of the Deweyville Terrace that was excavated for fill dirt. The pit is largely devoid of cultural material, with only occasional, scattered lithic artifacts observed. No test or salvage units were excavated in this portion of the site, but the walls of pit provided abundant opportunities to examine the deposits (Figure 39). Subsurface testing to determine the relationship between the upper Holocene deposits and the underlying Deweyville Paleosol and fluvial deposits were described in previous sections. This section describes a detailed profile of the upper sandy deposits in relation to the Holocene stratigraphy, and details the archaeological findings from this portion of the site.

One portion of the sand pit was cleaned and profiled. This section was 3 m wide and 1.75 m deep with a 0.25 m pit to extend the profile deeper (Figure 40). Holocene Units Ic, was identified in this profile, though unit Ib may be present at the base of the profile. The profile exhibited an A1-A2-E/Bt-C horizon sequence, and did not encounter the Deweyville Paleosol. The A1-A2-E/Bt sequence is similar to Holocene Unit Ic, and

Figure 39. Photo of Sand Pit

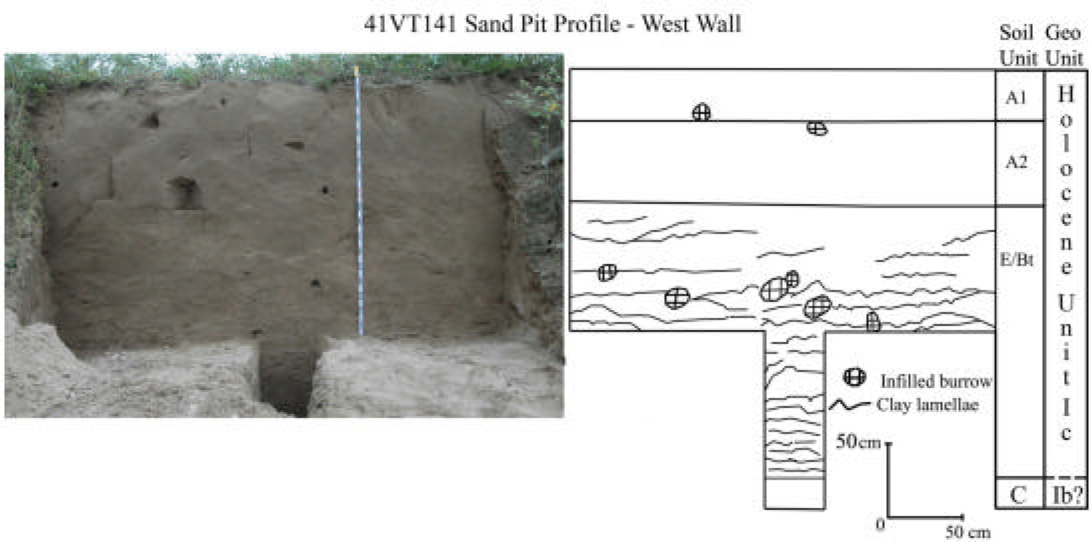


Figure 40. Sand Pit photo and profile

though the C horizon does not have the paleosol at the top of the Unit Ib the C horizon is in the same stratigraphic position below an E/Bt horizon like exposures of Unit Ib on the edge of the terrace. The epipedon is brown fine sand with little to no evidence of cultural material, however bioturbation in the form of infilled insect and rodent burrows is common. Below the A1-A2 horizon the E/Bt horizon has clay lamellae that increase in frequency with depth. The evidence of bioturbation decreases in this level, but there are still infilled rodent and insect burrows. The upper 40 cm of this level has dispersed fine charcoal and occasional undiagnostic lithic artifacts and small well rounded pebbles. The artifacts and pebbles were all recovered from a cluster in a rodent burrow, demonstrating the impacts of bioturbation. The surfaces of the chert artifacts have a shiny polish and feel slick to the touch. This condition may result from abrasion by sands, which could have been caused by artifact translocation through the profile. No artifacts were recovered from below the upper portion of the E/Bt horizon.

The lack of diagnostic artifacts, and the effects of bioturbation complicate developing an archaeological stratigraphy of the Sand Pit and the tread of the Deweyville Terrace. Lithic artifacts and diffuse charcoal flecks were observed in other exposures in the Sand Pit, but the abundant evidence of disturbance and potential for artifact translocation has potentially obliterated any cultural stratigraphy. Considering the likely eolian reworking of the upper horizons of this surface, and the probably limited prehistoric occupations on the tread, there appears to be limited potential for future recovery of archaeological deposits in this portion of the site.

Comparison to Similar Sites

Though there are a number of archaeological sites in the region associated with Deweyville terraces there is little work on site formation processes associated with these terraces. The stratigraphy of this site is compared to the stratigraphy of three other sites, however only one of the sites is in an analogous context. First the stratigraphy will be compared to the Buckeye Knoll site (41VT98). This site is most analogous to the McNeil-Gonzales site, and has had the most comprehensive geoarchaeological investigation of any site in the region (Frederick and Bateman 2004). The site will also be compared to the Berger Bluff site (41GD30) (Brown 1983, Brown 1986, Brown 1996). This site is in a different physiographic setting and the final report of the site has not been published, but it worthwhile to compare because it is the earliest recorded site in the region, and shares some of the same depositional processes as the McNeil-Gonzales site. Finally the Loma Sandia site will be examined. The Loma Sandia site (41LK28) is found in a very different setting in the interior of the Coastal Plain, but similar stratigraphy, cultural artifacts, and a prehistoric cemetery make it a worthwhile comparison (Taylor and Highley 1995). Other sites such as Blue Bayou (41VT94), and the Cinco Ranch sites in Fort Bend County have similarities to the McNeill-Gonzales site, but they either have limited geomorphic data to compare with, like Blue Bayou, or they do not have a cemetery component and are limited to relatively late deposits such as the Cinco Ranch sites (Huebner and Comuzzie 1992, Ensor 1987).

Buckeye Knoll (41VT98). The most comprehensive study is the work by Frederick and Bateman (2005: 11-15) at the Buckeye Knoll site. As described in the previous chapter the site is located in a mantle of Holocene sands on a Deweyville Terrace, and Beaumont Formation upland of the Guadalupe River Valley. The Deweyville Formation stratigraphy was described in the previous chapter, but the Holocene sands were not compared to the archaeological deposits and Holocene depositional units of the McNeill-Gonzales site. The research identified four Holocene depositional units that were dominated by sands with pedogenic alteration but no B-horizons. The deposits aggraded episodically, first mantling the Beaumont Formation, then infilling depressions in the buried paleosol of the Deweyville Formation, and finally aggrading atop the sandy mantle. Though there was variability across the site the general soil horizon sequence was A-2Ab-2AC-2CA-3AC-3CA (Fredrick and Bateman 2004: Figure B). Holocene Unit 1 mantles the Beaumont Formation and contains Early Archaic Bell and Early Triangular points in one portion of the site, and Late Paleoindian Dalton, Barber, and Golondrina points in another. The bottom of the unit was a yellowish brown, and the unit became a very dark gray at the top of the unit. Analysis of total organic carbon found an increase in organic carbon at the top of the deposit, which they interpreted along with the darker color to be a paleosol capping the deposit. There Holocene Unit 1 is similar to the Holocene Unit Ia in Excavation Area 4 at the McNeill-Gonzales site, except that at the McNeil-Gonzales site the Unit Ia formed on the Deweyville Terrace, not the Beaumont Formation.

Holocene Unit 2 truncated portions of Holocene Unit 1 and began infilling depressions on the truncated Deweyville Paleosol and the Beaumont Formation. The unit had a lighter color C horizon and a darker buried A horizon above. OSL dating dated the deposit from 6 to 4 ka, which corresponds to the Early-Middle Archaic. Most of the prehistoric burials dated to the early part of this period of deposition. This unit corresponds to Unit Ib at the McNeill-Gonzales site. A difference is that there is not evidence of this unit truncating the earlier Unit Ia.

Holocene Unit 3 continued filling depressions and intense prehistoric occupation led to the formation of a midden. The unit had a distinct A-C horizon sequence, except for areas with dense midden accumulation. The unit had quite variable ages, ranging from 3.8 to 1.2 ka, which spans from the Late Middle Archaic to the Early Late Prehistoric. It appears that deposition of this unit took place at different times across the terrace surface. This unit has some attributes of Unit Ic at the McNeill-Gonzales site, but the chronology is different. Midden deposits did occur at the McNeill-Gonzales site, but the artifact content of horizon and the middens dated only to the Late Archaic and Late Prehistoric. Holocene Unit 3 of the Buckeye Knoll site began aggrading earlier and at varying times across the site. The McNeill-Gonzales site may have seen variable periodicity in the aggradation of unit Ic as well but the chronometric resolution is poor considering that diagnostic artifacts were the only means of establishing chronology of these deposits.

The final unit identified at the Buckeye Knoll site was Holocene Unit 4. This unit is a cumulic dark A horizon that is time transgressive as it moves up the slope of the terrace surface. The lower portions are the thickest and date from the Late Archaic to the Late Prehistoric (2.5 ka to present), while the portions further up the slope are thinner and only date to the Late Prehistoric (approx 1 ka to present). This unit lacks a strong midden component. In some ways it is like the upper-most portion of Unit Ic at the McNeill-Gonzales site which typically has approximately 20-30 cm of dark cumulic sediments above the midden portion of the unit, and some downslope areas such as in the Paleo Area Burial Unit have a thickened horizon as compared to areas further upslope.

The stratigraphy of the Buckeye Knoll site is very similar to the McNeill-Gonzales site, and their study into the origin of the deposits has the potential to shed light on the depositional origin of the McNeill-Gonzales site. Numerous methods were employed to determine the method of deposition and the sediment source for the Holocene sands, however the results were inconclusive. Granulometric, heavy mineral, mineral magnetics, elemental, and SEM studies of quartz grain surface micromorphology provided conflicting results. In the end the researchers hypothesized that the deposits originated from local eolian reworking of Deweyville sands based on the morphology of the sand sheet deposit, but they could not come to a firm conclusion because of the discrepancies in the data sets (Frederick and Bateman 2004: 15-19).

Berger Bluff (41GD30). The Berger Bluff site provides an interesting comparison because it has one of the earliest dated archaeological components in the region. The site is located on a bluff on Coleto Creek, and has been inundated by the Coleto Creek Reservoir. Like the McNeill-Gonzales site it has a long history of occupation with stratified archaeological deposits from the Paleoindian period to the Late Prehistoric, though in a mixture of aggrading floodplain deposits for the earlier archaeological components and an upper mantle of colluvium and eolian deposits for the later components that has characteristics similar to the McNeill-Gonzales site. A distinct difference is that the earliest components of the site were buried by alluvial sedimentation, and then subsequently indurated by calcium carbonate from a now buried spring. These deposits had exceptionally well preserved faunal remains, unlike the Late Paleoindian components of the McNeill-Gonzales site (Brown 1986). In comparison far fewer lithic artifacts were recovered from these early components and it appears that a short term occupation with specific activity areas occurred at the site (Brown 1996). The middle 4.5 m of the site were not tested but the upper portions of the site were tested by excavation units and had Late Archaic and Late Prehistoric components remarkably similar to the McNeill-Gonzales site. The upper deposits are described as brown loamy fine sand with dense Late Prehistoric and Late Archaic artifacts (Brown 1983). These deposits are similar to the deposits of the McNeil-Gonzales site and are an example of how a sandy loam mantle of colluvial and potential eolian sediments can exist on lower order streams like Coleto Creek, and with different underlying geologic formations. Though the Paleoindian component is in a different depositional setting than the McNeill-Gonzales site it demonstrates how complex depositional environments can preserve multicomponent sites.

Loma Sandia (41LK28). The Loma Sandia site is located on a sandy knoll overlooking a small tributary of the Frio River in the interior of the Gulf Coastal Plain. The site has occupations spanning back to the Paleoindian Period, though the most impressive feature of the site is the very large cemetery that dates from the Middle Archaic period (2,850-2,550 B.P.). Holliday summarized the geoarchaeology of the site, though his research was hindered by being written after the completion of the field work (Holliday 1995). The site primarily consisted of approximately 1 to 3 m of loamy fine sands (Stratum 3) overlying a truncated buried paleoargillic horizon (Stratum 1) and colluvial wash on the margin of the knoll (Stratum 2). The paleoargillic horizon is described as red sandy clay, which is similar to the Deweyville Paleosol at the McNeill-Gonzales site. The upper deposits consisted of an A-AC-C soil horizon that saw significant bioturbation. The deposits were generally gray brown in color and possibly had clay lamellae development. The upper A horizons were stained with dark colored organics and contained primarily Late Archaic and Late Prehistoric components. This is similar to the Ic deposits of the McNeill-Gonzales site. The older Middle and Early Archaic components occurred in the thicker AC and C horizons. These thicker horizons saw less pedoturbation and appear to have aggraded fairly rapidly during these periods. This correlates to the Ib deposits on the upper portion of the McNeill-Gonzales site. Though the McNeill-Gonzales site Ib unit is typically darker colored with a preserved A horizon paleosol it is a relatively thick deposit with a general decrease in artifact concentrations. This may help corroborate a regional correlation of more arid climates and increased eolian transport during the Middle Archaic. The Late Paleoindian component at the base of the sand deposits is relatively minor at this site and does not provide much opportunity for comparison. A final observation from the Loma Sandia site is how localized and compact a prehistoric cemetery can be, which suggests a great deal of the prehistoric cemetery at the McNeill-Gonzales site may have been destroyed. According to the report approximately 205 individuals were excavated primarily from an area 144 m^2 (Taylor and Highley 1995: iii). Approximately 5,625 m^2 around the excavated burial areas were destroyed by borrow pit operations at the McNeill-Gonzales site. If the McNeill-Gonzales site had burials at even a fraction of the density of the Loma Sandia site than a significant number of burials were destroyed and are now presumably resting in countless Victoria area gardens.

CHAPTER V

CONCLUSION

Geoarchaeological investigations at the McNeill-Gonzales site placed this site in a stratigraphic context, as a framework for future archaeological research. It also developed a model of site formation that can be tested at other sites in similar geomorphic settings, provided information on the soils and slope processes of Deweyville terraces, and presented additional dates on the Deweyville Formation. This conclusion presents a model of site formation and prehistoric occupation at the McNeill-Gonzales site, and suggests future lines of investigation.

Model of Site Formation and Prehistoric Occupation

Interpretations of site formation at the McNeill-Gonzales site most closely resemble a model presented by Paine for sites on the slopes of the San Jacinto River terrace (Paine 1987, 1990, Abbott 2001). In this model a Pleistocene surface of the Beaumont Formation is laterally incised by the San Jacinto River as it downcuts during the Late Glacial sea level lowstand. This lateral incision and gullying of the terrace continues until the Early Holocene when sea level rise and floodplain aggradation begins. Slopes then develop a colluvial mantle on the margins of the Pleistocene terrace. This mantle laterally truncates the Pleistocene soil, and archaeological deposits become incorporated into the colluvial mantle. The sites Paine (1987, 1990) studied were primarily Late Archaic and Late Prehistoric in age, and the colluvial mantle were fine-grained sediments that derived from the Beaumont Formation.

Landscape development of the McNeill-Gonzales site is very similar, except instead of being clayey sediments of the Beaumont Formation the deposits are predominately sandy fluvial deposits of the Deweyville Formation. The other important factor involved is that a sandy mantle of Holocene deposits covers the Deweyville Terrace. At the McNeill-Gonzales site the Deweyville terrace stopped aggrading and developed a soil beginning shortly after 60,000 yr. Sea level drop associated with the Late Glacial led to downcutting and the lateral erosion of the Deweyville surface, which created the terrace. This lateral erosion stripped off portions of the Deweyville Paleosol as well as underlying fluvial deposits. Surficial erosion and gullying also impacted the Deweyville surface. These actions truncated the surface of the terrace creating topographic depressions, and gullies that exposed the calcic portion of the Deweyville Paleosol, and the underlying sandy fluvial deposits. The remnant of a small post-Deweyville paleochannel on the edge of the terrace is testament to the erosional forces acting on the Deweyville terrace. This channel probably rapidly filled during the initial period of floodplain aggradation, though chronological control of this feature is very weak.

The truncated Deweyville Paleosol became the first living surface for prehistoric peoples approximately 10,000-8,000 B.P. People using Plainview and Golondrina projectile points occupied the slopes of the Deweyville terrace, primarily on the southeastern portion atop the exposed calcic paleosol, and atop the relatively minimally eroded paleosol further upslope on the central portion of the terrace. Though the artifact analysis has yet to be completed, the numerous wood working gouge tools in these early portions of the site suggests woodworking activities at the site. It stands to reason that during this period of the early Holocene when it was cooler and drier than present the riparian zones along the floodplains may have been the only locations where hardwood for tools, shelter and transport were located.

Sometime after the incision and lateral erosion that created the Deweyville terrace the deposition of an eolian sandy mantle began on the terrace (Unit Ia). Low surfaces along the terrace margins began aggrading with fine sand. It is uncertain how much sand was deposited on the terrace tread at this time because the deposits atop the tread have not been correlated and dated. Along the terrace scarp prehistoric settlement continued with additional Late Paleoindian to Early Archaic diagnostic artifacts being recovered. Angostura, Saint Mary Hall, Big Sandy, and Lerma Late Paleoindian/Early Archaic dart points were recovered, as well as the ubiquitous Clear Fork gouges. A weak paleosol developed atop the fine sands of these deposits on the western edge of the terrace and while fine sands began to fill the paleo-gully on the western portion of the scarp, and mantle the reworked colluvial deposits of the Deweyville paleosol calcic horizon on the eastern side of the terrace. The soil did not form on the eastern side of the terrace and instead the sedimentation continued into the Early Archaic where Uvalde and Bulverde dart points of the Early to Middle Archaic are found mixed with the earlier Late Paleoindian/Early Archaic dart points.

A thicker sand deposit of Unit Ib continued filling low-lying portions of the terrace and possibly mantled the entire tread of the Deweyville terrace. This thicker sand deposit has artifacts of the Middle and Early Archaic (8,000-2,500 B.P.). This potentially correlates to the Middle Holocene period of aridity that is inferred to have occurred on a regional scale. On the eastern edge of the terrace in the Paleo Area fine sands continued aggrading with the continuation of prehistoric occupation. The earliest dated burial is found in this deposit, and it dates to 3,650 ^{14}C yr B.P. Freshwater mussel shells and snail shells appear in the site matrix, which suggests close proximity to a channel that could support beds of mussels. The interpretation of a nearby stream channel also implies that sandy would have been adjacent to the terrace, and point bars or overbank deposits could have been deflated in close proximity to the terrace. There are fewer mussel shells on the western portion of the site, though by this time the paleo-gully below the Burial Areas had nearly completely filled to the level of the terrace tread.

Towards the end of the Middle Archaic (2,500-3,000 B.P.) a paleosol formed at the top of the fine sand deposits. This paleosol is a mollic and has more strongly developed soil structure. This soil is found on the western portion of the terrace scarp in the Burial Areas, the Area 4 Excavation unit, and on the eastern edge of the scarp in the Paleo Area. There was enough stability in the Paleo Excavation Area for the formation of a weak illuvial horizon in the lower portions of Early Archaic/Late Paleoindian deposits.

From the Late Archaic to the Present (2,500 B.P. to present) sedimentation continued across the tread and the scarp. During this period the aggradation Unit Ic covered the entire surface, with thick sand deposits aggrading at the Main Site Area on the western edge of the terrace, colluvial deposits accumulating at the central portion of the terrace for the first time in the Anaqua Mott Area, and a relatively thin deposit of sand mantling the eastern portion of the terrace in the Paleo Area. In the thicker portions of the deposit pedogenic clay lamellae develop, which can be traced from the Main Site Area to the Sand Pit on the terrace tread. This depositional unit has the greatest concentration of prehistoric artifacts, with distinct midden deposits of darker sediments and high concentrations of cultural artifacts occurring in the Anaqua Mott and downslope portions of the main site area in Excavation Area 5. The two of the burials recovered from the Main Site Area date to the Late Archaic and considering much of the area where the burials were located were destroyed by the borrow pit operations there may have been a substantial Late Archaic cemetery at this portion of the site.

Suggestions for Future Work

Future work at the site would benefit from more radiometric dating to better correlate deposits across the terrace and scarp. Most of the soil and sediment ages come from relative ages of diagnostic artifacts. Although dating by diagnostic artifacts is a useful method for dating archaeological deposits some point types were used over long periods of time, and the range of some tool forms are poorly defined. These factors and considerations for the impacts of bio-pedoturbation on the Holocene depositional units make their dating rather general at this time. Because charcoal preservation is so poor at the site other methods such as dating bone collagen by AMS or dating sands by OSL remain as productive ways to date the site and the Deweyville terrace. Both methods have been used to good effect, and future OSL dating of the mantling sands will be required in order to better understand the depositional processes that led to the formation of the sandy mantle. Pedoturbation may hinder the interpretative value of OSL dating, but advancing in interpreting OSL data and the application of the single grain method of paleodose rates has the potential to not only provide more accurate dates, but potentially measure the amount of pedoturbation that has occurred in the samples (Bateman et al 2003).

The understanding the soil formation processes and the depositional origin of the Holocene deposits of the site and the terrace mantle would benefit from additional soil chemistry, soil magnetism, isotopic studies, and micromorphological studies. A study of the amount of organic carbon and phosphorous in the Holocene deposits may help define the paleosols. Increases of organic carbon are shown to relate to the increase in organic matter associated with buried soils (Frederick and Bateman 2004). Increased concentration of phosphorous in archaeological sites has been shown to derive from prehistoric cultural activities (Holliday 2004). Conducting studies of the magnetic properties of the Holocene sediments may assist in identifying sediment sources (Lees 1999). Stable isotope studies of the bulk soil organic matter could provide data on changes in vegetation types present through time on the slope and scarp of the terrace. Finally scanning electron microscope (SEM) studies of grain morphology could help with identifying sediment sources. Comparing grain morphology of the Holocene sands to known fluvial and eolian sands could assist in determining the mode of transport, though results could be inconclusive if the eolian sediments were transported only a short distance. Most studies of eolian grain morphology are from sands that would have experienced extensive eolian transport in arid desert environments (Tchakerian 1991).

This full suite of studies along with heavy mineral and elemental analyses was undertaken at the Buckeye Knoll site (41VT98), however the results were often contradictory (Frederick and Bateman 2004). Replicating some of the studies at the McNeill-Gonzales site would further facilitate the comparison of these sites, and may help resolve some of the contradictory results of their analyses.

The work at the terrace would benefit from additional geomorphic testing on the Holocene floodplain adjacent to the site and deep cores to understand the relationship between the Deweyville Terrace and the Beaumont Formation. Understanding the Holocene floodplain would help with understanding the fluvial response to sea level change during the Late Quaternary by identifying terraces that may be buried by Holocene floodplain aggradation. It would also help discern the location and nature of Holocene channel deposits, which would assist in evaluating the potential scenarios of eolian deflation of floodplain deposits onto the Deweyville terrace.

Ultimately regional geomorphic surveys of similar settings on other remnant Deweyville Terraces will be required to determine the nature and extent of the Holocene mantle on Deweyville Terraces. Archaeological deposits are buried in deposits of Deweyville Terraces of the Guadalupe River and until a uniform theory can explain the processes that buried these sites the site formation processes at this site will remain uncertain. A cursory examination of site distributions along the lower Guadalupe River shows that many prehistoric sites identified in the region are located on slopes and high terraces along the margin of the Guadalupe River. A larger sample size of sites in similar settings with geomorphic investigations, and a spatial analysis of site distributions relative to geomorphic surfaces would provide valuable insight into site preservation, site distribution, help future systematic archaeological investigations, and the management of these archaeological resources.

Additional studies of materials recovered from excavations could contribute to the understanding of site formation processes and paleoenvironment. Continuing studies of artifact distributions through the profile based on artifact weight and size could provide information on the impacts of bio-pedoturbation on the cultural stratigraphy of the site. Vertical sorting of artifacts by size or weight may suggest that pedoturbation decreased site integrity. The presence of diagnostic artifacts in good stratigraphic context and intact features is evidence that bioturbation has not disturbed the archaeological deposits to the degree where integrity is compromised. Faunal studies of mussel and snail shells, as well as animal bones recovered would help in understanding the local environments during the Holocene. Studying mussel and snail shell species could provide important data on the behavior of the Guadalupe River by correlating the environments that the modern mussel species live to the species found in the archaeological record. Faunal remains from mammals, amphibians, reptiles, and fish that were recovered from the excavations could provide a wealth of information on the local environment during the Holocene due to changing distributions of species, as well as changing dietary patterns of prehistoric peoples.

The understanding of the site stratigraphy and archaeological deposits would benefit from additional excavations, and geoarchaeological studies. First, the age and the nature of the archaeological deposits found the in the Paleo Area profile below the colluvially reworked calcic horizon have not been adequately examined. Based on stratigraphic studies these deposits could be Late Paleoindian or older and as of publication there have been no excavations into the horizon that contain these deposits. The Paleo Area needs a systematic excavation unit in an undisturbed portion of the site to obtain a complete representation of the prehistoric deposits in the area. Test excavations focused on the exposed earlier components of the site, and the later components have not been examined. Test excavations of these components would help relate the stratigraphy and archaeological deposits of this portion of the site to the other portion. Though more Late Paleoindian artifacts were recovered in the Paleo Area than anywhere else, it may not be the best part of the site to recover discrete Late Paleoindian components. Significant mixing of Late Paleoindian and Early Archaic artifacts, the position on a colluvial slope, significant clay illuviation, and the observations of scattered artifact distributions suggest that this portion of the site has seen significant mixing of archaeological components, artifact translocation, and post burial pedogenic alteration. The deeply buried Late Paleoindian component of Excavation Area 4 indicates that this portion of the site may hold more intact Paleoindian deposits. The Paleoindian component at this portion of the site was effectively sealed from later disturbance by a palesol at the top of the unit. As opposed to being an occupation on a slope these deposits are found in a slight depression on the edge of the terrace tread that was buried through vertical aggradation as opposed to colluvial deposition. Though some clay illuviation has occurred in this horizon it is far less pronounced than in the

Paleo Area. Based on the stratigraphic work it is estimated that an area of approximately 800 m^2 may contain these deposits in the area around Excavation Area 4.

Artifacts from the Early to Middle Archaic are less common than the Late Archaic/Late Prehistoric and the Late Paleoindian, but there are some locations where deposits exist. First the burial in the Paleo Area is from the late Middle Archaic and additional excavations could possibly identify more burials from this time period. Considering that the archaeological record of the Middle Archaic is poorly understood on the Coastal Plain and the interior Coastal Plain the burial and Middle Archaic artifacts from Excavation Area 4 could provide needed information on this period of prehistory (Ricklis 2004a). The timing of the paleosol development atop the Archaic period deposits in the Paleo Area could be facilitated by additional excavation of the Archaic components.

Finally the Late Archaic/Late Prehistoric occupations of the site could provide a wealth of information on these prehistoric time periods. These periods have the greatest density and distribution of artifacts, with middens and burials that date to this period. The mixing of deposits during the late 2,500 years does complicate the interpretive value of these deposits, but the sheer volume and wide distribution of artifacts is a compelling reason for future studies. These levels have the best preservation of charcoal, shell, and faunal material, which would further contribute to interpretations of subsistence patterns and environmental setting. The Paleo Area is the only portion of the site where significant deposits from these time periods have not been recovered. Targeted excavations of midden deposits would be best served in the Anaqua Mott area, while burials most likely still remain to be excavated in the Burial Areas of the Main Site Area.

Though much work has been done these suggestions show just how much work is possible. I hope future investigations at the site will be facilitated by this geoarchaeological research and that this research will contribute to and help stimulate future geoarchaeological studies in the region.

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APPENDIX A

FIELD DESCRIPTIONS

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Core #1	7/30/2004	Ap		0-18	18	Very dark gray 10YR3/1 clay, fine blocky subangular to prismatic, very hard, very sticky, numerous fine roots, no HCl reaction, clear lower boundary
	approx 500m from Hwy 87, northwest side of ranch rd	Bss		18-97	79	Very dark gray 10YR2.5/1 clay, fine prismatic with slickensides, very hard, very sticky, occasional fine roots, no HCl reaction, undetermined lower boundary
	level upland with microrelief	Bkss1		97-167	70	Dark gray10YR3.5/1 clay, fine prismatic parting to fine blocky subangular with slickensides, mottled with CaCO3 soft masses 10YR6/3 from 10% to 40% increasing with depth to very coarse sands to gravel size nodules at base, no roots, strong HCl reactions, smooth lower boundary
	Soil is mapped as Lake Charles, but will be updated as Key West.	Bkss2	Beaumont Formation	167-247	80	Light reddish brown (2.5Y6/4) silty clay, fine blocky subangular with slickensides, numerous 20-50% white (2.5Y8/1) granular to pebble sized soft masses to concretions of CaCO3, HCl reactions, abrupt lower boundary
		Bkss3		247-457	10	Equal parts light yellowish brown (10YR6/5) clay and light gray (10YR7/1) clay, fine blocky subangular with slickensides, very hard, very firm, few CaCO3 size to soft masses and occasional granule sized nodule, presence of black 1-2mm clay, possibly charcoal coatings on grains
		C1		457-467	10	Light brownish gray (2.5Y6/2) interbedded silty loam
		2Bkss		467-495	28	equal parts light yellowish brown 10YR6/5 clay and light gray 10YR7/1 clay, fine blocky subangular with slickensides, very hard, very firm, few CaCO3 size to soft masses and occasional granule sized nodule, presence of black 1-2mm clay, possibly charcoal coatings on grains
		2C		495-505	10	Light brownish gray (2.5Y6/2) interbedded silty loam

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Core #2	7/30/2004		Beaumont Formation	0-100	100	black calcareous clays of the DeCosta Series, no samples collected, only observed.
	South side of ranch road, leading to old house, on the scarp of the convex upper slope of the Beaumont uplands. Approximately 400m from house.					

Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	Description
Core #3	7/30/2004	Ap		0-27	27	Very dark gray (10YR3/1) loam, weak fine subangular blocky, moderate-common fine roots, slightly hard, friable, no reaction to HCl, abrupt lower boundary
	Approximately 30m southwest of Core #2, 300m up road to NE of the old house.	Btss		27-71	44	Very dark gray (10YR3/1) clay, moderate fine prismatic, shiny slickensides, very hard, very firm, few very fine roots, no reaction to HCl, clear lower boundary
		Btk1	Beaumont Formation	71-101	30	Dark gray (10YR4.5/1) clay, moderate fine prismatic parting to moderate fine blocky, common fine sand grain sized CaCO3 grains, reacts to HCl, very occasional fine roots, clear boundary
		Btk2		101-125	24	Yellowish brown (10YR5/4) silty clay, moderate fine subangular blocky, common >20% numerous fine sand grains with occasional <5mm soft masses, occasional granule sized white nodules, no roots, clear lower boundary
		Btk3		125-160	35	Brownish yellow (10YR5.5/6) clay with common to many strong brown (7.5YR5/8) mottles, common dark brown (7.5YR3/2) mottles, 2mm thick carbonate films, 5mm white soft masses, coarse sand grain to granule sizes white nodules, fine angular blocky
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Core #4	7/30/2004	A1		0-18	18	Dark grayish brown (10YR4/2) loamy fine sand, loose single grained to granular, few fine roots, clear lower boundary
	Approximately 7 m northeast of Excavation Area 4	A2		18-90	72	Dark grayish brown 10YR4.5/2 fine sand, loose single grained to granular, occasional fine roots, clear gradual boundary
	ground surface obscured by high vegetation, surface uneven, centered on a high spot. Broke rig at 170cm.	A3	Unit I: Holocene undetermined	90-150	60	Brown (10YR5/2.5) sand with occasional very coarse grained sand, subrounded grains, loose sand to granular, no roots, well rounded pebble at 135cm, lithic artifacts 150cm, clear gradual lower boundary
	*note descriptions questionable due to problems extracting core from broken rig	A4		150-170	20	Light browish gray (10YR6/1.5) coarse to medium sand, loose single grained to granular, no roots, artifacts at 150cm, abrupt lower boundary
		Bt	Deweyville Paleosol	170-190	30	Brown (10YR5/3) sandy clay loam with common reddish yellow (7.5YR6/6) distinct medium mottles, weak fine granular to subangular blocky

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Core #5	11/13/2004	A		0-25	25	Very dark brown (10YR2/2) sandy loam, very dark grayish brown (10YR3/2) dry, very weak medium blocky subangular structure, few fine roots, clear boundary
	: Due West of house,	BA		25-50	25	Very dark gray (7.5YR3/1) silty clay loam, with common distinct fine reddish brown (5YR4/4) mottles that increase with depth, yellowish red (5YR4/6) dry, moderate fine blocky subangular structure, hard, diffuse lower boundary
	approximately 50m, across road	Bt1		50-94	44	Reddish brown (5YR4/4) silty clay loam, moderate fine blocky subangular structure, few white carbonate granule sized nodules, few black manganese granular sized nodules, gradual lower boundary
	surface is just below the upper Beaumont Formation surface	Bt2	Beaumont Formation	94-128	34	Yellowish red (5YR4/6) silty loam, yellowish red (5YR5/6) dry, fine blocky subangular structure, firm, abrupt lower boundary
		Btk1		128-220	92	Brownish yellow (10YR6/6) silty loam, very pale brown (10YR7/4) dry, weak fine blocky angular structure, common, coarse white carbonate soft masses, firm, sticky, diffuse lower boundary
		Btk2		220-280	40	Pale brown (10YR6/3) silty clay loam with many distinct yellowish brown (10YR5/6) mottles increasing to equal with dominant color, blocky angular structure, common coarse white carbonate soft masses, firm, slightly sticky, gradual lower boundary
		Ck		280-295	15	Light yellowish brown (10YR6/4) fine sand, Very pale brown (10YR7/4) dry, single grain structure, few faint carbonates, decreasing with depth

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Core #6	11/13/2004	A		0-60	60	Grayish brown (10YR5/2) fine sand, light gray (10YR7/2) dry, massive structure, few (2%) granule sized pebbles, soft, few fine roots, diffuse lower boundary
	At North end of Sand Field-Deweyville Terrace	AE	Unit I: Holocene undetermined	60-100	40	Brown (10YR5/3) loamy fine sand, pale brown (10YR6/3) dry, with very few, faint, fine, dark yellowish brown (10YR3/6) lamelle, massive structure, diffuse lower boundary
	Just south of Y-in Road, south of cattle guard	E		100-285	185	Light gray (10YR7/2) loamy fine sand, very pale brown (10YR7/3) dry, very weak fine blocky subangular structure, becomes saturated at 190cm, soft, abrupt lower boundary
		Btg, 2Btg?	Deweyville Paleosol	285-295	15	Brownish yellow (10YR6/6) fine sandy loam, light yellowish brown (10YR6/4) dry, with few, faint, yellowish red (10YR5/8) mottles, reddish yellow (5YR6/8) dry, very weak fine blocky subangular, slightly firm, moist, limit of exposure

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Core #7	11/13/2004	A		0-14	15	Black (10YR2/1) silty clay, very dark gray (10YR3/1) dry, strong fine blocky angular, hard, sticky, few fine roots, abrupt lower boundary
	N. side of cattelgaurd/fence	Bt		15-70	55	Very dark grayish brown (10YR3/2) clay, very dark gray (10YR3/1) dry, strong fine blocky angular, shiny ped surfaces, hard, sticky, very few fine roots, abrupt lower boundary
	E of road 25-30 m, toe slope of	Btk1	Beaumont Formation	70-155	85	Very dark gray (10YR3/1) clay, strong fine blocky angular structure, few (5%) white granule sized carbonate nodules and soft masses, hard, sticky, abrupt lower boundary
	upland scarp, level with sand field	Btkg		155-215	50	Pale brown (10YR6/3) clay, strong fine blocky angular, few (5%) white granule sized carbonate nodules and soft masses, few (3%) very dark gray (10YR3/1) fine coatings on vertical and lateral ped faces, few, distinct, brownish yellow (10YR6/8) mottles increasing with depth common at base of horizon, hard, sticky, abrupt lower boundary
		Btk2		215-230	15	Light gray (10YR7/2) silty clay, very pale brown dry, strong fine blocky subangular, common distinct large carbonate soft masses and granule sized nodules, limit of exposure

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Core #8	11/13/2004	2Btg1		0-60	60	Gray (10YR5/1) silty clay with many (to 40%) prominent fine dark red (2.5YR3/6) mottles, red (2.5YR4/6) dry, few coarse sand sized black manganese grains, weak fine blocky subangular, firm, slightly sticky, diffuse lower boundary
	In sand pit, near east enterance,	2Btg2	Deweyville Paleosol	60-110	50	Grayish brown (10YR5/2) silty loam, light brownish gray (10YR6/2) dry, with common prominent fine yellowish brown (10YR5/6) mottles, weak blocky subangular structure, few coarse sand sized black manganese grains, friable, abrupt lower boundary
	encountering argillic paleosol,	2Btk		110-177	67	Very pale brown (10YR7/3) fine sandy loam, weak fine blocky subangular structure, common (15%) coarse carbonate soft masses to nodules, very slightly sticky, diffuse lower boundary
	exposed at bottom of pit, should	2C	Deweyville fluvial sands	177-222	45	Pale brown (10YR6/3) fine sand, very pale brown (10YR8/2) dry, single grain, limit of exposure
	be approx 1.5 of sand above					

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Core #9	11/13/2004	A1	Holocene Unit Ic	0-30	30	Very dark grayish brown (10YR3/2) loamy fine sand, brown (10YR4/3) dry, very weak fine blocky subangular to single grained, loose to soft, few fine roots, diffuse lower boundary
	Between Anaqua Mott Area 4 and	A2		30-58	28	Very dark grayish brown (10YR3/2) fine sandy loam, very weak fine blocky subangular to single grained, loose to soft, very few fine roots, abrupt lower boundary
	Paleo Area, 39m at 80 degrees	2Ab	Holocene Unit Ib	58-83	25	Very dark brown (10YR2/2) fine sandy loam, very dark grayish brown (10YR3/2) dry, very weak blocky subangular, very few fine roots, firm, diffuse lower boundary
	from E397 N539, 14m at 40 degrees	2E		83-125	42	Brown (10YR4/3) fine sandy loam, dark yellowish brown (10YR4/4) dry, massive, soft, diffuse lower boundary
	from E397 N539, 14m at 40 degrees from DAT 3 (N347E886)	2EB		125-145	20	Dark yellowish brown (10YR4/4) fine sandy loam, massive, soft, very slightly sticky, diffuse lower boundary
		3C	Deweyville fluvial sands	145-175	30	Pale brown (10YR6/3) gravelly fine sand, very pale brown (10YR7/3) dry, single grain, gravels 3% well rounded fine granules to pebbles, limit of exposure
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Core #10	11/13/2004	EB	Holocene Unit Ic	0-65	65	Dark grayish brown (10YR4/2) fine sandy loam, brown (10YR4/3) dry, very dark brown (10YR2/2) medium (1 cm) lamelle every 10 cm, very weak blocky subangular, few (1%) well rounded granule, soft, few fine roots, diffuse lower boundary
	In main site area, from site datum 19.5m at 9 degrees	EB2		65-155	90	Brown (10YR4/3) fine sandy loam, very dark brown (10YR2/2) medium (1 cm) lamelle every 15-20 cm, very weak blocky subangular to massive, soft, slightly sticky, diffuse lower boundary
	note .75- 1m of sediments existed above the current surface, gone due to dozing.	2Ab1	Holocene Unit Ib/a	155-185	30	Dark grayish brown (10YR4/2) loamy fine sand, brown (10YR4/3) dry, soft, massive, diffuse lower boundary
		2E		185-222	17	Yellowish brown (10YR5/4) fine sandy loam, light yellowish brown (10YR6/4) dry, massive structure, soft, abrupt lower boundary
		2Btg		222-340	118	Light yellowish brown (10YR6/4) fine sandy loam to fine sandy clay loam, very weak blocky subangular to massive structure, firm, slightly cohesive, few (1%) faint light brownish gray (10YR6/2) mottles, limit of exposure

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-1	5/15/2005	A	Holocene Unit Ic	0-20	20	10YR3/2 (w) fine to med. sand
	N374 E979, ele. 97.29	2Ab	Holocene Unit Ib	20-30	10	10YR3/2 (d) / 10YR2/1 (w) sandy clay loam
	approx. 15m west of paleo profile	3Btk1	Holocene Unit Ia	30-50	20	10YR4/3 (d) / 10YR4/2 (w) sandy clay loam, weakly calcic, flake and small shell frags
		3Btk2		50-80	30	10YR6/1 (d) / 10YR6/4 (w) sandy loam. Few faint filaments to few small soft masses of CaCO3
		3C1	Deweyville fluvial sands	80-130	50	10YR6/4 (d) / 10YR5/3 (w) fine to medium sand.
		3C2		130-160	30	10YR6/4 (d) / 10YR5/4 (w) medium sand
		3C3		160-190	30	10YR7/4 (d) / 10YR6/4 (w) medium to course sand with few well rounded small pebbles
		3C4		190-310	120	10YR7/4 (d) / 10YR6/4 (w) medium to course sand
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-2	5/15/2005	A1	Holocene Unit Ic	0-20	20	10YR4/2 (d) fine to med. sand
	N358 E979, ele. 96.24	A2		20-50	30	10YR3/2 (d) fine to med. sand
	15m south of 5-1,	2Ab1	Holocene Unit Ib	50-89	39	10YR2/2 (d) sandy loam
	down slope	2Ab2		89-102	13	10YR3/2 (d) sandy loam
		2Btk	Holocene Unit Ia	102-140	38	10YR4/3 (d) sandy loam, weakly calcic, small shell frags.
		2Bk		140-180	40	10YR5/3 medium sand with few pebbles to 30mm3. Few faint filaments to few small soft masses of CaCO3
		3C1	Deweyville fluvial sands	180-207	27	10YR6/4 (d) fine to medium sand
		3C2		207-230	27	10YR7/4 (d) fine to medium sand with few small gravels to 12mm3. Terminates at impenetrable gravels
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-3	5/15/2005	A1	Holocene Unit Ic	0-20	20	10YR4/2 (d) fine to med. sand
	N342 E979, ele. 95.18	A2		20-60	40	10YR3/2 (d) sandy loam
	17m south of 5-2 same transect,	2Ab1	Holocene Unit Ib	60-70	10	10YR2/1 (d) sandy clay loam
	immediately to the West	2Ab2		70-120	50	10YR3/2 (d) / 10YR2/1 (w) sandy clay loam, at 90cm fine well rounded gravel, flake and gravels at 105cm
	of paleo excavation	3Bt	Deweyville Paleosol	120-160	40	10YR4/4 (d) / 10YR3/4 sandy clay with few small well rounded gravels, flake 150cm
	units	3BC		160-185	15	10YR5/6 (d) 10YR4/6 (w) sandy clay loam
		3C	Deweyville fluvial sands	185-203	18	10YR6/6 (d) 10YR5/6 (w) sandy loam gravels increases with depth from few granules to common small well rounded gravels. Terminate at impenetrable gravels

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-4	5/15/205	A1	Holocene Unit Ic	0-20	20	10YR4/2 (d) fine to med. sand
	N324 E978, ele 94.29	A2		20-60	40	10YR4/2 (d) sandy loam
	16m south of 5-3, along same transect west of paleoarea	2Ab	Holocene Unit Ib	60-84	24	10YR2/2 sandy loam few small pebbles 8mm3
		2Bt	Holocene Unit Ib/a	84-93	9	10YR2/2 sandy clay flake at 93cm
		3C	Deweyville deep gravels/calcic horizon	93-100	7	10YR3/2 gravelly sandy clay gravels large, well rounded, terminates at impenetrable gravels

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-5	5/15/2005	A	Infilled Post - Deweyville channel	0-50	50	10YR2/1 (d) / 10YR2/1 (w) clay
	N309 E978, ele 93.94	Bk1		50-90	40	10YR4/1 (d) / 10YR5/1 (w) silty clay, fine faint CaCO3 filaments, possible small shell frags from 50-60cm
	16 m south of 5-4, downslope	Bk2		90-160	70	10YR6/2 (d) / 10YR5/2 (w) silty clay, fine faint CaCO3 filaments
	under mesquite/acacia trees, away from site area	C		160-260	100	10YR6/2 (d) sandy clay loam
		2Bk		260-290	30	10YR4/3 sandy clay loam few faint CaCO3 soft masses and very few small pebbles and shell frags

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-6	5/15/2005	A	Infilled Post - Deweyville channel	0-30	30	10YR3/2 (d) 10YR3/1 (w) silty clay loam
	N280 E977, ele 93.58	Bt1		30-60	30	10YR6/3 (d) 10YR6/2 (w) sandy clay
	30m south of 5-5, 25 m north of BHT3	Bt2		60-87	27	10YR5/3 (d) 10YR5/3 (w) sandy loam
		Btk1		87-120	33	10YR4/2 (d) sandy clay few faint CaCO3 filaments, mussel shell frag at 120cm
		Btk2		120-230	110	10YR4/2 (d) silty clay, few to moderate faint CaCO3 filaments, snail shell at 173cm
		Btg		230-253	23	10YR6/2 (d) 10YR6/3 (w) clay with few faint 10YR6/6 (d) mottles

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-7	5/16/2005	A	Holocene Unit Ic	0-20	20	10YR4/2 (d) 10YR3/2 (w) fine to medium sand
	N388 E978, ele 97.54	2Ab	Holocene Unit Ib	20-35	15	sandy clay loam, flake 25cm
	15m north of 5-1,	3Btk1	Holocene Unit Ia	35-45	10	10YR4/3 (d) / 10YR4/2 (w) clay loam weakly calcic, FCR and small shell frags
	heading upslope	3Btk2		45-140	95	10YR5/3 (d) 10YR4/3 (w) sandy clay loam Few faint filaments to few small soft masses of CaCO3
		3Bk	Deweyville fluvial sands w/ arch intrusion	140-160	20	10YR6/4 (d) sand with CaCO3 soft masses
		3C1		160-237	77	10YR6/4 (d) sand flake at 190cm
		3C2		237-280	43	10YR6/4 (d) sand with common small pebbles 5-12mm some to 30+mm
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-8	5/16/2005	A	Holocene Unit Ic	0-45	45	10YR4/2 (d) 10YR3/2 (w) fine to medium sand
	N404 E978, ele. 97.99	2Ab	Holocene Unit Ib/a	45-55	10	10YR2/2 (d) sandy clay loam
	15m north of 5-7	2Bt		55-90	35	10YR3/2 (d) sandy clay loam to sandy clay flake 82cm
		3Btk1	Deweyville Paleosol/edge of colluvium	90-110	20	10YR4/3 (d) / 10YR4/2 (w) sandy clay loam moderate small filament to soft masses CaCO3, increasing in size and frequency with depth
		3Btk2		110-155	45	10YR4/3 (d) / 10YR4/2 (w) sandy clay loam frequent to moderate medium filaments and soft masses of CaCO3
		3Btk3		155-164	9	10YR6/4 (d) sandy clay loam few fine soft masses of CaCO3
		3C1	Deweyville fluvial sands	164-282	18	10YR6/4 (d) fine to medium sand
		3C2		282-302	20	10YR6/4 (d) medium to course sand
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-9	5/16/2005	A	Holocene Unit Ic	0-35	35	10YR4/2 (d) 10YR3/2 (w) fine to medium sand
	N419 E978, ele. 98.69	2Ab	Holocene Unit Ib/a	35-45	10	10YR3/2 (d) sandy loam
	15m north of 5-8	3Btg	Deweyville Paleosol	45-113	68	10YR4/1 (d/w) sandy clay loam with distinct common 5% medium 2.5YR5/8 (w) mottles
		3Btkg		113-151	38	10YR4/1 (d/w) silty clay with distinct few medium 2.5YR5/8 (w) mottles and few fine CaCO3 filaments
		3Btk		151-158	7	10YR4/1 (d/w) silty clay with moderate medium CaCO3 nodules
		3CB	Deweyville fluvial sands	158-170	12	10YR4/1 (d) sandy loam
		3C		170-222	52	10YR6/4 (d) fine to medium sand
		3Ck		222-320	98	10YR6/4 (d) medium sand with few small 10-15mm pebbles with occasional CaCO3 nodule

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-10	5/16/2005	A	Holocene Unit Ic	0-65	65	10YR5/2 (d) fine to medium sand
	N440 E978, ele 99.00 17m N of 5-9	2Btg	Deweyville Paleosol	65-86	21	10YR4/1 (d/w) silty clay with distinct common 5% medium 2.5YR5/8 (w) mottles
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-12	5/16/2005	A	Holocene Unit I:undetermined	0-90	90	10YR5/3 (d) 10YR4/3 (w) fine to medium sand
	N978 E451 99.49, N of 5-10, note no 5-11	2Btg	Deweyville Paleosol	90-95	5	10YR4/1 (d/w) silty clay with distinct common 5% medium 2.5YR5/8 (w) mottles
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-13	N978 E466, 99.43, 15m N of Auger 5-12	A	Holocene Unit I:undetermined	0-98	98	10YR5/3 (d) fine to medium sand
		2Btg	Deweyville Paleosol	98-101	3	10YR4/1 (d/w) silty clay with distinct common 5% medium 2.5YR5/8 (w) mottles
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-14	5/17/2005	A1	Holocene Unit Ic	0-30	30	10YR4/2 (d) 10YR3/2 (w) fine to medium sand
	N363 N958, ele. 96.75	A2		30-110	80	10YR3/2 (d) loamy sand
	15m W of DAT 4	2Ab	Holocene Unit Ib	110-125	15	10YR3/2 (d) / 10YR2/1 (w) sandy loam
		2Btk	Holocene Unit Ia	125-150	25	10YR5/3 (w) sandy clay loam few fine faint CaCO3 filaments to soft masses, snail shell fragments, flake
		2Ck	Deweyville fluvial sands	150-175	25	10YR5/3 (d) sandy loam few faint fine CaCO3
		3C1		175-260	85	10YR5/3 (d) course to medium sand with occasional small well rounded pebbles, sand cemented to some pebbles
		3Ck		260-290	30	10YR7/2 (d) medium sand with occasional small well rounded pebbles and occasional well rounded CaCO3 pebbles

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-15	5/17/2005	A1	Holocene Unit Ic	0-42	42	10YR4/2 (d) 10YR3/2 (w) fine to medium sand
	N363 E917, ele 97.23	A2		42-60	18	10YR3/2 (d) sandy loam
	55m west of Dat 4,	2Ab	Holocene Unit Ib/a	60-90	30	10YR3/2 (d) sandy clay loam
	15 m west of Core 9	2E		90-107	107	10YR4/3 (d) sandy clay loam
		3Btk	Deweyville Paleosol	107-158	51	10YR5/4 (d) sandy clay loam with few fine CaCO3 soft masses
		3BC	Deweyville Fluvial sands	158-182	26	10YR5/4 (d) medium to fine sands few medium CaCO3 nodules
		3C1		182-235	53	10YR5/4 (d) medium sand
		3C2		235-300	65	10YR6/4 (d) medium sand
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-16	5/17/2005	A1	Holocene Unit Ic	0-30	30	10YR4/2 (d) 10YR3/2 (w) fine to medium sand
	N365 E897, ele. 97.40	A2		30-76	46	10YR4/2 (d) fine sand to fine sandy loam
	22m at 38 degrees from Anaqua Mott	2Btk	Deweyville Paleosol	76-104	28	10YR5/4 (d) sandy clay loam with common 4% distinct medium CaCO3 soft masses to nodules
	Primary Dat N347 E888 ele. 96.75	2C1	Deweyville Fluvial sands	104-125	21	10YR6/4 (d) sandy loam
		2C2		125-150	25	10YR7/3 (d) medium to fine sand
		2Ck		150-175	25	10YR6/4 (d) medium sand common 5% distinct medium CaCO3 nodules
		2C		175-280	105	10YR7/3 (d) course to medium sand with granules to small pebbles
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-17	5/17/2005	A1	Holocene Unit Ic	0-68	68	10YR3/1 (d) fine to medium loamy sandy
	N364 E872, ele. 97.6	A1		68-92	24	10YR3/1 (d) sandy loam, small shell frags
	23m W of 5-16	2Ab	Holocene Unit Ib/Deweyville Paleoso l	92-110	18	10YR4/2 (d) sandy clay loam
		3Btk1	Deweyville Paleosol	110-125	15	10YR4/2 (d) sandy clay loam few faint fine CaCO3 filaments rabdotus snail shell
		3Btk2		125-150	25	10YR5/4 (d) sandy clay loam few faint fine CaCO3
		3Btk3		150-183	33	10YR5/4 (d) sandy clay loam few faint medium CaCO3 soft masses
		3C	Deweyville fluvial sands	183-230	47	10YR6/4 (d) fine to medium sand
		3Ck		230-255	25	10YR7/4 (d) fine to medium sand few small pebbles 10-14mm few fine faint CaCO3
		3C		255-290	35	10YR7/4 (d) medium to course sands

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-18	5/17/2005	A1	Holocene Unit I: Undetermined	0-68	68	10YR3/1 (d) fine sandy loam
	N364 E843, ele. 97.75	A2		68-130	62	10YR4/3 (d) sandy loam
	30m W of 5-17	2Btk	Deweyville Paleosol	130-154	24	10YR5/4 (d) sandy clay loam few fine faint CaCO3
		2Ck	Deweyville Fluvial sands	154-185	31	10YR7/4 (d) medium sand few medium distint CaCO3 soft masses and nodules
		2C		185-276	91	10YR7/3 (d) course to medium sand occasional small well rounded pebbles

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-19	5/17/2005	A1	Holocene I: Undetermined	0-62	62	10YR3/1 (d) fine to medium sand, sandy loam
	N364 E822, ele. 97.05	A2		62-132	70	10YR4/3 (d) sandy loam
	20m west of 5-18	(2)Bt	Holocene illuvial/Deweyvill e Paleosol	132-172	40	10YR4/3 (d) sandy clay loam
		2C1	Deweyville fluvial sands	172-190	18	10YR4/4 (d) fine to medium sand
		2C2		190-230	40	10YR4/4 (d) course to medium sand with few small gravels
		2C3		230-260	30	10YR7/4 (d) coarse to medium sand

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-20	5/17/2005	A1	Holocene Unit I: undetermined	0-60	60	10YR4/2 (d) fine to medium sand to loamy sand
	N364 E808, ele. 96.08	A2		60-85	15	10YR5/3 (d) fine to medium sand to loamy sand
	15m W of 5-19	C	Undetermined colluvial Deweyville?	85-105	20	10YR4/3 (d) medium sand with frequent 20mm3 rounded pebbles
		2Bt1	Deweyville Paleosol	105-122	17	10YR4/3 (d) medium sandy clay
		2Bt2		122-156	34	7.5YR4/3 (d) medium sandy clay
		2C1	Deweyville Fluvial sands	156-213	57	10YR5/4 (d) medium to course sandy loam with few small 10mm3 pebbles
		2C2		213-220	7	2.5Y7/4 (d) medium to course sand
		2C3		220-265	45	10YR7/3 (d) medium to course sand
		2C4		265-275	10	10YR6/6 (d) dom. with 10YR5/8 course sand
		2Ck		275-287	12	10YR6/6 (d) course sands with distinct medium CaCO3 masses.

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-21	5/17/2005	A1	Holocene Unit I: undetermined	0-42	42	10YR3/3 (d) fine to medium sands with few small pebbles flake at 12cm
	N368 E785, 95.15	A2		42-50	8	10YR4/3 (d) sandy loam
	23m at 280 degrees from 5-20	2Bt1	Deweyville Paleosol	50-62	12	5YR3/3.5 (d) sandy clay
		2Bt2		62-85	23	5YR3/4 (d) sandy clay with small pebbles
		2Bt3		85-106	21	5YR4/6 (d) sandy clay loam with small pebbles
		2BC	Deweyville fluvial sand	106-123	17	7.5YR5/6 (d) medium course sand with small pebbles
		2C1		123-152	29	7.5YR6/6 (d) course sands with frequent small pebbles
		2C2		152-185	33	10YR7/6 (d) course sands with 7.5YR8/6 (d) clayey mottles with medium pebbles 15-30mm up to 38mm

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-22	5/17/2005	2Ab	Holocene Unit Ib	0-70	70	10YR3/2 (d) sandy loam snail shell frag and flake
	N441 E765	2EC	Holocene Unit Ib/Ia?	70-95	25	10YR5/3 (d) sandy loam bone frag
	Location: at base of profile in Burial Area #2	2C		95-124	29	10YR6/4 (d) sandy loam
	top "0" is at 48cm below the pinflag datum in the wall	2/3Bt1	Deweyville Paleosol/ Holocene Unit Ib/a?	124-147	23	10YR6/6 (d) sandy clay loam
		2/3Bt2		147-175	28	10YR5/6 (d) sandy clay loam
		2/3Bt3		175-197	23	10YR6/6 (d) sandy clay loam
		3C1	Deweyville Fluvial sands	197-246	49	10YR6/4 (d) fine to medium sandy loam
		3C2		246-275	29	10YR7/3 (d) medium to course sand few 10-30mm pebbles

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-23	5/18/2005 N379 E808 ele. 97.23	A	Holocene Unit I: undetermined	0-15	15	10YR3/2 (d) fine to medium sandy loam
	15m north of 5-20,	2Bt1	Holocene Unit I: undetermined/ Deweyville Paleosol	15-40	25	7.5YR4/3 (d) sandy clay
	heading upslope in	2Bt2		40-70	30	7.5YR5/6 (d) sandy clay loam
	gully,	2BC		70-92	22	10YR6.5/4 (d) sandy loam
	in what appears to be	2C1	Deweyville Fluvial sands	92-210	118	10YR7/3 (d) medium sand
	the natural surface,	2C2		210-240	30	10YR7/4 (d) medium to course sand
	though the surface is	2C3		240-250	10	10YR8/4 (d) medium sand
	certainly disturbed due	2C4		250-264	14	10YR8/4 (d) fine sands
	to nearby gullies	2C5		264-304	40	10YR8/4 (d) fine to medium sand
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-24	5/18/2005	Ap/2ABb1	Holocene Unit Ib	0-60	60	10YR3/2 (d) sandy clay loam
	N394 E810 ele. 98.23	2Bt	Holocene Unit Ib/a?	60-70	10	10YR4/2 (d) sandy clay loam numerous roots
	15m north of 5-23	3Bt	Deweyville Paleosol with artifact at top of deposit	70-90	20	10YR4/3 (d) sandy clay flake at 77cm, roots continue
	on eroded/excavated surface,	3Btg		90-125	35	10YR5/3 (d) sandy clay with few faint fine 5YR5/8 mottles
	real surface would be	3Bt1		125-185	60	10YR6/6 (d) sandy clay
	approximately 1.5m	3Bt2		185-205	20	10YR6/4 (d) sandy clay loam
	over the surface	3BC	Deweyville Fluvial sands	205-225	20	10YR6/4 (d) sandy loam with occasional very small well rounded pebbles
		3C		225-280	55	10YR7/3 (d) medium sand
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 5-25	5/18/2005	Ap	Holocene Unit I: undetermined	0-40	40	10YR3/2 (d) sandy clay loam, 24cm white glaze ceramic
	N410 E809 ele. 99.11	A1		40-144	104	10YR4/2 (d) sandy loam, 73cm cortical flake
	15m N of 5-24	A2		144-172	28	10YR5/3 (d) sandy loam, 156cm flake
		Bt1		172-195	23	10YR6/4 (d) sandy clay loam
		Bt2		195-204	9	10YR6/4 (d) sandy loam
		Bg		204-230	26	10YR5/3 (d) sandy loam with some mottles, at 230cm broken/tested cobble 30x50x65mm
		2Bt	DeweyPaleosol	230-291	61	10YR5/6 (d) sandy clay loam to sandy clay

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-26	5/18/2005	A1	Holocene Unit I: Undetermined	0-75	75	10YR3/2 (d) sandy loam, 24cm flake with flakes throughout level
	N429 E811 ele. 100.15	A2		75-115	40	10YR4/2 (d) sandy loam
	20m N of 5-25	A3		115-180	65	10YR5/2 (d) sandy loam, 145cm flake
		A4		180-220	40	10YR6/3 (d) sandy loam
		A5		220-246	46	10YR6/4 (d) sandy loam
		A5		246-300	54	10YR7/2 (d) medium sand, at 280 becomes saturated
		2Btg	Deweyville Paleosol	300+	10	10YR6/3 (d) sandy clay, saturated with distinct common 40% 10YR5/6 mottles

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-27	5/18/2005	A1	Holocene Unit Ic / Undetermined	0-98	98	10YR5/3 m-fine sand
	N454 E810 ele. 100.65	A2		98-186	88	10YR5/4 m-fine sand, 173 blocky shatter & cortical flake
	25m N of 5-26	E/Bt1		186-206	20	10YR5/4 sand w/ faint 10YR4/3 clayey lamelle bands
		E/Bt2		206-262	56	10YR6/3 m-fine sands, lamelle continue sparsely possibly every 5-10cm
		E/Bt3		262-303	41	10YR6/3 sands, lamelle 10YR5/6 sandy clay, up to 2cm thick

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-28	5/18/2005	A1	Infilled Post - Deweyville channel	0-28	28	2.5Y 2.5/1 si clay, numerous roots
	N309 E883 ele. 93.71	A2		28-92	64	2.5Y 3/1 si clay, small granule size broken shell frags throughout
	In anaqua mott, 15m S (downslope)	Bk1		92-120	28	10YR5/3 si clay loam, w. few fine calcarious granules/soft masses and small broken shell frags
	of 2nd DAT N322 E886 94.75m	Bk2		120-190	70	10YR5/2 si clay loam, friable-crumbly common (4%) faint fine to med CaCO3 soft masses, occasional 20mm3 pebbles begin at 142
		Bk3		190-250	60	10YR5/2 si clay loam, friable-crumbly common (4%) faint fine to med CaCO3 soft masses, occasional 20mm3 pebbles
		C?		250+	10	gravelly and crumbly

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-29	5/19/2005	A1	Holocene I: Undetermined	0-95	95	10YR5/3 med sand
	N410 E882 ele. 99.85	A2		95-105	10	10YR4/2 med sand, saturated seds
	45m N of E/W line (which is 14m W of A5-16)	2Btg	Deweyville Paleosol	105-162	57	10YR4/1 sandy clay to silty clay w 10YR5/6 faint-med. Common 3% mottles that get stronger with depth
	due N of anaqua mott DAT	2Bt		162-223	61	7.5YR5/6 dry sandy clay
		2Btk		223-260	37	10YR5/4 sandy clay loam w. white soft masses-films
		3C	Deweyville fluvial deposit	260-278	16	10YR6/4 sandy loam with occasional well rounded small pebbles, terminates at gravels

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-30	5/19/2005	A1	Holocene Unit I: Undetermined	0-52	52	10YR4/2 f-m sand
	N389 E883 ele. 93.71	A2		52-72	20	10YR3/1 sandy clay loam then to 10YR3/3 sandy clay loam at 60cm
	15m N of E/W line (14m w. A5-16)	2Bt1	Deweyville Paleosol	72-110	38	10YR4/3 sandy clay, possibly manganese nodules? Charcoal?
		2Bt2		110-116	6	10YR5/3 sandy clay
		2Btk1		116-143	27	10YR5/3 sandy clay with CaCO3 nodules
		2Btk2		143-160	27	10YR6/4 sandy loam w. common CaCO3 nodules & masses
		2C1	Deweyville Fluvial deposits	160-227	67	10YR6/4 m-f sand
		2C2		227-286	59	10YR6/4 m-coarse sand, few sm gravels, one 20X60cm

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-31	5/22/2005	A	Holocene Unit Ic	0-20	20	10YR3/2 f-med sand
	N315 E978, ele. 94.06	2Ab	Holocene Unit Ib	20-40	20	10YR2/2 sandy loam
	7m S of A5-4, to determine possible edge of channel	2Bt1	Holocene Unit Ib/Ia	40-83	43	10YR2/1 sandy clay
		2Bt2		83-120	37	10YR4/2 sandy clay, flake @ 87cm, v.occasional sm. Pebble
		3Btk	Deweyville Paleosol	120-165	45	10YR4/3 sandy clay to sandy clay loam slightly CaCO3, few faint specks of CaCO3, frequent granule t o v. fine pebbles w/depth, possible flake at 160cm
		3Btk		165-175	10	10YR6/3 sandy clay w. distinct med. CaCO3 mottles and soft masses terminate b/c gravels are granule to med. Pebbles

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-32	5/22/2005	A1	Holocene Unit Ic	0-5	5	10YR5/2 sand
	N368 E1125	2Ab	Holocene Unit Ib	5-60	55	10YR3/2 sandy loam
	from N368 E1013, 15m	2Bt		60-90	30	10YR4/4 sandy clay loam
	E, just west of Rd	3Btk1	Deweyville Paleosol	90-120	30	10YR6/3 sandy clay loam v. weak calcareous fine weak CaCO3 grains, occasional granule sized nodules to mod. Distinct med. Soft masses
		3Btk2		120-157	37	10YR6/3 sandy clay loam few med. CaCO3 soft masses, few granule to sm pebble, 155cm mussel shell frag
		3Btk3		157-180	23	10YR7/2 sandy clay, few med. CaCO3 soft masses
		3Btk4		180-202	22	10YR8/1 silty clay, entirely calcic soft masses, becomes moist w/ depth terminate at 202 b/c dense small pebble gravel- like paleo trench profile

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-33	5/23/2005	2Btg	Deweyville Paleosol	0-20	20	Zn. 3 of profile description
	At base of Excavation Area 5	2Bt		20-65	45	7.5YR6/6 sandy clay no mottles
	ele. Approx 97.70	2Btk1		65-90	25	10YR5/4 silty clay w/ occasional med CaCO3 soft masses
		2Btk2		90-100	10	10YR8/3 silty clay CaCO3 continues
		2C1	Deweyville Fluvial sands	100-120	20	10YR6/4 sandy loam
		2C2		120-210	90	10YR8/2 f-med sands
		2C3		210-230	20	10YR7/3 c-m. sands w. frequent granules, few small pebbles
		2C4		230-240	10	10YR8/2 fine sand loose, end at 230 b/c can't keep sand in auger, it falls out

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-34	5/23/2005	Ap/Ab	Holocene Unit I: Undetermined	0-5	5	10YR3/2 sandy clay loam, "red"
	N355 E993, Paleo Area	2Btk	Deweyville Paleosol	5 - 24	19	10YR6/3 sandy clay CaCO3 (10%) soft masses to sm gravel nodules 10YR8/2, sm pebble at 15cm
	ele. 95.00	2C1	Deweyville Fluvial sands	24-45	21	10YR6/4 med sandy loam
		2C2		45-70	25	10YR7/3 med sand
		2C3		70-125	55	10YR6/4 med-coarse sand w. med. Granule to f. pebbles
		2C4		125-175	50	10YR8/3 med.-coarse sand w. med gravels to f. pebbles, terminate at 175cm at gravels

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-35	5/23/2005	A1	Holocene Unit Ic/ Undetermined	0-30	30	10YR4/2 sandy loam
	20m E of 5-32	A2		30-50	20	10YR3/2 sandy loam
		2Bt	Post Deweyville Infilled Channel?	50-80	30	10YR2/2 moist sandy clay
		2Btg1		80-120	40	5YR5/8 sandy clay with faint few 10YR5/2 mottles with common strong 5YR5/8 mottles
		2Btg2		120-192	72	10YR7/2 silty clay with strong common 5YR5/8
		2Btk		192-236	44	10YR7/3 silty clay w. mod. Med. Soft CaCO3 masses

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-36	5/24/2005	Ap	Holocene Unit I: undetermined	0-30	30	10YR6/4 sandy clay (poss disturbed b/c sand pit operation)
	sandpit auger 60m N of A5-13 at approx 45 m north	A		30-50	20	10YR7/3 med. Sand
	of last exposure of red clay,	2Btg	Deweyville Paleosol	50-100	50	7.5YR6/4 sandy clay to sandy clay loam w/ common med 7.5YR5/8 mottles, mottles decrease with depth to few
	estimate 2.25m of sand	2Bt		100-120	20	10YR8/1 med. Sandy loam, 1 sm pebble
	originally above this surface,	2Bt		120-155	35	10YR6/6 sandy clay
	also took 2 samples of adjacent profile	2C	Deweyville Fluvial Deposits	155-170	15	10YR7/3 med. Sandy loam
	20, 90, 150 cmbgs	2E/Bt		170-203	33	10YR7/4 dom. w. 10YR6/6 lamelle, f. to med. Sandy loam alternating lighter and darker seds. W. varying clay lamelle continuing with depth
		2C		203-300	97	10YR8/3 med-coarse sand

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-37	5/24/2005	A	Holocene Unit I: Undetermined	0-30	30	10YR4/3 f. sandy loam, rabdotus frags.
	bottom of Anaqua Mott Unit	AE		30-140	110	10yR5/3 f. sandy loam to sandy clay loam, whole rabdotus (unburned) and possible charcoal frag. @ 52cm
	N341 E883	2Btk	Deweyville Paleosol	140-242	102	10YR6/3 silty loam weakly calcic, few faint CaCO3 grains, 2 whole snail shell (rab.) at 220cm
		2BC		242-258	16	10YR6/3 silty clay loam, few med. Weak calcic nodules, terminate at small-med. Well rounded pebbles

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-38	5/24/2005	A	Holocene Unit I: Undetermined	0-78	78	10YR5/3 f.-med. Sand
	15m N of 5-30, 15m S of 5-29	2Btg	Deweyville Paleosol	78-83	5	10YR4/1 sitly clay with common faint 10YR5/8 (like A5-29 105-162cm)

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger 5-39	5/24/2005	A	Holocene Unit I: Undetermined	0-98	98	10YR5/3 med. Sand
	15m N of A5-29	2Btg	Deweyville Paleosol	98-103	5	10YR5/2 silty clay w. 5YR5/8 strong med mottles

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #1	10/17/2004	C1	Deweyville Fluvial sands and deep calcic horizon	0-80	80	gravelly sands with CaCO3 nodules
	Paleo Area, base of paleo profile	C2		80-90	10	light gray gravelly sandy clay, calcic

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #2	10/17/2004	Ap/2Bt1	Holocene Unit Ib	0-30	30	10YR3/1 (w) loamy fine to medium sand, flake
	Paleo Area, 1m west of surficial paleo burial	2Bt2		30-60	30	10YR4/1 fine sandy loam, flakes, snail and mussel shell, bone, FCR
	note surface truncated approx	2BC		60-100	40	10YR4/2 sandy loam-sandy clay loam flakes, shell, sterile from 75-90, flakes and human humerous and tibia fragments between 90-100cm
	.75m, surface ele 94.9	3C1	Holocene Unit Ia	100-125	25	10YR4/1 sandy loam-sandy clay loam, quartzite cobble frag, snail shell
		3C2		125-160	35	10YR5.5/2 sandy loam, calcareous granules and CaCO3 crusted large pebbles, mussel shell fragments
		4Ck	Deweyville deep Calcic horizon	160-175	15	2.5Y8/2 coarse sandy clay, CaCO3 rich

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #3	11/12/2004	2E/Bt1		120-140	20	10YR4/3 loamy sand, single grained, at 130 sandy loam-sandy clay loam lamelle 10YR4/2 with 7.5YR5/6 mottles
	Deep Pit Profile	2E/Bt2		140-190	50	10YR6/3 medium to coarse sands with 10YR4/3 sandy loam to sandy clay loam lamelle, lamelle decreasing in thickness and frequency with depth
	measurements are from nail in wall	2C1		190-200	10	10YR8/2 fine to medium sand
	(96.95), surface of auger = 95.75	2C2		200-240	40	10YR6/2 medium sand
	At base of profile have 10YR6/3	2C3	Deweyville Fluvial sands	240-245	5	10YR8/2 medium sand
	sands interbedded with 10YR4/3	2C4		245-275	30	10YR6/2 medium sand
	loamy sand lamelle	2C5		275-320	45	10YR8/1 medium sand
		2C6		320-330	10	10YR7/3 medium sand
		2C7		330-340	10	10YR8/1 medium to fine sand
		2C8		340-345	5	10YR8/1 loamy sand with few 10YR6/6 mottles
		2C9		345-365	20	10YR6/6 medium sand dominate with moderate 10YR8/1, very occasional granule
		2C10		365-380	15	2.5Y7/3 medium sand
		2C11		380-385	5	10YR7/1 very firm sandy clay, some organics, possibly root
		2C12		385-395	10	10YR7/1 gravelly loam sand

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #4	11/13/2004	A1		0-5	5	10YR4/1 fine sand, single grained, roots
	15m NE of Core #6, at north edge	A2	Holocene Unit I: Undetermined	5-25	20	10YR3/2 fine sandy loam, roots, single grained to granular
	of sandfield, at contact with	A3		25-37	12	10YR4/2 medium sand
	Beaumont clayey toeslope	A4		37-60	23	10YR4/1 sandy loam, abrupt lower boundary
		2Btg1	Deweyville Paleosol	60-70	10	10YR4/1 sandy clay loam, with very occasional 7.5YR5/6 mottles, granule sized black concretions, possibly charcoal
		2Btg2		70-95	25	10YR3/1 clay with 10YR6/6 to 7.5YR5/6 mottles

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #5	12/9/2004	2Btk1	Deweyville Paleosol/ Colluvium	0-25	25	10YR6/2 (w) scl w/ occasional CaCO3 granules
	Bottom of Anaqua Mott 2x2 unit	2Btk2		25-40	15	10YR6/3 (w) sl w/ numerous CaCO3 granule to pebble sized concretions
	N324 E886, NE corner of unit	2Btk3		41-53	12	10YR8/2 (w) scl w/ hard CaCO3 nodules, 41-43 is indurated, consolidated hard CaCO3
	ele. 94.02 at bottom of pit	2Btk4		53-105	52	10YR8/1 (w) scl w/ occasional to common CaCO3 nodules
		2Btk5		105-108	3	10YR8/1 (w) scl w/occasional CaCO3 nodules, 2 well rounded small cobble sized river gravels, auger obstructed by gravels.

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #10-1	10/8/2005	A1	Holocene Unit I: Undetermined	0-30	30	10YR4/2 (d) 10YR3/2 (w) fsl, loose, soft
	7.5m N of Auger 5-8, on transect b/t 5-8 and 5-9	A2/Ab		30-50	20	10YR3/2 (d) 10YR2/2 (w) sl-scl, firm
		Btg	Deweyville Paleosol	50-55	5	10YR4/2 (d) 10YR4/3 (w), with 7.5YR5/6 (d) few mottles, scl, firm

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #10-2	10/8/2005	A1	Holocene Unit Ib/Ic	0-40	40	10YR4/2 (d) 10YR3/2 (w) sl, medium to fine sands, loose, soft
	7.5m S of Auger 5-1, between 5-1 b/t 5-8 and 5-9	A2		40-72	32	10YR4/3 (d) 10YR3/2 (w) sl, firm (AB)
	and 5-2, in 2-track rd	2Bkb1	Holocene Unit Ia/Deweyville Paleosol	72-98	26	10YR4/2 (d) 10YR4/3 (w) sl, hard, occasional CaCO3 nodule, snail shell fragments
		2Bkb2		98-125	27	10YR6/3 (d) 10YR5/3 (w) fsl, soft, no CaCo3, velvety texture
		2Bkb3		125-170	45	10YR7/3 (d) 10YR7/4 (w) medium s to sl, at 130cmbgs is med. rounded pebble w. CaCO3 crust, soft, proximal white colored flake frag 140cmbgs, few sm pebbles
		2C1	Deweyville Fluvial sands	170-245	75	10YR7/3 (d) 10YR7/4 (w) medium sand, occasional coarse grains, few small pebbles
		2C2		245-255	10	10YR7/3 (w & d) gr. (5%) sl, medium to coarse sands, granule to medium pebbles, CaCO3 rounded, hard nodules, impenetrable any deeper

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #10-3	10/9/2005	A1	Holocene Unit I: Undetermined	0-40	40	10YR5/3 (d) 10YR4/3 (w) fsl-fs, well sorted, slightly moist, A
	Outside of site boundary, NE side of KyC sand	A2		40-115	75	10YR6/3 (d) 10YR4/3 (w) fs-vfs, dry, C1
	Deweyville Terrace, 35m at 20 degrees to isolated house	C		115-160	45	10YR8/2 (d) 10YR6/3 (w) fs-vfs, dry, beginning at 140 very occasional sm. quartzite pebbles
	on topo map, near contact with Dna soils. Surface of test is near modern dump	2Bt1	Deweyville Paleosol/ illuvial Holocene?	160-240	80	10YR7/2 (d) 10YR5/3 (w) dom. w/ 10% 7.5YR5/6 (d) 7.5YR5/8 (w) mottles, fsl, slightly moist (Bt1?)
	on elevated surface relative to DnA, large mott of veges on dunes to SW	2Bt2		240-310	70	10YR6/6 (w & d) fsl-fscl, slightly moist, firm
	rd on topo goes around to E of mott, auger is b/t mott and rd					
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger 10-4	10/9/2005	A1	Holocene Unit I: Undetermined	0-15	15	10YR4/2 (d) 10YR3/2 (w) fsl
	300 degrees at 28m from last	A2		15-25	10	10YR4/3 (d) 10YR3/3 (w) fsl
	(10-3) downslope, approx. .75m in ele, looking at	2Btg	Beaumont Formation	25-30	5	10YR4/2 (d) 10YR3/2 (w) with 10YR5/8 (d) 10YR5/6 (w) moderate, distinct mottles, scl-sicl, hard, dry
	surface, the soils are right at edge of sands upslope and clay downslope in little low drainage					
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Auger #10-5	10/9/2005	A1	Holocene Unit I: Undetermined	0-25	25	10YR5/2 (d) 10YR3/2 (w) sl, soft
	120 degrees for 10m from 10-4	A2		25-45	20	10YR5/3 (d) 10YR3/2 (w) well sorted fs (like 40-115 of 10-3)
	upslope	2Btg	Beaumont Formation	45-50	5	10YR4/1 (d) dom. with 10YR5/6 (d) strong, 8% matrix, sc-scl, like in auger 10-4

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #10-6	10/9/2005	Ap	Holocene Unit Ib/c?	0-18	18	10YR3/4 (d) 10YR3/2 (w) sl, dry, hard
	44 degrees at 13m to datum stake at the burial in the paleo area island b/t paleo burial and excavation area is 6m to the SE	Bk1	Holocene Unit Ia/ Deweyville Paleosol	18-105	87	10YR4/4 (d) 10YR3/3 (w) sl, with 3% (vry occasional) few sm. pebble sized, soft masses of 10YR8/2 white CaCO3 masses, occasional sm. shell frag, beginning 90cm possible sm fcr, flake 100cm
	island b/t paleo burial and excavation area is 6m to the SE	Bk2		105-123	18	10YR7/3 (d) 10YR5/3 (w) fs-fsl, with 1% (vry few) granule to filaments of CaCO3, beginning at 120cm few medium pebbles to lrg well rounded cobbles w. CaCO3 crust, numerous snail shell, flake 115cm, end at 120-123 become impenetrable

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Auger #10-7	10/9/2005	A	Holocene Unit Ic	0-35	35	10YR3/3 (d) 10YR3/2 (w) fsl, firm (A)
	23m at 20 degrees from Dat Stake	2Ab	Holocene Unit Ib	35-95	60	10YR3/2 (d) 10YR3/3 (w) fsl, hard (Ab)
	at the bural in paleo area, W aprox	3Bk	Holocene Unit Ia/Deweyville Paleosol-Colluvium	95-120	25	10YR6/8 (d) 10YR5/6 (w) sl-fsl with 5% strong white soft masses-filaments to granule and sm pebble, sl-fsl
	5m of rd, on nat level surface, gully	3Bk		120-160	40	10YR6/4 (d) 10YR5/4 (w) fsl, 5% soft to firm nodules CaCO3
	immed to E	3C1	Deweyville Fluvial sand	160-230	70	10YR6/3 (d) 10YR5/3 (w) sl-s (med.) few medium well rounded pebbles with CaCO3 crust, no CaCO3 in matrix
		3C2		230-295	65	10YR8/2 (d) 10YR7/1 (w) med to coarse sand with common fine to lrg pebbles, no pebbles after 260cmbgs

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Excavation Area 4		Ap		0-30	30	Very dark gray (7.5YR3/1) loamy fine sand, dark gray (7.5YR4/1) dry, single grained to massive, few large roots and root casts, common small roots, common large to small open pores, clear smooth lower boundary, historic and prehistoric artifacts
		A1	Holocene Unt Ic	30-60	30	Dark brown (7.5YR3/2) loamy fine sand, single grained to massive, few medium, common fine roots, few medium, common fine pores, clear wavy lower boundary, historic and Late Prehistoric period artifacts
		AC		60-110	50	Very dark gray (10YR3/1) loamy fine sand, single grained to massive, few large, common fine roots, few medium to fine pores, abrupt broken lower boundary, prehistoric Late Archaic period artifacts, mottled midden sediments at top of horizon
		2Ab	Holocene Unit Ib	110-170	60	Dark gray (10YR4/1) loamy fine sand, grayish brown (10YR4.5/2) dry, single grained to weak coarse blocky subangular, common vertical 2-3 mm wide sand filled root casts 2 to 15 cm long from top of horizon, few fine roots, few fine filled pores, abrupt broken lower boundary, Middle and Early Archaic period artifacts
		3Ab		170-180	10	Dark grayish brown (10YR4/2) loamy fine sand, single grained, few fine pores, clear smooth lower boundary, prehistoric artifacts
		3AB		180-202	22	Brown (10YR5/2.5) loamy fine sand, grayish brown (10YR5/2) dry, single grained to massive, firm, common vertical 2.5 cm wide, up to 20 cm long, filled with dark grayish brown sand from above horizon, gradual smooth lower boundary, Late Paleoindian period artifacts
		3Bt1	Holocene Unit Ia	202-225	23	Pale brown (10YR6/3) fine sandy loam, brown (10YR5/3) dry, weak fine blocky subangular, few filled root casts from upper horizon extend into this horizon, clear smooth lower boundary, few Late Paleoindian period artifacts
		3Bt2		225-264	39	Light gray (10YR6.5/2) fine sandy clay loam, pale brown (10YR6/3) dry, slightly hard, moderate medium blocky subangular, few Late Paleoindian artifacts, clear smooth lower boundary
		4Bt	Deweyville Paleosol	264-295	31	Light gray (10YR6.5/2) fine sandy clay loam, pale brown (10YR6/3) dry, slightly hard, moderate medium blocky subangular, common moderate yellowish brown (10YR5/6) mottles, limit of exposure

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Burial Area 1		A1	Holocene Unit Ic	0-50	50	10YR3/2 (w) fls, soft, massive structure, many fine roots and fine pores, clear smooth lower boundary, cultural material: lithic artifacts
		A2		50-107	57	10YR3.5/2 (w) fls, soft, massive structure, moderate fine roots and pores, abrupt smooth lower boundary, cultural material: lithic artifacts, 1 modern ceramic?
		E/Bt		107-155	48	10YR3/2 (w) fls, weak medium blocky subangular with 10YR2/2 (w) vfls lamelle bands, 1cm thick wavy discontinuous, horizontal lamelle at 5cm intervals, occasional medium roots, very occasional fine roots and fine pores, clear smooth lower boundary, cultural material: lithic artifacts and FCR,
		2Ab	Holocene Unit Ib	155-215	60	10YR3/2 (w) fls, weak fine blocky subangular to massive, very few fine roots and fine pores, limit of exposure, cultural material: lithic artifacts and FCR
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Burial Area 2		Ap	Holocene Unit Ic	0-40	40	fls, approximate depth of disturbed pushpile sediments which overlay the intact deposits
		A1		40-85	45	10YR2/1 (w) fls, slightly moist, weak fine blocky subangular parting to single grained (fine crumb), few horizontal and vertical 10YR4/2 (w) bands, poss. Lamelle, disturbance of roots, burrows?, numerous very fine and fine roots, moderate very fine to fine open pores, smooth clear lower boundary that appears to be very weak lamelle, cultural material:1 whiteware ceramic
		A2		85-120	35	10YR2.5/2 (w) fls, weak fine blocky subangular parting to single grained (medium crumb), numerous very fine roots, few fine open pores, abrupt smooth lower boundary, cultural material: lithic artifacts
		A3		120-180	60	10YR2/2 (w) fls, slightly moist, friable, slightly hard, weak medium blocky angular parting to medium crumb, numerous very fine roots, occasional medium to large root, very occasional very fine open pores, cultural material: lithic artifacts observed
		A4		180-224	44	10YR3/2 (w) fls, very friable, weak fine blocky subangular parting to very fine crumbs, few very fine to medium roots, few very fine pores, gradual smooth lower boundary, cultural material: lithics, bone, burned clay, FCR
		2Ab	Holocene Unit Ib	224-271	47	10YR3/1 (w) fls, friable weak medium to fine prismatic parting to very fine crumbs to single grained, large infilled burrow with roots, limit of exposure, cultural material: lithics, bone, FCR

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Excavation Area 5	ele at B43top of unit 99.30	A1	Holocene Unit Ic	0-54	54	10YR4/2 (d) fs-fsl, soft fine single grained to massive, occasional large roots, numerous very fine roots and open pores, cultural material: few historic artifacts, common prehistoric flakes, shell, smooth lower boundary
		A2		54-136	82	10YR3/2 (d) sl, soft weak massive, common fine to medium roots and fine open pores, cultural material: moderate lithic and shell, abrupt wavy lower boundary
		2Btkg	Deweyville Paleosol	136-150	14	10YR6/4 (d) dominate with 5YR5/6 mottles, dry, hard moderate medium blocky subangular, few fine weak calcic soft masses, few very fine roots, no cultural material, limit of exposure
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Anaqua Mott 1x2	5/24/2005	A1	Holocene Unit Ic	0-34	34	10YR3/2 (d) fsl, friable, slightly hard massive parting to weak granular structure, common fine to medium roots and fine pores, cultural material: numerous snail shell fragments, flakes, bone, charcoal, wavy lower boundary
	Unit N341 E883, N341 E882	A2		34-60	26	10YR2/2 (d) fsl, friable, hard massive parting to granular structure, common fine to medium roots and fine pores, cultural material: abundant flakes, charcoal, shell, bone and FCR, clear smooth lower boundary
		A3		60-88	28	10YR3/2 (d) fsl, friable, hard massive to very weak blocky subangular, fewer roots and pores, cultural material: common but less numerous charcoal, flakes, bone, shell, FCR, clear smooth lower boundary
		AE		88-120	42	10YR4/2 (d) fsl, friable, slightly hard massive to very weak blocky subangular structure, occasional medium, few fine roots and very few pores, cultural material: few charcoal, flakes, bone, and shell, clear abrupt lower boundary
		E		120-140	20	10YR4/3 (d) fsl, friable, soft massive structure, few fine roots, very few fine pores, no artifacts observed, limit of exposure
Field Designation	**Date/ Location**	**Horizon**	**Strat Designation**	**Depth (cm)**	**Thickness (cm)**	**Description**
Anaqua Mott 2x2	12/8/2004	A1	Holocene Unit Ic	0-20	20	10YR3/1 (w) sl, granular structure?, numerous fine to large roots and fine pores, cultural material: snail shell (broken & whole), mussel shell, flakes, bones. Clear smooth lower boundary
		A2		20-50	30	10YR2/1 (w) scl, granular structure?, numerous fine to large roots and fine pores, color and texture, cultural material: snail shell, mussel shell, flakes, bones. Clear smooth lower boundary
		A3		50-74	24	10YR3/1 (w) sl, granular structure?, numerous fine to large roots and medium pores, less cultural material but still occasional snail, mussel, flakes, bone, clear smooth lower boundary
		AE		74-84	10	10YR3.5/1 (w) sl, granular structure, moderate medium to fine roots, and occasional fine pores, some dark stains of upper horizon, is more like lower sediments, cultural material: occasional snail shell, flakes, clear smooth lower boundary
		E		84-101	17	10YR4/1.5 (w) granular structure?, few fine roots, 1 mussel shell, limit of exposure.

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Paleo Area Excavation	5/25/2005	2Ap/Ab	Holocene Unit Ib/Ia	0-15	15	10YR4/2 (d & w) med. sl, massive, slightly variable in color, probably disturbed, few fine roots, few fine open pores, abrupt wavy lower boundary
	surface truncated by borrow pit excavations	2Bt1		15-30	15	10YR3/2 (d & w) fine to med. sandy clay, very hard, strong coarse blocky angular, very few fine roots, very few fine pores, abrupt wavy lower boundary, cultural material: few lithics few FCR
		2Bt2		30-45	15	10YR3.5/2 (d & w) fine to med scl, moderate coarse blocky subangular parting to fine blocky subangular, very few fine roots, very few fine open pores, smooth clear lower boundary, very few small pebbles, smooth clear lower boundary, cultural material: few lithics, few FCR
		2BC		45-60	15	10YR4/3 (d & w) med scl-sl, 1% small rounded pebbles,weak medium blocky subangular parting to fine granular, one medium root, few open pores, smooth clear lower boundary, cultural material: lithic artifacts and possible FCR
		2CB		60-75	15	10YR5/4 (d) 10YR5/3 (w) med sl to med sand with common small pebbles and few small boulders at base of profile, massive structure, limit of exposure

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Paleo Burial Area	10/10/2005	2Bt1	Holocene Unit Ib	0-18	18	10YR3/2 (d) 10YR2/2 (w) fsl, firm dry massive structure, few fin e roots and open pores, smooth clear lower boundary, must consider disturbance because surface has been cleared, natural surface approx 40-60cm higher, cultural material: common snail shell fragments, very occasional bone and lithics
	N369 E1012	2Bt2		18-40	22	10YR4/2 (d) 10YR3/2 (w) fsl, firm, hard, massive structure, midden like greasy texture, color, infilled rodent burrows, abrupt smooth lower boundary, cultural material: common lithics, shell, few FCR
		2Bt3		40-63	23	10YR4/2 (d) 10YR3/2 (w) fsl, soft, massive, smooth clear lower boundary, cultural material: few lithics, shell
		2BC		63-82	29	10YR4/2 (d) 10YR3/2 (w) fsl, soft, massive, burrowing disturbances, smooth clear lower boundary, cultural material: common lithics, bone, FCR, 1 large well rounded pebble
		3CB1	Holocene Unit Ia	82-102	20	10YR4/3 (d) 10YR4/2 (w) fsl, soft, transition to lower horizon, smooth clear lower boundary, cultural material: few shell and lithics
		3CB2		102-105	3	10YR5/3 (d) 10YR5/2 (w) fsl, snail shells continue, few to no artifacts

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Deep Pit North Profile	1/7/2005	A	Holocene Unit Ic	0-55	55	10YR5/2 (d) sl, very weak fine blocky angular parting to single grain, fine roots and fine open pores, few faint fine (1cm thick) wavy to smooth lamelle, one lamelle continuous across exposed profile, in-filled rodent burrows, abrupt smooth lower boundary, cultural material: occasional flakes
	northern profile	2Ab	Holocene Unit Ib	55-73	18	10YR3.5/1 (d) fsl, moderate medium prismatic parting to fine blocky angular, very occasional roots and open pores, in -filled rodent burrows and root systems, with sand from above (possibly ant tunnels?) clear smooth lower boundary, cultural material: occasional lithic
	approx 1.5m of seds are above	Bt2		73-113	40	10YR4/2 (d) fsl, moderate medium prismatic parting ot fine blocky angular, no roots or pores, rodent burrows, vertically oriented sand filled roots, clear smooth lower boundary, cultural material: lithic artifacts including bifaces and occasional well rounded pebbles
	top of profile	C		113-130	17	10YR5/3 (d) sl, moderate fine blocky subangular, no roots or pores, occasional well rounded granules, limit of exposure, no cultural material

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Sand Pit Profile	10/11/2005	A1	Holocene Unit Ic	0-35	35	10YR4/3 (w) fs-fsl, massive, common medium to fine roots, open ant and insect burrows, smooth clear lower boundary
		A2		35-90	55	10YR4.5/3 (w) fs-fsl massive, very common infilled roots and insect burrows, few large 3cm3 open burrows, infilled roots burrows 10YR5/3 (w), abrupt smooth lower boundary
		EBt		90-275	85	10YR5/3 (w) sl, massive structure with common wavy lamelle 10YR3/3 (w), approximately 5mm thick, roughly horizontal, parallel bedded, but do merge with upper and lower bands, become discontinuous across profile, increase in frequency with depth, but retain same thickness, few fine roots, few fine open pores, few infilled large roots or burrows to 8cm3, smooth abrupt lower boundary cultural material: diffuse scattered charcoal, few lithic artifacts though mostly in upper 40cm, cluster of large pebbles and lithics, suggests burrow disturbance
		C	Holocene Unit I Undetermined	275-295	20	10YR6/3 (d) 10YR6/2 (w) f-med s, massive structure, no lamelle, limit of exposure

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Paleo Profile	10/16/2004	A	Holocene Unit Ic	0-65	65	10YR3/2 (wet) ls, numerous fine, very fine roots & pores, fine-medium weak blocky subangular, smooth, gradual boundary, cultural material: very occasional lithic artifacts
	N374 E995 top approx 97.30	2Ab1	Holocene Unit Ib	65-100	35	10YR4/2 (wet) sandy loam, occasional fine to very fine roots and pores, coarse parting to fine medium weak blocky angular, gradual smooth boundary, cultural material: numerous lithic artifacts, high concentration of snail shell fragments, mostly broken, rabdotus and small spiral shaped
	from DAT7 100 deg 4.5m	2AB		100-138	38	10YR5/2 (wet) med to fine sl, occasional very fine roots, very occasional very fine pores, weak fine blocky subangular structure, gradual smooth boundary.cultural material: numerous rabdotus and spiral snails, mussel shell fragments, most shells broken but a few rabdotus are intact.
		3Btkb1	Holocene Unit Ia/ Deweyville Paleosol-Colluvium	138-174	36	10YR5/3 (wet) fine sl, no roots no pores, weak fine blocky subangular., CaCO3 15% filaments and fine soft masses, smooth, clear boundary. Cultural material: lithics occasional, heavily patinated, numerous snail and mussel shell fragments
		3Btkb2		174-202	28	10YR6/4 fsl, , fine weak blocky sub angular to granular, occasional CaCO3 nodules 5mm3no roots or pores, smooth clear boundary, greatly reduced cultural material: no shell, 1 possible flake
		3BC		170-200	30	10YR7/3 fs, soft, single grained, decrease in CaCO3 nodules, no roots, no pores, no cultural material, smooth clear boundary, OSL Sample #2 collected from top of unit.
		3C	Deweyville Fluvial sands	202-217	15	limit of exposure med-coarse sand to loamy sand, soft, single grain, very occasional CaCO3 3mm3 nodules, biface frag observed in upper portions of horizon

Field Designation	Date/ Location	Horizon	Strat Designation	Depth (cm)	Thickness (cm)	Description
Paleo Area	1/5/2005	Ap	Holocene Unit Ic	0-13	13	Ap- disturbed, scraped surface
North Profile	N394 E1005	A1		13-28	15	10YR2/2 (d) fsl, weak fine blocky subangular, numerous fine roots and medium to fine open pores, clear wavy lower boundary –A1
	top 97.40	2Ab	Holocene Unit Ib	28-46	18	10YR3/2 (d) fsl, moderate prismatic parting to fine blocky subangular structure, moderate fine roots and moderate open pores, abrupt wavy boundary, cultural material: lithics – Ab or A2
		3Btk1	Holocene Unit Ia/Deweyville Paleosol	46-73	27	10YR5/3 (d) well rounded fsl, moderate prismatic structure, 5% mottled with soft masses and nodules up to 5mm3 of CaCO3, occasional very fine roots roots and fine to medium open pores, clear wavy lower boundary
		3Btk2		73-93	30	10YR6/3 (d) well rounded fsl, weak, fine prismatic structure, a few granular nodules of CaCO3, clear smooth lower boundary
		3BC	Deweyville Fluvial sands	93-109	12	10YR6/3 (d) medium well rounded sl, weak fine blocky subangular-prismatic structure, few granular nodules of CaCO3, smooth lower boundary
		3C		109-145	36	10YR5/3 (d) medium well rounded sand, very occasional granule to small pebble, massive structure, possible gopher disturbance, limit of exposure, possible lithic artifact.

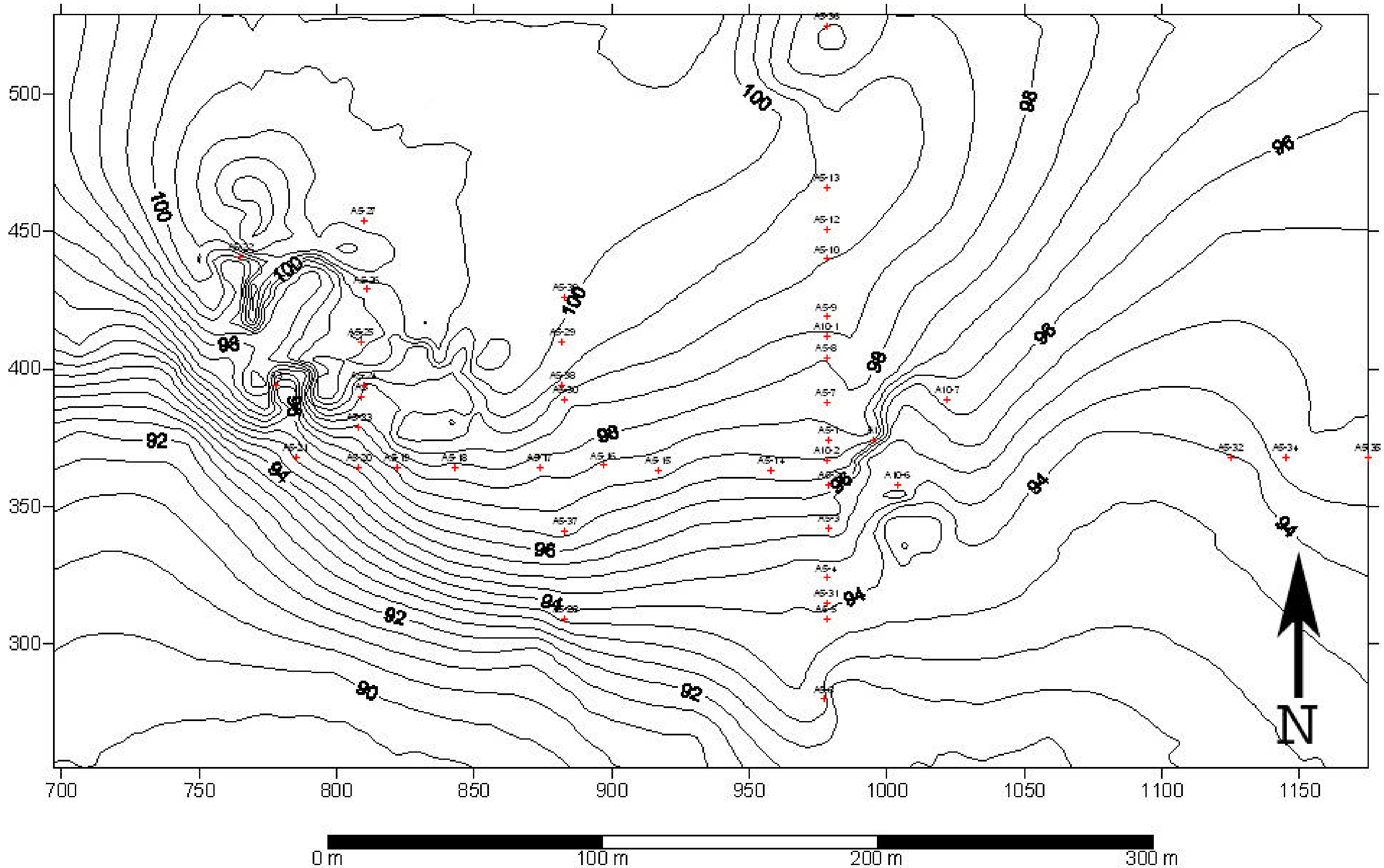


Figure A-1. Project area map with auger locations

APPENDIX B

PARTICLE SIZE DISTRIBUTIONS

EXCAVATION AREA 4, UNIT N398 E850

					PARTICLE SIZE DISTRIBUTION (mm)											
					……SAND……						…SILT…		…CLAY…			
LAB NO	**DEPTH**	**Depth below surface**	**SOIL-GEO HORIZON**	**COARSE FRAG-MENTS %**	**Very Coarse (2.0-1.0)**	**Coarse (1.0-0.5)**	**Medium (0.5-0.25)**	**Fine (0.25-0.10)**	**Very Fine (0.10-0.05)**	**TOTAL (2.0-0.05)**	**Fine (0.02-0.002)**	**Total (0.05-0.002)**	**Fine (<0.0002)**	**Total (<0.002)**	**TEXTURE CLASS**	**pH**
					………	………	………	………	………	%	………	………	………	………		
D9689	100.15-100.20	0-5		0.01	0.1	1.8	16.2	55.8	14.0	87.9	3.3	6.1	3.1	6.0	LFS	
D9688	100.10-100.15	5-10		0	0.3	1.6	15.0	57.5	13.5	87.9	3.0	5.8	3.4	6.3	LFS	
D9687	100.05-100.10	10-15		0	0.2	2.0	15.3	56.5	13.9	87.9	2.7	5.6	3.5	6.5	LFS	6.6
D9686	100.00-100.05	15-20		0	0.2	1.9	17.0	56.6	12.7	88.4	2.5	5.0	3.9	6.6	FS	
D9685	99.95-100.00	20-25	Ap –Unit Ic	0	0.1	1.8	15.1	56.1	14.0	87.1	3.3	5.7	4.1	7.2	LFS	
D9684	99.90-99.95	25-30		0	0.1	1.7	15.4	56.7	13.7	87.6	3.0	5.4	4.2	7.0	LFS	
D9683	99.85-99.90	30-35		0	0.2	1.7	16.2	56.2	13.4	87.7	3.0	5.6	4.1	6.7	LFS	
D9682	99.80-99.85	35-40		0	0.1	1.8	15.5	56.7	13.7	87.8	2.9	5.4	4.2	6.8	LFS	
D9681	99.75-99.80	40-45		0	0.2	1.9	16.0	56.8	13.2	88.1	3.0	5.4	3.9	6.5	LFS	
D9680	99.70-99.75	45-50		0	0.2	1.5	15.2	57.0	14.1	88.0	2.9	5.7	3.8	6.3	LFS	6.6
D9679	99.65-99.70	50-55		0	0.1	1.6	15.0	56.4	14.1	87.2	2.8	5.8	4.6	7.0	LFS	
D9678	99.60-99.65	55-60		0	0.2	2.0	17.3	55.3	12.8	87.6	2.1	5.6	4.2	6.8	LFS	
D9677	99.55-99.60	60-65	A1-Unit Ic	0	0.1	1.4	13.0	57.3	15.5	87.3	3.3	5.9	4.3	6.8	LFS	
D9676	99.50-99.55	65-70		0	0.1	1.9	16.3	56.2	13.5	88.0	3.2	5.4	4.2	6.6	LFS	
D9675	99.45-99.50	70-75		0	0.1	1.7	14.8	56.4	14.7	87.7	3.1	5.5	4.3	6.8	LFS	
D9674	99.40-99.45	75-80		0	0.1	1.3	14.0	57.2	15.0	87.6	3.2	5.6	4.3	6.8	LFS	6.7
D9673	99.35-99.40	80-85		0	0.1	1.6	14.3	56.9	14.9	87.8	3.0	5.5	4.3	6.7	LFS	
D9672	99.30-99.35	85-90	AC, A2-Unit Ic	0	0.0	1.8	15.2	56.3	14.3	87.6	2.9	5.9	4.1	6.5	LFS	
D9671	99.25-99.30	90-95		0	0.2	1.6	15.1	56.6	14.1	87.6	3.1	6.0	4.0	6.4	LFS	

LAB NO	DEPTH	Depth below surface	SOIL –GEO HORIZON	COARSE FRAG-MENTS %	Very Coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.10)	Very Fine (0.10-0.05)	TOTAL (2.0-0.05)	Fine (0.02-0.002)	Total (0.05-0.002)	Fine (<0.0002)	Total (<0.002)	TEXTURE CLASS	pH
					…………………………………………………………%…………………………………………………………...											
D9670	99.20-99.25	95-100	AC, A2- Unit Ic	0	0.1	1.6	14.8	56.3	14.8	87.6	2.7	5.7	4.1	6.7	LFS	
D9669	99.15-99.20	100-105		0	0.2	1.6	14.9	55.5	14.8	87.0	3.1	5.9	4.8	7.1	LFS	
D9668	99.10-99.15	105-110		0	0.1	1.6	15.3	55.3	14.3	86.6	2.7	5.9	4.8	7.5	LFS	
D9667	99.05-99.10	110-115		0	0.1	1.7	15.8	55.8	14.0	87.4	3.0	5.3	5.0	7.3	LFS	
D9666	99.00-99.05	115-120		0	0.2	1.5	14.4	56.1	14.9	87.1	3.1	5.6	4.9	7.3	LFS	6.5
D9665	98.95-99.00	120-125		0	0.1	1.9	16.0	54.7	14.3	87.0	2.9	5.8	4.8	7.2	LFS	
D9664	98.95-98.90	125-130		0	0.2	1.7	14.2	55.2	15.3	86.6	2.6	6.0	5.0	7.4	LFS	
D9663	98.85-98.90	130-135		0	0.2	1.8	15.4	56.0	13.8	87.2	2.6	5.5	5.1	7.3	LFS	
D9662	98.80-98.85	135-140		0	0.2	1.4	14.9	56.8	14.3	87.6	2.9	5.7	4.3	6.7	LFS	
D9661	98.75-98.80	140-145		0	0.2	1.8	15.7	55.4	14.3	87.4	3.2	5.8	4.3	6.8	LFS	
D9660	98.70-98.75	145-150		0	0.1	1.7	15.5	55.0	14.6	86.9	3.1	5.9	4.3	7.2	LFS	
D9659	98.65-98.70	150-155		0	0.2	1.7	15.5	56.3	14.0	87.7	2.5	5.1	4.4	7.2	LFS	6.3
D9658	98.60-98.65	155-160	2Ab- Unit Ib	0	0.1	1.8	15.5	57.1	14.2	88.7	2.8	5.2	3.7	6.1	FS	
D9657	98.55-98.60	160-165		0	0.1	1.7	15.9	56.5	13.9	88.1	2.9	5.6	4.4	6.3	LFS	
D9656	98.50-98.55	165-170		0	0.0	2.1	16.8	56.6	13.4	88.9	2.7	5.2	3.7	5.9	FS	
D9655	98.45-98.50	170-175		0	0.2	1.8	15.6	55.8	14.1	87.5	2.6	6.1	4.1	6.4	LFS	
D9654	98.40-98.45	175-180		0	0.3	2.1	15.9	54.6	13.7	86.6	2.7	5.9	5.1	7.5	LFS	6.2
D9653	98.35-98.40	180-185		0	0.2	2.1	15.9	53.6	13.8	85.6	2.8	5.5	6.6	8.9	LFS	
D9652	98.30-98.35	185-190		0	0.2	2.0	16.2	52.8	13.8	85.0	2.5	5.6	6.8	9.4	LFS	
D9651	98.25-98.30	190-195		0	0.2	2.2	15.7	51.4	13.7	83.2	3.5	6.3	7.4	10.5	LFS	
D9650	98.20-98.25	195-200	3Ab- Unit Ia	0	0.1	2.2	16.0	51.8	13.7	83.8	3.4	6.0	7.2	10.2	LFS	
D9649	98.15-98.20	200-205		0	0.1	1.7	12.4	53.0	16.1	83.3	3.1	7.1	6.9	9.6	LFS	
D9648	98.10-98.15	205-210	3AB- Unit Ia	0	0.1	2.2	15.4	51.3	14.0	83.0	3.4	6.2	7.7	10.8	LFS	6.20
D9647	98.05-98.10	210-215		0	0.1	2.3	16.7	50.6	12.8	82.5	3.3	5.9	8.5	11.6	LFS	
D9646	98.00-98.05	215-220		0	0.1	2.4	16.8	49.8	12.6	81.7	3.4	6.9	8.5	11.4	LFS	
x	97.85-98.95	225-235	3Bt-Unit Ia							80.4	3.5			16.1		
x	97.75-97.85	235-245								79.7	3.5			16.8		
x	97.65-97.75	245-255								79.6	3.5			16.9		

LAB NO	DEPTH	Depth below surface	SOIL –GEO HORIZON	COARSE FRAG-MENTS %	Very Coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.10)	Very Fine (0.10-0.05)	TOTAL (2.0-0.05)	Fine (0.02-0.002)	Total (0.05-0.002)	Fine (<0.0002)	Total (<0.002)	TEXTURE CLASS	pH
					……………………………………………………………%…………………………………………………………...											
D9690	97.56-97.66	254-264	4Bt-Deweyville Paleosol	0	0.3	1.9	14.3	45.3	13.6	75.4	4.7	8.5	11.6	16.1	FSL	
D9691	97.46-97.56	264-274		0	0.1	1.7	12.6	42.0	13.3	69.7	4.3	7.7	16.2	22.6	SCL	5.7
D9692	97.36-97.46	274-284		0.01	0.1	1.6	12.4	41.2	13.1	68.4	4.1	7.5	17.6	24.1	SCL	

PALEO AREA PROFILE

PARTICLE SIZE DISTRIBUTION (mm)

	LAB NO	DEPTH	Depth below surface	SOIL-GEO HORIZON	COARSE FRAG-MENTS %	………SAND……… Very Coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5- 0.25)	Fine (0.25-0.10)	Very Fine (0.10-0.05)	TOTAL (2.0-0.05)	…SILT… Fine (0.02-0.002)	Total (0.05-0.002)	…CLAY… Fine (<0.0002)	Total (<0.002)	TEXTURE CLASS	pH
						……………………………………………………………%…………………………………………………………...											
Paleo Area Profile	D9856	96.55-97.20	0-65	A	0	0.4	3.3	22.0	45.0	12.6	83.3					FSL	8.1
	D9857	96.20-96.55	65-100	2Ab	0	0.3	3.2	20.2	43.3	11.9	78.9	4.6	8.8	7.3	12.3	FSL	8.3
	D9858	95.82-96.20	100-138	2AB	0	0.6	2.8	19.4	41.6	11.0	75.4	6.3	10.0	8.2	14.6	FSL	8.4
	D9859	95.46-95.82	138-174	3Btkb1	0	0.4	2.5	17.5	38.2	11.2	69.8	8.2	12.6	9.1	17.6	FSL	8.3
	D9860	95.18-95.46	174-202	3Btkb2	0	0.1	1.9	17.4	44.9	10.8	75.1	8.7	12.3	6.4	12.6	FSL	8.4
	D9861	94.63-95.18	202-217	3C1	1	0.4	4.5	32.2	47.2	5.1	89.4					S	8.6
Auger #1	D9866		237-257		6	0.5	5.5	32.0	45.1	7.6	90.7					S	
Auger #1	D9867	94.53-94.63	287-297	3C2	1	3.8	28.8	33.9	22.6	3.0	92.1					S	

SAND PIT

PARTICLE SIZE DISTRIBUTION (mm)

	LAB NO	Depth below surface	SOIL-GEO HORIZON	COARSE FRAG-MENTS %	………SAND……… Very Coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5- 0.25)	Fine (0.25-0.10)	Very Fine (0.10-0.05)	TOTAL (2.0- 0.05)	…SILT… Fine (0.02 -0.002)	Total (0.05-0.002)	…CLAY… Fine (<0.0002)	Total (<0.002)	TEXTURE CLASS	pH
					……………………………………………………………%…………………………………………………………...											
Sand Pit Profile	D9862	20cm	A1-Unit Ic	0	0.2	1.5	13.2	61.3	16.5	92.7					FS	7.1
	D9863	90cm	A2-Unit Ic	0	0.1	1.6	13.3	61.4	16.5	92.9					FS	6.0
	D9864	150cm	E/Bt-Unit Ic/Ib?	0	0.1	1.2	12.8	62.3	16.6	93.0					FS	6.6
Auger 5-36	D9865	203-300cm	2C-Deweyville sands	0	0.1	4.6	56.7	30.1	2.3	93.8					S	7.4

GUADALUPE RIVER OVERBANK DEPOSIT

PARTICLE SIZE DISTRIBUTION (mm)

	LAB NO	DEPTH	SOIL-GEO HORIZON	COARSE FRAG-MENTS %	……SAND…… Very Coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5- 0.25)	Fine (0.25-0.10)	Very Fine (0.10-0.05)	TOTAL (2.0-0.05)	…SILT…… Fine (0.02 -0.002)	Total (0.05-0.002)	……CLAY…… Fine (<0.0002)	Total (<0.002)	TEXTURE CLASS	pH
					……%……											
overbank	D9852	surface	X	0	0.1	3.1	45.8	34.8	6.2	90.0	3.1	6.0	3.0	4.0	S	8.3

AUGER 5-9

PARTICLE SIZE DISTRIBUTION (mm)

	LAB NO	Depth below surface	SOIL-GEO HORIZON	COARSE FRAG-MENTS %	……SAND…… Very Coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5- 0.25)	Fine (0.25-0.10)	Very Fine (0.10-0.05)	TOTAL (2.0-0.05)	…SILT…… Fine (0.02-0.002)	Total (0.05-0.002)	……CLAY…… Fine (<0.0002)	Total (<0.002)	TEXTURE CLASS	pH
					……%……											
Auger 5-9	D9853	43-113	2Bt-Deweyville Paleosol	0	0.1	1.2	7.8	28.3	15.4	52.8	9.7	17.5	22.8	29.7	SCL	5.9
Auger 5-9	D9854	170-222	C1-Deweyville Fluvial Sands	0	0.1	0.8	5.7	58.3	17.3	82.2					FSL	8.2
Auger 5-9	D9855	222-320	C2-Deweyville Fluvial Sands	0	0.0	0.2	1.7	80.8	12.4	95.1					S	8.6

APPENDIX C

EXCAVATION AREA 4 ARTIFACT DISTRIBUTIONS

UNIT N398 E850							
Geo Unit	Soil Unit	Level	Elevation	Debitage (gr)	Bone (gr)	FCR (gr)	Uniques
Ic	Ap	1	100.15	160	8	38	
		2	100.05	180	54	113	
		3	99.95	285	265	182	
		4	99.85	179	80	282	
		5	99.75	358	56	283	
		6	99.65	408	40	458	
	A1	7	99.55	367	51	350	
		8	99.45	150	10	350	
	A2/AC	9	99.35	456	49	726	
		10	99.25	289	46	497	
		11	99.15	351	26	537	
		12	99.05	470	28	1203	
		13	98.95	501	43	719	
Ib	2Ab	14	98.85	307	48	5	
		15	98.75	268	18	460	
		16	98.65	393	20	348	
		17	98.55	240	30	313	
		18	98.45	488	25	397	Lerma Lt Pal-E Arch
Ia	3AB	19	98.35	188	18	762	
		20	98.25	395	57	596	
		21	98.15	417	14	596	
		22	98.05	336	10	787	Chopper tool
		23	97.95	325	8	282	
Deweyville	4Bt	24	97.85	280	1	99	
		25	97.75	210	1	104	
		26	97.65	411	1	153	

UNIT N398 E851							
Geo Unit	**Soil Unit**	**Level**	**Elevation**	**Debitage (gr)**	**Bone (gr)**	**FCR (gr)**	**Uniques**
Ic	Ap	1	100.15	324	23	0	Perdiz proximal (Lt Pre hist II)
		2	100.05	428	27	0	Scallorn (Lt Prehist I, bone awl)
		3	99.95	267	51	0	
		4	99.85	328	7	0	
	A1	5	99.75	572	40	0	
		6	99.65	377	32	432	preform, incised bone awl frag
		7	99.55	296	3	179	
	A2/AC	8	99.45	664	42	0	
		9	99.35	738	30	0	medial frag of lrg triangular biface
		10	99.25	424	258	63	
		11	99.15	354	39	451	
		12	99.05	1031	31	0	
Ib	2Ab	13	98.95	460	4	0	
		14	98.85	236	22	344	bone awl frag
		15	98.75	362	21	421	pedernales, clearfork, bone awl frag (mid arch)
		16	98.65	284	15	234	
		17	98.55	875	60	893	
Ia	3Ab	18	98.45	176	4	455	
	3AB	19	98.35	121	7	523	
		20	98.25	157	7	426	Hoxie proximal (early arch)
		21	98.15	305	7	171	
		22	98.05	438	5	199	
	3Bt	23	97.95	247	5	254	turtleback scraper
		24	97.85	289	0	153	Big Sandy (early arch
Deweyville	4Bt	25	97.75	348	0	103	Clear Fork w/asphaltum, Abasolo (early mid arch)
		26	97.65	158	0	46	

UNIT N398 E852							
Geo Unit	Soil Unit	Level	Elevation	Debitage (gr)	Bone (gr)	FCR (gr)	Uniques
Ic	Ap	1	100.15	414	73	329	whetstone
		2	100.05	241	27	0	
	A1	3	99.95	111	31	123	
		4	99.85	161	15	464	
	A2/AC	5	99.75	268	29	267	Perdiz (Lt Prehist II)
		6	99.65	320	23	1216	
		7	99.55	288	56	515	
		8	99.45	247	16	517	Deer ulna tool
		9	99.35	375	31	418	
		10	99.25	617	9	252	
		11	99.15	326	50	701	
		12	99.05	324	17	226	
Ib	2Ab	13	98.95	405	52	487	
		14	98.85	470	45	1351	gouge
		15	98.75	329	13	198	lrg proximal biface
		16	98.65	167	7	198	pandora proximal (mid-late arch)
		17	98.55	329	10	461	
Ia	3Ab	18	98.45	276	1	223	
	3AB	19	98.35	269	6	388	perforator drill
		20	98.25	480	2	1046	
		21	98.15	432	0	198	
	3Bt	22	98.05	460	0	121	
		23	97.95	302	0	72	
		24	97.85	205	0	118	
Deweyville	4Bt	25	97.75	220	0	140	
		26	97.65	468	0	189	

UNIT N397 E850							
Geo Unit	**Soil Unit**	**Level**	**Elevation**	**Debitage (gr)**	**Bone (gr)**	**FCR (gr)**	**Uniques**
Ic	Ap	1	100.15	32	0	0	
		2	100.05	690	60	0	
		3	99.95	403	45	0	Perdiz (Lt prehist II)
		4	99.85	420	110	6	Axtell (mid-lt arch)
		5	99.75	601	30	0	Scallorn (Lt Prehist I)
	A1	6	99.65	445	65	25	Scallorn (Lt Prehist I)
		7	99.55	433	28	41	
		8	99.45	363	20	6	Friday biface
		9	99.35	296	20	49	Ensor (trans arch Lt Prehist I)
		10	99.25	456	34	836	
	A2/AC	11	99.15	444	34	25	
		12	99.05	917	90	2637	*feature?*
		13	98.95	292	37	176	
Ib	2Ab	14	98.85	436	29	433	Clear Fork, bit tool
		15	98.75	395	30	306	Core frag
		16	98.65	311	13	382	incised bone-deer ulna
		17	98.55	388	35	371	
		18	98.45	401	3	620	bone awl-2 pieces
		19	98.35	294	1	444	
		20	98.25	263	12	420	
Ia	3AB	21	98.15	202	2	263	Angostura proximal (Lt Paleo)
		22	98.05	202	13	389	
		23	97.95	211	7	351	
		24	97.85	610	2	175	
Deweyville	4Bt	25	97.75	585	1	156	
		26	97.65	176	1	81	

UNIT N397 E851							
Geo Unit	Soil Unit	Level	Elevation	Debitage (gr)	Bone (gr)	FCR (gr)	Uniques
Ic	Ap	1	100.15	185	6	0	
		2	100.05	371	16	34	
		3	99.95	462	36	84	Perdiz Lt Prehist II
	A1	4	99.85	375	31	23	
		5	99.75	397	40	91	
		6	99.65	291	54	434	
	A2/AC	7	99.55	284	25	605	
		8	99.45	309	39	278	
		9	99.35	507	30	754	
		10	99.25	470	36	241	
		11	99.15	587	43	602	Feature: hearth w. 30 stones
		12	99.05	202	2	177	
Ib	2Ab	13	98.95	483	52	400	
		14	98.85	314	28	586	
		15	98.75	161	5	437	Tortuga (mid-arch)
		16	98.65	298	12	454	
		17	98.55	580	10	1020	
Ia	3AB	18	98.45	347	17	628	
		19	98.35	203	10	339	Chopper
		20	98.25	283	3	636	
		21	98.15	466	10	641	
		22	98.05	392	1	68	
	3Bt	23	97.95	917	0	143	
		24	97.85	297	0	117	
Deweyville	4Bt	25	97.75	173	0	31	
		26	97.65	52	0	9	

UNIT N397 E852							
Geo Unit	Soil Unit	Level	Elevation	Debitage (gr)	Bone (gr)	FCR (gr)	Uniques
Ic	Ap	1	100.15	147	2	12	
		2	100.05	331	34	257	
		3	99.95	264	28	456	
	A1	4	99.85	365	32	393	bone awl fragment
		5	99.75	330	20	593	
		6	99.65	310	36	218	
	A2/AC	7	99.55	216	32	303	
		8	99.45	422	35	606	bone tool/ulna
		9	99.35	300	31	283	
		10	99.25	661	20	335	
Ib	2Ab	11	99.15	478	20	445	
		12	99.05	325	22	213	biface/knife
		13	98.95	434	22	427	Pandora mid-late arch
		14	98.85	526	28	692	preform
		15	98.75	478	12	901	
		16	98.65	263	14	962	Tortuga proximal (mid arch)
Ia	3AB	17	98.55	131	4	498	
		18	98.45	242	6	388	
		19	98.35	381	4	823	Clear Fork (archaic)
		20	98.25	296	20	2154	Biface-narrow w/bit
		21	98.15	417	3	790	
	3Bt	22	98.05	424	0	270	
		23	97.95	441	0	115	
		24	97.85	288	0	186	Golondrina (lt paleo)
Deweyville	4Bt	25	97.75	416	2	96	
		26	97.65	260	0	60	Hand Chopper

APPENDIX D

POLLEN ANALYSIS

For this report sediment samples from one excavation unit profile were analyzed to assess the potential for pollen preservation in the Holocene sands mantling the Deweyville Terrace. The following report details the archaeological and ecological context the samples were taken from, the methods used to process the sediment samples for pollen analysis, and the analyses of the pollen data. This report finds pollen preservation at this site is very poor and the potential does not exist to recover pollen in quantities necessary to make paleoclimatic interpretations.

Site Context

The McNeill-Gonzales site is located in the Floodplains and Low Terraces ecological sub-region along the Guadalupe River and the modern vegetation is dominated by deciduous hardwoods along the edge of the terrace and a mixture of graminoids and forbs on the terrace tread (Griffith et al 2004). The deciduous species observed in the immediate vicinity of the site are *Quercus, Prosopis, Carya, Celtis, Ehretria elliptica,* and *Ulmus*. The flowering forbs are typically *Asteraceae, Lupinus, Urticia, Solanum, Castilleja, Argemone,* and numerous unidentified graminoids. The region is considered a warm temperate climate, with a mean rainfall of 965 mm and a mean temperature of 21.2°C. The mean wettest month is September, and the mean driest month is March. The average last freeze of the spring is March 6th and the average first freeze of the fall is November 12th (Miller 1979).

Samples were collected from Excavation Area 4, which has the most complete record of Holocene sedimentation with chronological control. The west wall of unit N397 E850 was sampled on July 9, 2004. The profile was cleaned before collection, and samples were taken from the top and bottom of each stratigraphic unit using a trowel cleaned with distilled water between each sample. Seven samples were collected from this profile. A surface sample was collected from random grab samples collected across the surface of the site area on March 13, 2005. All eight samples were collected in plastic ziplock bags and were left untreated (Table D-1).

Table D-1. Sample Localities and Numbering System

41VT141 Unit: N397 E850				
West Wall Profile, *notes sample processed Fall 2004				
Pollen Sample Number	Sed Sample Designation	Soil/Geo Unit Designation	Elevation	Sample Weight (g)
4	Zn 1 Top	Ap-Unit Ic	99.95-100.00	20.4
1*	Zn 1 Bottom	A1-Unit Ic	99.71-99.76	10
2*	Zn 3 Bottom	AC/A2-Unit Ic	99.00-99.05	10
5	Zn 4 Top	2Ab-Unit Ib	98.80-98.85	20.2
6	Zn 4 Bottom	2Ab-Unit Ib	98.41-98.46	20.1
3*	Zn 5 Bottom	3AB-Unit Ia	98.05-98.00	10
7	Zn 6	3Bt-Unit Ia	97.83-97.80	21.3

The sediments within the archaeological deposits are dark gray (10YR3/2) organic rich loamy fine sands. The dark color may be due to decay of organics from the increased biomass along the terrace edge, or the anthropic input of organics and human wastes. Post-depositional disturbance by bio- and pedoturbation is common. There was moderate to good recovery of bone and shell in the upper Holocene Unit Ic deposits, but the abundance and presumably the preservation of these artifact types decreases with depth. Charcoal was only observed in Unit Ic.

Expectations for Pollen Recovery

The expectations for recovering pollen from this context were low because the environmental region and many variables at this site are not conducive to the preservation of pollen. The Loma Sandia site (41LK28), which is found in a very similar environmental and geological context as 41VT141, saw no recovery of pollen from archaeological sediments (Jones and Sobolik 1995). Both the southern and eastern portions of Texas are characterized as having poor pollen preservation, and there is an almost nonexistent pollen record in this region (Bryant and Holloway 1985: 54, 60-61). The frequent wetting and drying of the well drained sandy soils can cause the degradation of pollen grains. Studies conducted by Holloway (1989) have shown that repeated wetting and drying cycles, which occur in the warm-temperate climate of the Gulf Coastal Plain, cause significant destruction of pollen through breakage, warping, and corrosion of the pollen exine. Alkaline sediments, and soil formation processes such as illuviation of clays and carbonates has the potential to damage pollen. There is the potential for pollen recovery from high pH sediments, though pollen is typically in a poor state of preservation (Bryant and Hall 1993). Though anthropogenic inputs to the pollen record could contribute to the amount of pollen present at the site, deleterious impacts of mechanical destruction by human activities should be considered as well. Finally, biological activity is also an agent of pollen destruction. The relatively high biomass along the terrace scarp, the warm temperatures, and moist climate are conducive to the growth of bacteria and fungi, which have been shown to feed on pollen (Holloway 1989).

Processing Methods

Eight samples from the McNeil Gonzales site were processed. Seven samples were selected to provide a representative sample of the potential for recovery of pollen of each soil horizon and one surface sample was collected to provide data on the modern pollen rain. Beginning on September 23, 2004 three samples were processed by the author and Tim Riley. The remaining four samples were processed by author between February 7 and 16, 2005. Samples were weighted before processing and two *Lycopodium* 13,500 grain marker tablets were added to each sample. For the first three samples 10 grams of sediment were processed. There was very minimal recovery of pollen in these samples so it was decided to double the sample size in order to increase the potential for pollen recovery. 30% HCl was added to each of the samples to dissolve the Lycopodium tablets and carbonates. Additional water was added to dilute the HCl and samples were then screened with 150 micron mesh screens. Samples were then "swirled" to reduce the amount of larger silicates in the sample. The supernatant was collected and the heavy fraction was discarded. The supernatants were allowed to settle overnight and the water was suctioned off. Unfortunately after the water was sucked off the samples they were allowed to dry out. The samples were probably desiccated for 4 hours, and desiccation for any period of time has the potential to degrade pollen. Due to increased clay content samples 3 and 7 were sonicated with a small amount of soap to disaggregate the fine clay sediments, which releases pollen that is potentially trapped in the sediments. These samples were then repeatedly washed in water and centrifuged to remove the soap from the samples. All of the samples were then treated with 48% HF to dissolve the remaining silicates. A small amount of HF was added to each of the samples, which were then allowed to sit overnight. Water was then added to the samples to dilute the HF. The samples were washed three times and allowed to settle for three hours between washes. The samples were then transferred to centrifuge tubes and water with a small amount of 1% KOH was added to each sample. Samples were then repeatedly washed and centrifuged, and then transferred to 12 mL centrifuge tubes. The next stage of sample preparation was acetolysis to remove cellulose from the sample, and the use of KOH to remove humic acids. The KOH step was used on samples 1-3, but it was accidentally not conducted on samples 4-7. The acetolysis process consisted of first adding glacial acetic acid to the sample, then centrifuging and decanting the supernatant. Then 5 mL of the 9:1 acetic anhydride: sulfuric acid acetolysis mixture is added to each of the samples. The samples were then placed in the heating block for 8 minutes, and were frequently stirred. This process broke down the cellulose molecules. Glacial acetic acid is then added to stop the chemical reaction and the samples were centrifuged. The samples were washed with water repeatedly and centrifuged with 95% alcohol to drive out any water. Samples were then treated with the Zinc Bromide Procedure to separate the pollen grains from any remaining minerals. This procedure is predicated on the differences in specific gravity of pollen and minerals. A $ZnBr_2$ solution of a specific gravity of 2.0 causes the lighter 1.5 specific gravity pollen to float to the top of the tube and the heavier silicates to sink to the bottom. Approximately 8 mL of $ZnBr_2$ are added to each sample, as well as a small amount of water to the top of the sample. The samples were centrifuged for 8 minutes and then the water and pollen that had risen to the top of the solution were collected with a pipette. 50 mL of alcohol was added to this supernatant and then the samples were centrifuged down and the alcohol supernatant was discarded. Water and one drop of red stain was added to each sample to stain the pollen. This was centrifuged once to set the stain. The samples were then transferred to 1 dram vials and centrifuged once more to separate the alcohol that was used in the process of transferring the sample from the test tube to the dram vial from the pollen. The alcohol was decanted and three drops of glycerol were added to each sample as a substrate. The samples were then left on the hot plate overnight to dissolve the remaining alcohol. Slides were made for each sample and were examined using light microscopes at 400X power. Tallies of all pollen and *Lycopodium* tracer spores were made, and digital photographs of representative pollen grains and questionable pollen grains were taken. Pollen types were compared to type collections at the Texas A&M Palynology Lab, Knapp's guide (2000), and internet sources (Davis 2005).

Results

The results of the pollen count detailed in Table D-2 show a very poor recovery of pollen from the archaeological samples. For the sake of time and due to the extremely poor recovery it was decided to only count one slide for each of the samples. Sixteen taxa were identified however the concentration values for the archaeological samples are very low. Photographs identifying some of the taxa identified in the samples are found in Figure D-1. While continuing to count more slides would probably increase the number of taxa in the samples, the concentration values would still be too low to consider these samples meaningful representations of paleoenvironments.

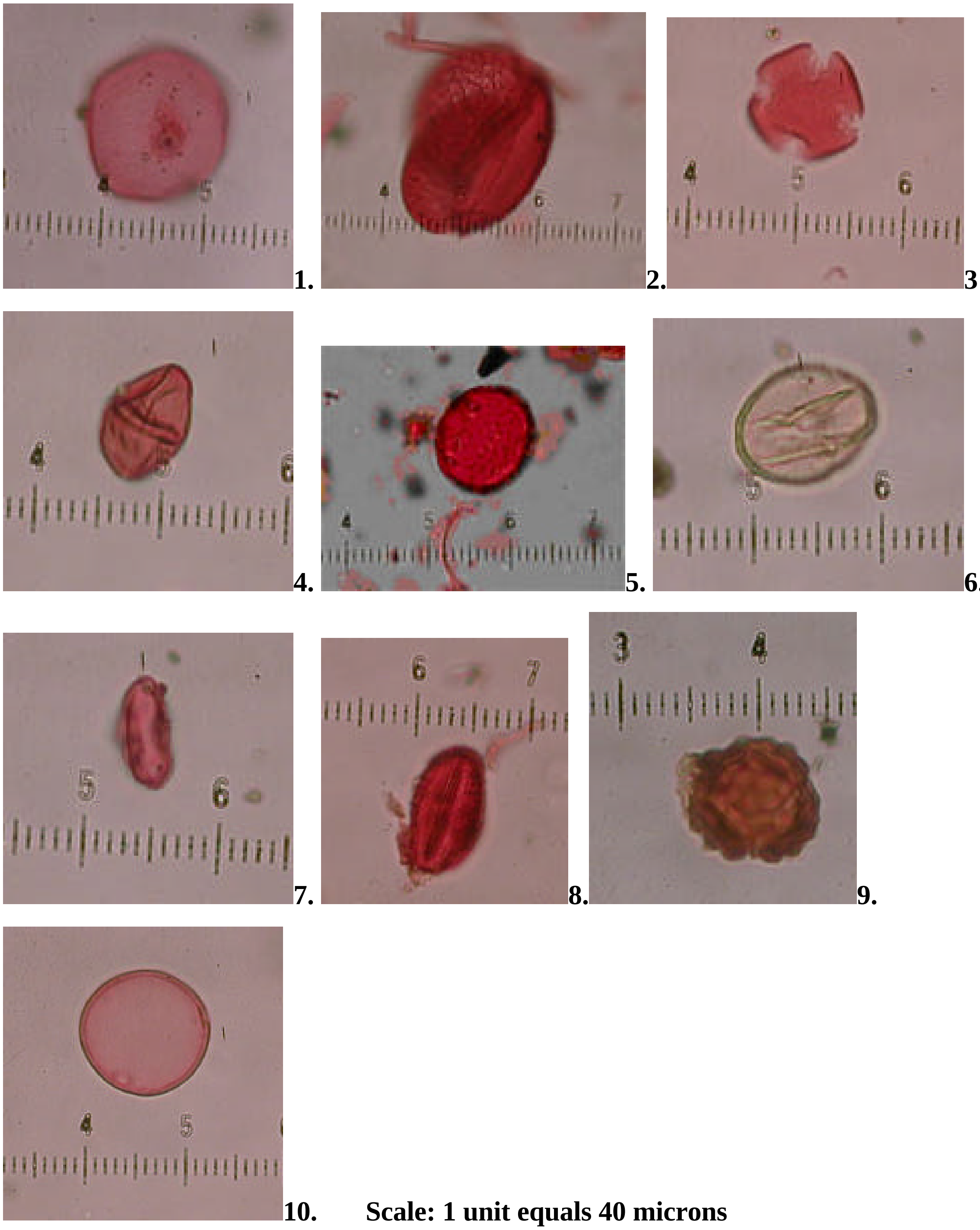
The surface sample had a very high percentage of *Celtis*, which may be a result of the surface collection coinciding with its period of bloom. All of the taxa identified in the surface sample are present in the area, except for *Pinus*. The pollen types identified are all represented locally in the grass/forbs terrace tread and the riparian scarp of the site area. Though *Pinus* is not present in the site area its presence is to be expected considering it has such a wide area of dispersal and is grown ornamentally. The pollen identified indicates a pollen spectrum not too different from the local vegetation, a mixture of arboreal pollen associated with riparian environments, with grass and forbs pollen from the open terrace tread and adjacent uplands.

The samples from the upper portion of the test unit (1 and 4) which correspond Holocene Unit Ic (2,500 B.P. to present) have higher concentration values than the lower deposits, though recovery was still very poor. Though there were a high number of spores present in this sample, with the majority being *Pucciniaceae sp.* and an unidentified Spheroid Dark Red Spore, the spores were not counted. These upper samples were dirtier slides and Sample 1 still had a number of silicate grains, which suggests the potential for error in processing. The number of spores decreased dramatically with depth.

Table D-2. Pollen counts

41VT141 POLLEN COUNT **Sample #**

Pollen Taxa	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**surface**
Wind-Pollinated Types								
Pinus	1	0	1	2	0	0	0	2
Populus	0	0	0	0	3	0	0	0
Salix	0	0	0	0	0	0	0	1
Celtis	0	1	0	1	0	0	0	97
Castanea	0	0	0	0	1	0	0	2
Fraxinus	0	0	0	0	0	0	0	1
Ulmus	0	0	0	0	0	0	0	8
POACEAE	0	0	0	0	1	0	0	15
ASTERACEAE (LS-type)	10	0	2	1	2	0	0	42
CHENO-AMS	0	0	0	2	0	0	0	8
Insect Pollinated Types								
ASTERACEAE (HS-type)	2	0	0	0	0	0	0	5
Prosopis	0	0	0	0	1	0	0	
Ehretia	0	0	0	0	0	0	0	1
FABACEAE *Mimosa-like*	0	0	0	0	4	0	0	5
SOLANACEAE	0	0	0	0	0	0	0	1
Degraded Tricolporate	0	1	0	0	0	0	0	10
NO ID- Broken & Unknown	8	0	0	13	2	2	1	16
total pollen counted	21	2	3	19	14	2	1	214
weight of sample (g)	10	10	10	20.4	20.2	20.1	21.3	20.1
Lycopodium	99	96	60	298	667	365	54	35
Pollen Concentration/gram	275.7576	27.08333	65	40.63035	13.5081	3.543924	11.30238	3954.513



Scale: 1 unit equals 40 microns

1. POACEAE 2. *Pinus* 3. *Fraxinus* 4. *Solanaceae* 5. *Ulmus* *6. Ehretia*

7**.** *Castanea* 8. *Salix* 9. *ASTERACEAE (LS)* 10. *Celtis*

Figure D-1. Photographs of identified pollen types

The pollen recovery from the lowest parts of the site was practically nil. The samples from the intermediate portion of the site (2, 5, and 6) correspond to the Holocene Unit Ib (7,500-2,500 B.P.). These samples had a marked reduction in spores, and it can be assumed that the barrage of post-depositional processes had destroyed much of the pollen record. The deepest samples which correspond to Holocene Unit Ia (10,000-7,500 B.P.) had only the most minimal amount of pollen recovered, and considering the development of a weak illuvial horizon this unit has experienced more pedogenesis and weathering than the upper deposits.

Conclusions

The analysis of sediment samples found the potential for pollen recovery is extremely low, and future pollen analyses at this site are not recommended. The environmental setting is clearly not conducive to pollen preservation, but that does not discount the utility of this exercise because it serves as a model for pollen preservation for similar sites located in sandy sediments along alluvial terraces of the Gulf Coastal Plain. One can certainly not rule out the potential for pollen to have been lost during processing, especially since the sample dried out before the HF treatment. In conclusion, analysis of these samples tested and confirmed the hypothesis that sandy open sites in humid-temperate environments have poor pollen preservation and are poorly suited for pollen analysis.

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VITA

Michael John Aiuvalasit received his Bachelor of Arts Degree in archaeological studies, anthropology, and history from The University of Texas at Austin in 2001. During his time at UT he attended an archaeological field school in Belize and was an assistant on a research project in Mexico directed by Dr. James Neely. Coursework in geoarchaeology under Dr. Karl Butzer and fieldwork in Mexico along side Dr. Chris Caran kindled his interest in geoarchaeology. After graduation he spent three years working in cultural resource management for a number of private and university contract archaeology firms in Texas and for the National Park Service in New Mexico. He enrolled at Texas A&M University in the fall of 2003 and received his Masters of Arts Degree in anthropology in May of 2006. During his time at Texas A&M he conducted geoarchaeological research on a prehistoric hunter-gatherer site in Victoria Co., Texas; large prehistoric water management features in the Tehuacan Valley, Puebla, Mexico; and began a pilot study of gleaning environmental and geomorphic data from historical documents of the Spanish mission period of Texas.

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