



Sec. 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties. The Federal Highway Administration delegated most of their responsibility for Section 106 compliance to TxDOT.

TxDOT's Cultural Resources Management (CRM) Section conducts these reviews on behalf of 25 TxDOT Districts around the state. The CRM section is comprised of the Archeological Studies and Historical Studies branches.

TxDOT works under a programmatic agreement with the Advisory Council on Historic Preservation, the Federal Highway Administration and the Texas State Historic Preservation Office (SHPO) regarding the implementation of transportation undertakings. This agreement allows TxDOT to efficiently meet the Sec. 106 requirements for many simple projects that have a low risk for impacts to cultural resources.

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“Management of archeological sites should be conducted in a spirit of stewardship for future generations, with full recognition of their non-renewable nature and their potential multiple uses and public values.”

36 CFR part 800, “Protection of Historic Properties,” implementing Section 106 of the National Historic Preservation Act



VISIT TxDOT'S SESSIONS AT THE 88TH ANNUAL MEETING OF THE TAS

FRIDAY, OCT. 20

2 p.m.

The TxDOT Northeast Parkway Project: Forthcoming Investigations of Four Jornada Mogollon Sites Near El Paso | J. Kevin Hanselka
 ♻ HERITAGE II

SATURDAY, OCT. 21

8 a.m.

A Greasy Mess: Reconsidering Bone Grease Extraction and Its Implications for Site Interpretation | Rachel Feit, Katherine Seikel and Jon Budd
 ♻ HERITAGE II

9 a.m.

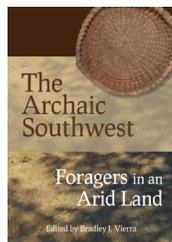
Seeing Site Matrix in Ridiculous Detail: An Example of the Application of Computed Tomography (CT) Scan Data to Geoarcheological Studies | James T. Abbott, Matthew Colbert and Charles Frederick
 ♻ HERITAGE II

10 a.m. – noon

PANEL DISCUSSION: Native American Traditional Cultural Properties in Texas | TxDOT, Tribal Nations and Professional Archeologists
 ♻ HERITAGE III

10:20 a.m.

"What Do I Call Thee?" Twenty-Five Years Later: Assessing New Approaches to Projectile Point Typology | Jason W. Barrett
 ♻ HERITAGE II

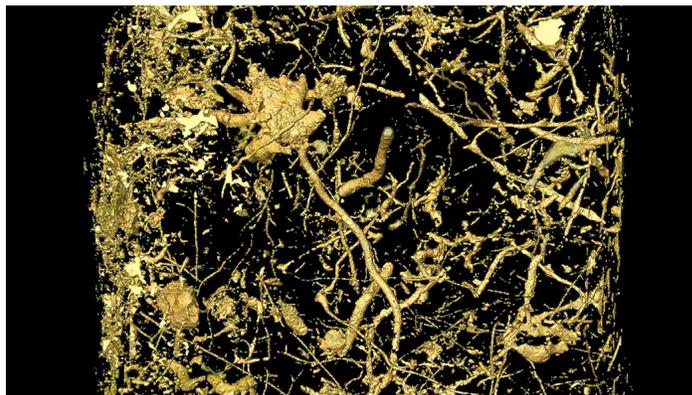


11 a.m. – 11:55 a.m.

Texas Book Festival Presentation: "The Archaic Southwest: Foragers in an Arid Land." Edited by Bradley J. Vierra, with "A Pan-Regional Overview of Archaic Agriculture in the Southwest" (chapter by J. Kevin Hanselka) | Presented by J. Kevin Hanselka
 ♻ EXHIBIT HALL

2:30 – 4:30 p.m.

Flint Knapping as Experimental Archeology: A Demonstration | Christopher Ringstaff, Robert Lassen and Sergio Ayala
 ♻ HERITAGE III



POSTER SESSIONS

- Besides the Points: Other Chipped Stone from 41HR796, Dimond Knoll (Eric Oksanen)
- Coming Together to Make Archeology Public (CAR, CAS, TARL, THC and TxDOT)
- Research Partnerships for TxDOT Legacy Projects (TxDOT)
- Can We Predict Prehistoric Caddo Villages and Hamlets Sites Locations Based on Landform Characteristics? (Waldo Troell)
- Public Attitudes Toward Archeology in Texas (Scott Pletka)

WHAT WE DO

TxDOT conducts more permitted archeology than any other institution or organization in Texas. Through our Cultural Resources Management process, we can examine parts of the state that would otherwise be ignored. The stories we preserve connect Texans today to the history and people of the past.

TxDOT reviews hundreds of projects each year, but only 1 percent may go to “data recovery” through excavation. As leaders in the field, our studies and methods continue to advance the science of archeology through the years.



2017 PROGRAM HIGHLIGHTS



340

projects reviewed and cleared by archeologists



55

sites identified



5,616

acres surveyed



10,982

cubic feet of dirt hand-excavated on TxDOT projects

TxDOT ARCHEOLOGY'S RESEARCH IN 2017

BONE GREASE ANALYSIS AND ETHNOGRAPHIC RESEARCH

In Hamilton County, archeologists found a Late Prehistoric site (41HM51) with concentrations of bone fragments that measured less than 1 inch in length.

Based on ethnographic research from the Human Relations Area Files, ancient people at other sites where small bone fragments occurred were extracting grease from the bones of deer and bison that they hunted. They intentionally broke the bones into smaller pieces so that they could boil out and use the greasy residue to:

- Mix with red ochre to make red paint, or with charcoal to make black paint, or even with some clays to make yellow paint
- Grease arrow shaft straighteners or to use on the skin as an insect repellent
- Mix with herbs to use as a medicinal ointment or to condition hair
- Create pemmican loaves, an important ancient food source and trade item that could last for months or years without refrigeration

Archeologists will continue to analyze the bone fragments to determine the types of breaks and when they were broken. (Acknowledgments: Jon Budd – TxDOT Archeology, Prewitt & Associates, and AmaTerra)



THE CORNELIO ALVAREZ SITE

This site in Starr County (41SR242) spans more than 4000 years. Its location provided a seasonal water source, access to quality stone for tools, and a good viewshed for hunting.

Unlike many of the gravel capped uplands of the area, the site has areas of relatively deep Holocene sediments that may be the product of a combination of slopewash and insect activity. The site dates, based on wood charcoal, span a 1500-year-long period from approximately 1600 B.C. until approximately 100 B.C. The site is well-preserved and archeologists have found:

- Two artifacts clusters consisting of chipped stone flaking debris, land snails and bone (tentatively identified as bison, javelin and snake)
- More than 2 dozen projectile points, including (mainly) Tortugas, Matamoros, Refugio, Langtry and Lerma, that exhibited significant resharpening and use-damage

Once the analysis and results of other various studies are compiled, TxDOT will make a determination of whether additional work is warranted. (Acknowledgments: Chris Ringstaff, James T. Abbott, J. Kevin Hanselka and Jason Barrett – TxDOT Archeology)

FAST FACT:
Before deciding to excavate a site, TxDOT must determine whether the site is eligible for preservation: a process called “testing.”



Lerma



Refugio



Tortugas



Matamoros

INNOVATIVE TECHNIQUES THAT ADVANCE THE SCIENCE OF ARCHEOLOGY

A CLOSER LOOK

TxDOT uses a digital microscope to perform archeological analyses, such as scientific analysis, forensics studies, manufacturing, medical research and medical applications.

The microscope can record both video and still images on a computer screen with high resolution and allows archeologists the ability to inspect materials and artifacts up to a magnification of 220 times normal vision. Archeologists use the microscope to examine the surface of artifacts for microscopic traces that indicate how an artifact was used (cutting, scraping, grooving, drilling and chopping) against materials such as wood, grass, bone or hide. Currently, TxDOT is using the microscope to identify plant remains as well as types of use-wear on stone tools from Dimond Knoll. *(Acknowledgments: J. Kevin Hanselka, Eric Oksanen, Chris Ringstaff and Jason Barrett – TxDOT Archeology)*

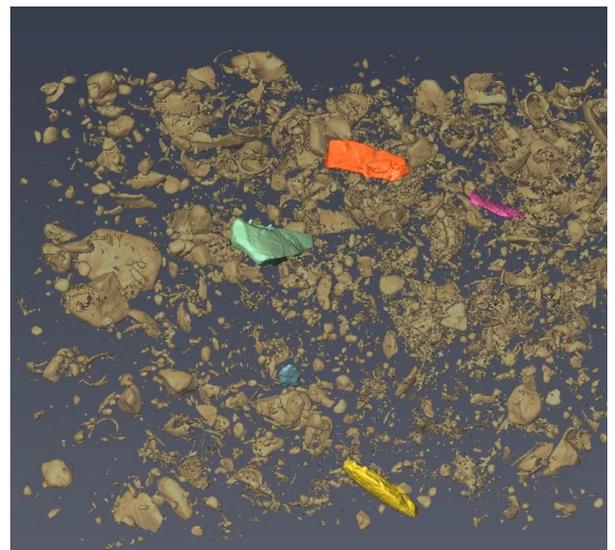


REPURPOSING MEDICAL TECHNOLOGY FOR ARCHEOLOGY IN STARR COUNTY

Computed tomography—also called CT or CAT scanning—revolutionized medicine by providing a tool that allows archeologists to visualize internal structures in the body in unprecedented detail.

Archeologists occasionally use CT in the imaging of bodies, such as mummies. Recently, TxDOT partnered with the University of Texas at Austin's Computed Tomography Laboratory (UTCT) to examine samples of site matrix from Starr County (41SR242) where concentrations of artifacts were found deeply buried in an upland site. Large burrows such as those produced by fossorial mammals were not apparent, and TxDOT suspected that insects were primarily responsible for burial of the site. TxDOT and UTCT performed imaging of four different samples of intact site matrix.

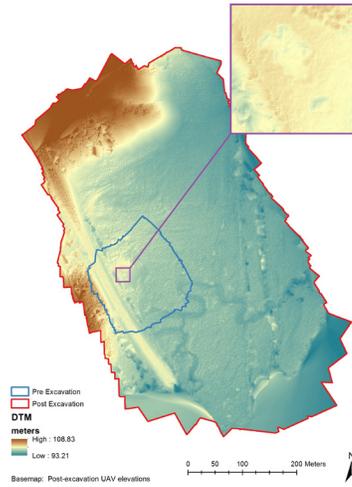
Although analysis is ongoing, the imaging revealed complex structures throughout each block that indicate insect bioturbation has been ubiquitous and appears to be the primary mechanism that buried the cultural material. *(Acknowledgments: James T. Abbott and Chris Ringstaff – TxDOT Archeology, Charles Frederick, Dr. Matthew Colbert and Dr. Jessie Maisano, UTCT)*



GOING HIGH TO LOOK LOW

For a Caddo site in northeast Texas (41TT103), TxDOT created a very high-resolution topographic map with a small Unmanned Aerial Vehicle, or drone.

As part of the geoarcheological work at the site, archeologists produced both a stitched orthophoto and a digital elevation model of the site area from before and after the data recovery excavations. Additionally, a very high-resolution 3-D model of the completed excavations was produced by the same photogrammetric method as the drone, but with instead hundreds of overlapping ground photographs. (*Acknowledgments: Waldo Troell – TxDOT Archeology, AmaTerra and Arlo McKee*)



OTHER TOOLS OF THE TRADE

- *Ultra-purification*: This technique is used to screen contaminants in bone collagen to get a more accurate radiocarbon date.
- *Ground Penetrating Radar (GPR)*: In certain settings, TxDOT will use GPR to send electromagnetic waves into the subsurface from an antenna that is pulled along the ground. When the waves encounter an interface, such as the boundary between site matrix and rock architecture, some of the waves are reflected back to the surface and recorded.
- *Real Time Kinematic (RTK)*: TxDOT uses Trimble GNSS (Global Navigation Satellite System) Real Time Kinematic receivers that can record the location of an object to less than a centimeter.

UNIQUE EXPERTISE TO HELP MANAGE OUR CULTURAL RESOURCES

DEVELOPING NEW PREDICTIVE MODELS FOR EAST TEXAS

TxDOT's PALM (Potential Archeological Liability Maps) and HPALM (Hybrid Potential Archeological Liability Maps) systems use a geoarcheological approach to predict where sites are likely to be preserved with sufficient integrity to warrant further detailed study. This type of integrity-focused model has been used in many TxDOT districts, but this approach is not applicable in many parts of East Texas.

TxDOT is taking a different approach to predictive modeling in the Sandy Mantle area of the northeast part of Texas, which includes parts of the Atlanta, Paris, Tyler, Lufkin and Bryan districts. For several reasons, stratigraphic and spatial integrity (the focus of HPALM modeling) are not particularly good analogs for site integrity in this part of the world. Therefore, TxDOT is exploring more traditional, inductive approaches to predictive modeling of archeological site location in this area.

Most researchers with experience in the region have an intuitive feel for where sites are located. TxDOT's predictive models will attempt to identify settings similar to those of known sites through comparison with the distribution of relevant environmental variables. If successful, it is expected that the models will begin to appear, subject to the approval of the Texas Historical Commission, during Fiscal Year 2018.

TxDOT's HPALM models are available from:

<http://www.txdot.gov/inside-txdot/division/environmental/compliance-toolkits/toolkit/archeological-map.html>

USING STATISTICAL METHODS TO DISCOVER HIDDEN ARCHEOLOGICAL PATTERNS

Bayesian statistical methods formalize the commonsense approach people use to evaluate information. Bayesian methods weigh new data against prior beliefs, explicitly considering both the strength of those prior beliefs and the strength of the new information. As computing power has increased, Bayesian methods have become more common. TxDOT employed Bayesian statistical methods to develop new ways to quickly evaluate the chipped stone debris created while flint knapping to make a tool.

During flint knapping, the knapper reduces a core and produces flakes. The flakes struck initially from the core are likely to be larger than those flakes struck later in the process of making a stone tool. For many years, archeologists have attempted to quickly characterize flake assemblages using techniques such as size sorting the flakes through a series of nested screens. Archeologists counted the number of flakes in each size grade. These analyses have observed that the distribution of flakes in the size grades changes as knapping progresses from one stage to the next stage. Smaller flakes are more common in the later stages.

TxDOT's method provides an analogous approach through Bayesian statistical techniques. Using simple measures of flake length and width, this method can identify the stages of knapping represented by a flake assemblage. This method may be more accurate in identifying those stages and characterizing our certainty about the identification.

FAST FACT:

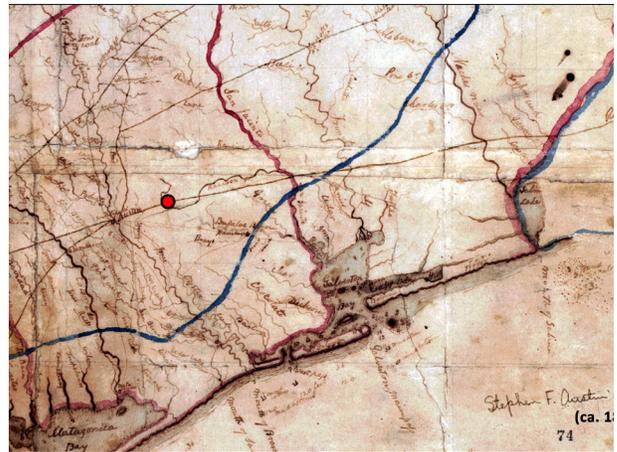
Identifying archeological sites before construction begins is one of the most important aspects of our work. It allows us to make better decisions about how to manage the cultural landscape.

DIGGING DEEPER AT DIMOND KNOLL

Dimond Knoll is one of only a few sites in southeast Texas that show evidence of occupation across all time periods (Paleo through Late Prehistoric), and no other site in the region has yielded more projectile points per cubic meter of excavation. The diversity of types represented is staggering. To better understand the character and importance of the site to prehistoric peoples, TxDOT archeologists are researching ancient overland trail. The knoll's location relative to ancient waterborne and overland corridors may have afforded it a number of strategic advantages with respect to facilitating interregional trade, the seasonal migration of population groups and pilgrimage cycles.

TxDOT experts have begun examining the chipped stone tools from the Dimond Knoll artifact assemblage.

- Eric Oksanen is completing microscopic use-wear analysis for many of the site's informal bifaces, knives, blades and assorted expedient tools.
- Allen Bettis is reporting on the more than 150 Late Prehistoric arrow points discovered at the site.
- Chris Ringstaff is analyzing hammerstones, cores and other evidence of tool manufacture at the site.
- Jason Barrett is completing a technological analysis and use-wear study for the several hundred dart points recovered at Dimond Knoll, and for the 300 additional dart points from nearby Smithers Lake on loan from the Fort Bend Archeological Society private collection.

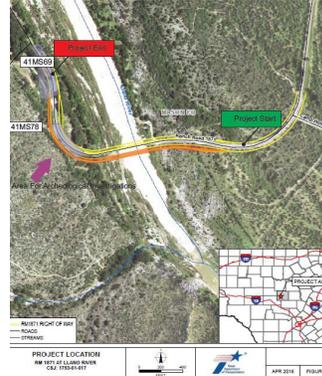


A LOOK AHEAD AT FUTURE TxDOT ARCHEOLOGY PROJECTS

MASON COUNTY

41MS78 is a prehistoric site exposed in a 20-foot-high terrace above the Llano River. TxDOT archeologists examined the location and determined that the deposits of burned rocks, shell and chipped stone may represent a significant find estimated to be at least 5000 years old.

The fieldwork presents several logistical challenges: excavating in a narrow right of way on an active highway into the face of the high terrace wall. The visible material is a sample of what may be a 12,000 year record of climate, environmental and cultural activity. The investigations at 41MS78 will contribute valuable information about the people and climate of ancient Texas. *(Acknowledgments: Eric Oksanen, James T. Abbott, J. Kevin Hanselka, Scott Pletka – TxDOT Archeology)*



FIRECRACKER PUEBLO

Firecracker Pueblo is a well-known archeological site and State Archeological Landmark located within the proposed right of way for the Northeast Parkway, a new-location highway northeast of El Paso planned to ease heavy traffic along I-10. Excavations here in the 1980s found that early in the 15th century, desert farmers established a small village or hamlet on the Firecracker site, probably with corn and bean fields planted nearby. These farmers built at least 17 “pit houses” (roughly circular or oval houses over shallow pits) on the site but later constructed an aboveground adobe-walled structure with about 16 rooms on top of the former pit houses.

Testing and excavations are planned for the upcoming years. These new TxDOT investigations will complement previous findings from Firecracker Pueblo (much of which remains unpublished) and enhance our knowledge about the lives of El Paso phase (circa A.D. 1300 – 1450) Jornada Mogollon farmers. *(Acknowledgments: J. Kevin Hanselka, James T. Abbott – TxDOT Archeology, and Texas Archeological Research Laboratory)*



CREATIVE MITIGATION

The outcome of the Section 106 process is not predetermined; it is the interaction among the participants in the consultative process that determines the outcome (with the Federal agency making the final decision). As a result, many opportunities for creative and innovative approaches to fulfilling the requirements of Section 106 exist. This is especially the case in resolving adverse effects.

We want to hear your ideas about mitigation banking, training/field work and peer exchanges, outreach, reports, videos, publications, conservation plans, landscape surveys, GIS models and language programs, etc.

PARTNERSHIPS AND OUTREACH

Through the Cultural Resources Management process, TxDOT consults with the Texas Historical Commission, communities and tribes to determine how to manage sites that could be impacted by transportation projects. There is also an inherent public interest in archeology and history and learning the stories of people and the past. TxDOT is proud to partner with these agencies and organizations on spreading the word about Texas archeology.

- Bureau of Economic Geology
- Center for Archaeological Research
- Center for Archaeological Studies
- Council of Texas Archaeologists
- Federally Recognized Tribes
- Houston Archeological Society
- Houston Museum of Natural Science
- Index of Texas Archaeology
- Institute of Texan Cultures
- Stephen F. Austin State University
- Texas Archeological Research Laboratory
- Texas Archeological Society (TAS)
- TAS Field School and TAS Academies
- Texas Beyond History
- Texas Historical Commission
- Texas Military Department
- Texas Parks and Wildlife Department
- Texas State University
- Travis County Archaeological Society
- Witte Museum



STAY TUNED FOR INFORMATION ABOUT THE NEWLY FORMED TEXAS PUBLIC ARCHEOLOGY NETWORK (TXPAN)

TxPAN's vision:

A collaborative resource where the science of archeology connects us all to the people, places and stories of the past.



