PERMIAN QUARTERLY

Permian Basin Programmatic Agreement Quarterly Newsletter

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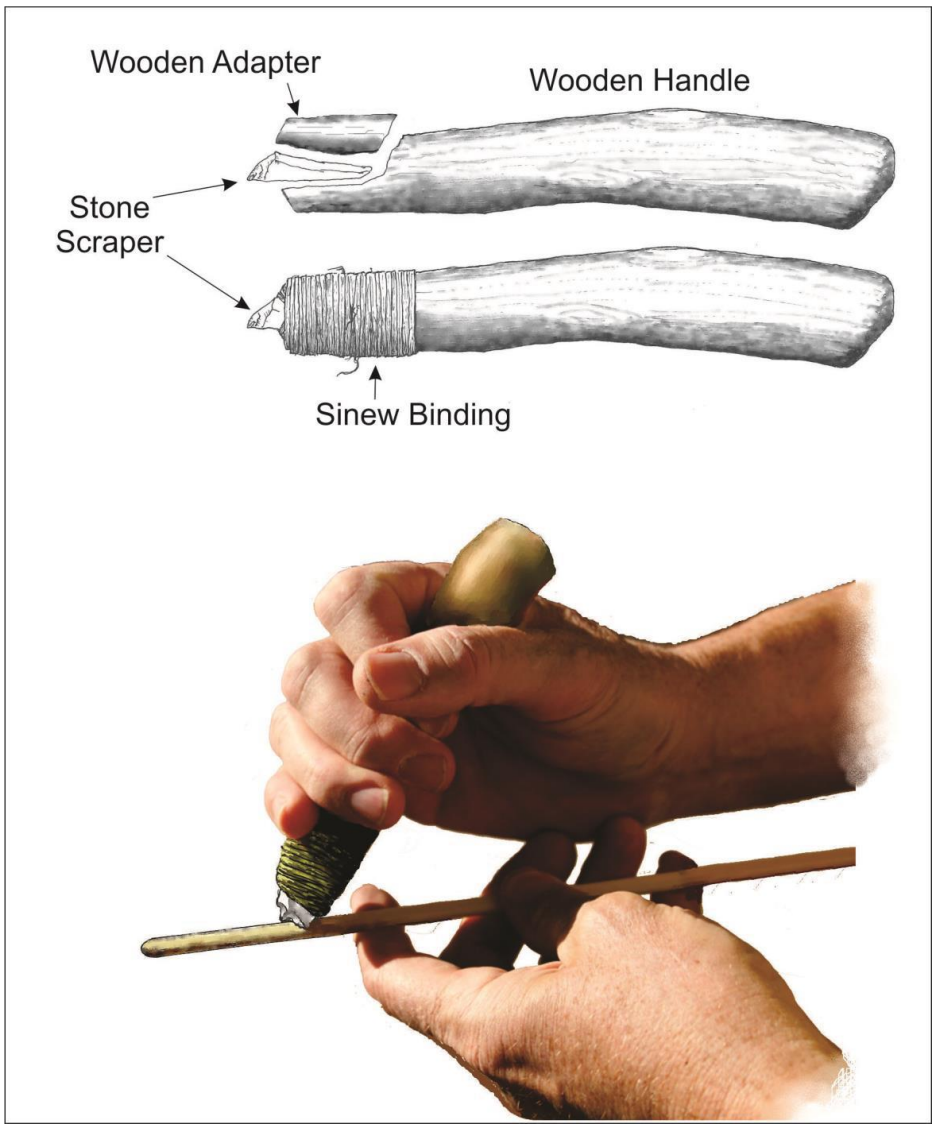

Hypothetical assembly and use of a scraper. Find out more about this tool inside this newsletter. Illustration by Jim A. Railey.

The *Permian Quarterly* is a newsletter for participants in the Permian Basin Programmatic Agreement (PA) and for other interested persons. Its purpose is to provide information in a timely manner about implementation of the PA and to disseminate that information to a wide audience.

Introduction to the Permian Basin Programmatic Agreement

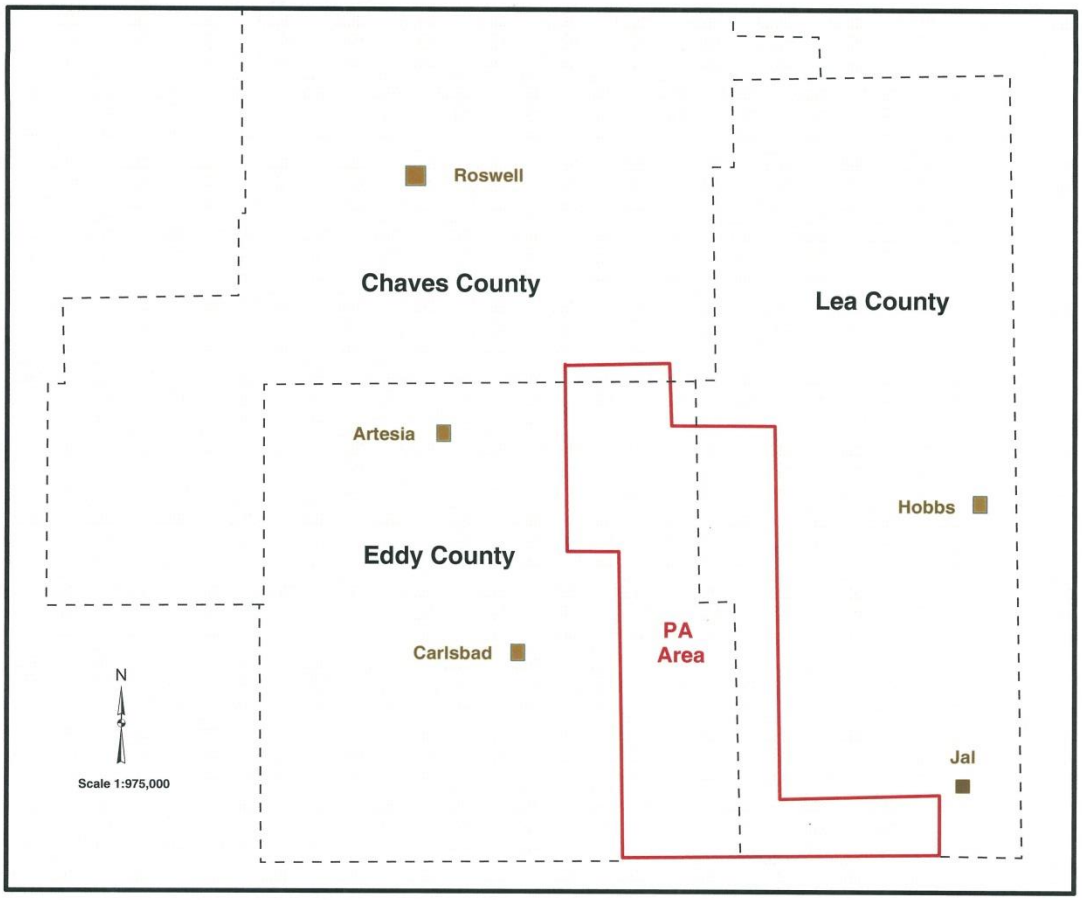

Figure 1. Map showing the Permian Basin PA Area.

The PA is an alternate form of compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, that is offered to the oil and gas industry, potash mining companies, and local governments in southeastern New Mexico for federal projects located on Bureau of Land Management (BLM) land or private property. Formerly called the Permian Basin MOA, it was extended for a period of three years in April 2013 as a Programmatic Agreement. The PA area, noted above in red, is located partially in Chaves, Eddy, and Lea counties and generally coincides with a physiographic region in southeastern New Mexico called the Mescalero Plain. Proponents of projects within the PA area may contribute to a dedicated archeological research fund in lieu of contracting for project specific archeological surveys, provided their proposed projects avoid recorded archeological sites. This dedicated fund is then used to study the archeology and history of southeastern New Mexico.

Current PA News

Permian Basin PA Workgroup Meeting Held in El Paso

A meeting of the Permian Basin PA Workgroup was held October 8, 2015 in El Paso, Texas in conjunction with the 19th Biennial Jornada-Mogollon Conference. The Workgroup is composed of state and federal regulatory archeologists, academic archeologists with research interests in Southeastern New Mexico, a representative from the Indian tribes and pueblos with ancestral ties to the region, and representatives from industries operating within the PA area. The Workgroup provides guidance for research projects undertaken through the Permian Basin Programmatic Agreement, as it is administered by the Carlsbad Field Office. Retiring Workgroup members Paul Katz, Meade Kemrer, and Phillip Shelley were recognized for their service, beginning in 2008 as original members and continuing through 2015. The operation of the program was discussed and brief presentations of current and recently completed PA projects were made by archeologists from SWCA Environmental Consultants and Statistical Research, Incorporated.

Future PA projects recommended by the Workgroup covered a wide range of topics, including a rock art recording project; obtaining radiocarbon dates and evaluating sites in the Southwest Slopes physiographic region, which is at present poorly dated; completing the interpretation of rock ring-middens in previously acquired Lidar data and recording a sample of these sites; completing an archeological and geomorphological survey of Salado Draw, a locality that has produced numerous Paleoindian projectile points; evaluating the impact of the operation of the PA on the archeological record of southeastern New Mexico, by examining a sample of completed PA projects in the field; consulting with the Mescalero Apache Indian Tribe about enhancing a previously completed Traditional Cultural Property survey; evaluating "village" sites dating to the period circa A.D. 1200 to A.D. 1400; and developing outreach materials and activities for members of the general public and for school children. Readers of the *Permian Quarterly* can expect to see details of these projects in future issues. The next meeting of the Workgroup will take place in Carlsbad, New Mexico during 2016, although the exact date has not been selected at this time.

Many of the Workgroup members attended the Jornada-Mogollon Conference which was held the following two days at the El Paso Museum of Archaeology. This conference highlights research within the Jornada-Mogollon region, roughly defined as an area of northern Chihuahua, Mexico, and portions of southern New Mexico, and west Texas in the United States. A mini-symposium of four papers on a current PA contract to do remediation at the Merchant Site in Lea County, New Mexico was presented by Versar, Inc. and a description of the plant utilization handbook, another PA project, was given by SWCA, Environmental Consultants.

PA Report is Completed

Statistical Research, Incorporated completed an eagerly awaited report entitled "An Assessment of Transect Recording Unit Survey and Subsurface Testing Methods at Four Sites in the Permian Basin, New Mexico," edited by Michael Heilen and Monica Murrell. While the subject matter, recording and evaluating prehistoric archeological sites, can be considered to be "dry" these activities can lead to exciting new avenues of knowledge and understanding.

It is unusual for sites to be preserved in total. Cataclysmic events, such as the volcanic eruption that killed the inhabitants and preserved the remains of the Roman towns of Herculaneum and Pompeii in Italy are rare. The norm is for people to depart a place, taking what is useful and portable. What remains is transformed by weathering and deterioration and may become buried through geological processes. In particular, prehistoric people who inhabited the Mescalero Plain in southeastern New Mexico for the most part lived in small temporary camps. They needed only lightweight structures, either temporary huts or shades, primarily composed of brush; or portable dwellings, such as tipis, covered with mats or tanned animal skins that have left few traces in the archeological record. Durable artifacts, such as pieces of pottery, stone tools, or stone waste flakes survive, as can permanent features of a site, such as storage pits, hearths, or roasting pits containing burned caliche. These permanent features can be recognized primarily by their darker charcoal-stained soils, sometimes combined with burned rocks. Many of the colorful and useful artifacts of daily life such as feather or animal skin robes, fiber sandals, basket containers, or wooden bows and arrows used in hunting do not survive in open sites, typical of the Mescalero Plain, but may be found elsewhere in caves or rockshelters protected from the elements.

In southeastern New Mexico sites are traditionally found by an archeologist walking over the landscape looking for clues to a site's presence. The geological processes, primarily wind and water erosion, that transport sediments to cover over and preserve site remnants can also expose site features and artifacts. The sandy soils of the Mescalero Plain contain many deflation basins or "blowouts" and artifacts can often be found in the bottoms of these blowouts within site areas.

Figure 2. Disarticulated burned rock exposed on the ground surface. Adapted from Heilen and Murrell 2015: Figure 38.

Upon discovering any artifacts or features the archeologist must first determine if they represent a "site" and he or she may then examine the area around the initial find in wider and wider circles, or transects, to

see if more artifacts, such as stone flakes or burned rock, can be found and related to the original find. During this process the recorder notes such things as vegetation that can obscure the ground in parts of the site, areas where the ground has been disturbed, the types and number of artifacts found, and the types and number of permanent features that are present. Selected artifacts or features may be recorded using global positioning system (GPS) points and a sketch map is drawn to show the relationships of selected artifacts and features. Site boundaries are usually determined by the areal extent of artifacts exposed on the ground surface.

Such records can be used for research and management purposes, but they also have built-in flaws in that limit their usefulness. Observations on site content and condition are made, but they are not always consistently made and seldom with enough precision because they are "site" oriented observations. One goal of the report is to demonstrate a more effective way to record a site by using an electronic grid to guide a surveyor on the ground and to record in each grid cell observations about artifacts and features or vegetation and erosion, this is called the Transect Recording Unit (TRU) method of recording. Using the TRU method results in a series of discrete observations that can then be combined to produce a complete site report. The focus of this type of recording is on the parts instead of the whole and, while the quality of the observations still rests on the skill and experience of the recorder, it produces a more detailed and useful site report. The electronic grid can be reestablished at any time in the future to allow another archeologist to follow in the footsteps of the original recorder and note any changes to the original observations.

Four previously recorded sites within the PA area were selected for recording and evaluation using the TRU method. These sites are located in different regions of the PA area, were recorded at different times in the past, and varied in size and topographic location. They are also located in sandy soils that are of different depths. Two of the four sites, LA 99437 and LA 143568, are discussed in this article.

LA 99437 is located on a broad ridge on the south side of Clayton Basin. It was originally recorded in 1992, at which time it was described as a prehistoric campsite of unknown cultural affiliation. Modern visitors to the site some 20 years later had initial impressions that the site had limited potential for further research. Bedrock was visible in many places within the site area and it was evident that where soil existed it was not very deep. Burned rock was scattered across the surface indicating much erosion had taken place, thereby limiting the possibility that intact features or artifact distributions would be present.

The site boundaries at LA 99437 were considerably modified as a result of the TRU survey (see Figure 3). Additional artifacts and features were found beyond the previously defined site boundary (the red areas in Figure 3), but at the same time an area void of artifacts or features was noted in the central portion of the site area as it had been previously recorded (the green area in Figure 3). Thus it appears that a better depiction of this site is that of two distinct localities, as opposed to one oval concentration, or even as two distinct sites, since the distance between the two concentrations meets the criterion for establishing a site boundary.

By focusing on a small area of the ground surface the TRU survey method also brings into focus the reality that the distribution of artifacts and features across the landscape is not always neatly divided into well-defined sites. It then becomes the archeologist's job to explain the "messy" nature of the archeological record. Sometimes this can be the result of erosion displacing artifacts and moving them away from the spot at which they were originally deposited. At other times human activity may be

responsible, for instance, TRU survey at Fort Bliss, Texas (in the El Paso vicinity) enabled archeologists there to recognize linear distributions of potsherds and other artifacts that occurred between village sites and these have been interpreted to mark the locations of well-used trails between these pueblos.

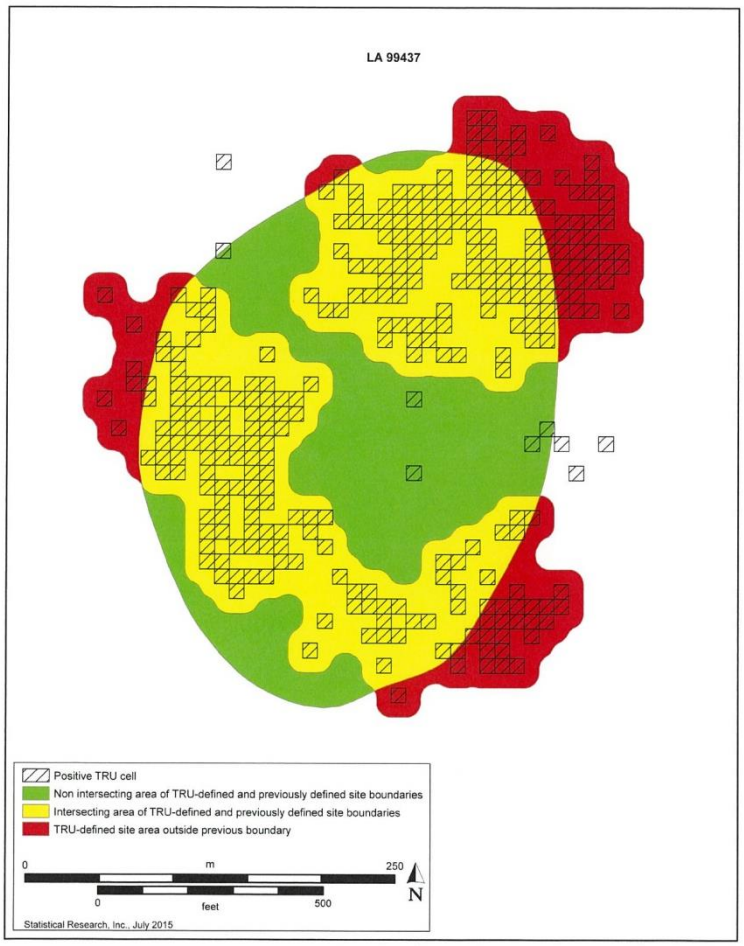

Figure 3. A depiction of the distribution of artifacts and features at site LA 99437. The TRU survey of this site resulted in the definition of two distinct localities containing site evidence, instead of the one originally recorded. Adapted from Heilen and Murrell 2015: Figure44.

Once the surface indications of a site have been recorded it then becomes the archeologist's task to determine how the site can contribute to our understanding of the past and this contribution often hinges on the site's physical integrity. The relationships between artifacts and features comprise an important source of information for interpretation and if these relationships are destroyed interpretation suffers. As an example, imagine a site with two levels that are exposed in a blowout. The upper level is from the Late Formative Period and the lower level is from the Archaic Period. An obsidian flake is found on the floor of the blowout and this flake can be traced to a particular obsidian source, but since it has been found eroded out of context it is not possible to tell which level it belongs to. A potential source of information about contacts or trade in either the Formative or Archaic periods that could be suggested by the obsidian is lost. Since almost all sites in the PA area are recognized by artifacts that have been eroded on the surface and out of context, it is important to evaluate a site's physical condition or integrity.

Using the TRU survey method different aspects of a site's condition and artifact or feature distribution

can be recognized and used as a guide for subsurface testing. Figure 4 illustrates the distribution of features recognized at the site and degree of impacts, including erosion, road, and pipeline construction within different portions of the site area. The predominance of orange and red colors indicates much of the site has been impacted.

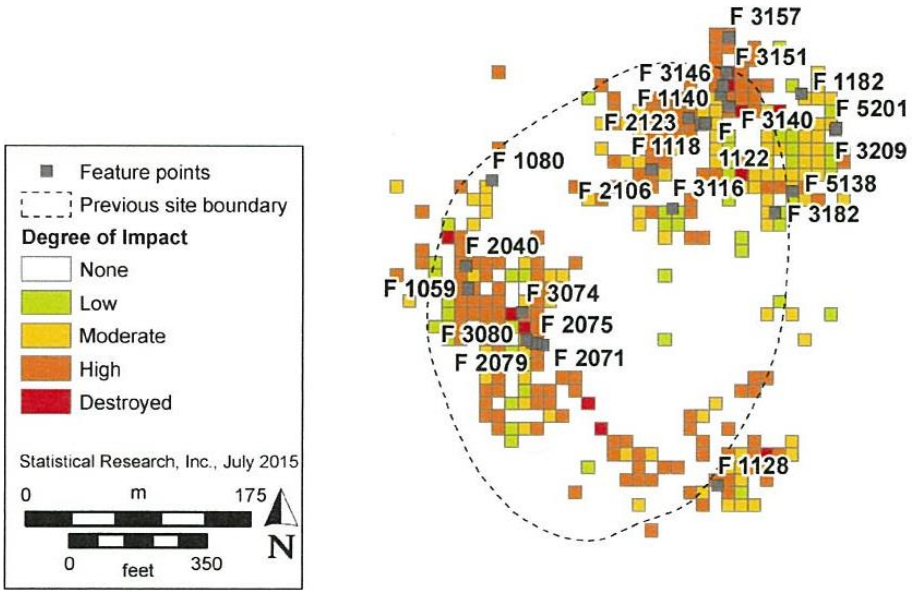

Figure 4. The geomorphological integrity of the soil deposits at site LA 99437. Adapted from Heilen and Murrell 2015: Figure26.

Similar plots were made to document the distribution and density of artifacts at the site and these patterns were used to identify different activity areas within the site and clusters of features that were also used as guides for subsurface investigations. Subsurface evaluations at the site included the use of trowels, shovels, and augers (all hand tools) to make small-scale test excavations and to clear limited areas of the site's surface. These tests were supplemented by larger trenches dug by using a back-hoe equipped tractor.

The testing here, as at the other sites, was extensively documented to cumulatively answer two basic questions that always arise; how should the testing be done and how much testing is needed to demonstrate that a site has research potential? Although there are differences in the location, topographic situation, soil depth, number of artifacts, and features between site LA 99437 and the other three sites included in the project the results from using the different methods are similar. Trowel tests were used to examine the different features and the report states:

> *Although the trowel tests did provide some evidence of subsurface deposits, this method was not a very effective means of revealing the context of the materials, and that context is necessary to the integrity and research potential of the site. Trowel-test units typically cannot be excavated to depths exceeding 25 cm, and the units were not large or deep enough to reveal any information regarding the site's geomorphic context. The probability of encountering subsurface deposits within the scattered archaeological manifestations in the area is negligible. However, trowel*

testing did confirm the presence of subsurface materials, and it remains an invaluable technique for determining whether datable deposits are associated with features exposed along the site surface.

Nine auger tests were made across the site and three of these had evidence of buried cultural materials. The report notes that:

Similar to the trowel tests, auger testing did provide some indication of the presence of buried cultural manifestations but yielded materials that lacked a significant context for determining the condition of the subsurface cultural remains or the site's geomorphic context. Again, this level of detail is a minimum requirement for evaluating the context of the remains in relation to the research potential of the site. The greatest utility of this testing method was in providing a rough estimate of the depth of cultural materials, as well as a gross characterization of the subsurface deposits.

Shovel tests (see Figure 5) were made to determine the site's depth and also to shave the top soil within small areas to better define suspected features. The report says:

Among the various hand-testing methods, the shovel tests excavated across LA 99437 provided the most significant amount of information in regard to aspects of the site's geomorphic context and the nature of the subsurface cultural manifestations. They also allowed for an exact determination of the stratigraphic context of the subsurface materials and provided the most information regarding the integrity of those remains. The test units were large enough to produce reliable profiles representing the site stratigraphy and the geomorphic context of subsurface materials. Shovel testing was the preferred method of all the hand-excavation techniques necessary to evaluate the nature of cultural manifestations within the area of site that demonstrated the greatest potential to contain a discrete occupational episode with an associated activity area.

Figure 5. Shovel test showing calcrete bedrock at bottom.
Adapted from Heilen and Murrell 2015: Figure 21.

Two mechanical trenches were excavated within the site and one outside the site's boundaries as an off-site control unit for defining site stratigraphy. One trench was excaveted in the shallow soil in the eastern portion of the TRU defined site area and one in the western TRU defined site area that had deeper soils. The western trench found a thick anthrosol approximately 10 cm in thickness beneath the coppice dunes. An anthrosol is a dark soil horizon resulting from human occupation of an area, in which charcoal, ashes, and other vegetal and animal waste is concentrated and incorporated into the soil. A feature consisting of a naturally occuring soil pipe within the calcrete bedrock was found at the base of the anthrosol. This soil pipe had been excavated by the prehistoric occupants and the resulting cavity in the bedrock had formed a ready-made subsurface storage pit (see Figure 6).

Figure 6. Archeologist Monica Murrell retrieves a probe from a storage pit created from a naturally occuring soil pipe in the calcrete bedrock at site LA 99437.

The report concludes with this statement about the mechanical trenching:

> *Of all the testing methods, mechanical trenches provided the greatest amount of detail regarding the site's geomorphic context and allowed for a regional correlation of the site stratigraphy, in addition to revealing aspects of the local landscape evolution. Furthermore, trenching at the site revealed the presence of a previously undiscovered, buried feature with an associated activity*

area, raising numerous implications for future research that would not have been otherwise identified at LA 99437.

The recording, testing, and analysis carried out at the site showed that there were concentrations of artifacts and features. Two features produced radiocarbon dates from both the Early and Late Formative Periods and a Three Rivers Red-on-terracotta potsherd dating to A.D. 1125-1300 also in the Late Formative Period. A limited number of macrobotanical remains also came from the two features, including mesquite wood, hackberry wood, prickly pear cactus seeds, hedgehog cactus seeds, cheno-am seeds (possibly goosefoot or pigweed seeds), and grass culms. Subsistence remains from one feature related to a fall season camping event, while the other reflected both spring/summer and fall resources. This is the soil pipe storage pit feature associated with the anthrosol and the interpretation of multiple-season plant remains reinforces the possibility that a single residence was located here and that people stayed for an extended period of time.

The significance of the site depends upon its ability to answer research questions contained in the *Southeastern New Mexico Regional Research Design and Cultural Resource Management Strategy* report and the site can contribute to three research domains: chronology and culture history, subsistence strategies, and settlement systems/mobility strategies. More specifically, research questions that may be addressed by the site include the following:

- When was the site occupied?
- What plant and animal food resources were collected, processed, and/or consumed by the site's inhabitants?
- What activities were conducted at the site?
- What were the probable size and composition of the resident group?
- What were the season and duration of the occupation/activity?

Site LA 99437 is illustrative of many of the sites located within the PA area in the Mescalero Plain. It is relatively small, the two areas identified through the TRU survey when combined are actually smaller by 7.7 percent than the area encompassed in the original recording. The site's artifact assemblage is also small, consisting of two potsherds and 44 lithic artifacts, and although 21 features were identified, only two had charcoal suitable for dating and charred macrobotanical remains for plant identification. Much of the site area has been impacted by erosion and bedrock appears at the surface, or very close to the surface, in many parts of the site. Yet a closer examination (not all of which was discussed above) revealed a complex series of occupations, mostly short-term and by a small number of people, spanning an estimated 700 years of time.

Site LA 143568 is located on a low hill containing deep sandy soil within a broad plain gently sloping to the west. It was initially recorded in 2004 and like LA 99437 it was a site of unknown cultural affiliation. There was little for current visitors to see on the surface, a few burned rocks eroding down the side of a deep depression, and a chert flake. In contrast to the eroded condition of LA 99437 this site obviously has deep soil and potentially buried within it intact features or artifacts.

As was done at all sites examined in the project, a series of hand tools were used to make a series of small tests using trowels, augers, and shovels. This was followed by the excavation of two trenches using a backhoe, one within the site area and one off site. The results were similar to those obtained at LA

99437: trowel tests were not able to be excavated to any depth and they were too small to reveal any information regarding the overall site condition and geomorphic context. The report notes*: However, surface observations indicated that the single feature had been highly disturbed prior to testing, and a trowel test was a very effective method of confirming that observation.*

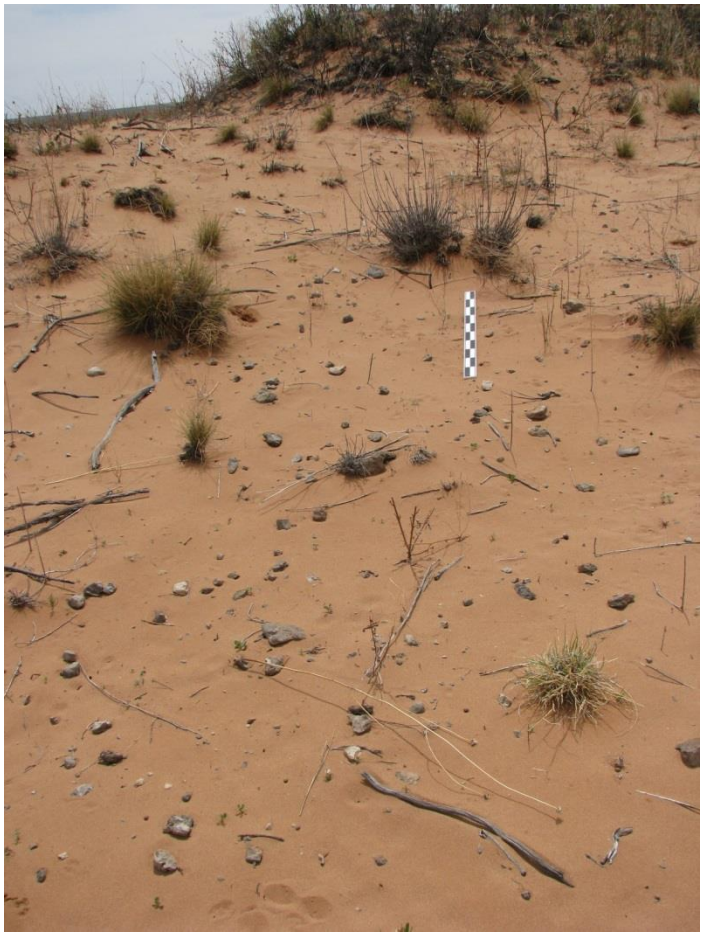

Figure 7. A view of a disarticulated burned caliche feature at site LA 143568. Small subsurface tests showed that the feature has no remaining intact portion.

The results of the auger tests found no evidence of buried cultural items or reliable information about the site condition. The report states: *Auger testing was most valuable in revealing the absence of buried cultural manifestations within the extensive dunal deposits and providing a general idea of the site stratigraphy. The results of this testing method suggested that the site was confined to the extent of the surface materials exposed in the blowouts.*

Shovel tests were more productive and like those at LA 99437 provided the most information about site stratigraphy and the nature of buried cultural materials. Shovel tests found one nodule of burned caliche at a depth of 10 cm to 31 cm below ground surface and another test discovered two pieces of burned caliche at a similar depth of 20 cm to 30 cm below ground surface. This burned caliche was scattered similar to the nodules that can be seen on the surface and though buried they are not indicative of additional intact deposits. Most surprising was the discovery of an ancient pond deposit in one of the

shovel tests. This pond marl was further exposed by one of the backhoe trenches. The report says: *Shovel-test units excavated at the site allowed for precise determination of the stratigraphic context of the buried cultural remains. Shovel testing was the preferred method of all the hand-excavation techniques necessary to evaluate the subsurface potential of the site.*

The backhoe trenches found two aeolian (wind-blown) units underlain by an ancient lacustrine deposit, but cultural materials were not observed in either trench. The report provides additional information about the lacustrine deposit:

> *The lacustrine deposit found in the off-site trench (TR 5007) is a pond marl that developed during the last full glacial or late Wisconsin. That discovery may provide additional information relevant to regional paleoenvironmental reconstructions, and it has been demonstrated that varieties of both gastropod- and ostracode-shell remains are contained within the deposit. However, an attempt to extract pollen from the marl was unsuccessful, indicating that it is devoid of any preserved remains, and the pond deposit substantially predates human occupation of North America. The lack of any associated buried cultural materials relating to scattered materials exposed at the surfaces of the interdunal basins at the site is suggestive of very ephemeral site use likely characterized by a single short-term, logistical camping event. Of all the testing methods, mechanical trenches provided the greatest amount of detail regarding the site's geomorphic context and allowed for regional correlation of the site stratigraphy. The trenches extended to depths exceeding that of the cultural component, in order to reveal nuances of the local landscape evolution. Although not directly related to the surface cultural component, the excavation of these trenches was invaluable in revealing the ancient pond deposits concealed by the aeolian sands. This deposit could have served as a resource to prehistoric occupants in the area and contains valuable paleoenvironmental information; it warrants further investigation (Figure 32).*

Figure 8. Photograph of the ancient lacustrine deposit (the gray soil) found at the base of a mechanical trench, east-wall profile. A reproduction of Figure 32 in Heilen and Murrell 2015.

The TRU survey at the site located a total of six artifacts consisting of four pieces of debitage, or waste byproducts from making stone tools and two potsherds (see Figure 9). The debitage was of chert, petrified wood, and rhyolite materials. The lack of any cores or lithic tools implies that those were carried away at the time of site abandonment and is further evidence of the ephemeral nature of the prehistoric occupation. Two ceramic sherds were found; one a Playas Red Textured body sherd and an undifferentiated brown ware body sherd. This is important, because no ceramic artifacts were found previously at the site and the Playas Red Textured sherd provides a relative date of A.D. 1200 to A.D. 1400 for the site's occupation. Brown ware was made for a much longer period of time and is less useful for dating purposes. The original recording noted the presence of groundstone fragments, but none were

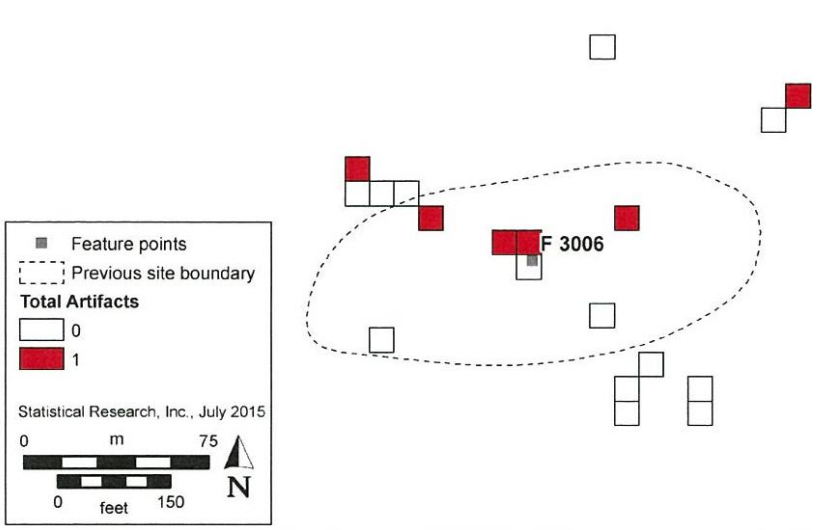

Figure 9. The distribution of artifacts at LA 143568.

found during the later TRU recording, in contrast, ceramic sherds were found in the later TRU visit, but not by the original recorders.

A summary of the site's significance notes that it represents an ephemerally occupied campsite at some indeterminate time within the Late Formative Period. The single burned caliche feature is deflated and has no datable deposits nor carbonized plant remains that can be identified and related to subsistence activities. The site lacks physical integrity and cultural items have been vertically displaced at least 60 cm in elevation. No evidence of buried artifacts or features was found. The Pleistocene-aged pond deposit is geologically important and can contribute to future paleoenvironmental studies relevant to the Mescalero Plain, but Optically Stimulated Luminescence dating indicates the deposit dates prior to the human occupation of North America and it does not qualify as an archeological component of the site. Basically the TRU recording and testing concludes all of the research that can be done at the site. The written record and collected artifacts comprise a body of information that will be available to any interested researcher in the future.

This report has made a significant contribution by illustrating the value of taking a systematic approach in recording sites within the PA area. As one example, the artifact inventory at site LA 143568 originally

included three groundstone fragments, but these items were not found during the later TRU survey. The groundstone was not identified as to type, which would be useful information to know. Given that the site has sandy soil, one can speculate that the fragments have been covered by shifting sand during the 10 year interval between the original recording and the TRU update. The site form has no information on the location of these artifacts, but to try to sift through the loose surface sand within the approximately 2.8 acres (11,331 square meters) of the site area is a significant and expensive undertaking. If these groundstone fragments had been recorded using the TRU method the search area could have been reduced to a 10 square meter square area (the grid size), assuming they were all deposited in one place.

As another example, impacts to site LA 99437 recorded through the TRU method, were used as one attribute to determine where testing would take place and this led to the discovery of the anthrosol and buried feature that produced a radiocarbon date and carbonized plant remains used to identify seasonal use of the site.

Likewise the careful recording of the placement and results of the different testing methods should be useful as a guide for others in future site evaluations undertaken within the PA area. In particular the limits and possibilities of each kind of technique can be evaluated and applied to a wide variety of specific site circumstances. This is important because few archeologists have had an opportunity to participate in the evaluation of a wide range of site types.

Other Archeology News from the Permian Basin

Projectile points readily come to mind when the subject of archeology comes up, but prehistoric people needed a variety of stone tools in daily life. One such tool, a scraper, was highlighted in a recent report entitled "Mobile Hunter-Gatherers in the Cedar Lake Playa Depression: Archaeological Data Recovery at The Biting Ant Site Complex (LA 117293 and LA 171726), Linn Energy's Turner "B" South Tank Battery Produced Water Release Cleanup, Eddy County, New Mexico," edited by Jim Railey. This report was briefly described in the *Permian Quarterly,* Volume 3, Number 2.

This artifact is made of chert and measures 2.9 cm x 1.5 cm x 0.59 cm (length, width, thickness). One can visualize the approximate size of this artifact by placing two standard paperclips side by side. It is pictured below in Figure 10, illustrations A and B. The tool has a small concave working edge and as researcher Jim Railey noted: *This tool would have been suited for scraping and smoothing the surfaces of a dart foreshaft, fire-making drill, or some other narrow, cylindrical-shaped object of wood. Use wear is evident along its working edge (Figure 8.5, B). The tool was probably set into a wooden handle, and the portion of the tool protruding beyond the handle edge appears to have snapped off, probably during use.*

His hypothetical reconstruction of the tool in its handle and how it may have been used is illustrated on the cover of this newsletter and his Figure 8.5, B is reproduced as Figure 10 below. Figure 10, C is a bifacially shaped tool made from a chalcedony pebble. Railey notes: *Its working edge is sharp and the tool may have been used for slicing. Its wedge-shaped cross-section suggests an alternative (or additional) function as a tool for splitting materials such as small sticks, which in turn could have been fashioned into any number of items.*

These relatively simple tools may have been viewed by their original users as an important part of their total tool kit and they point to the presence of other items of daily use made of wood, feathers, and fiber

that do not survive in open air sites such as LA 171726. Readers with internet access can go to the website "Texas Beyond History" and then to the Granado Cave page to see artifacts such as a net burden

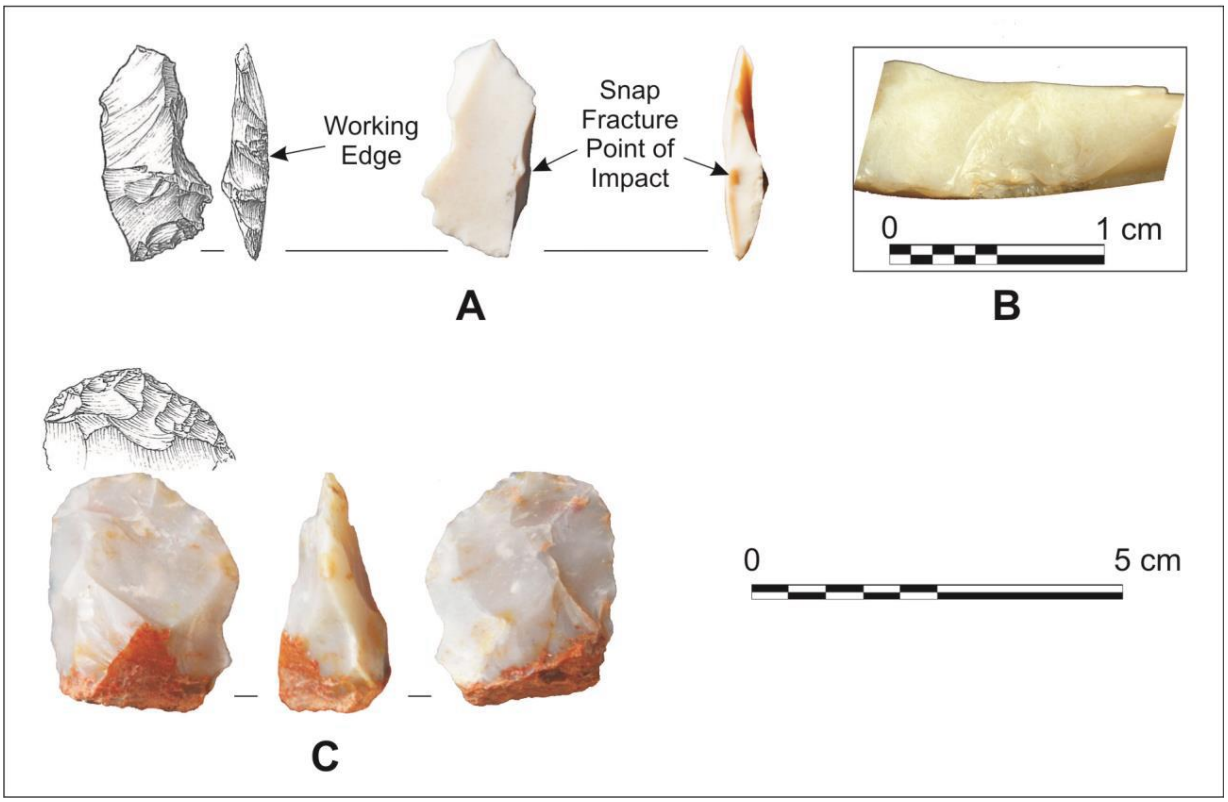

Figure 10. Two tools from LA 171726 include a flake scraper of white chert (A), with a concave working edge. Inset B is a microphotograph of the working edge. Artifact C is a wedge-shaped bifacially flaked tool of chalcedony.

basket, a coiled basket, a grass bag, yucca cords and sandals, as well as wooden musical instruments, rabbit sticks and arrows of cane with feather remnants (http://www.texasbeyondhistory.net/granado/index.html). Granado Cave is located in the Texas portion of the Chihuahuan Desert just south of the PA area and the New Mexico state line.

Back Issues of the *Permian Quarterly* are Available

Back issues of the *Permian Quarterly* are available at the Bureau of Land Management, New Mexico State Office website at http://www.blm.gov/nm/st/en.html. Use the "Quick Links" section then go to Cultural Resources - Research/Partnerships - Permian Basin Partnership.

Newsletter Contact Information

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