PERMIAN QUARTERLY

Permian Basin Programmatic Agreement Quarterly Newsletter

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Dr. Steve Hall discusses the characteristics of the sandy soil exposed in the backhoe trench beside him during the recent Permian Basin geomorphology workshop. More information about the workshop can be found inside this newsletter.

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 the implementation of the PA and to disseminate that information to a wide audience.

Introduction to the Permian Basin Programmatic Agreement

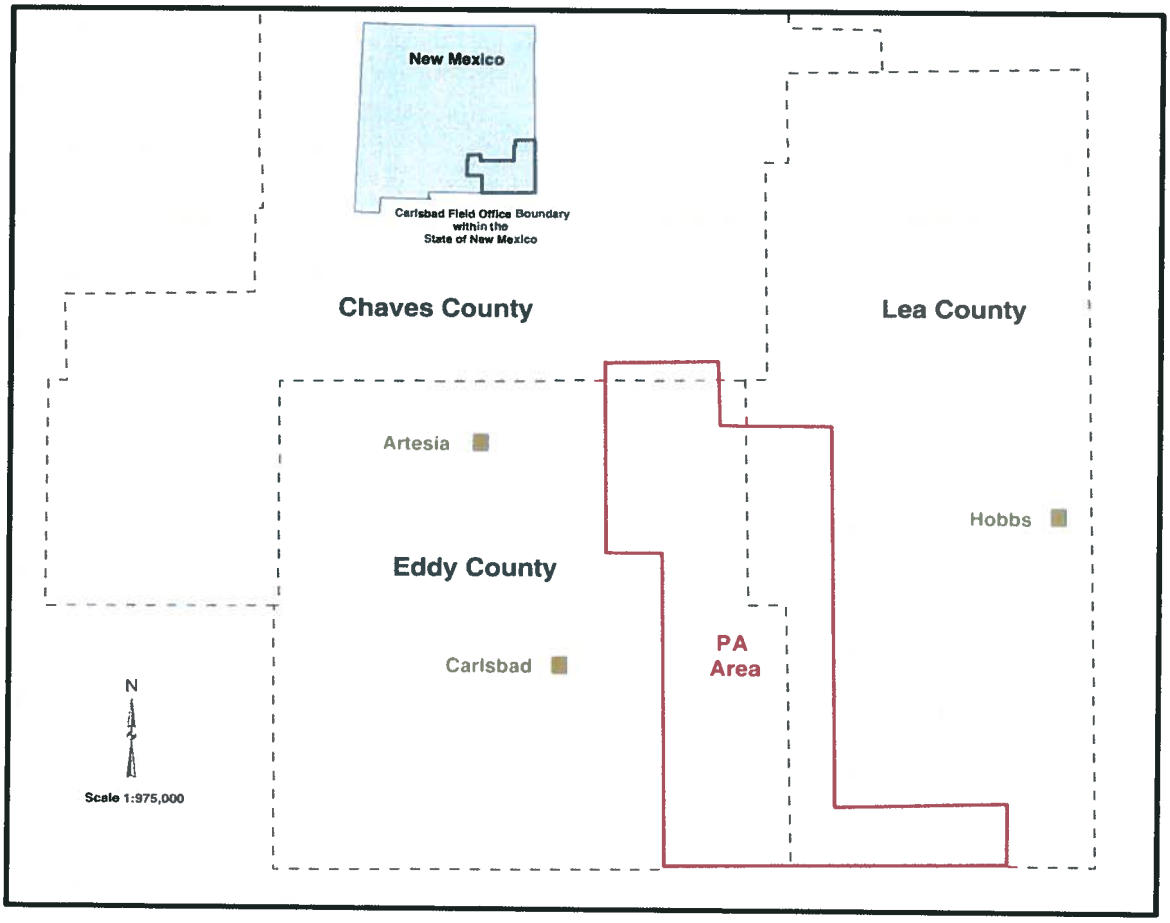

Figure 1. Map showing the Permian Basin PA Area.

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 southeast 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 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 southeast New Mexico.

Current PA News

Permian Basin MOA is now a Programmatic Agreement!

The Memorandum of Agreement among the Bureau of Land Management New Mexico State Office (BLM), the New Mexico State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation (ACHP) concerning Improved Strategies for Managing Historic Properties within the Permian Basin, New Mexico (MOA) expired in May of this year. In April, a three year extension was approved, terminating in May 2016. The extension, executed as a Programmatic Agreement (PA), retains all the provisions of the original Memorandum of Agreement, plus it now allows the BLM to offer the alternative PA compliance process to potash companies or local units of government for small-scale projects, such as exploratory wells, pipelines, power lines, access roads or telephone and fiber optic lines (but not cell towers). Elgible projects must be able to be easily relocated in order to avoid known archeological sites.

Projects **not** eligible for the PA primarily include those of large scale, such as intrastate transmission lines, mining plans of operation, portions of federal mineral leases extending beyond the PA boundaries, and interstate projects, such as transmission lines and highways. These projects must comply with 36 CFR 800 regulations that typically include an archeological survey to identify cultural resources early in project planning.

Although the acronym has been changed from MOA to PA, the operation and intent of the original agreement to promote research has not changed.

PA Advisory Workgroup Meeting

The PA Workgroup is composed federal and state archeologists with compliance or land management responsibilities in the PA area; contract and academic archeologists with research interests in the PA area; a representative of seven Indian tribes with historic ties to southeast New Mexico, and a representative from the oil and gas industry. It was established to provide direction for archeological research conducted through the PA. The next meeting of the Workgroup is scheduled for October 3, 2013 in conjunction with the Jornada-Mogollon Conference in El Paso, Texas.

Task Order Update

Task Orders created through the BLM contracting system provide the major thrust of the research effort undertaken by the PA. Currently three task orders are underway: Task Order 9 is an historic context of the oil and gas industry in southeastern New Mexico; Task Order 10, which is summarized below, will provide a roster of sites for research purposes; and Task Order 11 is a study of lithic resources within the Carlsbad Field Office boundaries.

Task Order 10, entitled *Landscape Testing Project: Analysis of Feature Samples,* has begun. This contract is for the analysis of soil samples taken from 500 features, primarily hearths, distributed across the PA area. Although the samples are small - each one approximately 8 ounces or a measuring cup in size - it is anticipated that each will produce a radiocarbon date and information about plant utilization by the people who created the feature from which it was collected (see the previous *Permian Quarterly* V. 1, No. 1 for more detail about this task order). The analyzed samples will provide a roster of dated sites for future research.

The initial processing of the samples has begun and we have received preliminary plant identification information and 200 radiocarbon dates for the portion of the PA area from the Chaves County line to U.S. Highway 62/180, which is approximately midway within the PA area. The comments that follow focus on the charred material that was used in dating the features, and as such, represent only a portion of the plant identifications that were made.

As expected, mesquite is the most common charred plant material found in the samples, comprising 55 percent of all the samples and 70 percent of the samples in which the charred material can be identified. This is probably the result of its well-known properties as fuel since it burns slowly, with an intense heat, and produces a long-lasting bed of coals. It is interesting to note that 96 percent of the identified mesquite is characterized as being in a vitrified state, that is it has a hard, glassy appearance. The use of mesquite for fuel, food, medicine, and crafts as documented in historic and ethnographic sources can be found in the last issue of the *Permian Quarterly* (Volume 1, Number 1).

The next most common plant is saltbush, comprising 13 percent of the identified remains. Uses of this plant were described in a recent (2010) report, "Macrofloral Analysis, AMS radiocarbon Dating, and Organic Residue (FTIR) Analysis of Samples from Site LA 165923, Eddy County, New Mexico," by Melissa Logan and Kathryn Puseman.

> *Atriplex* (saltbush) was exploited for both its greens (cooked as potherbs) and seeds. The seeds were ground and sometimes mixed with cornmeal to make a variety of mushes and cakes. The seeds were parched and ground into a meal. *Atriplex* meal sometimes was used to make a salty pinole. *Atriplex* leaves and young shoots also have a salty taste and were cooked as greens or added to meat and other vegetables for its salty flavor. Young stems and hearts of saltbush were eaten. The leaves also were boiled in water, then strained and fried in grease. Leaves were rubbed in water to produce a lather for washing clothes and baskets. The dried tops of *A. canescens* (four-wing saltbush) were used to make a tea for treating nausea and vomiting from the flu. A hot tea was taken for breaking fevers, while a cold tea was used to treat stomachaches. *Atriplex* ashes also were used to make hominy. *Atriplex* leaves, twigs and blossoms yield a bright yellow dye. The wood was a source of firewood. *Atriplex* are annual or perennial, herbaceous or shrubby plants found in arid, alkaline, or saline soil (Bryan and Young 1978:32; Cornell 1997:46; Curtain 1984:66-69; Kearney and Peebles 1960:225; Kirk 1975:59; Moore 1990:29; Whiting 1939:18, 22, 73).

Other plants identified in the samples include buckthorn, cholla, creosote, hedgehog cactus, juniper, oak, sagebrush, sumac, and sunflower.

A surprise find was that of a small piece of fabric from prehistoric site LA 172564. This tiny scrap, in area approximately the size of a Number 2 pencil eraser, clearly shows its woven character in a photograph taken through a microscope. Further tests are planned to determine if it is composed of animal or plant fibers. A future issue of the *Permian Quarterly* will provide an updated analysis of the fabric.

Figure 2. A fragment of fiber with mm scale. Photograph by Peter Kovacik, Paleoresearch Institute.

Figure 3. General view of site LA 172564. The fabric came from the vicinity of the sign board.

PA Small Grants Program

In cooperation with the Historic Preservation Division of the New Mexico Department of Cultural Affairs, the PA is funding a small grants program. Six applications (listed below) were approved in the current round for projects to be completed by May 15, 2014. These applications include an interesting mix of current technology applied to archeological research questions. The name of the project is in italics, followed by a brief summary of the work to be accomplished, and its result.

- *Characterization of the Nutt Mountain Obsidian Source*
  Researchers from the University of Missouri and the Archaeological XRF Laboratory in Albuquerque have teamed up to characterize the obsidian present in ash flow deposits associated with Nutt Mountain in the Deming, New Mexico vicinity. The composition of the trace elements present in obsidian from this source will be compared to samples from major western New Mexico sources in an effort to distinguish between them and more confidently identify artifacts using the non-destructive method of x-ray fluorescence (XRF). Obsidian, or volcanic glass, is well suited to XRF analysis and because obsidian was a prized material for trade or gift exchange, its distribution across the landscape provides one of the most conclusive indicators of long-distance interaction between prehistoric people. Obsidian does not naturally occur in the Permian Basin or elsewhere within the CFO boundary, but obsidian artifacts are found at sites in this region, providing opportunities for research into its distribution.

- *Understanding Sources of Variability in Brownware Ceramics in Southeast New Mexico*
  The archeological consulting firm APAC proposes to study brownware potsherds using petrographic mineralogy and instrumental neutron activation analysis (INAA), in combination with more traditional ceramic typology methods, to identify potential sources of brownware pottery production. This should improve the recognition of sherds from these sources at sites within the PA area and elsewhere in southeast New Mexico. Brownware pottery and more commonly sherds (broken pieces of whole pots) are the most abundant ceramic artifacts found at sites in southeast New Mexico. The lack of decoration on these sherds, the variations in color and surface finish (primarily resulting from their production), and the visual identification of mineral inclusions in their paste has led to a number of type names being assigned to them. Type names can be a useful shorthand method of analysis but currently, a large number of names and the uncertainty of assigning sherds to them limits the usefulness of this method.

- *Detection of Buried Archaeological Features in the Mescalero Sand Plain Using Geophysical Survey Methods*
  Archaeo-Physics, LLC , the Institute for Rock Magnetism, and the Archaeological Sciences Group at the University of Minnesota propose to conduct geophysical fieldwork at three to five sites in the PA area. This will be accomplished by conducting a magnetic field gradient survey over the site, followed by a very high-resolution ground penetrating radar survey over anomalies identified in the resulting magnetic data. Magnetic surveys in arid environments have had mixed successes in the past, due to limited magnetic contrast between the soil in the

archeological features and the soil that surrounds them, so one component of the project will be the analyses of soil samples in the laboratory to facilitate more sophisticated modeling of the expected signal response from buried features. These non-invasive survey methods, if successful, will be a boon to future evaluation of sites in the PA area.

- *Survey and Documentation of Four Rock Art Sites in Eddy County*
  Consulting firm Geo-Marine, Inc., Sacred Sites Research, Inc., of Albuquerque, and Mark Willis Archaeology of Austin, Texas will document rock art panels at four sites using state-of-the-art digital photography, scaled panel drawings, and tracing of selected pictographs, if needed. Digital images will also be collected to allow for a 3D reconstruction of the rock art and its location. A 3D reconstruction is useful for research and as well for public education to enhance the awareness and appreciation of these sites (for an example, Google Panther Cave, Texas 3D). Interpretations of the age and iconography of the rock art elements and motifs using current theoretical models will be offered. Rock art is a fragile resource and it is important to document it accurately and adequately. For example, the Ruby Canyon Shelter, one of the sites to be documented, was within the area burned by a wildfire in 2011. Although an inspection of the site after the fire showed no immediate damage, the heat of the fire may have caused internal changes in the rock structure and these may only become evident in the future, when the rock spalls or otherwise disintegrates.

- *Investigating Clay Lunette Dune Fields at the Laguna Plata Basin, Lea County, New Mexico: A Case Study for Paleo-Environmental Reconstruction in Southeast New Mexico*
  Consulting Firm Geo-Marine, Inc. and the University of Arizona, School of Anthropology and Geosciences propose to study the age and composition of clay lunettes or dunes that fringe the eastern/southeastern side of Laguna Plata, a large salt lake basin, through core samples. Laguna Plata is ringed by numerous prehistoric sites that are listed on the National Register of Historic Places as an archeological district. The nomination form notes that, "The key relationship among the archaeological sites that makes the District a cohesive unit for preservation and investigation is the aggregation of these sites in a specific ecosystem consisting of the dune area, several small ephemeral playas, and springs; all of these are on the margin of a major lake – Laguna Plata…Taken together, these associations form a relationship among sites and their environment that remains intact while offering investigators a unique opportunity to study human adaptation to playa ecosystems." The intent of this research project is to build upon an existing geoarchaeological study carried out at the Laguna Plata lunette dunes, with a focus on the older Series I clay lunette dunes along the southeast margin of the basin; to understand the depositional relationship between the younger Series II and III lunette dunes and the Series III dunes as they relate to basin dynamics; and to reconstruct the paleoenvironmental history of the basin and how past environmental factors may have influenced human utilization of the basin landscape.

- *Paleoindian-age Geomorphology and Environments at the Williams Sink, Southeastern New Mexico*

  Red Rock Geological Enterprises of Santa Fe intends to determine the relationship between Paleoindian site LA170225 and the local stratigraphic and geochronologic sequence of deposits at the north edge of Williams Sink. The Williams Sink was formed by the collapse of the near-surface rocks upon the dissolution of salt from the subsurface Salado Formation (Upper Permian). Although the sink is thought to be Pleistocene in age, there is no way of knowing ahead of the proposed study if the sediments in the sink include the Paleoindian period. The products of this study will include a summary of the Paleoindian site LA170225, an assessment of the geomorphic context of the site, a well-dated pollen sequence with which Red Rock Geological Enterprises will reconstruct the paleo-vegetation of the central Mescalero Plain for the period defined by the age of the proxy data record, a well-dated diatom sequence that will define the water-quality history of the sink, and a sedimentologic evaluation of the sink deposits. Another product is to construct a preliminary paleoclimatic framework which, in turn, can be compared to other regional records. It is also anticipated that the results of this study of Williams Sink will document the research potential of other depression-fill deposits in the Permian Basin.

Results of the small grants projects will be reported in future issues of the *Permian Quarterly*.

Other Archeology News from the Permian Basin

Geomorphology Workshop

A second geomorphology workshop focused on the Mescalero Plain was held April 19-20, 2013. The workshop was sponsored by Intrepid Potash New Mexico, L.L.C., the New Mexico Archaeological Council, Lone Mountain Archaeological Services, Inc. and the BLM Carlsbad Field Office. Since the first workshop was held in 2002, new data has been collected, in particular, optically stimulated luminescence (OSL) dates that have provided a better understanding of the geologic history of the sand sheet and its relationship to the archeological record. Guided by workshop instructor Dr. Steve Hall of Redrock Geological Enterprises, the 28 participants visited natural exposures of soil columns and others provided by backhoe trenches at five locations in the central and northern portions of the Mescalero Plain.

Topics discussed during the workshop included the origin of sand in the Mescalero Plain, the mechanics of sand movement, the formation of coppice dunes and parabolic dunes, the age and distribution of the Loco Hills soil, dating the sand and correlation of dates in different localities, and the creation of the modern landscape through erosion in the early 20th Century. Workshop participants came away with a new appreciation for the complicated geologic history of the Mescalero Plain.

Volunteer Cataloging Project

Volunteers from the Southeast Chapter of the New Mexico SiteWatch program have, for the last several months, been cataloging donated artifact collections at the Western Heritage Museum and Lea County Cowboy Hall of Fame in Hobbs. These collections primarily consist of prehistoric artifacts collected in

Figure 4. Geomorphology workshop participants examine the former location of a spring now buried deep within parabolic dunes. Different types of sand dunes directly relate to different preservation potential for prehistoric archeological sites.

Chaves, Eddy, and Lea counties in the 1950s and 1960s. Other donated collections originated in west Texas.

In order to make these collections available for exhibits and to facilitate access to them by researchers, they are separated into artifact classes and museum accession cards are filled out under the supervision of archeologists from the Carlsbad Field Office. To date over 190 hours have been donated to this project. The bulk of the artifacts came from the Smith family, former members of the Lea County Archeological Society. Calvin Smith was also the former director of the Western Heritage Museum and a tireless promoter of the history and prehistory of southeast New Mexico. The end result of the project will enable these collections to fulfill their potential to fascinate and educate future generations about the prehistory of southeast New Mexico.

Newsletter Contact Information

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Figure 5. Volunteers catalog artifacts in a storage facility at the Western Heritage Museum in Hobbs.