PERMIAN QUARTERLY

Permian Basin Programmatic Agreement Quarterly Newsletter

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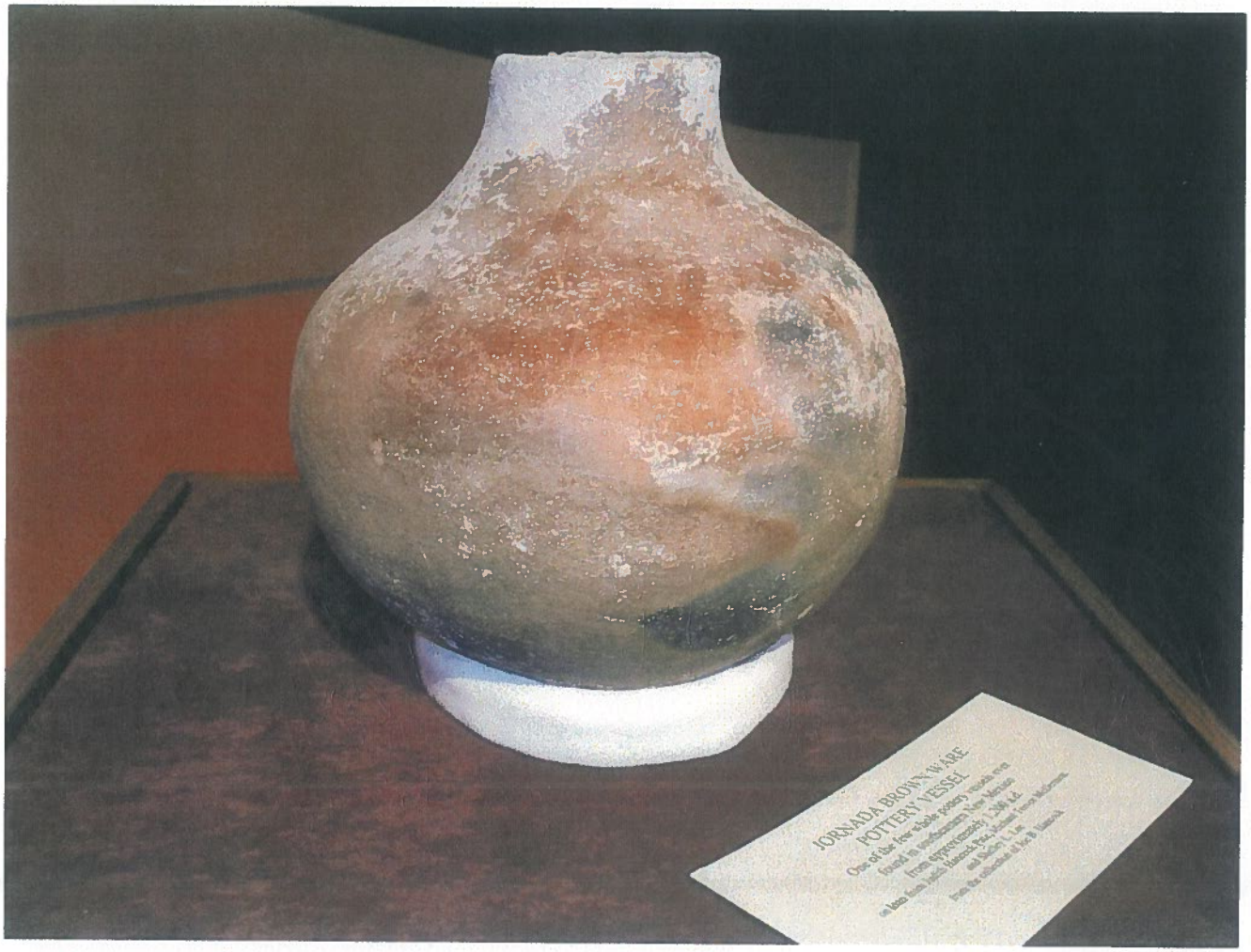
New Mexico



This Jornada Brownware pottery vessel is on display at the Western Heritage Center and Lea County Cowboy Hall of Fame in Hobbs, New Mexico. Utilitarian pots, such as this one, were widely used in later prehistoric periods as evidenced by the discovery of potsherds at numerous sites in Chaves, Eddy, and Lea Counties. A study to identify the localities of manufacture and distribution of pottery is reported in this newsletter (Photograph courtesy of Cal Smith).

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

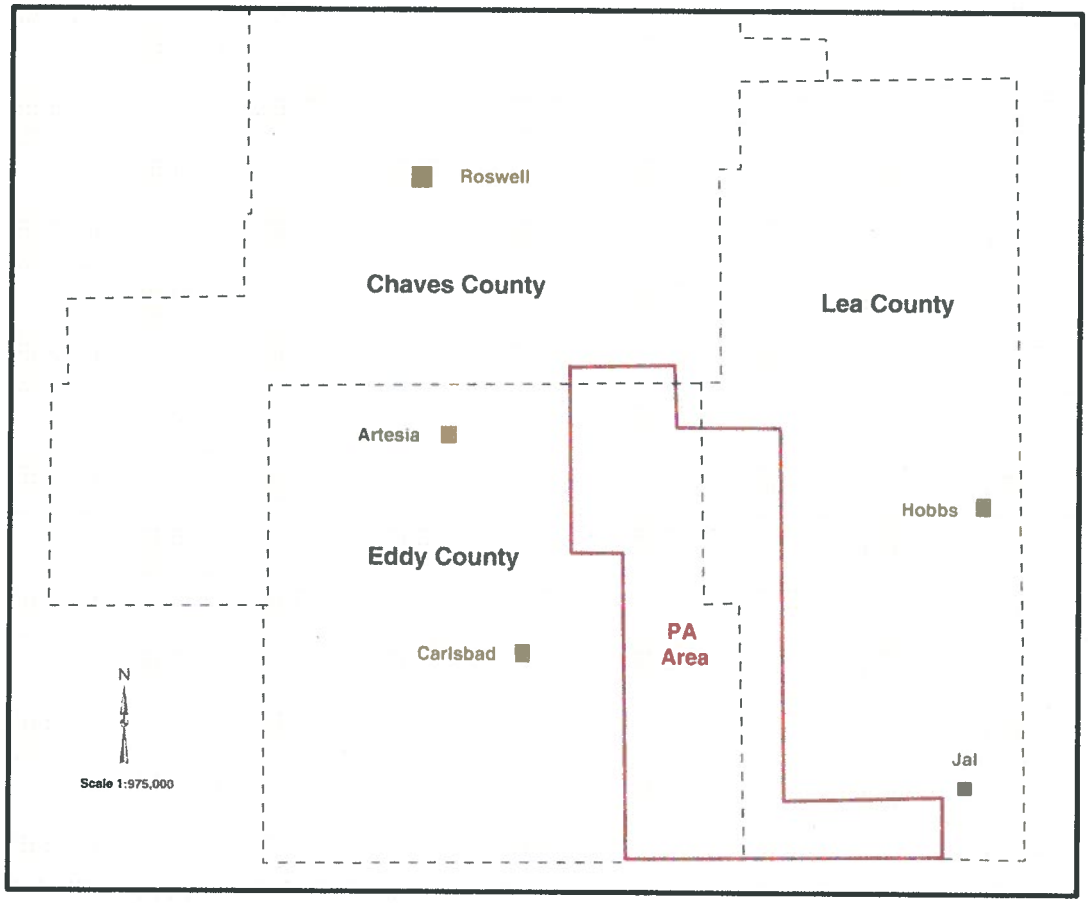


Figure 1. Map showing the Permian Basin PA Area.

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

How is it Working? An Evaluation of the Permian Basin PA in Federal Fiscal Year 2014

September 30, 2014 marked the end of Federal Fiscal Year (FFY) 2014 and this milestone prompted a review of the operation of the Permian Basin PA during that period. All projects in the PA area that were reviewed under the PA and those reviewed under Section 106 of the National Historic Preservation Act of 1966, as amended, where archeological surveys are required, were examined. The results of the review were used to gauge how well the PA program is working.

- How many projects were undertaken within the Permian Basin PA area in FFY 2014?

  There were 975 projects, primarily designed for oil and gas related activities, located within the Permian Basin PA area.

- How many of those projects were reviewed under the Permian Basin PA?

  There were 678 projects reviewed under the PA, broken down into four major categories: corridors for flowlines, pipelines, electric lines, or roads; pads for oil and gas wells; blocks for compressor stations or drill islands, and areas of oil or saltwater spills. Corridor projects totaled 218; well pads were 443; blocks totaled 3; and there were 14 spills processed under the PA.

- Were any of the Section 106 reviewed projects eligible for processing under the PA?

  Yes, 161of the 297 Section 106 surveys were eligible for PA review. This was determined by examining the projects' location with respect to previously recorded sites. For instance, if a well pad was located within a space 100 feet from any previously recorded site (a PA requirement), but it was subject to Section 106 survey, it was counted as a potential PA project.

- Why were these potential PA projects processed under Section 106?

  A further review of these potentially eligible projects was undertaken to see if one or more reasons for not using the PA could be deduced, but this review produced inconclusive results. Some companies have never used the PA and a number of the survey reports could be linked to their projects. Other reports were from companies that are new to the region and they are possibly not aware of the alternate form of compliance. Still other reports were associated with companies that do use the PA for the majority of their projects, but for some unknown reason did not do so in these instances.

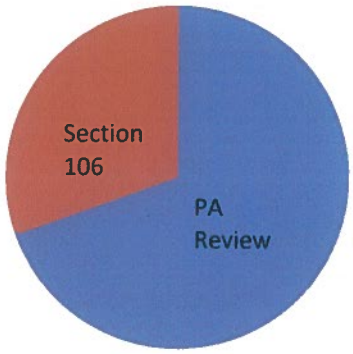
- Did any of the surveys done for projects reviewed under Section 106, but potentially eligible for the PA process, report finding previously unrecorded sites?

  Yes, of the 73 linear surveys, 70 well pads, 16 spills, and 2 block surveys, one reported the discovery of a site. A small prehistoric site, LA 178471, was discovered during the survey for a produced water spill. This site was a small artifact scatter consisting of 2 stone flakes, 9 brownware potsherds, 1 hammerstone fragment, two ash stains, and a charcoal stain, probably representing the remains of a former hearth. This site was located within the buffer zone surrounding the spill and it was not impacted by the spill or cleanup. If this spill had been reviewed under the PA the site would not have been impacted, but the existence of the site would

not have been discovered at this time. This information is important as a rough estimate of the impact of the PA on unrecorded archeological sites. One underlying tenent of the PA is that although some sites may be impacted by PA projects, the value of the research funded through the PA will offset any losses.

In summary the Permian Basin PA was used for 678 of the primarily oil and gas projects undertaken within the PA area during FFY 2014. Adding the 161 projects that were potentially eligible for PA review boosts the total to 839, which would indicate full use of the PA during that time period. For FFY 2014 the PA review was used for 81 percent of the projects that were eligible under the agreement. This review of the Permian Basin PA indicates that it is performing at a high level. The results of the research undertaken and funded by the PA will hopefully also be rated at a high level when viewed retrospectively in the future.

Figure 2. Projects Reviewed in Federal Fiscal Year 2014.



Research Update

Brownware Pottery Study is Completed

The majority of the prehistoric sites found within southeastern New Mexico are small and are interpreted as temporary stopping places for people living a mobile lifestyle as hunter/gatherers. The artifacts left behind in these sites reflect this mobility also, as they are typically limited in quantity and in type, having been produced by a small number of people over a relatively short time period. Durable stone artifacts are most common and the most abundant type is stone waste flakes produced during the process of making stone tools, such as projectile points, knives, or other forms of cutting and piercing tools. Manos and metates, or fragments of these grinding tools, are found at some locations. Other durable artifacts found at some sites are potsherds, which are fragments of broken pottery vessels. This artifact inventory is common for open air sites, which are the most numerous.

A more complete picture of the items used in daily life can be seen in the artifact inventories found in dry caves, rockshelters, or other places protected from the weather. Stone and ceramic artifacts can also be found in these locations, but perishable artifacts are exclusively found in these protected places. Items such as coiled baskets, woven fiber sandals, lengths of cord, twined woven baskets, portions of netting, wooden atlatls, and wooden foreshafts for projectile points have been found in dry caves in this region (Howard 1935). Readers can find photographs of similar objects found in Texas, just south of the state line, at the website *Texas Beyond History*. Navigate to "Trans Pecos" and then "Granado Cave." Taken together these durable and perishable artifacts are all useful objects for daily life.

Just as these artifacts were useful to their original makers for different tasks in daily life, so today analysis of these artifacts can shed light on one or more aspects of the prehistoric lives of their makers. Pottery vessels and potsherds have been of interest to archeologists for many years. The introduction of pottery is seen as a major watershed event in prehistoric North America and the definition of different pottery types has been a major activity of archeologists. Southwestern archeologists have had much success in sorting out the time periods during which decorated pottery was produced at different pueblos. This has provided a means of dating sites where decorated sherds have been found, sometimes hundreds of miles from the pueblo of their origin. These distant finds have also contributed to the definition of trade or contact routes showing interaction between widely scattered people.

Not all pottery is decorated, however. These plain vessels are often termed "utilitarian" pots. These are vessels used for the mundane tasks of daily life, for example, carrying water, storing food, or for cooking. This newsletter cover shows a photograph of an intact Jornada Brownware vessel, which is an unusual find because most of the pottery at sites is found in the form of sherds, typically 2 square inches or less (5 cm) in size. Many of the potsherds found within the Carlsbad Field Office boundaries are classified as "unspecified brownware," referring to their brown color and lack of decoration or other distinguishing characteristics. Plain brown pottery is among the first produced in the region beginning approximately A.D. 200 and it has a wide distribution in the Jornada and Jornada-Mogollon areas, generally from Chihuahua, Mexico through south-central New Mexico, to southeast New Mexico, and the Trans-Pecos area of west Texas. Brownware sherds are also occasionally found in the Llano Estacado region of the High Plains, such as the Kent Creek Site near Turkey, Texas (Cruse 1992).

While brownware sherds can reliably be distinguished from plain pottery produced in other regions, distinguishing variation within the ware has proven more difficult. Researchers have noted differences in pottery produced in the southern portion of this region from that produced in the northern region, primarily based upon tempering material. Crushed granite rocks were used in the southern Rio Grande River drainages and southern Tularosa Basin for El Paso Brownware, while a variety of rocks and minerals occur in northern Sierra Blanca and Sacramento Mountains pottery for Jornada Brownware. Attempts have been made in the past to categorize different brownware sherds based upon differences in attributes such as surface polish, temper, or paste color, but these attributes have not proven to be consistent indicators. Often the same sherd will be classified differently when viewed by different analysts. This is frustrating because brownware pottery, if it can be reliably classified, could potentially provide the same information as decorated pottery concerning its date of production and its distribution through geographic space.

The Permian Basin PA funded a small grants program in 2013 administered by the Historic Preservation Division of the New Mexico Department of Cultural Affairs. The purpose of the program was to provide funds for small-scale, but important research projects that could be accomplished in a relatively short period of time. One of the projects selected for the grants program was a study of brownware pottery by Dr. David Hill of the consulting firm APAC. His report entitled, "Understanding Sources of Variability in Brownware Ceramics from Southeastern New Mexico," studied potsherds collected from five sites in the vicinity of Carlsbad and Artesia, which he termed "Lowland Sites" and compared them to sherds obtained from four excavated sites located over 100 miles to the west, which he termed "Upland Sites." This research was a pilot study to evaluate the success of different methods to categorize brownware sherds.

His analysis relied on a visual classification of a study sample of 80 sherds, coupled with thin section petrographic, and Instrumental Neutron Activation Analysis (INAA) studies of the same sample. He intended to answer two questions: Is it possible to visually identify brownware ceramics that share a common mineralogical and chemical composition? and "How do ceramics that have been identified as originating from different sources correspond to the different typological classifications that have been

applied to brownware ceramics in southeastern New Mexico?" Another topic of research was to compare the physical attributes of brownware ceramics with the results of thin section petrography and INAA to determine the sources of those ceramics.

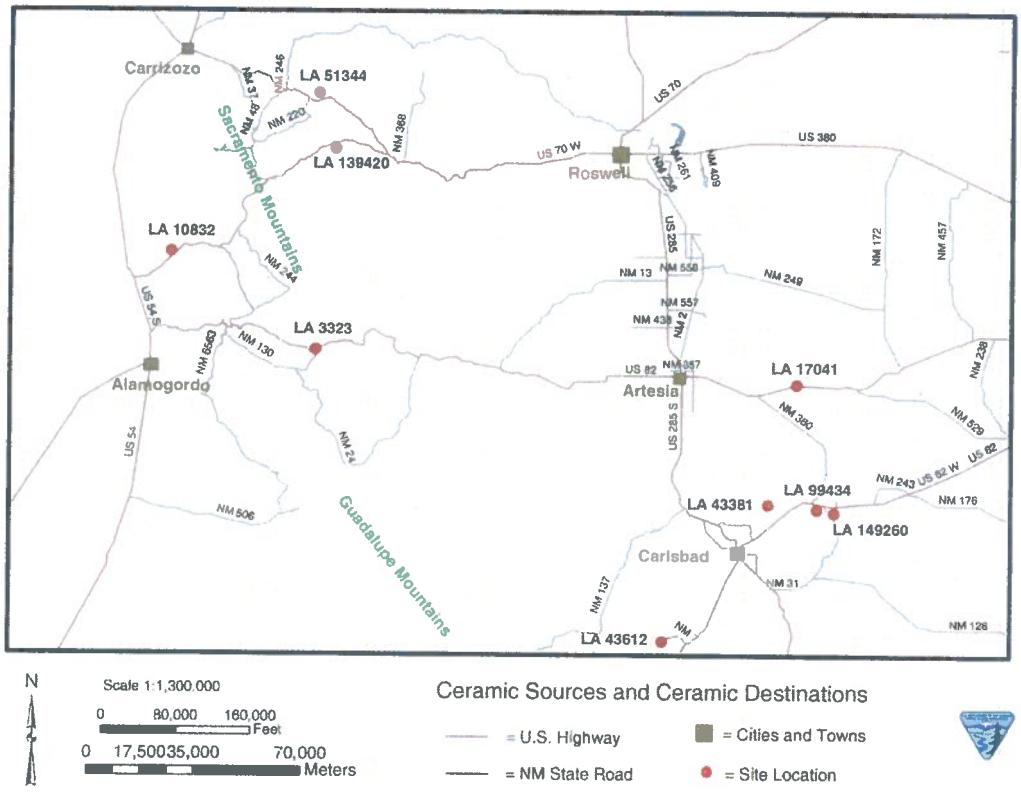


Figure 3. A portion of south-central and southeastern New Mexico showing the locations of sites mentioned in the text.

Briefly, thin section petrography views potsherds that have been ground to a standard thickness through a petrographic microscope utilizing polarized light and a polarizing filter fitted to the microscope. Different minerals present in the sherds can be recognized by their color, texture, and crystalline structure. Other inclusions, such as rock fragments, can also be seen and described. The minerals and other inclusions can identify the general geological sources of clay or tempering material used.

INAA uses samples that are irradiated by a neutron flux, which produces radioactive nuclides. As these nuclides decay, they emit gamma rays that can be measured to identify the elements present within the sample. INAA identifies 33 elements, divided into three groups: nine short-lived elements (for one example aluminum); seven medium half-life elements (for one example arsenic); and 17 long half-life elements (for one example cobalt). The proportions of elements in each sample can be compared to other samples to produce "composition groups" that have similar proportions of elements, as determined by pattern-recognition statistical techniques. It is assumed that the chemical or compositional variation within a given source of raw materials, such as clay/or tempering material, is less than the variation between different sources.

The results of the INAA analysis of the 80 sherds in this sample were compared to a much larger INAA sample of brownware from southern New Mexico which has 40 reference groups, separated into nine

divisions, in its current configuration. Although preliminary in nature the reference groups appear to be useful constructs and of the nine divisions the El Paso, Jornada, and Mogollon groups were represented in the sample. El Paso Brownwares include 29 percent of the specimens, while 31 percent can be confidently assigned to the Jornada brownware groups. Six sherds match the Mogollon reference groups, 1 sherd is affiliated with brownware sherds from the Middle Pecos region, 15 are new compositional groups, not previously recognized, and 9 sherds remain unassigned.

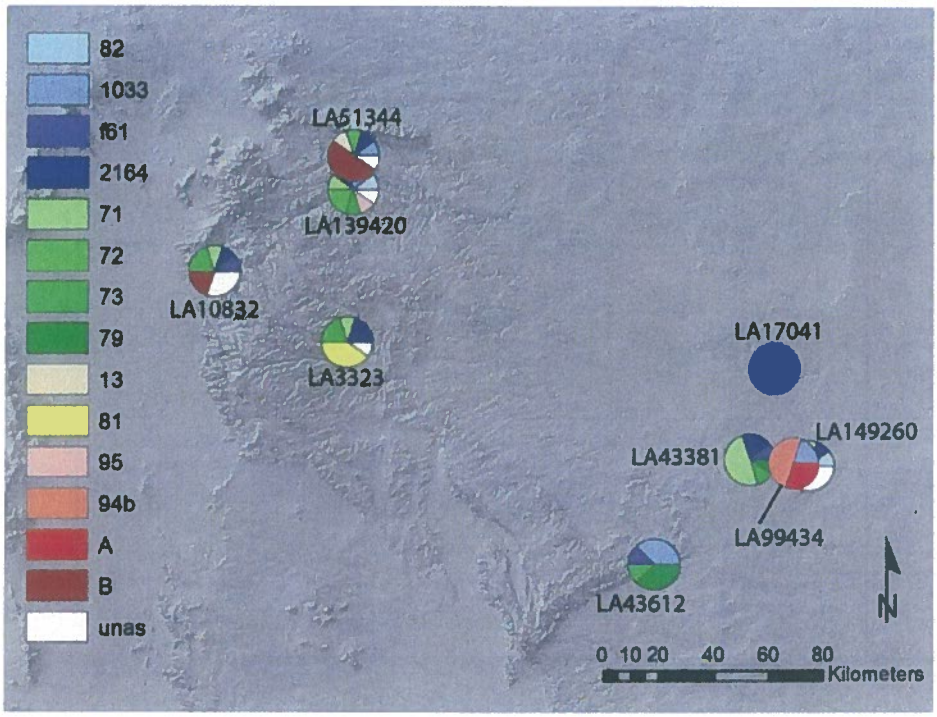


Figure 4. The distribution of compositional groups by site. El Paso groups are blues, Jornada groups in greens, possible Mogollon groups in yellows, other/new groups in reds, and unassigned specimens in white (Hill 2014).

The results of this research project are interesting. The visual classification of the sherd sample was completed by two experienced ceramic analysts, who sorted the sherds into the two major brownware types, El Paso Brownware and Jornada Brownware. However, there was more disagreement (60 percent), than agreement (40 percent) between them about which ware the sherds being examined belonged to. This was a surprising and unexpected result. Previous studies had noted some overlapping of the traits studied - surface texture, paste color, and temper - from one ware to another, but this overlapping was though to have a minor influence on the sorting outcome.

The INAA composition groups and mineralogical data derived from the petrographic analysis were also compared for the two major ceramic wares. The report notes that, "The study is designed to see if there is a consistent chemical or mineralogical attribute that could be used to identify specific ceramic types. Judging from the data present in Table 7 there is neither a single chemical or mineralogical attribute that consistently correlates with either El Paso brown or Jornada Brown. Rather, there seems to be a rough correspondence with the presence of granite or sediments derived from one or more sources of coarse-grained plutonic rock in El Paso Brownware. This is not always the case as granite and sediments weathered from a plutonic source were also observed in sherds of Jornada Brown. However, sherds of Jornada Brown in the present study contain quartz-poor rocks such as monzonite and quartz monzonite or sediments weathered from such rocks." (Hill 2014:12).

Table 7. Comparison of Brownware Type Classifications with INAA Composition Groups and Mineral Inclusions					
Brownware Types	Hill & Wiseman Agree	Hill & Wiseman Disagree	INAA Agree with Type Assessment of Hill & Wiseman	INAA Disagree with Type Assessment of Hill & Wiseman	Mineral/Rock Inclusion Type in INAA Composition Group
LA 10832					
El Paso Brown	1	3	1	3	Granite, Diorite
Jornada Brown	2	5	0	10	Granite, Monzonite
LA 3323					
El Paso Brown	1	1	1	1	Granite
Jornada Brown	6	2	2	6	Monzonite, Quartz Monzonite
LA 99434					
El Paso Brown	1	3	1	1	Plutonic sediments, monzonite
Jornada Brown	2	5	New composition group		Aplite Granite
LA 139420					
El Paso Brown	0	5	0		Plutonic sediments
Jornada Brown	2	2	2		Plutonic sediments
LA 149260					
El Paso Brown	2	3	1		Plutonic sediments
Jornada Brown	4	3	2		Plutonic sediments

Figure 5. Table 7 abstracted from Hill 2014.

The study was successful in demonstrating that the sherds from the Lowland Sites were not made locally, but were transported to those locations from places of manufacture more than 100 miles (160 km) distant. The study was also successful in defining new INAA compositional groups and adding additional locational information to previously defined compositional groups that will further refine them and enhance their usefulness. An example of this is the discovery of five sherds from site LA 3323 that were tempered with a unique hornblende diorite temper. Four of these sherds were assigned to the Mogollon composition group by INAA. Given the unique type of intrusive igneous rock found in these sherds, they may represent a local source and not an exotic one, as indicated by the INAA analysis. The study also pointed to the future use of INAA as having a greater chance of unlocking the information contained within the inscrutable brown sherds.

Readers interested in learning more about the prehistoric pottery of New Mexico should consult the website *Office of Archaeological Studies, Pottery Typology Project* at http://ceramics.nmarchaeology.org.

References Cited

Cruse, Jimmy B.

1992 Archaeological Investigations at the Kent Creek Site (41HL66): Evidence of Mogollon Influence on the Southern Plains. Panhandle Archeological Society, Publication No. 6, Amarillo, Texas.

Hill, David V.

2014 Understanding Sources of Variability in Brownware Ceramics from Southeastern New Mexico. Contract Number 14-505-7000-0014, APAC, Carlsbad, New Mexico

Howard, Edgar B.

1935 Evidence of Early Man in North America. Museum Journal (24: 2 & 3), University Museum, University of Pennsylvania, Philadelphia.

New Member Added to the Permian Basin PA Workgroup

Chris Turnbow, Archeologist and Environmental Scientist, with the New Mexico Gas Company has joined the Permian Basin PA Workgroup. 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 a representative from the oil and gas industry. The Workgroup provides guidance for the operation of the Permian Basin Programmatic Agreement as it is carried out by the Carlsbad Field Office archeologists.

Chris has broad professional experience in archaeology and anthropology that spans 40 years in cultural resource management, museums, and historic preservation compliance. His research on Paleoindian, Archaic, Ancestral Puebloan, and Spanish Colonial period occupations has given him a thorough understanding of New Mexico's rich cultural heritage. He has previously served as curator and a director of two major museums, including the Museum of Indian Arts & Culture/Laboratory of Anthropology, a branch of the Museum of New Mexico. In this capacity, he managed New Mexico's largest archaeological curation facility; designed and constructed exhibitions; and developed educational programs and interpretative publications. He has also consulted with Native groups, prepared NAGPRA action plans; and dealt with NAGPRA repatriations from museum collections and excavation projects in New Mexico. In addition to the Permian Basin PA Workgroup, he is vice president of the New Mexico Archaeological Council and a board member for the Archaeological Society of New Mexico. His state-wide experience and interest in public outreach activities should be an asset for the group and his current position in a regulated industry brings to the group a different perspective.

Back Issues of the Newsletter 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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