

6-30-2008

Archaeological Inventory, Site Assessment, and Data Management, Lake Mead National Recreation Area (LMNRA) and Parashant National Monument (PARA): Quarterly Progress Report, Period Ending June 30, 2008

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QUARTERLY PROGRESS REPORT

University of Nevada, Las Vegas
Period Ending June 30, 2008

Cooperative Agreement Number H8R07060001
Task Agreement Number J8R07060013

Archaeological Inventory, Site Assessment, and Data Management, Lake Mead National Recreation Area (LMNRA) and Parashant National Monument (PARA)

Executive Summary

- Completed modifications to original task agreement, extending the agreement through February 17, 2009
- Completed all field and laboratory work associated with the Saint Thomas Project (Project 1A)
- Completed over 2,000 acres of inventory and found over 90 archaeological sites for fuels-related projects on PARA (Project 3B)
- Conducted subsurface test excavations at two Virgin Anasazi Pueblos and collected pollen/soil samples from three prehistoric agricultural fields on PARA (Project 4A)
- Completed draft technical reports for all three inventories associated with Phase 2 of the Capital Improvement Project (Project 5)
- Conducted geophysical surveys on three sites at Lost City (Project 6)

Summary of Attachments

- Site Condition Assessment Summary
- Paleo Research Institute Technical Report No. 07-149

Modifications to the Task Agreement

Modifications to the initial Task Agreement (TA) have been completed and approved, as of June 17, 2008. These modifications alter deadlines, deliverables and/or scopes of work for five on-going projects (Project 1B, Project 1C, Project 3B, Project 4B, Project 6). Deadlines for the Lake Mead culture and history website (Project 1B) have been extended for a number of the deliverables. Likewise, deadlines for completion of the technical report that presents the results of subsurface test excavations at Site 26Ck4943 have also been extended (Project 1C, Phase 2, Deliverables 1-3). Deadline extensions for both of the abovementioned projects were needed to accommodate activities for other high-priority work on other TA and NPS related projects. A 1,900 acre fuel reduction inventory on Kelly Point (Kelly East Fuels Treatment Unit) has been substituted for the 200 acre Twin Springs Unit inventory (Project 3B). Deadlines for Phase 2 of the settlement pattern study and predictive model for the Shivwits Plateau (Project 4B) have been extended to accommodate the collection more sensitive, fine-grained environmental data. Lastly, a geophysical survey component, coupled with subsurface test excavations, has been added to the Lost City Project (Project 6, Phase 3).

Program Activities

Preserve America Project 1A: Saint Thomas

This particular project, including all deliverables specified in the TA, is now complete. The following narrative summarizes the results of all field and laboratory-based work that took place over the last two years.

During the first year of the TA (Phase 1), site and feature information obtained prior to the agreement was compiled into a variety of computer files/databases with hard-copy originals placed in a large three-ring binder (Phase 1, Deliverable 1). A copy of the original documents was also created for use during field work. A feature monitoring form was developed in collaboration with various cultural resource management professionals and used during field work in January of 2007 (Phase 1, Deliverable 2). Field work proved that with only one modification, the monitoring form is sufficient for long-term use (Phase 1, Deliverable 3). During this first phase, a total of 141 architectural and non-architectural features were monitored, including 17 new features (Phase 1, Deliverable 3). GPS spatial data were obtained for all of these features, as well as approximately 1,400 tree stumps that lined roadways and property boundaries (Phase 1, Deliverable 4). Scale drawings were made and photographs were taken for 10 features (Phase 1, Deliverable 5). Finally, a GIS-derived site map was developed from the GPS data (Phase 1, Deliverable 6). These data are available for Park Service use and GIS manipulation on the NPS network (R:\CRData\Geodatabase_Working_NAD83\26Ck6758(St_Thomas)). A copy of the completed map was attached to the 2006-2007 second quarter report.

During the second year of work (Phase 2), condition assessments were conducted on all previously recorded features at the site (Phase 2, Deliverable 1). This work included filling out the condition assessment form for each feature and reduplicating digital photographs from established photo points. Scale drawings, along with digital photographs, were also completed for 27 features, 7 more than specified in the task agreement (Phase 2, Deliverable 2). All of the information obtained as a result of this project has been integrated into appropriate electronic and hard-copy databases.

To summarize the results of long-term monitoring efforts at Saint Thomas, of the 156 features identified at the site to date, 125 features have been documented/monitored for three years (Features 1-129, 2003-2008), 21 have been documented/monitored for two years (Features 130-151, 2007-2008), and 5 for only one year (Features 152-156, 2008). Of these features, 35 (23%) are in poor condition or less than 25% of each of these features remain intact, 44 (29%) are in fair condition or have between 25-75% of each feature intact, while 72 (48%) remain in good condition with over 75% of each feature intact. The overwhelming majority of damage/disturbance affecting these features is the pervasive growth of tamarisk. Tables that summarize the results of monitoring efforts were attached to the previous quarterly report.

In addition, preventive maintenance was performed on two features: Feature 3, a cement foundation, and Feature 17, a covered water diversion channel. In the case of Feature 3, the Phase 1 assessment found part of the foundation undercut by erosion, so dirt was shoveled

underneath it last January (Phase 2) to shore it up. For Feature 17, the Phase 1 assessment found that visitors walking across the top of the feature had caused a portion of the cement to fracture. During Phase 2, four metal posts with a connecting chain were emplaced to discourage visitors from walking across it. In addition, most of the cisterns remain open and some even contain water. These features pose real threats to visitor safety and should be sealed in some fashion. Monitoring efforts have identified at least 12 cisterns that pose a threat to visitor safety.

Preserve America Project 1B: Lake Mead Website Cultural Resource Information Review and Update

Work on this project continues to proceed with periodic meetings between NPS ATR Daron, Program Manager Haynes, and Research Assistant Velasquez. During this quarter, web text and graphics for the following topics have been drafted for Park Service review: Gregg Basin Overview, Temple Bar Overview, a short history of the Six Companies Railroad in Boulder Basin, and summary text on McKeeversville and Ragtown. It is important to stress that the content of each web page, in terms of related texts and graphics, is being conducted in close coordination with NPS ATR Daron. If, and when, this information gets posted on the official Lake Mead website is entirely up to the Park Service. The following list presents what has been drafted and delivered to the Park Service to date:

- Thematic Overviews
 1. Outline for presenting historic and prehistoric period information
 2. Culture and History Introduction
 3. Native Peoples (Prehistoric, Native American)
 4. Archaeological Impacts, Preservation and Stewardship
- Geographic Overviews
 5. Boulder Basin (Lake Mead)
 6. Overton Arm (Lake Mead)
 7. Gregg Basin (Lake Mead)
 8. Temple Bar (Lake Mead)
 9. Newberry Mountains (Lake Mohave)
- Historic Web Pages
 10. Six Companies Railroad in Boulder Beach (Boulder Basin)
 11. McKeeversville and Ragtown (Boulder Basin)
 12. Anson Call (Callville Bay)
 13. Daniel Bonelli (Temple Bar)
 14. B-29 (Overton Arm)
 15. Civilian Conservation Corps
 16. Elwood Mead
- Prehistoric Web Pages
 17. Pueblo Grande de Nevada (Overton Arm)
 18. Salt Caves (Overton Arm)
 19. Mark Raymond Harrington

Preserve America Project 1C: Evaluation of Site 26Ck4943

Analyses of both pollen and macrofloral botanical remains were recently completed by Paleo Research Institute (see attached report). A total of four such samples were sent to Paleo Research Institute for specialized analyses. These include one pollen and one macrofloral sample from a discrete fire-related feature (Feature 2), along with one pollen and one macrofloral control sample recovered from a sterile test unit located on open alluvium. Since results of recent subsurface test excavations proved, on the whole, to be negative, the purpose of these specialized analyses was to discover whether the fire-related feature was natural in origin or man-made. The results of specialized analyses suggest that the feature is natural in origin:

There is no specific portion of the pollen signature that allows an interpretation of whether or not Feature 2 is of cultural origin (Cummings and Puseman 2008:5);

The macrofloral record from Feature 2 consisted mainly of charcoal fragments from a woody member of the sunflower family and charred root bark, suggesting that the feature might reflect an area where a shrub had burned naturally (Cummings and Puseman 2008:5).

Mr. Gregory Seymour, an archaeologist who specializes in Lower Colorado ceramics, analyzed 23 pottery sherds obtained from site 26Ck4943. He concluded that there are three different Lower Colorado ceramic wares present in the assemblage: Topoc Buff or Desert Topoc, River Topoc, and Colorado Buff. All but two of the 23 ceramic sherds are Topoc Buff. Topoc Buff is made in the interior desert areas west of the Colorado River. River Topoc is made along the Colorado River in areas occupied historically by Mohave Indians. Colorado Buff is made all along the Lower Colorado River where Yuman-speaking peoples are known to have lived. The dominance of Topoc Buff (Desert Topoc) in the ceramic assemblage suggests that the prehistoric occupants of this site were strongly affiliated with interior desert areas located west of the Lower Colorado River.

Finally, all obsidian artifacts recovered from the site (n=2) have been sent to Geochemical Research Laboratories in Portola, California, in order to identify their source provenance. It will be interesting to find out whether obsidian provenances correspond or conflict with the above ceramic information. Results are expected by mid-July and this information will be incorporated into a technical report currently in preparation.

Project 2: Site Condition Assessments

A total of 40 site condition assessments have been completed for Phase 2 of this project (see attached, Table 1). Of these, condition assessments have been accomplished for 24 sites on LMNRA, while 16 have been accomplished on PARA. For this quarter, condition assessments were conducted on nine sites in the Grand Wash area of PARA. Besides two sites that could not be re-located, all of these sites were considered to be in *GOOD* condition, with only minor or *LOW* impacts related to natural erosion and/or deflation. The two sites that could not be relocated include A:9:96 (ASM) and AZ A:9:98 (ASM). Condition assessment work in the Grand Wash area has found that previously recorded sites are typically located in close proximity to one another (~ 30-50 m). It is likely that the two abovementioned sites were actually monitored in conjunction with other immediately adjacent

ones. In consultation with Park Archaeologist, Steve Daron, sites that cannot be accurately located will be classified as a *Local Resource* in ASMIS. All condition assessment information has been updated in ASMIS and the completed hard-copy forms filed with each site's official record.

Project 3: NPS Fire Management Projects (PARA)

All of the deliverables identified in Phase 1 and Phase 2 for the Andrus Burn Unit project are complete, as stated previously in the FY07 Year End Report (Project 3A, Phases 1-2, Deliverables 1-2).

The Twin South Fuels Treatment Unit (Project 3B) will no longer take place as originally formulated in the task agreement. However, the 200 acres associated with this project has now been subsumed into a larger 1,900 acre fuels project on Kelly Point. Field work for the Kelly East prescribed fire project has been completed this quarter, and approximately 80 archaeological sites documented. In addition to basic site surface documentation, 42 shovel probes were excavated at four prehistoric sites. While 17 artifacts were recovered from these probes (< 1 per probe), these subsurface tests show little potential for sensitive archaeological deposits to be located in near-surface contexts at these particular sites (A:15:270, A:15:293, A:15:336, A:15:337). In addition, relatively low-level heat or quick burning fires will likely not affect most archaeological deposits located in buried contexts. An inventory report, to be drafted by Research Assistant Stephanie Velasquez (see Unpublished Technical Reports, Velasquez), is scheduled for completion before the end of this recording period.

Project 4A: UNLV Archaeological Field School on the Shivwits Plateau

A draft report that presents the results of UNLV's archaeological field school investigations at Lava Ridge Ruin is nearly complete. A 30-day extension was approved by NPS ATR Steve Daron in order to incorporate the results of pollen and macrofloral analyses currently being conducted by Paleo Research Laboratories.

A 9-day field session to conduct limited subsurface test excavations at several sites on the Shivwits Plateau was undertaken by PLI Principal Investigator, Dr. Karen Harry. Field work was focused primarily on the excavation of test units at two large pueblos (Corn Cob Pueblo, AZ A:15:56; Andrus Pueblo, AZ A:15:151). Work at Corn Cob Pueblo included three 1-x-1 m and one 1-x-2 m test excavation units, along with three 2-x-2 m surface collection units. In addition, pollen/soil samples were obtained from various levels in each excavation unit and the entire site was mapped. Work at Andrus Pueblo included two 1-x-1 m excavation units and three 2-x-2 m surface collection units. Pollen/sediment soils were obtained from various levels in each excavation unit and diagnostic artifacts from across the site were also collected. Other work included a site map and in-field ceramic analysis at Hill-Top Pueblo and the collection of multiple pollen/soil samples from three sites believed to be prehistoric agricultural fields (AZ A:14:91; AZ A:14:110; PARA-9).

This work was a collaborative effort in partnership with Dr. James Watson, Assistant Professor of Anthropology at Indiana University, Indianapolis. Temporary project employees, Ms Glendee Ane Osborne and Ms Sharlyn Anderson, as well as two student volunteers, Mr. Andreas Charest and Ms Stephanie Henrikson, assisted with the field work,

along with Program Manager Haynes and NPS ATR Daron. In addition, four of Dr. Watson's students participated for field school credit. Dr. Brett McLaurin, Assistant Professor, Department of Geography and Geosciences, Bloomsburg University, Pennsylvania, conducted geological studies in the region in support of this project. Dr. McLaurin is currently authoring a report that presents the results of his findings, *pro bono*, for the Park Service.

Project 4B: Shivwits Plateau Settlement Pattern Study

After consultation with NPS ATR, Steve Daron, the deadline for a draft report that presents the results of a predictive settlement model for the Shivwits Plateau was extended to May 25. A preliminary report was delivered, as scheduled (Phase 2, Deliverable 1) (see Unpublished Technical Reports, Osborne). This report includes a research design, a discussion of the general methodology, a presentation of basic patterns identified in the data, as well as seven appendices (vegetation descriptions, site type definitions, site function definitions, site record database, populated site record database, training site presence database, training site absence database). However, the final predictive model is not yet complete. Field work to test the model's accuracy is scheduled for later this summer.

Project 5: SNPLMA Capital Improvement Projects

To date, all field work related to the CIP inventories is complete (Phase 2, Deliverable 2). A total of 975 acres were surveyed this year: a 320 acre parcel near Laughlin, a 245 acre parcel in Government Wash; and a 410 acre parcel near Twin Springs. In all, 9 new sites and 53 isolated finds were documented. All three technical reports associated with these inventories have been written (Phase 2, Deliverable 3). Currently, the Laughlin report is under Park Service review (see Unpublished Technical Reports, Haynes), the Government Wash report has been reviewed and is under revision (see Unpublished Technical Reports, Roycraft), while the Twin Springs Cove report is complete (see Unpublished Technical Reports, Velasquez).

Project 6: Lost City Inventory

Draft site forms for all 19 sites found as a result of this year's inventory at Lost City are complete. A comprehensive report that covers findings from both Year 1 (Phase 1) and Year 2 (Phase 2) is currently in preparation.

Geophysical surveys have recently been undertaken at three Puebloan sites located as a result of field work (Phase 3, Deliverable 1). These sites include Harrington's House 46 (26Ck8411), Harrington's House 47 (26Ck7592) and the historic, Euroamerican-built, Pageant Site pueblo (26Ck6759). All three sites have long been submerged underneath Lake Mead, but are now exposed on the valley floor as a result of the lake's recession. The outline of roomblocks and rubble mounds, among other things, indicate the presence of both architectural and non-architectural features at these sites.

On March 29, a ground penetrating radar survey was conducted at House 46 (26Ck8411) and House 47 (26Ck7592). This kind of geophysical device sends a radiometric pulse at given intervals into the ground and distortions in the pulse can identify dense objects or voids in the substrate, so-called *anomalies*. The radiometric frequency determines the depth of the pulse. Since features at these sites were thought to be at a relatively shallow depth, a high frequency

antenna (500 MHz) was used to detect anomalies located within 2 m of the ground surface. The antenna sends out pulse-after-pulse, as the technician carries it along a specified transect, and the results were viewed on a computer screen in real-time. At both sites, anomalies were identifiable at specific locations along survey transects. These anomalies are hypothesized to be rocks or hardened clay associated with individual rooms or roomblocks. Subsurface test excavations will be conducted in the fall to test the strongest of these anomalies.

Later, on May 9, an electromagnetic conductivity and magnetic resistivity survey was conducted at House 46 (26Ck8411) and the Pageant Site (26Ck6759). Data for both electromagnetic and resistivity surveys are collected at the same time using a single, light-weight, 1.5 m long device. A continuous electronic wave or *flow* is emitted from one end of the device, radiating throughout a 1.5 m³ area, and received at the other end of the device. Substantial changes in substrate composition can be identified by these two, somewhat different, electronically-derived waves. In order to collect a complete, fine-grained subsurface map, each site was transected at 2 m intervals, so that the 1.5 m³ flow would overlap. While the entire Pageant Site was surveyed, time constraints allowed only about a third of the 120 x 50 m area associated with House 46 to be surveyed in this manner. Data collected during this survey is currently being processed, so final results are forthcoming.

The geophysical survey work is being conducted jointly by Archaeology Program Manager, Dr. Greg Haynes, and Dr. Barbara Luke in the Civil and Environmental Engineering Department at UNLV. Mr. Chris Cothrun, a Research Assistant working for Dr. Luke, assists with both field and laboratory work. The recent modification to the original TA identifies this as Phase 3 for the Lost City Project (Project 6, Phase 3, Deliverables 1-3).

Project 7: BLM Andrus Burn Unit (PARA)

All of the deliverables identified in both Phase 1 and Phase 2 for this project are complete, as previously stated in the FY07 Year End Report.

Other Program Activities

Two other fuel reduction/fire management projects were undertaken by PLI archaeologists at the request of the National Park Service this quarter. Research Assistant Stephanie Velasquez conducted a joint PLI-NPS archaeological crew for a 465 acre inventory near Valley of Fire Wash, Lake Mead NRA (see Unpublished Technical Reports, Velasquez). This inventory took three days to complete and three sites were documented as a result. Research Assistant Elizabeth Roycraft also conducted a joint PLI-NPS archaeological crew for a 290 acre inventory in the Kelly Dam area of PARA. This survey took four days and 11 prehistoric sites were found as a result. A technical report that presents the results of this inventory has yet to be completed.

Personnel and Hiring

Like last quarter, significant changes in personnel have taken place or will take place by the end of this quarter (June 30). Ms. Allison King, hired by a Letter-of-Appointment on January 1, resigned at the end of May due to significant changes in her personal life. More

importantly, long-time Research Assistant Stephanie Velasquez will resign as of June 30. Ms Velasquez has accepted a position with the California State Parks system as a lead fire archaeologist. On the other hand, graduate students Glendee Ane Osborne and Sharlyn Anderson, both working on their Masters degree in anthropology at UNLV under Principal Investigator Harry, have been hired to work through the summer. Because the Task Agreement will soon be complete, there are no plans to hire any more permanent research assistants. Temporary, Letter-of-Appointment or hourly hires are scheduled to take place in order to complete on-going projects.

Training

This quarter, Research Assistant Stephanie Velasquez successfully completed a semester-long “Emergency Medical Training B” course at the College of Southern Nevada and received an “A” grade. Ms Velasquez also completed her annual Wildland Fire refresher course and Arduous Duty pack test to renew her firefighter “Red Card”.

Scholarly Activity

Papers that present the results of on-going TA projects were given at a number of professional conferences this past quarter. Dr. Karen Harry co-authored a paper based on UNLV archaeological field school investigations on the Shivwits Plateau (see Conference Papers, Harry and Watson). This paper was presented at the 73rd Annual Meetings of the Society for American Archaeology in Vancouver, British Columbia. Dr. Harry, along with NPS ATR Steve Daron, co-authored a paper on Depression-era archaeological work conducted at Lake Mead by the Civilian Conservation Corps (see Conference Papers, Harry and Daron). This paper was presented at the 9th Biennial Conference on Nevada History, held in Reno, Nevada. Dr. Harry, along with UNLV physical anthropologists Drs. Jennifer Thompson and Debra Martin, presented a paper that highlighted demographic composition and health for prehistoric osteological populations associated with the Lost City (see Conference Papers, Thompson, Martin and Harry). This paper was presented at the 77th Annual Meetings of the American Association of Physical Anthropologists in Columbus, Ohio. Dr. Gregory Haynes presented a paper that reviewed the kinds of agricultural strategies that could have been practiced by prehistoric villagers at Lost City (see Conference Papers, Haynes). This paper was presented at the 37th Annual Meetings of the Nevada Archaeological Association, held in Minden, Nevada.

At this year’s Annual Meetings of the Nevada Archaeological Association, Dr. Haynes was elected to serve for a third year-long term on the Association’s Board of Directors. Moreover, that board selected him to serve a second year-long term as its Secretary. In addition, he was asked to be the editor for an upcoming southern Nevada thematic issue of the *Nevada Archaeologist*. Finally, Dr. Haynes submitted an article entitled “Cross-Cultural Implications for Ancestral Puebloan Agriculture along the Lower Muddy River in the Mojave Desert;” for publication in the *Journal of Anthropological Research* (see Articles and Manuscripts, Haynes). This article is currently under peer-review.

Unpublished Technical Reports

Cummings, Linda Scott, and Kathryn Puseman

Pollen and Macrofloral Analysis of Samples from the Catacombs Curve Site, 26Ck4943, Nevada. Paleo Research Institute Technical Report No. 07-149. Prepared by Paleo Research Institute, Golden, Colorado. Technical Report on file at the Public Lands Institute, University of Nevada, Las Vegas. (11 pages)

Haynes, Gregory M.

Lake Mead Capital Improvement Project 2008: The Laughlin Inventory. Lake Mead National Recreation Area Cultural Resources Project No. 08-012. Technical report on file at Lake Mead NRA, Cultural Resources Office, Boulder City, Nevada. (19 pages, 2 site documents)

Osborne, Glendee Ane

Prehistoric Settlement and Land Use: A Predictive Model of the Shivwits Plateau, Northwest Arizona. Technical Report on file at Lake Mead National Recreation Area, Cultural Resources Office, Boulder City, Nevada. (115 pages, 7 Appendices)

Roycraft, Elizabeth

Lake Mead Capital Improvement Project 2008: Government Wash Area Survey, Condition Assessments, and Report Synthesis. Western Archaeological and Conservation Center Project No. LAME 2007 M; Lake Mead National Recreation Area Cultural Resources Project No. 08-008. Technical report on file at Lake Mead NRA, Cultural Resources Office, Boulder City, Nevada. (31 pages, 6 site documents)

Velasquez, Stephanie

Kelly East Prescribed Fire Project, Grand Canyon-Parashant National Monument, Arizona. Western Archaeological and Conservation Center Project No. PARA 2008 A; Clearance No. 001-2008-PARA. Technical report on file at Grand Canyon-Parashant National Monument, Cultural Resources Office, Saint George, Utah. (40 pages, 80 site documents)

Capital Improvement Project Parcel 3a – Twin Springs Cove. Lake Mead Cultural Resource Project Number 08-015. Draft report on file at Lake Mead National Recreation Area, Boulder City, Nevada. (13 pages, 0 site documents)

Valley of Fire Wash Prescribed Fire Project, Lake Mead National Recreation Area, Clark County, Nevada. Lake Mead National Recreation Area Cultural Resources Project No. 08-031. Technical report on file at Lake Mead NRA, Cultural Resources Office, Boulder City, Nevada. (15 pages, 3 site documents)

Conference Papers

Harry, Karen G., and Jim Watson

Recent Archaeological Investigations on the Shivwits Plateau, Arizona. Paper presented at the 73rd Annual Meetings for the Society for American Archaeology, Vancouver, British Columbia.

Harry, Karen G., and Steve Daron

Depression Era Archaeology along the Colorado River: The Role and Legacy of the CCC. Paper presented at the 9th Biennial Conference on Nevada History, Reno, Nevada.

Haynes, Gregory M.

Cross-Cultural Implications for Ancestral Pueblo Agriculture along the Lower Muddy River in the Mojave Desert. Paper presented at the 37th Annual Meetings of the Nevada Archaeological Association, Minden, Nevada.

Thompson, Jennifer, Debra Martin, and Karen G. Harry

Demographic Composition and Health at Pueblo Grande de Nevada. Paper presented at the 77th Annual Meeting of the American Association of Physical Anthropologists, Columbus Ohio.

Articles and Manuscripts

Haynes, Gregory M.

Cross-Cultural Implications for Ancestral Pueblo Agriculture along the Lower Muddy River in the Mojave Desert. Manuscript submitted for peer-review, *Journal of Anthropological Research*.

Submitted by:



Margaret N. Rees, Project Administrator

07/1/2008

Date

ATTACHMENTS

POLLEN AND MACROFLORAL ANALYSIS OF SAMPLES FROM
THE CATACOMBS CURVE SITE, 26CK4943, NEVADA

By

Linda Scott Cummings
and
Kathryn Puseman

With Assistance from
R. A. Varney
and
Kimberly Henderson

Paleo Research Institute, Inc.
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Paleo Research Institute Technical Report 07-149

Prepared For

Public Lands Institute
University of Nevada, Las Vegas
Las Vegas, Nevada

March 2008

INTRODUCTION

Pollen and macrofloral samples were examined from the fill of a discrete ash lense in the side-wall of an incised wash at the Catacombs Curve site (26Ck4943) in southwest Nevada to determine if the feature is natural or cultural in origin. A control sample from unit fill also was examined. The Catacombs Curve site is an open, ceramic period artifact scatter located in the Newberry Mountains near the eroded granitic rock formation known as the "Catacombs". The site is identified as ancestral Yuman (lowland Patayan), based on location near the lower Colorado River and the presence of Lower Colorado type ceramics. Occupation is estimated to have occurred between AD 500 and 1900.

METHODS

Pollen

A chemical extraction technique based on flotation is the standard preparation technique used in this laboratory for the removal of the pollen from the large volume of sand, silt, and clay with which they are mixed. This particular process was developed for extraction of pollen from soils where preservation has been less than ideal and pollen density is lower than in peat.

Hydrochloric acid (10%) is used to remove calcium carbonates present in the soil, after which the samples are screened through 150 micron mesh. The samples are rinsed until neutral by adding water, letting the samples stand for 2 hours, then pouring off the supernatant. A small quantity of sodium hexametaphosphate is added to each sample once it reaches neutrality, then the samples are allowed to settle according to Stoke's Law in settling columns. This process is repeated with ethylenediaminetetraacetic acid (EDTA). These steps remove clay prior to heavy liquid separation. The samples are then freeze dried. Sodium polytungstate (SPT), with a density 1.8, is used for the flotation process. The samples are mixed with SPT and centrifuged at 1500 rpm for 10 minutes to separate organic from inorganic remains. The supernatant containing pollen and organic remains are decanted. Sodium polytungstate is again added to the inorganic fraction to repeat the separation process. The supernatant is decanted into the same tube as the supernatant from the first separation. This supernatant is then centrifuged at 1500 rpm for 10 minutes to allow any silica remaining to be separated from the organics. Following this, the supernatant is decanted into a 50 ml conical tube and diluted with distilled water. These samples are centrifuged at 3000 rpm to concentrate the organic fraction in the bottom of the tube. After rinsing the pollen-rich organic fraction obtained by this separation, all samples receive a short (20-30 minute) treatment in hot hydrofluoric acid to remove any remaining inorganic particles. The samples are then acetolated for 3-5 minutes to remove any extraneous organic matter.

A light microscope is used to count the pollen to a total of approximately 100 to 200 pollen grains at a magnification of 500x. Pollen preservation in these samples varied from good to poor. Comparative reference material collected at the Intermountain Herbarium at Utah State University and the University of Colorado Herbarium was used to identify the pollen to the family, genus, and species level, where possible.

Pollen aggregates were recorded during identification of the pollen. Aggregates are clumps of a single type of pollen and may be interpreted to represent pollen dispersal over short distances or the introduction of portions of the plant represented into an archaeological setting. Aggregates were included in the pollen counts as single grains, as is customary. The presence of aggregates is noted by an "A" next to the pollen frequency on the pollen diagram. Pollen diagrams are produced using Tilia, which was developed by Dr.

Eric Grimm of the Illinois State Museum. Total pollen concentrations are calculated in Tilia using the quantity of sample processed in cubic centimeters (cc), the quantity of exotics (spores) added to the sample, the quantity of exotics counted, and the total pollen counted and expressed as pollen per cc of sediment.

Indeterminate pollen includes pollen grains that are folded, mutilated, and otherwise distorted beyond recognition. These grains are included in the total pollen count since they are part of the pollen record. The microscopic charcoal frequency registers the relationship between pollen and charcoal. The total number of microscopic charcoal fragments was divided by the pollen sum, resulting in a charcoal frequency that reflects the quantity of microscopic charcoal fragments observed, normalized per 100 pollen grains.

Pollen analysis also includes examination for and identification of starch granules to general categories, if they are present. Starch granules are a plant's mechanism for storing carbohydrates. Starches are found in numerous seeds, as well as in starchy roots and tubers. The primary categories of starches include the following: with or without visible hila, hilum centric or eccentric, hila patterns (dot, cracked, elongated), and shape of starch (angular, ellipse, circular, eccentric). Some of these starch categories are typical of specific plants, while others are more common and tend to occur in many different types of plants.

Macrofloral

The macrofloral samples were floated by personnel at the Public Lands Institute, University of Nevada, Las Vegas. The dried light and heavy fractions were submitted to Paleo Research for analysis. The light fractions were weighed, then passed through a series of graduated screens (US Standard Sieves with 2-mm, 1-mm, 0.5-mm and 0.25-mm openings) to separate charcoal debris and to initially sort the remains. The contents of each screen then were examined. Charcoal pieces larger than 2-mm, 1-mm, or 0.5-mm in diameter were separated from the rest of the light fraction and the total charcoal weighed. A representative sample of these charcoal pieces was broken to expose a fresh cross section and examined under a binocular microscope at a magnification of 70x. The weights of each charcoal type within the representative sample also were recorded. The material that remained in the 2-mm, 1-mm, 0.5-mm, and 0.25-mm sieves was scanned under a binocular stereo microscope at a magnification of 10x, with some identifications requiring magnifications of up to 70x. The material that passed through the 0.25-mm screen was not examined. The heavy fractions were scanned at a magnification of 2x for the presence of botanic remains. Remains from the light and heavy fractions were recorded as charred and/or uncharred, whole and/or fragments. The term "seed" is used to represent seeds, achenes, caryopses, and other disseminules. Macrofloral remains are identified using manuals (Martin and Barkley 1961; Musil 1963; Schopmeyer 1974) and by comparison with modern and archaeological references.

Samples from archaeological sites commonly contain both charred and uncharred remains. Many ethnobotanists use the basic rule that unless there is a specific reason to believe otherwise, only charred remains will be considered prehistoric (Minnis 1981:147). Minnis (1981:147) states that it is "improbable that many prehistoric seeds survive uncharred through common archaeological time spans." Few seeds live longer than a century, and most live for a much shorter period of time (Harrington 1972; Justice and Bass 1978; Quick 1961). It is presumed that once seeds have died, decomposing organisms act to decay the seeds. Sites in caves, water-logged areas, and in very arid areas, however, can contain uncharred prehistoric remains. Interpretation of uncharred seeds to represent presence in the prehistoric record is considered on a sample-by-sample basis. Extraordinary conditions for preservation are required.

DISCUSSION

The Catacombs Curve site (26Ck4943) is situated in a small alluvial valley surrounded by the Newberry Mountains. Local vegetation is dominated by creosote bush (*Larrea tridentata*) and bursage (*Ambrosia*), with Mormon tea (*Ephedra*), catclaw acacia (*Acacia greggii*), buckwheat (*Eriogonum*), yucca (*Yucca*), and low grasses (Poaceae) present. A wash along the western side of the site supports scrub oak (*Quercus*), while a juniper woodland with Mojave Desert woody scrub and cacti are found on the slopes of the Newberry Mountains.

The site yielded a light-to-moderately dense ceramic period artifact scatter. Culturally affiliated with the ancestral Yuman (lowland Patayan) people, this site contained Lower Colorado type ceramics. Other sites located in the immediate vicinity also contained a similar assemblage of ceramics, placing the entire complex of sites within the ancestral Yuman group. Occupation dates of AD 500-1900 are stated for this site.

This site measures approximately 350 m long and 200 m wide. Artifacts include chipped stone, mainly debitage and ground stone, and Lower Colorado ceramics. Anasazi gray ware and Shoshone brown ware ceramics were documented by (Fox and Perez-Perez 1994), but none of these types of ceramics have been observed since the 1993 field season. Feature 1, a substantial charcoal lens and “basin-shaped” hearth-like feature containing burned rock fragments and one mammal long bone, was found by Fox in 1993 but has since eroded away. Current features include a rock shelter that did not contain cultural deposits and the discrete ash lense (Feature 2). A concentration of Lower Colorado ceramic sherds appears to represent a single pot-drop.

Sample 15 represents fill collected as a control sample at a depth of 50-60 cm in Test Unit 11 (Table 1). This sample was examined for both pollen and macrofloral remains. The pollen record is dominated by High-spine Asteraceae pollen (Figure 1, Table 2), with Low-spine Asteraceae pollen as a sub-dominant, reflecting vegetation strongly dominated by plants from the sunflower family. Low-spine Asteraceae pollen represents plants such as bursage, ragweed, cocklebur, and/or marsh elder. High-spine Asteraceae pollen represents most of the rest of the sunflower family with the exception of the chicory tribe. Other pollen recorded in small quantities includes *Acacia*, *Juniperus*, and *Prosopis*, reflecting locally growing acacia, juniper, and mesquite. Recovery of small quantities of Brassicaceae, Chenopodiales, *Sarcobatus*, *Cylindropuntia*, *Ephedra nevadensis*-type, *Eriogonum*, Fabaceae, *Larrea*, Onagraceae, Poaceae, Rosaceae, and *Sphaeralcea* pollen reflects local growth of members of the mustard family, members of the goosefoot family or perhaps amaranth, greasewood, cholla, Mormon tea or ephedra, wild buckwheat, legumes, creosote bush, members of the evening primrose family, grasses, members of the rose family, and globe mallow. Microscopic pieces of charcoal were more abundant than pollen in this sample. Total pollen concentration was only approximately 55 pollen per cubic centimeter (cc) of sediment.

The macrofloral record from sample 15 yielded one uncharred *Erodium* seed fragment, reflecting modern storksbill or filaree plants growing in the area (Table 3, Table 4). A few small fragments of *Larrea tridentata*, *Quercus*, and *Prosopis* charcoal might reflect prehistoric charcoal “rain” from burning creosote bush, oak, and mesquite wood as fuel by the prehistoric site occupants, possibly in the nearby Feature 1, and/or burning of local trees by wild fires. A few fragments of slightly vitrified unidentifiable charcoal also were present. Vitrified material has a shiny, glassy appearance due to fusion by heat. A slightly vitrified appearance might reflect wood that burned while it was still somewhat green and fresh. A few insect chitin fragments and worm casts note limited subsurface disturbance from insect and earthworm activity in the area.

Samples 7 and 4 represent fill collected at a depth of 70-80 cm from Feature 2, the discrete ash lense. The pollen record displays evidence of pollen deterioration in the recovery of a large quantity of pollen identified as Tubuliflorae rather than High-spine Asteraceae. Assignment to the category Tubuliflorae indicates that it was not possible to distinguish the original length of the spines on these pollen, hence identification as either Low-spine Asteraceae or High-spine Asteraceae was not certain. This indicates mechanical abrasion of the pollen. Other pollen types observed in this sample include *Prosopis*, Low-spine Asteraceae, High-spine Asteraceae, Chen-am, *Cylindropuntia*, *Ephedra nevadensis*-type, Fabaceae, *Larrea*, Onagraceae, and Poaceae, indicating local growth of mesquite, various members of the sunflower family, members of the goosefoot family and/or amaranth, cholla, Mormon tea or ephedra, legumes, creosote bush, members of the evening primrose family, and grasses. Recovery of *Larrea* pollen in both samples suggests that creosote bush might have been a substantial member of the local vegetation community, since this pollen is usually seriously under represented. Microscopic pieces of charcoal were particularly abundant in this sample, numbering more than 6000 pieces per 100 pollen grains. Total pollen concentration was very low at only approximately 4 pollen per cc of sediment. The pollen record indicates that the vegetation in the two areas represented was probably similar. Loss of variety within the pollen record of sample 7 is consistent with the difference in preservation noted by the condition of the individual pollen grains, as well as the reduced total pollen concentration. It is not possible to identify whether the reduced total pollen concentration is the result of pollen deterioration, more rapid sediment accumulation, or that it reflects significantly sparser local vegetation growing in the area represented by sample 7.

Macrofloral sample 4 contained several fragments of Asteraceae charcoal and a few fragments of charred root bark. It is possible that the ash lense is the result of burning of a woody member of the sagebrush family that was growing in this area. Uncharred seeds, roots, and rootlets represent modern plants in the area. A few insect chitin fragments also were noted.

SUMMARY AND CONCLUSIONS

The combined pollen and macrofloral records indicate that the vegetation community in the two areas tested was similar. Vegetation might have been sparser in the Feature 2 area represented by sample 7. Alternatively, sediments might simply have accumulated faster in this area, which is consistent with the abraded character of the pollen. There is no specific portion of the pollen signature that allows an interpretation of whether or not Feature 2 is of cultural origin.

The macrofloral record from Feature 2 consisted mainly of charcoal fragments from a woody member of the sunflower family and charred root bark, suggesting that the feature might reflect an area where a shrub had burned naturally. No other charred remains were present to suggest a cultural origin for the feature. The few small fragments of charcoal in control sample 15 might reflect burning creosote bush, oak, and mesquite wood as fuel by the prehistoric site occupants or possibly trees that burned in a natural fire in the area.

TABLE 1
 PROVENIENCE DATA FOR SAMPLES FROM SITE 26CK4943

Sample No.	Feature No.	Unit No.	Depth (cmbs)	Provenience/ Description	Analysis
15		11	50-60	Soil control	Pollen Macrofloral
7	2	5	70-80	Fill from discrete ash lense exposed in the sidewall of a narrow incised wash	Pollen
4	2	5	70-80	Floated light and heavy fraction from fill of the discrete ash lense	Macrofloral

TABLE 2
POLLEN TYPES OBSERVED IN SAMPLES FROM SITE 26CK4943

Scientific Name	Common Name
ARBOREAL POLLEN:	
<i>Acacia</i>	Acacia
<i>Juniperus</i>	Juniper
<i>Prosopis</i>	Mesquite
Asteraceae:	Sunflower family
Low-spine	Includes ragweed, cocklebur, sumpweed
High-spine	Includes aster, rabbitbrush, snakeweed, sunflower, etc.
Tubuliflorae	Includes eroded <i>Artemisia</i> (sagebrush), Low-spine, and High-spine
Brassicaceae	Cruciferae, also known as the crucifers, the mustard family or cabbage family
Cheno-am	Includes the goosefoot family and amaranth
<i>Sarcobatus</i>	Greasewood
<i>Cylindropuntia</i>	Chollas part of the Cactaceae family
<i>Ephedra nevadensis</i> -type (includes <i>E. clokeyi</i> , <i>E. coryi</i> , <i>E. funera</i> , <i>E. viridis</i> , <i>E. californica</i> , <i>E. nevadensis</i> , and <i>E. aspera</i>)	Ephedra, Jointfir, Mormon tea
<i>Eriogonum</i>	Wild buckwheat
Fabaceae:	Bean or Legume family
<i>Larrea</i>	Creosote
Onagraceae (Gaura)	Evening primrose family
Poaceae	Grass family
Rosaceae:	Rose family
<i>Sphaeralcea</i>	Globe mallow
Indeterminate	Too badly deteriorated to identify
Charcoal	Microscopic charcoal fragment
Total pollen concentration	Quantity of pollen per cubic centimeter (cc) of sediment

TABLE 3
MACROFLORAL REMAINS FROM SITE 26CK4943

Sample No.	Identification	Part	Charred		Uncharred		Weights/ Comments	
			W	F	W	F		
15	Light Fraction Weight							
Control	FLORAL REMAINS:							
	<i>Erodium</i>	Seed				1		
	Roots					X	Few	
	Rootlets					X	Few	
	CHARCOAL/WOOD:							
	Total charcoal ≥ 1 mm							0.07 g
	<i>Larrea tridentata</i>	Charcoal		10				<0.01 g
	<i>Quercus</i>	Charcoal		9				<0.01 g
	<i>Prosopis</i>	Charcoal		2				<0.01 g
	Unidentifiable - slightly vitrified	Charcoal		9				0.04 g
	NON-FLORAL REMAINS:							
	Insect	Chitin					4	
Rock/Gravel						X	Moderate	
Worm casts					X	X	Few	
4	Light Fraction Weight							11.02 g
Feature 2	FLORAL REMAINS:							
	Asteraceae	Seed				1		
	Unidentified	Seed					1	
	Roots					X	Few	
	Root bark			X				Few
	Rootlets					X	Few	
	CHARCOAL/WOOD:							
	Total charcoal ≥ 2 mm							2.00 g
	Asteraceae	Charcoal		40				0.78 g
	NON-FLORAL REMAINS:							
	Insect	Chitin					11	
	Rock/Gravel						X	Abundant

W = Whole
F = Fragment
X = Presence noted in sample
g = grams

TABLE 4
INDEX OF MACROFLORAL REMAINS RECOVERED FROM SITE 26Ck4943

Scientific Name	Common Name
FLORAL REMAINS:	
Asteraceae	Sunflower family
<i>Erodium</i>	Storksbill, Filaree
CHARCOAL/WOOD:	
Asteraceae	Sunflower family
<i>Larrea tridentata</i>	Creosote bush
<i>Prosopis</i>	Mesquite
<i>Quercus</i>	Oak
Unidentifiable - vitrified	Charcoal exhibiting a shiny, glassy appearance due to fusion by heat

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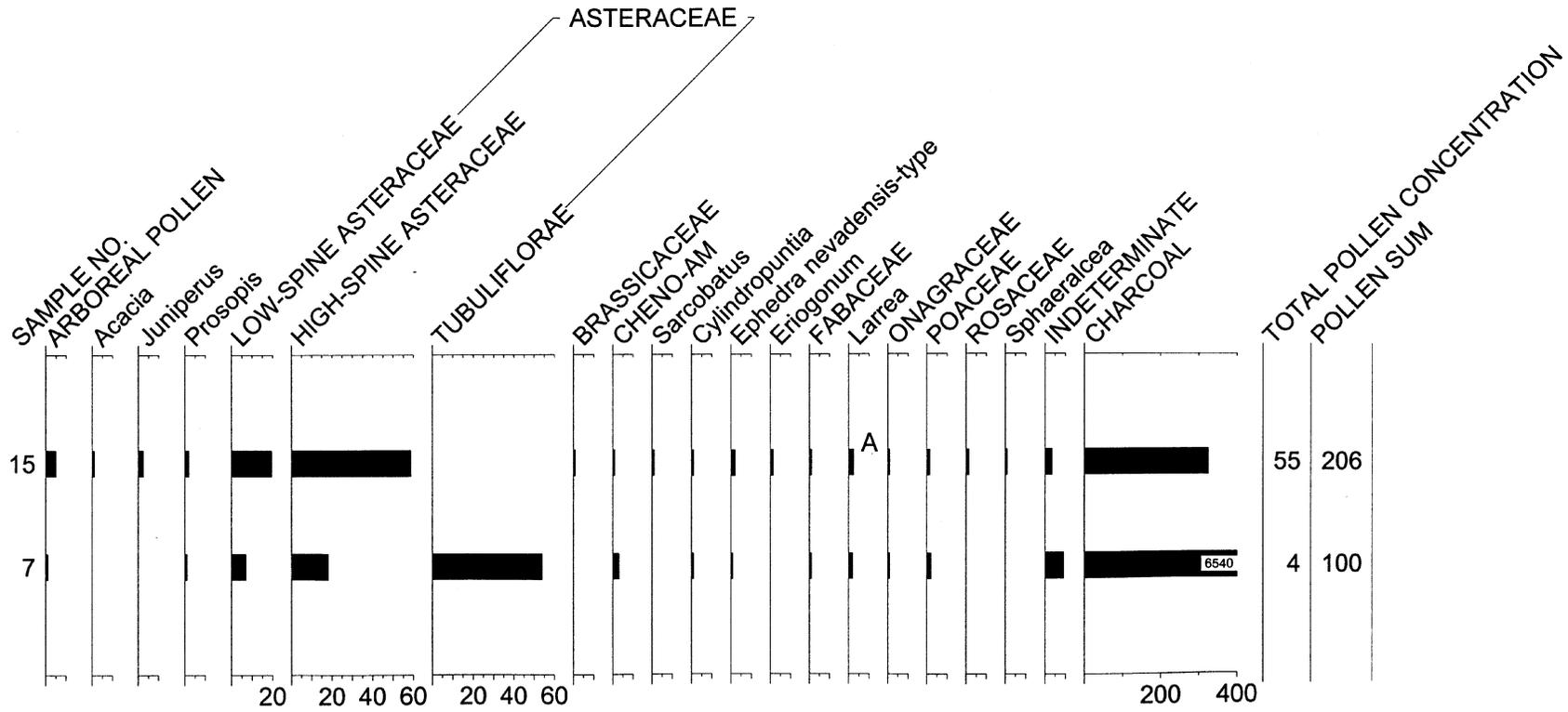


FIGURE 1. POLLEN DIAGRAM FOR 26CK4943, NEVADA.

Table 1. Site Condition Assessment Summary (October 1, 2007 to June 30, 2008)

NPS Unit	Site Number	General Location	Site Type	Condition	Comments
LAME	26Ck1218	Las Vegas Wash	Prehistoric	Good	
LAME	26Ck1219	Las Vegas Wash	Prehistoric	Good	Local resource – does not meet current site definitions
LAME	26Ck1532	Las Vegas Wash	Prehistoric	*	Local resource – could not be relocated
LAME	26Ck1223	Boxcar Cove Road	Prehistoric	Good	
LAME	26Ck1220	Government Wash	Prehistoric	Good	
LAME	26Ck1221	Government Wash	Prehistoric	*	Local resource – site re-recorded as multiple sites
LAME	26Ck6015	Government Wash	Prehistoric	*	Local resource – does not meet current site definitions
LAME	26Ck6020	Government Wash	Prehistoric	Good	
LAME	26Ck6032	Government Wash	Prehistoric	Good	
LAME	26Ck6604	Government Wash	Prehistoric	Good	
LAME	26Ck6605	Government Wash	Prehistoric	Good	
LAME	26Ck6017	Government Wash	Prehistoric	Good	
LAME	26Ck6529	Government Wash	Prehistoric	Fair	Off road vehicle and erosion damage present
LAME	26Ck6539	Government Wash	Prehistoric	Good	
LAME	26Ck6661	Government Wash	Prehistoric	Good	
LAME	26Ck6662	Government Wash	Prehistoric	*	Local resource – could not be relocated
LAME	26Ck6663	Government Wash	Prehistoric	Good	
LAME	26Ck6664	Government Wash	Prehistoric	Good	
LAME	26Ck6769	Government Wash	Prehistoric	Good	
LAME	26Ck6817	Government Wash	Prehistoric	*	Local resource – does not meet current site definitions
LAME	26Ck6818	Government Wash	Prehistoric	Good	
LAME	26Ck6819	Government Wash	Prehistoric	Good	
LAME	26Ck6820	Government Wash	Prehistoric	Good	
LAME	26Ck6821	Government Wash	Prehistoric	Good	
PARA	AZ A:9:012	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:013	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:014	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:015	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:016	Grand Wash	Prehistoric	Good	Some erosion present
PARA	AZ A:9:081	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:087	Grand Wash	Prehistoric	Good	

PARA	AZ A:9:090	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:094	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:095	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:096	Grand Wash	Prehistoric	*	Local resource – could not be relocated
PARA	AZ A:9:097	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:098	Grand Wash	Prehistoric	*	Local resource – could not be relocated
PARA	AZ A:9:099	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:100	Grand Wash	Prehistoric	Good	
PARA	AZ A:9:103	Grand Wash	Prehistoric	Good	