ARCHAEOLOGICAL SITES INVENTORY OF THE TRAINING AREA 10 AND 12 PORTIONS OF THE PINON CANYON MANEUVER SITE, LAS ANIMAS COUNTY, COLORADO

VOLUME 2

By
Mark Owens and Lawrence L. Loendorf

With contributions by
Richard E. Hughes
Richard A. Krause
Caralee Maechtle
Pamela R. Owens

Project Administered through
Midwest Archeological Center
National Park Service, Lincoln, Nebraska
Cooperative Agreement No. 1443-CA-6000-98-016

Prepared by
The Department of Sociology and Anthropology
New Mexico State University
Las Cruces, New Mexico

Fort Carson Cultural Resources Management Series
Contribution Number 10

This project was prepared for and funded by the Directorate of Environmental Compliance and Management, Department of the Army, Fort Carson, Colorado

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14. ABSTRACT
During a large archaeological survey at the Piñon Canyon Maneuver Site, Las Animas County, Colorado, 315 sites were identified. The Piñon Canyon Maneuver Site is a large military base used by the United States Army as a training area for mechanized tracked and wheeled vehicle maneuvers. Most sites are cultural material scatters or places where fragments of chipped-stone flaking debris, chipped-stone tools, or ground-stone tools are exposed on the ground surface. Nearly a quarter of the project sites, however, contain the remnants of stone houses like tipi rings or Apishapa phase structures. Project sites are often found along the canyon edges where access to food and water is good. As such, the types of artifacts identified by archaeologists at these locations indicate canyon areas were used for the past 10,000 years.

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Popular Abstract

During a large archaeological survey at the Piñon Canyon Maneuver Site, Las Animas County, Colorado, 315 sites were identified. The Piñon Canyon Maneuver Site is a large military base used by the United States Army as a training area for mechanized tracked and wheeled vehicle maneuvers. Most sites are cultural material scatters or places where fragments of chipped-stone flaking debris, chipped-stone tools, or ground-stone tools are exposed on the ground surface. Nearly a quarter of the project sites, however, contain the remnants of stone houses like tipi rings or Apishapa phase structures. Project sites are often found along the canyon edges where access to food and water is good. As such, the types of artifacts identified by archaeologists at these locations indicate canyon areas were used for the past 10,000 years.

Professional Abstract

This report presents the results of an archaeological survey in the Training area 10 and 12 portions of the Piñon Canyon Maneuver Site, Las Animas County, Colorado. In this survey, archaeologists identified and recorded 304 new sites and revisited 11 known sites. Most of these were lithic material scatters, though locations with contiguous wall and spaced-stone architectural units were identified on 23% of the project sites. Regarding contiguous wall architectural units, many were found along the canyon edges, suggesting a line-of-sight communications network. Others, however, were found in flat terrain and are related to the human need for acquiring food and water. Locally available materials dominate the material type assemblage, but a high frequency of non-local materials like Jemez Mountain obsidian or Alibates dolomite suggests that the prehistoric inhabitants of Piñon Canyon region were either highly mobile or were involved in a broad network of trade and exchange.

All of the sites were evaluated with respect to their potential to inform on the research domains outlined in Andrefsky et al. (1990) and Zier and Kalasz (1999). Two hundred and thirty-nine sites were determined to have low information potential, and were recommended as not eligible for inclusion to the National Register of Historic Places. These require no further archaeological or management work. The remaining 76 sites, have been determined to meet at least one of the National Register Criterion, and were recommended as eligible. These eligible sites need to be preserved and protected from future adverse impacts.

Acknowledgments

We are grateful to the many individuals and organizations that have contributed to the overall success of this project; several deserve special mention. The support of the Directorate of Environmental Compliance and Management, United States Army, Fort Carson, is greatly appreciated. Specifically, we appreciate Cody Anderson, Steve Chomko, Mike Flowers, Randy Korgel, Bob Hill, Thad Swan, Tom Warren, and Kelly Wright for providing support, in a great variety of ways, throughout the project. Steven DeVore coordinated the project for the National Park Service, Midwest Archaeological Center. Other Park Service personnel deserving thanks include Kevin Baldwin, Ann Chancey, Mike Chidley, Melissa Connor, Forest Frost, Ralph Hartley, Ron Marvin, and Linda Zumpfe. All are thanked for their professionalism and hard work. We would also like to thank the National Park Service's Carrol Moxham for her assistance in the printing and production of this report.

Our field team, who helped us collect, process, and record all field data, deserves the lion's share of credit for the success of our project. Rich Burleson, Mike Chidley, Mike Flowers, Mark Owens, and Ardeth Vineyard were the field crew chiefs. Field crew members Nancielee Albin, Kelli Barnes, Joe Bergstrom, Jane Ann Blakney, Rich Burleson, Karen Clem, Marilyn Cunningham, Chris Ecker, Sean Graebner, Keith Hahn, Wes Hahn, Roche Lindsey, Caralee Maechtle, Matt Mallery, Thad Swan, Dulce Wassil, Kay Winchester and Courtney Yilk did a great job for us despite the fact that the bugs were thick and the temperatures were often extreme. Volunteers Jeff Fladung, Anna Gray, Jennifer Hudson, Don Owens, Josh Schneider, Marissia Tice, Bill Tilley, and Cheryl Wagner also contributed as surveyors. Camp cooks Lorrie Lincoln-Babb, Sheri Landis, and Terry Moody kept up crew morale with their wonderful meals. Bonnie Newman was the project lab director, assisted at times by Kelli Barnes.

Our office administrators, Renee Beltran and Elaine Nimmo, kept things running smoothly. They also served as our project pinch-hitters, contributing as photographers, data analysts, and editors at times.

Specialized analysis and consultations also contributed to overall project success. Richard A. Krause of the University of Alabama helped to identify the project ceramic types. Richard E. Hughes, the director of Geochemical Research Laboratory, identified obsidian material specimens. Jack Hofman (University of Kansas) and Stan Ahler (Paleocultural Research Group) provided assistance with projectile point identification. Pam Rasfeld Owens, of New Mexico State University, researched project historic sites and provided genealogies for families living in the area now designated as the PCMS.

Foreword

The archeological investigations reported in this manuscript are an important part of the Fort Carson Cultural Resources Management Program whose goal is to maintain the largest possible area for military training while protecting significant cultural and environmental resources. The current study of Training Areas 10 and 12 is part of an integrated plan that takes a long-term systematic approach to meeting identification, evaluation, and resource protection requirements mandated by the National Historic Preservation Act. While meeting legislated requirements, this project also provides a valuable contribution to our knowledge of the prehistory and resources of Las Animas County, Colorado. Through an Interagency Service Agreement, the National Park Service, Midwest Archeological Center (MWAC), assists Fort Carson in accomplishing its cultural resources goals and meeting its legal obligations. New Mexico State University completed the reported project under a cooperative agreement with the MWAC.

Fort Carson began cultural resource studies on the Pinon Canyon Maneuver Site in 1983, immediately following the purchase of these lands. The Cultural Resource Program takes a multidisciplinary approach, combining archeological theory and historical methods with geological, geomorphological, botanical, and statistical techniques and procedures in order to focus its efforts to locate, evaluate, and protect significant cultural resources. Professional studies and consultations with Native American tribes have resulted in the identification of National Register of Historic Places eligible sites and districts. The cultural resources of Fort Carson and the Pinon Canyon Maneuver Site represent all major prehistoric and historic cultural periods recognized in the Great Plains and Rocky Mountains. Sites of the Paleoindian, Archaic, and Ceramic stages are present as are sites from the Fur Trade era, 19th century Hispanic and Euroamerican settlements, early 20th century homesteading and ranching, and World War II and Cold War era military sites. The project reported here completes the first phase of the archeological inventory program – identification and documentation of archeological sites to determine their National Register of Historic Places (NRHP) eligibility.

The Cultural Resources Management Program is in the Directorate of Environmental Compliance and Management (DECAM). The directorate is tasked with maintaining Fort Carson's compliance with federal, state, and local environmental laws and mandates. The DECAM holistic management philosophy holds that all resources are interrelated. Decisions affecting one resource will impact other resources. The decisions we make today will affect the condition of Department of Army lands and resources for future training, research, and recreation. Mission requirements, training resources, wildlife, range, soil, hydrology, air, and recreation influence cultural resources management decisions. Integrating compliance and resource protection concerns into a comprehensive planning process reduces the time and effort expended on the compliance process, minimizes conflicts between resource protection and use, allows flexibility in project design, minimizes costs, and maximizes resource protection.

Federal laws protect the resources on the Pinon Canyon Maneuver Site and Fort Carson. Theft and vandalism are federal crimes. Protective measures ensure that Army activity does not inadvertently impact significant cultural and paleontological sites. Fort Carson does not give out site location information nor are sites developed for public visitation. Similar resources are located in the Picketwire Canyonlands where public visits can be arranged through the U.S. Forest Service, Comanche National Grasslands in La Junta, Colorado.

Fort Carson endeavors to make results of the resource investigations available to the public and scientific communities. Technical reports on cultural resources are on file at the Fort Carson Curation Facility (Building 2420) and the Colorado State Historic Preservation Office. They are also available through the National Technical Information Service, Springfield VA. Selected reports have been distributed to public libraries in Colorado. Three video programs produced by Fort Carson are periodically shown on Public Broadcasting Stations. Non-technical reports on the prehistory, history, and rock art of southeastern Colorado have been distributed to schools and libraries within the state. Fort Carson continues to demonstrate that military training and resource protection are mutually compatible goals.

Thomas L. Warren
Director
Directorate of Environmental Compliance and Management
Fort Carson, Colorado
February 2004

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Chapter V: Non-Eligible Sites

By
Mark Owens and Caralee Maechtle

During cultural resource survey work, 371 previously unrecorded sites and isolated finds were located in the Training Area 10 and 12 portions of the Piñon Canyon Maneuver Site. Evaluations of the sites indicate that 78 sites should be nominated to the National Register, and a total of 238 sites are not eligible. The latter sites require no further work, but because we did collect artifacts and are interested in certain aspects of their spatial patterning, it is important that they are discussed in some detail. This chapter summarizes these data. Descriptive tables of selective information about all sites recorded or revisited by NMSU in Training Areas 10 and 12 can be found in Appendix V.

5LA2267

During field inspection, a large concentration of artifacts was found by the crew that increased the site's previously recorded (University of Denver in 1983) dimensions from 39 meters north/south by 40 meters east/west to 240 meters north/south by 270 meters east/west. Moderate wind and water erosion exposed some additional artifacts within the previous site boundary. The datum was re-established with the placement of a new rebar, then the site was re-recorded and a 150-count debitage sample was added to the project database. Eight stone tools, none temporally diagnostic, were collected. There were also three areas listed on the old site form as possible hearths. These were determined to be darkened sandstone pieces eroding out at the surface at different rates. No additional features were encountered by NMSU.

The site is located on the southwest edge of an unnamed drainage feeding Lockwood Canyon. It is composed of a moderately dense scatter of artifacts, with areas of occasional concentration. Soil depth ranges from exposed bedrock to 40 cm, and the site is placed within the juniper/black grama (Shaw et al. 1989:28) plant community of the PCMS. Juniper, sage, prickly pear, needle and thread grass, foxtail, cholla, sunflowers and blackfoot daisy were observed growing on the surface.

The debitage sample is comprised of 3% biface-thinning flakes, 40% complex flakes, 7% shatter and 50% simple flakes. Lithic material frequencies are 31% fine-grained quartzite, 44% chert, 17% coarse quartzite, with the remainder (8%) being hornfels/basalt, silicified wood and argillite. Sixty six per cent of the flakes are classified as small, 34 % are large, and cortex is present on 33 % of the flakes.

Chipped-stone tools include three utilized flakes (FS 5, 8 and 9), a drill (FS 3), a biface (FS 6) and an end/side scraper (FS 10). Field Specimens 5, 6, 8 and 10 are chert, FS 3 is argillite and FS 9 is fine-grained quartzite. The drill shows heavy use wear and is broken. The biface is broken with no visible use wear. Two of the utilized flakes (FS 5 and 8) have an edge angle of less than 45 degrees and exhibit light use wear. Of these, FS 5 is broken. Utilized flake FS 9 has an edge angle greater than 45 degrees and light use wear. The end/side scraper has an edge angle > 45 degrees with heavy use present.

A single mano (FS 4) was recorded. It is broken (< 50 %), made of sandstone, and exhibits moderate use wear. There is also evidence to support burning in the form of a red color change.

The site is not eligible for the NRHP as there are no features and no evidence for buried cultural deposits. Because of this, no further work should be done on the site.

5LA2298

During our field inspection in 1999, NMSU found surface flaking debris that extended down from the edge of Study Unit 135 into the previously established boundary of site 5LA2298. Field crews from the University of Denver originally recorded this site in 1983 and it seems that since then, mechanized vehicle impacts, and light wind and water erosion continue to expose surface artifacts. We completed a site revisitation form and analyzed the lithic artifacts using our project lithic analysis format.

The site is a sparse lithic scatter on the west terrace of a large southwest to northeast trending canyon in the Lockwood Canyon system. There is little topography on-site, though the terrain slopes gently to the southwest. Sandstone bedrock outcrops at the southern edge of the site forming a series of small terraces that follow a low ridge down into the canyon. Overall, our site addition measures 128 m east to west, and 118 m north to south. There is a high artifact density along the northern site boundary and thinly scattered lithics occur near the bottom of the site near the canyon edge.

Juniper, sagebrush, blue grama, sunflowers, prickly pear, cholla, threeawn, and galleta grass were growing on the site when it was recorded. Soil deposition is relatively shallow near the edge of the canyon, with some pockets of up to 25 cm noted at the northeast edge of the scatter. There seems to be some buried lithic material on 5LA2298, but no thermal features, ground stone, or structures appear at the surface.

A total of 57 pieces of chipped-stone debitage were recorded from the surface. The majority of the materials are quartzite (28% fine-grained and 19% coarse grained) and argillite (33%), with chert (14%), chalcedony (2%), basalt (2%), and baked claystone (2%) also represented, to a lesser extent, in the assemblage. The total assemblage was found to be made of complex flakes (40%), simple flakes (46%), shatter (10%), and biface-thinning flakes (4%). Freehand percussion seems to have been the most important technique in generating the debitage. Though many of the items are small in size (61% of the assemblage), most information gathered from the lithic analysis indicates that raw materials (other than the argillite and basalt) were being collected from Lockwood Canyon and brought to the site to be made into early-stage bifaces and flake tools. Most of this debitage (nearly 90%) is noncortical and indicates that quartzite, chert, and chalcedony materials were tested and initially reduced down in the canyon and brought to the site as prepared cores or flake blanks. The high percentage of argillite is somewhat surprising given 5LA2298's distance (18 km) from the hogback source area. Of the argillite debitage (19 items), 58% of the items are complex flakes, 21% are simple flakes, 16%

are shatter, and 5% are biface-thinning flakes. It seems the inhabitants of this site had procured argillite lithic material from the hogback, and then moved east to the edge of Lockwood Canyon to obtain higher quality lithic material.

Site 5LA2298 seems to have been used on a short-term basis for the reduction of lithic materials procured from the southern edge of the PCMS. The site has some soil deposition, but there are no indications from the surface reconnaissance that there are substantial buried deposits here. The site warrants no further consideration or additional work.

5LA8283

The site is a small cluster of lithic artifacts on the flat plain between Taylor and Big Water Arroyo. A grassland plant community dominates the vegetation with black and hairy grama, prickly pear, sunflower, cholla, yucca, and sparse juniper trees present. The surface soil is silty clay and depths of up to 50 cm were seen in the sidewall of the two-track road. No features are present at the surface and the cultural soil depth is unknown. A modern two-track road passes from north to south at the western edge of the site.

Lithic artifacts consist of 26 pieces of debitage, one mano fragment (FS 1), and one projectile point (FS 2). Of the flakes, 19 are fine-grained quartzite, three are coarse-grained quartzite, three are chert, and one is argillite. Over half (14) are as complex flakes, with simple flakes (9), and biface-thinning flakes (3) also seen. Two material types were noted in the biface-thinning flakes and indicate at least two bifaces were manufactured on site. The mano fragment is less than 50% complete and made on a coarse-grained quartzite cobble. Its complete end is battered and moderate grinding is seen on an incomplete facet. The projectile point is 85% complete and made of chert. Using Anderson's (1989) classification scheme, this point is recorded as a P38 dating from AD 600 to AD 1000 (Developmental period). Based on the artifacts, activities performed on site include raw material reduction, tool manufacture, and food processing. Because this is a small site with no structures or features, no further work is needed.

5LA8284

This large multicomponent site consists of a huge lithic scatter, and a dispersed scatter of historic debris. It is located at the arroyo/canyon contact of an unnamed side drainage that flows south into Big Water Arroyo. This site surrounds a large cattle pond at the head of the canyon, then extends up the terrace on the west and east sides. Surface visibility is good, owing to light vegetation and sandstone bedrock, which outcrops on the slopes leading into the drainage, and on the terraces above. Dominant surface vegetation includes juniper, needle and thread grass, various grama grasses, and prickly pear. Soil depths of up to 20 cm are seen in sediment remnants and animal burrows on the site. Evidence of U.S. Army maneuvers are present including vehicle tracks, modern trash, blank cartridge casings, and three small sandstone slab structures that appear of recent construction. Two structures are built at the base of juniper trees (one has communication wire strung through it while the other has sandbags inside of it) and the third structure is along sandstone outcrops on the east side of the pond. All three architectural features appear hastily constructed.

The historic trash scatter is a light concentration and it is located along the west edge of the pond. Artifacts include more than 85 pieces of bottle glass (base and side fragments), more than 40 tin cans (mainly sanitary can fragments), white ware ceramic fragments, round nails, lard buckets, sheet metal, bailing wire, one tablespoon fragment, one 55 gallon barrel (flattened), one piece of metal pipe, and other insignificant pieces of metal. Based on the artifacts and the history of the region, the historic component likely dates to ca. 1900 and is a single event trash dump. No evidence for historic habitation or shelter features remains.

The high density of flaking debris required a sampling of 154 pieces. Artifact classes are 69 simple flakes, 54 complex flakes, 18 biface-thinning flakes, and 13 pieces of shatter. Hornfels/basalt (31%) and argillite (36%) are the dominant material types, with lesser amounts of fine-grained quartzite (13%), exotic chert (8%), unspecified chert (6%), coarse-grained quartzite (4%), chalcedony (1%), and silicified wood (1%) represented. Twenty-eight percent of the flakes show some degree of dorsal cortex. Of the total, 21% are large flakes and 7% are small ones. Noncortical, small flakes comprise 49% of the assemblage. This information coupled with the high number of shatter specimens suggests that early-stage core-reduction was a minor site activity and prepared cores or early-stage bifaces were brought to the site to be reduced further. It is evident that late-stage biface manufacturing or resharpening also occurred. Four material types are present in the biface-thinning flakes. All the materials appear to be locally available, other than the exotic chert specimens and the Black Forest silicified wood flake. The source for the exotic chert is unknown and may be locally available.

There are four artifact types represented in the flaked tools; five non-bipolar cores, two bifaces, two utilized flakes, and two retouched flakes. The cores are argillite (3), quartzite (1), and basalt (1); the retouched tools are basalt. Freshly resharpened edges are visible on the retouched tools, which are likely early-stage scrapers. The utilized flakes are argillite and chert and exhibit cutting (<45 degree) wear on one lateral edge. Both bifaces are fine-grained chert; one is an unfinished biface and the other a knife with acute lateral edges.

Three ground-stone objects were recorded, including two slab metate fragments and one mano fragment. All are less than 50% complete. The mano and one metate fragment are sandstone and exhibit a red color change from heat exposure. Fine-grained basalt is the material type for the other metate fragment.

This is an interesting site, with an abundance of material types (local and non-local), chipped-stone tool classes, and a variety of ground stone. No features or diagnostic artifacts were recovered, however. Though some soil deposition is present, we do not recommend this site for the NRHP. No further work is recommended here as all data has been removed.

5LA8285

The site is a historic dugout with tabular sandstone blocks forming a sturdy collar. It is situated in the grassy plain approximately 500 m from an unnamed drainage flowing south into Big Water Arroyo. The pit feature is a rectangular sandstone foundation that has collapsed and filled in the depression. A scattering of window glass lies in and on top of the blocks and dirt. Additional artifacts scattered around the feature include pieces of barbed wire, bailing wire, and wire nails. Because no log or block walls remain, it is likely materials from this structure were removed upon abandonment. Based on the artifact assemblage, and other structures in the immediate area, the site likely dates ca. 1920. These historic cultural remains can likely be attributed to the Manire family, who were granted a land patent for 320 acres in 1922. This site is not eligible and no further work is recommended because the structure is in poor condition and the associated artifacts are not unique or diagnostic.

5LA8286

The site is a small and discrete cluster of lithic artifacts located on a sparsely vegetated slope overlooking an unnamed drainage. Artifacts consist of a single granite mano fragment (FS 1) and a scatter of chert, argillite, and quartzite flakes. The soil is characterized as sandy silt here with juniper, prickly pear, and broom snakeweed growing at the surface. The cultural soil depth is estimated at 10 cm as seen in erosional remnants and vehicle ruts. Because this is a small site with no diagnostic artifacts or features, additional research is not recommended.

5LA8287

This site is a sparse, 95 meter north-south by 65 meter east-west artifact scatter on a grassy plain above the confluence of Big Water and Taylor Arroyo (500 m southwest). It was found above the eastern terrace in an open area surrounded by juniper trees. Surface vegetation includes prickly pear, soapweed, sagebrush, grama grass, and snakeweed. There is some soil erosion toward the southern end of the site and sandstone bedrock has been exposed at this location. As observed in animal burrows, the soil deposition is good (30-50 cm).

The lithic assemblage includes 15 pieces of debitage, a bifacial core-tool, and a projectile point. Debitage materials are fine-grained quartzite (8), argillite (3), chert (2), chalcedony (1), and basalt (1), and classes are complex flake (10), simple flake (4), and biface-thinning flake (1). The bifacial–core tool (FS 1) is fine-grained quartzite, with negative flake scars on two faces and battering on both ends. The small point is corner-notched (FS 2), made of chert, and 96% complete. It appears similar to Anderson's (1989) type P36 with associated dates from the Late Archaic stage to the early portion of the Late Prehistoric stage. No thermal features are noted at the surface of this small site and it is not eligible for inclusion into the NRHP.

5LA8288

The site is a small lithic scatter consisting of ten artifacts: eight pieces of debitage, one retouched flake, and one bifacial core-tool. Artifacts are primarily located in the eroded, washed out basin of a low hill, which overlooks the confluence of Big Water and Taylor Arroyos (650 m southwest). The vegetation is typical for an area where grassland meets shrubland; juniper, soapweed, cholla, galleta, and threeawn are the dominant plant species. Debitage material types are fine-grained quartzite (3), argillite (3), and chert (2). These are three complex flakes, three simple flakes, a piece of shatter, and a biface-thinning flake. Cortex was noted on the biface-thinning flake and shatter specimen. The retouched flake (FS 2) is fine-grained quartzite with light use wear along the steep left lateral edge. Field Specimen 1, the core tool (FS 1), is coarse-grained quartzite.

Soil depths of 10 cm are visible in pockets at the base of juniper trees. Because the site is subject to heavy water erosion, all artifacts appear to have deflated down to their current position. Because this is a small site with a lack of diagnostic artifacts, features, or structures, no further work is required and it is not eligible for the National Register.

5LA8290

This site is located on the northern terrace above Lockwood Canyon approximately 900 m northwest of Sharp's Ranch. Two small side drainages are positioned at either end of the site and sandstone bedrock exposes at the surface in many areas. Soil depths grade from 1 to 50 cm and the site has been subject to heavy water erosion. Overstory species are sagebrush, soapweed, prickly pear, and juniper. Blue grama, sand dropseed, threeawn, muhly, galleta, feathergrass, sunflowers, and daisies were seen growing as understory species. Traffic along a two-track road has negatively impacted the site, with lighter pedestrian and animal impact noted. Field crews observed no features or structures. This site is comprised of a scatter of lithic debitage and chipped- and ground-stone tools.

One hundred sixty-one pieces of debitage were recorded from random locations across the site, and are classified as 82 complex flakes, 56 simple flakes, 20 pieces of shatter, and three biface-thinning flakes. Material types are 46% coarse-grained quartzite, 19% chert, 13% fine-grained quartzite, 11% hornfels/basalt, 7% argillite, 1% quartz, 1% obsidian, 1% silicified wood, and 1% siltstone. The debitage is 58% noncortical, small items; 19% cortical, small items; 12% large, noncortical items and 11% cortical, large items. The biface-thinning flakes are chert and fine-grained quartzite and suggest two bifaces were manufactured here. Based on the high number of small, noncortical flakes this site functioned as a biface reduction location or small cores were brought to the site trimmed of surface cortex. The cortical items indicate primary core-reduction.

Seventeen chipped-stone tools, representing six tool classes, were recorded as the stone tool assemblage. Of these, five are unifaces, four are utilized flakes, three are projectile points, two are bifaces, two are scraping tools, and one is a non-bipolar core. The unifaces are chert (3), basalt (1), and coarse-grained quartzite (1); all display steep retouch on at least one lateral edge. Three of these are broken and two are complete. Two exhibit moderate usage, two were lightly used, and one is freshly resharpened with no apparent use wear. Utilized flakes are chert (3) and obsidian (1); two are broken and two are complete; and three show steep lateral edges and one has an acute edge. The bifaces are chert and coarse-grained quartzite, and classified as unfinished. Fine-grained quartzite and chert are the material types for the end/side scrapers, and the non-bipolar core is chert.

All three points were assigned to a category in the Anderson's (1989) classification. The first two are chert and are recorded as P79 and P49 type points. The third, falls into the P49 category and is orthoquartzite. All of the points suggest a Late Prehistoric occupation for the site with a rough date range from AD 800 to AD 1750 (Anderson 1989:175, 213).

The ground-stone artifacts are two complete manos, a complete lapstone, and a mano fragment. The whole manos are sandstone and granite, they display moderate grinding and pecking on the utilized face. The lapstone is sandstone, and flaking has modified both edges and its base. There is heavy use wear on one face in the form of grinding and pecking. The mano fragment is granite.

Though some soil deposition is noted, the site has eroded down to sandstone bedrock. Most artifacts were found on the rock surface and suggests the site has been deflated. Despite the recovery of temporally diagnostic artifacts, no further work is recommended, and the site is not considered eligible.

5LA8292

This is a large lithic scatter located on the top and side slopes of a hill overlooking the largest southern side drainage of Lockwood Arroyo. This nine acre site is situated in the grassy flats and the slope dips gently to the northeast. When this site was recorded, juniper, cholla, prickly pear, daisies, sagebrush, grama grass, snakeweed, and foxtail barley were noted on the brown, silty-sand soil at the surface.

A total of 151 pieces of debitage were analyzed in the field and include the specimens from one small concentration (Feature 1). These are made of chert (49%), fine-grained quartzite (34%), coarse-grained quartzite (9%), argillite (6%), chalcedony (1%), and hornfels/basalt (1%). Recorded artifact classes are simple flakes (76), complex flakes (58), shatter (10), and bifacial-thinning flakes (7). Like most sites in the project area, only 22% of the pieces show some degree of dorsal cortex. Cortical items break down to 19 simple flakes, nine complex flakes, and five pieces of shatter.

There are five artifact classes represented in the flaked tool assemblage, including six projectile points, four uniface tools, three end/side scrapers, two bifaces, and one non-bipolar core. Of the points, four are chert, one is silicified wood, and one is fine-grained quartzite. Anderson (1989) type classes for these are P20, P32, P63, and P69. Two points are highly fragmented and cannot not be placed within a specific class. As a group, the points seem to date from the Middle Archaic period to the Protohistoric period, with a more distinct occupation during the later Late Prehistoric stage. Ground-stone artifacts include three sandstone metate fragments.

No thermal features are visible and despite small pockets of accumulated soil depth, the overall site has eroded leaving little, if any, intact subsurface deposits. Even though diagnostic points and one feature (lithic concentration) were encountered, there are no other prehistoric structures or features. The site lacks the ability to provide any additional information pertinent to the prehistory of Colorado, and no further work is required.

5LA8293

The site was found on a grassy hillside, 300 meters west of a spring in Lockwood Arroyo. Overall, it is large, but artifact density is extremely low throughout. The surface has been impacted by episodic sheetwash erosion and the surface soil has eroded down to sandstone bedrock in many locations. The artifact assemblage consists of 20 pieces of flaking debris, two utilized flakes (one obsidian, one basalt), and one unfinished basalt biface. The debitage is made of two material types: hornfels/basalt (19), and chert (1), and debitage classes are complex flake (17), simple flake (2), and biface-thinning flake (1). Most debitage was located in a tight cluster and designated as (Feature 1). Thermal features were not noted, and the site has very little subsurface deposition. No further work is recommended on this ineligible site.

5LA8294

Site 5LA8294 has two major concentrations of lithic debris and ceramics and both were assigned feature numbers. Feature 1 contains prehistoric ceramic vessel fragments and debitage, Feature 2 consists primarily of brown chert debitage and ceramic pieces. The cultural debris scatter is located in a grassy and flat area north of Lockwood Canyon, and at the head of a small unnamed drainage basin. Most of the artifacts were located on a small rise that gently slopes into the drainage below. Surface vegetation includes juniper, cholla, fleabane, daisies, needle and thread grass, and soapweed. Soils are generally shallow (10 cm) based on visible erosion remnants. Surface artifacts include 41 pieces of debitage, a silicified wood projectile point (type P80), two utilized flakes (chert and fine-grained quartzite), a chert end/side scraper, and a non-bipolar core made of siltstone. The ceramic vessels are a class of artifact not often found on sites without architectural features and may indicate a specialized function for the site. Analysis reveals that the sherds are of mica bearing clay with grit temper, but vessel form can not be determined (Appendix IV). Because no thermal features or structures were observed, and the surface soils are shallow, this site is ineligible for the NRHP as all available data has been collected. No further work is recommended for this rather unique site.

5LA8295

This site is a light-density scatter of debitage and chipped-stone tools on top of a grassy hill approximately 200 m northwest of Cross Ranch. The vegetation community is grassland, with foxtail barley, sagebrush, prickly pear, wheatgrass, ricegrass, yucca, sunflowers, alkali sacaton, and snakeweed visible. Most of the site has been highly weathered and sandstone bedrock is exposed in many areas. Military debris and tracked vehicle trails are present within the site boundaries.

A total of 79 artifacts were recorded at the surface, including 78 pieces of flaking debris, and one unfinished chert biface. The debitage was found to be made of chert (69), fine-grained quartzite (4), argillite (3), silicified wood (1), and quartz (1). Most are simple flakes (37) and complex flakes (32), with angular shatter (5) and biface-thinning flakes (4) also seen. The debitage is 28% cortical. Cortex is present on 14 of the simple flakes, six of the complex flakes, and two pieces of shatter.

The site has little soil depth (10 cm) and intact subsurface deposits are unlikely. In addition, no diagnostic artifacts, structures, or features were observed. The site is not eligible and further work has not been recommended.

5LA8296

This rather small (68 m by 39 m) site is a sparse lithic scatter situated in the Lockwood Arroyo floodplain 300 m east of historic Cross Ranch. It is 5 m south of a massive sandstone outcrop with overhangs that may have been used by the prehistoric site occupants. After inspection, these were determined to contain no artifacts or evidence for surface features though one of the overhangs has experienced historic (animal shelter) and military disturbance. The general surface context artifacts are 11 fine-grained quartzite flakes, three chert flakes, one argillite flake, one piece of basalt shatter, and one non-bipolar core made of fine-grained quartzite. The surface of the site appears churned-up by small mammal foraging activity. Vegetation includes wheatgrass, fleabane, foxtail, sunflower, prickly pear, needle and thread grass, thistle, clover, and soapweed. Historic use and heavy disturbance likely has impacted the prehistoric component and without subsurface continuity, the site is not considered significant and is not eligible for inclusion into the NRHP.

5LA8298

Site 5LA8298 represents a large multicomponent lithic scatter located on the northern, and upper terrace of Lockwood Canyon 300 m east of the Sharps Ranch facility. The northern end of the site is situated on a slight rise (ca. 5000 ft in elevation) and here, the terrain slopes to the south down to the dry arroyo bottom. Surface soil is sandy in nature with a cryptogamic crust; depths are generally shallow (<20 cm) as observed in erosional features and shallow lenses at the base of trees. Army maneuvers and alluvial deposit mixing have impacted prehistoric components and surface soils. Most of the cultural debris lies on exposed bedrock among sparsely scattered skunkbush sumac, sagebrush, prickly pear, cholla, juniper, and grama plants.

Noted in the 151 debitage specimens sampled are 93 complex flakes, 37 simple flakes, and 21 pieces of debitage. The preponderance are coarse-grained quartzite (71%), with lesser amounts of chert (23%), hornfels/basalt (3%), and argillite (3%). The presence of cortex on 22% of the debitage indicates these materials were recovered from nodule or waterworn sources. The debitage breaks down as 58% small non-cortical items, 20% large non-cortical items, 15% large cortical items, and 7% small cortical items. Nearly all chert debitage is reddened from heat treatment, but all other materials lack evidence for heat exposure. As established by analysis of the debitage assemblage, all phases of lithic reduction were carried out on site with the exception of late-stage biface manufacture or trimming. All debitage materials are locally available.

Table 5.1 summarizes the various material types for the flaked- and ground-stone tools. The flaked tool assemblage includes seven discrete artifact classes. Specimens include seven bifaces, six projectile points, five non-bipolar cores, three utilized flakes, one end scraper, one side scraper, and one uniface tool. Of the bifaces, four are complete and three are broken; five of these are classified as unfinished, one is finished, and one is a nearly finished biface. The nearly finished specimen shows light wear on one <45 degree lateral edge. All projectile points are highly fragmented and many temporal attributes are undetermined. As a result, none could be accurately classified within the Anderson (1989) system. Ground-stone remains consist of one edge-ground mano, one bedrock metate, and one slab metate fragment.

Table 5.1: Material Type by Tool Type for Site 5LA8298.

Artifact Type	Material Type Alibates	Argillite	Chert	Hornfels/Basalt	Quartzite	Sandstone	Total	Percent
Biface	0	0	3	0	4	0	7	25.9%
Edge Ground Mano	0	0	0	0	0	1	1	3.7%
End Scraper	0	0	0	0	1	0	1	3.7%
Metate	0	0	0	0	0	2	2	7.4%
Non-bipolar Core	0	0	1	1	3	0	5	18.5%
Projectile Point	0	0	5	0	1	0	6	22.2%
Side Scraper	1	0	0	0	0	0	1	3.7%
Uniface	0	0	1	0	0	0	1	3.7%
Utilized Flake	0	1	1	0	1	0	3	11.1%
Total	1	1	11	1	10	3	27	100.0%
Percent	3.7%	3.7%	40.7%	3.7%	37.0%	11.1%	100.0%	

Overall, artifact density is quite high, though features are lacking and shallow deposits offer little chance for encountering them. This site is a poor candidate for additional work, though the high number of projectile points, and bifaces overall, is quite unique for sites in this part of the base.

5LA8299

The site is a sparse lithic scatter located on a sloping terraced ridge that projects out into Lockwood Canyon 150 m northwest of Sharp's Ranch. Soil accumulation is poor, discounting one small bowl-like feature at the center portion of the site. Depths of up to 50 cm were noted in this location. Other areas of the site have sandstone beds outcropping and sandstone boulders are scattered near the canyon rim. The site is in a shrubland plant community, juniper, prickly pear, grama grass, and mountain mahogany comprise the dominant vegetation.

Most lithic debris is a bluish quartzite and based on abundance and size, the procurement location is likely quite close. Analysis reveals 34 complex flakes, 20 simple flakes, and 14 pieces of shatter. Assemblage materials are 63% coarse-grained quartzite, 34% fine-grained quartzite, and 3% chert. Unlike many sites in Training Area 10, 60% of the debitage specimens have dorsal cortex and of additional interest, 37% are large items. This indicates that the site is related to early-stage reduction of locally outcropping raw material. Chipped-stone tools are two unifaces and one scraping tool. The end/side scraper (FS 3) is chert and exhibits heavy use wear and retouch modification on both lateral edges and its distal end. Uniface tools are fine-grained quartzite and broken. One of these (FS 1) has light use wear on its acute right lateral edge, the other (FS 2) displays moderate usage on both steep lateral edges.

Features, structures, diagnostics, and ground-stone artifacts are absent from the remains. This is a small site located near a quartzite quarry with little subsurface deposition. It has little potential to add to our knowledge of prehistory and requires no additional work.

5LA8300

The site was discovered on a grassy ridge on the uppermost terrace north of Lockwood Canyon. Surface visibility is good because Dakota sandstone bedrock has been exposed in many areas throughout the area. Vegetation on-site is juniper woodland, though many trees are found only along the site perimeter. Artifacts recorded in this location include debitage, ground stone, and chipped-stone tools. Debitage categories include (63%) hornfels/basalt, (24%) argillite, (10%) quartzite, and (3%) chert; classes are comprised of 26 simple flakes, 22 complex flakes, and three pieces of shatter. Dorsal cortex is present on 23 debitage specimens.

This artifact assemblage contains 17 chipped-stone tools -- cores (5), bifaces (4), retouched flakes (3), utilized flakes (2), projectile points (2), and one side scraper. Five material types were recorded in the assemblage; most tools were made of chert (5) or fine-grained quartzite (5) and the remainder are argillite (4), coarse-grained quartzite (2), and silicified wood (1). Both projectile points are small in size and classified as finished. The first point (5LA8300.0.2) classifies to Anderson's (1989) P49 category, and the other to the P58 category. The dates for these points range from AD 400 to AD 1750. Analysis describes a total of four metate fragments, two mano fragments, and a complete mano in the site assemblage. Of these seven specimens, two of the manos and one of the metate fragments exhibit a red color change from heat exposure.

At least two "looters piles" were found within the site boundary. One contains metate fragments (FS 1, 2, and 3); the other a core, mano, metate (FS 4, 5, and 6 respectively), and other flakes. No deposition remains at this small site. Additional information will not be obtained by testing it.

5LA8301

The site is a lithic scatter located on a ridge top along the north edge of Lockwood Canyon. Sharp's Ranch is approximately 600 m west of this location. Bedrock outcroppings and unattached sandstone blocks of diverse size are scattered across the surface. Soils, the result of secondary depositional processes, contain intermixed gravel. Depths of up to 15 cm were espied in small arroyo cuts near the western site boundary. Features were not detected and ground-stone tools are lacking from this scatter. Covering slightly more than two and one-half acres, the site is situated in junipers with open grassy meadow openings. Other vegetation includes cholla, mountain mahogany, prickly pear, grama grass, sagebrush, and snakeweed.

Flaking debris includes 27 complex flakes, 19 simple flakes, 12 pieces of shatter, and one biface-thinning flake. The debitage is 61% coarse-grained quartzite, 17% argillite, 12% fine-grained quartzite, 7% basalt, and 3% chert. In 66% of the assemblage, dorsal cortex is present. Chipped-stone tools are four unifaces, an unfinished biface, a side scraper, and a core. Two unifaces have symmetrical and heavy retouch, likely functioning as early-stage scrapers.

Along the canyon edge several small overhangs were observed. None of these contain internal features or artifacts, though they would have afforded prehistoric site occupants some degree of shelter. The site has been exposed to moderate and heavy damage by tracked vehicle maneuvers, but this impact is not believed to be significant as there are no areas with buried deposits. No future work is recommended.

5LA8302

The site is situated on the plain above Lockwood Canyon and the terrain gently slopes to the southeast. Vegetation is dominated by juniper; other plants include cholla, yucca, prickly pear, grama, sunflower, sagebrush, and skunkbush sumac. Dakota sandstone bedrock is eroding out in many locations on the site. Between these, soils are silty clay with sparse surface gravels; depths of 30 cm were present in the numerous tracked vehicle gouges scarring the upper strata.

There are two major areas of lithic concentration, each with variable density. The first (Feature 1), measures 20 x 15 m and yielded 14 chipped-stone tools and miscellaneous debitage. Feature 2 contains scattered fire-cracked rock, five chipped-stone tools, and debitage. Ground stone could not be located in either feature and both were near disturbance or had been disturbed by tracked vehicles.

One hundred fifty-four pieces of debitage were sampled from the dense artifact scatter. This includes 52 pieces each from Features 1 and 2, and 50 items from the general site area. Surface flaking debris is made of fine-grained quartzite (61), coarse-grained quartzite (58), chert (26), basalt (6), argillite (2), and silicified wood (1). The debitage classes are complex flake (103), simple flake (34), shatter (16), and biface-thinning flake (1). Cortex is present in only 23% of these items. The Feature 1 items are coarse-grained quartzite (21), chert (21), fine-grained quartzite (9), and silicified wood (1). These are further classified as 34 complex flakes, ten simple flakes, seven pieces of shatter, and a biface-thinning flake. In Feature 2, the materials are fine-grained quartzite (33), coarse-grained quartzite (15), and chert (4). Thirty-eight complex flakes, 12 simple flakes, and two pieces of shatter were recovered. This assemblage suggests that the site functioned as a reduction location for locally available quartzite. The high number of cortical flakes, and cores in the assemblage seem to bear this out. The high number of large bifaces recovered and the large number of complex flakes also support the idea that this locale functioned as an early stage-biface manufacturing area. In Feature 1 many of the chert specimens show proof of heat treatment.

The chipped-stone tools included ten large bifaces, six non-bipolar cores, four uniface tools, three utilized flakes, three scrapers, and two projectile points. Material types for the cores are fine-grained quartzite (4) and coarse-grained quartzite. Ground-stone tools are three metate fragments and one broken mano.

Of the bifaces, all are fine-grained quartzite and broken. These are classified as three finished bifaces, 3 nearly finished bifaces, and four unfinished bifaces. All show distinct bifacial modification, six of these display some degree of use wear. Five of the six were used to cut material and have an edge angle of less than 45 degrees. The remaining biface has been used as a scraping tool, one lateral edge is greater than 45 degrees. Uniface tools are fine-grained quartzite (3), and orthoquartzite (1). These exhibit both cutting (2) and scraping (2) wear on one or both lateral edges. The utilized flakes are chert (2), and fine-grained quartzite (1). In all, light wear is seen on the left lateral edge, and in one case, also on the distal end. Scraping tools are two end/side scrapers (Alibates dolomite and coarse-grained quartzite) and a chert end scraper. Two projectile points were recovered, both are so highly fragmented that they could not be typed. Material classifications are orthoquartzite and chert.

Most of the site is on an exposed two-track road and areas of lithic concentration appear in blowouts. No thermal features were found and without any temporally diagnostic artifacts, this site is not considered to be meaningful. Additional work here is not likely to produce significant data.

5LA8304

The site is a light concentration of lithic debris, including a unfinished chert biface, a chert scraper, and a quartzite core. These artifacts were located in the grassy plain between Taylor and Big Water arroyos, approximately 500 m northwest of their confluence. Surface flaking detritus is chert (16), argillite (1), and basalt (1), and further distinguished as complex flakes (8), simple flakes (5), biface-thinning flakes (3), and shatter (2). Most cultural materials were encountered upon exposed sandstone bedrock, though areas with well-developed soils and the potential for buried cultural remains are apparent. In the absence of thermal features, the site is not eligible for the National Register and additional research has not been recommended.

5LA8305

The site is located on a slope near the confluence of Big Water Arroyo and Taylor Arroyo (820 m southeast). Juniper, sunflowers, grama grass, prickly pear, and squirreltail grass characterize vegetation of the area. A total of seven pieces of debitage were analyzed and found to be manufactured of quartzite (3), chert (3), and argillite (1). A complete metate was recovered in a small pile of tabular sandstone boulders that may be a historic cairn, though there is no other evidence for historic occupation. Thermal features were not identified and the site is unworthy of additional attention.

5LA8307

An end/side scraper of chert, three manos, an edge-ground cobble, 12 complex flakes and 10 simple flakes comprise this small site. The debitage is chert (10), coarse-grained quartzite (7), argillite (2), basalt (2), and fine-grained quartzite (1). Sixteen of these specimens are noncortical items and six display dorsal cortex.

These cultural materials were encountered on a low stream terrace that gently slopes down to the east into Big Water Arroyo. The surface offers high visibility as sandstone bedrock outcrops throughout the site area. Between these outcrops, some pockets of sediment deposition (up to 15 cm) are to be found; the most intact deposits are along a small arroyo at the northern edge of the site. No features were encountered, nor were there any obvious places where buried cultural deposits likely occur. This is one of the many small lithic scatters in this part of the PCMS with little additional information potential.

5LA8308

The site is an expansive lithic scatter located on the northern plain above Lockwood Canyon. Cultural material was found on sandstone bedrock, and on the gravel and loam surface sloping down to the edge of the canyon. A heavier concentration of debris was detected at the northern end of the site. This suggests that the cultural debris here has been buried by alluvial processes and will only be found in areas where erosion has occurred. Juniper, squirreltail grass, prickly pear, and sagebrush are the dominant plant species observed on the landform.

One hundred and fifty two debitage items were sampled from the assemblage and are comprised of 11 different materials. Most flaking debris is unspecified chert (90) and fine-grained quartzite (25); remaining materials include silicified wood (7), coarse-grained quartzite (7), exotic chert (7), argillite (6), basalt (3), obsidian (2), Black Forest silicified wood (2), Alibates dolomite (2) and chalcedony (1). Debitage classes are complex flake (61), simple flake (56), biface-thinning flake (31), and shatter (4). In addition to the Alibates specimen, other non-local items are dendritic chert (likely from the Hartville Uplift source) and obsidian. The source location for this obsidian is the Jemez Mountains of New Mexico (Cerro del Medio dome, Appendix I).

The tools are diverse and include eight bifaces, six utilized flakes, five projectile points, two uniface tools, two end/side scrapers, one core, one metate, and one mano. Tool classes and material types are presented in Table 5.2. All of the projectile points were collected; only three could be typed using the Anderson (1989) system. The first point is nearly complete and is similar to a P47 type. These points range in age from 3300 BC to AD 1000. The other two points have been classified as P26, with estimated dates between 1000 BC and AD 500. These points present a broad time span for prehistoric occupation on 5LA8308, but we suspect at least one prehistoric component would have occurred sometime between the Early Archaic period and the Developmental period.

Table 5.2: Material Type by Tool Type for Site 5LA8308.

	Material Type							
Artifact Type	Argillite	Chert	Quartzite	Obsidian	Silicified Wood	Sandstone	Total	Percent
Biface	1	3	3	0	1	0	8	30.8%
Core	0	0	0	1	0	0	1	3.8%
End/Side Scraper	0	2	0	0	0	0	2	7.7%
Mano	0	0	0	0	0	1	1	3.8%
Metate	0	0	0	0	0	1	1	3.8%
Projectile Point	0	3	2	0	0	0	5	19.2%
Uniface	0	2	0	0	0	0	2	7.7%
Utilized Flake	0	6	0	0	0	0	6	23.1%
Total	1	16	5	1	1	2	26	100.0%
Percent	3.8%	61.5%	19.2%	3.8%	3.8%	7.7%	100.0%	

The historic component consists of a trash scatter and a collapsed single-room stone structure (Feature 1) with a field stone foundation. This foundation measures approximately 13 x 12.5 ft, and the structure is apparently the recent remains of a temporary out-building or short term habitation. Surface artifacts include a single fragment of green bottle glass with "..1 CA..." marked on its surface. Four machine solder seamed cans and two hand-soldered seamed cans were also found approximately 100 m south of the structure. One can had about six bullet holes (ca. .22 cal) in it. Government Land Office records show that a James Dutton was granted a land patent here in 1924. No further work is warranted for the site, as neither the prehistoric nor the historic components are considered significant based on the sparseness of the remains.

5LA8310

Field crews found this small site in the open grasslands 1.5 km south of Lockwood Canyon. Intermittent watercourses can be found approximately 200 m to the south, and 200 m to the east of this location. Three flakes (two quartzite and one chert) and a deflated hearth (Feature 1) comprise the prehistoric remains. The hearth, a small conglomeration of fire-cracked sandstone, contains no ash stained soil. A few other pieces of fire-cracked rock were encountered randomly across the site, but are not cohesive enough to be called features. Alluvial sedimentation is variable, some areas maintain about 25 cm of deposition and could be covering buried cultural deposits. The vegetation community is best characterized as grassland with squirreltail, grama, and needle and thread grass dominating the ground cover. Though a hearth was found, it has no integrity because of erosion. No further work is required at the site.

5LA8312

This non-eligible site is a prehistoric lithic scatter and historic animal pen located in a stand of juniper trees. Open, grassy plains are visible to the north and 500 m to the southwest, Lockwood Canyon and a permanent water source can be encountered. The surface terrain slopes gently to the southwest at an angle of 2 degrees and has resulted from moderate erosion.

Surface flaking debris is chert (15), coarse-grained quartzite (13), argillite (10), fine-grained quartzite (5), basalt (5), quartz (1), and obsidian (1). Patterned tools include three utilized flakes-- chert, basalt, and obsidian. A partially deflated hearth (Feature 2) was also detected during recording procedures. Recorded as a cluster of partially exposed burnt sandstone cobbles, it is not considered to have integrity because it has been deflated, and modern alluvium is now filling it in.

The animal pen (Feature 1) measures about 29 feet square and is constructed of sheet metal, galvanized wire, 8 d machined nails, notched juniper logs, milled lumber (3" x 1 ¼" x 6' and 9" x 1" x 6'), and barbed wire. This structure is in ruins and partially on bedrock; no additional historic artifacts were noted outside of the structure. As neither the prehistoric nor the historic components of the site are considered significant, no further work is required.

5LA8595

The site is a thin debitage scatter in a flat plain, just south of an unnamed Lockwood Arroyo feeder drainage. Surface visibility is poor due to dense grassland vegetation, and the surface soil is sandy loam with a cryptogamic crust. Fire-cracked rock pieces are visible in several locations with one conspicuous concentration. This possible hearth lacks ash and charcoal and its outline could not be determined as it has deflated to its current position. Recorded flaking debris includes four simple flakes, one complex flake, and one biface-thinning flake; materials are chert (4), quartz (1), and siltstone (1). This site is not considered eligible as the potential thermal feature has little integrity.

5LA8596

The site is located on the western edge of a large drainage basin, 700 m south of Lockwood Canyon. At its west edge the terrain is relatively flat; the eastern portion slopes at 3 degrees to the east. Growing on the light-brown sandy loam soils are juniper, foxtail barley, sage, mountain mahogany, and grama grass plants.

Artifacts found at the site represent lithic reduction and food processing activity. Ground-stone tools include two sandstone metate fragments, quartzite chipped-stone tools are two cores, and a retouched flake. Flaking debris, analyzed in a 149 piece sample, consists of 129 quartzite, eight chert, five argillite, four basalt, and three silicified wood items. Eighty-five pieces of debitage are simple flakes, 54 are complex flakes, and 10 are shatter. This site is probably near a source of raw quartzite and functioned as a primary reduction site. All available information has been gathered and no further work is required.

5LA8597

This is a small lithic scatter composed of 20 pieces of debitage, and one quartzite non-bipolar core. A two-track road borders the east edge of the site, another the west edge; they form a fork just north of the cultural materials. Located in the grassy flat south of Lockwood Arroyo, this site may be associated with 5LA3480, which is 25 m northeast.

Of the debitage, 18 pieces are quartzite, with single samples represented by chert and argillite; 14 are simple flakes and six are complex flakes; 15 of the items are noncortical and five show dorsal cortex. No features, patterned chipped-stone tools, or ground-stone tools were noted encountered in this raw material deduction workshop. Because this small site has sparse cultural remains and no potential for buried deposits, no supplemental work is required.

5LA8598

This is a thinly distributed lithic scatter located on the grassy plain above, and to the east of, an unnamed side drainage that flows north into Lockwood Canyon. Flakes (16 quartzite, two chert, and one argillite) were noted on the surface with a well-made quartzite corner-notched projectile point (Type P58) and a chert non-bipolar core. Colluvial soil deposits to 25 cm were observed on this 48 x 47 m surface scatter. Juniper, soapweed, milkweed, sunflowers, prickly pear, cholla, and grama grass grow on its surface. In the absence of fire features and ground stone, the site is not considered a good candidate for additional research.

5LA8599

The site is located on a sloping finger ridge that forms a bench near its tip. It overlooks a shallow intermittent stream channel that flows northward to Lockwood Canyon (1.9 km). Analysis of chipped-stone surface debris included chert (42), quartzite (6), and basalt (1). Of these, 21 specimens are complex flakes, 18 are simple flakes, five are biface-thinning flakes, and five are angular pieces of shatter. The chert items appear to have been procured from the same parent source and exhibit a reddish tinge indicating heat treatment. Considering the entire assemblage, all of the flakes are finely worked, indicating tool or late-stage biface manufacture was the dominant site activity. This is surprising as no patterned tools were identified. The site requires no additional research, as all data here has been collected.

5LA8600

The site consists of a few scattered flakes and a hornfels/basalt core. Measuring 60 x 45 m, it was found on the gently sloping west face of a large north to south trending ridge south of Lockwood Canyon. Flaking debris includes basalt (4), quartzite (3), chert (2), and argillite (1) items. This sparse debris scatter requires no further work as thermal features are absent and no buried deposits were observed.

5LA8601

This is a high-density lithic scatter with five chipped-stone tools found on the eastern terrace of an unnamed side drainage that flows north to Lockwood Canyon. An incipient gully at the southern site boundary and is the only landscape feature. Soil is sandy silt with depths to 25 cm observed. A grassland plant community intergrades with shrubland at this location.

Most of the lithic material displays a red cast or heat spalling. No thermal features were recorded at the site, so heat treatment must have occurred at a different location. The field crew sampled a total of 154 pieces of flaking debris. Most (94%) debitage items are chert; quartzite, basalt, and argillite pieces comprise the remainder. Tools include two broken projectile points, an unfinished quartzite biface, a chert end/side scraper, and a chert utilized flake. Both projectile points are temporally diagnostic and made of chert. The first (FS1) is a P49 and ranges in time between AD 800 and 1750 (Anderson 1989:175). The second point (FS2) is associated with dates that range between 1000 BC to AD 500 and is classified as a P26 type. Based on these two artifacts, the site was occupied from sometime between the Middle Archaic period and the Developmental period of the Late Prehistoric stage. This lithic scatter requires no further work as thermal features are absent and no buried deposits were observed.

5LA8602

The site is a large (124 m x 85 m) scatter of lithic debitage with two bedrock grinding surfaces. These cultural materials were discovered in the grassy plains between two large, unnamed drainages that merge approximately 600 m to the north. Grassland plant species dominate the vegetation; sagebrush, foxtail barley, western wheatgrass, needle and thread grass, prickly pear, yucca, cholla, and sparse juniper were encountered within the site boundary. Surface soil is a sandy silt, found in depositional pockets between the numerous exposures of Dakota group sandstone. Thermal features and structures were not encountered during our work and the cultural soil deposits are not likely to exist. Overall, the colluvial and alluvial sediments are shallow-- from 0 to 15 cm.

Plentiful lithic artifacts consist of debitage (a 160 piece sample was recorded), 26 chipped-stone tools, and four ground-stone artifacts. Of the debitage items, 74 are fine-grained quartzite, 42 are coarse-grained quartzite, 26 are chert, 13 are argillite, four are basalt, and one is silicified wood. Nearly half (72) are classified as simple flakes, with complex flakes (66), shatter (17), and biface-thinning flakes (5) also seen. Three material types were noted in the biface-thinning flakes and indicate at least that many bifaces were manufactured on site. Visible cortex is present on 52 specimens indicating that the quarry area is nearby.

Many tools were recorded including eight non-bipolar cores, five utilized flakes, four unifaces, three unfinished bifaces, two projectile points, two side scrapers, one end scraper, and one jewelry item. Tool classes and material types are presented in Table 5.3. Only one projectile point was typed to the Anderson (1989) system, it is whole and similar to a P62 type (AD 500 to AD 1400). Ground-stone artifacts include two bedrock metates (Features 1 and 2), a slab metate fragment, and a mano fragment.

Table 5.3: Material Type by Tool Type for Site 5LA8602.

	Material Type							
Artifact Type	Argillite	Chert	Quartzite	Basalt	Kaolinite	Sandstone	Total	Percent
Biface	0	1	1	1	0	0	3	10.0%
Core	0	1	7	0	0	0	8	26.7%
Scrapers	0	1	2	0	0	0	3	10.0%
Mano	0	0	0	0	0	1	1	3.3%
Metate	0	0	0	0	0	3	3	10.0%
Projectile Point	0	2	0	0	0	0	2	6.7%
Jewelry	0	0	0	0	1	0	1	3.3%
Uniface	1	0	3	0	0	0	4	13.3%
Utilized Flake	1	1	3	0	0	0	5	16.7%
Total	2	6	16	1	1	4	30	100.0%
Percent	6.7%	20.0%	53.3%	3.3%	3.3%	13.3%	100.0%	

Based on the artifact assemblage, site activities include raw material reduction, tool/biface manufacture, jewelry manufacture, and food processing. There are no developed soils or structures or features, so it is not eligible and additional research is not recommended.

5LA8604

The site is a 35 x 10 m lithic scatter located on a small erosional terrace on the northern slope of a large east-west trending ridge that overlooks the upper Stage Canyon drainage. Surface soils are light-brown silty loam with intermixed limestone gravel; the visible maximum soil depth is 15 cm. Vegetation on site consisted of typical grassland residents: snakeweed, sagebrush, yucca, saltbush, threeawn, hairy grama, and pale wolfberry.

The meager surface assemblage included nine pieces of debitage and three chipped- stone tools. Field Specimen 1, a patterned tool and FS 3, a retouched/utilized flake, are both made of orthoquartzite. Field Specimen 2, an unfinished biface, is chert. Of the nine pieces of debitage, four were flakes of orthoquartzite, three were chert flakes, and there were two pieces of quartzite--one fine-grained and one coarse-grained. There were five simple flakes, three complex ones, and one piece of shatter. Eighty-nine percent of the specimens were non-cortical, while 11% exhibited cortex. Fifty-six percent of the flakes were large, and 44% were classified as small. No ground stone was found on this site, and no structures or features were located. No further work is needed.

5LA8605

This is a large lithic scatter located on a low ridge that encompasses 6.60 acres within its boundary. It was found along the west terrace of an unnamed northern side drainage feeding Lockwood Arroyo. Vegetation is classed as shrubland; yucca, sage, cholla, juniper, snakeweed, sumac, and various grama grasses were growing on the light-brown, silty clay surface soil. Deposition is poor (< 15 cm) and bedrock outcrops in many areas.

A total of 150 pieces of debitage were analyzed in the field. These are coarse-grained quartzite (62%), chert (17%), argillite (7%), fine-grained quartzite (7%), and basalt (7%). Artifact classes are 73 complex flakes, 56 simple flakes, 20 pieces of shatter, and one bifacial-thinning flake. Only 25% of the flakes show some degree of dorsal cortex. Quartzite (n=46, 31%) shows the most cortical specimens in the assemblage.

There are five artifact types represented in the flaked-tool assemblage (Table 5.4), including six non-bipolar cores, four projectile points, four uniface tools, three bifaces, and one utilized flake. Three of the four projectile points were classified under Anderson's (1989) system. The chert piece (FS 20), is the base of a Hell Gap point, with a date range of 8,000 BC to 7,000 BC. Field Specimen 18 is Hartville Uplift chert, is 68% complete, and classified as P63 (AD 600 and AD 1100). The last point (FS 5) is a P11, and has a tentative date estimate of 4000 BC to 3500 BC. Eight ground-stone items were recorded-- six slab metate fragments, one mano fragment, and one complete mano.

Though there are artifacts from three separate occupations on this non-eligible site, no further work is required here because there are no thermal remains and there is very little sediment at the surface (what remains is secondary alluvial deposition). A moderate to heavy amount of surface disturbance in the form of tracked vehicle ruts is present.

Table 5.4: Material Type by Tool Type for Site 5LA8605.

Artifact Type	Material Type						
	Chert	Basalt	Quartzite	Orthoquartzite	Sandstone	Total	Percent
Biface	1	0	2	0	0	3	11.5%
Core	0	1	5	0	0	6	23.1%
Mano	0	0	0	0	2	2	7.7%
Metate	0	0	0	0	6	6	23.1%
Projectile Point	2	0	1	1	0	4	15.4%
Uniface	1	0	3	0	0	4	15.4%
Utilized Flake	0	0	1	0	0	1	3.8%
Total	4	1	12	1	8	26	100.0%
Percent	15.4%	3.8%	46.2%	3.8%	30.8%	100.0%	

5LA8608

This large, but sparse, lithic scatter covers 3.8 acres. Cultural materials consist of 20 pieces of debitage, a quartzite non-bipolar core, and a quartzite uniface tool. Of the debitage, most are simple flakes (13), with complex flakes (4), biface-thinning flakes (2), and shatter (1) also recorded. The flaking debris has the following material type distribution -- quartzite (11), chert (3), argillite (3), siltstone (1), dendritic chert (1), and porcelanite (1). The site is located on a grassy slope with an intermittent drainage at the western boundary. It has been moderately disturbed by army maneuvers and some water erosion, in the form of small erosional cuts, was observed near the small drainage. There is no potential for buried deposits here and no further work is required on this featureless site.

5LA8609

The site was found in the grassy plains approximately 1 km southwest from the head of Welsh Canyon. Based on the artifact assemblage, raw material reduction and tool manufacture are inferred. Prehistorically exploitable vegetation includes juniper, soapweed, sage, hairy and black grama, prickly pear, and cholla. Soils here have been deflated and most artifacts were located on sandstone bedrock. Those residual soils remaining have been rutted by military activity.

The artifact assemblage contains 25 flakes and three non-bipolar cores. Of the flakes, 20 are quartzite, and five are chert; 19 are noncortical and six show cortex; 19 are simple flakes and six are complex flakes. The cores are chert (2) and quartzite (1). The site is not thought to have contextual integrity and no further work is recommended.

5LA8610

This is a low-density lithic scatter with two stone rings. These cultural materials were encountered on a grassy slope, at the east edge of the floodplain in the northwest fork of upper Red Rock Canyon. Surface visibility is poor owing to the thick growth of snakeweed, sage, prickly pear, cholla, and grama grasses. Scattered sparsely at the surface, the debitage was found to be made of chert (3), and quartzite (2). Debitage reduction stages are complex flakes (2), biface-thinning flakes (2), and simple flakes (1). A single chert utilized flake represents the tools.

Feature 1 is a spaced stone ring measuring 4.7 x 3.8 m. Fill within appears shallow (<10 cm), and the unmodified sandstone blocks comprising this habitation feature are eroding down the slope. A partial stone ring was designated Feature 2 and, like Feature 1, this structure is eroding downhill. There may be additional stone rings in the area, but these are indistinct, due to the thick surface vegetation. Additional work is not required, as the site is a poor candidate for further research.

5LA8611

The site is composed of a chert projectile point (Anderson Type P12, 3000 BC to AD 500) and eight flakes (six quartzite and two chert). Cholla, yucca, juniper, grama grasses, and snakeweed are growing in the immediate site area, which is located on a small knoll in the middle of grassland. Bedrock outcrops and bare patches of soil provide good surface visibility. Wheeled and tracked vehicles have destroyed the surface of the site and any research potential.

5LA8612

The site is a sparse lithic scatter and two historic tin cans. Both cans are extremely deteriorated with no discernable markings; no other historic artifacts/components were located during recording. The lithics are three flakes (two argillite, one chert) and a chert uniface. Located on a sloping bench, the site is surrounded by intermittent drainages and has been impacted by them. Sediment deposition is poor, there are numerous bedrock outcrops, and the thick surface gravels indicate a deflated context. No additional work is recommended for this small debris scatter.

5LA8614

The site is a large lithic debris scatter with stone rings and a noteworthy concentration of lithic tools. It was found on the southern terrace of the far western side drainage of Red Rock Canyon. A permanent spring with standing water is 170 m east, and cottonwood trees in the drainage directly north of the site indicate that water is present just below the surface. The site is located in a grassland/shrubland transition zone, with sparse juniper tree cover near the drainage. More prominent plant species growing on the surface are snakeweed, sage, wheatgrass, foxtail barley, needle and thread grass, and various grama grasses. For the most part, soils around the site are shallow with many areas of exposed outcropping sandstone near the eastern site boundary. These soils are characterized as a light silty loam with a cryptogamic crust.

A total of four features were recorded-- three spaced stone rings, and a tool concentration (Feature 4). The stone rings (Features 1-3) are single course, unmodified sandstone blocks and average 5.5 m in diameter. Additional rings are likely to be found on the terrace, but thick vegetation makes the surface difficult to see in many locations.

Artifacts identified at the surface include debitage, patterned chipped-stone tools, and ground stone. The unexpected size of the flaked debitage assemblage required us to sample 150 items from random locations across the landform. Locally available quartzite (87%) is the dominant material, with lesser amounts of chert (7%), argillite (5%), and quartz (1%) noted. The assemblage mainly contains simple flakes (66%), with some complex flakes (30%), shatter (3%), and biface-thinning flakes (1%) also seen. Eighty-six percent of the debitage specimens are non-cortical and 14% show some degree of dorsal cortex. In the cortical items, 7% are large flakes and 11% are small. This reflects an emphasis on core reduction to produce expedient flake tools. The large number of cores and utilized/retouched flakes supports this assumption when debitage is compared to the chipped-stone tool assemblage. It appears that many cores were initially roughed out at the quarry or source area and brought to the site in noncortical form. Once on site, these were manufactured into early-stage bifaces or used to produce flakes.

The tool classes are utilized flake (27), core (14), metate (9), uniface (8), projectile point (3), unfinished biface (1), drill (1), end scraper (1), mano (1), and end/side scraper (1). These tool types have been listed in Table 5.6. Forty-two (64%) of the tools can be attributed to hunting and game processing activities, while 14 (21%) are core-reduction artifacts and ten (15%) are food processing tools. With the exception of the silicified wood item, all materials can be found in and around the PCMS. The silicified wood specimen is from the central foothills of Colorado. A selection preference for materials with cryptocrystalline structure (82%) is apparent in the chipped-tool assemblage.

Table 5.5: Material Type by Tool Type, 5LA8614

	Material Type							
Artifact Type	Argillite	Silicified Wood	Chert	Quartzite	Basalt	Sandstone	Total	Percent
Biface	0	0	1	0	0	0	1	1.5%
Drill	0	0	1	0	0	0	1	1.5%
Core	2	0	1	10	1	0	14	21.2%
Scrapers	0	1	1	0	0	0	2	3.0%
Mano	0	0	0	0	0	1	1	1.5%
Metate	0	0	0	0	0	9	9	13.6%
Projectile Point	0	0	1	1	1	0	3	4.5%
Uniface	1	0	1	6	0	0	8	12.1%
Utilized Flake	0	0	6	21	0	0	27	40.9%
Total	3	1	12	38	2	10	66	100.0%

The expedient use tools, utilized flakes and unifaces were mainly used for scraping. Thirty specimens show an edge angle greater than 45 degrees and five have an edge angle less that 45 degrees. When combined with the patterned scraping tools, hide scraping functions and game processing functions are the dominant site activity.

Only one of the projectile points recovered from the surface of this site is temporally diagnostic. Though broken, this fine-grained quartzite point was identified as Hell Gap. Hell Gap points have been dated from 8,000 to 7,000 BC in many areas of the Plains states. The other two points are highly fragmented and cannot be typed. Of these, the chert point is small and the basalt point is large. Based on the large projectile, the site likely had one occupation in the Plano

Period of the Paleoindian Stage. The small size of the chert point suggests a Late Prehistoric occupation.

This multicomponent site appears to have been inhabited from Paleoindian time to the Late Prehistoric period. With a good source of water nearby, this area of the PCMS appears to have experienced heavy usage by all prehistoric inhabitants. Across the drainage to the north, and directly to the east, sites 5LA8620 and 5LA4940 are found. These are also large multicomponent sites, and without thick vegetation in the drainage below they could likely be connected. The lack of thermal features and thin soil depth makes this site a poor candidate for future work though.

5LA8618

The site is a light lithic scatter found on an elevated point overlooking upper Red Rock Canyon. It is sparsely vegetated with juniper, sage, milkweed, and grama grasses. Consisting of debitage, a basalt core, and a quartzite core, this is one of the many small and insignificant lithic scatters found on the PCMS. Surface flaking debris consists of chert (6), quartzite (3), and basalt (1); these are six large and four small items; cortex is absent on seven specimens. No groundstone tools were found and no evidence for prehistoric hearths was noted.

5LA8621

This is a lithic scatter consisting of a chert scraper and two chert flakes. These were located in the grassy flat 1.1 km east of upper Red Rock Canyon. A modern barbed wire fence is present just north of the artifacts. The site is in a general grassland region, and supports sage, prickly pear, soapweed, juniper, and grama grass. Though these artifacts appear to be eroding out at the surface, no additional work is needed at this small site.

5LA8653

The site is a sparse lithic scatter with three stone alignments. Encountered at an elevation of 1518 m (4979 ft), the site is on the eastern terrace of Lockwood Arroyo approximately 1200 m southeast of Cross Ranch. Vegetation is grassland with an intergrading juniper woodland community. Ground visibility is good on the exposed sandstone outcrops near the terrace edge; poor in the grass covered slopes below. The architectural features are alignments of stone, but not rings, being oblong or rectangular in shape. All are small in size, and due to 5LA8653's location and proximity to the game drive site at Cross Ranch, the structures may be possible blinds or lookouts. They are also in close proximity to Army maneuvers evidence and debris, so it is possible that they could be military in origin. Used signal flares were located in close association with Features 1 and 2.

The debitage assemblage is quartzite (17), chert (6), basalt (4), and argillite (2). These are further classified as 16 complex flakes, 12 simple flakes, and one piece of angular shatter. The tool assemblage includes: five metates, two cores, two utilized flakes, and an unfinished biface. No thermal features or diagnostic artifacts were found on the site and, without knowing the origin of the stone structures, it is difficult to assign significance to this site.

5LA8654

The site is a rockshelter and isolated bedrock metate at the foot of a natural sandstone face at the east edge of the Lockwood Arroyo floodplain. Cross Ranch is 440 m northeast. The rockshelter, with evidence of recent Army trash inside of it, measures 9 x 3.5 m. A sandstone wall along the front edge of the shelter is present and represents a prehistoric architectural unit. Soil is very shallow (10 cm in rock hollows) within the shelter and is secondary aeolian deposition. The milling slick was found outside the shelter on an outcropping sandstone bed. This grinding surface measures 41 x 26 cm and shows moderate usage in the form of grinding and transverse striations. The absence of lithic debris and the lack of soil depth lead us to believe the site will not contain significant remains. No additional research is recommended, and the site is not to be considered eligible for the National Register.

5LA8655

This is a high-density lithic scatter on a grassy ridge that overlooks Lockwood Arroyo to the east. It consists of two spaced stone rings (Features 1 and 2) and a lithic concentration (Feature 3). Most of the lithic material was encountered in Feature 3. Primary material types are chert (60) and quartzite (42). Recorded in smaller amounts are argillite (4), basalt (1), baked claystone (1), and obsidian (1). Debitage reduction stages are simple flakes (52), complex flakes (40), shatter (14), and bifacial-thinning flakes (3). This site differs from others in the area in that cortex is present in only 2% of the assemblage. Recorded artifacts consist of nine tools: three projectile points, two scrapers, two utilized flakes, one edge-ground cobble, and one core. All three projectile points are small in size and they are made of chert, argillite, and fine-grained quartzite. Two of the were classified in the Anderson (1989) system; the fine-grained quartzite point is P49 and the argillite point is P83. Suggested age dates for these types of points start at AD 750 and end near AD 1750. 5LA8655 appears to have been a short-term habitation based on the stone rings, a ceramic sherd, and an edge-ground cobble. It may be on the fringe of a large encampment, though thick grass in the floodplain prevented us from finding additional rings. Because the soil deposits are thin and weakly developed, the site has little potential for additional research.

5LA8657

5LA8657 is located on the south side of Lockwood Arroyo, approximately 1.2 km southeast of the Cross Ranch historic site. Surface vegetation is grass (foxtail, grama, needle and thread, wheatgrass), sage, cholla, prickly pear, and stickseed. Though ground visibility is poor, owing to the thick grass, three stone rings are noted (Features 1-3). The terrace that the site was encountered on is not stable, and has been scoured by flooding episodes from Lockwood Arroyo. In addition, heavy sediment damage has been incurred from U.S. Army maneuvers.

The surface lithic debris contains seven pieces of quartzite debitage, and a utilized flake of chert. Of the debitage, four pieces are simple flakes, two are complex flakes, and one is shatter. No further work is required here as the disturbed nature of the parent landform and cultural materials makes it ineligible.

5LA8659

The site is located in a shallow drainage basin along the confluence of an unnamed northern side canyon and Lockwood Canyon proper. It measures approximately 135 m northwest to southeast and 125 m northeast to southwest. The site is bordered on the west by Lockwood Canyon, and the terrain slopes steeply from east to west (2-4 degrees). Prehistoric surface remains include chipped-stone artifacts, two hearths, a rockshelter, and a stone ring. Surface visibility is good with minimal ground cover. Vegetation includes cholla, juniper, foxtail, sage brush, skunkbrush, prickly pear, grama grass, and snakeweed. Site disturbances range from military activity to water and wind erosion. There is sandstone caprock at the east edge of the site, though bedrock also is exposed throughout this cultural debris scatter. Very little soil deposition is seen, that observed is secondary aeolian and alluvial sediment.

Diverse artifacts were encountered, including 93 pieces of debitage, 22 flaked tools, and eight ground-stone artifacts. Raw materials noted for debitage are coarse-grained quartzite (68%), chert (12%), argillite (11%), fine-grained quartzite (4%), basalt (3%), baked claystone (1%), and obsidian (1%). The obsidian was sourced (Appendix I) to the Cerro del Medio locale of the central Jemez Mountains of New Mexico. The three debitage classes are simple flakes (40), complex flakes (35), and shatter (18). Chipped-stone tools include ten cores, six bifaces, two unifaces, one utilized flake, one core-tool, one end scraper, and one end/side scraper. Five metate fragments, two bedrock metates, and one mano comprise the ground-stone assemblage.

Diagnostic artifacts were not detected, and the site shows very little soil deposition. As evidence for the deflated nature of the overall site, no fill remains within the rockshelter and both hearths have eroded downhill from their original position. This site is not believed to be significant due to extensive erosional impacts.

5LA8660

This large site consists of a large lithic scatter, stone rings (Features 1-3), and a possible hearth feature (Feature 4). It is located on the upper terrace of Lockwood Arroyo with a large unnamed side canyon at the site boundary. Topography ranges from hill slopes along the northern confines, to bedrock outcrops, to a terraced area near the canyon edge. Several small dry washes down cut the site and eventually drain into the east canyon. Dominant surface vegetation includes juniper, soapweed, prickly pear, sage, snakeweed, skunkbrush, sideoats and hairy grama, and needle and thread grass. Soil depths of up to 10 cm are plainly visible on top of eroding sandstone bedrock in many areas of the site. Evidence of U.S. Army maneuvers are observed in the presence of modern trash and abundant vehicle tracks.

The unexpected size of the flaking debris assemblage required a sampling of 153 pieces of debitage. The artifact classes are 72 complex flakes, 65 simple flakes, and 16 pieces of shatter. Coarse-grained quartzite (80%) is the dominant material type, and large chunks of this material are seen scattered naturally across the surface. The remaining material types (20%) are chert, fine-grained quartzite, argillite, and basalt. Thirty-one percent of the flakes show some degree of dorsal cortex, of which 22% are large flakes and 9% are small flakes. Noncortical, large flakes comprise 39% of the assemblage. This information, coupled with the high number of shatter specimens and recorded cores, suggests that core-reduction was a dominant site activity. The large number of unfinished bifaces indicates that quartzite raw material was roughed out in the form of early-stage bifaces. All of the material recorded on site is locally available.

There are five artifact types represented in the flaked tool assemblage. These are eight non-bipolar cores, four bifaces, five utilized flakes, six retouched flakes, and a projectile point. Table 5.6 outlines the tool class by material type for chipped- and ground-stone tools. The projectile point is made of coarse-grained quartzite and most closely resembles Anderson's (1989) P48 type, which has associated dates of between AD 1000 and AD 1400.

Table 5.6: Material Type by Tool Type for 5LA8660

	Material Type						
Artifact Type	Argillite	Basalt	Chert	Quartzite	Sandstone	Total	Percent
Biface	0	0	0	4	0	4	10.0%
Non-bipolar Core	0	0	4	4	0	8	20.0%
Mano	0	0	0	0	5	5	12.5%
Metate	0	0	0	0	11	11	27.5%
Projectile Point	0	0	1	0	0	1	2.5%
Uniface	0	0	2	4	0	6	15.0%
Utilized Flake	1	1	2	1	0	5	12.5%
Total	1	1	9	13	16	40	100.0%
Percent	2.5%	2.5%	22.5%	32.5%	40.0%	100.0%	

Sixteen ground-stone specimens were recorded-- six metate fragments, five bedrock metates, four mano fragments, and an edge-ground cobble. Seven of these artifacts exhibit a red color change from heat exposure.

Though this site is a quartzite procurement locale, with stone rings and two areas with ashy soil and fire-cracked rock, no further work is needed. With an abundance of material types, chipped-stone tool classes, and a variety of ground stone, indicated site activities are food processing, tool manufacturing, and raw material reduction. Because the cultural soil deposits have eroded from the surface of this site, it is not recommended for the NRHP.

5LA8661

The site is a sparse lithic scatter situated in the plains near the edge of the juniper covered caprock north of Lockwood Canyon. Ground visibility is generally poor (grama grasses are thick here) and the surface soil is identified as silty loam. Depths to 15 cm are observed above the numerous areas of outcropping sandstone bedrock. Thirty debitage items were analyzed and found to include 22 pieces of quartzite, six of chert, one of argillite, and one of basalt. Tools include an argillite uniface that may be an early stage scraper, a chert utilized flake, an irregular chert core, and a sandstone edge-ground cobble fragment. No signs of habitation were identified and no diagnostic tools were recovered, so additional research is not warranted for the site.

5LA8662

The site is a small cultural debris scatter-- a quartzite flake, a quartzite uniface, and a complete mano above a possible prehistoric rock shelter. Two field stone alignments were also noted on top of a small knoll, overlooking the canyon that provides a 360 degree view of the region (including down in Lockwood Canyon). No sediment depth is detected in the shelter or in the area of the alignments. The former is situated on the point of a cliff edge along the canyon edge. The site is southwest of sites 5LA8660 and 5LA8671 and perhaps is affiliated with its neighbors. Independent of the other sites, 5LA8662 is not considered significant; no further work is required.

5LA8663

The site is located at the head of a large drainage basin in the grassy flats to the north of Lockwood Arroyo. The setting is a resistant, soil-covered knoll, with exposed sandstone bedrock near the western site boundary. Grama grass (sideoats and hairy), yucca, prickly pear, cholla, juniper, and sage are growing on the site.

Its historic component consists of a sandstone block foundation (23 x 13 ft), a dugout (8 x 8 ft), and an associated trash scatter. Cooking materials, mostly from porcelain containers, glass containers, and rusted cans, were identified. This domicile was patented by Smith in 1925 and the artifacts support this occupation date. It appears the house structure and the dugout were scavenged for materials after abandonment so little can be learned from additional work.

A sparse prehistoric component, detected along the site boundary, is comprised of three quartzite flakes. No formal tools or surface features were seen.

5LA8664

Located in Training Area 12, this site was encountered along the western edge of a large erosional shelf formed by resistant outcropping shale and limestone beds. Two small erosional drainages scar the surface at the east and west site boundaries. Shrubland is the vegetative community dominating the site and the surrounding area and would best be described as grassland. Plant species include soapweed, juniper, cholla, prickly pear, sage, snakeweed, threeawn, and skunkbush. The terrain slopes down at an angle of 2 degrees, north to south, and many small terraces have formed here. Secondary sediment depth approaches 10 cm in many locations, though numerous artifacts were recovered on limestone bedrock. Mechanized vehicle disturbance is considerable; most of the northern site area has deep gouges from tracked vehicle maneuvers. A total of 93 artifacts were recorded, including 80 pieces of debitage, 12 flaked tools, and one piece of ground stone (metate fragment). Found within the scatter were a one hole-in-top can with lapped seam, and two lard buckets with pry-out lids.

Eighty debitage items are recorded and found to be made from seven specific material types. Table 5.7 shows that there was a strong selection preference for chert on this site. The debitage is 70% chert, 21% coarse-grained quartzite, 4% silicified wood, 1% chalcedony, 1% fine-grained quartzite, 1% basalt, and 1% obsidian. Nearly all materials are available in the region; four pieces of debitage are non-local material. Three of these are Black Forest silicified wood, and the obsidian is sourced to the Valles Caldera of New Mexico. All materials can be further reduced to the following structures: 76% cryptocrystalline, 23 % macrocrystalline, 1% microcrystalline. The debitage items are complex flakes (40%) and simple flakes (39%), biface-thinning flakes (16%) and shatter (5%).

All phases of raw material reduction are seen in the debitage assemblage. Twenty-four percent of the debitage specimens have dorsal cortex. Of the cortical specimens, eleven are classified as small and eight are large. In the noncortical specimens, 58 are small and three are large. All cortical flakes and the noncortical large flakes appear to be the result of core-reduction activity. The high number of small flakes indicates that nearly exhausted cores were used, or most of the tool manufacturing was done to produce later-stage bifaces. Most of the large and unpatterned bifaces appear to have been roughed out at the quarry location and the nearly finished specimens were finished on site. Biface-thinning flakes, represented by two material types, indicate at least two biface tools were manufactured or reworked on site. Two of these flakes are very small and could be classified as minute-retouch flakes. Heat treatment is not evident in the debitage assemblage.

TABLE 5.7: Summary Description of Chipped-Stone Debitage for 5LA8664.

	Silicified Wood	Chalcedony	Chert	Quartzite	Basalt	Obsidian
Total	3	1	56	18	1	1
Large	1	0	4	5	1	0
Small	2	1	52	13	0	1
Cortical	2	0	12	4	1	0
Noncortical	1	1	44	14	0	1
Complex	1	0	27	4	0	0
Shatter	0	0	3	1	0	0
Simple	2	1	16	10	1	1
Biface-thinning	0	0	10	3	0	0

There are 12 flaked-lithic tools, which fall into the following classes -- projectile point (5), biface (3), uniface (1), utilized flake (1), core (1), and core-tool (1). All were recovered randomly from the surface in no apparent concentration. These are many of most of the same material types as encountered in the debitage (Table 5.8).

Only three projectile points could be classified in Anderson's (1989) system, FS 11 and 12 are so highly fragmented that they cannot be diagnostically typed. The first diagnostic projectile point (FS 6) is made out of fine-grained quartzite. This small point is similar to a P79 type and dates to AD 1000 to AD 1750. The second point (FS 8), is corner-notched and chert. It is classified as a P62 with an age range of AD 500 to AD 1400. The third classifiable point (FS 9) is basally notched, chert, and classified as a P82 (AD 750 to AD 1725).

All bifaces exhibit use wear, are broken, and have been recovered in finished form. The first (FS 1), is a large biface fragment of chert. It is a finished knife and displays heavy retouch modification and use wear on both (<45 degree) lateral edges. Heat treatment is evident in the red color change and numerous potlid scars. The second biface (FS 4), is a knife fragment of orthoquartzite; it has light wear on both lateral edges. The last orthoquartzite biface fragment (FS 11), has wear on both of its lateral edges. The left edge is used for scraping, and the right edge has been used for cutting.

Ten (83%) of the tools can be attributed to hunting and game processing activities while two (17%) are core-reduction tools. Unlike the flakes, most (58%) tools are microcrystalline in structure with the remainder being cryptocrystalline (42%). A distinct selection preference is seen for these lower fracture toughness materials, most tools have been thinned and are considered finished. Raw materials, shown in the chipped-stone tool group, are locally available material.

TABLE 5.8: Stone Tool Type by Material Group, 5LA8664.

	Type			
Material	Chert	Quartzite	Orthoquartzite	Total
Core/Tool	0	1	0	1
Biface	1	0	2	3
Core	0	1	0	1
Projectile Point	3	1	1	5
Uniface	0	1	0	1
Utilized Flake	1	0	0	1
Total	5	4	3	12

This is a heavily deflated site and nearly all artifacts were found resting on the surface of exposed limestone and shale bedrock. The site placement is curious because no permanent water source is in the area; the closest intermittent stream lies 900 m to the south.

A total of 93 lithic items were examined. These include 80 pieces of debitage, 12 flaked tools, and one metate fragment. As shown in the assemblage, the high proportion of local materials suggests the local resources found within the PCMS met the technological and quantitative need of the site inhabitants. Non-local obsidian and Black Forest silicified wood was observed, indicating some contact with groups outside the region, or that the site inhabitants were a highly mobile group. The high proportion of chipped- to ground-stone tools suggests wild plant resources were not exploited and this locale is directly related to the hunting and processing of game.

Though the site is located in a high military impact area and diagnostic artifacts were recovered, no further work is recommended.

5LA8665

Site 5LA8665 is located near the northern boundary of the PCMS and Training Area 12, on a large southeast trending ridge in the upper drainage basin of Stage Canyon. An intermittent stream is located 1 km south. Surface sediments here are shallow, silty clay, and deposited over a base of limestone and shale bedrock. These outcrops form small terraces along the ridge and in many areas of the site, dominate the surface. Because the site is located in a high gradient area

(1-3 degrees), the sediments are subject to episodic sheetwash erosion and in many areas, these can only be seen at the base of trees. Heavy mechanized vehicle disturbance is apparent and modern trash can be found across the landform. The drainage basin is largely a grassland plant community with juniper woodland near the ridge and over most of the site. Juniper, threeawn, soapweed, prickly pear, sage, and skunkbush were the most abundant plant species observed by the field crew.

Seventy-one pieces of chipped-stone debitage were recorded at the surface of this site. These consist of 38 simple flakes, 10 complex flakes, 22 pieces of shatter, and a biface-thinning flake. Table 5.9 presents the data on debitage type by material type. The majority (73%) of the debitage is chert. The remaining 27% is quartzite, basalt, silicified wood, and chalcedony. Fifty-two specimens are small and 19 are large; 89% of the assemblage is noncortical and 11% has cortex. Over two-thirds (70%) of the debitage specimens are noncortical, small flakes. Noncortical large items are 19% of the assemblage, cortical large items are 8%, and cortical small items are 3%. Though all stages of reduction are visible in the assemblage, a lack of cortex on debitage items indicates that noncortical cores and early-stage bifaces were brought to the site and used to produce flakes. An equally low number of complex and biface-thinning flakes suggest that tool manufacture was not a dominant site activity. It is likely that flakes were removed from cores for use as expedient cutting tools. These utilized edges can likely not be identified without optical magnification, however. A silicified wood flake, of Black Forest silicified wood, is the only non-local item.

Eleven chipped tools were analyzed from 5LA8665 and consist of three projectile points, two end/side scrapers, two unifaces, two utilized flakes, and a single specimen for both the unfinished biface and core class (Table 5.10). Most materials are presumably from the PCMS, however none are known to outcrop in Training Area 12. Only the end/side scrapers are complete tools.

All three projectile points have morphological characteristics allowing them to be placed in the Anderson (1989) system. The first recorded point (FS 1) is chert, a P62 as described by Anderson (1989:184-187), and has a time range from AD 500 to AD 14300. A second point (FS 7) appears to be a P83 type, with a date range between AD 750 and AD 1650. The last point (FS 14) is P80 style, with a tentatively assigned age range of AD 1000 and AD 1725.

The end/side scrapers (FS 5 and 8) are both made of chert. Field Specimen 5 shows moderate to heavy retouch modification, and micro-step flake scars were observed on both lateral edges and the distal end. The other scraper (FS 8) is made on a large chert core reduction flake. Marginal retouch and micro-step flake scarps are present along the distal end and both lateral edges. Heavy use wear is seen along the >45 degree working edges.

The remaining tools are four utilized/retouched flakes and an unfinished biface fragment. Field Specimen 6 is the right lateral edge of a uniface tool. It is made on a large core-reduction flake made of argillite, and heavy use wear is observed on the >45 degree working edge. There is some indication that unifacial retouch was used for thinning this artifact. Another specimen (FS 11) is a noncortical chert flake with retouch along both heavily used lateral edges. The right lateral edge shows a use angle of <45 degrees and the left lateral edge is >45 degrees. Field

Specimen 12 is a utilized chert flake that was used as an expedient cutting tool. Unpatterned nicks and micro-step flake scars were observed along both <45 degree lateral edges. This tool is broken and no cortex is present on the dorsal face. Light use wear is present on the left lateral edge of the last chert flake tool (FS 13). The working edge is >45 degrees indicating that its function was as an expedient scraping tool. A red color change and irregular cracking of the material suggest heat exposure. The unfinished quartzite biface fragment (FS 2) shows light use wear on the >45 degree left lateral edge. No indication of additional wear is noted on any of the other edges.

TABLE 5.9: Summary Description of Chipped-Stone Debitage for 5LA8665.

	Chalcedon	Chert	Hornfels/Basalt	Quartzite	Silicified Wood
Total	1	52	4	13	1
Large	0	9	2	8	0
Small	1	43	2	5	1
Cortical	0	2	1	5	0
Noncortical	1	50	3	8	1
Complex	0	7	0	3	0
Shatter	1	19	0	2	0
Simple	0	26	4	7	1
Biface Thinning	0	0	0	1	0

TABLE 5.10: Stone Tool Type by Material Group, 5LA8665.

	Type					
Material	Chert	Quartzite	Orthoquartzite	Argillite	Basalt	Total
Biface	0	1	0	0	0	1
Core	0	1	0	0	0	1
End/side Scraper	2	0	0	0	0	2
Projectile Point	1	0	1	0	1	3
Uniface	1	0	0	1	0	2
Utilized Flake	2	0	0	0	0	2
Total	6	2	1	1	1	11

The ground-stone assemblage includes two items. The first (FS 9) is the lateral edge of a burned sandstone slab metate. Multiple striations suggest several grinding angles, though the specific orientation of this piece cannot be determined. The second tool (FS 10) is broken. This is the end of a one-hand mano and it has light grinding on portions of one face.

The majority (77%) of the tools can be attributed to hunting and game processing activities. Those remaining were used presumably for food processing (15%) and raw material reduction (8%). Tools are cryptocrystalline or microcrystalline in structure and three are macrocrystalline. This is not surprising as microcrystalline and cryptocrystalline materials are easier to flake, and thus, better for shaping into patterned tool types. All raw materials can be found in the PCMS, though both the argillite and basalt items were transported from 27 km away. All three projectile points were complete enough to assign to Anderson's (1989) types for the PCMS. Based on morphological attributes, all can be placed within the Late Prehistoric Stage.

The inhabitants of Site 5LA8665 appear to have been involved with the hunting and processing of game animals. The site contains no thermal features or structures and very little intact soil remains on the surface. There is no permanent water source near the site and the closest intermittent stream is 1 km to the south.

A total of 84 lithic items were examined-- 71 pieces of debitage, 11 chipped-stone tools, and two ground-stone tools. Raw material availability within the PCMS explains the dominance of chert and quartzite in the site assemblage. These materials can be found in cobble or bed form in the numerous canyons south of this location. The only non-local material is Black Forest silicified wood and indicates perhaps minimal interaction with groups from the north. Nearly all of the chipped-stone tools can be attributed to hunting and game processing. The ground stone tools indicate that plant processing was likely performed within the site boundaries, though it is unknown whether these tools might have aided in the processing of game.

The site has been moderately impacted by U.S. Army maneuvers; tank tracks and military trash remain on the shale bedrock surface. Because little surface soil remains, this site is not a good candidate for additional research, and is not recommended for the National Register.

5LA8666

This multicomponent site is a generally sparse scatter of lithic refuse, which was found on the top of a gently sloping finger ridge near the PCMS boundary fence in Training Area 12. The vegetative community is grassland with some scattered juniper trees, specific vegetation includes yucca, prickly pear, sagebrush, sumac, and purple threeawn. Characterized as silty clay, the surface sediments vary in depth; on the crest of the hill near the fence, a maximum depth of 20 cm is observed. In the areas occupying exposed shale bedrock, it averages only 5 cm in depth. Moderate mechanized vehicle disturbance was noted in the form of tracked and wheeled vehicle ruts.

A sample of 150 debitage items was recorded and includes 84 simple flakes, 51 complex flakes, 14 pieces of shatter, and a biface-thinning flake. Table 5.11 presents the data on debitage type by material type. The majority of the items are quartzite (48%) and chert (31%), the remainder are argillite (11%), basalt (8%), limestone (1%), and obsidian (1%). Seventy-seven percent of the specimens are small and 23% are large; non-cortical items make up 89% of the assemblage and 11% have dorsal cortex. All stages of lithic reduction are represented when the entire assemblage is considered. A lack of cortex on the debitage indicates that non-cortical cores and early-stage bifaces were brought to the site and used to produce flakes. A low number of complex and biface-thinning flakes suggest that tool manufacture was not a dominant activity. It also appears flakes were removed from secondary cores for use as expedient cutting tools. The obsidian flake has been visually identified as Polvadera Peak variety, from the Jemez Mountains of New Mexico.

Sixteen chipped-stone tools were recorded at the surface of 5LA8666 (Table 5.12) and consist of four projectile points, three uniface tools, three utilized flakes, two drills, two cores, an end/side scraper, and an unfinished biface. All of the material types can be found at the PCMS; none are known to outcrop in Training Area 12 though. The cores were analyzed in the field and are not included in the discussion below.

TABLE 5.11: Summary Description of Chipped-Stone Debitage for 5LA8666.

	Argillite	Chert	Hornfels/Basalt	Limestone	Obsidian	Quartzite
Total	17	47	12	1	1	72
Large	3	2	4	1	1	23
Small	14	45	8	0	0	49
Cortical	2	5	0	0	0	10
Noncortical	15	42	12	1	1	62
Complex	9	15	6	1	1	19
Shatter	2	8	0	0	0	4
Simple	6	23	0	0	0	49
Biface-Thinning	0	1	0	0	0	0

TABLE 5.12: Stone Tool Type by Material Group, 5LA8666.

	Type					
Material	Argillite	Chert	Quartzite	Silicified Wood	Orthoquartzite	Total
Biface	0	0	0	1	0	1
Core	0	2	0	0	0	2
End/side Scraper	0	1	0	0	0	1
Projectile Point	0	2	0	1	1	4
Uniface	1	1	0	0	1	3
Drill	0	0	2	0	0	2
Utilized Flake	0	1	2	0	0	3
Total	1	7	4	1	1	16

Four projectile points were recovered randomly across the site surface. Of these, the oolitic chert Paleoindian preform (FS 13) is classified in the Anderson (1989) typology as a P2. It is a patinated basal fragment that appears to have broken late in the manufacturing process. Though it shows a straight base, rounded tangs, and convex blade edges, it cannot be assigned to any specific Paleoindian style. The second point (FS 1) is chert, and is a base fragment from a very large point. In the Anderson system, category P45 (3000 BC to 300 BC) best fits this point. An orthoquartzite point (FS 8) is nearly complete with the base broken at the notches. The point appears to be the P58 type and has conditional dates between AD 600 and AD 1200. The last point is only a tip of a small projectile point of Black Forest silicified wood. Its fragmented nature makes assigning it to any type class impossible.

Nine ground-stone tools were recorded and include seven slab metate fragments, a complete edge-ground cobble, and a one-hand mano fragment. All are sandstone and were found scattered randomly across the surface of the site.

The majority (56%) of the tools can be attributed to hunting and game processing. In those remaining, food processing (36%) and raw material reduction (8%) are the functions inferred. Nearly all raw materials (discounting the Black Forest silicified wood specimen) in the assemblage can apparently be found on the PCMS. Three of the four points were complete enough to assign a date range. Based on the Anderson type, the site has apparently seen occupations from the Paleoindian period to the Late Prehistoric stage. The site has been moderately impacted by U.S. Army maneuvers; tank tracks are visible on the shale bedrock surface. Because little surface soil remains, this site is not a good candidate for additional research and it is not recommended for the National Register.

5LA8667

The site boundary was defined by the extent of the lithic scatter, and consists of seven simple flakes, five complex flakes, and a single piece of shatter. These pieces of detritus are mostly quartzite (11), with some chert (1), and basalt (1). This site is located on a juniper dotted finger ridge formed as a resistant layer of shale exposes at the modern ground surface. No surface indications for thermal features were seen and no diagnostic tools were found. Because there is little soil development here, additional research is not warranted for this sparse debitage scatter.

5LA8668

This is a sparse lithic scatter and it's associated bedrock metates (Features 1 and 2). Found at an elevation of 1500 m (4920 ft) on the sloping terraces above Red Rock Canyon, the site is located in a transitional zone between grassland and shrub land, with the overstory dominated by juniper. Understory species includes sagebrush, skunkbush sumac, yucca, prickly pear, snakeweed, and grasses such as hairy grama, wheatgrass, and threeawn. Observed surface sediments are depositional in nature and appear to be the result of an alluvial event. A maximum sediment depth is 20 cm, though most flakes have been displaced and are found lying on the surface. One other specimen of ground stone was encountered: FS 11, a one-hand mano fragment made of sandstone.

The chipped-stone tool assemblage contains four coarse-grained quartzite non-bipolar cores, three unfinished bifaces (two chert, one coarse-grained quartzite), a coarse-grained quartzite retouched/utilized flake, and a small corner-notched projectile point of fine-grained quartzite. This point dates the site to the Late Prehistoric period (AD 100 to AD 1725). Debitage items are 70 pieces, material types include coarse-grained quartzite (46), chert (9), fine-grained quartzite (8), basalt (6), and orthoquartzite (1). Debitage classifications are 42 simple flakes, 18 complex flakes, eight pieces of shatter, and two biface-thinning flakes.

Though alluvial deposition may be covering artifacts here, surface evidence for prehistoric occupation is relatively sparse. Considering these factors, this site has no further potential to contribute to our understanding of prehistory.

5LA8670

The secondary quartzite reduction site contains a small, yet rather dense, scatter of lithic debitage and a bedrock metate. A 152 piece sample of the debitage was analyzed; 147 items are coarse-grained quartzite and five are fine-grained quartzite. Debitage classes include 77 simple flakes, 55 complex flakes, 14 pieces of shatter, and six biface-thinning flakes. Eighty-five pieces of debitage sorted to the large size grade, cortex is present on 24 items. Three biface-thinning flakes are coarse-grained quartzite and three are fine-grained quartzite, indicating perhaps that two bifaces were manufactured here. Two utilized flakes (quartzite), one unfinished quartzite biface, and a chert biface fragment constitute the chipped-stone tool assemblage.

The site is located in a shrubland to grassland transition zone on the upper (southern) terrace above Red Rock Canyon. Surface soils are less than 5 cm in depth, with areas of Dakota bedrock exposed throughout the area. This information, coupled with low artifact counts, a lack of features, and lack of diagnostic artifacts, shows the site is not worthy of additional investigation.

5LA8672

This site is a small, but dense, lithic scatter measuring 19.5 x 11 m. It is found on a gently sloping, juniper dotted plain descending into a small dry side drainage of Lockwood Canyon. Located in a shrubland to grassland transition zone, soil deposition is poor with only 10 cm observed under trees. The soil is the top of an A horizon, a light-brown silty loam with cryptogamic crust. The site has been impacted by U.S. Army maneuvers, and there are tracks adjacent to the concentration area.

The concentration contains more than 300 pieces, primarily quartzite, with chert as a secondary material. Because the lithic scatter is dense, a 150 piece sample was analyzed. One hundred and ten items are quartzite and 40 are chert. Further, there are 64 simple quartzite flakes, and 15 chert ones; 18 chert flakes are complex with 30 quartzite items. Three pieces of chert and 14 pieces of quartzite represent shatter. There are also four chert biface-thinning flakes and two quartzite flakes. Tools consist of a large projectile point (FS 9), eight quartzite utilized flakes, six large unfinished bifaces of chert, and a biface of quartzite. The point is complete and Alibates dolomite. It is the only specimen of non-local material on the site, and is classified as an Anderson's (1989) P80 type. These points have associated dates that extend from AD 1000 to AD 1725.

No ground-stone artifacts, features or structures were located on 5LA8672. This site is a short-term campsite near quartzite and chert outcrops where a hunter-gatherer group restocked their tool kit with bifaces. The Alibates specimen suggests that this population may have entered the PCMS from the southeast. Though this site is interesting, it has no further potential to contribute to our understanding of prehistory because all data has already been collected.

5LA8673

The site is a small and localized lithic scatter situated in juniper woodland at an elevation of 1524 m (5000 ft). It was found on a sloping ridge above a dry side drainage of Lockwood Canyon, and is bisected by small dry washes. These washes have exposed large areas of sandstone bedrock, and many of the artifacts were recorded on its surface. Ground visibility is good, the surface soil has gravel as well as a cryptogamic crust, and very little vegetation.

The site debitage is quartzite (115 pieces), with flakes primarily coming from a large, light purple core that was encountered within the scatter. Flakes from a darker purple parent material were also found. Only one piece of chert debitage was found. Like the debitage, stone tools are all quartzite, and consist of two non-bipolar cores (FS 1 and 2), and three utilized/retouched flakes (FS 3-5). This site is small (68 x 25 m) and has poor deposition. Coupled with a lack of features, further work has been deemed unnecessary.

5LA8675

This is a 70 x 63 m lithic scatter situated on a grassy, juniper dotted ridge top near the edge of an unnamed side canyon of Lockwood Canyon. Surface soil is classified as alluvial sediment with intermixed gravel, its average depth is 15 cm. The site has an abundance of naturally outcropping quartzite (metamorphosed Dakota sandstone), and functioned primarily as a procurement location. 5LA8675 is likely the source of quartzite material for 5LA8673, 5LA8676, and 5LA8674; these sites are directly related spatially and all have high quartzite concentrations.

The stone tool assemblage is an unfinished argillite biface (FS 2), two utilized/retouched flakes of quartzite (FS 1 and 3), and a quartzite core fragment (FS 4). The debitage is 80 pieces of flaking debris, 73 of these (91%) are coarse-grained quartzite, three flakes are chert (4%), there are two pieces of fine-grained quartzite (3%), and one specimen each for hornfels/basalt and silicified wood. In the assemblage there are 29 complex flakes, 44 simple flakes, and nine pieces of shatter. In the absence of features, no further work is required on the site.

5LA8677

The site is a single stone alignment situated on a point that juts out into Lockwood Canyon. The structure was placed directly on bedrock that is beginning to shift away from the main cliff face, and will eventually fall into the canyon below. Measuring 6.5 x 3.5 m, this structure may be one in a series of these features, possibly "communication or lookout stations", located along the canyon rims. From here, there is a direct line of site to 5LA8662, another structure site with a cliff edge structure. This lone architectural unit requires no further work.

5LA8685

This site is a high density lithic scatter containing quartzite debitage and two fine-grained quartzite cores. It is located on the upper, southern terrace above Red Rock Canyon on a rather steep (3°) northeast facing slope. For the most part, no surface sediments are present, rotten bedrock (grading from sandstone to quartzite) covers 95% of the surface. Not surprisingly, vegetation is relatively sparse with juniper, grama grass, sagebrush, cholla, prickly pear, and skunkbush sumac noted in various locations. The debitage assemblage includes 86 simple flakes, 53 complex flakes, 15 pieces of irregular shatter, and four biface-thinning flakes. The presence of cortex (21 items) and the high number of large flakes (46) and simple flakes suggest that the quartzite outcrop/quarry is close by. No thermal features, structures, or patterned tools were encountered; additional research is not recommended and the site is not considered eligible for the National Register.

5LA8686

This is a large lithic scatter located on the eastern terrace above an unnamed side drainage that flows northward into Red Rock Canyon. It was found 40 m southeast of 5LA8605, a rockshelter site. These two are likely related, but could not be connected by artifacts. In places, a shallow layer (< 5 cm) of silty clay sediment covers the surface though most of the site (estimated 95%) exhibits exposed sandstone bedrock. A small rise can be found at the northern edge of the site and the terrain dips gently to the south and west from this point. Overstory plant species are juniper and *rhus trilobata* with sparse patches of snakeweed, sagebrush, threeawn, yucca, cholla, and hairy grama below.

Recorded artifacts are debitage, and chipped- and ground-stone tools. The debitage items are coarse-grained quartzite (16), chert (6), fine-grained quartzite (5), argillite (3), basalt (3), and orthoquartzite (1). Debitage classes are simple flakes (25), complex flakes (7), and shatter (2). Among the debitage pieces are three utilized flakes (silicified wood, basalt, quartzite), two basalt cores, a chert biface, and a quartzite scraping tool. A single edge-ground cobble (FS 2) comprises the ground assemblage. The site functioned as a raw material reduction location for lithic materials recovered from the side walls of Red Rock Canyon. All available information at the site has been recovered and additional research is not recommended.

5LA8688

The site is located on a slight ridge that gently slopes down to the west into an unnamed side canyon of Red Rock Canyon. Vegetation consists mainly of bunchgrass, snakeweed, and some scattered juniper. Surface visibility is good with exposed sandstone bedrock everywhere.

The artifact density is light and artifacts were located randomly across the surface of the landform. A total of 35 pieces of debitage was recorded. Of these, 24 are simple flakes, six are complex flakes, three items are angular shatter specimens, and two are biface-thinning flakes. Material classes are chert (15), fine-grained quartzite (7), argillite (5), coarse-grained quartzite (5), and basalt (3). Twenty-two items are small and most (15) are noncortical. If the biface-thinning flakes are also considered, it appears that the site functioned as an early- to late-stage biface manufacturing location. The recorded tools are one small chert projectile point (non diagnostic), two utilized flakes (quartzite and chert), one quartzite biface, three cores (two quartzite and one chert), and two sandstone manos (one complete, one broken).

No further work is required here as soil deposition is extremely poor (less than 5 cm) and the site is highly deflated.

5LA8691

The site consists of a lithic scatter located on a narrow saddle in the middle portion of a north-south trending ridge above Red Rock Canyon. Most of the saddle is highly deflated as evidenced by bedrock at the surface. A thin layer of silty clay alluvium has been deposited near the ridge and along the southern boundary. Ninety-two pieces of debitage were analyzed and found to be made of the following materials: fine-grained quartzite (49%), chert (33%), coarse-grained quartzite (10%), chalcedony (3%), basalt (2%), argillite (2%), and obsidian (1%). Tools are diverse and include: two cores (one fine-grained quartzite, one basalt), two utilized flakes of quartzite, two end/side scrapers (one Alibates dolomite, one Flat Top chalcedony), two bifaces (one chert, one fine-grained quartzite, a fine-grained quartzite uniface, and three diagnostic projectile points. The first point (FS 1) is argillite and is similar to Anderson's (1989) type P59. This type has been associated with dates that range between AD 500 to AD 1200. The second projectile point (FS 2) is Alibates and a P62. P62 points range in time from AD 500 to AD 1400. The last point fragment (FS 43) is a P49 and chert. This preform class has a date range of AD 800 to AD 1750. Based on these three artifacts, the site likely had at least one occupation in the Late Prehistoric stage (AD 100 to AD 1725).

Soils are eroded and thin. Because features were not noted, the site does not appear to have any good potential for excavation. Therefore, it is not recommended for additional research.

5LA9021

This site is a relatively thick historic trash scatter located in the grassy plain above Red Rock Canyon. Found on the south side of a broad, gently sloping ridge, this household trash, estimated to date to the 1920s, includes milk glass, amethyst bottle glass, and colorless bottle glass sherds, ceramic sherds, solder dot cans, and stove parts. Construction material included corrugated metal fragments, nails, barbed wire, fence posts, and bailing wire. Smaller artifacts were recovered from the downhill portion (south end) of the site indicating that the site has been impacted by sheetwash erosion. The site is not significant and represents a single trash dumping episode.

5LA9022

This is a sparse scatter of debitage located on the eastern terrace above an unnamed side drainage that flows southward into Lockwood Arroyo. The landform is characterized as a grassy plain with no tree cover. An apparent preference for quartzite (7) is seen in material type, with hornfels/basalt (2), orthoquartzite (1), and chert (1) also represented. Classifications for the 11 debitage specimens are simple flakes (5), complex flakes (5), and shatter (1). No flaked or ground-stone tools were found, and no thermal features are noted. Further work is not recommended as this is one of the many insignificant small lithic scatters on the PCMS.

5LA9023

The site is a localized lithic scatter on the point of a ridge top overlooking grasslands to the east and south. Artifacts include a projectile point preform (chert), a discoidal scraper (fine-grained quartzite), an irregular tool with grinding and pecking wear (quartzite), and a non-bipolar core (coarse-grained quartzite). Remaining artifacts are miscellaneous lithic debitage – coarse-grained quartzite (12), basalt (2), chert (2), and silicified wood (1). The debitage assemblage--

eight simple flakes, seven complex flakes, one piece of shatter, and one bifacial-thinning flake indicates the reduction technology revolved around raw material reduction and the production of early stage bifaces. The site is small, covering an area slightly less than one-quarter acre. Because features were not found, additional work is not warranted.

5LA9024

The site is a sparse debitage scatter, located within a juniper woodland/grassland plant community. Soil deposition is relatively minimal and the surface exhibits heavy impact from mechanized vehicle activity. The debitage assemblage is very small, consisting of six simple flakes, five complex flakes, and two pieces of shatter; materials are quartzite (7), chert (4), basalt (1), and limestone (1). A chert biface fragment and chert scraper indicate some tool use, though general lithic reduction appears to be the dominant site activity based on the presence of cortical and noncortical simple flakes and large complex flakes. There are areas where sediments could be as much as 15 cm deep, but without any evidence for fire features, the site requires no additional investigation.

5LA9025

The site consists of an Alibates scraping tool, a fine-grained quartzite retouched flake, four pieces of fine-grained quartzite debitage, and three pieces of chert debitage. This cultural debris scatter is located on a gently sloping ridge top in the shelved/terraced ridge 900 m northeast of the "Old Baldy" landmark. Surface sediment is less than 20 cm in depth, with areas of limestone bedrock exposed throughout the site area. In addition, the sediments represent secondary deposition so potential artifacts in the matrix will have been displaced. The debitage assemblage suggests limited tool manufacture established by the presence of a biface-thinning flake and flakes with multiple dorsal flake scars (3). An equal amount of simple core reduction flakes (3) indicate general raw material reduction. The low artifact count, lack of features, and lack of diagnostic artifacts make this site not worthy of additional investigation.

5LA9026

The site is positioned on a gently sloping ridge in juniper tree cover. The "Old Baldy" landmark is 700 m north. Very little soil remains (10 cm) and most of the artifacts have deflated down to limestone and shale bedrock. Surface visibility is good and vegetation is somewhat sparse, consisting of yucca, piñon, threeawn, prickly pear, barrel cactus, and rabbitbrush. Twenty-three flakes, eight chipped-stone tools, and three ground-stone artifacts were observed. In the flakes, utilized materials consist of quartzite (11), chert (10), and Cerro del Medio obsidian (2). These are further classified as complex flakes (9), biface-thinning flakes (7), simple flakes (6), and shatter (1). The biface-thinning flakes are found to be made from three material types, so at least three bifaces were manufactured on site. Recorded tool classes are utilized flake (2), projectile point (2), unfinished biface (2), core (1), scraper (1), edge-ground cobble (1), mano (1), and metate (1). All of the ground-stone tools are broken. Only one of the projectile points is complete enough to be classified. This point is P83 style based on Anderson's (1989) point classification system and is Late Prehistoric in age.

Numerous rusted pinflags were observed on the site surface. A record search at the DECAM facility revealed no recorded site here, therefore it is unknown why these pinflags are present. The site area is moderately eroded and has been heavily disturbed by mechanized vehicle traffic. No surface features are noted, and the site does not have research potential.

5LA9027

The site consists of a relatively sparse scattering of lithic artifacts on a gentle slope in the grassy plains between the Bear Springs Hills and Red Rock canyon. Vegetation consists of typical shortgrass prairie species: bluestem, sagebrush, snakeweed, prickly pear, and needle and thread grass. Five simple flakes, three complex flakes, and a piece of shatter were recorded. This flaking debris has the following material type distribution -- orthoquartzite (4), chert (3), chalcedony (1), and fine-grained quartzite (1). A small chert projectile point fragment was also collected (FS 1). The specimen is similar in size and shape to Anderson's (1989) type P62 and has a range from AD 500 to AD 1400. This site is insignificant and represents one of the many short-term hunting sites located in the open grassland portion of the PCMS. No further work is necessary, as the surface consists of poorly consolidated alluvial sediment and the landform is subject to periodic sheetwash erosion.

5LA9029

This site is a large, yet sparse lithic scatter located on the northern terrace of an intermittent stream that flowing northeast into Lockwood Canyon (1.9 km). The site surface is clay hardpan with sparse vegetation scattered randomly throughout. Large saltbush plants and alkali sacaton dominate the vegetation, these anchor some of the deeper pockets of cultural deposition (up to 40 cm visible).

The artifact assemblage includes debitage, cord-marked ceramics (FS 1-3, 5), and a single utilized flake of silicified wood. Twenty-eight pieces of lithic debitage were analyzed and found to be made of the following materials: fine-grained quartzite (9), coarse-grained quartzite (9), chert (7), orthoquartzite (2), and basalt (1). Of these, 13 are simple flakes, nine are complex flakes, four are biface-thinning flakes, and two pieces are shatter.

A military two-track road bisects the site and tank tracks criss-cross the surface. Though certain artifacts appear to be eroding from the soil, the absence of heat-cracked stone and time-diagnostic artifacts lead us to believe the site will not contain significant remains.

5LA9030

The site is a small and discrete cluster of lithic artifacts and fire-cracked rock on top of the northern terrace of an unnamed side drainage feeding Stage Canyon. Lithic artifacts recovered on site consist of 13 flakes; of these, six are simple flakes, five are complex flakes, and two are biface-thinning flakes. Over half (7) are chert with orthoquartzite (3), argillite (2), and basalt (1) also observed. A high proportion of complex and biface-thinning flakes indicates some tool manufacture, and raw material reduction occurred at a smaller scale. Several large pieces of sandstone fire-cracked rock were noted along the northern site boundary. This feature remnant has deflated to the modern ground surface and no ash or smaller burned rocks remain. Because this is a highly deflated site, no further work is recommended.

5LA9035

This sparse lithic scatter was found on top of a low hill along a mesa ridgeline at the southern edge of the Big Arroyo hills. Pedestrian survey revealed lithic artifacts scattered widely over this landform, with two or three pockets of higher density. Artifacts include lithic debitage, one Late Prehistoric age projectile point fragment (FS 1), a mano fragment, and complete and partial cores. Debitage materials consist of chert (26%), coarse-grained quartzite (22%), fine-grained quartzite (20%), silicified wood (12%), dendritic chert (6%), chalcedony (6%), orthoquartzite (3%), basalt (3%), and Cerro del Medio obsidian (1%). Most items are complex (55%) or simple (38%) flakes, with fewer shatter specimens (3%) or biface-thinning flakes (3%).

Secondary soil deposits are being scoured away by sheetwash erosion. This has also been compounded by heavy surface damage by tracked and wheeled vehicles. An abundance of FCR was noted across landform, but because of erosion, no intact thermal features were located. Cultural activities on this site are limited to lithic reduction, food preparation, and perhaps, short-term habitation. No further work is needed as the potential for significant deposition is gone.

5LA9036

The site is a sparse lithic scatter located on a gently sloping plain below the "Old Baldy" landmark. Secondary deposition is significant (between 20 and 50 cm) owing to the site's position on a small alluvial fan, in many locations though, water erosion and military maneuvers are leading to depositional mixing. Artifact density is low, analyzed flakes include six pieces of chert and one of chalcedony. Flaked tools include the distal end of a chert scraper and the lateral edge of a Black Forest silicified wood utilized flake. The site appears to be a short-term campsite, and this probably accounts for the lack of ground stone and thermal features. Located in a stand of juniper trees, the surface also contains grama grasses, snakeweed, and prickly pear. Because alluvial processes have mixed cultural materials on 5LA9036, it is a poor candidate for additional research.

5LA9038

The site is a rockshelter on the eastern terrace above an unnamed northern tributary of upper Lockwood Arroyo. It was found under an isolated outcropping of Dakota sandstone and there is a light scatter of lithic debris around it. A bedrock metate (FS 1) was found on top of the shelter, as well as a complete slab metate south of it. There is approximately 12 cm of fill observed within the dripline, but this is secondary in nature and most, if not all, of the prehistoric soil deposits have eroded out. A few chipped lithics are concentrated near the opening of the shelter, they are 12 pieces of debitage and a large orthoquartzite preform fragment (FS 2). Of the debitage, there are six simple flakes and six complex flakes. Materials are basalt (5), coarse-grained quartzite (4), fine-grained quartzite (2), and chert (1). The site occupies the ecotone between unbroken high prairie and a relatively deep drainage; sagebrush, thistle, grama gasses, saltbush, alkali sacaton, and wheatgrass are observed growing on the surface. No thermal features were apparent and no manos were found. All available data has been collected so additional work is not required at this small and insignificant site.

5LA9039

The site occupies an area on the plains, above, and to the east, of an unnamed tributary of Lockwood Arroyo. Abundant materials are observed in the debitage and include 20 fine-grained quartzite flakes, 15 basalt flakes, 15 chert flakes, 15 argillite flakes, 14 coarse-grained quartzite flakes, six chalcedony flakes, five orthoquartzite flakes, a piece of obsidian, and a piece of siltstone. Over half of the debitage items are simple flakes; of those remaining, 29 are complex flakes and 14 are shatter. Stone-tools consist of four utilized/retouched flakes (two basalt, one quartzite, and one orthoquartzite), two projectile points (one chert, one orthoquartzite), a basalt core, and a patterned argillite biface. The site has two possible components, both in the Late Prehistoric stage, based on the classification (Anderson 1989, P42 and P68 types) of the points. A bedrock metate and a complete slab metate, both of sandstone, were noted.

Juniper trees, thin stands of thistle, and blue stem are found on the 6.10-acre site. Soils are thin, and although there was a deflated hearth found (Feature 1) at the base of an outcrop of sandstone bedrock, the site is not a good candidate for further work.

5LA9041

5LA9041 is a small, three item, lithic scatter encountered on a rocky outcropping. On a larger scale, it was found in the grassy flats in the upper drainage basin of Red Rock Canyon. Surface artifacts are one medium-sized quartzite projectile point (Category P18, Middle to Late Archaic), the medial portion of a finished quartzite biface, and a large basalt flake with heavy patination. The site is interesting because it represents one of the few, single component, Archaic scatters on the PCMS. This being said, no thermal features were observed, soils are thin, and no further research is recommended.

5LA9042

This site consists of a flanged projectile point (Type P83) of chert and a heat-treated core reduction flake of basalt. Both were found in the grassy plain above the northern side branch of upper Red Rock arroyo. A small, unnamed arroyo passes from the northwest to the southeast north of the cultural materials. Terrace soils are residual in nature indicating the site is highly deflated. As it stands, all available data has been collected from this Late Prehistoric stage site and no further work is required.

5LA9175

The site is a rockshelter located just above the drainage at the head of Lockwood Arroyo. It is 30 m west of 5LA9180, and the two sites may have been occupied at the same time. The shelter floor is exposed sandstone bedrock; only 2 cm of fill is present in a depression on the floor, and this is likely slope wash from elsewhere. Measuring 5 x 3 m with a maximum vertical height of 2.7 m, the shelter has two grinding surfaces along its right side. Compared with others in the vicinity, the site is small and insignificant, so additional work is not needed.

5LA9176

The site is a rockshelter (3.2 x 8.5 x 1.2 m) along the north terrace edge in upper Lockwood Arroyo. Set in the north wall of a sandstone outcrop, the site is contained within an alcove that formed a sheltered activity area. Artifacts are absent in the shelter, though outside is a sandstone boulder with a substantial pecked and ground surface on its upturned face. With less than 5 cm of fill, it appears the shelter served only as temporary shelter, and it has no further potential to contribute to our understanding of prehistory.

5LA9177

Consisting of a light scatter of lithic debris, the site was found along sandstone bedrock terraces above, and on the south side, of Lockwood Arroyo. No diagnostic artifacts were identified among the lithic debris, though the tip of a chert projectile point and a quartzite core were recorded. Debitage included both simple flakes (6) and complex flakes (3); four of these are hornfels/basalt, three are chert, and two are coarse-grained quartzite. A bedrock metate and a slab metate fragment were also found.

Some pockets, where field recorders thought the light-brown sandy loam soils may have depth, were identified, though all artifacts are found on exposed bedrock. The absence of diagnostic artifacts and thermal features suggest 5LA9177 is not a good candidate for additional work.

5LA9178

The site is on a juniper and piñon covered terrace 1.8 km south of the "Old Baldy" landmark. Eroded shale and limestone bedrock form the terrace, which has very little soil deposition (<10 cm) on it. A series of small arroyos bisect the landform and flow from west to east. Though this is a light lithic scatter, two apparent debitage concentrations were noted. The first contains mainly hornfels/basalt items and the second contains mainly quartzite debitage. This area of the PCMS has been heavily disturbed by tracked vehicle activity; this may have altered the original site boundaries.

Thirty-eight pieces of debitage, dominated by coarse-grained quartzite (39%) and hornfels/basalt (37%), were recorded, with lesser amounts of chert (13%), fine-grained quartzite (8%), and argillite (3%). The debitage sample is 53% complex flakes, 37% simple flakes, and 11% shatter, indicating general lithic reduction, as well as early-stage biface and patterned tool manufacture. Tools include a fine-grained quartzite drill, a silicified wood utilized flake, and an obsidian projectile point base. Based on size and morphology, this point (type P16) dates from sometime in the Middle or Late Archaic periods. When compared to known specimens, the obsidian visually compares to samples from the Jemez Mountains in New Mexico.

A sandstone mano fragment was also recorded, but no thermal features or structures were identified. Since there is little opportunity for finding buried cultural deposits, the site is not a good candidate for further work.

5LA9179

This is a small lithic scatter situated on the northern terrace of Lockwood Arroyo. The terrain is flat, open grassland with Dakota sandstone bedrock exposed on the surface in many areas. Five pieces of debitage were examined and include coarse-grained quartzite (2), argillite (1), chert (1), and basalt (1). Two scraping tools (fine-grained quartzite and argillite) and a sandstone mano fragment were also recorded. No evidence of former fire features was noted on the poorly developed soil, and the site is not a good candidate for additional research.

5LA9180

The site is a sparse lithic scatter located on the northern side of Lockwood Arroyo. Most of the cultural debris was found on the grassy plain above the arroyo, but some artifacts extended into the drainage, particularly onto the bedrock terraces below. Tools include a silicified wood biface and a reworked argillite Late Prehistoric projectile point (Anderson Type P52, AD 800 to AD 1350). Six flakes were recorded-- four quartzite, one chert, one argillite.

At first glance, a circular stone structure is present on one terrace, but when viewed from the top of the arroyo, it is actually a large "smiling face" constructed recently by the military for aerial viewing. Two rockshelter sites are found in this area of Lockwood Canyon, 5LA9175 and 5LA9176, and these sites are likely related to 5LA9180.

5LA9181

The site is a widely separated scatter of lithic debris among sparse juniper and is confined to exposed bedrock between the northern edge of Lockwood Arroyo and open grassland. Flaking debris is quartzite (5), argillite (4), basalt (3), and chert (1). This diversity in such a small number of flakes is not unusual for this portion of the PCMS. An argillite non-bipolar core and a complete slab metate were recorded. Additional research is not warranted for the site.

5LA9183

This large multicomponent site is located on top and down the slope of a shale and limestone bedrock covered bench. It forms three small finger ridges, small intermittent drainages separate each one. The landform also overlooks the upper Lockwood Arroyo drainage basin and was a good location for spotting game animals in the flats to the south and east. Surface visibility is good, owing to intermittent vegetation that consists of juniper, piñon, scrub oak, threeawn, alkali sacaton, mountain mahogany, and grama grass. There is heavy surface damage due to military maneuvers as well as extensive water erosion.

The site includes two deflated thermal features, but no possibility of subsurface deposits remains. A single solder seal can and prehistoric ceramics were found among the flaking debris.

The large size of the flaking debris assemblage required a sampling of 153 pieces of debitage. The artifact classes are 79 simple flakes, 58 complex flakes, 12 biface-thinning flakes, and four pieces of shatter. Chert (48%) is the dominant material type, with lesser amounts of coarse-grained quartzite (27%), fine-grained quartzite (11%), basalt (4%), obsidian (3%), silicified wood (2%), argillite (2%), chalcedony (1%), limestone (1%), and siltstone (1%) represented. Twenty-five percent of the debitage items show some degree of dorsal cortex. All materials are locally available on the PCMS, excluding the obsidian. Cerro del Medio (FS 12) and Obsidian Ridge (FS 49) varieties were identified through x-ray fluorescence.

There are five artifact types represented in the flaked tool assemblage-- ten retouched/utilized flakes, seven projectile points, four non-bipolar cores, four patterned tools, and an unfinished biface. Table 5.13 displays material type for artifacts in the flaked tool assemblage.

TABLE 5.13: Tool Type by Material Group, 5LA9183.

	Material Type									
Type	Argillite	Chert	C. Quartzite	Sil. Wood	F. Quartzite	Obsidian	Basalt	Alibates	Total	Pct.
Unfinished Biface	0	0	0	0	0	0	1	1	2	7.14%
Non-Bipolar Core	1	1	1	0	2	0	0	0	5	17.86%
Drill	0	1	0	0	0	0	0	0	1	3.57%
End Scraper	0	0	0	1	0	0	0	0	1	3.57%
End/Side Scraper	0	1	0	0	0	0	0	0	1	3.57%
Side Scraper	0	0	0	0	1	0	0	0	1	3.57%
Flake Tool	1	2	1	0	1	2	0	0	7	25.00%
Projectile Point	0	3	0	2	2	0	0	0	7	25.00%
Uniface	0	0	0	0	3	0	0	0	3	10.71%
Total	3	6	13	3	6	2	1	1	28	100.00%

All projectile points recovered from the site are temporally diagnostic. Two of these (FS 13 and 35) are relatively early, and have dates that extend into the Late Archaic stage (1000 BC to AD 1000). These two are similar to Anderson's (1989) P21 type. Three other points (FS 21, 28, and 44) resemble Anderson's (1989) P79 type, which has a wide temporal range from AD 1000 to AD 1750. The next point (FS 48) is classified as a P83, which dates from AD 750 to AD 1650. The final specimen (FS 32) falls into Anderson's (1989) P49 type, which has a temporal range from AD 800 to AD 1750. Based on the points alone, it seems likely that the site had a Late Archaic or Developmental period occupation. Another occupation seems likely much later in the Late Prehistoric stage.

Both bifaces are broken. The basalt biface (FS 38) is classified as unfinished and broken early in the manufacturing process. The other biface is Alibates dolomite. This piece was carried to the site unfinished, and once here, further thinning produced a large outrepassé flake that made the tool unusable and thus, it was discarded.

The scraping tools are an end/side scraper, a side scraper, and an end scraper. The first scraper fragment (FS 36) is an unknown non-local chert. Heavy wear and retouch modification is seen on its left lateral edge and distal end. The right lateral edge is lightly utilized. The side scraper (FS 18) is complete and fine-grained quartzite. Heavy wear is seen on its right lateral edge, and the left lateral edge is lightly used. The end scraper (FS 30) is broken and made of Black Forest silicified wood.

The utilized flakes are made of varied materials: Cerro del Medio obsidian (1), Flat Top chalcedony (1), argillite (1), chert (1), coarse-grained quartzite (1), fine-grained quartzite (1), and Obsidian Ridge obsidian (1). Heavy patination is noted on both the Flat Top and argillite specimens. The fine-grained quartzite item is highly burned. All tools have been used for scraping with wear present on at least one steep lateral edge. Five items are broken, only the quartzite flakes are complete.

The remaining four artifacts include three fine-grained quartzite uniface tools and a complete chert drill (FS 19). All unifaces are complete and apparently used for scraping.

Seventeen broken ground-stone tools were recorded, including 13 slab metates and four one-hand mano fragments. The manos are sandstone (2), granite (1), and coarse-grained quartzite (1). The metates are sandstone (12) and conglomerate (1).

This is an interesting site, with an abundance of material types, tools, and ground-stone. It has several temporally diagnostic projectile points; but, with a lack of features and no soil deposition, it does not offer any potential for additional research. The age of the points suggests it was in use during all periods of the Late Prehistoric stage and was possibly occupied sometime in the Late Archaic.

5LA9184

This site is a historic foundation located on the western terrace of a small, intermittent arroyo. It is rectangular in planview and represents a single-room structure. Field-stones appear to have been spaced around 20 inches apart and the overall dimensions would be approximately 28 x 23 ft. A porch foundation was identified on the north wall near the northwest corner. No other construction materials were noted as these were likely scavenged for re-use elsewhere. In addition, no historical artifacts or trash were encountered and this site has no potential for buried deposits. A 240 acre parcel of land was patented by Mangum Craig in 1920, and this habitation remnant is found in its southwest corner.

5LA9185

The site is a sparse lithic scatter located on the western terrace of the upper fork of the Mary Doyle arm in Welsh Canyon. Its main landform is a small knoll/ridge with artifacts lightly scattered on top, and slightly off to either side. Soils are generally shallow with exposed bedrock around and comprising the knoll. The few remaining pockets of soil have been deeply gouged by tank tracks and eroded by water. Nearly all artifacts were recovered on top of bedrock and are in deflated context. A small side-notched chert point, a chert utilized flake, and 19 pieces of debitage comprise the artifact assemblage. Of the debitage pieces, 11 are simple flakes, four are complex flakes, and four are shatter. All are quartzite, and this can be obtained locally in the side walls of Welsh Canyon. Using Anderson's (1989) typology, the point has been classified as a P83, which dates to the Late Prehistoric period. No thermal features or structures were noted, and a lack of soil depth makes this site a poor candidate for the National Register.

5LA9189

This site consists of a very sparse scatter of lithic debris that was located along a low ridge 1.8 km south from the "Old Baldy" landmark. A quartzite projectile point fragment (type P29, 500 BC to AD 600), a discoidal chert scraper, and slab metate fragment were identified. Flaking debris consisted of two simple flakes-- chert and argillite. The site has been heavily impacted by tracked vehicle activity and very little surface soil remains. No additional research is recommended for this small lithic scatter.

5LA9190

The site is a lithic scatter located in a dense stand of piñon and juniper trees. It is located in the upper Stage Canyon drainage basin, west of and inside the soil conservation fence. The site covers slightly less than one-half acre and contained eight pieces of debitage, an obsidian utilized flake, a quartzite scraper, and two metate fragments. The flaking debris is quartzite (4), chert (2), obsidian (1), and orthoquartzite (1), these can be further classified as four complex flakes, two simple flakes, and two pieces of shatter. Both pieces of obsidian have been identified as originating from the Jemez Mountain source in New Mexico. The limited debitage suggests raw material reduction and, possibly, early-stage biface manufacture. No additional research is recommended for this small lithic scatter.

5LA9191

Two coarse-grained quartzite simple flakes, two basalt complex flakes, and a slab metate fragment comprise the cultural remains. These were encountered in the upper Taylor Arroyo drainage basin along the southern edge of the Big Arroyo Hills. Vegetation includes juniper, sagebrush, sparse grama grasses, and cholla, and open grasslands exist beyond the site in every direction. Additional work is not required as the site is heavily disturbed by military activity.

5LA9193

This site is a dispersed lithic scatter located on the west face of a small north to south trending ridge. This ridge is found on the upper (north) terrace of Red Rock Canyon approximately 2.9 km east of the Red Rock Ranch Facility. Most artifacts are found in a large semi-circular outcrop that promotes large amounts of soil deposition on its downhill side. Ground visibility is low in many places due to thick vegetation; juniper trees, yucca, needle and thread grass, cholla, and sagebrush were recorded.

Recorded tools include three utilized flakes (two of quartzite, one of silicified wood), a quartzite core, a fine-grained quartzite scraper, and two large chert projectile point fragments.

The first point fragment (FS 6) is similar to flange stemmed points dating to the Late Prehistoric period; however, it is much larger in size than those shown in Anderson (1989:167). Classified as a P45, it has dates extending from 3000 BC to 300 BC. The other point (FS 4), a P84, has a date range of AD 750 to AD 1200 according to Anderson (1989:222).

The debitage assemblage indicates various stages of lithic manufacture with 41 complex flakes, 34 simple flakes, 20 biface-thinning flakes, and three pieces of shatter. A total of seven large biface-thinning flakes and 29 complex flakes are indicative of the primary stages of biface reduction, while 13 small biface-thinning flakes and eight small, complex flakes suggest more advanced stages of reduction and tool manufacture. The simple flakes, shatter specimens, and those with cortex (16) indicate initial raw material reduction.

Though there are areas with good soil depth, the site produced no evidence for former fires. Also, the lack of ground-stone tools and small number of patterned flake tools suggest this location will not produce significant cultural materials if excavated.

5LA9194

This non-eligible site is a small rockshelter (Feature 1) and its associated lithic scatter. These are found on the west slope of a ridge on the northern terrace of Red Rock Canyon, and are in close proximity to 5LA9192 and 5LA9193. The shelter measures 6.5 x 3.5 m with 14 cm of sediment deposition. There are no thermal features apparent on the floor but the ceiling is blackened from smoke exposure. The lithic assemblage consists of a mano fragment, a quartzite core, 11 quartzite flakes, and a chert flake. One utilized fine-grained quartzite flake suggests some level of tool use and discard. Though there is some deposition within the shelter, the survey crew determined that this is redeposited sediment and not intact soil. No further work is needed.

5LA9195

The site is a light lithic scatter located in the grassy flats between Red Rock Canyon and Welsh Canyon. It consists of four pieces of fine-grained quartzite debitage and a fine-grained quartzite core that was not collected. No ground-stone tools were found, and no evidence for fires was noted. The site is one of the many minor lithic scatters found throughout the PCMS that are not significant.

5LA9196

This sparse scatter consists of 18 coarse-grained quartzite flakes, a patterned quartzite tool, and a chert projectile point (Anderson Type P55, AD 500 to AD 1450). The point is complete, and although it is poorly manufactured, its overall size suggests a Late Prehistoric age. The depositional environment here is poor as evidenced by eroding bedrock at the surface. The site is small, no features were found, and there are no areas that the investigators thought would produce intact remains through excavation. No additional research is recommended.

5LA9197

The site was located on the juniper covered flats 250 m north of Red Rock Canyon. The landform is bounded on both sides by substantial drainages leading into the canyon below. Surface visibility is relatively good due to lack of vegetation, and sandstone bedrock outcrops in many areas. Vegetation includes juniper, blue grama, yucca, cholla, prickly pear, and snakeweed. Artifacts are a large quartzite biface, a quartzite core, and a large sandstone metate fragment. The debitage is composed of locally available materials, including fine-grained quartzite (82%), coarse-grained quartzite (11%), chert (5%), argillite (1%), and basalt (1%). Forty-nine simple flakes, 47 complex flakes, eight pieces of shatter, and one biface-thinning flake comprise the artifact classes. Artifact density is high but specimens are scattered with no apparent concentration. No further work is recommended on this site.

5LA9198

This site is a small lithic scatter located on a large ridge top that extends into Red Rock Canyon. The site is adjacent to a major side drainage that joins the main canyon. There is a limited amount of residual sediment (10-20 cm of light-brown silt), but many artifacts were recovered from on top of exposed bedrock. The site's assemblage consisted of two chipped-stone tools and 119 pieces of debitage. The stone tools are both unfinished bifaces, one of argillite and one of fine-grained quartzite. Debitage is made of four material types: chert (3 flakes), coarse-grained quartzite (4), hornfels/basalt (4), and fine-grained quartzite (108). These are 39 complex flakes, 78 simple ones, and two pieces of shatter. Sixty-six flakes are large in size and 53 are small; 55 pieces are non-cortical and 64 have cortex. The assemblage suggests several reduction strategies were employed at the site, from primary core reduction of locally procured quartzite, to the early-stages of biface reduction. No structures, features, diagnostic artifacts, or ground stone were located on this 89 x 88 m site and no further work is required.

5LA9199

This site is a 21 x 26 m lithic scatter situated on a large ridge bordering a side drainage of Red Rock Canyon. Sediments are shallow, <10 cm, and most artifacts were recovered from highly weathered surfaces. Vegetation recorded is the typical juniper woodland community. The assemblage consists entirely of debitage-- 49 pieces. The primary material is quartzite, with 19 flakes of fine-grained and 26 of coarse-grained. There are two flakes of hornfels/basalt and a piece each for argillite and chert. Most of the sample is simple flakes (28), with eight pieces of shatter and 13 complex flakes. Primary reduction of local materials appears to have been the main function for this site. No additional research is recommended for this lithic scatter.

5LA9201

This site is located along a gentle north-to-south sloping plain above Lockwood Arroyo, at an elevation of 5128 ft. Vegetation on the site consists of sparse grassland. Sediment deposition is extensive, with up to 50 cm of alluvially deposited clay silt. Erosion has been minimal, and military impact has been moderate. No chipped or ground-stone tools were recovered on this site. The entire assemblage was eight pieces of debitage: one chert, one fine-grained quartzite, three orthoquartzite, and three hornfels/basalt pieces. Four of these items are cortical, five are large, six are simple flakes, and two are complex flakes. This site was a primary lithic reduction location, and needs no further work.

5LA9202

This site is a sparse lithic scatter occupying 80 x 45 m on the top of an extended tableland ridgeline, which in turn, can be found above an unnamed drainage. Located in a piñon-juniper woodland community, sediment deposition is poor and the site is actively deflating because of heavy water erosion and tracked and wheeled vehicle maneuver impacts. The cultural assemblage is four pieces of ground stone, two chipped-stone tools and 27 pieces of debitage. Three granite mano fragments and a sandstone metate fragment make up the ground-stone assemblage, while two non-bipolar cores (one limestone, one baked claystone) comprise the stone tools. The 27 piece sample of debitage is 23 flakes of chert, two pieces of fine-grained quartzite, and one flake each of orthoquartzite and chalcedony. No further work is required as all available data has been recorded.

5LA9203

The site, situated amid sparse junipers, was encountered on a gently undulating short grass prairie, approximately 1.2 km southwest of a series of finger ridges associated with "Old Baldy". This landform is a low, broad hill flanked by small intermittent drainages. Cultural materials, recorded by the survey crew, are lithic debitage and a small basalt biface fragment. The debitage assemblage has 30 flakes of argillite (2 patinated pieces), six of chert, thirteen of quartzite, seven of hornfels/basalt, one of orthoquartzite, and one of obsidian from Obsidian Ridge in the Jemez Mountains. The site may also have served as a short-term campsite, perhaps a one-time event, though there are several nearby sites (5LA9202, 5LA9035, 5LA9037) that are located on higher hilltops (30 ft away) that would served as better locations for camping. No additional research is recommended for this small lithic scatter.

5LA9204

This cultural debris scatter was found on a sloping terrace along the southern side of Lockwood Arroyo. Artifacts were encountered below the plains and above the arroyo, at an elevation of 1542 m (5060 ft). Vegetation is characterized as sparse grassland with surface sediments almost non-existent. No structures or features were located and thermal features, if they once existed, have eroded from the surface.

A high incidence of tools and ground stone indicates the site likely was occupied for an extended period of time, or had multiple occupations. There are 20 chipped-stone tools, six pieces of ground stone, and 68 pieces of debitage in the assemblage. One whole mano of quartzite, two sandstone mano fragments, a whole slab metate, and other sandstone metate fragments made up the ground stone. Chipped-stone tools are eight cores, a basalt core-tool, eight-utilized/retouched flakes (chert, basalt, fine-grained quartzite), and two unfinished bifaces (one orthoquartzite, one fine-grained quartzite). A projectile point preform was also recovered. This tool is made of claystone. While it is not temporally diagnostic, its large size and heavy patination suggest an early occupation for the site. The debitage is 68 pieces: chert (26), fine-grained quartzite (14), hornfels/basalt (12), orthoquartzite (10), silicified wood (3), quartzite (2), and obsidian (1). Only eight of the flakes are cortical and all are large. Of the non-cortical flakes, 36 are large and 24 are small; further, 22 of these large flakes are complex, 11 are simple, and nine of the small non-cortical pieces are complex, while eight are simple.

Based on the debitage, this site probably functioned as a secondary reduction area away from the quarry location. Some early-stage biface manufacturing appears to have taken place as well as vegetal preparation and processing. Soils on the site are thin and investigators did not find areas where they thought there might be buried deposits. No further work is recommended.

5LA9205

This is a very sparse lithic scatter with a few tools. These were found on a gentle slope that continues down to Lockwood Arroyo. The surface is mostly exposed bedrock, and secondary sediment depth is minimal. Artifacts on site are widely scattered, and in places may exceed 20 m in spacing; however, they are all considered part of one site because of general continuity in tool, flake, and raw material type. Three chipped-stone tools and 13 pieces of debitage were recorded. Debitage is chalcedony (1), chert (2), quartzite (1), fine-grained quartzite (2), hornfels/basalt (6), and orthoquartzite (1). 5LA9205 appears to have been a short-term camp, primarily associated with lithic reduction and some expedient tool use. No further work is recommended.

5LA9207

This site occupies the top of flat tableland on the southeast margin of the Bear Springs Hills. A three-fingered ridge here rises 100 ft above the prairie below and is capped by broken platy limestone. Sediments are transitory in nature with a maximum depth of 10 cm. Recorded artifacts include five pieces of ground stone, a core, a scraper, and 43 pieces of debitage. Of the debitage, most is fine-grained quartzite (18 flakes), hornfels/basalt (9) or chert (8), with lesser amounts of argillite, quartzite and orthoquartzite. These items have been classified as complex flakes (22), simple flakes (15), biface-thinning flakes, and shatter (4). Though the overall density of lithics is low, a high number of complex flakes and two biface-thinning flakes suggest that later stage reduction and tool manufacture occurred on site. The landform is prominent and the view it affords would have attracted prehistoric peoples. No further work is recommended.

5LA9208

The site occupies a very low, wide rise (5 x 175 m wide) in the middle of a nearly flat drainage basin 1.6 km south of the Bear Springs Hills. A 100 x 130 m scatter of cultural materials was encountered in the middle of a juniper forest; two medium density lithic concentrations were recorded. Because of flourishing groundcover, sediment preservation is good (10 to 20 cm); however, vehicle disturbance is moderate to heavy, with tracked vehicles gouging down to the limestone substrate in places.

Two manos, two cores, two utilized flakes, an unfinished biface, a scraper, and two projectile points were found scattered randomly among debitage. Both points are large, and when typed in the Anderson (1989) system, were classified as of the P29 style (500 BC to AD 600). The debitage assemblage consisted of 108 items of the following materials: argillite (2), chalcedony (7), chert (53) quartzite (4), dendritic chert (11), fine-grained quartzite (16), hornfels/basalt (11), orthoquartzite (3), and silicified wood (1). The sample is overwhelmingly non-cortical (94 items), with only 14 pieces exhibiting dorsal cortex. Fifty flakes are simple ones, 42 are complex, 10 pieces are shatter, and there are six biface-thinning flakes. Biface-thinning flakes are unspecified chert (3) and dendritic chert (3), so at least two bifaces were manufactured on site.

5LA9208 has evidence of all stages of lithic reduction, from primary through final-stage biface manufacture. One possible knapping station was found, which has a preponderance of high-quality mustard-brown colored chert that may be Niobrara jasper. There is a large amount of lithic debris for such a non-descript landform. Its protective juniper canopy and proximity to wild game on the nearby open prairie would have been two of its main attractions. The site lacks fire features, and even though there may be some buried remains, their secondary depositional nature makes the site insignificant.

5LA9209

The site occupies a low rise extending south from a prominent ridge in the Bear Springs Hills, 11 km north. Lithic materials are situated on an island of sparse juniper in the middle of the prairie, at an elevation of 1622 m (5320 ft). Sediment deposition is excellent, with over 30 cm of silt and gravel present. Erosional impact has been minimal; the site is placed at the toe of a broad alluvial fan and deposition is likely covering parts of the prehistoric occupation surface. Moderate-to-heavy disturbance from tracked vehicle maneuvers has altered the upper 5 cm of the surface sediments.

The cultural assemblage is sparse: two pieces of ground stone, two chipped tools, and 23 pieces of debitage. A granite mano fragment and a sandstone mano fragment represent the ground stone, while a chert utilized flake and an unfinished biface of fine-grained quartzite comprise the tools. Primarily of quartzite, debitage materials also include chert, hornfels/basalt, and silicified wood. These are eight complex flakes, six pieces of shatter, and nine simple flakes. Based on debitage alone, primary and secondary raw material reduction are the main technologies employed at this location.

5LA9209 is sparse and localized, suggesting opportunistic use, with limited reuse through the years. The landform is unremarkable and possesses no unique or exploitable resources. This site is smaller than its neighbors, 5LA9203 and 5LA9208, and does not appear to have experienced the same degree of occupation that these sites did. Though there is some sediment deposition, sparse surface remains suggest the site is not a good candidate for additional research.

5LA9211

This site is a multi-component lithic scatter. It measures 360 m north-to-south, and 233-m east-to-west and was found on a gently sloping and low hill covered with juniper on the alluvial fan between the Bear Springs Hill and Lockwood Arroyo. Plains and an arroyo drainage border the site on the south, with stable limestone terraces above the arroyo. All of the surface sediments have eroded from the terraces though pockets of alluvium were noted at the north and east edges of the site. Heavy terrace erosion leaves little hope of intact cultural deposits here. In addition, the site has experienced significant military impact, in the form of tracked vehicle maneuvers and dumping of modern trash (MRE wrappers, etc.). Several "looters piles" of lithics were encountered, indicating that some patterned tools have perhaps been removed.

The cultural assemblage consisted of debitage, chipped-stone tools, ground-stone artifacts and ceramics. Unlike many sites of the PCMS, the ground-stone assemblage was quite large; 14 metate fragments, nine mano fragments, a complete mano and a complete metate. All are sandstone. Four ceramics were collected from an area 57° and 67 m away from the datum. All appear to be coiled, with a black slip on the inside wall (Appendix IV). The presence of significant ground stone and ceramics may indicate preparation, processing, and possible storage of a food product, possibly vegetal in character.

Thirty-eight chipped-stone tools were recorded: 14 small patterned bifaces, four large patterned bifaces, an unfinished biface, eight scrapers, seven utilized flakes, and four cores. Most tools are chert (12) or hornfels/basalt (11), orthoquartzite (7), fine-grained quartzite (4), obsidian (2), silicified wood (1), and glass (1) were found in smaller quantities. Small projectile points are corner- and side-notched and date to the Late Prehistoric Period (AD 100 to AD 1725); large points are corner-notched and Archaic in age (5800 BC to AD 100). Two items of special interest were encountered; a medial portion of a possible Paleoindian point, and an end scraper of brown bottle glass. The point fragment is orthoquartzite, and is the heavily patinated medial blade portion. None of the other artifacts evidence patination, and it is apparent this piece was curated. The flaked-glass end scraper could be a Protohistoric Native American implement, or might have been made by the early Hispanic homesteaders of the area.

The site exhibits a plethora of debitage materials, most is fine-grained quartzite (52%), chert (20%), and basalt (17%), with lesser amounts of argillite, Black Forest silicified wood, obsidian, and siltstone. Size-wise, 92 items are small and 70 are large; cortex is absent on 127 specimens and present on 35. The sample is complex flakes (48%), simple flakes (37%), biface-thinning flakes (9%), and shatter (6%). The high number of complex and biface-thinning flakes indicate that practically all the debitage pieces would have been produced in early- to late-stage biface reduction. The simple and cortical items demonstrate core reduction was also an important site activity. Of interest, both obsidian pieces were sent for x-ray fluorescence analysis and found to originate in the Malad source of southern Idaho (Appendix I).

While 5LA9211 exhibits one of the richest artifact assemblages on the PCMS, it is highly eroded with little chance for recovering buried cultural deposits through testing. In addition, the site has been heavily impacted by military maneuvers and looting, and therefore would not benefit from supplementary work.

5LA9212

This site is another multi-component lithic scatter with occupations in the Archaic (5800 BC to AD 100) and Late Prehistoric stages (AD 100 to AD 1750). It was discovered on a gentle slope leading down to a northern drainage of Lockwood Arroyo, and 53 m west of 5LA9211. Sediment depth is almost nonexistent (5 cm maximum), with eroding limestone bedrock outcropping to form a rather flat landform. Recent military maneuvers, evidenced by tank tracks and trash, are adverse impacts.

One hundred and five pieces of debitage, 14 chipped-stone tools, and seven pieces of ground stone were recorded. Debitage from the assemblage is primarily simple, non-cortical flakes (only 18 flakes were cortical); thus, cores were probably being brought in from an outside procurement area, without cortex, and being reduced for expedient tools. There are 51 simple flakes, 43 complex flakes, six biface-thinning flakes, and five pieces of shatter. Materials are either fine-grained quartzite (44) or basalt (27), with lower chert, argillite, coarse-grained quartzite, siltstone and orthoquartzite counts. Five metate fragments, two mano fragments, four utilized flakes, four unfinished bifaces, three small patterned bifaces, two large patterned bifaces, and one scraper were identified.

5LA9212 site does not contain areas with possible intact buried deposits. Coupled with an absence of fire-related materials, such as heat-altered stones, it does not have good potential for additional research.

5LA9213

Three flakes and a utilized argillite flake are the cultural materials on this meager site. Measuring 42 x 15 m, it was identified near the crest of a low grassland covered ridge between two intermittent drainages that drain into Big Water Arroyo. Deposition is excellent, up to 35 cm) with silty alluvium topped by limestone gravel. All lithics were retrieved from tracked vehicle ruts, providing good evidence that buried occupations can be found. At this time there is no need for additional work, but the landform should be monitored in case features begin to expose.

5LA9214

Artifacts comprising this site were encountered on a gently sloping plain at the base of the Big Arroyo Hills. This is one of the highest sites in Training Area 10; the datum was established at 1628 m (5340 ft). Vegetation is that typically found in the steppes, grassland with a few juniper trees as the overstory species. The site is on the edge of an active alluvial fan, and cultural sediments are minimally 20 cm, though alternating outwash gravels may exceed 5 m in depth.

A 150 piece debitage sample was recorded and is mostly argillite (77%) and basalt (13%), with smaller quantities of obsidian (5%), chert (3%), fine-grained quartzite (1%) and limestone (1%). Obsidian is the only non-local material, and these pieces visually compare to known specimens from the Jemez Mountains of New Mexico. Many (76) of the total 116 argillite items are small; 75 are simple flakes, 34 are complex flakes, four are biface-thinning flakes, and three are shatter. Only 29 of these are cortical indicating that initial core trimming occurred elsewhere. High percentages of argillite and basalt are more common for sites around the Hogback (15 km southwest). Though this idea is untested, the argillite and basalt assemblages seem to be linked with earlier occupations. The large corner-notched basalt point (FS 2) found on the site supports this notion (1000 BC to AD 500, Anderson type P26).

No thermal features were identified, and though the site assemblage is unique for this part of the base, it is not a good candidate for further work.

5LA9215

The site is positioned on a small finger ridge that trends northwest to southeast. It is above an unnamed side drainage in the Lockwood Arroyo system and below the southeast corner of the Big Arroyo Hills. Grassland to juniper woodland transition best characterizes vegetation in this arid landscape. Located at the edge of a small alluvial fan, site sediments are stable enough to develop an organic upper layer in places. More erosionally resistant limestone bedrock forms the low flat terraces structuring the ridge. Of the twenty-three recorded debitage specimens, five material types were noted: chert (7), argillite (6), basalt (4), fine-grained quartzite (4), and coarse-grained quartzite (2). Heavy military impact has caused the cultural component of 5LA9215 to loose its integrity, so additional work is not necessary.

5LA9216

Seven flakes, a core, a hammerstone, pieces of fire-cracked rock, and a metate comprise this cultural material scatter. All of these artifacts were found in small erosional features on the slope of an alluvial fan below the Big Arroyo hills. There is a drainage 105 m south, and it supports a riparian plant community where a small spring forms a standing pool of water. In all likelihood, alluvial sediments contain buried prehistoric artifacts (as they appear to be exposed in tracked vehicle gouges) but, the sediments here are mixed and artifacts within them are not *in situ*. Because the site does not contain intact archaeological deposits, it is not eligible for the NRHP and requires no additional work.

5LA9217

A historic trash dumping location, identified in a dry arroyo at the fringe of the Big Arroyo Hills was designated 5LA9217. Most items are relatively recent, ca. 1960's and 1970's, though some pieces from the 1940's and 1950's are mixed in. No further work is recommended.

5LA9218

This site contains both a prehistoric and a historic component. Its prehistoric component is a sparse lithic scatter and the historic component is a domestic trash scatter. Neither component is thought to have significance. Found within a stand of juniper trees in the upper Lockwood Arroyo drainage basin, the site's surface soils are shallow and have been recently deposited on limestone bedrock. The landform has been impacted by tracked vehicle maneuvers and very little of the substrate remains intact.

The prehistoric assemblage contains 33 pieces of debitage, seven ground artifacts, and four chipped tools. Debitage is made from five material types: argillite (9), chert (7), fine-grained quartzite (7), basalt (6), and, coarse-grained quartzite (4), and these are 23 simple flakes, six complex flakes, three pieces of shatter, and a biface-thinning flake. A knife fragment, a side-scraper, a basalt core, and a hammerstone are listed as the stone tools. Ground stone is four mano fragments, two metate fragments, and a complete mano. No surface evidence for prehistoric structures or features is apparent.

5LA9219

This 90 x 180 m lithic scatter was found on a limestone-capped ridge 1.2 km northeast of the intersection of the pipeline road and MSR3. The Pipeline Road passes 430 meters north at 293°. Hornfels/basalt, chert, and fine-grained purple quartzite flakes were identified, as well as two cores and two slab metate fragments. Seed bearing grasses grow around the site and include New Mexico feathergrass, ricegrass, grama grass, and foxtail barley. Without soils to test, no subsequent work is needed.

5LA9220

All artifacts were found in bare patches among relatively thick grassland vegetation. Surface flaking debris has the following material-type distribution: chert (9), fine-grained quartzite (4), and coarse-grained quartzite (1), these are classified as seven complex flakes, four simple flakes, and three biface-thinning flakes. Recorded tools are a sandstone mano fragment, a quartzite preform (Anderson Type P49, AD 800 to AD 1750), a utilized/retouched flake of chert, and an obsidian projectile point fragment (Type P18, 3000 to 500 BC). Anderson P18 points date from the Middle to Late Archaic period; the preform could have been produced anytime during Late Prehistoric stage.

This sparse lithic scatter extends from the southern terrace of an unnamed drainage, up and to the south into the plains. Sediments from a small alluvial fan are covering the upper end of the site and may be capping additional cultural remains. This small scatter lacks thermal features, is considered insignificant, and is not eligible for inclusion into the NRHP.

5LA9221

This site (12 x 1 m) was identified in the grassland steppes west of Big Water Arroyo. Sediments here are relatively stable and have a minimal depth of 30 cm. Two artifacts were recorded: a utilized/retouched basalt flake and basalt shatter. No further work is needed.

5LA9222

Found on a low terrace above Big Water Arroyo, this site is comprised of flakes, mainly simple, large, and non-cortical. Cultural materials were found in between the relatively thick grassland vegetation and the entire assemblage is a basalt utilized/retouched flake and 14 flakes of argillite (8), chert (3), fine-grained quartzite (2), and hornfels/basalt (1). In spite of considerable deposition on the landform (>50 cm), the lack of features and diagnostic artifacts renders the site ineligible.

5LA9223

This sparse lithic scatter occupies the western margin of a gently sloping minor finger ridge extending south from the Bear Springs Hills (1 km northeast). Soils are a light-brown silt with an average depth of 15 cm, and support juniper trees and grassland vegetation. Tools include a mano and two metate fragments and flaking debris was manufactured from chert (8), fine- (3) and coarse-grained (4) quartzite, hornfels/basalt (3), and silicified wood (1). Of the 19 flake total, eight pieces are complex, eight are simple, and there are three pieces of shatter. This lithic scatter needs no further work.

5LA9224

This 47 x 85 m lithic scatter was found on a gently sloping finger ridge at the toe of an alluvial fan south of the Bear Springs Hills (1.5 km north-northwest). Situated between two dry arroyo drainages, at an elevation of 1585 m (5200 ft), cultural debris was found on a friable limestone outcrop. In the grassland steppes, the landform is covered with woodland plant species with juniper and piñon pine trees dominating the overstory.

Tools include a basalt non-bipolar core, a utilized/retouched flake of chert, a one-hand mano fragment, and a slab metate fragment. The 36 pieces of debitage are made from a variety of materials: orthoquartzite (1), basalt (3), coarse-grained quartzite (11), silicified wood (1), fine-grained quartzite (11), obsidian (1), and chert (8). Five pieces are complex flakes, 26 are simple flakes, and there are six pieces of shatter. Most of these are large and non-cortical, with some small non-cortical pieces, indicating middle- to late-stage raw material reduction.

No structures, features, or diagnostic artifacts were found, and the sparse distribution of the lithic items suggests limited use for the site. Because it has no potential for addressing any of the research domains, the site is not eligible for the NRHP. Of note: three pieces of rebar were found, and could be related to military use, or, they may indicate the site is formerly recorded. A search of DECAM records showed no previously recorded site at this location, however.

5LA9225

This is a small and sparse lithic scatter located south of the Bear Springs Hills. It was found on a juniper covered finger ridge in the grassland steppes. Surface soil is light-brown silt with intermixed limestone gravels. Its sediment deposition is shallow (<10 cm) and secondary in nature, meaning there is no possibility for buried and intact cultural deposits. As such, it is not eligible for inclusion to the NRHP.

Cultural materials include 116 pieces of debitage, a mano fragment, and four unfinished bifaces. Of the bifaces, FS 1 is chert and FS 2 - 4 are fine-grained quartzite. Debitage material types include fine-grained quartzite (90), coarse-grained quartzite (3), basalt (1), chert (21), and chalcedony (1). Most of debitage was found in a 5 x 10 m area, but erosion is heavy here and it is possible this concentration is related to deflation, rather than it being a formal chipping station. The debitage consists of an almost equal number of complex (48) and simple flakes (52), with fewer shatter (14), and biface-thinning flakes. This lithic scatter requires no further work.

5LA9226

This small lithic scatter was found on a gently sloping hill slope below the Bear Springs Hills. Sediment depth is poor, less than 5 cm, with areas of eroding limestone bedrock everywhere. The landform has experienced wind and water erosion, and moderate impact from the U.S. Army in the form tracked vehicle gouges. One sandstone mano was found among 13 pieces of debitage. Debitage materials are chert (8), fine-grained quartzite (3), dendritic chert (1), and coarse-grained quartzite (1). The site is small and deflated, and will yield no additional information.

5LA9227

The site is an extremely sparse lithic scatter occupying a low rise at the juncture of two unnamed arroyos in the steppes below the Bear Springs Hills. Sediment depth varies from approximately 40 cm near the arroyos, to 5 cm on the top of the rise; this soil is light-brown silt. Vegetation is juniper woodland, with an understory of mixed grasses. Also present are a number of scrub oak trees, which would possibly have been highly exploitable seasonal resources. Tracked vehicle ruts of up to 35-40 cm deep were encountered, and heavy sheetwash erosion is causing these tracks to grow into small arroyos.

The artifact assemblage contained of two Late Archaic age projectile points (large corner-notched points), chipped-stone tools, two slab metate fragments, and debitage. The chert point (FS 2) is classified, in the Anderson (1989) system, as a P31, the other, a coarse-grained quartzite point (FS 6) is a P26. The remaining chipped tools are a non-bipolar argillite core, an orthoquartzite scraper, and a utilized coarse-grained quartzite flake. Debitage contains argillite (1), chert (11), basalt (3), orthoquartzite (1), and fine-grained quartzite pieces (2).

5LA9227 probably was occupied on a seasonal basis for the exploitation of local plant and animal resources. Of note is the scrub oak and its potential for attracting prehistoric peoples to the fringes below the Bear Springs Hills. There are areas where sediments may be covering prehistoric occupation surfaces, but in the absence of fire-related features, the site is not a good candidate for additional work.

5LA9258

The site occupies a limestone covered terrace west-southwest of a minor drainage, and below the Bear Springs Hills. Artifact density is uniformly low across the landform. The tool assemblage is an unfinished chert biface, a non-bipolar core of silicified wood, a chert scraper, three utilized flakes of chert, dendritic chert, and orthoquartzite, and a small patterned biface of silicified wood (Anderson type P50, AD 1000 to AD 1750). One sandstone mano fragment was also encountered. Debitage, a total of 21 pieces, breaks down into the following material types: chert (13), coarse-grained quartzite (2), fine-grained quartzite (4), and silicified wood (2). These are categorized as 11 simple flakes, eight complex flakes, a piece of shatter, and a biface-thinning flake. No structures or features were found, and minimal sediments (<15 cm) are not likely to contain intact, buried deposits. No further work is needed on this small site.

5LA9259

This large site has both a prehistoric and a historic component. It was found on a low rise that forms a broad terrace below the "Old Baldy" landmark (1.5 km northeast). Juniper trees cover the rise, and grassland steppes are found above and below the terrace. Secondary sediments are a light-brown silt with intermixed limestone and shale gravel. Deposition varies, with the deepest soils at the northeast site boundary and at the toe of an active alluvial fan. A gas pipeline and its associated maintenance road bisect the site. 5LA9259 has experienced light to moderate erosion from wind and water, impacts in the form of U.S. Army tracked vehicle maneuvers are most severe. Six looters piles were noted, these contain mostly cores, large pieces of debitage, and ground-stone tools.

Debitage, chipped-stone tools and ground stone comprise the prehistoric component. There are an estimated 300+ pieces of debitage on 5LA9259, so a 154 flake sample was analyzed. This sample shows a wide variety of lithic materials were utilized, including coarse-grained (11) and fine-grained (74) quartzite, silicified wood (1), chert (39), hornfels/basalt (14), argillite (8), orthoquartzite (3), and Obsidian Ridge obsidian (4). Three biface-thinning flakes were found: two of chert, and one of fine-grained quartzite, indicating that at least two bifaces were manufactured. Seventy-two pieces are complex flakes, 67 are simple flakes, and there are 12 angular shatter specimens. One hundred and nineteen items are large, and 78 are non-cortical while 41 exhibited cortex. Fifty-seven of the large flakes are complex and 54 were simple; 35 are small specimens, and these are all non-cortical. All stages of lithic reduction are apparent in the assemblage, showing that activities ranged from primary raw material reduction to tool manufacture and maintenance.

The ground-stone assemblage is substantial and includes 18 items: nine one-hand mano fragments (8 sandstone, 1 quartzite), and eight sandstone slab metate fragments. An edge-ground cobble of sandstone, with an extremely high edge polish, was also collected.

Stone tools are a hornfels/basalt bifacial core tool, nine projectile points, and five large patterned bifaces (one argillite, three chert, one silicified wood. Of the projectile points, five are temporally diagnostic. The oldest points are FS 11 (P19) and FS 46 (P28) which date somewhere from the Middle Archaic to the Developmental period according to Anderson (1989). The next point (FS 6) is similar to Anderson's (1989) type P38; it has associated dates that range from AD 600 to AD 1000. The fourth projectile point (FS 33) is a P58 and was apparently made sometime between AD 600 and AD 1200. The remaining point (FS 13) is a P65, and has associated dates that range from between AD 800 to AD 1100. From these artifacts, it appears the site is minimally multi-component and had occupations in the Middle Archaic through the Diversification periods.

The density and variability of the prehistoric artifacts on the site suggests that this landform experienced regular and intense use through time. The presence of several different technologies and a wide variety of lithic materials support this conclusion. The appearance of heavy slab metates, as well as manos made of river cobbles obtained at a considerable distance from 5LA9259, perhaps indicate stays of extended duration. It is also interesting to note that some of the chipped tools are worn beyond further use.

In spite of the fact that 5LA9259 has several diagnostic projectile points, numerous chipped-stone tools and ground-stone artifacts, and richly varied debitage, its prehistoric component is not eligible because the soils are secondary in nature. Its historic component is a non-diagnostic trash scatter and a wagon axle. These historic materials are window glass, wire nails, tin cans, and some buckets. Historic artifacts are few, so the historic component is also considered insignificant.

5LA9260

This site occupies a limestone covered shelf in the rolling prairie between the Bear Springs Hills and Lockwood Arroyo. The pipeline road is 1 km east, and the "Old Baldy" landmark is 1.9 km northeast. Surface sediments are variable, this light-brown silt with intermixed gravel ranges in depth from 5 to 25 cm, when viewed in the side walls of the many erosional cuts that bisect the landform.

The surface assemblage, 73 pieces of debitage, a polishing stone, and six chipped-stone tools, is sparse with no visible areas of concentration. Stone tools are represented by an Alibates scraper, two retouched/utilized flakes (chert and fine-grained quartzite), two unfinished bifaces (chert and hornfels/basalt), and a large corner-notched projectile point fragment of chert (possibly of Archaic age).

Recorded debitage items include argillite (2), chalcedony (1), chert (20), coarse-grained (16) and fine-grained (19) quartzite, hornfels/basalt (10), obsidian (1), orthoquartzite (2), and silicified wood (2). Thirty-four of these are complex flakes, 32 are simple flakes, there are four pieces of shatter, and three biface-thinning flakes.

No structures or features were found, and though erosional impacts have been moderate, the disturbance from the Army has been heavy. Not only has there been heavy damage from tracked vehicle maneuvers, but also, the site is littered with all sorts of trash, eating utensils, and MRE wrappers. No further work is required here because the sediments are active, and occupation surfaces have little chance of having remained intact.

5LA9261

This 210 x 165 m lithic scatter and structure site starts in the grassy plains and extends down slope, and along a series of sandstone terraces on the south side of Red Rock Canyon. Surface sediments have eroded away leaving Dakota sandstone bedrock exposed in many areas. Meager sediments here are only 10 cm in depth and are the result of erosional deposition. Dakota quartzite outcrops are visible, as are silicified wood nodules, indicating that the site functioned as a lithic procurement location. Features 1 and 2, both wall remnants, have deflated down onto bedrock and their original shape, or function, is unknown. Associated with Feature 1, is substantial fire-cracked rock that may be the deflated remains of a roasting pit.

Chipped-stone tools include four non-bipolar cores, seven retouched or utilized flakes, five unfinished bifaces, and a preform of chert (in the Anderson typology a P49, Ad 800 to AD 1750). Tool material types are argillite, chert, and fine- and coarse-grained quartzite. Recorded debitage specimens (94 pieces) are the same materials as the tools with the addition of chalcedony, hornfels/basalt, and orthoquartzite. Forty-seven of these are simple flakes, 43 are complex flakes, three items are shatter, and there is a single biface-thinning flake. Sixty-two pieces are large, and of these, 35 are cortical and 27 non-cortical. There are 32 small flakes, 26 non-cortical and six cortical. Based on the debitage it is apparent that all phases of lithic reduction occurred on site, from core reduction to tool manufacture. The presence of many large and cortical pieces is not surprising given the fact that two raw materials outcrop in the immediate area.

Both features are completely deflated and testing would be unproductive. Sediments everywhere else are secondary in nature, so 5LA9261 is not considered to be a good candidate for additional research.

5LA9262

Located on the south side of Red Rock Canyon, 5LA9262, this lithic scatter consists of debitage, an obsidian biface fragment, a chert drill fragment, a preform, a core, and four utilized flakes. A projectile point of orthoquartzite was also found (P50 in Anderson's 1989 typology, AD 1000 to 1750). These artifacts were found on a small finger ridge that juts out into the canyon, mixed within areas of light-brown sand, or on top of sandstone bedrock. Only one feature was recorded, this is a single bedrock metate (Feature 1), with a milling slick ground on its upper face.

A total of 97 pieces of debitage were recorded-- fine-grained quartzite (65%), chert (10%), coarse-grained quartzite (9%), hornfels/basalt (7%), siltstone (3%), orthoquartzite (2%), argillite (2%), and obsidian (1%). These are divided into 37 complex flakes, 53 simple ones, six pieces of shatter, and a biface-thinning flake. Sixty-one pieces are large; with 35 being non-cortical and 26 cortical. There are also 36 small flakes, 33 are non-cortical, and three cortical.

Unfortunately the site does not have any areas where investigators thought there might be intact cultural remains. The absence of any evidence for former fires is a good indicator that excavation would not produce significant cultural remains. Because of this, no additional research is recommended for the site.

5LA9263

This lithic scatter measures 96 x 59 m, and is debitage and a retouched quartzite flake. Cultural materials are dispersed over the site, with an average of 10 m between artifacts. Thirty-five pieces of debitage were recorded: argillite (2), chert (3), coarse-grained quartzite (23), fine-grained quartzite (6) and hornfels/basalt (1). Simple flakes dominated the assemblage with 22 items. In addition there are seven complex flakes, a piece of shatter, and five biface-thinning flakes. The site was found on the north side of Red Rock Canyon on a juniper covered hillslope. There is little soil deposition; the site lacks fire features, and there is little opportunity for any significant research.

5LA9264

This lithic scatter was found on the northern side of Red Rock Canyon. A series of undulating sandstone outcrops form terraces here, these collect alluvial sediments, and support a juniper woodland plant community. Dense in composition, the scatter contains 121 pieces of debitage, nine chipped-stone tools, and a sandstone mano fragment. Of the debitage, nearly all (98%) are quartzite (62% fine-grained and 36% coarse-grained) pieces with only 2% of chert. Most are simple flakes (45%) or complex flakes (36%), with fewer shatter specimens (16%) and biface-thinning flakes (4%). Unfortunately, no temporally diagnostic materials, such as projectile points or ceramics, were recorded. Tools are six quartzite cores, two large unpatterned bifaces (one quartzite, one chert), and a quartzite utilized flake. No features or structures were identified, and the site is therefore not eligible for the NRHP.

5LA9266

The site consists of a rockshelter and sparse lithic scatter. These cultural materials were found on a small ridge above, and on the north side of Red Rock Canyon. Numerous terraces are defined by a series of sandstone outcroppings, the shelter was found in the largest one of these. The artifact assemblage is 78 pieces of debitage (only one item was encountered in the shelter), two cores, and a slab metate fragment. Most of the debitage specimens are simple flakes (65); of those remaining, six are complex flakes, four are shatter, and three are biface-thinning flakes. Nearly all are coarse-grained quartzite (69%), with fine-grained quartzite (27%), and chert (4%) also recorded. Thermal features were not identified; the only interesting thing about this site is that the lithic artifacts are confined to two isolated areas. Some surface disturbance from wind and water erosion is discernible, and because there is no deposition left in the shelter, more work is not recommended.

5LA9267

The site is a sparse scatter of lithic debris that was found in the juniper covered flats north of Red Rock Canyon. Three complex quartzite flakes and an "end shocked" quartzite biface fragment were recorded. Though there is some soil deposition (15-25 cm), surface features are absent. At this time, no additional research is planned for this small site.

5LA9274

5LA9274 is a moderately dense lithic scatter with three rockshelters and a hearth. It was found at the head of a major drainage that flows south into Red Rock canyon. The landform, on which the site was found, is a slight slope, resulting from down-cutting of the drainage from the plains. Site topography includes a grassy flat area near the center of the site, a ridge along the north side boundary, and the head of the drainage. The majority of the artifacts were found in sediment pockets interspersed along the bedrock shelf above the drainage.

Rockshelter 1 is located approximately 75m southwest of the site datum. It is a overhang with a considerable amount of sooting on the roof. The following measurements were taken: length 5.5 m, width 4.2 m, and floor to ceiling height 1.85m. Dense grass at the mouth of the shelter may be hiding surface artifacts.

Rockshelter 2 is located 65 m southwest of the site datum. It is also an overhang, measuring approximately 5 x 2.2 x 1.6 m. Three flakes were found within the feature with more out in front. Hearth features are absent, and roof sooting was not observed.

Rockshelter 3 measures 4.7 x 2.2 x 1.5 m and is 60 m southwest of the datum. The floor here is relatively level, sloping 1-2 degrees to the south. Due to heavy grass cover, no artifacts were recorded. Feature 4, a deflated thermal feature, is found in the southwest corner. No artifacts, other than FCR pieces were identified on the floor.

A 150 piece sample of the debitage was taken for this site. Of this, 45% is coarse-grained quartzite, 40% is fine-grained quartzite, 9% is chert, 2% is argillite, 2% is basalt, 1% is orthoquartzite, and 1% is chalcedony. The debitage is 66% large and 34% small; 36% has cortex and 64% is noncortical; and 42% is recorded as complex flakes, 37% as simple flakes, 20% as shatter, and 1% as biface-thinning flakes. Considering the type and number of debitage items found, it appears the site was used for a broad range of lithic reduction activities with primary core reduction, expedient tool manufacture, and finished biface production also represented.

Chipped-stone tools included non-bipolar cores (11), retouched/utilized flakes (9), unfinished biface (3), small patterned biface (2), scraping tool (2), and large patterned biface (1). Four broken manos, three complete manos, and two metate fragments were recorded. Three of the bifaces could be correlated to Anderson (1989) typology. The first of these, FS20, is a basal fragment of a P33 projectile, which Anderson dates between 500 BC and AD 900. The next point (FS23) is a P73 that tentatively dates from AD 600 to 950. The final point (FS34) is a P58 with date ranges from AD 600 to 1200.

Even though this site has three rockshelters with evidence for habitation, the integrity of the site deposits has been lost. As such, no significant information recovery potential remains.

5LA9275

The site is a dispersed lithic scatter located on the top of a ridge that gently slopes down to the west. The ridge is bordered by a drainage on the east, and a series of terraces on the west above an unnamed canyon. In a mixed juniper woodland to grassland plant community, the site exhibits a light-brown sandy surface sediment with intermixed sandstone gravels; its depth fluctuates from 0 to 10 cm along the ridge. Dakota sandstone bedrock outcrops nearly everywhere.

The unexpected size of the flaking debris assemblage required a sampling of 153 pieces of debitage. Artifact classes contain 67 simple flakes, 48 complex flakes, and 38 pieces of shatter. Coarse-grained quartzite (58%) is the dominant material type, with lesser amounts of fine-grained quartzite (16%), chert (11%), orthoquartzite (7%), argillite (4%), basalt (3%), chalcedony (1%), and obsidian (<1%) represented. Twenty-eight percent of the flakes show some degree of dorsal cortex. Early-stage lithic reduction was the primary activity performed at this location. An absence of biface-thinning flakes and few (13) small, complex flakes indicate that biface reduction occurred elsewhere.

There are six artifact types represented in the flaked tool assemblage-- three unfinished bifaces, two large patterned bifaces, two retouched/utilized flakes, two small patterned bifaces, a core, and a scraping tool. Of the patterned bifaces, all are temporally diagnostic. One of these (FS 5) resembles Anderson's (1989) P30 type, which dates from approximately 1000 BC to AD 1000. Another point (FS 8) is a P37 and dates from 1000 BC to AD 1200. The other two points have later beginning dates; the P79 (FS 3) point from AD 1000 to 1750 and the other (FS 12), has an associated date of Ad 800 to AD 1750. Based on these dates, the site may have had two occupations, one in the Late Archaic period and perhaps another, much later in the Late Prehistoric stage. Many of the above age ranges overlap and its possible they represent only one occupation in the early portion of the Late Prehistoric stage.

Three ground-stone specimens were recorded and include a diorite edge-ground cobble fragment, a sandstone edge-ground cobble fragment, and a sandstone metate fragment. Although diagnostic artifacts were recovered, a lack of developed soils and features make this site ineligible for the National Register. As such, no further work is required.

5LA9276

Located on a gently sloping plain dotted with juniper trees, this lithic scatter is at the head of a small side drainage feeding Red Rock Canyon. Found in two concentrations, the debitage includes quartzite (37), chert (36), basalt (14), orthoquartzite (8), chalcedony (1), and argillite (1). The high proportion of chert stands out when compared to other small lithic scatters in Training Area 10, where quartzite usually dominates the material type assemblage. Two utilized flakes, one quartzite and the other chert, and a chert core comprise the chipped-tool assemblage.

While there are areas where soils could be as much as 15 cm deep, there is no evidence for surface features and the site requires no additional investigation.

5LA9278

This is a large lithic scatter, encompassing 3.9 acres, located above the terraced edge of a side canyon that feeds Red Rock Canyon. Surface vegetation can be categorized as juniper woodland; juniper, yucca, low sage, cholla, mountain mahogany, skunkbrush, and piñon trees were observed growing on the light-brown, silty soil.

A total of 150 pieces of debitage was subjected to analysis and comprise just a small sample of flakes noted at the surface. Flaking debris is primarily coarse-grained quartzite (92%), with smaller amounts of chert (3%), fine-grained quartzite (2%), argillite (1%), obsidian (<1%), and orthoquartzite (<1%). Debitage classes include 75 simple flakes, 67 complex flakes, seven pieces of shatter, and one bifacial-thinning flake. Proportionally, only a small amount (35%) of the items exhibit dorsal cortex.

Six artifact types represent the flaked tool assemblage, including eight unfinished bifaces, five retouched/utilized flakes, two large patterned bifaces, two small patterned bifaces, and one core. Four bifaces are considered projectile points and thus, temporally diagnostic. The first point (FS 12) is similar to Anderson's (1989) Type P26 (1000 BC to AD 500). Another projectile point (FS 14) is a P75 and has an assigned range of AD 800 to AD 1450. A third point (FS 13) is a P76 (AD 800 to AD 1100), and the last point (FS 3), a P48, tentatively dates between AD 500 and AD 1400. Based on these artifacts, the site has seen occupation from the Late Archaic Period to the Diversification period, but it is unknown to us how many occupations actually occurred. Of the unfinished bifaces, five of these are coarse-grained quartzite, two are fine-grained quartzite, and one is chert. Ground stone includes two metate fragments, a mano fragment, and a complete mano. All are made of locally available Dakota sandstone.

Thermal features were not noted and poorly developed soils typify this portion of the PCMS. A moderate amount of wind and water erosion as well as military activity is present has led to some vegetation loss and artifact mixing. In summary, the artifact assemblage suggests this locale functioned chiefly for early-stage biface manufacture. As the field crew recorded all available data, no further work is needed on this site.

5LA9279

The site, classed as a lithic scatter, also contains a bedrock metate (Feature 1). It was found in the upper drainage basin of an intermittent drainage flowing northward into the Mary Doyle arm of Welsh Canyon. All artifacts were found in a heavily deflated blowout with exposed sandstone bedrock outcropping nearly everywhere. Observed plant species include currant, yucca, prickly pear, threeawn, and juniper; these were found around the perimeter of the blow out and in sparse patches within it. The surface scatter consists only of debitage; these are 19 simple flakes, 11 complex flakes, and three pieces of shatter. Thirty-one of these items are fine-grained quartzite, and two are chert.

No additional work is required here, as there are no buried deposits. In fact most of the cultural materials are in deflated context and no fire-related materials, such as heat-altered stones, were observed.

5LA9280

This site is a large and thinly distributed lithic scatter located along the top of an erosional terrace-hill approximately 700 meters south of Mary Doyle Ranch, in Welsh Canyon. Surface vegetation grades from grassland to juniper woodland with proportionally denser vegetation along the south site boundary.

The cultural material assemblage consists of 150 pieces of debitage, five chipped-stone tools, and ground stone. Features 1 and 2, bedrock metates, contain a total of six milling slicks, and two one-hand mano fragments were found in close proximity to Feature 2. Two utilized flakes, two scrapers, and a projectile point preform comprise the chipped-stone assemblage. Material types for the debitage are: fine-grained quartzite (48%), coarse-grained quartzite (25%), chert (15%), argillite (8%), and <1% each of silicified wood, sandstone, orthoquartzite, chalcedony, and basalt. The sample was 52% simple flakes, 34% complex, 11% shatter, and 2% biface-thinning flakes; all phases of raw material reduction were represented, core reduction apparently is the dominant activity.

Subsurface sedimentation appears significant, with up to 40 cm of sandy loam covering the sandstone bedrock outcropping along the canyon rim. Most artifacts seem to be eroding out at the base of trees, or in deep the tracked vehicle gouges that cover the site. This suggests that there are buried cultural materials, but the sediments are mixed alluvium and artifacts within them have been displaced from primary context. Given the poor archaeological potential, we judge this site to be not eligible for NRHP inclusion and recommend no further work.

5LA9282

This site is located in a small bowl-like depression surrounded by gently sloping terraces. The site sits at an elevation of 1536 m (5038 ft) in the grassland/juniper woodland transition zone. Deposition consists of approximately 25 cm of sand with cryptogamic crust. This site is small (47 x 23 m) and very sparse; the entire assemblage consists of 15 flakes of debitage and three argillite cores. The debitage is primarily argillite, with 12 of the 15 flakes being of this material type. The other three flakes are chert. The debitage further breaks down as nine simple flakes (eight argillite, one chert), three complex flakes (two argillite, one chert), and three pieces of shatter (one chert, two argillite). All of the argillite is heavily patinated, suggesting an early date for the site; although without diagnostics no timeframe can be established. This small site requires no further attention.

5LA9285

This site consists of a rock shelter and its associated cultural debris scatter, situated within a large sandstone bedrock outcrop. Found on a ridge that extends out into a major side canyon of Red Rock Canyon, the site occupies the far western tip. Datum elevation is 1506 m

(4940 ft), and the surrounding vegetation consists of juniper, skunkbush sumac, yucca, cholla, prickly pear, and blue grama grass. Throughout the area soil depth is minimal, with 0-10 cm of sandy loam observed over sandstone bedrock.

The rock shelter, Feature 1, is fairly small, 8.5 x 2.5 x 1.5 m high, and deposition is poor (less than 5 cm). There are no architectural units or thermal features within the dripline, however, a small amount of charcoal material was noted at the surface. One large slab metate (FS 3), is located along the back wall of the shelter. Feature 1 appears to have had only ephemeral use, however, there is a much larger rock shelter within the same parent outcrop that appears to have collapsed.

The surface assemblage consists of 93 pieces of debitage; six pieces of ground stone, and four chipped-stone tools. Besides the whole metate found in Feature 1, there are three metate fragments, and two whole, one-hand manos. All of the ground stone is local sandstone. Stone tools are represented by two quartzite cores, and two large patterned bifaces, both of quartzite. One of these is a large stemmed projectile point (P43, 3000 BC to 500 BC) that suggests Middle to Late Archaic period occupation for this site.

There is very little soil remaining in the shelter and this seems to be of secondary deposition. Because the site, and more specifically the shelter, has no potential to contribute to our understanding of prehistory and no further work is necessary. The aforementioned large and collapsed shelter may have buried cultural deposits, but evidence for this is lacking from the surface remains.

5LA9286

The site is a small, localized lithic scatter that is situated along the side of a small drainage that is confined on three sides by a ridge. This small drainage empties into a major side canyon of Red Rock Canyon. The elevation of the site is 1509 m (4950 ft), and the vegetative community is the common juniper woodland/grassland transition zone. There is at least 30 cm of alluvial soil depth on site that is the result of slope wash and drainage flooding, and the artifacts are located in this. It is unknown whether the site's present location is a result of this slope wash, or whether it is *in situ*.

The cultural assemblage is made up of debitage and one fine-grained quartzite core. There were 61 pieces of debitage in the sample; 34 were coarse-grained quartzite, 24 were fine-grained quartzite, and one flake was hornfels/basalt. Eighteen of the specimens were complex flakes, 41 were simple, and two were pieces of shatter. The assemblage was primarily large in size, and cortical, indicating that this site functioned as a primary reduction location.

The site's integrity is questionable due to sheetwash erosion. In addition, no ground-stone artifacts, diagnostic artifacts, structures, or thermal features were found. No further work is required on this site.

5LA9287

This site is a large lithic scatter located on the top of a ridge that is adjacent to a major side canyon of Red Rock Canyon. The site is relatively long and narrow, being 188 m north-south and 33 m east-west. The elevation at the datum is 1521 m (4990 ft), and the vegetation on and around the site is the grassland/juniper woodland transition zone. Some areas of the site have higher artifact densities due to good visibility, as well as tool manufacture. Raw materials are diverse, with large quantities of high quality, fine-grained quartzite, and various cherts. The debitage consisted of 114 flakes of argillite (7 pieces), chert (11), quartzite (50), fine-grained quartzite (44), hornfels/basalt (1), and rhyolite (1). There were five biface thinning flakes, 20 complex flakes, 13 pieces of shatter, and 76 simple flakes. Three cores, one argillite and two of quartzite, represent the stone tools.

Based on the tools and debitage, this site was used for both secondary reduction of local raw materials, and early-to-late stage biface manufacture. There are pockets of soil across the site that offer depth of at least 15 cm, and these may suggest areas that have not yet been exposed. At this time, the site is considered ineligible for the National Register. It should be monitored periodically, and if features or structures start to expose at the surface then, the management recommendation should be changed.

5LA9288

This site is a very small scatter of flakes and ground stone. It was found on the top of a ridge, adjacent to a major side canyon of Red Rock Canyon, at an elevation of 1521 m (4990 ft). Vegetation is juniper dotted grassland; the ground cover is rather thick and may account for the small size of the assemblage. Soil deposition is good, with at least 30 cm of sandy loam covering the site area. No features, diagnostic artifacts, or chipped tools were encountered; the eight pieces of debitage are four flakes of quartzite, two of hornfels/basalt, and two of fine-grained quartzite. All quartzite appears to be local in origin, probably coming from Red Rock Canyon below. Because all available information has been recorded, this sparse scatter requires no further investigation.

5LA9289

This site is a very sparse lithic scatter located on a large ridge top next to a major side-drainage canyon of Red Rock Canyon. The site sits at an elevation of 1521 m in juniper dotted grasslands. Deposition averages 15 cm of a sandy-gravelly loam, and there has only been light erosional impact on site. The lithic assemblage is dispersed, and is primarily local quartzite. No debitage, features, ground stone, or diagnostic artifacts were discovered, and two quartzite cores and a utilized flake represent the recorded artifacts. One of the cores is fine-grained and the other is coarse-grained quartzite. The utilized flake, FS 1, is made of fine-grained quartzite, and is an extensively retouched unifacial tool. Additional work would not be productive on this small site.

5LA9291

This site is a very small, very sparse site consisting of one tool and seven pieces of debitage. This 23 x 9 m site is located at a bend in a large side drainage of Red Rock Canyon, at an elevation of 1480 m. The site sits close to the actual drainage bottom, which is shallow and basin-like at this point. Vegetation consists of mixed grasses, with some cactus and juniper trees present. The debitage consists of five flakes of fine-grained quartzite, one flake of hornfels/basalt, and one flake of chert. Three of the flakes are complex and four are simple in class designation. The only stone tool recorded is a diagnostic projectile point. This point (FS 1) is made of chalcedony and dates to either the Developmental or Diversification period (Anderson [1989] Type P75, AD 800 to AD 1450).

There is deposition of at least 50 cm of sandy loam on the site, however, this is the result of alluvial deposition, and the artifacts here likely resulted from sheetwash from sites located further up the surrounding slopes. Because the surface integrity is unclear, no further work should be done at this site.

5LA9292

The site is an extremely small (14 x 4 m) diffuse lithic scatter located on a ridge situated between Red Rock Canyon and an intersecting major side drainage. The elevation at the datum is 1514 m, and the vegetation is a transitional grassland/juniper woodland community. Deposition on site consists of at least 10 cm of sandy loam.

The surface assemblage consists of five flakes: one fine-grained quartzite, one chert, and three coarse-grained quartzite. All are large in size; one has cortex, two are complex and the rest are simple. Based on this limited sample, the site may have been a middle-stage reduction or flake use location. It may also have been a short-term re-tooling point, or an activity area between two large sites, one located to the north, the other to the south.

No features or tools were found on the site. Soils are thin, and the site is not expected to contain intact cultural remains. No further work is recommended.

5LA9293

The site is a sparse lithic scatter located on a gently sloping hillside, halfway up the slope. It is situated at the head of a drainage and another one is located to the west. Both of these drainages flow into Lockwood Canyon to the north. The site sits at 4930 ft., in the juniper woodland/grassland transition community. The soil is sandy silt with surface gravels, and deposition is approximately 15 cm.

Two small pieces of ground stone (slab metate fragments) were recorded. No indications for structures or features were noted at the surface, and the chipped-stone tools consisted of one fine-grained quartzite biface and one quartzite core. The debitage was made up of fine-grained quartzite, coarse-grained quartzite, chert, and one piece of siltstone. Most of the debitage consisted of large, cortical, simple flakes, indicating this site was primarily used for early-stage core reduction, and that later stage tool manufacture took place elsewhere. Due to the sparseness of the assemblage, it is also possible that the site was used only for short-term, or seasonal purposes, most likely a single event. Given the poor soil deposition on site recovery potential is low and no further work is recommended.

5LA9294

The site is a small lithic scatter located in a gently sloping meadow on a juniper-covered slope. The site is bordered by an unnamed drainage to the west, and by Lockwood Canyon to the north. Vegetation is juniper woodland interspersed with grasslands, and the elevation is 4920 ft. The soil is light-brown sandy silt with surface gravel, and a maximum depth of 5 cm. Quartzite outcrops along the canyon edges, allowing ample procurement opportunities, however, it is sometimes difficult to distinguish artifacts from the natural spalls and breaks.

The stone tools consisted of one chert core and one quartzite utilized flake. Debitage is primarily quartzite from the canyon, with fewer argillite and chert items. Most items were large, simple flakes, both with and without cortex. Based the debitage, and the presence of the core, it is likely that this site was primarily used for raw material procurement. It is doubtful that any long-term habitation took place on 5LA9294, judging by the assemblage analysis. It was probably a short-term camp though no features were observed at the surface. No ground stone was encountered, and the site requires no additional research.

5LA9296

This 101 x 39 m site consists of a lithic scatter and two rock shelters. The site is situated along the end of a short broad ridge immediately above Red Rock Canyon, at an elevation of 4910 ft. The site sits along the canyon rim with exposed bedrock and a juniper woodland plant community. Soil deposition is minimal, with 0-15 cm of sandy loam on site.

Feature 1 is a 7 x 2.75 m rock shelter that has an internal height of 1.2 m. The roof exhibits soot staining, but there is no surface evidence of a hearth, and with only 1-2 cm of deposition, recovery potential is extremely poor. No artifacts were found inside Feature 1, however, a whole sandstone mano, FS 3, and one flake of debitage were found on top of the overhang that forms the shelter. Feature 2 is a small boulder overhang located less than ten meters from Feature 1. This feature may be a more temporary shelter, or work area connected with Feature 1. It measures 1.9 x 1.1 x 1m high. Two artifacts were found inside Feature 2, a whole sandstone metate, and a quartzite biface fragment (FS 6).

The tool assemblage consists of 23 items: seven cores, thirteen utilized flakes, two unfinished bifaces, and one small patterned biface made of chert. None of the artifacts are diagnostic, and no date range can be established. The debitage consisted of 50 flakes of the following material types: chert (2 flakes), quartzite (14), fine-grained quartzite (32), hornfels/basalt (1), and quartz (1). The sample further breaks down into 25 simple flakes, 19 complex ones, five pieces of shatter, and one biface-thinning flake. Forty-six of the flakes are the large size grade, and 38 of these are non-cortical.

There are areas where soils could be as much as 15 cm deep on the site, but without any depth in either of the shelters, the site is not worthy of additional investigation.

5LA9297

This site is a small lithic scatter lying in dense juniper woodland in the middle of flat grasslands, at an elevation of 5130 ft. The site lies approximately 1.5 km east of the Bear Springs Hills. The ground slopes gently towards the south-southeast, to an intermittent drainage 200 m away. Other than this slope and drainage, there are no distinguishing landforms close to the site. Deposition is excellent, with at least 30 cm of gravelly clay-silt, and the effects of erosion and military maneuvers are minimal.

The cultural assemblage consists of one very small metate fragment and 15 pieces of debitage. There were five flakes of chert, four pieces of fine-grained quartzite, two flakes apiece of hornfels/basalt and silicified wood, and one piece of argillite and coarse-grained quartzite. There were eight complex flakes, four simple ones, one biface-thinning flake, and two pieces of shatter. The majority of the flakes were large and non-cortical (10), with only two small flakes in the assemblage (both non-cortical). The debitage suggests that secondary reduction and some tool manufacture (possibly a single event) took place on this 18 x 28 m site.

Soils are relatively well developed on the site, and some materials may be buried. However, without any evidence for fire features, e.g. heat-cracked stone, the site is not considered a good candidate for more research.

5LA9299

This site sits on the plains above the east terrace of an unnamed north-south trending drainage that eventually flows into Upper Taylor Arroyo. The vegetation is sparse grassland, and while the site is open, pockets of juniper woodland surround it. The elevation at the datum is 5023 ft., and the soil is a sand-and-loam mix. Deposition is poor, ranging from 0 – 10 cm.

Two chipped-stone tools and 33 pieces of debitage comprised the assemblage; no ground stone or diagnostic artifacts were located at the surface. The tools were an argillite core (FS 1) and a patinated argillite tool (FS 2). This tool has three scraping edges and is made on a broken, then recycled, biface. Most of the debitage sample is large simple argillite flakes, with lesser amounts of coarse-grained and fine-grained quartzite, and chert. And, of note, most of the debitage is cortical. The debitage suggests that this site is a primary raw material reduction location where flakes were removed from cortical nodules or cobbles.

The site is insignificant and not likely to contain buried cultural remains. Because of this, no further work is needed.

5LA9300

The site consists of both a sparse historic component and a more substantial prehistoric component. The site is located on the southern rim of Spring Canyon, between the canyon edge and the grasslands, at an elevation of 5065 ft. Exposed bedrock is located just north of the site, and forms areas of erosional remnants. There is approximately 30 cm of deposition on 5LA9300, in the form of sandy clay loam in the southern portion of the site, and aeolian sand along the northern margins. Vegetation is the typical juniper woodland/grassland transition community, with one exception; the site encompasses a stand of ponderosa pines, which are not normally found at this elevation or in this environmental setting.

The prehistoric assemblage consisted of a 150-flake sample of debitage, 12 chipped-stone tools, and one piece of ground stone. Most of the stone tools (5) were made of argillite, with items made of chert, quartzite, basalt, and orthoquartzite also present. There were four cores, four utilized/retouched flakes, three unfinished bifaces, one argillite scraper, and one small chert projectile point. This point (FS 4) is similar to Anderson's (1989) Type P66 and is associated with an AD 800 to AD 1450 date. One small sandstone fragment of a one-handed mano represented the ground stone.

The field- analyzed debitage sample consisted primarily of argillite (81 flakes), with chert (21), fine-grained quartzite (17), coarse-grained quartzite (15), hornfels/basalt (11), orthoquartzite (3), and sandstone (2). These were further broken down into 80 simple flakes, 36 complex ones, two biface-thinning flakes, 30 pieces of shatter, and two re-sharpening flakes (both sandstone). Most of the flakes were large (87) and cortical (97), indicating primary reduction was an important activity on site. The presence of complex flakes, biface-thinning flakes, and re-sharpening flakes indicates that some tool manufacture and retouch took place as well. No prehistoric structures or features were located, and no diagnostic artifacts were recovered. The site has eroded, and many of the artifacts were sitting on exposed sandstone. No work is needed on the prehistoric component as all surface integrity has been lost.

The historic component consisted of a light scatter of tin cans, which were uniformly scattered across the site's surface. The site is located on land patented by Teofallo Quintana in 1882. The historic component is also not thought to be significant.

5LA9301

The site is a sparse 24 x 19-meter scatter of lithics located on the top of a broad, gently sloping finger ridge overlooking Red Rock Canyon and a major side-drainage. The site is relatively flat and sits at an elevation of 4990 ft. Vegetation is grassland/juniper woodland transition zone, and there is approximately 20 cm of silt with intermixed gravel for deposition. The assemblage consisted of 18 pieces of debitage and one chipped-stone tool. The stone tool is a biface fragment made out of fine-grained quartzite. The debitage is almost entirely large in size (16), and is evenly split between cortical and non-cortical specimens. Coarse-grained quartzite is the dominant material with 15 pieces (10 of which are simple), and one specimen each is present for fine-grained quartzite, chert, and argillite. Due to its proximity, this site is probably related to nearby 5LA9295, and its only significance is its relation to the more important nearby site. No further work is needed.

5LA9302

This site is a small but dense lithic scatter located on a broad finger-ridge above the confluence of Welsh and Red Rock Canyons, and the canyon of the Purgatoire River. The site sits at an elevation of 1570 m (5150 ft), in the juniper woodland/grassland transition zone. Cultural materials appear to be buried and most artifacts were recovered from an area around the datum that has been highly disturbed by animal burrowing activities. Artifacts were located in the burrow back-dirt piles, and these have eroded and randomly scattered the artifacts over the surface. The sediment (up to 60 cm) is a mix of silt and sand over much of the site area, with what appears to be ashy-gray sediment in the burrows. Visual identification cannot determine whether this cultural material or just decomposing root. As the site occupies a shallow drainage, most of it seems to have been buried by colluvial deposition.

Lithic materials consist of debitage, ground- and chipped-stone tools. Noted in the 126-piece debitage sample were 63 complex flakes, 48 simple ones, 14 pieces of shatter, and one biface-thinning flake. Most of the sample (47%) was coarse-grained quartzite, with lesser amounts of chert (30%), fine-grained quartzite (18%), argillite (4%), and chalcedony (1%). The majority of the flakes were large (116), and the presence of cortex on 30% of the sample indicates that the raw materials were all local, and were recovered from bedding or nodule sources. Based on the debitage assemblage, raw material reduction is the main site function. A high number of complex flakes indicates that early-stage biface manufacture took place as well.

The flaked stone tool assemblage consisted of three small projectile points, two unfinished bifaces (one chert, one fine-grained quartzite), one large chert patterned biface, and one core of coarse-grained quartzite. The three points were all diagnostic, and based on Anderson's typology, date to the Late Prehistoric period (AD 100 to AD 1725). Two of these points (FS 3 and 6) were made of fine-grained quartzite, and the third (FS 5) was made of chert. The ground stone was represented by one slab metate fragment of sandstone.

Overall, artifact density is low, with dense clusters of artifacts around animal burrows. Most of the prehistoric materials appear to be buried, but alternating layers of sand and silt with mixed, and poorly sorted, gravels provide no clear evidence for intact and buried cultural deposits. Given the apparent mixing of stratigraphy and artifacts, the site has low archaeological potential to address regional and local research issues. As such, it is not eligible for the NRHP and we recommend no additional work.

5LA9303

This non-eligible site consists of a small scatter of flakes, a large utilized flake of granite and a large chert projectile point fragment (unknown type due to fragmentation). This 29 x 5 m site is located at the base of a sandstone outcrop, at the top of a ridge, above Red Rock Canyon, at its confluence with Welsh Canyon. Elevation at the datum is 1567 m (5140 ft), and the vegetal community is the common juniper to grassland transition community. There is a maximum depth of 10 cm of sandy silt with intermixed gravel over eroding bedrock. Debitage items consists of six flakes: four of chert, one orthoquartzite, and one coarse-grained quartzite. Four of the flakes are complex, three chert, one orthoquartzite, and there are also one chert simple flake and one piece of quartzite shatter. No evidence for fire features was noted. Soils are not well developed. The site is not a good candidate for additional research.

5LA9304

The site is a small sparse lithic scatter consisting of 12-pieces of debitage and two chipped-stone tools. The site occupies the northeast tip of a ridge that stands 250 ft above the floor of Red Rock Canyon. The ridge juts out into the canyon from its southern flank. Elevation on site is 1518 m (4980 ft), and the vegetal community is juniper woodland. Soil deposition is poor here with bedrock exposed over much of the site. Very thin layers of sandy soil accumulate in these flat areas, in erosional pockets, or around vegetation. Impact from sheetwash erosion has been light, however wind erosion has been moderate to heavy.

The material types for the debitage include quartzite (4 flakes), fine-grained quartzite (5), and orthoquartzite (3). Four of the flakes were complex and eight were simple. The two stone tools were both made out of chert. One was a core, the other, the tip of a biface (possibly a projectile point tip). The lithic scatter is very sparse over this 84 x 55 m site, suggesting limited use. The assemblage does not indicate tool manufacture, and the site was likely used for middle-stage lithic reduction, and perhaps short-term camping. While the vantage point over Red Rock Canyon is good, sight distance is poor since the site occupies a major bend in the canyon. The expenditure of additional resources on the site is not recommended.

5LA9305

The site is a moderately dense, localized 80 x 60 m scatter of lithics occupying the flat tableland immediately south of Red Rock Canyon. The dominant landform is a gently rolling plain (1524 m/ 5000 ft asl), with a mix of juniper woodland and short-grass prairie vegetation. The site sits at the base of a ridge that extends about 450 m northeast into the canyon. Soil deposition and preservation are average, with the effects of erosion and deflation minimized by the juniper/grassland ground cover. Bedrock appears only in minor amounts, and there is no evidence of any U.S. Army maneuvers.

The debitage is dominated by large simple flakes of fine-grained quartzite, both cortical and non-cortical, indicating that primary reduction was carried out on site. Of the 80 flakes in the sample, 64 were fine-grained quartzite, 11 were chert, four were coarse-grained quartzite, and one flake was argillite. Site 5LA9305 is similar to the other sites along this part of Red Rock Canyon where early reduction of locally obtained raw materials occurred. The chipped-stone tools consisted of one fine-grained quartzite core, one coarse-grained quartzite patterned tool, and the base/medial portion of a projectile point. This point fragment (FS 26), made of fine-grained quartzite, is a P26, and dates from the Late Archaic period to the Developmental period (1000 BC to AD 500). No further work is warranted on this site.

5LA9306

This site is a 65 x 82 m scatter situated on a small bedrock terrace and the tops of two adjoining drainages, located on the tableland southwest of Red Rock Canyon. The site sits 250 ft above the floor of an unnamed side-canyon of Red Rock Canyon, and extends from the lip of the southern terrace to the base of the higher northern terrace. The vegetation on, and around, the site is a juniper/grassland transition community, and the elevation at the datum is 1521 m (4990 ft). Sandstone bedrock appears on approximately 40% of the site, with up to 10 cm of silty loam across the remainder.

The cultural assemblage consisted of 101 pieces of debitage and eight chipped-stone tools. Three cores and four retouched/utilized flakes were all made out of coarse-grained quartzite, while the remaining tool, an unfinished biface, was made of fine-grained quartzite. Debitage is made up of 82 flakes of coarse-grained quartzite, 16 pieces of fine-grained quartzite, two pieces of chert, and one flake of hornfels/basalt. Large flakes account for 87 items in the sample and 78 of these are cortical. In comparison, there were only 14 small items and 10 were non-cortical. Fifty-seven of the pieces were simple flakes, 23 were complex, 19 were pieces of shatter, and two were biface-thinning flakes. Quartzite outcrops on site and at least 20 tested nodules are present on site. Site 5LA9306 appears to have been a low-grade quartzite procurement area, where primary reduction, expedient tool manufacture, and early-stage biface manufacturing also took place. No features were found, and no additional work is recommended.

5LA9309

The site encompasses two low hilltops and a shallow bedrock-rimmed arroyo that drains northeast towards Red Rock Canyon. At the site's elevation 1530 m (5020 ft) asl, the vegetative community is a juniper woodland/short-grass prairie transition. The soil on site is sandy silt with good deposition where the open prairie funnels down into the low gradient arroyo. The soil on site has weathered off the hilltops, which have lost about 30% of their surfaces to sheetwash erosion, and have been scoured down to bedrock. Moderate U.S. Army tracked-vehicle maneuver damage is visible on the southern hilltop, and the drainage through the middle of the site poses an erosional threat to the resource.

The cultural materials include a 60 piece sample of debitage, one chipped-stone tool, and two pieces of ground stone. No structures, features or diagnostic artifacts were located on this 115 x 120 m site. The tool is classified as an end/side scraper, is made from fine-grained quartzite, and is complete. Ground-stone artifacts are a sandstone one-hand mano and a quartzite polishing stone. Debitage consisted of the following material types: quartzite (36 flakes), fine-grained quartzite (13), chert (6), argillite (3), and orthoquartzite (2). There were 20 complex flakes, 28 simple flakes, none pieces of shatter, and three biface-thinning flakes. There were only two small flakes in the sample, and both were non-cortical. Of the 58 large flakes, 33 exhibited cortex and 25 were non-cortical.

Based on the debitage, primary raw material reduction was the dominant activity carried out on site, with a lesser amount of early-stage biface manufacture also occurring. This site is one of many small lithic scatters located along the Red Rock Canyon system, however, it is different in that this scatter is smaller, and the site not near the canyon walls. No fire features were noted and erosion has caused much secondary soil deposition. This site does not appear to have any potential for additional research.

5LA9310

This site is a lithic scatter located on the end of a small ridge and extending down slope towards an unnamed arroyo. The site sits in the grassland/juniper woodland transition zone at an elevation of 1527 m (5010 ft). Soil deposition is poor, with between 0-15 cm of silt intermixed with limestone gravel. The site is subject to periodic sheetwash erosion, which may explain the dispersed nature of the artifact assemblage. The assemblage consists of debitage, and four tools. Tools consisted of one utilized/retouched flake of fine-grained quartzite, a chert utilized flake, a chert end/side scraper, and the lateral edge of a knife blade. Fifty-one pieces of debitage were noted at the surface and it is coarse-grained quartzite (90%), fine-grained quartzite (6%), and chert (4%). Most of the flakes were large non-cortical, simple and complex specimens, suggesting that this site was a secondary reduction location, with some possible early-stage biface manufacture also taking place. No further work is needed at this site.

5LA9311

The tiny site (14 x 5.5 m) consists of eight pieces of debitage, one stone tool, and one piece of ground stone. The site sits in a sandstone bedrock outcrop along the southern edge of a narrow finger ridge that overlooks Red Rock Canyon. The vegetal community is juniper woodland, and the elevation is 1579 m (5180 ft). Soil is nonexistent over most of the site's surface but, up to 20 cm of sand is present in erosional pockets. The small sample of debitage contained seven pieces of coarse-grained quartzite and one flake of chert. There were three complex flakes, three simple flakes, and two pieces of shatter; seven of the eight flakes were large, and three exhibit dorsal cortex. The one tool found among the chipping debris is a non-bipolar core of fine-grained quartzite; interestingly enough, no fine-grained debitage was located on site. One sandstone mano fragment was also located, indicating limited processing of resources. No structures, features or diagnostic artifacts were encountered and no further work is recommended.

5LA9312

The site is a fairly dense, 74 x 33 m lithic scatter situated on a small saddle between two ridges that are located above, and northwest of lower Red Rock Canyon. The site is located close to the confluence of Red Rock and Welsh Canyons, at an elevation of 1558 m (5110 ft) in the juniper woodland plant community. The surface deposit varies from bedrock to up to 15 cm of gravelly silt around juniper trees.

The stone tools consist of one unfinished orthoquartzite biface, one nearly finished chert biface and one massive hammer stone. Both bifaces were broken during manufacture. The debitage sample contained 139 flakes, and unlike most of the sites in the canyon region, the dominant material is chert, which accounted for 76% (105 pieces). The remaining 24% of the debitage was made up of quartzite (20 flakes), fine-grained quartzite (11), orthoquartzite (2), and claystone (1). All phases of lithic reduction are present in the sample, with 64 complex flakes, 47 simple ones, 23 pieces of shatter, and 5 bipolar flakes. Bipolar flakes are rare on the PCMS, and this site has five distinct specimens, all chert. This information, coupled with the high number of chert flakes, indicates that a terrace containing chert cobbles exists somewhere below the site in Red Rock Canyon. Eleven of the chert flakes exhibit heavy patination and two items were heat treated. All available data has been collected and not further work is recommended.

5LA9313

The site is a very sparse 38 x 23 m scatter consisting of two manos, one utilized quartzite flake, and nine pieces of debitage. All of the artifacts were recovered from along a shallow shale covered bench that sits in front of a large sandstone outcrop. This outcrop is located on a finger ridge above a side drainage of Red Rock Canyon, at an elevation of 1555 m (5100 ft). Deposition is poor, with a maximum of 10 cm of sandy silt over bedrock, and what vegetation there is falls into the juniper woodland/grassland transition zone.

The debitage is made up of six chert flakes, two quartzite flakes, and one piece of argillite. Most of the flakes are simple (4) or shatter (4), indicating that core reduction was the primary site activity. One complex flake suggests possible early-stage biface reduction also occurred. The location for this site is a good one, as it is out of the wind, and several shallow overhangs were noted in the outcrop. Unfortunately, none of these exhibited any signs of use and we do not believe the site has potential for additional research.

5LA9314

This site is a scatter of debitage, flaked stone tools and ground stone located along a gently sloping shelf at the edge of a side drainage of Welsh Canyon. The general terrain of this 76 x 22 m site includes sandstone outcrops, gentle slopes, and several small arroyo cuts. The elevation at the datum is 1552 m (5090 ft), and the vegetation consists of juniper, soapweed, prickly pear, various grama grasses, cholla, and skunkbush sumac. Deposition is very poor, with less than 5 cm of sandy, gravelly silt visible around exposed bedrock. No structures or features were located on this site.

The tool assemblage consists of a chert drill bit fragment and a utilized flake made of coarse-grained quartzite. There were two one-handed mano fragments and two fragments from two separate trough metates; all ground stone was made out of sandstone. There were 117 pieces of debitage in the sample, made out of the following material types: coarse-grained quartzite (89 flakes), chert (15), fine-grained quartzite (10), and hornfels/basalt (3). There were 58 complex flakes, 48 simple flakes and eleven pieces of shatter. Large-sized pieces accounted for 112 items in the sample, and 73 of those were non-cortical. Only five flakes were small, and four of those were non-cortical.

Of interest on this site is the presence of trough metates as this is a class of artifacts not commonly found on the PCMS. No further work is required on this shallow site.

5LA9315

This site is a very small lithic scatter located on the edge above an unnamed side-canyon of Welsh Canyon. This 20 x 6 m site is located in a deflated area on a low east sloping finger ridge, at an elevation of 1527 m (5010 ft). Vegetation on the site consists of juniper, broom snakeweed, cholla, yucca, feather grass, and blue grama. While there is about 20 cm of surface soil, there is no cultural depth, as all artifacts were sitting on the modern deflated ground surface.

The entire assemblage consisted of 32 pieces of debitage and one utilized flake of coarse-grained quartzite. Thirty-one flakes were coarse-grained quartzite and one flake is chert; all of the flakes were large, and 19 were non-cortical. Debitage classes are 18 complex flakes and 14 simple ones. Based on this, the site functioned as a raw material reduction location, where early-stage biface reduction likely occurred. Because the prehistoric ground surface has been destroyed by erosion, this site is not a good candidate for additional work.

5LA9317

The site is a diffuse lithic scatter located on a point overlooking Welsh Canyon, with a side-drainage located directly to the west. The elevation on site is 1527 m (5010 ft), and the vegetation consists of blue grama, juniper, prickly pear, yucca, broom snakeweed, and skunkbush sumac. The soil is light grayish-brown sandy silt with abundant surface gravel. Soil depth is approximately 25 cm. The entire surface assemblage consisted of debitage, 38 coarse-grained quartzite items and four pieces of chert. Forty of the flakes were large, with 22 cortical specimens and 18 non-cortical items. Based on the debitage, primary and secondary lithic reduction were the main activities carried out on site. No further work is required on 5LA9317.

5LA9318

The site is a sparse lithic scatter located on a gentle slope leading down to a side-drainage of Welsh Canyon. The site sits at an elevation of 1540 m (5050 ft), and vegetation is typical of a grassland to juniper woodland transition community. Surface soils are light-brown sandy silt with over 30 cm of depth. It seems that the artifacts recorded on the surface have eroded from upslope, and washed down to their present location. The entire assemblage consisted of debitage. The debitage consisted of 13 quartzite flakes and one chert flake, all large, with eight non-cortical items and six exhibiting dorsal cortex. There were eight complex flakes and six simple ones in the assemblage. According to the debitage, secondary core reduction was the primary site activity. Site 5LA9318 is quite small, 29 x 26 m, and offers little potential for adding to our understanding of prehistory.

5LA9320

This site is a sparse lithic scatter with a single tipi ring (Feature 1). The site is located on the northern terrace of Taylor Arroyo in an area where sheetwash erosion has exposed sandstone bedrock. Most of the artifacts were recovered on bedrock, suggesting cultural deposits have completely eroded away. There is some secondary aeolian deposition (20 cm) near Feature 1. The vegetation is grassland with a few juniper trees dotting the land.

Feature 1 is a spaced stone circle constructed of locally available and unmodified sandstone blocks. These are mostly buried. The structure measures 45 x 3.75 m and has an apparent depth of approximately 20 cm. However, no artifacts were found in or around Feature

1, and there is no surface evidence of any thermal features within the circle. This feature has suffered heavy impact from tracked vehicle maneuvers, with several of the blocks being crushed.

The cultural assemblage consists of four tools and 55 pieces of debitage. There are two unfinished bifaces (chert and argillite), and two cores (chert and argillite). The debitage consisted of 31 simple flakes, 12 complex ones, and 12 pieces of shatter. Thirty-one of these were large and 24 were the small size-grade, and 60% exhibited dorsal cortex. Argillite accounted for 56% of the sample, coarse-grained quartzite for 24%, basalt for 15%, and there is one item each of obsidian, silicified wood, and chert. Based on the assemblage, this site functioned chiefly as a raw material reduction location for locally available argillite, basalt, and quartzite. Due to heavy erosional and military impact, and a sparse surface assemblage, no further work is recommended.

5LA9321

The site is a lithic scatter occupying the transitional zone between the short-grass prairie and the Taylor Arroyo system. This 28 x 16 m site sits at an elevation of 1544 m (5065 ft), and up to 10 cm of yellow-orange aeolian sand covers its surface. Deposition is better on the northern portion of the site, as grasses and juniper woodland preserve soil. The southern half of the site is heavily eroded, with low sandstone bedrock knobs protruding from pockets of preserved soil and scoured bedrock. The site suffers from moderate to heavy water erosion and has had heavy tracked vehicle maneuver impact.

The cultural assemblage was limited, and consisted of six stone tools and five pieces of debitage. Three flakes of chert, one piece of argillite, and one flake of fine-grained quartzite made up the debitage. There were three simple flakes and two complex ones; one flake was large in size and the remaining four were small, and all of the flakes were non-cortical. The chipped tools were a non-bipolar core of fossiliferous chert, one utilized/retouched flake of orthoquartzite, and four scrapers. One was an orthoquartzite side-scraper, while the remainder were end-scrapers: two chert, and one made of Black Forest silicified wood. One of the end scrapers (FS 6) is very highly patinated. All of the scrapers and the utilized flake were found in a very localized area (2 x 3 m) on an exposed landform. This suggests that this portion of the site was a kill-processing location. Further work is not recommended for this site because of a sparse surface assemblage, poor deposition, and lack of structures, features, and diagnostic artifacts.

5LA9322

The site consists of a large (122 m east-west by 98 m north-south) scatter of lithics. Three argillite cores, a chert end/side scraper, an argillite side scraper, and a finished quartzite biface tip were located. Nearly half of the debitage is argillite (47%), the remaining materials are fine-grained quartzite (21%), coarse-grained quartzite (12%), basalt (11%), chert (9%), and obsidian (1%). The only non-local item is obsidian and visually, this specimen is comparable to items from the Polvadera Peak source of New Mexico, suggesting a contact between the site occupants and that area.

The artifacts were noted on the crest of a small ridge (north site boundary) and down slope to the south and east. Ground visibility is generally poor with thick clumps of feather grass covering the surface. Based on visual depth in rodent burrows and tank tracks, most of this site is buried (soil depth of 30 cm). There is moderate to heavy tracked vehicle damage that has destroyed the surface in many areas. This lack of integrity, coupled with an absence of fire features is a good indicator that it will not produce significant cultural materials, if excavated. No additional research is recommended for the site at this time. Periodically, this site should be revisited. If thermal feature or structures erode out at the surface, then the management recommendation should be re-evaluated.

5LA9323

This site is located on the grassy plain between Red Rock and Welsh Canyons, and is comprised of an historic mine shaft that is approximately 3.5 x 3.5 m at the opening. Depth is difficult to ascertain due to the hazard of waste rock pile collapse, but it appears to be at least 25 m deep. A circular pile of waste rock surrounds the shaft opening, and is 1 m high on three sides and 50 cm high on the west. This waste rock collar measures roughly 3 m in width around the shaft. This shaft is directly associated with 5LA6101, an historic mining complex located 500 m to the northwest, and was likely placed to find the subsurface coal seam. A rock drill bit was observed in the east wall of the shaft (and in 2002 was not visible), and a screen of some sort was noted about 20 m down. Elevation at the datum is 1523 m (4995 ft), and vegetation is sparse grassland, with juniper woodland nearby. The shaft is on land patented by Charles Albert in 1903 as a coal claim, the only such claim on the PCMS among original land grants. Although 5LA9323 is directly related to 5LA6101, it is not significant in itself, and no further work is needed. However, because this site is an open shaft and a hazard to personnel, equipment, and wildlife, it is recommended that a protection fence be erected.

5LA9324

This site is a sparse lithic scatter located on a ridge between a side-drainage of Welsh Canyon, and Welsh Canyon proper. The site is situated at an elevation of 1546 m (5070 ft), and the vegetation consists of juniper, yucca, cholla, broom snakeweed, and both blue and sideoats grama grasses. The soil is light-brown sandy silt, with an average depth of 40 cm. The site's assemblage consisted of 34 flakes of debitage and one chert biface that was broken during heat-treatment. The debitage sample was made up of four pieces of chert, three flakes of coarse-grained quartzite, one piece of orthoquartzite, and 26 flakes of fine-grained quartzite. There were 19 complex flakes, 12 simple ones, and three pieces of shatter. Thirty of the flakes were large, 17 were non-cortical, while 13 exhibited dorsal cortex. Half of the four small flakes had cortex. Based on the lithic morphology, secondary core reduction was the main activity carried out on site. No structures or features were located, and chipped- and or ground-stone tools were not encountered. No further work is needed.

5LA9325

The site is a small, sparse, localized lithic scatter located on the cliff edge above Welsh Canyon, on the highest outcrop along the canyon rim. The site is situated above the intersection of the Welsh Canyon Road and the southern Black Hills Road, 800 m away, on the canyon floor below. The elevation at the datum is 5150 ft, and the vegetation is a juniper woodland/grassland transition zone. The soil on site is light-brown silt with intermixed gravel, and a maximum depth of 30 cm. The lithic scatter consisted of 25 flakes of debitage and two non-bipolar cores of coarse-grained quartzite. The debitage was primarily fine-grained quartzite (17 flakes), with chert (4), and coarse-grained quartzite (4) also present in the sample. The debitage further broke down into 18 complex flakes, six simple ones, and one piece of shatter. There were 20 large flakes (19 non-cortical) and five small flakes (four non-cortical). Based on the assemblage, secondary lithic reduction was the dominant site activity. No further work is needed on this 27 x 17-meter site due to a lack of structures, thermal features, diagnostic artifacts, and its sparse surface assemblage.

5LA9326

The site is a small, localized lithic scatter located halfway along a finger ridge that juts out into a side-drainage of Welsh Canyon. The site's elevation is 5010 ft, and it is situated in the juniper woodland zone typical for this part of the PCMS. The soil is sandy silt with intermixed gravel and covered with a cryptogamic crust. There is essentially no depth on this site and most of the artifacts were recovered on top of bedrock. Previously recorded sites 5LA6767 and 5LA6768 are located on either side of 5LA9326, and all were likely linked in prehistoric times. Due to heavy surface erosion, the sites cannot be connected. Twenty-eight pieces of debitage, three chipped-stone tools, and one piece of ground stone (a mano) represented the cultural material. The stone tools were a core and a retouched flake, both of coarse-grained quartzite, and an unfinished biface made of fine-grained quartzite. The debitage was mostly fine-grained quartzite (16 pieces), with lesser amounts of coarse-grained quartzite (9), and chert (3). There were 19 complex flakes, five simple ones, three pieces of shatter, and one rare bipolar flake. Twenty-four of the flakes are large and 20 are non-cortical. Based on lithic morphology, secondary reduction of local materials was the primary occupation on this site. There is no deposition on this site, and no potential for the recovery of buried deposits, therefore, no further work is necessary.

5LA9327

This site is a concentrated 15 x 13-meter lithic scatter situated at the cliff above an unnamed side-drainage of Welsh Canyon. There are a series of small overhangs and alcoves just over the edge of the caprock, but no cultural remains were located. The site sits at an elevation of 5010 ft, and has the typical juniper woodland/grassland transition vegetation. There is little or no soil present on 5LA9327, as most of the site is exposed bedrock. There are erosional remnants, 10 cm thick, of silty loam intermixed with sandstone gravel throughout the site. No prehistoric structures or features were located, although part of an historic livestock fence is visible over the cliff edge. This site lies 250 meters to the southwest of 5LA6768, a previously recorded prehistoric site, and may be related.

The chipped-stone assemblage contains two non-bipolar cores and an unfinished biface, all of quartzite. No ground stone was located. The debitage consisted of a 34-piece sample of quartzite (32 flakes), and one chert and one argillite flake. There were 14 simple flakes, 12 pieces of shatter, and eight complex flakes. The lithic data indicates that this site functioned chiefly as a reduction locale for locally available quartzite, and that this material was leaving the site in the form of early-stage bifacial tools. No further work is recommended, as this is a very small site that has been heavily deflated, and lacks structures, features, and diagnostic artifacts.

5LA9328

This is a habitation site with an associated scatter of lithic artifacts. The site is located in the juniper-covered flats above Welsh Canyon, at an elevation of 5030 ft. Shrubland is the plant community with abundant grama grasses and juniper trees. A large stand of scrub oak is located just off the site and this was probably an important seasonal resource. The caprock along the edge of the canyon contains numerous alcoves and overhangs which were probably used as shelters. No cultural materials were located in them.

Two identifiable rockshelters (Features 1 and 2) were recorded. Unfortunately, both contain less than 10 cm of fill, and the soils are residual with a high gravel content. Situated between the rockshelters at the caprock, and the canyon edge, is a wide grassy tree-dotted terrace, which would have afforded ample working or living space. Although there are numerous patinated rock surfaces across the site, no rock art panels were discovered here. Feature 1 measures 10.1 x 5.5 m, with an interior height of 1.83 m. It was formed when a large sandstone boulder broke off the cliff and rolled down slope. In its current location, shelter is provided along both the south and east sides. Most of the artifacts recorded for the site were located just outside of Feature 1; FS 9, a one-handed mano fragment was located just outside of the dripline, and two fine-grained quartzite cores and a small patterned biface of coarse-grained quartzite were found nearby. Fifty-five pieces of debitage were analyzed from Feature 1; 37 flakes of fine-grained quartzite, 11 pieces of coarse-grained quartzite, four flakes of chert, two of orthoquartzite, and one piece of claystone. Feature 1 has minimal deposition, and it appears that the entire cultural fill has been washed out of the shelter and down slope. Feature 2 is a rockshelter located along the east side of a fallen sandstone boulder. It measures 5.2 x 3.6 m, and has an interior height of 2.7 m. It too has minimal fill, and also appears to have eroded out over time. Only five flakes of fine-grained quartzite, a coarse-grained quartzite core and a slab metate fragment remained in front of the shelter.

Tool classes noted on 5LA9328 included debitage and both chipped- and ground-stone artifacts. An incised piece of heat-treated claystone was also recovered (FS 7). The debitage sample consisted of 121-flakes from across the general site surface. In addition, an additional 60 pieces from Features 1 and 2 were analyzed. Locally available fine-grained quartzite is the dominant material type in the assemblage (76%), followed by coarse-grained quartzite (12%), chert (9%), orthoquartzite (2%), claystone (<1%), and argillite (<1%). Morphologically, the assemblage contains 50% complex flakes, with 33% simple ones, and 17% shatter. Overall, 88% of the sample is large in size, while 12% is small; 54% are non-cortical and 46% exhibit cortex. The debitage assemblage reflects an emphasis on raw material reduction with all stages present.

For the most part, it appears that many of the cores were brought to the site in cortical form, signifying that the site is close to the procurement area. Once on site the raw material was reduced into early-stage bifaces, or used to produce flakes.

The ground-stone assemblage contained five items; in addition to FS 9 found with Feature 1 (a mano fragment), and FS 8 found with Feature 2 (metate fragment), there were two other slab metate fragments and another one-handed mano fragment. All were made out of sandstone. There were a total of nine chipped tools found on 5LA9328. In addition to those found near Feature 1, there were two large hammerstones, another core, a large fine-grained quartzite patterned biface, two more small patterned bifaces, and a utilized flake of chert. None of the patterned bifaces were time diagnostic.

In summary, this site contains two rockshelters at the base of a large outcrop of sandstone, which has broken into several huge boulders that lie scattered on the slope. Numerous small alcoves and overhangs are present, although only Features 1 and 2 showed any cultural remains. Neither shelter has more than minimal deposition, and soils across the site are generally shallow. The whole site has suffered from heavy water erosion, and recovery potential is poor. Based on this, no further work is recommended.

5LA9329

This site is a large lithic scatter with four bedrock metates. No structures or other features were located. The site is located on a ridge overlooking a large side-drainage of Welsh Canyon, at an elevation of 5010 ft. The vegetation consists of juniper woodland and abundant mixed grasses and plants such as blue grama, sunflower, and yampa. 5LA9320 runs up slope from the drainage head, and has soil deposition that ranges from 0 cm on bedrock to greater than 30 cm. The soil is light-brown sandy silt with areas of cryptogamic crust and aeolian sand. The northwestern portion of the site is covered by a "dune," which may be covering intact cultural deposits. An area of ash staining with bits of charcoal may indicate either a deflated hearth or a buried thermal feature that may erode to the surface in the future.

Features 1-4 are all bedrock metates. Feature 1 is located on a small, desert-varnished sandstone outcrop. This metate has two milling slicks on it; FS 16, which measures 1 m x 37 cm, and FS 17, which measures 32 x 19 cm. The overall dimensions of Feature 1 are 1.15 m x 77 cm. Feature 2 is also located on a small sandstone outcrop that exhibits desert varnish. It's dimensions are 1.5 x 1.07 m. This metate contains FS 18, a milling slick that measures 25 x 20 cm. Feature 3 is another bedrock metate that houses FS 19, a 55 x 40 cm use-wear surface. Feature 4 is a varnished sandstone boulder that measures 5 x 4 m. Field Specimen 20 is located on Feature 4, and measures 36 x 35 cm. The relatively large quantity of ground stone (two manos and two slab metate fragments were also found) indicates a lot of resource processing was occurring at this location. 5LA9329 is ideally situated to take advantage of local resources; in addition to stands of scrub oak and other seasonal vegetation in the canyons below, there are many seed-bearing grasses and root plants growing on site, which were almost certainly utilized.

The remaining artifact assemblage consists of a 150 flake sample of debitage and 12 chipped-stone tools. Recorded tools include four utilized flakes (three quartzite, one glass), two scrapers (chert and quartzite), two chert projectile point fragments, two large biface fragments (chert and orthoquartzite), one quartzite core and one quartzite hammerstone. There was one diagnostic point found on this site, a small chert point that Anderson's typology places in the Late Prehistoric period. It was classified as a P62 and has a date range of AD 500 to AD 1400.

The debitage sample contained five material types. Sixty-seven percent of the total was fine-grained quartzite, with lesser amounts of coarse-grained quartzite (13%), chert (11%), orthoquartzite (7%) and argillite (2%). There were 73 complex flakes, 63 simple ones, and 14 pieces of shatter; the majority of the flakes were large (134) and non-cortical (92). The debitage suggests that 5LA9329 functioned as a raw material reduction area where flakes were removed for use, and early-stage biface manufacture occurred. Most of the lithic material appears to have been "trimmed" at the quarry location.

5LA9329 is well situated to take advantage of local resources. It is located at the head of a side-canyon that offers reasonable access to the floor of a large side-canyon that in turn, provides good access into Welsh Canyon proper. The site is in close proximity to stands of scrub oak trees and other vegetation in the canyons that would be valuable seasonal resources. This seasonal, vegetal resource may account for the cluster of metates in this location. In spite of the fact that there is at least 30 cm of deposition in the northwestern portion of the site, and a possible buried thermal feature there, this site is not considered eligible. Most of the site has suffered heavy erosional impact and little general depth remains. In addition, no structures and only one diagnostic artifact were located. 5LA9329 needs no further work at this time; however, the charcoal specked area should be periodically monitored to determine whether a feature is starting to erode to the surface. If any cultural remains become apparent in this area the management recommendation should be re-evaluated.

5LA9330

This site is located in a small saddle between two hilltops, on a finger ridge above Welsh Canyon. The elevation at the datum is 5040 ft (asl), and the site sits in the juniper woodland plant community. Piñon pine was also noted growing on site and provides a good seasonal resource. The soil on site is relatively thin, ranging from 0 to 10 cm in depth, and is very light-brown sand mixed with gravel and exposed bedrock. No structures or thermal features were located, and no diagnostic artifacts or chipped tools were recovered. The only tool found on 5LA9330 was a sandstone metate fragment. There were twelve pieces of debitage in the sample: six flakes of fine-grained quartzite, five flakes of orthoquartzite, and one piece of coarse-grained quartzite. There were seven complex flakes, four simple flakes, and one biface-thinning flake. Seven of the flakes were large (five were non-cortical), and five items were small (all non-cortical). The debitage indicates later stage reduction and some biface manufacture occurred on site, as well as vegetal processing. This site needs no further work, as it has a small sparse surface assemblage, no structures or features, and poor deposition.

5LA9332

The site is a sparse lithic scatter located on a gently sloping finger ridge between Welsh Canyon proper, to the north, and a large tributary canyon of Welsh to the south. The elevation at the datum is 5050 ft, and the vegetal community is juniper woodland to grassland transition. The soil is light-brown sandy silt with an average depth of greater than 40 cm, based on a pinflag probe. Only one piece of ground stone was recorded: a lightly used, sandstone metate fragment. The debitage sample consisted of 50 flakes of fine-grained quartzite (36 pieces), orthoquartzite (6), chert (5), and coarse-grained quartzite (3). There were 20 complex flakes, 27 simple ones, and three pieces of shatter in the sample. Forty-three of the items were of the large size-grade and seven were small; 31 of the large flakes were non-cortical, while 12 exhibited dorsal cortex, and four of the small flakes were cortical. Based on the debitage, initial core reduction was the primary activity carried out on site. Vegetal processing appears to have been a lesser activity. While this site has good deposition, it has a very sparse surface assemblage and no structures or features; therefore, no further work is recommended.

5LA9334

The site consists of a deflated thermal feature (Feature 1), and a very small sparse associated lithic scatter. The site sits in a small drainage basin at an elevation of 5010 ft. Vegetation on site is a juniper overstory with an understory of skunkbush sumac, mountain mahogany, wheatgrass and various grama grasses. The soil is sand eroding from bedrock and aeolian deposits.

Feature 1 is a deflated area of fire-cracked rock (FCR) that has eroded down into a circular planview. This feature has been eroded by sheetwash and down cut by several small arroyos. Although darker soil is visible at the surface, no intact fill remains. No artifacts were associated with this FCR concentration, and based on the hill slope, the prehistoric ground surface must have been at least 40 cm higher than it is now.

No structures or other features were located on 5LA9334, and no diagnostic artifacts were recovered. The only tools found on site were two metate fragments and a core. The debitage consisted of 22 pieces of argillite (3 flakes), coarse-grained quartzite (3), fine-grained quartzite (12), orthoquartzite (3), and siltstone (1). Eight items were complex, 12 were simple, and two were pieces of shatter; eighteen flakes were large and 14 were non-cortical. Secondary reduction of local materials appears to have been the main occupation of this 65 x 35-meter site. Based on the poor deposition, sparse scatter, and lack of structures and features, no further work is needed.

5LA9335

The site is a small lithic scatter located in a sandy erosional pocket in a bedrock drainage. It sits just under the caprock of a small ridge, at an elevation of 5020 ft. The drainage the site sits in eventually empties into Welsh Canyon to the north. The soil is erosional sand and is deposited in pockets. The vegetation consists of juniper woodland with understory of skunkbush sumac, mountain mahogany, wheatgrass, bee balm, yucca, prickly pear and cholla. Neither structures nor features were located on this 42 x 35-meter site, nor were any diagnostic artifacts recovered. The cultural assemblage consisted of one piece of ground stone, one quartzite core, and one retouched flake of quartzite, and six pieces of debitage. Five of the flakes were fine-grained quartzite and one flake was heat-treated chert. One flake was simple and the other five were complex. This is a very small scatter, which will not yield any more meaningful data. In addition, the deposition is non-existent, the site sits in a bedrock drainage and there is no recovery potential. Therefore, no further work is needed.

5LA9336

This site is a dispersed lithic scatter extending from the top of a ridgeline down a series of terraces to the edge of an unnamed side-drainage of Red Rock Canyon. The site sits in the juniper woodland/ short-grass prairie transition zone, at an elevation of 5000 ft. The deposition on site is generally poor, with a range of between 0 to 15 cm. The artifact assemblage is fairly dispersed across this 380 x 100 meter site, with the exception of three distinct concentrations: each one on a terrace descending to the edge of the canyon to the southeast. Another concentration is located on a small knoll at the southeast end of the site. No structures or features were located on 5LA9336, and neither diagnostic artifacts nor ground stone were recovered. The assemblage contained a 152 piece sample of the debitage and 22 chipped tools.

The stone tool assemblage consisted of seven large patterned bifaces, eight utilized flakes, four cores, and two scrapers. Twelve of the tools were made out of fine-grained quartzite, but three of the four cores were chert. None of the bifaces were diagnostic in nature. The 152-flake sample of debitage was made up primarily of coarse-grained quartzite (100 pieces), with lesser amounts of fine-grained quartzite (23), chert (20), argillite (7), and one flake each of orthoquartzite and sandstone. There were 81 complex flakes, 65 simple ones, and six pieces of shatter in the sample. There were 141 large items, 11 small, 105 were non-cortical, and 47 had dorsal cortex. Based on the debitage, both primary core reduction and secondary reduction with possible early-stage biface manufacture occurred on site. In light of this, it is likely that 5LA9336 was a lithic procurement/testing area, possibly associated with 5LA9307 and 5LA9337, which are nearby. Both of these sites exhibit signs of habitation and food processing, which 5LA9336 does not, as evidenced by its lack of structures and ground stone.

Overall, 5LA9336 has little research potential, due to heavy surface disturbance from sheetwash erosion and military maneuvers. This surface disturbance along with poor deposition indicate that the recovery potential for intact buried deposits is very poor, and no further work is recommended.

5LA9338

The site is a lithic scatter containing a thermal feature (Feature 1) that occupies medium density juniper woodland on the flats about 800 m north of a major bend in Taylor Arroyo. The local landforms are plains related level ground soil accumulations, but also include low, rounded tabular sandstone bedrock outcrops spaced about 30 m apart, that are a part of an upper side-drainage that feeds into Taylor Arroyo. Soil deposition ranges from 0-10 cm, with sheetwash erosion being problematic in heavy rain events.

Feature 1 is an irregularly-shaped thermal feature that measures 3 x 4 m. It consists of an area of dark ashy soil and a concentration of fire-cracked rock. One artifact, a one-handed mano fragment of sandstone, was located within the feature; however, deposition is poor due to sheetwash erosion, and less than 3 cm of soil remains intact.

The cultural assemblage consisted of 26-pieces of debitage, two sandstone mano fragments, and three chipped-stone tools. The tools are two non-bipolar cores, one argillite and one orthoquartzite, and one large patterned biface made of orthoquartzite. This biface (FS 6) is a hafted knife fragment and exhibits heat-treatment. The debitage was made up of 26 flakes of silicified wood (7 pieces), argillite (5), chert (5), coarse-grained quartzite (3), fine-grained quartzite (3), hornfels/basalt (1), and obsidian (1). There were 17 simple flakes, five complex ones, two biface-thinning flakes, and two pieces of shatter in the sample. Twenty-two of the specimens were large, four were small, 20 were non-cortical and six had dorsal cortex. Based on the debitage, secondary reduction was the primary activity on site, with some tool manufacture and usage taking place as well. Vegetal processing and either cooking or heat-treating were also important tasks carried out at this location.

Both the assemblage and the landform suggest that 5LA9338 was an opportunistic campsite where a variety of lithic materials were in all stages of reduction. Cooking and/or heat-treating also occurred, as did some vegetal processing; and the presence of obsidian hints at a connection to a long-range trade and exchange network. Overall, however, it is likely that this site had little use over the years. It has poor deposition, suffers from heavy sheetwash episodes, and has no structures or diagnostic artifacts, and further work would yield no further data.

5LA9339

The site is a disperse lithic scatter located at the crest of a long ridgeline between two unnamed side-drainages feeding Lockwood Canyon. The site sits in juniper woodland at an elevation of 5050 ft. Soil deposition is poor and the surface ranges from sandstone bedrock to 15 cm of soil around clumps of vegetation. The site has been impacted by periodic sheetwash erosion and tracked vehicle maneuvers, which may account for the dispersed nature of the artifacts.

The artifact assemblage consisted of debitage and four chipped tools. The stone tools consist of one fine-grained quartzite core, two scrapers (one argillite and one orthoquartzite), and one large patterned biface made of fine-grained quartzite. The debitage sample was made up of 51 flakes of fine-grained quartzite (42 flakes), chert (6), coarse-grained quartzite (2), and obsidian (1). Thirty-three of the flakes were complex, 13 were simple, and five were pieces of shatter. There were 47 large flakes, and 43 pieces of debitage were non-cortical. This suggests that the site was utilized for secondary reduction and early-stage biface manufacture. Due to the lack of structures and features it is unlikely that any long-term occupation took place here, and the assemblage likely represents a single event. This coupled with poor deposition and vehicle impact render this site ineligible and no further work is needed.

5LA9340

The site is a disperse lithic scatter located on a ridgeline overlooking an unnamed side-drainage of Lockwood Canyon. The site sits in a sparse juniper break at an elevation of 5000 ft. Deposition is poor with less than 10 cm of soil remaining; this is due to periodic sheetwash and wind erosion. The artifacts are dispersed evenly across the site, with no visible concentration.

The site assemblage consisted of debitage and a non-bipolar core of orthoquartzite, and a utilized flake made of fine-grained quartzite. The debitage consisted of 30 flakes of fine-grained quartzite (25 flakes), argillite (2), chert (1), orthoquartzite (1), and coarse-grained quartzite (1). Eighteen specimens were complex, nine were simple, and three were pieces of shatter. There were 27 large flakes, and 23 pieces were non-cortical. The debitage indicates secondary core reduction and early-stage biface manufacture were the dominant activities on 5LA9340. This site is most likely a short-term, single-stage event much like it's neighbor, 5LA9339. This site has no structures, features or diagnostics, and coupled with poor deposition and little recovery potential, it needs no further investigation.

5LA9341

This site is a disperse, 148 x 121 m lithic scatter situated on a low hill above the head of an unnamed side-drainage of Red Rock Canyon. The site sits in juniper woodland at an elevation of 5070 ft and its shallow surface soil is light-brown sandy silt. Recorded cultural remains consist of debitage and a utilized flake of obsidian, a non-bipolar core of argillite, an argillite scraper, and two quartzite bifaces. The debitage assemblage contained 80 flakes, the majority of which were fine-grained quartzite (71 items), followed by chert (4), orthoquartzite (3), argillite (1), and coarse-grained quartzite (1). There were 78 large flakes and 54 were non-cortical ones, suggesting secondary core reduction and early-stage tool manufacture. Based on the lack of structures, features, ground stone, and diagnostic artifacts, this site was probably a single event lithic reduction area, and, coupled with poor deposition, further work is unwarranted.

5LA9342

This site is a small lithic scatter located on a long ridge that juts out into Red Rock Canyon. The site sits in juniper woodland at an elevation of 5015 ft. Deposition is fairly good, ranging between 10- 40 cm. The artifact assemblage consisted of one non-diagnostic small patterned biface made out of fine-grained quartzite, and 53 flakes of debitage. All of the flakes are fine-grained quartzite, 51 are large, and 38 are non-cortical. There are 29 simple flakes, 20 complex ones, three pieces of shatter, and one biface-thinning flake. Most of the assemblage was concentrated in a 10 x 10-meter area. Secondary reduction was the main function of the site, with a smaller amount of expedient tool or biface manufacture occurring. There is no maneuver damage, and little erosional impact was noted. Although deposition is good, the likelihood of encountering buried deposits is poor. In all, this 35 x 25 m site needs no further work.

5LA9343

The site is a 110 x 60 m lithic scatter that sits on the top of a hill located on a ridge that extends into Red Rock Canyon. Two side drainages border the site. The elevation at the datum is 5020 ft, and the vegetation is juniper woodland. Soil deposition ranges from 1 cm near the bedrock outcrops to 20 cm near the northern edge of the site. The site has been impacted by sheetwash and wind erosion; however, this appears to have been a rather slow process.

The artifact assemblage is generally dispersed with a few areas of higher concentration. It consists of 146 pieces of debitage, one utilized flake and one core; both of fine-grained quartzite. There are 66 complex flakes, 63 simple ones and 17 pieces of shatter in the sample; 143 flakes are large, and there is an even split on cortical/non-cortical items at 73 each. The sample is overwhelmingly fine-grained quartzite with 135 specimens. In addition, there are seven flakes of chert (all heat-treated), and two flakes each of argillite and coarse-grained quartzite. The debitage indicates that both early and later stage core reduction was taking place on site, as well as some early-stage tool manufacture. Due to generally poor deposition, it is unlikely that there are any significant buried deposits on 5LA9343, and based on this, and a lack of structures, features, and diagnostic artifacts, this small site needs no more work.

5LA9345

The site is a small scatter of flakes located on the northern slope of a small intermittent drainage. The site was found in an open grassland/juniper woodland transition zone at an elevation 5043 ft. Although there is approximately 25 cm of soil, this is a surface scatter only and the entire surface assemblage consisted of 27 pieces of debitage. There were 21 flakes of fine-grained quartzite, five pieces of coarse-grained quartzite, and one piece of orthoquartzite. Sixteen flakes were classed as simple, eight as complex, and three as pieces of shatter. There were 25 large flakes, two small and ten cortical items in the sample. This indicates that the site was utilized as a secondary core reduction location. This small site has no tools, structures, or features, and needs no more work.

5LA9346

The site is a 37 x 16 m lithic scatter situated on a flat ledge on the southern cliff edge of Welsh Canyon. The site sits in grassland with juniper trees at an elevation of 5000 ft. There is very poor deposition on site, with between 0-10 cm of aeolian sand present above sandstone bedrock.

The assemblage consisted of six pieces of debitage. Five of the items were fine-grained quartzite and one is chert. There were three pieces of shatter, two simple flakes and one complex flake. This site has sparse surface remains and poor deposition. Coupled with a lack of thermal features, no further work is recommended for this site.

5LA9347

The site is a 16 x 10 m scatter of lithics located on a shelf below the sandstone caprock, on the northern edge of Red Rock Canyon, just above where a side-canyon enters Red Rock proper. The site is at an elevation of 4960 ft in the juniper woodland vegetation. The sandstone bedrock is highly eroded and this has led to aeolian deposition of up to 15 cm across the site. The cultural assemblage consists of 61 pieces of debitage and one argillite core. Most of the flakes are fine-grained quartzite (35 pieces), with lesser amounts of coarse-grained quartzite (10), argillite (2), chert (6), orthoquartzite (5), and siltstone (3). There were 59 large flakes in the sample, 27 complex, 24 simple, and 10 pieces of shatter. There were 33 non-cortical and 28 cortical specimens. 5LA9347 is like many small sites along the canyon-tops here on the PCMS in that it is only a small sparse secondary reduction location that needs no further work.

5LA9348

This site is a small, but concentrated lithic scatter located among small erosional features at the top of a ridge covered with sandstone bedrock outcrops. The site is situated at 1526 m (5005 ft), in juniper woodland to grassland vegetation above the edge of the northern rim of Red Rock Canyon. The soil consists of sand from eroding bedrock, and this secondary deposition has resulted in a total accumulation of 15 cm.

The entire assemblage consisted of 69 debitage items. Chert is the dominant material in the sample with 55 flakes; there were also 11 pieces of fine-grained quartzite and 3 flakes of coarse-grained quartzite. Forty-eight pieces of the chert were highly burned. There were 43 large flakes and 26 small ones; all of the small flakes were non-cortical, as were 31 of the large flakes. There were twice as many simple flakes (40) as complex ones (21), and there were eight pieces of shatter. Based on the debitage, secondary core reduction and heat-treatment of local chert were the primary functions of this site. It may even have been a single episode of reduction and treating. The combination of a sparse surface assemblage and poor deposition means no further work is needed for this site.

5LA9350

The site is a lithic scatter located in a small drainage. It is situated above the southern rim of Welsh Canyon, just over a ridge-top from the canyon itself. Vegetation is the typical juniper woodland community with various mixed grasses, and the elevation at the datum is 1534 m (5030 ft). Site cultural materials seem to be eroding out of a dune and as it moves in the wind, more artifacts are exposed.

The artifacts consist of three quartzite cores and a large, bifacial knife fragment of quartzite. Ground-stone tools are a metate fragment and mano fragment, both of sandstone. The debitage sample consisted of 67 flakes, with 76% of the sample being fine-grained quartzite, 10% argillite, 7% coarse-grained quartzite, 3% chert, and 3% orthoquartzite. There were 41 complex flakes, 23 simple ones, and three pieces of shatter. Sixty-five of the specimens were large, two were small, 38 were non-cortical and 29 had dorsal cortex present. Based on the lithic data, this site functioned primarily as a raw material reduction location.

This site lacks structures, features, and diagnostic artifacts. Artifacts are found in the dune deposits but no cultural materials will be found in good stratified context. As a result, the site is not eligible for the NRHP and requires no additional work.

5LA9351

This site is a lithic scatter that has deflated to the modern ground surface. The site is located in a drainage between a ridge and two small hills, and the site has been exposed through the drainage's erosion. A major feeder drainage of Welsh Canyon is located 300 m south of the site. Elevation at the datum is 1485 m (4870 ft) asl and the vegetation is juniper/grassland transition. The cultural assemblage consists of two chipped-stone tools; three pieces of ground stone, and 86 pieces of debitage. There are three fragments of sandstone slab metates, one fine-grained quartzite uniface, and a small chert projectile point. The chert point is identified as a P66 according to Anderson's typology, and dates to the Late Prehistoric period (AD 800 to AD 1450). The debitage is primarily local quartzite, with 59 pieces of fine-grained and 16 coarse-grained specimens. Other material types in sample were five pieces of chert, five flakes of orthoquartzite, and one piece of argillite. There were 56 large flakes, 30 small ones, 64 non-cortical items, and 22 with dorsal cortex. Complex flakes account for 45 specimens, simple flakes for 33 items, and shatter for eight pieces. No structures or features were located on 5LA9351, and the site is completely deflated. No research potential exists, and no further work is necessary.

5LA9352

The site consists of a sparse lithic scatter located on a finger ridge that juts out above the first major side canyon south of Welsh Canyon. The north side of the site is a low sandstone bedrock outcrop, and the southern portion exhibits pockets of aeolian deposition on exposed bedrock. Deposition across the site is less than 10 cm, and most of the artifacts were recovered on bedrock. The elevation at the datum is 1535 m (5035 ft), and the sparse vegetation consists of an overstory of juniper and mountain mahogany, with an understory of mixed grama grasses.

The assemblage consists of 13 pieces of debitage, four chipped-stone tools, and one sandstone mano fragment. The stone tools were two coarse-grained quartzite cores, a quartzite biface fragment (FS 1), and a chert biface knife fragment (FS 5). The debitage contains 12 flakes of quartzite (7 fine-grained, 5 coarse-grained) and one piece of argillite. All of the flakes are large, seven exhibit cortex while six are non-cortical. There were six pieces of shatter in the sample, along with five simple flakes, one complex item and one bipolar flake. The debitage indicates that this site functioned chiefly as a procurement and early-stage raw material reduction location. No structures or features were located and no diagnostic artifacts were recovered. Because this site is deflated and the artifacts rest, for the most part, on bedrock, no potential for intact buried deposits exists, and no further work is needed.

5LA9353

The site is a sparse lithic scatter situated along the northern edge of an unnamed side-drainage of Welsh Canyon at an elevation of 1526 m (5005 ft). The site is located on a gently sloping shelf, below the caprock cliff and above the canyon edge. Vegetation on site is juniper woodland with sparse grass cover. Deposition is very poor; the site is highly deflated and most artifacts were recovered on exposed sandstone bedrock. Aeolian dune deposits are found along a two-track road that crosses the site. These deposits are thin and likely move about the site depending on which way the wind blows. Numerous large sandstone boulders are scattered around the base of the ridge, and they form a series of small alcoves and windbreaks. No cultural remains were located in any of these, although the inhabitants of the site would certainly have used these for shelter.

The cultural assemblage contains two pieces of ground stone, three chipped-stone tools and 20 flakes of debitage. Both pieces of ground stone are made of sandstone, and are a one-handed mano fragment and a fragment of a slab metate. The stone tools are a quartzite core, a utilized flake of quartzite, and a utilized flake of chert from the local Ralston Creek deposit. The debitage consisted of eight flakes of coarse-grained quartzite, four pieces of fine-grained quartzite, three pieces of argillite, two flakes of baked claystone, and one flake of hornfels/basalt. There were eight complex flakes in the assemblage, nine simple ones, and three pieces of shatter. Eighteen of the specimens were large in size, while two were small, and 11 were non-cortical flakes, while nine exhibited dorsal cortex. Secondary reductions of local materials, along with expedient tool manufacture, were the main activities at this location. An outcrop of baked claystone is located near the western site boundary and it seems this material was being tested at this location. Because this 63 x 52 m site is so deflated, no recovery potential exists and additional work is unnecessary.

5LA9354

The site is a large (219 x 90 m) lithic scatter located on a finger ridge above the northern rim of a northern canyon that feeds into Red Rock Canyon. The site is situated just above the historic "La Placita" homestead (5LA6104), and encompasses a sandstone bedrock drainage basin to the northwest. The site's elevation is 1527 m (5010 ft) and the vegetal community is juniper woodland. Nearly all of the site has deflated down to bedrock, leaving only large flakes and tools at the surface. Anything small has long since washed away. The only soil on site is sand and this is only found in small random pockets across the site. Three features were located, all bedrock metates: Feature 1, which has two milling slicks on it, Feature 2, which has one grinding surface, and Feature 3, which has two utilized surfaces.

Aside from the milling surfaces, the cultural assemblage consisted of ground stone, stone tools, and debitage. Additional ground-stone artifacts included two slab metate fragments and an edge-ground cobble. Chipped tools consisted of eleven coarse-grained quartzite cores and a fine-grained quartzite chopping tool. The debitage sample contained 39 flakes, primarily coarse-grained quartzite (27 pieces), fine-grained quartzite (7), chert (2), orthoquartzite (2), and argillite (1). There were 11 complex flakes, 20 simple ones, and eight pieces of shatter in the sample. Large-sized items accounted for 36 items, and there was an almost even split between cortical items (20) and non-cortical flakes (19). Based on the debitage, 5LA9354 was primarily used for primary and secondary core reduction of locally available quartzite. The site has no research potential as its cultural materials have deflated to the modern ground surface. In addition, both erosion and possible interference from the nearby "La Placita" site have displaced an unknown number of artifacts. Accordingly, the site is not eligible for inclusion into the NRHP.

5LA9355

The site is a very small sparse scatter containing one simple flake of quartzite, one piece of quartzite shatter, one utilized flake of coarse-grained quartzite, and one fine-grained quartzite projectile point fragment. This point is small, and dates somewhere between the Late Archaic and Developmental periods (1000 BC – AD 500). The site sits in an eroded sandstone bedrock drainage basin just northwest of the "La Placita" historic homestead (5LA6104), at an elevation of 1515 m (4970 ft). There is no deposition, as the site is scoured bedrock with patches of secondary aeolian sand. The vegetation is that typically found in the juniper woodland zone. Shallow soils and a lack of features indicate that no further work is required here.

5LA9356

The site is a low-density scatter of chipped-stone debris plus cores (all quartzite), a utilized quartzite flake, an unfinished quartzite biface, two mano fragments, and a complete edge-ground cobble. It is located at the head of an unnamed side drainage that feeds Red Rock Canyon to the south. Vegetation is dominated by juniper in the nearly five acre site area.

There is one area of high lithic concentration, designated as Feature 1. In addition, debitage was sampled from across the surface of the site. Between Feature 1 and the general site sample, 151 items were recorded. Most of the debitage was classified as simple flakes (66%), however, shatter (17%), complex flakes (15%), and biface-thinning flakes (3%) were also seen. Primary materials are coarse- and fine-grained quartzite with some cherts and argillite. The diversity in the flaking detritus suggests the site functioned primarily as a raw material reduction location with some biface or tool manufacture. Though multiple activities have taken place at the site, and there is deposition (30 + cm), its surface scatter is diffuse, and there are no indications for surface features. No further work is required at this time.

5LA9357

The site is a surface scatter of flaking debris. It is located on a finger ridge that juts out into a side drainage canyon, north of Red Rock Canyon near its Welsh Canyon confluence. The debris is made of quartzite (7), and chert (5). Tools include an orthoquartzite flake tool, a sandstone abrading stone, a sandstone slab metate fragment, and an edge-ground cobble fragment of sandstone. No evidence of thermal features was noted on the site and no areas of significant sediment deposition are apparent. Additional research is not warranted and the site is not worthy of a NRHP nomination.

5LA9358

This site is a large (168 x 101m) lithic scatter located 450 m north of Red Rock Canyon on a north to south trending ridge. It is situated on the gently sloping west side of this ridge in a juniper woodland to grassland transition zone. Soils are deep (20 cm) and are characterized as light-brown sandy silt with areas of cryptogamic crust and surface gravels. No features were located and diagnostic artifacts were not identified.

One hundred fifty pieces of debitage were sampled and include are 61% simple flakes, 29% complex flakes, 9% shatter, and 1% biface-thinning flakes. These were made of coarse-grained quartzite (56%), fine-grained quartzite (28%), chert (12%), argillite (2%), and orthoquartzite (2%). The debitage is 67% large and 33% small; cortex is present on 28% of the assemblage. The tools are three cores (two chert, one quartzite), three utilized/retouched flakes (two quartzite, one chert), and an "end shocked" orthoquartzite biface fragment. A single sandstone mano fragment was also recorded. Based on the debitage and chipped-stone assemblage, this is a raw material reduction location for locally available quartzite. Some of these were turned into early- stage bifaces; however, very little late-stage reduction is evident.

The site does not exhibit areas where we think there may be intact cultural deposits. The absence of fire related materials, such as heat-altered stones, and the single ground-stone artifact suggest the site does not have good potential for additional research.

5LA9359

The site consists of a very sparse scatter of lithics along the cliff face of Red Rock Canyon. The landform is a boot-shaped projection that extends out into the canyon and is 3.1 km west of the Red Rock Canyon and Welsh Canyon confluence. Four quartzite flakes, three chert flakes, a bedrock metate, and the medial portion of a large chert projectile point were recorded. The bedrock metate measures 3 x 3 m in size and has an oval-shaped grinding surface measuring 30 x 24 cm. No features were noted. The site has well-developed soils (20 cm) but the surface does not show any areas where buried remains or thermal features might be located. No additional research is planned.

5LA9360

The site consists of a very sparse scatter of lithics (16), a bifacial core-tool made of quartzite, and a one-hand mano fragment of sandstone. Material types include quartzite (15), and chert (1). This site was found in the grassy flats above Red Rock Canyon (300 m south of the site) in an area where the soil has been baked into hardpan. No features were found on the site. Soils are thin and the site is not expected to contain intact cultural remains. No further work is recommended.

5LA9361

The site consists of six quartzite flakes and one projectile point fragment. Four of the flakes were complex and two were simple; one showed cortex on the dorsal surface. The projectile point is most similar to Anderson's (1989) Type P30, which has an age range between 1000 BC to AD 1000 (Late Archaic to Developmental periods). No other tools were found and no evidence for former fires was noted. Areas suitable for testing were not apparent and the site is not considered to be significant. Elevation at the site is 1534 m (5030 ft) asl and it is situated on the east sloping shelf of a ridge that extends out into Red Rock Canyon.

5LA9363

The site is a light scatter of lithic debris and tools on a bedrock covered ridge on the south edge of the landform that separates Welsh and Red Rock Canyons. Surface detritus is made of quartzite (11), and chert (1). Tools include an unfinished quartzite biface, a chert core, and a quartzite core. Soils are less than 5 cm in depth and without any evidence of former fire features, the site is not considered significant and requires no further work.

5LA9364

The site contains lithics and two tipi rings and was found on the north terrace of Taylor Arroyo, approximately 1.8 km east of the Rock Crossing landmark. It is located primarily in an area of heavily eroded sandstone with patches of grass and sand wash. The site boundary to the north is determined by the extent of the lithic scatter and is located within the juniper tree line, while the southern boundary is delineated by a topographical break (a small erosional slope of exposed bedrock) and the edge of the Taylor Arroyo terrace. The site has been impacted somewhat by military maneuvers, especially tracked vehicles, and contains several military emplacements and a cooking structure (rock grill). The site has also been highly eroded by sheetwash. Any other prehistoric features have likely eroded away or are no longer detectable. The site covers 3.25 acres and has a datum elevation of 1531 m (5020 ft). Juniper woodland is the vegetative community dominating the site and the surrounding area would best be described as grassland. Plant species noted at the surface include juniper, cholla, prickly pear, sage, skunkbush, and cedar.

A total of 170 artifacts were recorded at the surface, including a 150 piece sample of debitage, 12 flaked tools, and 8 pieces of ground stone. Flaking debris was found to be made of seven specific material types. There is a strong selection preference for chert (39%) and argillite (22%), which is unusual for sites in Training Area 10, as the vast majority of the sites show quartzite as the dominant raw material. The remaining debitage is fine-grained quartzite (15%), silicified wood (10%), coarse-grained quartzite (8%), basalt (5%), and orthoquartzite (1%). Most of the debitage samples are simple flakes (47%) and complex flakes (37%); biface-thinning flakes (5%) and shatter (11%) were also recorded.

All phases of raw material reduction are seen in the debitage assemblage. Twenty percent of the debitage specimens show dorsal cortex. All cortical flakes and most of the noncortical large flakes appear to be the result of core-reduction. The high number of small flakes (54) indicates that nearly exhausted cores were used or most of the tool manufacturing was performed on late-stage bifaces. Most of the large and unpatterned bifaces were likely roughed out at the quarry location and the nearly finished specimens were finished on site. Two material types are found in the biface-thinning flakes and indicate the manufacture of at least two biface tools. Fifteen debitage items showed a red color change from heat exposure.

There are 12 flaked lithic tools which fall into the following classes – utilized flake (5), core (5), and side scraper (2). Not counting the cores, all of the tools show burning. Also, one utilized flake of argillite (FS 3) shows thick patination. Material types for the cores include argillite (2), quartzite (1), orthoquartzite (1), and silicified wood (1). The utilized flakes are chert (2), argillite (1), Jemez Mountain obsidian (1), and orthoquartzite (1). Both side scrapers (one chert, one fine-grained quartzite) are lateral edge fragments and may be the edge of an end size scraper. The ground-stone tools are 4 slab metate fragment (2 quartzite, 2 sandstone), two mano fragments (1 schist, 1 sandstone), 1 complete sandstone mano, and 1 edge-ground cobble fragment of quartzite.

This is a heavily deflated site with nearly all the artifacts exposed on sandstone bedrock. No diagnostic artifacts or thermal features were found and it is located in a high military impact area. No further work is needed on this large site, as there is little potential here to contribute to our understanding of prehistory.

5LA9366

This site is a lithic scatter located at the south end of a large ridge and extends down to a lower terrace to the west of an unnamed side canyon north of Red Rock Canyon. It sits in juniper woodland with fairly poor soil deposition. Soil is a light-brown sandy silt than has been eroded by wind and water. Pockets of up to 15 cm are seen above eroded sandstone bedrock.

The artifact assemblage is fairly dispersed across the site, with the majority of tools found on top of the ridge. The main site function appears to be raw material reduction with some early-stage biface/tool manufacture, as evidenced by a high amount of large simple and complex cortical flakes. Material types include fine- and coarse-grained quartzite, with some chert. The tool classes are projectile point (2), biface (2), side scraper (1), utilized flake (1), and core (2). Both projectile points were complete enough to be assigned to an Anderson (1989) point class. The first point, Type P26 (Anderson 1989:143) is made of fine-grained quartzite and only has both barbs missing. It is a large projectile that is thought to date between 1000 BC to AD 500. The second point is made of argillite and is nearly complete. This point was classified as P66 (Anderson 1989:199-200) which is thought to date between AD 800 and AD 1450. One metate fragment and three manos were also found, suggesting food processing as an additional site function.

Due to this site's location and the presence of multi-component diagnostic artifacts, it is likely that it was occupied several times throughout prehistory. The lack of features and structures, as well as the few ground-stone items, indicate short-term occupation, possibly as a hunting camp or procurement location. This site is not eligible for the National Register based on poor soil deposition. No further work is necessary.

5LA9367

This site is debitage and two sandstone metate fragments scattered at the crest of a low hill that sits in the flats between Red Rock Canyon and Welsh Canyon. Artifacts were noted on bare patches of ground among scattered juniper trees, clumps of grama grass, and prickly pear cactus. A total of 74 pieces of debitage were analyzed-- 50 simple flakes, 18 complex flakes, and 6 pieces of shatter. Materials are 55% fine-grained quartzite, 21% coarse-grained quartzite, 20% chert, and 1% orthoquartzite. Most is noncortical flakes (46%), with large cortical flakes (30%), small noncortical flakes (20%), and small cortical flakes (4%) also seen. The debitage data shows that lithic reduction and, to a lesser extent, early-stage biface manufacture were the reduction techniques used by the inhabitants.

The site does not have any areas which appear to have intact cultural remains or evidence of hearths. No further work is recommended for the site.

5LA9368

The site consists of a single rockshelter and a scattering of lithic artifacts on the slope in front of it. The shelter sits along the north edge of a shallow arroyo in an area of exposed sandstone bedrock. This erosional feature is found in a northern side drainage of Red Rock Canyon and the canyon proper is approximately 1.3 km south. Fill within the shelter is shallow (<10 cm) and is the result of post abandonment deposition. In other words, no intact cultural fill remains in the shelter.

Outside the shelter (on the south side) there is a high density of lithic tools that includes 42 pieces of debitage, four one-hand mano fragments (all sandstone), two edge-ground cobbles (one basalt, one sandstone), and a quartzite non-bipolar core. In the debitage, four material types were noted-- coarse-grained quartzite (67%), fine-grained quartzite (24%), chert (7%), and argillite (2%). Most are simple flakes (52%), with complex flakes (26%), and shatter (21%) also seen. Because cortex is present on 48% of the debitage items and nearly 84% of the assemblage is large in size, early-stage raw material reduction was the dominant activity carried out in front of the shelter. Flakes may have been removed for cutting or scraping, however the grainy nature of the quartzite material makes light use wear impossible to determine.

No thermal features are present at the surface though burning did occur in the shelter at one time based on the presence of black soot on the roof. This is not an eligible site because there is no potential for buried deposits. No further work is needed because heavy erosion has scoured out the shelter and surrounding areas.

5LA9369

The prehistoric component of this site consists of two rockshelters along a caprock band of sandstone, a hearth, and lithic artifacts scattered across a broad terrace that is above a northern side drainage that flows southwest to Red Rock Canyon. Both shelters are found at the northern site boundary with Feature 1 being further to the west. Feature 1 is a deep and relatively high (3 x 5 m) shelter that has little remaining sediment deposition and appears to have been flushed by water. Sooting is heavy on the roof surface, however, no floor features were found. Only a single quartzite flake remained inside this feature. The second shelter is larger (7.3 x 5.3 m), 10 m east of Feature 1 and full of pack rat midden deposits. There is sooting on its roof also, and it too has been flushed by water erosion. Three simple quartzite flakes were found here. A hearth (Feature 4) has eroded out of the soil near the bedrock outcropping. It is 40 m and 115° from the datum, is composed of a thin smear of dark soil and charcoal, and is completely deflated. No debitage, tools, or burned bone were located in or around this stain.

The site debitage assemblage consisted of 76 items: 8 of which were chert, 19 were fine-grained quartzite, 5 were orthoquartzite, and 44 were coarse-grained quartzite. These were classified as 41 simple flakes, 27 complex flakes, 5 pieces of shatter, and three biface-thinning flakes. Most were large noncortical items (42), with fewer large cortical pieces (22), small noncortical pieces (11), and small cortical pieces (1). The debitage assemblage suggests that the site functioned as a secondary core reduction area. Because only three biface-thinning flakes and two small complex flakes were found, biface manufacture was not a main activity here.

The stone tools include two exhausted chert cores and the proximal end of a fine-grained quartzite side scraper. Both lateral edges exhibit steep marginal retouch and moderate use wear. No ground-stone artifacts were encountered.

A historic feature was encountered near the hearth. Feature 4 is a windbreak or livestock shelter that is set against a sandstone bedrock outcropping. This structure appears to be nothing more than a shade feature with upright and forked support posts that would have supported some kind of roof. The roof may have been scavenged for use elsewhere (historic sites 5LA6104 and 5LA6105 are located nearby). Only one of the upright posts remains intact. All of the others have collapsed, and of note, sandstone bedrock blocks loosely collar two of the four support posts.

Though there is some soil deposition on site, field investigators do not believe there is much potential for the recovery of intact cultural remains. No further work is needed at this site and neither the prehistoric or historic component of the site are considered significant because of the lack of integrity due to wind and water erosion. The site's importance rests primarily with its relationship to 5LA6104 and 5LA6105.

5LA9373

This site is a rather sparse lithic scatter measuring 260 x 228 meters. It is located at the head of a deep side canyon on the south side of Red Rock Canyon near the PCMS boundary. The canyon forms the northern border of the site; the eastern border is a small side drainage that empties into the big side canyon. The datum elevation is 1536 m (5038 ft) asl and the site is found in a juniper woodland community, with several piñon pines also present. 5LA9373 is located directly west, across the drainage, from 5LA9371 the "Jewelry Site". The big canyon below contains several potential rock shelters that were not investigated due to study unit constraints. There are no structures, and the only features were one bedrock metate (Feature 1), and a small fire-cracked rock concentration (Feature 2). The tools consisted of a slab metate fragment, five bifaces, one core, one uniface, one side scraper, and the lateral edge from a Folsom point.

A 150 piece debitage sample was field analyzed, breaking down as follows: the primary material was fine-grained quartzite, with 61% of the total sample. Coarse-grained quartzite made up 11%. Interestingly, 22% of the sample was chert, which is a high number for any site in the PCMS. Other material types included argillite, orthoquartzite, quartz, silicified wood, and baked claystone. All together, these other materials totaled less than 6%. Three piece of flaked baked claystone are a distinctive feature of the lithic assemblage. All materials, except for the quartz and perhaps the argillite, are available in the canyon system nearby.

Inhabitants were taking advantage of locally procured materials on 5LA9373. The fact that large flakes outnumber small flakes, nine to one, is not statistically significant, since surface survey tends to recover mainly large artifacts. There is a slight difference in the sample for simple flakes over complex (53% to 43%), although this difference may not be statistically significant either. The presence of simple, complex, shatter, and biface-thinning flakes demonstrates all stages of lithic reduction occurred. The preponderance of non-cortical flakes (66%) in the sample argues for later-stage reduction on site rather than initial core reduction. Tool materials show a definite preference for high-quality lithics in their manufacture. Expedient tools outnumber formal tools by six to three, a ratio typical for sites along the rim such as this one. The ground-stone tools consist of one granite mano, one slab metate, and one bedrock metate. Interpretation on the entire lithic assemblage suggests that 5LA9373 was a secondary lithic reduction site with some vegetal processing and hunting activities.

Folsom points are a rare type of artifact. But because the debitage and chipped tool assemblages contained no patinated items, it is likely that the point fragment was picked up, and then reused by later inhabitants. Shallow secondary sedimentation exists in pockets over most of the site area and outcropping Dakota sandstone bedrock dominates the landscape. Because of this, the site contains no significant archaeological materials in good stratified context. We judge this site not eligible for the National Register and recommend no additional work.

5LA9434

The site consists of a sparse scatter of lithic debris in the juniper covered flats south of Red Rock Canyon. No chipped- or ground-stone tools were found but flaking debris was recorded. Analyzed on the site, the debitage is made up of 17 pieces of quartzite, 8 pieces of argillite, 2 pieces of baked claystone, and one basalt flake. In the absence of structures and thermal features, we do not think the site is significant. No further work is needed.

5LA9435

The site is a small lithic scatter that is located on a flat-topped hill overlooking the drainage above the "Moses Stevens" homestead. A total of twelve pieces of quartzite debitage were recorded on this site, with eight being simple and four complex. Ten of the items are large, and four show dorsal cortex. Ground visibility is poor and all of the artifacts were found in bare patches in the thick vegetation. The soils are relatively deep here (20 cm), and much of this site could be buried. No features were visible on the surface, and no chipped- or ground-tools or diagnostics were found. No further work is necessary on this site.

5LA9436

This is a dense artifact scatter that sits on a broad shelf on the east side of a southwest to northeast trending ridge at the head of an unnamed canyon. On the western edge of the site outcroppings of sandstone form a 2.5-meter high ledge that would have served as a windbreak on the shelf. The eastern edge of the site also exhibits sandstone bedrock at the surface. The soils (up to 15 cm) are colluvial in nature, with gravel visible over the entire surface. The vegetation is sparse leading to good surface visibility and it appears that the artifacts have deflated down to the modern ground surface.

The artifact assemblage consisted of a 150 piece sample of lithic debitage, 4 chipped-stone tools, and 19 pieces of ground stone. Of the debitage, 75% of the assemblage was fine-grained quartzite, and the remaining 25% was comprised of argillite, chert, orthoquartzite, and coarse-grained quartzite. An overwhelming amount of items (93%) were large, and 47% exhibited dorsal cortex-- 88 items were simple flakes, 49 were complex flakes, and 13 were pieces of angular shatter. In addition, three items showed distinct burning. The stone tools consisted of two argillite cores, a quartzite core, and an unfinished quartzite biface. The most impressive part of this site is its ground-stone assemblage, which contains 11 slab metate fragments (ranging from pieces less than 50% to whole), four manos (two complete, two fragments), two basin metate fragments, an edge-ground cobble fragment, and a discoidal polishing stone. One of the manos is granite, and all of the other specimens are sandstone.

5LA9436's location on the shelf and its artifact assemblage suggests that the site functioned as a food processing location where flakes were removed from cores for some form of expedient use. Many of the ground stone artifacts are burned suggesting usage in close proximity to fire; some metates may have been used as griddles, for example. A "looters pile" is present in the northeast portion of the site. Several metate fragments were placed in a rough circle, with several manos stacked on top (FS 10-18). Although this is an interesting activity area, the surface soils are thin and the site is a poor candidate for further study. No structures or features were noted and it is possible that these are either up on the flats (outside the survey area) to the east or west of the site, or down in the side branch of Red Rock Canyon.

5LA9437

This site is a large lithic scatter located in a north-south oriented ridge that sits at the head of a tributary canyon that eventually flows into Red Rock Canyon. A series of small sandstone bedrock outcrops form this ridge and give it a stepped, or terraced appearance. For the most part the surface soils are shallow, although near the two-track road depths of up to 20 cm are seen. Vegetation consists mainly of cholla, yucca, prickly pear, mountain mahogany, side-oats grama, hairy grama, skunkbush, and juniper.

While no structures or thermal features were seen, a concentration of lithic debitage was designated Feature 1. The artifact assemblage contained debitage, chipped-stone tools, and ground stone. Because the surface scatter was so large, a 151 piece debitage sample was taken. This sample also includes 25 items from Feature 1. Five material types were noted: fine-grained quartzite (88%), coarse-grained quartzite (5%), argillite (3%), chert (3%), and orthoquartzite (1%). These were further classified as simple flakes (56%), complex flakes (39%), and shatter (5%). Most of the items fall into the large size grade (82%), and cortex is present on 34% of the assemblage. Only 5% of the specimens are small complex flakes. The above information coupled with the number of core tools, suggests the principal site reduction strategy is primary and secondary core reduction to produce flakes or early-stage bifaces. There were four tool types observed in the assemblage, these were five non-bipolar cores, two large unfinished bifaces, two projectile point fragments, and a retouched flake. Quartzite is the dominant material type, accounting for 60% of the tools. A one-hand mano fragment of sandstone was also noted.

The assemblage from Feature 1 consisted of debitage from a single fine-grained quartzite reduction episode. Fifteen simple flakes, nine complex flakes, and two pieces of shatter were recorded. Twenty-three specimens are large and 3 are small; cortex is present on 14 items, with 12 being noncortical.

Although this is a large site (317 m north-south by 120 m east-west), it is also very sparse. A single diagnostic artifact was recovered (Type P35) that suggests an occupation somewhere between 1000 BC and AD 1200. No "looters piles" were noted, however the lack of patterned tools suggests that this area was "collected" by the inhabitants of the "Moses Stevens" homestead (5LA5831) which is 100 meters northeast.

5LA9438

The site is a very small lithic scatter of chipped-stone debitage; a non diagnostic chert projectile point fragment and a mano were also identified. It was found on the juniper covered plain between Red Rock Canyon and Lockwood Canyon. This site is located in the same area as 5LA9446 (330 m south) and 5LA9433 (450 m southwest) but is more centrally located on the plain than these. A total of seven quartzite flakes were analyzed in the field and classified as five simple flakes, one complex flake, and one piece of shatter.

Grama grass, prickly pear, soapweed, cholla, feathergrass, and juniper are growing on this small site, which encompasses an area of .38 acres. Animal disturbance has apparently brought the artifacts up to the surface, so the site is believed to be buried. The scarcity of the assemblage and the lack of burned features render this site ineligible. No further work is needed, however, natural erosion could expose more of the site through time and if so, reevaluation should occur.

5LA9439

The site is a large lithic scatter with diffuse lithic debris covering a portion of the plain between Red Rock Canyon to the north, and Lockwood Canyon to the south. The total acreage is 2.9 acres. Dominant vegetation is juniper, but prickly pear, cholla, skunk bush, sagebrush, and various grasses also grow on the site.

Flaking debris on the site includes 142 pieces of debitage – 125 fine-grained quartzite, 7 chert, 5 coarse-grained quartzite, 2 basalt, 2 orthoquartzite, and 1 obsidian. Assigned debitage classes are simple flakes (91), complex flakes (46), and shatter (5). Many of the items are large (99) but only 37 are noncortical. Tools include three cores, one coarse-grained quartzite and two of fine-grained quartzite; a large and unfinished quartzite biface, and the medial portion of a large chert projectile point. The flaking detritus suggests secondary raw material reduction occurred on the site, but with no diagnostic artifacts or features, there is no potential here to contribute to our understanding of prehistory. Further work is not recommended for this site.

5LA9440

The site is a high density scatter of chipped lithics on a finger ridge, bordered by a side drainage, and extends toward Red Rock Canyon. It is located in juniper woodland, approximately 40 meters from its transition to grassy plains. Covering almost half an acre, the site is much like its neighbor, 5LA9441. Forty-six pieces of debitage were recorded from the surface of the site. Of these, 38 items were fine-grained quartzite, 6 were chert, and 2 were coarse-grained quartzite. No tools or features were found or was any ground stone noted. The site is one of the dozens of small scatters of chipped-stone debris in the region and requires no further work.

5LA9441

This site consists of a light scattering of lithic debitage as well as a slab metate fragment, a quartzite utilized flake, and an argillite scraping tool. These were found scattered across the east face of a low broad ridge in open patches of ground. For the most part, the surface vegetation is very thick and the open patches are just above sandstone bedrock. The surface soils are shallow, though some pockets of up to 25 cm were seen. Debitage is primarily quartzite (41), with three chert flakes, and one argillite flake recorded. Thirty-one specimens are large and 14 are small. Of these, only 5 items have dorsal cortex. Chiefly, this site functioned as a secondary core reduction area. The presence of small complex flakes and a single biface-thinning flake indicates some tool manufacturing occurred. The absence of fire related materials, such as heat-altered stones, suggest the site does not have good potential for additional research. No further work is needed.

5LA9442

This site is a large, but sparse lithic scatter located in the juniper covered flats between Lockwood Arroyo and Red Rock Canyon. It sits at the top of a broad north to south trending ridge and extends west from here along a finger ridge. The surface visibility is good, with large bare patches of soil found among the juniper trees and clumps of grama grass. A 150 piece debitage sample was taken--70% simple flakes, 28% complex flakes, and 2% shatter. The materials are quartzite (91%), chert (7%), and argillite (2%). Because 87% of the debitage items are large, and nearly one-third (34%) are cortical, this site revolved around the production of flakes through core reduction and possibly the manufacture of early-stage bifaces. The chipped-stone tools are four cores (3 quartzite, one argillite); one nearly finished quartzite biface, and a quartzite utilized flake. Two ground-stone tools were recorded; both are quartzite. One is the end fragment of a one-hand mano, and the other is the internal portion of a slab metate. Unfortunately the site does not have any areas where investigators thought there might be intact cultural remains. The absence of any evidence for former fires on the site is also not a good indicator that it will produce significant cultural materials, if excavated. No additional research is recommended for the site.

5LA9443

Site 5LA9443 is a small and sparse lithic scatter located near a side canyon of Lockwood Canyon. The artifacts, consisting of 15 pieces of debitage, are 9 simple flakes, 4 complex flakes, and 2 pieces of shatter. Due to its small size and low artifact density, the site likely represents a single reduction episode. Poor soil deposition (5-10 cm) makes the possibility of buried cultural deposits extremely low. Because of this, the site is not eligible for the National Register, and no further work is necessary.

5LA9444

The site is a small lithic scatter with minimal lithic debitage and a few tools visible. The site is located on a gently sloping terraced ridge at the head of a side drainage of Lockwood Arroyo. The most noteworthy thing about this location is that access is good into Lockwood Canyon through an unnamed side drainage. Soil deposition is less than 5 cm with no potential for cultural deposits anywhere on site. The artifact assemblage includes 63 pieces of debitage and 3 flaked tools. Like other sites in this region simple flakes (32) are the dominant debitage class, with fewer complex flakes (27), and shatter (4). Quartzite comprises 86% of the assemblage, chert is 13%, and argillite is 2%. The flaked-stone tools are classified as one silicified wood utilized flake, one chert end/side scraper, and one fine-grained quartzite non-bipolar core. Artifacts on-site are likely from a single event and this location was probably not reused. The site is not eligible for the National Register, and further work here would not provide additional information.

5LA9445

This site is a lithic scatter located in a drainage basin surrounded by low sloping ridges at the head of a small side drainage of Lockwood Canyon. The elevation is 1525 m (5002 ft) asl and the site is in the juniper woodland/grassland transition zone that is typical for this part of the PCMS. The ridges surrounding this site are bisected with smaller drainages and these have probably washed down soil into the basin. Soil depth is 0 to 40 cm and the surface is a light-brown sandy silt. With all of the deposition within the basin there is a possibility for buried deposits although no evidence for them exists on the surface. No features, ground stone, or diagnostic artifacts were encountered.

Forty-eight pieces of debitage were recorded. In addition, one unfinished quartzite biface was found at the surface. This biface appears to have been discarded early in manufacture and has a distinct scraping surface on one lateral edge. The debitage material type was comprised of coarse-grained quartzite (24), fine-grained quartzite (21), and chert (3). The majority were large cortical items (24), large noncortical (22) and small noncortial ones were also encountered.

The debitage data leads to the assumption that early-stage raw material reduction is the dominant site activity. Based on the sparse amount of artifacts and lack of features or structures, it is likely that this site was used as a single stage lithic reduction area or a short-term opportunistic camping area. This site is not eligible for the National register, and no further work is necessary.

5LA9447

The site 5LA9447 is located on a hilltop close to a side canyon of Red Rock Canyon. The site is bordered to the west by a grassy basin, to the northeast by the canyon and on the east by another drainage. Just south of the site there are more hills. Dimensions are 340 m north-south by 146 m east-west, but the site lies on a northeast-southwest axis. Surface vegetation is feather grass, prickly pear, cholla, snakeweed, side-oats grama, juniper, and mountain mahogany. The soil is a light-brown sandy silt and is erosional in nature. Deposition ranges to 15 cm, but there are areas of exposed sandstone bedrock. Based on visual estimate, less than 5 cm of cultural fill remains on-site due to deflation. These eroded areas are where most of the lithic material was found.

The artifact assemblage consists of a 150 piece sample of debitage, 8 chipped-stone tools, and 2 pieces of ground stone. While a 150 piece sample of debitage was recorded in the field, the overall density is sparse. There is a line of slightly higher lithic density that extends from the datum to the northeast part of the site. Of the debitage specimens, most (106) are simple flakes, with complex flakes (40) and shatter (5) also recorded. Quartzite (106), orthoquartzite (32), chert (9), argillite (2), hornfels/basalt (1), and baked claystone (1) comprise the material types. There is a majority of non cortical flakes to cortical ones (68% to 32%) and large flakes (78%) were found more than small (22%) ones. Based on the debitage sample primary and secondary raw material reduction occurred on-site.

Tool groups for the flaked-tools are bifaces (3), cores (3), and utilized flakes (2). The bifaces and expedient tools were all made from locally available quartzite, while only the cores are made of chert. The ground-stone tools are a one mano fragment and one metate fragment: both of sandstone.

The integrity of this site has been lost to erosion and buried deposits are unlikely. The disturbed nature of this site makes it ineligible, and no further work needs done here.

5LA9449

This site is a sparse lithic scatter located on a small finger ridge overlooking a southern side canyon of Red Rock Canyon. It is bordered on the north and south by smaller drainages. The elevation of the site datum is 1531 m (5021 ft) asl and the vegetative community is best characterized as juniper woodland to grassland transition. Deposition is poor (10 cm) and the site is experiencing wind and water erosion. No structures or thermal features were encountered, only a bedrock metate (Feature 1) with a single milling slick ground into it. In addition, no stone tools were found. The debitage was primarily quartzite and numerous large cortical simple and complex flakes indicate early-stage core reduction was the primary site activity. Weathering agents have destroyed the site integrity. The site is not eligible for the National Register of Historic Places and no further work is necessary.

5LA9453

The site is a sparse lithic scatter located on the northwest face of a ridge on the east terrace of a large side canyon that flows to the north to meet Red Rock Canyon. The recorded artifacts are pieces of debitage that were found in the bare patches of ground between the thick surface vegetation. The on-site vegetation is juniper, cholla, hairy grama, rabbit brush, and mountain mahogany. Light-brown silty loam characterizes the soil. This lithic reduction area shows 18 flakes; all are quartzite with 15 classified fine-grained and 3 coarse grained. Nine display dorsal cortex and 11 are large in size. Eleven items are simple flakes, six items are complex flakes, and there is one piece of shatter. This sparse site requires no further work as no tools or features were found.

5LA9454

This is a dense lithic scatter located on the eastern slope and on top of a narrow ridge (trends north to south). A major drainage is found 80 m to the east, but access to Red Rock Canyon seems poor here. The datum marker sits on a narrow terrace; large sandstone blocks cover the surface here. To the west of the datum, a small sandstone outcropping forms a large cliff and below, artifacts cover the slope. Also found here are large sandstone boulders that would have formed a barrier to the wind or could have separated activity areas. No artifacts were found among the boulders as erosion has washed cultural materials downslope.

The recorded artifacts include a 150 piece sample of the debitage, 18 chipped-stone tools, and eight ground-stone artifacts. Of the debitage, most (86%) are fine-grained quartzite, with lesser amounts of coarse-grained quartzite (7%), chert (5%), argillite (1%), and basalt (1%). Eighty-two percent are large items and 18% are small; 60% of the debitage is non-cortical, and 40% shows cortex. The debitage classes are simple flakes (53%), complex flakes (42%) and shatter (5%). Raw material reduction is the dominant site activity based on the debitage; the high number of cores supports this notion. The lack of biface-thinning flakes and low number of complex flakes (2%), suggests very little biface manufacturing occurred. Large non-patterned (early stage) bifaces were likely made here, however most of these were thinned to final form at another location. All of the lithic materials in the debitage assemblage can be found in the canyon below.

The chipped-stone tools are cores (12), utilized/retouched flakes (3), an unfinished quartzite biface, a small silicified wood projectile point fragment, and a large, argillite projectile point fragment. Only the argillite point fits into the Anderson (1989) system and is a Type P19. These points date from 2000 BC to AD 1000. This specimen is highly patinated so it likely falls closer to the 2000 BC date.

The ground-stone tools are six manos (five of the one-hand variety), a complete slab metate, and one large metate fragment. All of the one-hand manos and both metates are sandstone. The additional mano is a conglomerate.

The boulders scattered along the hill slope and below the crest of the ridge would have sheltered the inhabitants of this site from the elements. Sheet wash erosion and the gradient of the slope have caused most of the cultural materials to erode downhill and out of context. The site appears to show three activity areas, but these are most likely the result of erosion which has accumulated artifacts downslope at the back of large boulders. Because the integrity of this site has been lost, no further work is needed here.

5LA9455

This site is a small lithic scatter located on the northern half of a small drainage basin that is located on the east rim of a large tributary canyon that feeds Red Rock Canyon (1.2 km north). An intermittent drainage is seen at the southern edge of the site and an area of outcropping sandstone borders the western site boundary. The surface soil is shallow (<5 cm) and most artifacts are sitting on bedrock. The artifact assemblage contains 50 pieces of debitage, 2 cores (one chert, one fine-grained quartzite), and the lateral edge of a nearly finished, fine-grained quartzite biface. Of the debitage, most (46) are quartzite, and 4 are chert. The majority is large in size and nearly half exhibit dorsal cortex. All of the chert was classified as shatter, and all show evidence of heat exposure. Surface evidence shows that the site is highly deflated. Based on this data, and the lack of features and diagnostic artifacts, no further work in needed for this site.

5LA9456

This site is a sparse scatter of lithics located at the crest of a low southeast to northwest trending ridge. It sits in the juniper trees just north and west of open grassland approximately 1.9 km south of Red Rock Canyon. Surface vegetation is various grasses, cholla, prickly pear, mountain mahogany, and yucca. The surface soil is a silty loam with intermixed gravels and a depth of 30 cm was shown at the datum. Most of the site has been lightly impacted by wind and water erosion.

The artifact assemblage contains 143 pieces of debitage, a fine-grained quartzite biface fragment (FS 2), a chert core (FS 4), and a large chert projectile point preform fragment (FS 1). A burned piece of baked claystone (FS 3) was also recovered and this piece has distinct striations. The function for this piece is unknown but it was likely a jewelry blank or gaming piece. The debitage is fine-grained quartzite (94%), chert (4%), argillite (1%), and coarse-grained quartzite. Most are simple flakes (73%) with complex flakes (22%) and shatter (5%) also recorded. Cortex is present on only 8% of the assemblage and most (70%) items are large in size. No ground-stone tools were encountered and this site is just one of the many early-stage raw material reduction sites found in this portion of the PCMS.

No time diagnostic artifacts were found at the surface of the site. Though the soil appears to be relatively deep, the surface assemblage suggests the site has no potential to contribute to our understanding of prehistory. No further work is needed on this large (100 x 84 m) site.

5LA9457

This site contains two exhausted chert cores. Theses were located on the tip of a flat finger ridge that overlooks the confluence of two southern side-drainages feeding Red Rock Canyon. Red Rock Canyon proper is 900 m to the north. Sandstone bedrock outcrops at the surface, and very little soil (< 1 cm) is present. The on-site vegetation is mountain mahogany, juniper, and grama grasses (both hairy and side-oats). None of the flakes from the cores were found and given the steep slope in this area (3°) these likely washed over the cliff. This is a sparse surface assemblage with no possibility for buried deposits. Because of this, no further work is needed on this small site.

5LA9473

This site is a sparse lithic scatter located in and around a series of sandstone boulders and a large outcropping of sandstone bedrock. The surface soil is aeolian sand with very sparse vegetative cover. Most of the artifact assemblage was found in erosional areas suggesting that the site is heavily deflated. The artifact assemblage has 24 pieces of debitage, one sandstone metate fragment and one complete mano made of sandstone. The debitage is primarily quartzite (22); one piece of argillite and one piece of chert were also recorded. There are 12 simple flakes, 9 complex flakes, and 3 pieces of shatter. Eleven specimens have dorsal cortex. Based on the debitage, raw material reduction and early-stage biface manufacture occurred on site. A couple of small overhangs were found at the sandstone outcrop but no cultural materials were found here. There is no potential for data recovery here as the site has sparse surface evidence and heavy erosion.

5LA9475

The site is a small yet dense scatter of lithic artifacts that contains debitage and a chert core (FS 1). It can be found near the crest of a small ridge that overlooks a side canyon that feeds Red Rock Canyon to the southwest (700 m). On-site vegetation includes juniper, yucca, prickly pear, cholla, grama grass, and skunk brush. Coarse-grained quartzite (25), fine-grained quartzite (12), argillite (3), chert (2), and orthoquartzite (1) are the material types. Of the debitage specimens, 21 are simple flakes, 17 are complex flakes, and 5 are shatter. Based on the lithic assemblage, secondary core reduction occurred on site. Because the site is small and no diagnostic artifacts or features were found, there is no potential here to contribute to our understanding of prehistory. No further work is recommended.

5LA9477

Site 5LA9477 is located along the south side of a minor drainage which flows into a side drainage of Red Rock Canyon. Generally it is a sparse lithics scatter that extends from the caprock to the east across a small drainage and follows the caprock face to the west to a small, rockshelter formed in a bedrock boulder overhang. The rockshelter (Feature 1) measures 5.1 x 2.5 m and shows some historical use in the form of axe-cut juniper logs near the dripline in the southeast corner. All of the fill has washed out of the shelter and can be found downhill to the north. Prehistoric use is shown by sooting on the roof and the presence of two flakes northeast of the shelter opening. The site has no integrity due to water and wind erosion. There is very little intact sediment remaining and eroded gravels are the primary ground surface feature. The lithic assemblage (12) suggests secondary core reduction of local quartzite. The small number of flakes makes conclusions regarding production goals difficult, but it appears that the production on this site focused on expedient tool manufacture and curation. Only one core was recovered at the surface. No further work is needed here.

5LA9479

The site is located in the flats between Lockwood Canyon and Red Rock Canyon on a series of small terraces formed by eroding sandstone bedrock layers. Overall, the ground visibility is good with sparse vegetation in the form of juniper trees and grama grasses. The site has been heavily disturbed by wind and water erosion. Small in total number, the debitage specimens analyzed on site are eight complex flakes, three simple flakes, and one piece of shatter. Materials include fine- and coarse-grained quartzite, chert, and basalt. Two sandstone manos (one complete, one broken) were recorded among the flaking debris and exhibit heavy use wear on both faces. No diagnostic artifacts or thermal features were found, and there is a lack of site integrity due to sheetwash erosion. No further work is required.

5LA9480

The site is a sparse lithic scatter located on the south slope of a broad flat ridge. Vegetation is sparse, and surface visibility is good. The surface soil is the result of colluvial deposition and maneuver damage is seen here in the form of deep tracked vehicle ruts. Owing to the location, soil deposition on the site is poor (< 10 cm). Artifacts consist of 68 pieces of debitage, a fine-grained quartzite core, the lateral edge of an argillite side scraper, and a patinated utilized flake made of argillite. Fine-grained quartzite is the dominant material type, comprising 47 items in the assemblage. The remaining specimens are orthoquartzite (7), argillite (6), chert (3), coarse-grained quartzite (3), and basalt (2). Most (35) are classified as complex flakes, with simple flakes (30) and shatter (3) also represented. Only 26 items show some degree of cortex. Based on the sparse surface evidence, lack of features, and the lack of integrity due to military impact, this site is not significant and requires no further work.

5LA9481

The site is a sparse lithic scatter located in the grassy flats between Rock Rocks and Lockwood Canyon. The flaking debris consists of 11 complex flakes and nine simple flakes. All are quartzite (fourteen fine-grained, six coarse-grained) and seventeen are non cortical. One chert side scraper and the tip of a large argillite projectile point were recorded. The tip of this point is finished, and very large, suggesting it broke off of a large projectile point or knife. The site has been deflated by wind and water erosion and is seen in hard-pan blowout areas. There is a lack of site integrity due to this severe erosion, and further work is not recommended for this site.

Chapter VI: LITHIC ANALYSIS

INTRODUCTION

The number of lithic artifacts recorded by NMSU field crews while performing survey in the Training Area 10 and 12 portion of the PCMS is substantial. In its entirety, the assemblage contains over 27,000 items. Of these, there were 23,060 pieces of debitage recorded, 2789 chipped-stone tools, 1169 ground-stone items, and 168 miscellaneous artifacts. Table 6.1 below summarizes functional grouping and artifact classification for the prehistoric project artifact lithic assemblage.

TABLE 6.1: Project Prehistoric Artifact Classes.

FLAKED LITHIC GROUP			GROUND STONE/MISCELLANEOUS GROUP		
Artifact Classes	Count	Percentage	Artifact Classes	Count	Percentage
Biface-Thinning Flake	704	2.59%	Hammerstone	15	0.06%
Bipolar Flake	12	0.04%	Edge-Ground Cobble	57	0.21%
Complex Flake	8933	32.86%	Mano	404	1.49%
Shatter	2197	8.08%	Metate	701	2.58%
Simple Flake	11211	41.24%	Shaft Straightener	4	0.01%
Core-Rejuvination Flake	3	0.01%	Unknown Ground stone Fragmen	5	0.02%
Core/Hammerstone	1	0.00%	Jewlery Item	13	0.05%
Non-Bipolar Cores	751	2.76%	Hoe	1	0.00%
Core-Tools	26	0.10%	Polishing Stone	8	0.03%
Bipolar Cores	4	0.01%	Unique Item	1	0.00%
Biface	494	1.82%	Abrader	1	0.00%
Chopper	2	0.01%	Jar Cover	1	0.00%
Chopper/Hammerstone	17	0.06%	Lapstone	1	0.00%
Drill	27	0.10%	Pestle	1	0.00%
End Scraper	47	0.17%	Pounder	8	0.03%
End/Side Scraper	136	0.50%	Bone	28	0.10%
Graver	4	0.01%	Bead	4	0.01%
Perforator	4	0.01%	Ceramic Sherd	68	0.01%
Spokeshave	1	0.00%	Pipe Fragments	15	0.06%
Side Scraper	61	0.22%	Steatite Bowl Fragment	1	0.00%
Uniface	145	0.53%	TOTAL	1337	4.92%
Utilized/Retouched Flak	590	2.17%			
Projectile Point	479	1.76%			
TOTAL	25849	95.08%	TOTAL ARTIFACTS	27186	

The first portion of this chapter describes raw materials identified in the assemblage, and material sources inside and outside of the region. Next, the debitage analysis procedures and results are discussed. The chipped-stone tool analysis is then described and patterned tools, flake tools, projectile points, and cores/core-tools are discussed based on material type and morphological attribute. Following this, we discuss the type and nature of the ground-stone tools. The last portion of the chapter contains a section regarding the temporal and functional interpretations for the tools.

RAW MATERIALS

It is well known that the size, shape, and fracture toughness of chipped-stone raw materials constrain both the reduction techniques that can be employed and the character of the resulting artifacts (Andrefsky 1994, 2001). Consequently, it is of the utmost importance to consider raw material constraints in any lithic analysis endeavor. This section provides a brief description of the chipped-stone raw materials used by the prehistoric inhabitants of the PCMS. It should be noted that nearly all project crewmembers performed material and attribute analysis in the field. In cases involving nonlocal or unique materials, the crew chief was consulted. In the few cases where positive identification could not be resolved, items were collected for comparison with the PCMS type collection, or for more specialized ultraviolet analysis to determine the source. In many ways the field identification of raw material types is not that different than the procedures used in the laboratory, none the less, the material identification should be recognized as somewhat subjective.

Fracture toughness is defined as the stress-intensity factor necessary to begin the propagation of a crack in the stone (Cotterell and Kamminga 1987:678). Fracture toughness is a fundamental characteristic of chipped-stone raw materials, and although oversimplified, a meaningful dichotomy may be drawn between fine and coarse-grained materials. Coarse-grained materials are thought to have much higher fracture toughness than fine-grained materials (Andrefsky 1994). Not surprisingly, prehistoric flintknappers generally appear to have employed fine-grained and coarse-grained materials for different tasks.

Because of their lower fracture toughness, fine-grained and cryptocrystalline substances are preferred for reduction into patterned tool types. In contrast, the high fracture toughness of many coarse-grained raw materials makes retouching them by pressure flaking remarkably difficult without some modification such as heat treatment. High fracture toughness is a characteristic sought in expedient tools because working edges would have dulled much less quickly than fine-grained materials that are more brittle. As such, fine-grained materials are more often associated with the creation of patterned tools and coarse-grained materials appear to have been more frequently used for the manufacture of expedient flake tools.

Although grain structure varies somewhat within any given material type, the different types can be grouped into two broad generalizations (fine- or coarse-grained). Materials that generally have a finer grain, identified during NMSU's involvement at the PCMS, include chert, chalcedony, limestone, orthoquartzite, silicified wood, siltstone, fine-grained quartzite, quartz, and obsidian. Coarse-grained materials are comprised of hornfels/basalt, quartzite, conglomerate, diorite, sandstone, schist, welded tuff, granite, and argillite. For a partial list and description of these materials, as used in our field analysis program, the reader should consult Appendix 4 in Schiavitti et al. (2001:287-288).

Most raw material used by the prehistoric inhabitants of the project area is available locally at the hogback (hornfels/basalt and argillite), or in the many canyons bisecting the PCMS (quartzite and chert). There are several materials however, that have been transported or exchanged from great distances. These include Jemez Mountain obsidian, Alibates dolomite, Hartville Uplift chert, Flattop chalcedony, a material that visually compares to Knife River flint, Plate chalcedony, Niobrara jasper, Tiger-eye chert, and Black Forest silicified wood. Other specific and highly desirable raw materials, such as some quartzites and chert (i.e., Dakota quartzite, Ralston Creek chert, and Morrison chert), were probably transported into the survey area from the deeper canyon sections of the Purgatoire River system just outside of the base. Study unit location as determined by Kvamme's 1984 and 1989 predictive models, has led to most of the recorded sites within Training Area 10 and 12 being within 100 m of outcropping beds of knapable material.

The ground-stone assemblage reflects the use of a relatively narrow range of raw material types that are all available in the immediate project area. Identifiable sources of sandstone include the sedimentary rocks from the Dakota Group, Morrison Formation, Bell Ranch Formation, and Entrada Sandstone. These are exposed in the side canyons and floors of Taylor Arroyo, Red Rocks Canyon, Welsh Canyon and other drainages that feed the Purgatoire River system. Some basalt blocks from the hogback are used for metates, and in some interesting cases, metates are made of outcropping Cretaceous limestones in the steppe portion of the base.

In the southwestern part of the project area, surface geology can be attributed to Quaternary alluvium, pediment sediments, and colluvium (McFaul and Reider 1990). Unmodified nodules and cobbles of chert, basalt, argillite, and quartzite can be found exposed on erosional surfaces or in beds of intermittent watercourses, but for the most part, these are found in much smaller quantities than in the canyons, and these lithic pieces are generally small.

DEBITAGE

Debitage Analysis Procedures

Site debitage assemblages encountered in our project area were analyzed in the field using a system developed for PCMS fieldwork by Dr. Stanley Ahler (see Appendix B and C in Owens et al. 2002). Each NMSU crew has a lithic analyst to perform field analysis of lithic data on each site. This person logs all artifact attribute data into handheld computers in Excel database format. This section of the report provides a description of the project assemblage resulting from this field data collection, and some of the field procedures applied for the collection of these data.

Macroscopically unmodified chipped-stone artifacts were classified in a system based on Ahler's (1989) approach of chipped-stone mass analysis. His analysis focuses on size grade distributions of distinct raw material types represented in any given context. This analysis is based on the fundamental presumption that, in proportional terms, a higher quantity of smaller flakes were produced during the later stages of lithic reduction, while larger flakes predominate during the earlier stages of lithic reduction activities.

In debitage analysis procedures, two size grades (large and small) are used to gauge artifact size. Small, approximately 6 x 6 inch, wooden frame wire mesh screens with ½ square inch openings are employed to measure flaking debris in the field. An item considered to fall within the large-size grade will not pass in any orientation though a ½ square inch screen. This includes pieces with a minimum dimension greater than 0.71 inches (the diagonal of a ½ square inch). When an item passes through a ½ square inch screen it is classified as small; this included detritus with maximum dimensions of less than 0.71 inches.

A number of chipped-stone raw material types are known to outcrop in the PCMS. Andrefsky (1990) classified most of these materials. More recently, Ahler (Appendix II in Loendorf et al. 1996) collected a number of lithic raw material samples from a variety of environmental and topographic settings on the PCMS in order to redefine the typology and provide reference materials. The most widespread PCMS material types and nonlocal materials that could be distinguished based on visual examination were chosen as categories for NMSU's field analysis method. Most nonlocal materials are collected in the field and analyzed in the field laboratory. These are classified as to "source" based on comparison with known lithic material specimens in our "type" collection, or in some cases, using ultraviolet fluorescence identification.

Also recorded is the presence or absence of cortex (i.e., the weathered rind or natural exterior surface of the raw material). In some cases, cortex may appear as discoloration caused by chemical processes or as a smooth, polished surface in the case of water tumbled terrace cobbles. In each specimen, cortex is recorded as absent if no surface rind is present on the dorsal flake surface or platform. Cortex is recorded as present if a weathered coating is present in any amount on the dorsal flake surface or platform.

In addition to aforementioned size and material information, flaking debris items are classified according to debitage category. Recorded categories include chunk/shatter, simple and complex flakes, bifacial-thinning flakes, and bipolar flakes. These will be described further later in this chapter.

Debitage Analysis Results

A total of 23,060 pieces of debitage were analyzed on project sites and from isolated finds; these represent over 85% of the total artifact assemblage (Table 6.2). Twenty-one material types are present in the combined project assemblage (Tables 6.3 and 6.4). It comes as no surprise that locally available material types comprise the majority of the pieces (98%). Quartzite (67%) is the dominant material group; chert (18%), argillite (6%), hornfels/basalt (5%), orthoquartzite (2%), and silicified wood (1%) also showed relatively high percentages. Chalcedony, claystone, conglomerate, diorite, glass, granite, baked clay, limestone, petrified wood, porcelanite, quartz, rhyolite, sandstone, and siltstone represent less than one percent of the total assemblage. These materials are 54% microcrystalline, 20% cryptocrystalline, and 25% macrocrystalline. The high proportion of microcrystalline materials is attributed to the abundance of locally available coarse-grained quartzite, argillite and hornfels/basalt; quartzite outcrops, in most cases, less than 100 m from sites along the canyon edges. Nonlocal materials (330 items) seen in the debitage include Alibates dolomite (10), Black Forest silicified wood (105), an unspecified dendritic chert (38), unspecified exotic chert (33), Flattop chalcedony (5), Hartville Uplift chert (10), Valles Caldera obsidian (115), and porcelanite (14). Table 6.5 reveals summary metric data for nonlocal lithic materials encountered during this project. Combined with the nonlocal material data from the Training Areas 7 (Owens et al. 2002) and 11 (Owens et al. 2000) of the PCMS, a north-south oriented trade and exchange network is suggested. This is not surprising considering that the Front Range corridor is aligned north-south.

Simple flakes (48%) and complex flakes (39%) dominate the assemblage; fewer pieces of shatter (9%), biface-thinning flakes (3%), bipolar flakes (<1%), core-rejuvenation flakes (<1%), and tool resharpening flakes (<1%) were noted in the assemblage (Table 6.2). All stages of lithic reduction are represented; 67% of the assemblage retains no dorsal cortex. Large items account for 60% of the project assemblage, and 40% is small.

Simple flakes comprise the largest debitage class (n=11,210). A simple flake is a freehand percussion or pressure flake that exhibits parts of two or fewer previous flake scars on the dorsal surface (Owens et al 2000:19). Small platform trimming flakes, signifying platform preparation, are not considered dorsal flake scars. A flake may or may not retain the platform, so this category often includes incomplete flakes that lack platforms. Like the overall debitage assemblage, many material classes are present and a distinct selection preference for quartzite (73%) and chert (13%) was observed (Table 6.3). Obsidian, Alibates dolomite, Black Forest silicified wood, Flattop chalcedony, Hartville Uplift chert, and porcelanite comprise the nonlocal materials in the simple flakes (< 1% of the overall assemblage).

Sixty-one percent of the simple flakes are noncortical and 39% show some degree of dorsal cortex. Of these, 33% are noncortical small flakes, 29% are cortical large flakes, 28% are noncortical large flakes, and 9% are cortical small flakes. The high proportion of cortical flakes and large size specimens indicate that most of the simple flakes were produced by hard-hammer raw material reduction activities. The noncortical small flakes show, at least to a small degree, some early stage biface/uniface tool manufacture was also used to generate the simple flakes. Two hundred and ninety-one simple flakes show evidence for burning or heat preparation, 26 items were considered to be patinated.

TABLE 6.2: Summary Data for Debitage Type.

	Bifacial-thin.	Bipolar	Complex	Core-rej.	Shatter	Simple	Tool Res.	Total
Total	704	12	8930	3	2197	11210	4	23060
Large	115	12	6067	1	1291	6434	2	13922
Small	589	0	2863	2	906	4776	2	9138
Cortical	22	9	2220	1	894	4352	3	7501
Noncortical	682	3	6710	2	1303	6858	1	15559
Large/Cortical	13	9	1893	1	666	3323	2	5907
Small/Cortical	9	0	327	0	228	1029	1	1594
Large/Noncortical	102	3	4174	0	625	3111	0	8015
Small/Noncortical	580	0	2536	2	677	3747	1	7543

TABLE 6.3: Debitage Class by Material Type.

Material	Debitage Class							
	Bifacial-thin.	Bipolar	Complex	Core-Rej.	Shatter	Simple	Tool Res.	Total
Argillite	32	0	531	0	165	596	0	1324
Chalcedony	6	0	36	0	6	29	0	77
Chert	347	6	1819	1	574	1503	2	4252
Claystone	0	0	2	0	0	1	0	3
Conglomerate	0	0	0	0	0	1	0	1
Diorite	0	0	0	0	0	11	0	11
Glass	0	0	2	0	0	0	0	2
Granite	0	0	0	0	0	1	0	1
Hornfels/basalt	20	0	402	0	87	577	0	1086
Kaolinite	0	0	14	0	2	18	0	34
Limestone	0	0	2	0	1	8	0	11
Obsidian	13	0	52	0	14	36	0	115
Orthoquartzite	11	0	195	0	21	177	0	404
Petrified Wood	0	0	0	0	1	1	0	2
Porcelanite	0	0	5	0	1	8	0	14
Quartz	0	0	2	0	14	6	0	22
Quartzite	223	6	5750	1	1272	8138	0	15390
Rhyolite	0	0	0	0	0	1	0	1
Sandstone	0	0	0	0	2	3	2	7
Silicified Wood	52	0	98	1	33	82	0	266
Siltstone	0	0	20	0	4	13	0	37
Total	704	12	8930	3	2197	11210	4	23060

TABLE 6.4: Summary Data for Material Group.

	Total	Large	Small	Cortical	Noncortical	Lrg/Cortical	Sml/Cortical	Lrg/Non	Sml/Non
Argillite	1324	715	609	450	874	321	129	394	480
Chalcedony	77	20	57	11	66	5	6	15	51
Chert	4252	1510	2742	826	3426	497	329	1013	2413
Claystone	3	2	1	0	3	0	0	2	1
Conglomerate	1	1	0	0	1	0	0	1	0
Diorite	11	10	1	8	3	8	0	2	1
Glass	2	2	0	0	2	0	0	2	0
Granite	1	1	0	0	1	0	0	1	0
Hornfels/Basalt	1086	642	444	374	712	291	83	351	361
Kaolinite	34	23	11	17	17	12	5	11	6
Limestone	11	11	0	8	3	8	0	3	0
Obsidian	115	29	86	6	109	1	5	28	81
Orthoquartzite	404	266	138	73	331	58	15	208	123
Petrified Wood	2	2	0	0	2	0	0	2	0
Porcelanite	14	3	11	4	10	1	3	2	8
Quartz	22	10	12	4	18	2	2	8	10
Quartzite	15390	10563	4827	5634	9756	4659	975	5904	3852
Rhyolite	1	1	0	1	0	1	0	0	0
Sandstone	7	6	1	6	1	6	0	0	1
Silicified Wood	266	72	194	63	203	24	39	48	155
Siltstone	37	33	4	16	21	13	3	20	1

TABLE 6.5: Summary Data for Non-local Materials.

	Total	Large	Small	Cortical	Noncortical	Lrg/Cortical	Sml/Cortical	Lrg/Non	Sml/Non
Alibates Dolomite	10	2	8	0	10	0	0	2	8
Black Forest Sil. Wood	105	18	87	21	84	7	14	11	73
Dendritic Chert	38	11	27	2	36	2	0	9	27
Exotic Chert	33	11	22	6	27	5	1	6	21
Flattop Chalcedony	5	2	3	3	2	2	1	0	2
Hartville Uplift	10	1	9	1	9	0	1	1	8
Obsidian	115	29	86	6	109	1	5	28	81
Porcelanite	14	3	11	4	10	1	3	2	8

Complex flakes are freehand percussion or occasionally pressure flakes, that lack the more specialized features of a bifacial-thinning flake, but which do clearly exhibit all or parts of three or more previous flake scars on the dorsal surface (Owens et al 2000:18-19). Again, small platform preparation flakes are not considered. Complex flakes may be recorded whether they do, or do not, retain the proximal end/platform. Eight thousand nine hundred thirty-three specimens were classified as complex flakes. Like the simple flakes, quartzite (64%) and chert (20%) are the dominant materials; quartzite is seen as a smaller percentage and chert is larger by 7%. The other complex flakes (16%) are argillite, chalcedony, claystone, glass, hornfels/basalt, kaolinite, limestone, obsidian, orthoquartzite, porcelanite, quartz, silicified wood, and siltstone.

Of the quartzite specimens, 39% are large noncortical flakes, 30% are large cortical flakes, 25% are small noncortical flakes, and 6% are cortical small flakes. The chert flakes are 57% small noncortical flakes, 24% large noncortical flakes, 11% large cortical flakes, and 8% small cortical flakes. In the overall assemblage, large complex flakes (68%), both cortical and noncortical items, and the presence of cortex (33%) in all complex flakes, indicate overall reduction strategies revolved around core/raw material reduction. Based on the above information, it appears that most of the complex flakes were produced during secondary core trimming or the very early stages of biface or tool manufacture. Small noncortical flakes suggest some later-stage biface manufacturing activities. Ninety-nine percent of the complex flakes were made from local materials. Alibates dolomite (3), Black Forest silicified wood (28), Hartville Uplift chert (14), unspecified exotic chert (13), Flattop chalcedony (1), Jemez Mountain obsidian (52), and porcelanite (5) are the nonlocal materials. Of the complex flakes, 23 items are patinated and there were 249 items colored or cracked from heat exposure.

The shatter category consists of 2197 items. Chunk/shatter is defined in Owens et al. (2000:18-19) as a angular piece of knappable stone that lacks features which allow determination of the dorsal or ventral surfaces or the direction of force application (i.e., it is not possible to identify a bulb of percussion or platform). Experimental studies indicate that hard hammer cobble testing customarily generates shatter (Ahler and Christensen 1983:187). Therefore, a high proportion of shatter in the chipped-stone debitage assemblage is used as one indicator of cobble testing and early stage lithic reduction strategies.

The following material type distribution is seen for the shatter class-- quartzite (58%), chert (26%), argillite (8%), and hornfels basalt (4%). The following materials comprise the remaining 4% of the assemblage-- chalcedony, kaolinite, limestone, obsidian, orthoquartzite, petrified wood, porcelanite, quartz, sandstone, silicified wood, and siltstone. Nonlocal materials recorded in this class include Black Forest silicified wood (10), dendritic chert (3), unspecified exotic chert (3), Flattop chalcedony (1), Jemez Mountain obsidian (14), and porcelanite (1). These data indicate that some nonlocal materials were being brought to the PCMS as unfinished cobbles and not always in finished tool form. Of the local materials (2,165), most of the shatter pieces are large (59%) and noncortical (59%). This indicates that specific outcrops for these materials are very close to the study units surveyed during our project. One hundred and forty specimens show evidence for heat exposure and two items were patinated.

Bifacial-thinning flakes represent technologically specialized flakes removed from a biface during mid-to-late stages of thinning. Ahler and Christensen (1983:189) identify bifacial-thinning flakes as having "a thin flattened transverse cross-section; a thin, curved longitudinal cross-section; very acute lateral and distal edge angles associated with feather terminations, including opposite that of the subject flake; a narrow, faceted and prepared platform representing a small segment of a prepared and dull bifacial tool edge; a lipped platform; little or no cortex on the dorsal flake face; an expanding flake shape; and a diminutive, flattened or subdued positive bulb of force."

The debitage assemblage contains 704 biface-thinning flakes, and these are made from eight material groups. The materials are 59% cryptocrystalline, 31% microcrystalline, and 9% macrocrystalline; the material groups were chert (49%), quartzite (32%), silicified wood (7%), argillite (4%), hornfels/basalt (3%), obsidian (2%), orthoquartzite (2%), and chalcedony (1%).

Size and cortex data show that 82% of the biface-thinning flake assemblage is noncortical small flakes, 15% is noncortical large flakes, 2% is cortical large flakes, and 1% is cortical small flakes. The high proportion of noncortical small flakes coupled with the lack of cortex suggests that most of the biface-thinning flakes are attributed to late-stage biface manufacturing or resharpening activities. With cortex present on 3% percent of the flakes, some early-stage biface manufacture is evident. Because only 16% of the flakes are large, most of the bifaces manufactured in the Training Area 10 and 12 portions of the PCMS were apparently small to medium in size. Biface-thinning flakes include 86 pieces of non-local lithic material -- 38 Black Forest silicified wood, 35 unspecified chert, and 13 Jemez Mountain obsidian. Thirty-four of the biface-thinning flakes were burned.

Twelve distinct bipolar flakes were recorded from sites from Training Areas 10 and 12. Bipolar flakes are technologically specialized flakes (Owens et al 2000:19) indicative of bipolar percussion techniques. The place of force application consists of a point or ridge, often shattered or crushed. These flakes also have evidence of opposing fracture or force applications. Often the distinction between the dorsal and ventral face is difficult to determine. Linear and often parallel flake scar surfaces are apparent. Bipolar flakes tend to have angular, transverse cross-sections and a high frequency of pronounced ripple marks on flake surfaces. The lack of bipolar flakes in the assemblage suggests one of two things. Either the locations where bipolar core reduction typically occurs are not in the Priority I survey areas, or bipolar reduction was never a preferred technique for the reduction of cobbles and nodules in the PCMS region. The latter may-be correct as many of the chert cobbles found on erosional terraces in the canyon areas are quite small.

All of the bipolar flakes from the debitage assemblage were either locally available quartzite (6) or chert (6). All were classified as belonging in the large size grade and nine of the twelve specimens show dorsal cortex.

Three core-rejuvenation flakes and four tool-resharpening flakes were also recorded. Core-rejuvenation flakes are another technologically specialized class of flake often associated with the refurbishing of nearly exhausted cores. The place of force application (platform) is perpendicular to the platform group on the core and the dorsal ridge of the flake will show negative flakes scars and previously prepared platforms. Black Forest silicified wood, chert, and coarse-grained quartzite are the material types recorded for the core-rejuvenation flakes. The tool-resharpening flakes are chert (2), and sandstone (2). All sandstone flakes appear to have been removed from the edge of some kind of chopping tool, either purposely or as a use spall. The chert flakes resulted from chipped-stone tool resharpening.

Debitage Analysis Summary

During our survey project, on-site analysis for every piece of surface flaking debris was completed, or a 150-item sample was processed on large or artifactually dense sites. On some of the larger sites a 150-piece sample was taken, but smaller samples of up to 50 items were analyzed from individual features as we tried to determine specific feature function or associated subsistence or raw material reduction activities. It should be noted that there appears to be some minor problems with the use of our information. Minute retouch flakes and other biface-thinning flakes, for example, tend to be small and may not have been seen during field analysis. The main reason for this is that the erosional landscape of the PCMS is very active, particularly near the canyon edges, and small flakes tend to wash away, or be redeposited in secondary sedimentary events. As a result, the measure of chipped-stone tool manufacture or maintenance may be biased. Also, because field lithic analysis is a subjective endeavor, bias can be introduced into categories such as material type and debitage type. Recognizing these shortcomings, we still maintain that these debitage data can be useful for recognizing patterns of prehistoric use for sites in every portion of the PCMS. Though general, we believe meaningful results have been obtained.

Raw material availability explains the dominance of quartzite and chert in the site assemblages. Both materials can be found on terraces within the large canyons bisecting Training Area 10. Relatively high percentages of argillite and hornfels/basalt are also conspicuous; these materials occur in primary outcrops along the hogback or as cobbles or nodules on the terraces or within Van Bremer Arroyo. Though argillite and hornfels basalt are considered locally available materials, primary sources appear outside (southwest) of Training Area 10; it is nearly 12 km to the hogback and Van Bremer Arroyo from the closest site in the project area. The high proportion of local materials suggests the local lithic resources met the technological and quantitative needs of the community. This is seen as an *embedded* tactic (Binford 1977, 1979; Binford and Stone 1985) which involves the collection of raw materials incidentally while everyday subsistence activities are occurring. Because very little time and energy was used to collect suitable lithic material, time could be spent on other daily activities.

As stated earlier, in the overall debitage assemblage non-local materials (330) include Jemez Mountain Obsidian (Polvadera Peak, Obsidian Ridge, and Cerro del Medio sources), Malad obsidian, Alibates dolomite, Black Forest silicified wood, unspecified dendritic chert, unspecified exotic chert, Flattop chalcedony, Hartville Uplift chert, and porcelanite. Though these items represent only 1.43% of the overall debitage assemblage, some comments can be presented regarding material form and group mobility.

The nonlocal debitage items are 95 simple flakes, 86 biface-thinning flakes, 116 complex flakes, 32 pieces of shatter, and a single core-rejuvenation flake. Thirty of the simple flakes, seven of the complex flakes, and six pieces of shatter show cortex; these are Black Forest silicified wood, Flattop chalcedony, unspecified dendritic chert, Hartville Uplift chert, obsidian (Cerro del Medio, Polvadera peak, Obsidian Ridge, Malad Idaho) and porcelanite. The presence of cortex, especially on specimens of obsidian and Black Forest silicified wood, indicates some nonlocal materials were brought to the PCMS as unmodified cobbles. Nonlocal materials also entered the area as large, unpatterned bifaces or prepared cores based on the flaking debris classifications.

One question that needs to be asked is what were the nonlocal materials being used for? From the flakes, it appears that some formal tools, flake tools, and flake blanks were being produced. It is likely that tool resharpening produced some of the small biface-thinning flakes (81) and small complex flakes (82). It is unknown at this time whether the procurement tactic for nonlocal materials involves seasonal movement or trade and exchange; either way the transport routes appear to be aligned north-south.

The theory for these transportation routes is supported by the lithic material data from site 5LA9187. It seems that the site occupants, in the area for a large communal hunting event, migrated down from the upper Plains states to the PCMS.

Simple flakes and complex flakes dominate the project debitage assemblage, although shatter, biface-thinning flakes, bipolar flakes, core-rejuvenation flakes, and tool resharpening flakes were also noted. Both expedient flake technologies and bifacial technologies were methods of production used by prehistoric inhabitants in Training Areas 10 and 12. High percentages of simple flakes and the presence of much shatter indicate formal core reduction and/or raw material procurement were the dominant lithic reduction strategy performed along the edges of the major canyons and drainages of the PCMS. This statement is supported by the fact that high quality lithic material is accessible in these areas. There is also a strong emphasis on flake or tool manufacturing (making retouched flakes, unifaces, bifaces) based on the number of small complex flakes and biface-thinning flakes.

CHIPPED-STONE TOOLS

This section presents a description of the chipped-stone artifacts that were collected during the PCMS Training Areas 10 and 12 survey project. A total of 2,817 chipped-stone tools were collected during our work and include projectile points, drills/boring tools, scrapers, large bifaces, cores, multifunctional hammerstone tools, chopping tools, and expedient flake tools. A descriptive summary of this analysis, individual artifact analysis (in some cases), as well as observations regarding the patterns observed in the assemblage are included in the chapter.

Stone Tool Analysis Procedures

Stone tools were recorded in one of three size grades (i.e., large, medium, and small), and this was determined by processing artifacts through hand held wire mesh screens with ½ inch and 1 inch openings (Owens et al. 2002:19). Large-size grade artifacts will not pass, in any orientation, through a 1 square inch opening with a lateral measurement of 1.41 inches. Medium-size grade pieces include artifacts that pass through the 1 inch opening, but not through a ½ square inch opening. These items have maximum dimensions of less than 1.41 inches and minimum dimensions of greater than 0.71 inches. Small-size grade pieces will pass through the ½ square inch mesh; these have maximum dimensions of less than 0.71 inches.

In addition to the above information, artifact material types were coded using the same classification system as used for the flaking debris. Cortex presence or absence was also recorded employing the criteria used in the debitage flake analysis.

During the field analysis, chipped-stone tools were classified as one of eight categories; only the first five were collected and subsequently analyzed in greater detail in the laboratory. The categories are as follows: small thin patterned biface (arrow point or knife), large thin patterned biface (dart point or knife), other unfinished biface, patterned flake tool, retouched/utilized flake, large crude bifacial core/tool, non-bipolar core, and bipolar core.

Small thin patterned bifaces (Category 1) are heavily shaped by intentional secondary flaking (i.e., patterned), are small and thin in size and form (i.e., arrow point size), and exhibit only pressure flaking. This type includes both technologically finished and unfinished forms so both preforms and completed projectiles are included in this category (Owens et al. 2000:20).

Large thin patterned bifaces (Category 2) are defined as bifaces heavily shaped by intentional secondary flaking (i.e., patterned tool), medium to large in size and form (i.e., dart point size), and shaped by pressure flaking and/or percussion techniques with highly regularized bifacial margins (Owens et al. 2000:20). This type also includes both technologically finished and unfinished forms (i.e., both preforms and completed projectiles are included).

Other large patterned bifaces (Category 3) included any other large biface that lacked hafting elements and may have been used as handheld cutting implements, however, macroscopic evidence of use wear is not necessary for incorporation in this classification. These items may be technologically either finished or unfinished (Owens et al. 2000:20).

Patterned flake tools (Category 4) are defined (Owens et al. 2000:20) as a flake tool with secondary flakes removed to produce a form or outline intended by the knapper (e.g., scraping tool or perforator). This category was further divided into several types during ensuing laboratory analysis, including end scraper, side scraper, or drill.

Other retouched and/or utilized flakes (Category 5) consisted of unpatterned flake tools with one or more edges macroscopically modified by intentional retouch and/or heavy utilization wear (Owens et al. 2000:20). The outline, in planview, of these tools is largely a product of the flake blank shape rather than intentional retouch. In our analysis, flakes with unpatterned retouch and utilized pieces are included in a single, all encompassing category as it is often difficult to recognize differences between them. There are two reasons for this. First, retouch and use both involve the purposeful application of force to the artifact margin. In the case of a retouched artifact, it is held stationary and this force is applied using an implement. In artifact utilization the artifact is pressured against a stationary object. The point to be made here is that for both of the above instances, the two processes often produce macroscopically identical results. Second, most retouched artifacts are also utilized, making it functionally awkward to completely separate these categories.

Large crude bifacial core tools consist of thick cores modified by bifacially directed percussion flaking, often with a very sinuous or irregular edge. These artifacts may or may not have macroscopic evidence for use wear (i.e. ring fractures or micro step-flake scars). This category may include cores or early-stage bifacially reduced artifacts used as tools (Owens et al. 2000:20-21).

Non-bipolar cores consist of any core or core-like tool produced by freehand, or non-bipolar percussion flaking. Kooyman's (2000:170) definition bests describes this type of artifact. Cores are any piece of lithic material from which another piece of lithic material has been detached for the purpose of use as a tool or to manufacture into a tool. Bipolar cores are pieces of raw material fashioned by application of opposing forces. Areas of force application are often shattered or crushed, and rings of force are plainly visible on both ends.

Further laboratory analysis (at the Kent Hall Museum in New Mexico and the NMSU field office in Colorado) was completed for stone tool categories 1 through 5, which were collected, and this information is presented below. These artifacts were collected because their greater degree of culturally induced patterning allows the use of more meaningful analytical procedures (i.e., chronological age estimates can be researched in the case of projectile points). Metric attributes for recording these tools can be found in Dean (1992).

Patterned Tool Analysis Results

The patterned tool assemblage, not counting the projectile points, includes 1,518 artifacts. This section of the report describes an analysis of these collected artifacts. The intent is to provide descriptive data consistent with previous archaeological research on the PCMS. In order to control for inter-observer error, a single individual (Mark Owens) categorized the artifacts as one of eight more specialized tool types. These types are as follows; biface, preform, blank, drill/perforator, end scraper, end/side scraper, graver, side scraper, spokeshave, uniface, and utilized flake. For data manipulation purposes, all of these tools were also assigned a general class designation: biface, flake tool, perforator, and scraper.

Table 6.6 presents the counts of tool class by material type. Fine-grained quartzite (30%) and unspecified chert (28%) were the most common materials encountered in the assemblage. Coarse-grained quartzite (7%), orthoquartzite (6%) argillite (6%), and Black Forest silicified wood (4%) were the next most common materials. Other locally available materials, found in small percentages, were hornfels/basalt, Brushy Basin/Morrison chert, chalcedony, baked claystone, jasper, kaolinite, limestone, quartz, Ralston Creek chert, rhyolite, sandstone, silicified wood, and siltstone. Non-local materials, including the aforementioned Black Forest silicified wood (south central Colorado) were Alibates dolomite (Texas panhandle), a material that is visibly similar to Chinle chert (New Mexico), dendritic chert (Wyoming), Edwards Plateau chert (central Texas), Flattop chalcedony (northern Colorado border), Knife River flint (South Dakota), Niobrara jasper (Kansas), obsidian (New Mexico and Montana), Pedernal chert (New Mexico), Plate Chalcedony (South Dakota), and tiger-eye chert (northwest Colorado and southwestern Wyoming). Specimens made from amethyst glass and colorless glass were also recorded. In conclusion, local materials comprise 88% of the overall tool assemblage.

In general, bifaces (Figure 6.23) are artifacts with shallow angle retouch on both faces and one or more margins (Owens et al. 2000:244). These are a very common artifact types; nearly one-third of the retouched/utilized tools recorded in the Training Areas 10 and 12 project were classified as bifaces. Because many nearly finished and finished bifaces are difficult to distinguish from large projectile point preforms, some of these were simply classified in the general biface class. Totals of 494 biface tools were analyzed in the chipped-stone tool assemblage and include 460 unspecified bifaces, 21 preforms, and 13 blanks. Of these, most (n=267, 54%) are classified as unfinished. In the finished (n=67, 14%) and nearly finished (n=154, 31%) bifaces, 132 specimens show use wear. Of these, nearly three-quarters (74%) show an edge angle of less than 45 degrees (cutting wear) and the rest have an angle greater than 45 degrees (scraping wear). Most (n=348) of the bifaces are broken. In complete bifaces, the length ranges from 25 to 167 mm (average 57.90 mm), the width from 15 to 104 mm (average 37.50), the thickness from 5 to 36 mm (average 13.24), and the weight 2.2 to 501 gm (average 41.45 gm). The summary metric data for all complete bifaces is illustrated in Table 6.7. The majority are made of fine-grained quartzite (n=181, 39%) and chert (n=117, 25%), with smaller amounts of coarse-grained quartzite (12%), orthoquartzite (8%), argillite (5%), hornfels/basalt (2%), Black Forest silicified wood (2%), and about 1% each of Alibates dolomite, Brushy Basin chert, claystone, kaolinite, obsidian, Plate chalcedony, Ralston Creek chert, and silicified wood.

Artifacts in the perforator class (Owens et al. 2000:244-245) include drills, gravers, and unspecified boring tools (Figure 6.24). Drills are defined as flakes with retouch on opposing margins that forms a narrow neck. A total of twenty-seven drills were collected and are made of microcrystalline (60%), cryptocrystalline (31%), and macrocrystalline (9%) materials. In order to make a drill it is necessary to extensively retouch a flake. Because of this, finer-grained materials would have been preferred over coarse-grained materials, and this is demonstrated in the assemblage. Only three drills are composed of non-local material; these are Black Forest silicified wood (2) and Flattop chalcedony. The direction of the primary rotation was recorded for twenty-three of the drills (the remaining four were indeterminate). In twelve cases the rotation pattern is counterclockwise when viewed from the tip down, eight show clockwise rotation, and three were rotated in both directions. Only three of the drills are complete. The gravers and expedient boring tools are unspecified chert (93), Ralston Creek chert (2), fine-grained quartzite (2), Black Forest silicified wood (1), and obsidian (1).

TABLE 6.6: Patterned Tool Class by Material Type.

Material	Tool Class				
	Biface	Flake Tool	Perforator	Scraper	Total
Alibates	2	6	0	10	18
Amethyst Glass	0	1	0	0	1
Argillite	24	53	3	18	98
Black Forest	9	28	3	23	63
Brushy Basin	1	0	0	1	2
Chalcedony	0	3	0	3	6
Chert	124	186	17	95	422
Chinle Chert	0	1	0	0	1
Claystone	2	0	0	0	2
Coarse Quartzite	56	62	1	10	129
Dendritic Chert	0	2	0	4	6
Edwards Chert	0	0	0	1	1
Fine Quartzite	195	261	8	44	508
Flattop Chalcedony	0	5	1	4	10
Glass	0	1	0	1	2
Hartville Uplift	3	7	0	10	20
Hornfels/Basalt	13	27	0	3	43
Jasper	1	0	0	0	1
Kaolinite	1	1	0	0	2
Knife River Flint	0	1	0	0	1
Limestone	0	4	0	0	4
Niobrara Jasper	0	0	0	1	1
Obsidian	6	30	1	1	38
Orthoquartzite	44	29	0	14	87
Pedernal Chert	0	1	0	1	2
Plate Chalcedony	4	1	0	0	5
Quartz	0	1	0	0	1
Ralston Creek Chert	5	9	2	5	21
Rhyolite	0	1	0	0	1
Sandstone	0	1	0	0	1
Silicified Wood	4	9	0	4	17
Siltstone	0	3	0	0	3
Tiger-Eye Chert	0	1	0	0	1
Total	494	735	36	253	1518

End scrapers (Figure 6.25) are tools with steep angle retouch on the distal flake margin and are generally made on a thick flake (Owens et al. 2000:242-243). Many end scrapers were probably attached to a handle and used for scraping activities (i.e., removing flesh from animal hides). A total of 47 were recorded from the project area and they include 12 material types. Over 46% of the end scrapers are made from chert. Recorded in smaller percentages were fine-grained quartzite (13%), Black Forest silicified wood (11%), argillite (7%), coarse-grained quartzite (7%), dendritic chert (4%), Brushy Basin chert (2%), chalcedony (2%), glass (2%), hornfels/basalt (2%), orthoquartzite (2%), and silicified wood (2%).

Complete end scrapers (23) have length ranges from 16 to 75 mm (average 35.4 mm), widths from 16 to 65 mm (average 31.2 mm), and a thickness from 4 to 27 mm (average 11.39 mm). Weight data shows a minimum weight of 1.3 gm, a maximum weight of 92.1 gm, and average weight of 20.32 gm (Table 6.8).

End/side scrapers (Figure 6.26) are artifacts with steep angle retouch on the distal and lateral flake margins (Owens et al. 2000:244). Over half (53%) of the tools in the overall scraping tool assemblage were classified as end/side scrapers. As was the case for end scrapers, most end/side scrapers were made from fine-grained materials. These artifacts were also probably hafted onto a handle, but the addition of lateral retouch suggests they may have been used for a wider variety of tasks than end scrapers. In many instances, this lateral retouch may simply have been done in order to facilitate hafting. Some of these may have been used unhafted. Eighty-four items are complete and 52 are broken. Complete end/side scrapers range from 13 to 81 mm in length (average 40.57 mm), 5 to 69 mm in width (average 31.34 mm), and 5 to 27 mm in thickness (average 11.88 mm). Weight varies from 2.3 to 84.9 gm with an average of 20.17 gm. Table 6.9 shows the metric data for the end/side scrapers.

Side scrapers (Owens et al. 2000:244) are tools with steep angle retouch on one or more lateral margins (Figure 6.27). These artifacts may have been used in a handheld fashion or hafted and used for scraping activities. Side scrapers occurred with almost the same frequency as end scrapers, though these artifacts may have been used for a greater variety of tasks. Slightly over half (51%) of these tools are made of cryptocrystalline microcrystalline material; ten are made of non-local materials (Alibates dolomite (3), Black Forest silicified wood (3), unspecified dendritic chert (1), Flattop chalcedony (1), Hartville Uplift chert (1), and obsidian (1). Twenty-six of the 61 side scrapers are complete. In these, length ranges from 33 to 98 mm (average 60.88 mm), width 21 to 104 mm (average 40.69 mm), and thickness 5 to 35 mm (average 14.57 mm). The weight ranges from 6.1 to 151.2 gm with an average of 45.28 gm (Table 6.10). As shown in the metric data, the end and the end/side scrapers are much smaller than the side scrapers, likely the result of many resharpening events.

Ten scraping tools, because of differing attributes, were not classified into one of the general scraping categories. These are six spokeshaves, three combination scraper/gravers, and a tiny thumbnail scraper. These are made of undefined chert (4), Black Forest silicified wood (3), fine-grained quartzite (2), and Flattop chalcedony (1).

Unifaces are defined as tools with shallow angle retouch on one face that can be on one or more margins, but only one face per margin (Owens et al. 2000:244). It should be noted that some early-stage projectile point preforms are often difficult to distinguish from unifaces. In this analysis, flakes that lacked invasive retouch and exhibited usewear were classified as unifaces. These tools were fairly common in the assemblage; a total of 145 were recorded. These artifacts were made from a wide variety of materials suggesting that they were employed for many different tasks. A selection preference is seen for microcrystalline materials (n=99, 68%); cryptocrystalline (n=31, 21%), and macrocrystalline (n=15, 11%) materials were also used. Table 6.11 shows the metric data for the complete (83) uniface tools. These were large in size with an average length of 52.44 mm, width of 39.86, and thickness of 15.06 mm. Weight ranges from 1.6 to 265.1 gm with an average of 40.76 gm. Based on edge angle, these items were used primarily for scraping (121) activities, though some cutting (10) is also apparent. Fourteen of the unifaces are freshly resharpened with no apparent use wear. In sixteen percent of the assemblage, an artifact is so highly fragmented that its use location can not be identified. In 73 items only one edge was utilized, 50 items displayed two utilized edges, seven had use wear on three edges, and one was utilized on both lateral edges and the proximal and distal end.

A total of 590 utilized flakes were recorded in the tool assemblage (Figure 6.28). Utilized flakes are defined as flakes that lacked patterned flake removal, but exhibit macroscopically visible use wear. Unlike many of the other tool classes, most (n=328, 56%) of the utilized flakes were made from the coarser-grained materials. It is unknown whether the preference for microcrystalline or macrocrystalline materials is the product of raw material availability or because the high fracture toughness of these materials would lead to much less rapid dulling. Based on the edge angle, the utilized flakes were used for scraping (81%) and cutting (19%); most (383) were used along one edge or end, with fewer showing two (168), three (55), or four (2) use locations. In the complete utilized flakes (308), the mean length is 43.41 mm, the width is 34.08 mm. The weight averages nearly 27 gm (Table 6.12).

TABLE 6.7: Summary Metric Data for Complete Biface Tools.

			Bifaces			
Variable	Valid Number	Minimum	Maximum	Average	Standand Deviation	Variance
Length	126	25	167	57.9047	24.9336	621.6860
Width	126	15	104	37.5079	14.4076	207.5799
Thickness	126	5	36	13.2460	5.2087	27.1309
Weight	126	2.2	501	41.4589	62.8137	3945.573

TABLE 6.8: Summary Metric Data for Complete End Scrapers.

			End Scrapers			
Variable	Valid Number	Minimum	Maximum	Average	Standand Deviation	Variance
Length	23	16	75	35.4782	14.6190	213.7150
Width	23	16	65	31.2608	13.7715	189.6561
Thickness	23	4	27	11.3913	5.7819	33.4308
Weight	23	1.3	92.1	20.3286	25.8186	666.6048

TABLE 6.9: Summary Metric Data for Complete End/Side Scrapers.

End/Side Scrapers						
Variable	Valid Number	Minimum	Maximum	Average	Standand Deviation	Variance
Length	84	13	81	40.5714	14.6347	214.1755
Width	84	5	69	31.3452	11.5503	133.4094
Thickness	84	5	27	11.8809	4.8455	23.4796
Weight	84	2.3	84.9	20.1791	19.017	361.6489

Table 6.10: Summary Metric Data for Complete Side Scrapers.

Side Scrapers						
Variable	Valid Number	Minimum	Maximum	Average	Standand Deviation	Variance
Length	26	33	98	60.8846	18.3702	337.4661
Width	26	21	104	40.6923	17.3130	299.7415
Thickness	26	5	35	14.5769	6.4073	41.0538
Weight	26	6.1	151.2	45.2846	39.8755	1590.058

Table 6.11: Summary Metric Data for Complete Uniface Tools.

Uniface Tools						
Variable	Valid Number	Minimum	Maximum	Average	Standand Deviation	Variance
Length	83	19	113	52.4457	18.8810	356.4939
Width	83	10	93	39.8674	15.4175	237.7017
Thickness	83	4	6	15.0602	7.4561	55.5938
Weight	83	1.6	265.1	40.7612	39.9193	1593.551

Table 6.12: Summary Metric Data for Complete Utilized Flakes.

Utilized/Retouched Flakes						
Variable	Valid Number	Minimum	Maximum	Average	Standand Deviation	Variance
Length	308	10	115	43.4123	19.8966	395.8782
Width	308	9	111	34.0811	16.6661	277.7621
Thickness	308	1	52	11.4545	6.4217	41.2389
Weight	308	0.3	370.1	26.6588	40.9551	1677.3203

Projectile Points

A total of 479 projectile points were collected from surface assemblages in Training Area 10 and 12. This section provides a descriptive summary of these artifacts. When possible, projectile points were categorized according to the system developed by Anderson (1989:111-315) for classification of projectile points from the PCMS. For points that did not morphologically fit within the Anderson system, other references were consulted (i.e., Frison 1978; Irwin-Williams 1973; Stiger 2001). For additional expert analysis, several of the Paleoindian and Archaic age points were sent to Dr. Jack Hofman of the University of Kansas and Dr. Stanley Ahler of the Paleocultural Research Group.

The primary division within this system is between large (n=174) and small (n=300) projectile points. The larger styles are thought to generally be atlatl dart points or thrusting spear points, whereas the small point category probably includes more recent arrow points. Projectile point preforms comprise a small proportion of the point assemblage (13%). Preforms were classified as either early stage or nearly completed. It is often difficult to distinguish early stage preforms from a variety of different artifact types including unifaces and bifacial knives. Relatively flat artifacts with shallow angle retouch that lacked use wear were classified as early stage preforms. Few early-stage and nearly completed preforms were noted in the large point assemblage. This may be a result of a tendency to misclassify these artifacts as bifacial knives or other tools.

Projectile points were made from a variety of different raw materials, but fine-grained materials were more commonly used. Material types varied substantially for large and small points (Table 6.13). Cryptocrystalline materials (chert, chalcedony, obsidian, and silicified wood) that are more brittle and consequently easier to retouch were more frequently used for small points, whereas microcrystalline and macrocrystalline materials with a higher fracture toughness (fine- and coarse-grained quartzite, basalt, and argillite) were more common in the large point assemblage, though a fairly high proportion of cryptocrystalline materials were observed.

TABLE 6.13: Material Type by Projectile Point Size.

	Projectile Point Size					
Material Type	Small Point	Percent	Large Point	Percent	Total	Percent
Alibates	7	1.46%	7	1.46%	14	2.92%
Argillite	9	1.88%	15	3.13%	24	18.90%
Black Forest	33	6.89%	2	0.42%	35	7.31%
Brushy Basin	0	0.00%	1	0.21%	1	0.21%
Chalcedony	12	2.51%	3	0.63%	15	3.13%
Chert	131	27.35%	68	14.20%	199	41.54%
Dendritic Chert	3	0.63%	2	0.42%	5	1.04%
Fine Quartzite	50	10.44%	39	8.14%	89	18.58%
Flattop Chal.	2	0.42%	1	0.21%	3	0.63%
Hartville Uplift	8	1.67%	0	0.00%	8	1.67%
Hornfels/Basalt	5	1.04%	5	1.04%	10	2.09%
Obsidian	8	1.67%	5	1.05%	13	2.71%
Oolitic Chert	0	0.00%	1	0.21%	1	0.21%
Orthoquartzite	24	5.01%	24	5.01%	49	10.23%
Pedernal Chert	1	0.21%	0	0.00%	1	0.21%
Quartzite	0	0.00%	2	0.42%	2	0.42%
Ralston Creek	1	0.21%	0	0.00%	1	0.21%
Silicified Wood	6	1.25%	3	0.63%	9	1.88%
Total	300	62.63%	174	36.33%	479	100.00%

Diagnostic Projectile Points

This section summarizes metric attributes and shape characteristics for projectile points categorized according to the Anderson (1989) system. It is possible to assign 349 of the projectile points to categories in the Anderson typology, the remaining 130 points were too fragmentary for analysts to classify or type in any system. In a few isolated cases, collected projectile points did not fall into one of Anderson's because they were morphologically different in form. In these instances, other sources were researched to determine the type and nature of the point.

The following sections describe the projectile point classes in the Anderson system, and each of the different categories that are represented in the Training Area 10 and 12 assemblage. In order to facilitate comparisons with previous analyses (Loendorf and Loendorf 1999; Owens et al. 2000; Owens et al. 2002; Schiavitti et al. 2001), data are presented here in much the same format employed by Anderson (1989), with project specific modifications added where needed. A brief summary of each point class is presented, and then the categories within the class are summarized.

Large Unstemmed Point Class

This class consists of large projectile points that lack shoulders and stems. This class of points is relatively rare in PCMS assemblages and it accounts for only 3.97% of the classifiable projectile points. A total of 19 artifacts representing 5 types were classified as large unstemmed points. Four of the type categories can be found in Anderson (1989). Folsom points, a class of artifacts that have not been encountered in the PCMS, do not fit well within Anderson's system. For organizational purposes, these will be assigned to Category P1.1. One-third of the artifacts in this class have been assigned to Category P4, which includes teardrop shaped bifaces. Category P4 points may have been preforms for large projectile points that were discarded or lost prior to completion, in the Anderson system a broad age estimate of 5000 BC to AD 500 is suggested (1989:119). Hofman (personal communication, 2001) indicates that three of the P4 items may be Paleoindian preforms, so it seems reasonable that the date range for this class can be expanded to approximately 8000 BC. When all of the dates are considered, this is an extremely long time span. This is a reflection of the unfinished nature of the artifacts, and they would have likely been manufactured into a number of different styles when completed.

CATEGORY P1 (Figure 6.4)

Number of Artifacts: 1
Catalogue Number: 5LA9200 FS 1

Description: This point is missing its tip, has a bi-convex cross-section, straight blade edges, no shoulders or stem, and a concave base. Its base is distinctly ground. Anderson (1989:115-117) places Plainview, Allen, Fredrick, and other lanceolate points within this category and suggests an age range of between 8500 BC and 7700 BC for P1 points. Hofman (personal communication, 2001) identified this specific basal fragment as Plainview.

Metric Attributes

Length:	----
Width:	24 mm
Greatest Thickness:	----

Blade Length:	----
Blade Width:	24 mm
Haft Width:	----
Base Thickness:	4 mm

Material Type: Quartzite

CATEGORY P1.1 (Figure 6.3)

Number of Artifacts: 2
Catalogue Number: 5LA9187 FS16, 5LA9373 FS7

Description: These are Folsom point pieces (10,950 to 10,250 BP), one medial and one lateral edge portion. The fragmentary nature of these points makes specific morphological description difficult, for more detail regarding the point from 5LA9187 see Ahler (2002:65-67). Of note, the specimen from 5LA9373 is made of locally available orthoquartzite and suggests it was manufactured on the PCMS.

Metric Attributes

Length:	----
Width:	22 mm, n=1
Greatest Thickness:	4 mm, n=1
Blade Length:	----
Blade Width:	----
Haft Width:	----
Base Width:	----

Material Types: Flattop chalcedony (50%), Orthoquartzite (50%)

CATEGORY P2 (Figure 6.2)

Number of Artifacts: 4
Catalogue Numbers: 5LA5239 FS1, 5LA8605 FS20, 5LA8614 FS3, 5LA8656 FS1

Description: All of these points are basal fragments, with bi-convex to diamond shaped cross-sections. Stems are straight to contracting, and the bases are concave and straight. Anderson (1989:117) indicates that is difficult to assign an accurate date range for P2 points. Hofman (personal communication, 2001) has identified two of the four as Hell Gap points. Artifacts from the Hell Gap complex have been dated to around 10,000 to 9,500 radiocarbon years ago (Frison 1974, 1978).

Metric Attributes

Length:	----
Width:	16 mm, n=1
Greatest Thickness:	6 mm – 9 mm, mean=7.66 mm, n=3

Blade Length: ----
Blade Width: 16 mm, n=1
Haft Width: 20 mm, n=1
Base Width: 16 mm – 17 mm, mean=16.66 mm, n=3

Material Type: Unspecified chert (50%), Fine-grained Quartzite (50%)

CATEGORY P3 (Figure 6.12)

Number of Artifacts: 2
Catalogue Numbers: 5LA9020 FS22, 5LA9211 FS 38

Description: These broken points have missing tips, bi-convex cross-sections, straight blade edges, sloping shoulders, a contracting stem, pointed tangs, and a convex base. This category is thought to date between 7200 BC to 6500 BC (Anderson 1989:118), but our two specimens really do not match it that well. In addition, these large points display distinct basal grinding.

Metric Attributes
Length: ----
Width: 20 mm, n=1
Greatest Thickness: 6 mm, n=1
Blade Length: ----
Blade Width: 20.5 mm, n=2
Haft Width: 16 mm, n=1
Base Width: ----

Material Types: Basalt (50%) and Orthoquartzite (50%)

CATEGORY P4 (Figures 6.4, 6.8, 6.22)

Number of Artifacts: 10
Catalogue Numbers: 5LA2240 FS10, 5LA8620 FS10, 5LA8666 FS13, 5LA9038 FS2, 5LA9188 FS2, 5LA9278 FS10, 5LA9333 FS17, 5LA9448 FS3, 5LA9448 FS27, 5LA9456 FS1

Description: These are large, tear-drop and leaf-shaped preforms that have dull to sharp tips, bi-convex cross-sections, straight to convex blade edges, no shoulders to sloping shoulders, rounded tangs, and straight to convex bases. This category is thought to date between AD 5000/3000 to AD 500 (Anderson 1989:119). Hofman (personal communication, 2001) indicates that at least two of these specimens are likely Paleoindian point preforms, and this supports Anderson's earliest date.

Metric Attributes
Length: 26 mm – 31 mm, mean=28.5 mm, n=2
Width: 17 mm – 25 mm, mean=20 mm, n=7
Greatest Thickness: 4 mm – 10 mm, mean=6.3 mm, n=10
Blade Length: ----

Blade Width:	17 mm – 25 mm, mean=20.33 mm, n=3
Haft Width:	16 mm, n=1
Base Width:	13 mm – 25 mm, mean=17.6 mm, n=5

Material Types: Alibates dolomite (10%), Argillite (10%), Brushy Basin chert (10%), Unspecified chert (50%), Oolitic chert (10%), Orthoquartzite (10%)

Large Straight Stemmed Point Class

This class includes only three artifacts that are in two different categories. This class is one of the rarest, and constitutes only 0.63% percent of classifiable projectile point assemblage. Projectile points in this class appear to have been first manufactured during the Early Archaic period (5800 to 3000 BC) and may have been continued to be made until AD 1000 (Anderson 1989:124).

CATEGORY P8 (Figure 6.20)

Number of Artifacts: 1
Catalogue Numbers: 5LA9212 FS 20

Description: This is a medial blade and partial base of a large point. It is bi-convex in cross section, has straight blade edges, and weakly barbed shoulders. This point most closely resembles Anderson's P8 (1989:122), Specimen F, though there appears to be much variation within her category. No date range is presented for P8 type projectiles.

Metric Attributes

Length:	----
Width:	27 mm
Greatest Thickness:	6 mm
Blade Length:	----
Blade Width:	27 mm
Haft Width:	5 mm
Base Width:	----

Material Type: Fine-grained Quartzite

CATEGORY P9 (Figure 6.22)

Number of Artifacts: 2
Catalogue Numbers: 5LA8622 FS 5, 5LA9183 FS 35

Description: These thick, narrow-bladed points have sharp to very sharp tips, straight blade edges, rounded shoulders, long, straight to very slightly expanding stems, rounded tangs, and convex bases. The flaking is generally crude (Anderson 1989:123). There is much variation within this category of artifacts when both the Training Area 10 and Anderson's points are considered, so likely a variety of styles and time periods are encompassed within the class. Despite this stylistic variability, Anderson (1989:124) estimates a rather narrow age range for this category (3300 to 2800 BC).

<u>Metric Attributes</u>

Length:	31 mm, n=1
Width:	17 mm, n=1
Greatest Thickness:	6 mm – 7 mm, mean=6.5 mm, n=2
Blade Length:	20 mm, n=1
Blade Width:	17 mm, n=1
Haft Width:	12 mm, n=1
Base Width:	15 mm, n=1

<u>Material Type</u>: Argillite (50%), Fine-grained Quartzite (50%)

Large Expanding Stem Point Class

This rather common point class includes 82 projectile points in 25 categories. These artifacts constitute 17.33% of the classifiable projectile points. Projectile points in this class appear to have been manufactured over a long time span, beginning as early as 5500 BC and ending as late as AD 1600.

CATEGORY P10 (Figure 6.5)

<u>Number of Artifacts</u>: 2
<u>Catalogue Numbers</u>: 5LA8607 FS 6, 5LA9478 FS 37

<u>Description</u>: These projectile points have missing tips, bi-convex and diamond shaped cross-sections, concave to straight blade edges, rounded to sloping shoulders, broad, shallow side notches, very slightly expanding to expanding stems, rounded to pointed tangs, and convex bases. Anderson (1989:125) suggests that this style began in 5500 BC and continued until 3000 BC based on comparison with points from southern and west central Colorado.

<u>Metric Attributes</u>

Length:	----
Width:	20 mm, n=1
Greatest Thickness:	6 mm – 9 mm, mean=7.5 mm, n=2
Blade Length:	----
Blade Width:	20 mm, n=1
Haft Width:	13 mm, n=2
Base Width:	15 mm – 17 mm, mean=16 mm, n=2

<u>Material Type</u>: Argillite (50%), Obsidian (50%)

CATEGORY P11 (Figure 6.5)

Number of Artifacts: 1
Catalogue Numbers: 5LA8605 FS 3

Description: This is the medial portion of a large projectile point. Its tip is missing, it has a bi-convex cross-section, slightly barbed shoulders, and an expanding stem. Morphologically, this point is slightly different in style than that shown in Anderson's (1989:243) Figure 4.10, but it is similar enough to be classified as equivalent. An age estimate of 4000 to 3500 BC is suggested for this category (Anderson 1989:126).

Metric Attributes	
Length:	----
Width:	41 mm
Greatest Thickness:	5 mm
Blade Length:	----
Blade Width:	41 mm
Haft Width:	23 mm
Base Width:	----

Material Type: Fine-grained Quartzite

CATEGORY P12 (Figure 6.5)

Number of Artifacts: 2
Catalogue Numbers: 5LA8611 FS 1, 5LA9283 FS 15

Description: Both of these points have missing tips but very broad blades, bi-convex cross-sections, straight blade edges, extended barber shoulders, expanding stems, broken tangs, and straight bases. An age estimate of 3000 BC to AD 500 (Anderson 1989:127) is suggested for this category.

Metric Attributes	
Length:	----
Width:	----
Greatest Thickness:	4 mm – 6 mm, mean=5 mm, n=2
Blade Length:	----
Blade Width:	----
Haft Width:	14 mm, n=1
Base Width:	----

Material Types: Chert

CATEGORY P16 (Figure 6.5)

Number of Artifacts: 3
Catalogue Numbers: 5LA8311 FS3, 5LA8676 FS1, 5LA9187 FS1

Description: These points are all missing their tips, and have bi-convex cross-sections, convex blade edges, sloping to barbed shoulders, slightly expanding to expanding stems, rounded tangs, and concave bases. The age estimate suggested is 3000 BC to 200 BC (Anderson 1989:130-131).

Metric Attributes	
Length:	----
Width:	19 mm – 21 mm, mean=20 mm, n=3
Greatest Thickness:	5 mm, n=3
Blade Length:	----
Blade Width:	19 mm – 21 mm, mean=20 mm, n=3
Haft Width:	12 mm – 14 mm, mean=12.66 mm, n=3
Base Width:	14 mm – 18 mm, mean 16 mm, n=2

Material Types: Chalcedony (33%), Obsidian (33%), Silicified Wood (33%)

CATEGORY P18 (Figure 6.6)

Number of Artifacts: 6
Catalogue Numbers: 5LA4940 FS 11, 5LA8619 FS 7, 5LA8620 FS30, 5LA9041 FS1, 5LA9220 FS5, 5LA9283 FS37

Description: These large points have dull tips, bi-convex and irregular cross-sections, straight to convex blade edges, rounded to sloping shoulders, slightly expanding to expanding stems, rounded tangs, and concave bases. The age estimate for this category is 3000 BC to 500 BC (Anderson 1989:132-133).

Metric Attributes	
Length:	29 mm – 38 mm, mean=33.5 mm, n=2
Width:	18 mm – 21.6mm, mean=19.4 mm, n=3
Greatest Thickness:	5.3 mm – 6 mm, mean=5.7 mm, n=3
Blade Length:	20.5 mm – 27 mm, mean=24 mm, n=2
Blade Width:	18 mm – 21.6mm, mean=19.4 mm, n=3
Haft Width:	15.6 mm – 17 mm, mean=16.2 mm, n=3
Base Width:	16.5 mm – 19.6 mm, mean=17.7 mm, n=3

Material Types: Argillite (17%), Basalt (17%), Chert (17%), Fine-grained Quartzite (17%), Orthoquartzite (33%)

CATEGORY P19 (Figure 6.7)

Number of Artifacts: 6
Catalogue Numbers: 5LA8606 FS3, 5LA9259 FS11, 5LA9277 FS7, 5LA9337 FS72, 5LA9371 FS3, 5LA9454 FS17

Description: These are large points with dull to sharp tips (mainly dull), bi-convex cross-sections, straight to convex blade edges, weakly barbed to barbed shoulders, slightly expanding to expanding stems, rounded to pointed tangs, and straight to convex bases. An age estimate of 2000 BC to AD 1000 is suggested for this category, although their use may continue later in some places (Anderson 1989:134).

Metric Attributes

Length:	25 mm – 37 mm, mean=31 mm, n=2
Width:	17 mm – 24 mm, mean=20.75 mm, n=4
Greatest Thickness:	5 mm – 7 mm, mean=6 mm, n=6
Blade Length:	18 mm – 31 mm, mean=24.5 mm, n=2
Blade Width:	17 mm – 24 mm, mean=20.75 mm, n=4
Haft Width:	3 mm – 5 mm, mean=4.33 mm, n=6
Base Width:	13 mm – 17 mm, mean=15.75 mm, n=4

Material Type: Argillite (50%), Basalt (33%), Fine-grained quartzite (17%)

CATEGORY P20 (Figure 6.8)

Number of Artifacts: 2
Catalogue Numbers: 5LA8292 FS2, 5LA8606 FS1

Description: These are large points with dull tips, bi-convex cross-sections, straight blade edges, abrupt to weakly barbed shoulders, slightly expanding stems, rounded to pointed tangs, and straight to convex bases. An age estimate of 500 BC to AD 1 is suggested for this category (Anderson 1989:136).

Metric Attributes

Length:	26 mm – 31 mm, mean=28.5 mm, n=2
Width:	18 mm – 19 mm, mean=18.5 mm, n=2
Greatest Thickness:	5 mm, n=2
Blade Length:	17 mm - 22 mm, mean=19.5, n=2
Blade Width:	18 mm – 19 mm, mean=18.5 mm, n=2
Haft Width:	4 mm, n=2
Base Width:	12 mm – 15 mm, mean=13.5 mm, n=2

Material Types: Chert (50%), Orthoquartzite (50%)

CATEGORY P21 (Figure 6.8)

Number of Artifacts: 1
Catalogue Numbers: 5LA9183 FS13
Description: This is a broken and reworked point whose original shape would have been a P21. It has no tip, a bi-convex cross-section, convex blade edges, weakly barbed shoulders, an expanding stem, rounded tangs, and a convex base. Points from this category are thought to date between 1000 BC and AD 1000 (Anderson 1989:143), though it is unclear whether FS 13 can be attributed to this time frame.

Metric Attributes

Length:	----
Width:	21 mm
Greatest Thickness:	6 mm
Blade Length:	----
Blade Width:	21 mm
Haft Width:	5 mm
Base Width:	15 mm

Material Types: Chert

CATEGORY P24 (Figure 6.9)

Number of Artifacts: 1
Catalogue Numbers: 5LA9337 FS 13

Description: The tip and one tang are missing from this large projectile point. It has a bi-convex cross-section, convex blade edges, sloping shoulders, an expanding stem, round tangs, and a straight base. Points of this type are thought to date between 3000 and 200 BC according to Anderson (1989:141).

Metric Attributes

Length:	----
Width:	20 mm
Greatest Thickness:	6 mm
Blade Length:	----
Blade Width:	20 mm
Haft Width:	5 mm
Base Width:	----

Material Type: Argillite

CATEGORY P25 (Figure 6.8)

Number of Artifacts: 1
Catalogue Numbers: 5LA9281 FS6

Description: This is a large, triangular shaped point that is missing its tip and one tang. It has a bi-convex cross-section, straight blade edges, abrupt shoulders, an expanding stem, and a convex base. Anderson (1989:142) suggests points in this category date between 1500 and 1000 BC.

Metric Attributes

Length:	----
Width:	21 mm
Greatest Thickness:	7 mm
Blade Length:	----
Blade Width:	21 mm
Haft Width:	5 mm
Base Width:	----

Material Type: Fine-grained Quartzite

CATEGORY P26 (Figures 6.9, 6.10)

Number of Artifacts: 24

Catalogue Numbers: 5LA2240 FS7, 5LA8297 FS19, 5LA8308 FS14, 5LA8308 FS28, 5LA8601 FS2, 5LA8674 FS5, 5LA9211 FS9 and FS17, 5LA9214 FS2, 5LA9227 FS6, 5LA9233 FS1, 5LA9278 FS12, 5LA9284 FS6, 5LA9305 FS2, 5LA9308 FS2, 5LA9349 FS8, 5LA9355 FS1, 5LA9366 FS5, 5LA9371 FS2 and FS45, 5LA9371 FS69, FS88, and FS124

Description: Points in this category have sharp to very sharp tips, bi-convex to plano-convex cross-sections, concave, convex, and straight blade edges, weakly to extended barbed shoulders, slightly to greatly expanding bases, rounded to pointed tangs, and concave, convex, and straight bases. Anderson (1989:142-143) seems to have made this category a "catch all" for large corner-notched projectile points and thus they exhibit a relatively wide date range (1000 BC to AD 500).

Metric Attributes

Length:	29 mm – 39 mm, mean=34 mm, n=2
Width:	20 mm – 26 mm, mean=22 mm, n=5
Greatest Thickness:	3 mm – 6 mm, mean=4.54 mm, n=24
Blade Length:	21 mm – 44 mm, mean=32.25 mm, n=4
Blade Width:	20 mm – 26 mm, mean=22 mm, n=5
Haft Width:	7 mm – 17 mm, mean=11.86 mm, n=22
Base Width:	11 mm –21 mm, mean=16, n=11

Material Types: Argillite (13%), Black Forest silicified wood (4%), unspecified chert (46%), Fine-grained Quartzite (33%), Orthoquartzite (4%)

CATEGORY P27 (Figure 6.11)

Number of Artifacts: 1

Catalogue Numbers: 5LA9040 FS1

Description: This large and well-made point is missing its tip. It is bi-convex in cross-section, has convex blade edges, extended barbed shoulders, an expanding stem, pointed tangs, and a convex base. This point class, according to Anderson (1989:144), extends from the Late Archaic period to the Apishapa phase of the Late Prehistoric stage (500 BC to AD 1150).

Metric Attributes

Length:	----
Width:	30 mm
Greatest Thickness:	6 mm
Blade Length:	----
Blade Width:	30 mm
Haft Width:	5 mm
Base Width:	21 mm

Material Types: Orthoquartzite

CATEGORY P28 (Figure 6.10)

Number of Artifacts: 3
Catalogue Numbers: 5LA6105 FS50, 5LA8297 FS1, 5LA9259 FS46

Description: Three broken specimens were assigned to this category. They have dull to sharp tips, ovate to triangular blades, bi-convex to plano-convex cross-sections, convex to straight blade edges, abrupt to rounded shoulders, slightly expanding bases, rounded tangs, and straight bases. Anderson (1989:145) suggests this category dates between 2000 BC and AD 1000.

Metric Attributes

Length:	27 mm – 32 mm, mean=29.5, n=2
Width:	19 mm – 20 mm, mean=19.66, n=3
Greatest Thickness:	5 mm 8 mm, mean 6.33, n=3
Blade Length:	19 mm – 25 mm, mean 22, n=3
Blade Width:	19 mm –20 mm, mean 19.66, n=3
Haft Width:	11 mm – 14 mm, mean 12.33, n=3
Base Width:	13 mm, n=1

Material Types: Chert (33%), Fine-grained Quartzite (33%), Orthoquartzite (33%)

CATEGORY P29 (Figure 6.12)

Number of Artifacts: 4
Catalogue Numbers: 5LA9189 FS2, 5LA9208 FS5, 5LA9208 FS6, 5LA9290 FS22

Description: All of the points are asymmetrical and have been reworked to form a different tool. One was resharpened into a hafted cutting tool, one has a graver spur on its tip, and two were resharpened to form blunt tips. On the group, their tips are dull to very sharp, they have bi-convex to plano-convex cross-sections, convex to straight blade edges, abrupt, rounded, and weakly barbed shoulders, expanding stems, pointed to rounded tangs, and convex to straight bases. An age estimate of 500 BC to AD 600 is suggested by Anderson (1989:146), but the reworked nature of these points seems to make any temporal affiliation tenuous.

Metric Attributes

Length:	19 mm – 32 mm, mean=24.5 mm, n=4
Width:	16 mm – 21 mm, mean=19.25 mm, n=4
Greatest Thickness:	4 mm – 6 mm, mean=4.75 mm, n=4
Blade Length:	12 mm – 23 mm, mean=17.25 mm, n=4
Blade Width:	16 mm – 20 mm, mean=18 mm, n=4
Haft Width:	9 mm – 14 mm, mean=12 mm, n=4
Base Width:	11 mm – 18 mm, mean=15.5 mm, n=4

Material Types: Alibates dolomite (25%), Chert (25%), Obsidian (25%), Orthoquartzite (25%)

CATEGORY P30 (Figure 6.12)

Number of Artifacts: 3
Catalogue Numbers: 5LA8615 FS1, 5LA9275 FS5, 5LA9361 FS1

Description: Three examples were identified in the chipped-stone tool assemblage. These points have dull to sharp tips, bi-convex cross-sections, straight blade edges, abrupt to extended barbed shoulders, slightly expanding stems, rounded tangs, and straight bases. This category is suggested to date between 1000 BC and AD 1000 (Anderson 1989:148).

Metric Attributes

Length:	29 mm – 40 mm, mean=34.5 mm, n=2
Width:	24 mm – 26 mm, mean=25 mm, n=2
Greatest Thickness:	5 mm – 8 mm, mean=6mm, n=3
Blade Length:	20 mm – 29 mm, mean=23.66 mm, n=3
Blade Width:	24 mm – 26 mm, mean=25 mm, n=2
Haft Width:	3 mm – 6 mm, mean=4 mm, n=3
Base Width:	19 mm, n=1

Material Types: Chert (33%), Fine-grained Quartzite (33%), Orthoquartzite (33%)

CATEGORY P31 (Figure 6.12)

Number of Artifacts: 2
Catalogue Numbers: 5LA9227 FS2, 5LA9308 FS27

Description: These are broad bladed points with sharp tips, bi-convex to plano-convex cross-sections, straight to slightly convex blade edges, abrupt to barbed shoulders, expanding stems, rounded tangs, and broad convex bases. This category is thought to date between 1000 BC and AD 1000 (Anderson 1989:149).

Metric Attributes

Length:	31 mm – 40 mm, mean=35.5 mm, n=2
Width:	17 mm – 20 mm, mean=18.5 mm, n=2
Greatest Thickness:	5 mm – 9 mm, mean=7 mm, n=2
Blade Length:	23 mm – 30 mm, mean=26.5 mm, n=2
Blade Width:	17 mm – 20 mm, mean=18.5 mm, n=2
Haft Width:	4 mm – 5 mm, mean=4.5 mm, n=2
Base Width:	12 mm – 14 mm, mean=13 mm, n=2

Material Types: Chert (50%), Fine-grained Quartzite (50%)

CATEGORY P32 (Figure 6.12)

Number of Artifacts: 1
Catalogue Numbers: 5LA8292 FS11

Description: This nearly complete point has a broken tip, a bi-convex cross-section, convex blade edges, barbed shoulders, an expanding stem, rounded tangs, and straight base. This category is suggested to date between 500 BC and AD 1000 (Anderson 1989:152).

Metric Attributes

Length:	25 mm
Width:	19 mm
Greatest Thickness:	5 mm
Blade Length:	19 mm
Blade Width:	19 mm
Haft Width:	9 mm
Base Width:	13 mm

Material Type: Black Forest silicified wood

CATEGORY P33 (Figure 6.12)

Number of Artifacts: 1
Catalogue Numbers: 5LA9274 FS20

Description: This is a nearly complete artifact with a small portion of the base missing. It has a dull tip, a bi-convex cross-section, straight blade edges, sloping shoulders, a greatly expanding stem, and rounded tangs. According to Anderson (1989:152), this category is thought to date between 500 BC and AD 900.

Metric Attributes

Length:	18 mm
Width:	----

Greatest Thickness:	5 mm
Blade Length:	11 mm
Blade Width:	20 mm
Haft Width:	18 mm
Base Width:	----

Material Type: Fine-grained Quartzite

CATEGORY P34 (Figure 6.13)

Number of Artifacts: 1
Catalogue Numbers: 5LA9037 FS25

Description: Both of the barbs are broken on this large point. It has a dull tip, a plano-convex cross-section, convex blade edges, extended barbed shoulders, a slightly expanding stem, pointed tangs, and a straight base. This category occupies a very broad time range, from the Early Archaic period to the Developmental period of the Late Prehistoric stage (4000/3000 BC to AD 1000, Anderson 1989:153).

Metric Attributes

Length:	17 mm
Width:	----
Greatest Thickness:	5 mm
Blade Length:	11 mm
Blade Width:	----
Haft Width:	14 mm
Base Width:	15 mm

Material Type: Fine-grained Quartzite

CATEGORY P35 (Figures 6.13)

Number of Artifacts: 4
Catalogue Numbers: 5LA8309 FS10, 5LA9275 FS8, 5LA9437 FS6, 5LA9446 FS1

Description: This is one of the more common large point classes identified on the PCMS, however this is not the case in Training Area 10, as only four examples were recorded. These large points have sharp to very sharp tips, broad triangular blades, bi-convex to plano-convex cross-sections, straight to convex blade edges, abrupt to weakly barbed to barbed shoulders, broad expanding stems, round or pointed tangs, and straight to convex bases. This category is thought to date between 1000 BC and AD 1200 (Anderson 1989:154-155).

Metric Attributes

Length:	28 mm – 31 mm, mean=29.5 mm, n=2
Width:	19 mm – 20 mm, mean=20 mm, n=3
Greatest Thickness:	4 mm – 5 mm, mean=4.75 mm, n=4

Blade Length:	16 mm – 22 mm, mean=19.66 mm, n=3
Blade Width:	19 mm – 21 mm, mean=21 mm, n=3
Haft Width:	2 mm – 4 mm, mean=3.5 mm, n=4
Base Width:	4 mm – 18 mm, mean=11 mm, n=2

Material Types: Chert (25%), Fine-grained Quartzite (25%), Orthoquartzite (50%)

CATEGORY P36 (Figure 6.13)

Number of Artifacts: 3
Catalogue Numbers: 5LA8287 FS2, 5LA8606 FS2, 5LA9259 FS30

Description: Three examples of this category were identified in the chipped-stone tool assemblage. These broken points have sharp tips, bi-convex cross-sections, straight blade edges, barbed to extended barbed shoulders, slightly expanding to greatly expanding stems, rounded and pointed tangs, and convex to straight bases. 5LA9259 exhibits distinct basal grinding. No dates are presented for points of this class (Anderson 1989:156).

Metric Attributes

Length:	22 mm – 31 mm, mean=28 mm, n=3
Width:	----
Greatest Thickness:	4 mm – 6 mm, mean=4.66, n=3
Blade Length:	16 mm – 24 mm, mean=21.33 mm, n=3
Blade Width:	----
Haft Width:	12 mm – 15 mm, mean=13.66 mm, n=3
Base Width:	13 mm – 20 mm, mean=16.66 mm, n=3

Material Types: Unspecified Chert (33%), Dendritic Chert (66%)

CATEGORY P37 (Figure 6.13)

Number of Artifacts: 1
Catalogue Numbers: 5LA9476 FS11

Description: The barbs and tangs are missing from this large point. It has a sharp tip, bi-convex cross-section, convex blade edges, a greatly expanding stem, and a straight base. An age estimate of AD 850 to AD 1100 has been suggested for this category (Anderson 1989:157).

Metric Attributes

Length:	41 mm
Width:	----
Greatest Thickness:	6 mm
Blade Length:	32 mm
Blade Width:	----
Haft Width:	10 mm
Base Width:	14 mm

Material Type: Orthoquartzite

CATEGORY P38 (Figure 6.14)

Number of Artifacts: 3
Catalogue Numbers: 5LA8283 FS2, 5LA8629 FS1, 5LA9259 FS6

Description: All of the points assigned to this category are broken. They have very sharp tips, bi-convex cross-sections, straight blade edges, barbed to extended barbed shoulders, expanding to greatly expanding stems, rounded and pointed tangs, and convex to straight bases. Anderson (1989:157-158) indicates that no dates for this category have been obtained from the PCMS. Using point data from sites outside the region, she suggests a date range of AD 600 to AD 1000 for P38 points.

Metric Attributes	
Length:	25 mm, n=1
Width:	----
Greatest Thickness:	4 mm – 6 mm, mean=5 mm, n=3
Blade Length:	19 mm, n=1
Blade Width:	----
Haft Width:	3 mm, n=3
Base Width:	12 mm – 18 mm, mean 15 mm, n=2

Material Types: Alibates dolomite (33%), Unspecified chert (66%)

CATEGORY P39 (Figure 6.13)

Number of Artifacts: 1
Catalogue Numbers: 5LA9342 FS1

Description: The tip and one tang are missing from this large projectile point. It has a bi-convex cross-section, straight blade edges, rounded shoulders, an expanding stem, rounded tangs, and a convex base. Anderson (1989:158) indicates that there are no dates associated with this type of point. It is similar in style and size to Woodland points that date between AD 600 and AD 900 (Perino 1971:100), but it really is not known temporally where this point might be placed in southeastern Colorado assemblages.

Metric Attributes	
Length:	----
Width:	15 mm
Greatest Thickness:	5 mm
Blade Length:	----
Blade Width:	15 mm
Haft Width:	10 mm
Base Width:	----

Material Types: Fine-grained Quartzite

CATEGORY P42 (Figure 6.11)

Number of Artifacts: 4
Catalogue Numbers: 5LA8297 FS5, 5LA9037 FS38, 5LA9039 FS7, 5LA9188 FS5

Description: These large points have sharp tips, bi-convex to plano-convex cross-sections, straight to slightly convex blade edges, weakly barbed to barbed shoulders, very slightly expanding to expanding stems, rounded or pointed tangs, and slightly concave or straight bases. Anderson (1989:161-162) suggests an age estimate of AD 600 to AD 1600 for these points.

Metric Attributes	
Length:	30 mm, n=1
Width:	19 mm, n=1
Greatest Thickness:	3 mm – 5 mm, mean=4.25 mm, n=4
Blade Length:	24 mm, n=1
Blade Width:	19 mm, n=1
Haft Width:	7 mm – 12 mm, mean=9 mm, n=4
Base Width:	10 mm – 16 mm, mean=13 mm, n=2

Material Types: Argillite (25%), Chert (25%), Fine-grained Quartzite (50%)

Large Contracting Stem Point Class

Three projectile points from Training Unit 10 were assigned to this class. The relative paucity of this point class does not appear to be the result of temporal factors; these points are suggested to date from 3,000 BC to AD 500, and other point styles thought to date from this period were collected from the project area. These points have stems with an obtuse angled tang. They appear to be very rare throughout the PCMS; the large assemblage examined by Anderson (1989:164) included only four examples or 0.8% of the total sample. The Training Area 7 point assemblage (Owens and Loendorf 2003) did not contain a single large contracting stem point.

CATEGORY P43 (Figure 6.11)

Number of Artifacts: 3
Catalogue Numbers: 5LA8693 FS13, 5LA9285 FS5, 5LA9448 FS17

Description: These broken points are missing their tips, have bi-convex cross-sections, convex to I-E recurve to straight blade edges, abrupt and rounded shoulders, contracting stems, and convex and straight bases. Anderson (1989:164-165) suggests an age estimate of 3000 to 500 BC for these “Gypsum Cave-like” points.

Metric Attributes

Length:	----
Width:	17 mm – 22 mm, mean=19.33 mm, n=3
Greatest Thickness:	5 mm – 6 mm, mean=5.33 mm, n=3
Blade Length:	----
Blade Width:	17 mm – 22 mm, mean=19.33 mm, n=3
Haft Width:	3 mm – 5 mm, mean=4 mm, n=3
Base Width:	8 mm – 12 mm, mean=10 mm, n=2

Material Types: Chert (33%), Fine-grained Quartzite (33%), Orthoquartzite (33%)

Large Flange Stemmed Point Class

Only four projectile points were assigned to this class, which is 0.84% of the point assemblage considered in this analysis. Though much larger, these points are stylistically similar to several of the small flange-stemmed point styles, and these are much more common in the assemblage (24%). The age estimates for points in this class cover a very broad range from between 6000 BC and AD 1000 (Anderson 1989:170).

CATEGORY P45 (Figure 6.11)

Number of Artifacts: 2
Catalogue Numbers: 5LA8666 FS1, 5LA9193 FS6

Description: These two projectile points are essentially basal fragments, though they display enough of the necessary morphological characteristics to be placed in this category. Points of this class have bi-convex cross-sections, slightly convex blade edges, abrupt shoulders, straight flanged stems, pointed to rounded tangs, and deeply indented bases. An age estimate of 3000 BC to 300 BC has been suggested for points within this category (Anderson 1989:167).

Metric Attributes

Length:	----
Width:	21 mm, n=1
Greatest Thickness:	3 mm, n=1
Blade Length:	----
Blade Width:	21 mm, n=1
Haft Width:	3 mm, n=2
Base Width:	22 mm, n=1

Material Types: Chert (100%)

CATEGORY P47 (Figure 6.14)

Number of Artifacts: 2
Catalogue Numbers: 5LA6105 FS101, 5LA8308 FS2

Description: Two nearly complete points were assigned to category P47. These points have sharp tips, bi-convex and plano-convex cross-sections, convex blade edges, abrupt and rounded shoulders, contracting flange stems, and concave base and convex bases. An age estimate of BC 3300 to AD 1000 is suggested for this style (Anderson 1989:168-169).

Metric Attributes

Length:	25 mm – 30 mm, mean=27.5 mm, n=2
Width:	18 mm, n=1
Greatest Thickness:	5 mm, n=1
Blade Length:	16 mm – 18 mm, mean=17 mm, n=2
Blade Width:	18 mm, n=1
Haft Width:	3 mm – 4 mm, mean=3.5 mm, n=2
Base Width:	24 mm, n=1

Material Types: Chert (50%), Fine-grained Quartzite (50%)

Small Unstemmed Point Class

A total of 62 artifacts were assigned to this class. This relatively common class comprises 12.94% of the classifiable projectile point assemblage. Most, if not all, of the artifacts recorded in this class are small, unfinished projectile points that were either discarded or lost prior to completion. It is realistic to assume that some of these artifacts were used to tip projectiles, though most are thicker on average than other small point styles and frequently have step fractures or other naturally occurring flaws that preclude further thinning.

CATEGORY P48 (Figure 6.14)

Number of Artifacts: 14
Catalogue Numbers: 5LA6101 FS4, 5LA6105 FS91, 5LA6744 FS33, 5LA8606 FS36, 5LA8620 FS4, 5LA8660 FS21, 5LA9187 FS74, FS161, FS317, 5LA9210 FS47, 5LA9211 FS37, 5LA9211 FS61, 5LA9278 FS3, 5LA9478 FS31

Description: Artifacts in this category exhibit a considerable range of variation in morphological characteristics, which is probably a result of the unfinished nature of these artifacts. These small points have very sharp to dull tips, their cross-sections are bi-convex or plano-convex, the blade edges are straight or irregular, these points lack stems or shoulders, their bases are convex, and their tangs are rounded. Anderson (1989:170-171) suggests that these points were made between AD 500 and AD 1400, but were most common between AD 1000 and AD 1400.

Metric Attributes

Length:	16 mm – 27 mm, mean=21 mm, n=10
Width:	11 mm – 18 mm, mean=14.30 mm, n=13
Greatest Thickness:	3 mm – 7 mm, mean=4.35 mm, n=14
Blade Length:	25 mm, n=1
Blade Width:	11 mm – 18 mm, mean=14.50 mm, n=6

Haft Width:	---
Base Width:	12 mm – 17 mm, mean=13.66, n=6

Material Types: Argillite (7%), Black Forest silicified wood (22%), Chert (36%), Fine-grained Quartzite (7%), Orthoquartzite (29%)

CATEGORY P49 (Figure 6.22)

Number of Artifacts: 39
Catalogue Numbers: 5LA8290 FS11, 5LA8290 FS23, 5LA8291 FS7, 5LA8297 FS2, 5LA8300 FS2, 5LA8311 FS18, 5LA8601 FS1, 5LA8606 FS74, 5LA8620 FS7, LA8620 FS84, 5LA8655 FS10, 5LA8672 FS14, 5LA8691 FS43, 5LA9020 FS10, 5LA9020 FS24, 5LA9020 FS32, 5LA9023 FS1, 5LA9183 FS32, 5LA9187 FS107, FS119, FS149, FS150, FS160, FS676, 5LA9188 FS4, 5LA9210 FS45, 5LA9210 FS59, 5LA9211 FS16, 5LA9211 FS64, 5LA9211 FS67, 5LA9220 FS2, 5LA9261 FS1, 5LA9275 FS12, 5LA9331 FS7, 5LA9333 FS10, 5LA9362 FS19, 5LA9448 FS8, 5LA9448 FS16, 5LA9478 FS16

Description: This is one of the most common artifact classes in the chipped-tool assemblage, and artifacts within it exhibit considerable morphological variation. Most of the preforms are fragmentary, comprising 86% of the overall assemblage. These unnotched artifacts have dull to sharp to very sharp tips, bi-convex to concavo-convex to diamond shaped to plano-convex cross-sections, concave to convex to E-I recurve to I-E recurve to irregular to straight blade edges, all lack stems or shoulders, they have rounded to pointed tangs, and their bases are straight to concave to convex. Anderson (1989:174-175) suggests that these point preforms were made between AD 800 and AD 1750, but may date as early as 200 BC.

Metric Attributes

Length:	14 mm – 28 mm, mean 21.12 mm, n=8
Width:	10 mm – 18 mm, mean=13.91 mm, n=34
Greatest Thickness:	2 mm – 5 mm, mean=3.35 mm, n=37
Blade Length:	17 mm – 28 mm, mean=22.33 mm, n=3
Blade Width:	11 mm – 18 mm, mean=14.14 mm, n=14
Haft Width:	---
Base Width:	4 mm – 17 mm, mean=13.03 mm, n=26

Material Types: Alibates dolomite (3%), Black Forest silicified wood (10%), Unspecified Chert (56%), Fine-grained Quartzite (14%), Obsidian (3%), Orthoquartzite (8%), Ralston Creek chert (3%), Unspecified Silicified Wood (3%)

CATEGORY P50

Number of Artifacts: 7
Catalogue Numbers: 5LA2240 FS9, 5LA8689 FS5, 5LA8690 FS6, 5LA9187 FS57, 5LA9187 FS357, 5LA9258 FS8, 5LA9262 FS5

Description: These are small unstemmed triangular point preforms with dull to sharp tips, concave to convex blade edges, pointed to rounded tangs, and concave bases. Six of the seven specimens are fragmentary. Anderson (1989:175-176) suggests that these point preforms were made between AD 1000 and 1750.

Metric Attributes	
Length:	19 mm – 22 mm, mean 20.50 mm, n=2
Width:	11 mm – 17 mm, mean=14.28 mm, n=7
Greatest Thickness:	2 mm – 5 mm, mean=3.71 mm, n=7
Blade Length:	----
Blade Width:	11 mm – 16 mm, mean=13.50 mm, n=4
Haft Width:	---
Base Width:	12 mm – 17 mm, mean=14.30 mm, n=6

Material Types: Black Forest silicified wood (29%), Unspecified Chert (43%), Fine-grained Quartzite (14%), Orthoquartzite (14%)

CATEGORY P51

Number of Artifacts: 2
Catalogue Numbers: 5LA8620 FS36, 5LA9249 FS1

Description: These two small unstemmed point preforms have sharp tips, E-I recurve blade edges, rounded tangs, and concave bases. Anderson (1989:176-177) indicates this type of preforms was made between AD 1200 and 1750.

Metric Attributes	
Length:	30 mm, n=1
Width:	13 mm – 14 mm, mean=13.5 mm, n=2
Greatest Thickness:	5 mm – 7 mm, mean=6 mm, n=2
Blade Length:	21 mm, n=1
Blade Width:	13 mm – 14 mm, mean=13.50 mm, n=2
Haft Width:	---
Base Width:	11 mm – 13 mm, mean=112 mm, n=2

Material Types: Black Forest silicified wood (50%), Unspecified Chert (50%)

Small Straight Stemmed Point Class

A total of only nine artifacts were assigned to this class and constitute only 1.88% of the classifiable projectile point assemblage. Projectile points in this class appear to have been manufactured between AD 700 and 1400 (Anderson 1989:182).

CATEGORY P52 (Figure 6.14)

Number of Artifacts: 4
Catalogue Numbers: 5LA4940 FS26, 5LA9180 FS2, 5LA9349 FS9, 5LA9478 FS36

Description: Though four points were assigned to this category, relatively substantial variation exists in their morphological patterning. These points have sharp to very sharp tips, bi-convex cross-sections, convex and straight blade edges, abrupt or barbed shoulders, slightly expanding to straight stems, rounded or pointed tangs, and convex or straight or concave bases. Anderson (1989:178) notes that there are no dates for this class from the PCMS. Based on artifacts from outside the area, P52 points are thought to date between AD 800 and AD 1350.

Metric Attributes	
Length:	17 mm – 22 mm, mean=19.5 mm, n=2
Width:	14 mm, n=2
Greatest Thickness:	2 mm – 4 mm, mean=3.25 mm, n=4
Blade Length:	
Blade Width:	13 mm – 18 mm, mean=15.5 mm, n=2
Haft Width:	2 mm – 3 mm, mean=2.25 mm, n=4
Base Width:	7 mm – 10 mm, mean=8.66 mm, n=3

Material Types: Chert (50%), Fine-grained Quartzite (50%)

CATEGORY P53 (Figure 6.14)

Number of Artifacts: 2
Catalogue Numbers: 5LA9020 FS38, 5LA9262 FS3

Description: Both of these small broken points are missing their tips. They have bi-convex and concavo-convex cross-sections, straight blade edges, abrupt and weakly barbed shoulders, straight stems, round and pointed tangs, and straight bases. Stemmed points of this type are tentatively dated between AD 700 and AD 1200 (Anderson 1989:180).

Metric Attributes	
Length:	----
Width:	11 mm – 21 mm, mean=16 mm, n=2
Greatest Thickness:	3 mm – 5 mm, mean=4 mm, n=2
Blade Length:	----
Blade Width:	11 mm – 21 mm, mean=16 mm, n=2
Haft Width:	2 mm – 4 mm, mean=3 mm, n=2
Base Width:	6 mm – 10 mm, mean=8 mm, n=2

Material Types: Chert (50%), Orthoquartzite (50%)

CATEGORY P54 (Figure 6.15)

Number of Artifacts: 1
Catalogue Numbers: 5LA4725 FS82

Description: A single broken projectile point was assigned to this category; the tip and one lateral edge are missing. It has a bi-convex cross-section, straight blade edges, abrupt shoulders, a straight stem, rounded tangs, and a convex base. Based on comparative data, Anderson (1989:181) indicates that P54 points may date between AD 750 and AD 1400.

Metric Attributes	
Length:	----
Width:	----
Greatest Thickness:	3 mm, n=1
Blade Length:	----
Blade Width:	----
Haft Width:	5 mm, n=1
Base Width:	5 mm, n=1

Material Type: Chert

CATEGORY P55 (Figure 6.15)

Number of Artifacts: 1
Catalogue Numbers: 5LA9196 FS2

Description: This is a very small basally notched projectile point fragment. It has a sharp tip, a plano-convex cross-section, straight blade edges, barbed shoulders, a straight stem, and pointed tangs. Anderson (1989:182) indicates that these points are associated with dates spanning AD 500 and AD 1450.

Metric Attributes	
Length:	14 mm, n=1
Width:	----
Greatest Thickness:	2 mm, n=1
Blade Length:	9 mm, n=1
Blade Width:	----
Haft Width:	4 mm, n=1
Base Width:	----

Material Type: Chert

Small Expanding Stem Point Class

This class includes small corner notched projectile points. A total of 49 artifacts in 14 different categories were assigned to this class, which makes up 10.23% of the classifiable projectile points. Artifacts in this class appear to have been manufactured for a long period of time-- they may date from the end of the Late Archaic period to the Historic period.

CATEGORY P56 (Figure 6.15)

Number of Artifacts: 1
Catalogue Numbers: 5LA9037 FS27

Description: This is an asymmetrical point fragment that has a bi-convex cross-section, concave blade edges, abrupt shoulders, a slightly expanding base, rounded tangs, and a convex base. Anderson (1989:183) suggests that this type of point may date between AD 750 and AD 1100.

Metric Attributes

Length:	----
Width:	22 mm, n=1
Greatest Thickness:	4 mm, n=1
Blade Length:	----
Blade Width:	22 mm, n=1
Haft Width:	12 mm, n=1
Base Width:	13 mm, n=1

Material Type: Fine-grained Quartzite

CATEGORY P58 (Figure 6.15, 6.16)

Number of Artifacts: 14
Catalogue Numbers: 5LA2240 FS53, 5LA4725 FS104, 5LA8300 FS19, 5LA8311 FS21, 5LA8598 FS1, 5LA8606 FS90, 5LA8620 FS80, 5LA8622 FS4, 5LA8622 FS23, 5LA8666 FS8, 5LA9212 FS23, 5LA9259 FS33, 5LA9274 FS34, 5LA9277 FS10

Description: These artifacts were made from a relatively wide range of materials, all of which can be found on the PCMS. The projectile points have sharp to very sharp tips; most have bi-convex cross-sections, but five examples have plano-convex cross-sections; blade edges are straight or convex, shoulders are weakly barbed to barbed, stems are slightly expanding or expanding, the tangs are pointed and rounded, and the bases are straight or slightly convex. An age estimate of AD 600 to AD 1200 is suggested for this category (Anderson 1989:184-187).

Metric Attributes

Length:	19 mm – 23 mm, mean=21 mm, n=3
Width:	11 mm – 20 mm, mean=14.1 mm, n=10
Greatest Thickness:	2 mm – 5 mm, mean=3.46 mm, n=13
Blade Length:	13 mm – 25 mm, mean=18.33 mm, n=6
Blade Width:	11 mm – 20 mm, mean=14.1 mm, n=10
Haft Width:	7 mm – 14 mm, mean=8.83 mm, n=12
Base Width:	3 mm- 14 mm, mean=9.62 mm, n=8

Material Types: Argillite (7%), Chert (50%), Fine-grained Quartzite (29%), Orthoquartzite (14%)

CATEGORY P59 (Figure 6.16)

Number of Artifacts: 3
Catalogue Numbers: 5LA8681 FS1, 5LA8691 FS1, 5LA9474 FS13

Description: These points have sharp to very sharp tips, bi-convex and plano-convex cross-sections, convex and straight blade edges, barbed shoulders, expanding stems, rounded tangs, and convex bases. Anderson (1989:188-190) suggests an age estimate of AD 500 to AD 1200 for these points, but an ending date of AD 1450 is conceivable.

Metric Attributes

Length:	26 mm – 27 mm, mean=26.66 mm, n=3
Width:	14 mm – 16 mm, mean=14.66 mm, n=3
Greatest Thickness:	3 mm – 4 mm, mean=3.33 mm, n=3
Blade Length:	14 mm – 21 mm, mean=18.33 mm, n=3
Blade Width:	14 mm – 16 mm, mean=14.66 mm, n=3
Haft Width:	2 mm, n=3
Base Width:	9 mm, n=2

Material Types: Argillite (66%), Basalt (33%)

CATEGORY P60 (Figure 6.16)

Number of Artifacts: 4
Catalogue Numbers: 5LA8668 FS2, 5LA9020 FS41, 5LA9211 FS18, 5LA9211 FS65

Description: These points are all broken. They have sharp to very sharp tips, bi-convex and plano-convex cross-sections, convex blade edges, barbed to extended barb shoulders, slightly expanding to expanding stems, rounded to pointed tangs, and straight bases. According to Anderson (1989:192), P60 points have an age estimate of AD 500 to AD 1300.

Metric Attributes

Length:	19 mm, n=1
Width:	15 mm, n=2
Greatest Thickness:	3 mm – 4 mm, mean=3.25, n=4
Blade Length:	14 mm – 22 mm, mean=18 mm, n=2
Blade Width:	15 mm, n=2
Haft Width:	4 mm – 5 mm, mean 4.75 mm, n=4
Base Width:	----

Material Types: Chert (50%), Orthoquartzite (50%)

CATEGORY P62 (Figure 6.17)

Number of Artifacts: 11
Catalogue Numbers: 5LA8602 FS29, 5LA8622 FS3, 5LA8664 FS8, 5LA8665 FS1, 5LA8678 FS3, 5LA8690 FS8, 5LA8691 FS2, 5LA9027 FS1, 5LA9037 FS5, 5LA9329 FS1, 5LA9448 FS28

Description: These are small corner-notched points with sharp to very sharp tips, bi-convex and plano-convex cross-sections, convex and straight blade edges, weakly barbed to barbed to extended barbed shoulders, very slightly expanding to expanding stems, round and pointed tangs, and convex and straight bases. This is one of the few categories with absolute dates from the PCMS; P62 points were in use between AD 500 and AD 1400 (Anderson 1989:195).

Metric Attributes	
Length:	13 mm – 23 mm, mean=19 mm, n=9
Width:	2 mm – 16 mm, mean=12.42 mm, n=7
Greatest Thickness:	2 mm – 4 mm, mean=3.18 mm, n=11
Blade Length:	9 mm – 18 mm, mean=14.44 mm, n=9
Blade Width:	12 mm – 16 mm, mean=13.62 mm, n=8
Haft Width:	2 mm – 4 mm, mean=2.18 mm, n=11
Base Width:	5 mm – 10 mm, mean=7.85 mm, n=7

Material Types: Alibates dolomite (9%), Black Forest silicified wood (9%), Chert (82%)

CATEGORY P63 (Figure 6.17)

Number of Artifacts: 3
Catalogue Numbers: 5LA8292 FS7, 5LA8605 FS18, 5LA8619 FS16

Description: Three points were assigned to this category and have dull tips, bi-convex cross-sections, convex blade edges, rounded shoulders, slightly expanding bases, rounded tangs, and convex bases. Anderson (1989:197) presents a date range of between AD 600 and AD 1100 for points comprising this class.

Metric Attributes	
Length:	20 mm – 27 mm, mean=23.5 mm, n=2
Width:	12 mm, n=1
Greatest Thickness:	3 mm – 4 mm, mean=3.66 mm, n=3
Blade Length:	13 mm – 19 mm, mean=15 mm, n=3
Blade Width:	12 mm, n=2
Haft Width:	7 mm – 12 mm, mean=9.5 mm, n=2
Base Width:	9 mm – 14 mm, mean=11.5 mm, n=2

Material Types: Chert (33%), Fine-grained Quartzite (33%), Hartville Uplift Chert (33%)

CATEGORY P65 (Figure 6.18)

Number of Artifacts: 1
Catalogue Numbers: 5LA9259 FS13

Description: The base and tip are broken from this small point. It has a bi-convex cross-section, convex blade edges, and barbed shoulders. According to Anderson (1989:199), P65 points have a temporal range of AD 800 to AD 1100.

Metric Attributes	
Length:	----
Width:	----
Greatest Thickness:	3 mm, n=1
Blade Length:	----
Blade Width:	----
Haft Width:	6 mm, n=1
Base Width:	----

Material Type: Chert

CATEGORY P66 (Figure 6.18)

Number of Artifacts: 6
Catalogue Numbers: 5LA9187 FS111, 5LA9211 FS35, 5LA9211 FS36, 5LA9300 FS4, 5LA9351 FS2, 5LA9366 FS4

Description: These points have dull to sharp tips, bi-convex and plano-convex cross-sections, convex and straight blade edges, abrupt to barbed shoulders, expanding stems, pointed tangs, and convex or straight bases. The category is thought to date between AD 800 to AD 1450 (Anderson 1989:200).

Metric Attributes	
Length:	22 mm, n=2
Width:	11 mm – 14 mm, mean=12.5 mm, n=2
Greatest Thickness:	3 mm – 4 mm, mean 3.66 mm, n=6
Blade Length:	16 mm –17 mm, mean 16.33 mm, n=3
Blade Width:	11 mm – 14 mm, mean=12.66 mm, n=3
Haft Width:	6 mm –14 mm, mean=9.33 mm, n=6
Base Width:	----

Material Types: Alibates dolomite (33%), Argillite (17%), Chert (17%), Fine-grained Quartzite (33%)

CATEGORY P68 (Figure 6.18)

Number of Artifacts: 1

Catalogue Numbers: 5LA9039 FS2

Description: This is the base of a small projectile point that is intact enough to be assigned to the P68 category (AD 800 to AD 1350). Though fragmented, its cross-section is bi-convex, and it has a greatly expanding stem with pointed tangs and a convex base.

Metric Attributes	
Length:	----
Width:	----
Greatest Thickness:	----
Blade Length:	----
Blade Width:	----
Haft Width:	11 mm, n=1
Base Width:	----

Material Type: Orthoquartzite

CATEGORY P69 (Figure 6.18)

Number of Artifacts: 1
Catalogue Numbers: 5LA8292 FS4

Description: The only example of a P69 style projectile is a complete chert point, which was broken and reworked into a drill. In its original form, the point had a bi-convex cross-section, straight blade edges, abrupt shoulders, an expanding stem, pointed tangs, and a straight base. Category P69 points date between AD 950 and 1750 according to Anderson (1989:203).

Metric Attributes	
Length:	20 mm
Width:	10 mm
Greatest Thickness:	3 mm
Blade Length:	17 mm
Blade Width:	10 mm
Haft Width:	7 mm
Base Width:	8 mm

Material Type: Chert

CATEGORY P72

Number of Artifacts: 1
Catalogue Numbers: 5LA9187 FS102

Description: This projectile was collected from a site covered with P83 points and represents the only departure from flange stemmed styles. The point is missing its tip, has a plano-convex cross-section, barbed shoulders, convex blade edges, an expanding stem, rounded tangs, and a concave base. Anderson's (1989:206) age estimate for this category is AD 800 to AD 1100.

Metric Attributes

Length:	----
Width:	17 mm, n=1
Greatest Thickness:	3 mm, n=1
Blade Length:	----
Blade Width:	17 mm, n=1
Haft Width:	11 mm, n=1
Base Width:	----

Material Type: Black Forest silicified wood

CATEGORY P73 (Figure 6.18)

Number of Artifacts: 1
Catalogue Numbers: 5LA9274 FS23

Description: This point is broken with a missing tip. It has a bi-convex cross-section, straight blade edges, sloping shoulders, an expanding stem, rounded tangs, and a convex base. Though it does not fit precisely within the category, it shares many of the attributes of other points described here. Based on the stylistic similarities, this point is tentatively dated between AD 1000 and 1750.

Metric Attributes

Length:	----
Width:	10 mm, n=1
Greatest Thickness:	3 mm, n=1
Blade Length:	----
Blade Width:	10 mm, n=1
Haft Width:	9 mm, n=1
Base Width:	10 mm, n=1

Material Type: Chert

CATEGORY P74 (Figure 6.18)

Number of Artifacts: 1
Catalogue Numbers: 5LA4940 FS7

Description: This is a nearly complete corner-notched point with a very sharp tip, a bi-convex cross-section, straight blade edges, weakly barbed shoulders, an expanding stem, pointed tangs, and a convex base. A date range of AD 600 to AD 950 has been assigned to points of this category (Anderson 1989:207).

Metric Attributes

Length:	15 mm, n=1

Width:	12 mm, n=1
Greatest Thickness:	3 mm, n=1
Blade Length:	11 mm, n=1
Blade Width:	10 mm, n=1
Haft Width:	2 mm, n=1
Base Width:	10 mm, n=1

Material Type: Chert

Small Contracting Stem Point Class

Three examples from this point class were identified in the assemblage. In other PCMS assemblages, this point style is rare; it constituted 1.1% of the total assemblage considered by Anderson (1989:208), and only one item was identified in Owens et al. (2000:272). Three large contracting stem points were identified for this project. The extreme rarity of this stem style suggests that it may have been avoided due to functional concerns.

CATEGORY P75 (Figure 6.18)

Number of Artifacts: 2
Catalogue Numbers: 5LA9278 FS14, 5LA9291 FS1

Description: These small triangular points have dull to sharp tips, bi-convex and plano-convex cross-sections, concave and convex blade edges, weakly barbed and extended barbed shoulders, contracting stems, rounded tangs, and convex bases. Based on a comparison with points from outside the PCMS, Anderson (1989:209) suggests a date range of AD 800 and AD 1450.

Metric Attributes

Length:	21 mm, n=1
Width:	13 mm – 18 mm, mean=15.5 mm, n=2
Greatest Thickness:	3 mm – 4 mm, mean 3.5 mm, n=2
Blade Length:	15 mm – 16 mm, mean 15.5 mm, n=2
Blade Width:	13 mm – 18 mm, mean=15.5 mm, n=2
Haft Width:	4 mm – 9 mm, mean=6.5 mm, n=2
Base Width:	8 mm, n=1

Material Types: Fine-grained Quartzite (50%), Silicified Wood (50%)

CATEGORY P76 (Figure 6.19)

Number of Artifacts: 1
Catalogue Numbers: 5LA9278 FS13

Description: This complete point has a dull tip, a bi-convex cross-section, convex blade edges, sloping shoulders, a contracting stem, rounded tangs, and a straight base. This category is thought to date around AD 800 to AD 1100 (Anderson 1989:209).

Metric Attributes

Length:	21 mm
Width:	12 mm
Greatest Thickness:	4 mm
Blade Length:	14 mm
Blade Width:	12 mm
Haft Width:	10 mm
Base Width:	9 mm

Material Type: Chert

Small Flanged Stem Point Class

A total of 116 artifacts in seven different categories were assigned to this class. This class of projectile points is one of the most common, accounting for 24.22% of the classifiable projectile points. The class includes some of the most recent point styles in the assemblage, which may, in part, account for the abundance of this point class. These artifacts date largely from the end of the Developmental period to the Protohistoric period, though P81 points have dates that could begin sometime during the Late Archaic period.

CATEGORY P79 (Figure 6.19)

Number of Artifacts: 41
Catalogue Numbers: 5LA8290 FS14, 5LA8297 FS15, 5LA8311 FS10, 5LA8664 FS6, 5LA9026 FS8, 5LA9183 FS21, 5LA9183 FS28, 5LA9183 FS44, 5LA9187 FS8, FS10, FS76, FS77, FS89, FS91, FS93, FS115, FS116, FS147, FS174, FS176, FS180, FS189, FS198, FS200, FS203, FS230, FS232, FS244, FS245, FS246, FS280, FS335, FS384, FS457, FS509, FS523, FS554, 5LA9275 FS3, 5LA9302 FS3, 5LA9333 FS3, 5LA9344 FS33

Description: Twenty-nine of these specimens were recovered from site 5LA9187 and, stylistically, they all appear very uniform in size and shape. These small triangular points have dull to sharp to very sharp tips, bi-convex and plano-convex cross-sections, convex and straight blade edges, abrupt shoulders, expanding flanges, pointed and rounded tangs, and concave and straight bases. These projectile points appear to date between AD 1000 and 1750 (Anderson 1989:211-213). It should be noted that the Late Prehistoric component of 5LA9187 has been radiocarbon dated to ca. 700 BP (Ahler et al. 2002:104), but it is unknown if this is the best represented time period for points of this class.

Metric Attributes for the General Sample

Length:	16 mm – 32 mm, mean=21.37 mm, n=8

Width:	11 mm – 17 mm, mean=13.45 mm, n=20
Greatest Thickness:	2 mm – 4 mm, mean=2.94 mm, n=37
Blade Length:	9 mm – 23 mm, mean=13.75 mm, n=8
Blade Width:	8 mm – 13 mm, mean=11.40 mm, n=32
Haft Width:	5 mm – 9 mm, mean=7.41 mm, n=39
Base Width:	11 mm – 17 mm, mean=13.33 mm, n=24

Metric Attributes for Points from 5LA9187

Length:	16 mm – 22 mm, mean=18.2 mm, n=5
Width:	11 mm – 13 mm, mean=12.45 mm, n=11
Greatest Thickness:	2 mm – 4 mm, mean=2.92 mm, n=25
Blade Length:	9 mm – 14 mm, mean=11 mm, n=5
Blade Width:	10 mm – 13 mm, mean=11.15 mm, n=20
Haft Width:	5 mm – 8 mm, mean=7.07 mm, n=27
Base Width:	11 mm – 13 mm, mean=12.6 mm, n=15

Material Types for the General Sample: Alibates dolomite (2%), Argillite (2%), Black Forest Silicified Wood (22%), Chalcedony (12%), Unspecified Chert (15%), Fine-grained Quartzite (27%), Flattop Chalcedony (5%), Hartville Uplift Chert (5%), Obsidian (2%), Orthoquartzite (2%), Unspecified Silicified Wood (5%)

Material Types from 5LA9187: Argillite (3%), Black Forest silicified wood (29%), Chalcedony (17%), Unspecified Chert (3%), Fine-grained Quartzite (24%), Flattop Chalcedony (7%), Hartville Uplift Chert (7%), Obsidian (3%), Orthoquartzite (3%), Unspecified Silicified Wood (3%)

CATEGORY P80 (Figure 6.20)

Number of Artifacts: 4
Catalogue Numbers: 5LA8294 FS9, 5LA8311 FS7, 5LA8665 FS14, 5LA8672 FS9

Description: Three of the four specimens are complete, and each is a different material type. The points assigned to this category have sharp to very sharp tips, bi-convex and plano-convex cross-sections, straight blade edges, abrupt shoulders, expanding flange stems, pointed tangs, and straight to slightly concave bases. Anderson (1989:213-214) suggests that this category dates between AD 1000 and 1750.

Metric Attributes

Length:	16 mm – 17 mm, mean=16.66 mm, n=3
Width:	13 mm – 15 mm, mean=14 mm, n=3
Greatest Thickness:	2 mm – 3 mm, mean=2.75 mm, n=4
Blade Length:	8 mm – 10 mm, mean=9 mm, n=3
Blade Width:	10 mm, n=4
Haft Width:	7 mm – 9 mm, mean=7.75 mm, n=4
Base Width:	13 mm – 15 mm, mean=14 mm, n=3

Material Types: Alibates dolomite (25%), Basalt (25%), Black Forest silicified wood (25%), Chert (25%)

CATEGORY P81 (Figure 6.20)

Number of Artifacts: 1
Catalogue Numbers: 5LA9211 FS6

Description: This small point has a sharp tip, plano-convex cross-section, straight blade edges, abrupt shoulders, a very slightly expanding flange, pointed tangs, and a convex base. Points of this category are thought to date between 100 BC to AD 900 (Anderson 1989:215), though we expect this specimen falls toward the later end of this time range.

Metric Attributes	
Length:	20 mm
Width:	11 mm
Greatest Thickness:	3 mm
Blade Length:	14 mm
Blade Width:	11 mm
Haft Width:	3 mm
Base Width:	11 mm

Material Type: Basalt

CATEGORY P82 (Figure 6.20)

Number of Artifacts: 5
Catalogue Numbers: 5LA8664 FS9, 5LA9187 FS62, 5LA9187 FS86, FS94, FS703

Description: Two of these points are complete and three are broken. Artifacts in this category have sharp to bi-convex and plano-convex cross-sections, convex blade edges, abrupt shoulders, and u-shaped notches on straight or contracting flange stems. Anderson (1989:216) suggests a date range of AD 750 to AD 1725 for this projectile point category.

Metric Attributes	
Length:	30 mm – 31 mm, mean=30.5 mm, n=2
Width:	13 mm – 16 mm, mean=14 mm, n=4
Greatest Thickness:	3 mm – 5 mm, mean=3.6 mm, n=5
Blade Length:	22 mm, n=2
Blade Width:	11 mm – 16 mm, mean=13.2 mm, n=5
Haft Width:	2 mm – 3 mm, mean=2.4 mm, n=5
Base Width:	13 mm – 15 mm, mean=14 mm, n=3

Material Types: Black Forest silicified wood (25%), Chert (75%)

CATEGORY P83 (Figure 6.21)

Number of Artifacts: 45
Catalogue Numbers: 5LA2240 FS22, 5LA8620 FS70, 5LA8632 FS1, 5LA8655 FS8, 5LA8665 FS7, 5LA8676 FS2, 5LA8683 FS1, 5LA9020 FS17, 5LA9026 FS10, 5LA9037 FS20, 5LA9042 FS1, 5LA9183 FS48, 5LA9185 FS1, 5LA9187 FS48, FS79, FS87, FS120, FS165, FS181, FS194, FS195, FS197, FS215, FS223, FS231, FS236, FS237, FS239, FS240, FS241, FS243, FS312, FS524, FS657, FS658, FS735, 5LA9211 FS15, 5LA9211 FS48, 5LA9212 FS7, 5LA9283 FS35, 5LA9295 FS3, 5LA9302 FS6, 5LA9344 FS9, 5LA9370 FS52, 5LA9478 FS17

Description: A total of 45 items were classified as P83 projectiles. Twenty-three were from 5LA9187, and the other 23 were recovered from throughout Training Area 10. These triangular, side-notched points have dull to sharp to very sharp tips, bi-convex and plano-convex cross-sections, straight to convex to concave blade edges, abrupt shoulders, straight flange stems, pointed and rounded tangs, and straight or concave bases. These projectile points appear to date between AD 750 and AD 1650 (Anderson 1989:217-221), but a precise date of around AD 1300 has been given to points from site 5LA9187.

Metric Attributes for General Assemblage

Length:	16 mm – 23 mm, mean=19.75 mm, n=8
Width:	10 mm – 18 mm, mean=13.14 mm, n=27
Greatest Thickness:	2 mm – 5 mm, mean=3.13 mm, n=43
Blade Length:	9 mm – 15 mm, mean=12.75 mm, n=8
Blade Width:	8 mm – 16 mm, mean=11.82 mm, n=40
Haft Width:	5 mm – 13 mm, mean=8.09, n=43
Base Width:	9 mm – 18 mm, mean=13.1 mm, n=25

Metric Attributes for 5LA9187

Length:	16 mm – 22 mm, mean=19.33 mm, n=3
Width:	11 mm – 18 mm, mean=12.84 mm, n=13
Greatest Thickness:	2 mm – 4 mm, mean=2.95 mm, n=22
Blade Length:	9 mm – 14 mm, mean=11.66 mm, n=3
Blade Width:	9 mm – 15 mm, mean=11.57 mm, n=21
Haft Width:	5 mm – 10 mm, mean=7.66, n=21
Base Width:	10 mm – 18 mm, mean=12.69 mm, n=13

Material Types from the General Assemblage: Alibates dolomite (4%), Argillite (2%), Basalt (2%), Black Forest silicified wood (7%), Chalcedony (4%), Chert (39%), Dendritic Chert (6%), Fine-grained Quartzite (15%), Hartville Uplift Chert (6%), Orthoquartzite (11%), Unspecified silicified wood (2%)

Material Types from 5LA9187: Black Forest silicified wood (8%), Chalcedony (8%), Chert (13%), Dendritic Chert (13%), Fine-grained Quartzite (26%), Hartville Uplift Chert (13%), Orthoquartzite (13%), Unspecified silicified wood (4%)

CATEGORY P84

Number of Artifacts: 3
Catalogue Numbers: 5LA9035 FS1, 5LA9193 FS4, 5LA9210 FS31

Description: All three of these specimens are broken. They have dull to sharp tips, bi-convex cross-sections, straight to convex blade edges, abrupt shoulders, contracting and expanding flange stems, pointed and rounded tangs, and straight and concave bases. Anderson (1989:222) indicates that P84 points date from AD 750 to AD 1200.

Metric Attributes	
Length:	----
Width:	15 mm, n=1
Greatest Thickness:	2 mm – 4 mm, mean=3 mm, n=3
Blade Length:	12 mm, n=1
Blade Width:	13 mm – 15 mm, mean=14 mm, n=2
Haft Width:	9 mm – 10 mm, mean=9.5 mm, n=2
Base Width:	15 mm, n=1

Material Types: Chert (66%), Fine-grained Quartzite (33%)

CATEGORY P85

Number of Artifacts: 17
Catalogue Numbers: 5LA9187 FS7, FS23, FS36, FS92, FS96, FS177, FS186, FS187, FS193, FS196, FS199, FS222, FS229, FS234, FS235, 5LA9302 FS5, 5LA9333 FS12

Description: These points have dull to sharp to very sharp tips, bi-convex and plano-convex cross-sections, convex and straight blade edges, abrupt shoulders, straight and contracting flange stems, rounded and pointed tangs, and concave to convex to straight bases. An age estimate of AD 1000 to AD 1400 is suggested for this category (Anderson 1989:222-224).

Metric Attributes:	
Length:	18 mm – 27 mm, mean=22 mm, n=8
Width:	10 mm – 16 mm, mean=11.69 mm, n=13
Greatest Thickness:	2 mm –4 mm, mean=2.93 mm, n=15
Blade Length:	10 mm – 18 mm, mean=14.75 mm, n=8
Blade Width:	9 mm – 16 mm, mean=11 mm, n=14
Haft Width:	2 mm – 3 mm, mean=2.41 mm, n=17
Base Width:	3 mm – 16 mm, mean=10.84 mm, n=13

Material Types: Black Forest silicified wood (24%), Chalcedony (6%), Chert (24%), Fine-grained Quartzite (29%), Hartville Uplift chert (12%), Pedernal chert (6%)

Cores and Core Tools

The core and core tool class consists of 751 non-bipolar cores, 27 core-tools, and four bipolar cores. For the purposes of this analysis, tested cobbles are added to this class, specifically within the non-bipolar core designation. Cores, core-tools, and tested cobbles were recovered from the surface of 192 project sites; 119 sites have more than one core or core-tool in their assemblage. Very few (.01%) of these tools could be considered exhausted; most (87%) are large in size, with fewer medium (12%), and small (<1%) items. Heat exposure is visible in .02% of the assemblage. Table 6.14 presents the data on lithic material type for the cores and core tools.

TABLE 6.14: Material Type for the Cores and Core-Tools

Material	Core Class			
	Core-Tool	Non Bipolar Core	Bipolar Core	Total
Argillite	2	60	0	62
Black Forest Silicified Wood	0	6	0	6
Chert	3	141	2	146
Baked Claystone	0	5	0	5
Fllattop Chalcedony	0	2	0	2
Fine-Grained Quartzite	5	150	0	155
Hornfels/Basalt	3	38	0	41
Hartvill Uplift Chert	0	1	0	1
Chalcedony	0	2	0	2
Limestone	0	1	0	1
Obsidian	0	2	0	2
Orthoquartzite	0	13	0	13
Quartz	0	1	0	1
Coarse-Grained Quartzite	13	318	2	333
Ralston Creek Chert	0	1	0	1
Silicified Wood	0	8	0	8
Siltstone	0	2	0	2
Sandstone	1	0	0	1
Total	27	751	4	782

As a general rule, non-bipolar cores can be identified as a mass of raw material with patterned or unpatterned flake detachment from at least one direction. Bipolar cores (those with visible impact fractures in both ends) fall into a separate category. A total of eighteen material types were observed for the entire core assemblage, most of which (98%) can be found locally in the PCMS. Microcrystalline material types (308%) are the most varied group of the assemblage and include argillite, baked claystone, fine-grained quartzite, limestone, orthoquartzite, and siltstone. The cryptocrystalline materials (22%) are Black Forest silicified wood, chert, Flattop chalcedony, Hartville uplift chert, unspecified chalcedony, obsidian, quartz, Ralston Creek chert, and unspecified silicified wood; the macrocrystalline cores (48%) are hornfels/basalt, coarse-grained quartzite, and sandstone. The majority of the cores are large in size (87%) and display cortex (70%). Fifteen of the cores show a red color change and crazing from heat exposure. The high proportion of macro- and microcrystalline materials is likely attributed to the abundance of local materials that can be found in or near the project area. These types of materials have a high fracture toughness and flakes removed from these cores would have been advantageous for their use as expedient tools.

There are 24 core tools in the artifact assemblage. Core tools are categorized as formal cores (raw material displaying negative flake scars) coupled with use wear patterns from another functional task. Of items in this class, nearly all have a secondary use associated with battering or pounding.

Bipolar cores are a class of artifact very seldomly encountered in the high priority survey areas of the PCMS. The likely reason for this is that bipolar core reduction usually occurs at the raw material outcrop; in the PCMS and in Training Areas 10 and 12, locations containing these types of sites fall outside the Priority I study unit boundaries. In other words, by the time raw materials enter Priority I study units, initial nodule reduction has already occurred. NMSU survey crew members recorded four chert bipolar cores.

Chipped-Stone Tool Analysis Summary

The project tool assemblage is made up of 17 tool classes. Of these, 76 percent of the assemblage are tools that could be attributed to hunting and game processing activities, while 24 percent are related to the reduction of lithic raw materials. This seems to be a pattern throughout the steppes to canyon transition area of the PCMS, as the Training Area 7 chipped tool assemblage (Owens and Loendorf 2002:172) consisted of nearly the same 3:1 proportion of hunting and game processing tools when compared to those attributed to raw material reduction. The flaked lithic tools are primarily non-bipolar cores (27%), bifaces in various stages of reduction (18%), formal projectile points (17%), scrapers (8%), and uniface tools (5%). Those representing less that one percent of the assemblage include bipolar cores, chopping tools, core-tools, and perforating tools. The formal patterned tool to expedient tool ratio is 1.7:1. Though it is certainly not the case everywhere, it is known that expedient tools can signal a more sedentary population (Parry and Kelly 1987). These data suggest that the varied prehistoric inhabitants, representing numerous time periods, who utilized the project area, were relatively mobile populations or groups.

Nonlocal lithic materials are varied in material composition and represent an impressive 8% of the overall chipped-stone tool assemblage. Recorded materials include Alibates dolomite (14%), Black Forest silicified wood (45%), Chinle chert (<1%), Edwards Plateau chert (<1%), Flattop chalcedony (7%), Hartville Uplift chert (17%), a Knife River flint-like material (<1%), Niobrara jasper (<1%), unspecified obsidian (10%), a material that seems to be Pedernal chert (2%), plate chalcedony (2%), and Tiger-eye chert (<1%). The nonlocal material tool kit contains 35% projectile points (mainly from site 5LA9187), 22% utilized flakes, 15% end/side scrapers, 11% bifaces, 4% non-bipolar cores, 4% side scrapers, 4% end scrapers, 2% drills, and less than 1% for preforms. Local materials, in the chipped-stone tools, are mostly chert (36%) and fine-grained quartzite (30%), with lesser amounts of coarse-grained quartzite (12%), orthoquartzite (8%), argillite (7%), hornfels/basalt (3%), silicified wood (2%), chalcedony (2%), and Ralston creek chert (1%). Those materials with less than one percent in the chipped assemblage are claystone, glass, limestone, Morrison chert, quartz, rhyolite, sandstone, and siltstone. Artifacts found in the local material tool kit include utilized and retouched flakes (21%), cores and core-tools (27%), bifaces (19%), projectile points (16%), unifaces (6%), end/side scrapers (4%), side scrapers (2%), end scrapers (2%), drills/perferators (1%), and spokeshaves (1%).

Like the debitage it appears that local materials met the technological and quantitative needs of the prehistoric inhabitants of the area, and raw materials were collected while everyday subsistence activities took place. The biggest tool kit difference involves the overwhelming presence of cores and core-tools in the local lithic assemblage, when compared against the nonlocal assemblage. This is not suprising considering that core reduction or raw material procurement was the dominant lithic reduction strategy recognized in the analysis of the debitage for sites recorded in Training Areas 10 and 12. Percentages of the patterned tool types (i.e., projectile points and scraping tools) are much higher in the nonlocal assemblage, but this is somewhat misleading, as 5LA9187 (see chapter 4) most certainly skews the data.

It is widely recognized that projectile points are ambiguous temporal indicators. None the less, archaeologists continue to use them for assigning ages to sites on the PCMS because for surface sites lacking ceramic artifacts or rock art, they are the only temporal indicators for site occupation. To aid in relative site dating, Anderson (1989) developed a coding system for the PCMS based on similar point styles recovered from the region (i.e., southeast Colorado) and areas in the southern Plains states. From this system, we believe that it is safe to assign rough age estimates to sites recorded during the scope of our project.

Of the 479 projectile points collected during the Training Areas 10 and 12 survey project, 348 exhibited characteristics allowing them to be classed according to the Anderson (1989) system. The Training Area 10 and 12 sites, and more specifically the landforms on which they were encountered, have seen continuous prehistoric use from the Folsom period of the Paleoindian stage to the Protohistoric period of the Late Prehistoric stage. Changes in projectile point morphology are presumably related to the well-established shift from the use of a spear and atlatl by Paleoindian and Archaic groups to the bow and arrow by Late Prehistoric groups.

In many of Anderson's (1989) classes, the estimated time range spans more than one prehistoric stage. Though these age estimations are broad, two general statements can be made concerning the projectile point assemblage. Thirteen Paleoindian projectile points were recovered from project sites; two of these are Folsom point fragments, eight are points from the Plano period of the Paleoindian stage, and three fragmented specimens are of unknown period in the Paleoindian stage. Eight of the points are from multicomponent lithic scatters at the edges of Big Water, Lockwood, Red Rocks, Spring, and Stage canyons. Four of the points were found on sites within the steppes landform between the hills and the canyons, and one was found on a flat limestone outcrop along the east edge of the Bear Springs hills. This shows that there is little spatial patterning in regards to the location of Paleoindian points in Training Areas 10 and 12. Of the Folsom points, one (5LA9187, FS 16) was recovered in the upper Lockwood drainage basin and the other (5LA9373, FS 7) was found on the edge of lower Red Rocks canyon. For more detail regarding these points, the reader should examine Appendix III in this report. Archaic age points were fairly common within the projectile point assemblage, but, for the most part, Training Areas 10 and 12 were most heavily used during the early portion of the Late Prehistoric Stage as evidenced in Figure 7.1.

GROUND-STONE AND MISCELLANEOUS ITEMS

Ground-stone artifacts constitute a rather broad class of formal tools with relatively long use lives when overall lithic technologies are considered. Primarily these tools have been used to process vegetal materials through crushing and grinding (Hayden 1987), although different, more specialized uses, have been noted (Adams 2002). In the American Southwest grinding stones are most often associated with the processing of corn, but other studies point to manos and metates being used to process wild foodstuffs (Adams 1988). The latter function is surely of the most relevance to our work on the PCMS, but recently corn pollen has been recovered from a large thermal feature at site 5LA7538 (Schivaitti, 2003).

One thousand one hundred and sixty-nine ground-stone artifacts were recorded from 192 sites in combined Training Areas 10 and 12. The ground-stone pieces were analyzed in the field and were often so fragmentary that, in many cases, it was difficult to determine how many whole artifacts they might have originally represented. Six artifact groups are present in the ground-stone assemblage-- mano, metate, edge-ground cobble, lapstone, pestle, and unidentifiable ground-stone fragments. Miscellaneous items are artifacts that do not fall within the normal flaked tool definitions and include hammerstone, shaft straightener, jewelry item, hoe, polishing stone, unique item, abrader, jar cover, pounder, bone, bead, ceramic sherd, pipe fragment, and bowl fragment. Data collected from the analysis of ground stone and miscellaneous artifacts is presented in this chapter. Methods of analysis are explained first, then individual artifact groups are discussed. Table 6.1 summarizes the analyzed ground stone tools. Metric data for ground-stone artifacts are presented in Tables 6.16, 6.18 and 6.19, as well as throughout the text. Unlike the debitage and chipped-stone tool sections, there is no summary for miscellaneous and ground-stone artifacts. For the most part, and not counting the edge-ground cobbles, ground stone was recorded for simple attribute data and left in the field.

Methods

The ground-stone artifacts were analyzed in the field using the analysis format found in Owens and Loendorf (2002) Appendix A. This generalized system was developed during the 1997 PCMS field season and is based, in part, on the procedures described in Dean (1992). The general data categories examined for each tool include -- artifact type, material type, overall condition, length, width, burning, surface designation, use area condition, technology, shape, striations, use wear, use location length, use location width, and metate depth. The more complex edge-ground tools were collected and analyzed using the format found in Appendix B and thus, described in more detail. Measurements for all field artifacts were taken to the nearest centimeter but because of the considerable effort required to carry scales in the field, weights were not recorded. It should be noted that all field examinations were made without the aid of a hand-lens. The collected edge-ground tools were measured using a MIDWAY LCD sliding caliper (1 to 120 mm), and weighed with a PELOUZE electronic scale in 0.1 gram increments. Use wear patterns were examined under a 5X wide-angle table-mounted lens and a 10X-hand lens.

Manos

Manos are defined by Bender (1990) as: "groundstone artifacts which exhibit ground surfaces and/or edges. Manos are hand held implements used on large grinding surfaces (metates)". One hundred and thirty-eight project sites included manos in their overall artifact assemblages. The mano class consists of 397 one-hand manos and seven two-hand manos. Material classes recorded for these tools are varied; ten material types were noted (Table 6.15). By far, most manos were made of sandstone (84%), though granite (6%) and coarse-grained quartzite (5%) were also seen. Representing the remaining 5% of the mano assemblage are argillite, basalt, conglomerate, diorite, fine-grained quartzite, gabbro, and schist. It is well known that materials being used for processing vegetal foodstuffs must be hard, dense, and durable for grinding. Obviously the Dakota group sandstones used to make groundstone artifacts on the PCMS met the technological needs of the prehistoric inhabitants based on the high proportion of these materials on sites.

One hundred and eleven of the manos are complete; only one of these is of the two-handed variety. In the remaining specimens, 169 are small fragments and 124 are more than 50% complete. Complete one-hand mano length ranges from 6.5 to 18 cm (average 11.60 cm), width from 2 to 18.5 cm (average 8.22), and thickness from 1.5 to 6.5 cm (average 3.46). The summary metric data for all complete manos is illustrated in Table 6.16. The distinction between one and two-handed manos is subjective. Using the dimensions and width/length ratios of others, Bender (1990) was not able to ascertain a distinct size difference for one and two-handed manos. Based on Bender's (1990) definitions and descriptions only seven robust specimens are considered to be of the two-hand variety.

TABLE 6.15: Material Types for the Manos

	Mano Type		
Material	One Hand	Two Hand	Total
Argillite	1	0	1
Hornfels/Basalt	6	0	6
C. Quartzite	22	0	22
Conglomerate	4	0	4
Diorite	1	1	2
F. Quartzite	2	0	2
Gabbro	1	0	1
Granite	25	0	25
Sandstone	332	6	338
Schist	3	0	3
Total	397	7	404

TABLE 6.16: Summary Metric Data for Whole Manos.

	Manos					
Variable	Valid Number	Minimum	Maximum	Average	Standand Deviation	Variance
Length	110	6.5	18	11.62	2.47	6.12
Width	110	2	18.5	8.22	1.96	3.83
Thickness	110	1.5	6.5	3.49	1.04	1.09

Note: All measurements in cm.

All manos are made on natural cobbles or nodules of locally available material, at least originating in the terrace gravels along the Purgatoire River, and show very little modification prior to, or during usage. All have at least one utilized face; half (202 specimens) were utilized on both faces. Wear and modification patterns indicate that 99% of the assemblage display some grinding modification and/or use wear. Those without wear are friable and highly eroded, or thermally spalled pieces. Of the specimens displaying wear, 73% display grinding only, 14% show combination grinding and pecking, and 12% are ground and battered. The remaining 2% of the manos show some slightly different variation of wear with polish comprising the dominant wear remnant. In 166 (41%) specimens the striation pattern could not be determined during our field analysis. Macroscopically visible striation patterns are transverse (27%), longitudinal (17%), oblique (7%), circular (4%), and multiple (4%). Three degrees of use wear are present in the manos; 45% of the assemblage is moderately used, 23% shows light usage, and 33% is heavily used.

In planview the manos are 64% oval, 13% irregular in outline, 5% rectangular, 3% circular, 1% triangular, 1% cylindrical, and 1% curvilinear indeterminate. The remaining 12% of the assemblage are highly fragmented and cannot be classified. Two hundred and thirty-eight specimens show some degree of burning in the form of fire-cracks or red to black color changes.

Metates

Metates are artifacts characterized by at least one large grinding surface upon which vegetal foodstuffs or pigments were crushed or ground with a mano (Bender 1990). All of the metates recorded during the Training Area 10 and 12 survey project possess characteristic attributes that fit them within Bender's generalized description. They fall within four basic types-- slab metate (487), basin metate (1), bedrock metates (207), and trough metate (6). The metates, shown in Table 6.17, are primarily sandstone (99%); other specimens, found in much smaller quantities include quartzite, limestone, and conglomerate. In other parts of the PCMS, specifically Training Areas 3 through 7, basalt metates are common. This is easily explained though because the hogback, a hornfels/basalt intrusive, is found in the region.

Bedrock metates are a class of artifact that is nearly impossible to make meaningful statements about, when the overall groundstone assemblage is considered. As such, we will not spend any time addressing their quantitative data that we collected in the field. Though only a few trough metates, and a single basin metate were identified, these are noteworthy as they are functional styles not often found on the PCMS. The dominant metate type found on the PCMS, and in southeastern Colorado, are slab metates. There are two possible explanations for this. First, many of the facies changes in the Dakota group sandstone form rather thin tabular chunks. Because these pieces were readily available to all of the prehistoric inhabitants, this is what archaeologists find in the material record. The second possible explanation revolves around the supposition that most of the prehistoric populations of the PCMS were highly mobile. If true, than we would expect smaller metates instead of what Binford would call "site furniture." For the purpose of this analysis, only the slab, basin and trough metates will be quantitatively described further.

Whole metates (41) range from 11 to 85 cm (average 34.8 cm) in length, 11 to 63 cm (average 23.20) in width, and 2 to 34 cm (average 7.7 cm) in thickness (Table 6.18).

TABLE 6.17: Material Type by Metate Type

	Metate Type				
Material	Basin	Bedrock	Slab	Trough	Total
Quartzite	0	0	5	0	5
Conglomerate	0	0	1	0	1
Limestone	0	0	2	0	2
Sandstone	1	207	479	6	693
Total	1	207	487	6	701

TABLE 6.18: Summary Measurement Data for Whole Slab Metates.

	Metates					
Variable	Valid Number	Minimum	Maximum	Average	Standand Deviation	Variance
Length	41	11	85	34.89	18.05	325.71
Width	41	11	63	23.20	11.87	140.94
Thickness	41	2	34	7.74	5.89	34.79

Note: All measurements in cm.

The slab, basin, and trough metates were recovered from 133 project sites. Bedrock metates, normally found on landforms with down cutting erosional features, were found on 47 sites. Discounting the bedrock metate specimens, 92% of the assemblage is comprised of broken tools, and in these 43% exhibits some degree of heat exposure. Moderate use wear dominates the assemblage and was noted on 41% of the specimens. Lesser amounts of light (23%) and heavy (32%) use wear was observed.

Edge-Ground Cobbles

Edge-ground cobbles can occur in several varieties. The most common form is a smooth, flat, water-worn river cobble, generally oval in shape, which has a ground edge along its long axis and perpendicular to its short axis. Edge-ground cobbles of the PCMS are technologically specialized tools, though in appearance they are similar to prehistoric tools recovered in other parts of the world. Evidence supporting vegetal food processing (Butler 1966:95), hide tanning (Lowie 1963:67; Wissler 1941:61), flake or blade production (Crabtree and Swanson 1968:50-51), or the preparation of shellfish (McGimsey 1956:155,166) exists for the function of edge-ground tools. These tools have been encountered at a variety of geographic locations: in Colorado (Buckles et al. 1963; Owens et al. 2000), the Caribbean (Alegría et al. 1955; McGimsey 1956), the northwest United States (Crabtree and Swanson 1968), Wyoming (Frison 1967), and Montana (Lewis 1944; Loendorf 1974). Wide geographical range and varied possible use explanations led Darroch (1974:52) to the conclusion that, "[Use] apparently differs in accord with geographical situation, but different uses apparently produce very similar morphological features." This statement seems reasonable; it is therefore possible that edge-ground tools were used for a variety of tasks.

So what cultural activity produced this class of artifact? In Owens (2003), an explanation for this was advanced. Through experimentation and artifact comparison he was able to determine that edge-ground tools did not show the same use wear as tools used for vegetal material processing. Preliminary data supports that edge-ground cobbles were used in hide processing.

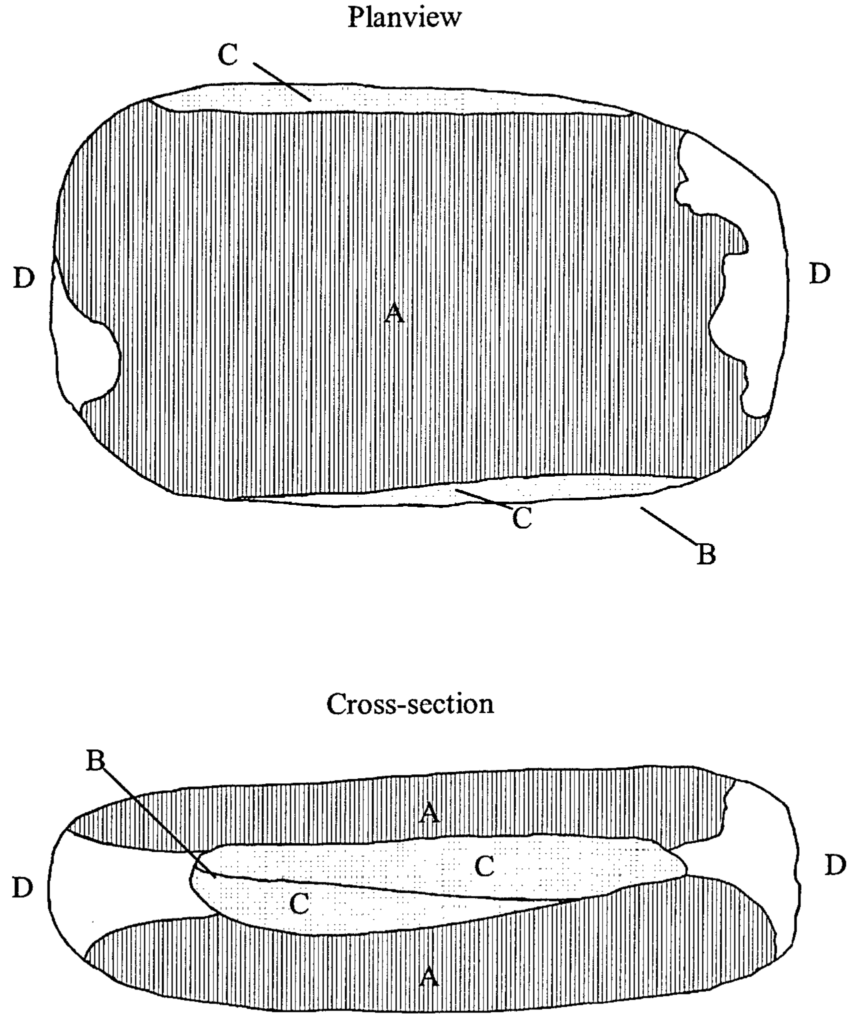
Fifty-seven artifacts from 45 sites were classified as edge-ground cobbles or manos (Figure 6.1). All were collected and further analyzed in the laboratory utilizing the attributes listed in the coding sheet presented in Owens and Loendorf (2002) Appendix B. The material types are 84% sandstone, 9% quartzite, 5% hornfels/basalt, and 2% granite. A definite selection preference is seen for the coarser grained materials and this should be the case if edge-ground tools were utilized for working flexible hides. All of these lithic materials can be collected within the boundary of the PCMS in cobble (91%) or tabular (9%) form.

Thirty-four of the 57 specimens are whole. For the most part, these edge-ground artifacts are much larger than other hand held tools in the overall mano class (i.e., closer in overall size to those considered a two-handed manos). In these specimens, the length ranges from 61 to 195 mm, the width from 36 to 112 mm, the thickness from 12 to 69 mm, and the weight from 42.2 to 1495.2 grams. The metric data for all edge-ground cobbles is illustrated in Table 6.19.

TABLE 6.19: Summary Metric Data for Whole Edge-Ground Cobbles.

Edge Ground Cobbles						
Variable	Valid Number	Minimum	Maximum	Average	Standand Deviation	Variance
Length	34	61	195	123.29%	31.14%	969.72%
Width	34	36	112	73.30%	15.18%	230.46%
Thickness	34	12	69	37.52%	10.67%	114.01%
Weight	34	42.2	1495.2	598.61%	312.78%	97837.47%
Use Angle	57	58	90	75.05%	9.21%	84.96%
Striation Degree	57	0	90	54.35%	37.96%	1441.23%

In 15 of the 57 examples, the parent piece (i.e., surface to be utilized) was apparently modified to some degree before use occurred. Slightly over one-half (51%) of the specimens are oval in planview; sub-triangular (9%), plano-convex (9%), biconvex (9%), sub-rectangular (5%), rectangular (7%), airfoil (2%), irregular (2%), round (2%), and trapezoidal (2%) cross-sections were also recorded. In four percent of the assemblage, cross-sections could not be determined because of the fragmented nature of the cobble. Planviews are primarily oval (49%), and sub-rectangular (26%); lesser amounts of sub-oval (7%), sub-rectangular (7%), irregular (2%), and cylindrical (2%) outlines were observed.



A – Face
B – Edge
C – Facets/Bevels
D – Ends

Figure 6.1: Edge-ground cobble attributes.

Twenty-five cobbles have a single utilized facet, while 19 specimens have two facets, two pieces have three facets, and eleven specimens have four utilized facets. Edge-ground tools were held by their user at 58 to 90 degrees to the surface of wear. These use surfaces, when viewed from end to end, display beveled edges that are 56% straight, 42% convex, and 2% concave. Along with polish, grinding was often observed resulting in oblique (44%), multiple (21%), transverse (14%), and longitudinal striations (5%). In nine highly eroded pieces, it was not possible to determine striation direction. Eighteen cobble tools have no peripheral, facial, or end battering, and 40 show facial use wear patterns consistent with those expected for typical mano usage. In every case, edge-ground mano/cobbles were found in association with other ground stone artifacts.

The remaining two ground stone tools are a lapstone, and a pestle. Pestles are handstones utilized to pulverize, or crush and grind (Adams 2002:138). The pestle (5LA9331, FS 13) recovered during our project is a small rectangular and tabular piece of sandstone measuring 91 x 16 x 15 mm. One end is covered with small ring fractures and grinding wear, but no evidence for adhesions (i.e., pigment or mastic material) remains. According to Adams (2002:145), a lapstone is a generally passive tool that serves as a base upon which other items were shaped or intermediate substances processed with small handstones. The lapstone (5LA8290, FS2) recorded during the Training Area 10 and 12 project measures 16 x 9.5 x 2.7 cm. Its parent material is a tabular slab of Dakota sandstone that has been modified by flaking/battering and grinding activities resulting in an oval shaped use surface or 10.5 x 7.6 x .02 cm.

MISCELLANEOUS ITEMS

One hundred and sixty-eight miscellaneous items were recorded during our work in Training Areas 10 and 12. They include 68 ceramic sherds, 28 pieces of burned and unburned bone, 15 pipe fragments, 15 hammerstones, 13 jewelry pieces, eight pounders, eight polishing stones, four shaft abraders, four beads, a hoe, a unknown/unique item, an abrading tool, a jar cover, and a steatite bowl fragment. The analysis of the sherds is covered in detail in Appendix II and IV, details regarding the beads can be found in Lindsey (2001); the bones have not been subjected to detailed analysis as of the writing of this report, and thus, are not discussed included in this section. The other miscellaneous artifacts are briefly discussed, and selected pieces are listed by site and Field Specimen number when applicable. In these cases the artifacts will be described in terms of tool type, lithic material type, attributes, dimensions, and weight.

Abrader

Abrading tools are hand held implements that lack specialized features other than a rough surface for removing material from another contacted surface (Adams 2002:79). These items may be flat, like that recovered from 5LA9357, FS 3, or grooved, like the shaft straighteners found on sites 5LA4940, FS 38, 5LA9187, FS 131 and 143, and 5LA9333, FS 9. All of the Training Area 10 and 12 abraders are made of locally available materials and are tabular pieces of Dakota sandstone, or a white colored baked clay (5LA9333). The flat abrader is broken with an intact width of 9 cm and a thickness of 5.5 cm. Pecking and grinding is readily apparent on one rough face. Both specimens from site 5LA9187 are broken and include rather deep grooves; the fragmented nature of these tools makes the presentation of measurements useless. On the other hand, the specimen from 5LA4940 is complete, has a deep and straight groove, and measures 79 x 37 x 26 mm.

Bowl

This (5LA8620, FS 15) artifact consists of an edge fragment of a thick-walled steatite vessel (Figure 6.30). It measures 36 x 45 mm and has a maximum thickness of 15 mm. A polished and slightly beveled rim is apparent and thick striations from manufacture are evident on the inside and outside faces. Steatite, often referred to as soapstone, is a very soft metamorphic rock. Sources are varied, but this material has been utilized by prehistoric peoples in Wyoming and Montana (Lawrence Loendorf, personal communication) and all along the North and Middle Atlantic coast (Tuck 1978). Likely this piece sources to somewhere in the Rocky Mountain Region, based on other trade and exchange items encountered on the PCMS.

Hammerstone

Haury (1976:279) defines hammerstones as irregularly shaped rocks selected for their useful size and weight, and they are expediently designed for use without modification. Adams (2002:151) adds they are used for applying forceful strokes to other surfaces. Obviously, a high specific gravity is a must in any material selected for battering activity. This is the case when PCMS hammerstones are considered; materials represented in this class of artifact are coarse-grained quartzite (11), diorite (2), limestone (1), and sandstone (1). All of these tools exhibit ring fractures on one or both lateral edges, or around their perimeter. Hammerstones are not a class of artifact collected for further analysis, and in our recording format measurements are not taken.

Hoe

This complete artifact (5LA8639, FS1) is made on a flaked basalt (locally available from the hogback) cobble measuring 167 mm in length, 77 mm in width, and is 46 mm in thickness (Figure 6.29). This is a class of artifact not normally found on the PCMS. As a matter of fact, the closest geographical reference to this tool type, matching exactly its description, is that offered by Davis and Montgomery (1995:29). In their work in southeast Utah, they encountered a procurement and production location where four stages of hoes were identified. Their finished hoes are made of a tuffaceous silty claystone with accretionary lapilli, are (1) bifacially flaked, (2) display two opposing lateral notches at the tool midpoint and in lateral cross-section, (3) exhibit a thick, blunt proximal poll, and (4) a beveled distal blade. Our PCMS specimen matches their Stage 4 hoes by description and by illustration. According to Davis and Montgomery (1995:37), these types of tools are found most commonly on Mesa Verde Anasazi Tradition sites in the Four Corners region, specifically in southeastern Utah and southwestern Colorado.

Jar Cover

This is a flat, and circular sandstone disk measuring 6 x 5.5 x .5 cm (5LA9331, FS 11). The perimeter exhibits flaking modification to form the piece and light polish is observed on both faces. The exact function of this piece is unknown, but it is similar in appearance to jar covers from the Four Corners Region (Hayes and Lancaster 1975:159), though smaller in size.

Jewelry Pieces

These thirteen items have been lumped into this category, but we really do not know what function all of the pieces may have served. Four of these items are pendants and include a piece of amazonite (5LA9187, FS 742), obsidian (5LA9371, FS48), a lithified shark's tooth (5LA9187, FS662), and a piece of shell (5LA6105, FS108). Items interpreted as jewelry blanks or jewelry manufacturing debris are primarily a baked clay (8), or sandstone (1). All are angular pieces whose edges or faces have been ground and show heavy striations. All are broken and it is unclear what the final form would have been (Figure 6.31). It should be noted that these jewelry items are made from the same baked clay material as the pipes. It is possible that some of these pieces may be edge fragments from pipes or cloud blowers, or they may represent pieces of gorgets like those described by Lintz (2000) in his work at Piñon Canyon.

Pipe Fragments

Pipes are tubes that have been bored to hold burning tobacco (Adams 2002:205). They are recovered as simple cylindrical tubes, or as "elbow pipes" (Hart 1978: Kidder 1932). Pipe fragments were found on three of the project sites (5LA6104, 5LA9371, and 5LA9474) and all appear to have been the "elbow" type (Figure 6.30). Parent materials are tabular pieces of baked clay, which has been abraded to form the desired shape. In the Black Hills of the PCMS and in a large side drainage in the Red Rocks canyon system this material outcrops in thin beds. Abraided pieces of clay have been found at other locations, but none have been interpreted as pipe pieces. Thirteen of the fifteen pipe pieces are from 5LA9371 (the Jewelry Site) and may be refitted to form one complete pipe.

Polishing Stone

A total of eight polishing stones were analyzed during the Training Areas 10 and 12 inventory and these were recorded on sites 5LA6744, 5LA8693, 5LA9020, 5LA9260, 5LA9274, 5LA9309, and 5LA9436. Only 5LA9020 contains pottery sherds; pottery manufacture is the usual activity accounting for this tool type. Adams (2002:91) describes the general attributes of a polisher as a rubbing tool that alters the surface of another object through abrasive and tribochemical mechanisms. Because abrasion is a key component for this wear type, grainy materials were preferred for this type of activity. The polishing stones we recorded are made of sandstone (4), quartz (1), claystone (1), coarse-grained quartzite (1), and basalt (1). All are generally large, with a length ranging from 3 to 9 cm (average 6 cm), with between 1.5 to 8 cm (average 3.6 cm), and a thickness between .5 to 2 cm (average 2 cm).

Pounder

This is a new class of artifact for the PCMS and these tools were encountered on a single site (5LA9187). Pounders are large cylindrical tools with a high specific gravity and heavy battering and spalling on both ends. According to Adams (2002:127), pounding is a high-impact action in which a tool is raised higher and brought more forcefully into contact with a substance. A total of eight of these were analyzed and include three rounded pieces of sandstone, two diorite pieces, and single specimens of fine-grained quartzite, granite, and quartz. Six of the eight pounding tools are whole with a minimum length of 13 cm, maximum length of 22 cm, and an average of 16.75 cm. In addition, the width ranges between 6 and 27 cm with an average of 19.5 cm and the thickness is 3.5 to 7 cm with an average of 5.6 cm. Obviously these tools are very large and based on the overall tool assemblage from 5LA9187, they were likely used to crush the large bones from big game animals.

Unique item

This is a flaked piece of chert measuring 19 x 12 x 3 cm (5LA4725, FS 83). This is an eccentric piece with no identifiable form and may be lumped within the general category of "gaming piece" because we do not know what it is.

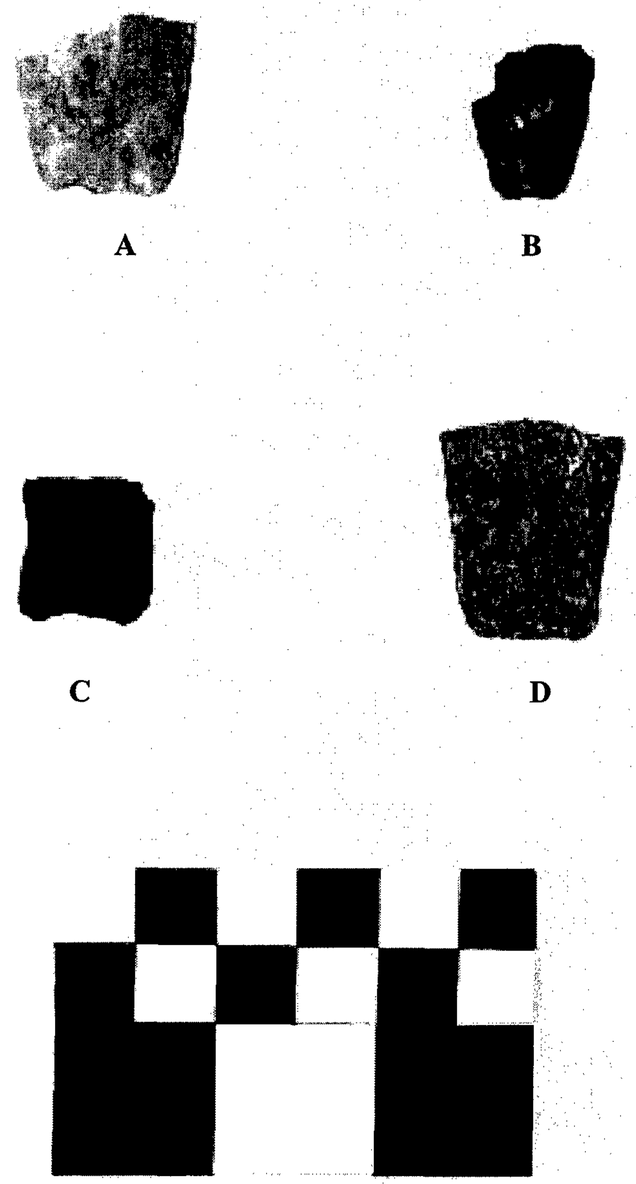


Figure 6.2: Diagnostic Paleoindian projectile point bases:A-5LA5239 FS1, B-5LA8605 FS20, C-5LA8614 FS3, D-5LA8656 FS1.

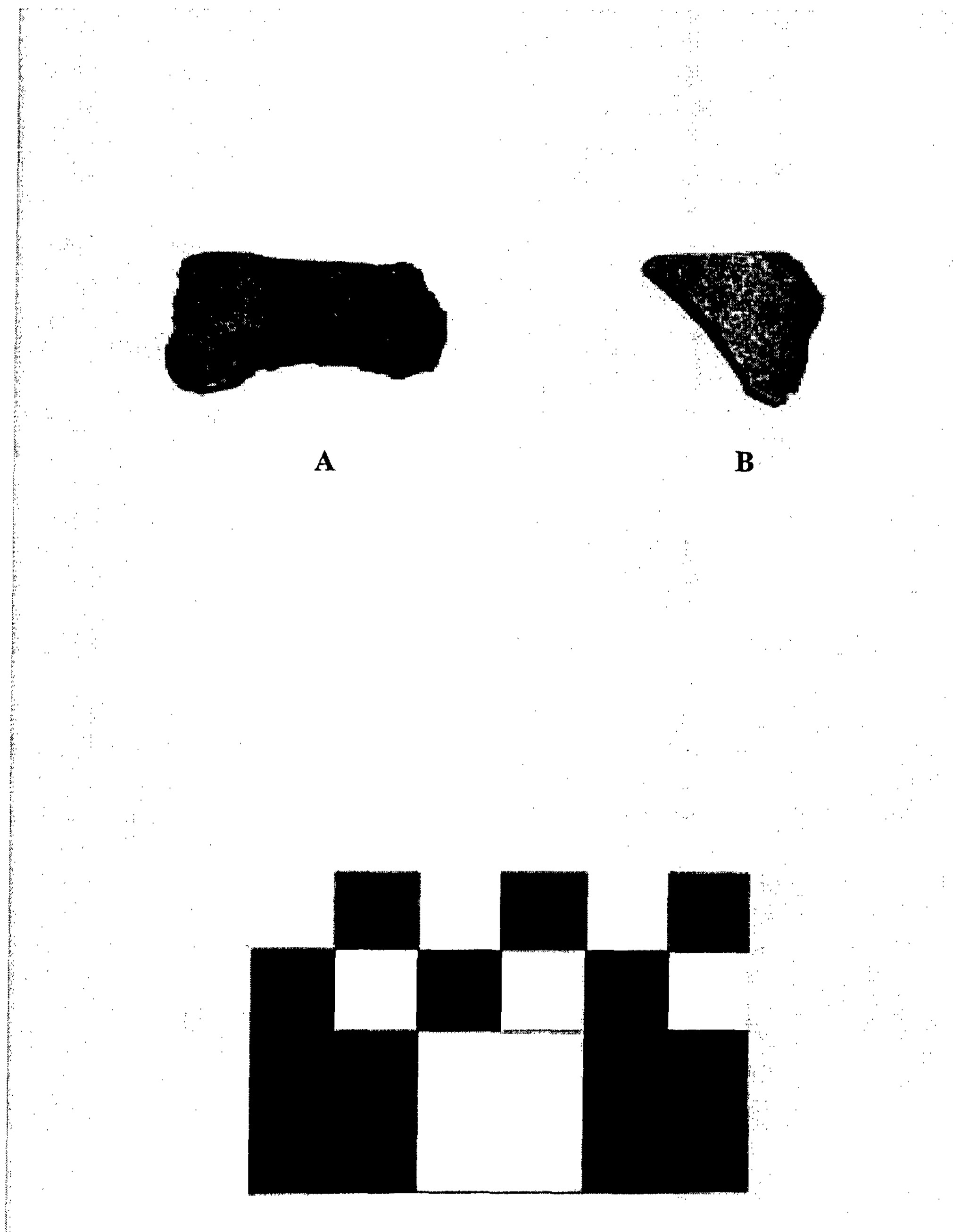


Figure 6.3: Diagnostic projectile points: A-5LA8605 FS6, B-5LA9373 FS7

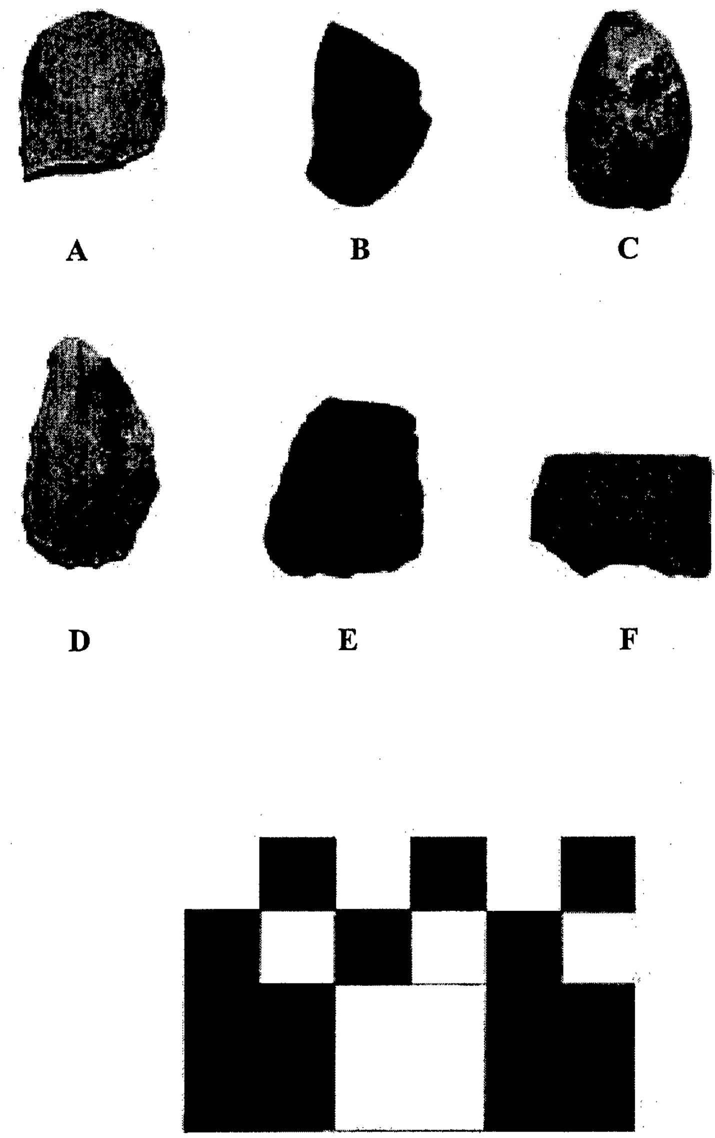


Figure 6.4: Large preforms and Plainview point: A-5LA9038 FS2, B-5LA9188 FS2, C-5LA9448 FS3, D-5LA9448 FS27, E-5LA9456 FS1, F-5LA9200 FS1.

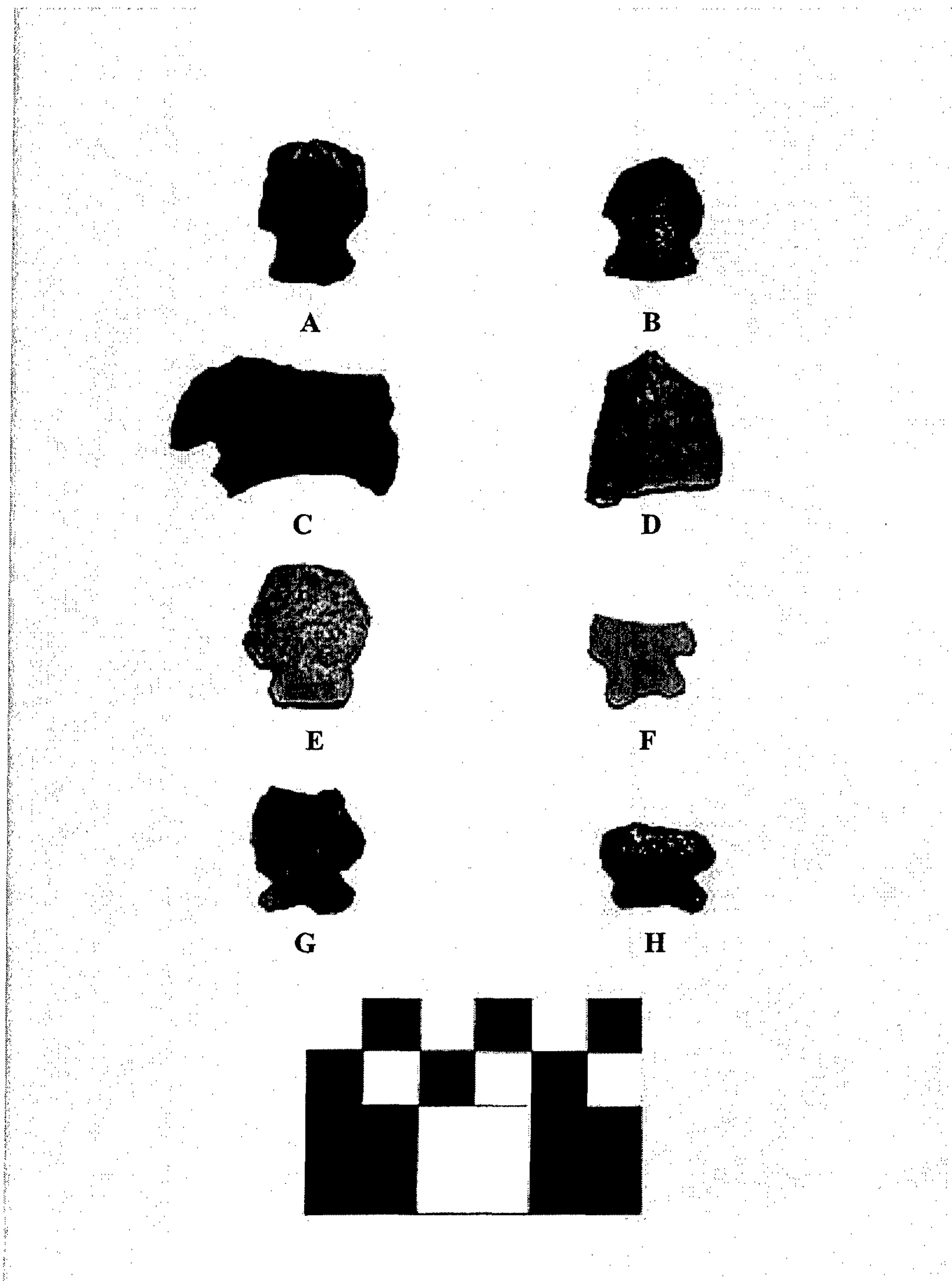


Figure 6.5: Diagnostic projectile points: A-5LA8607 FS6, B-5LA9478 FS37, C-5LA8605 FS3, D-5LA8611 FS1, E-5LA9283 FS15, F-5LA8311 FS3, G-5LA8676 FS1, H-5LA9178 FS1.

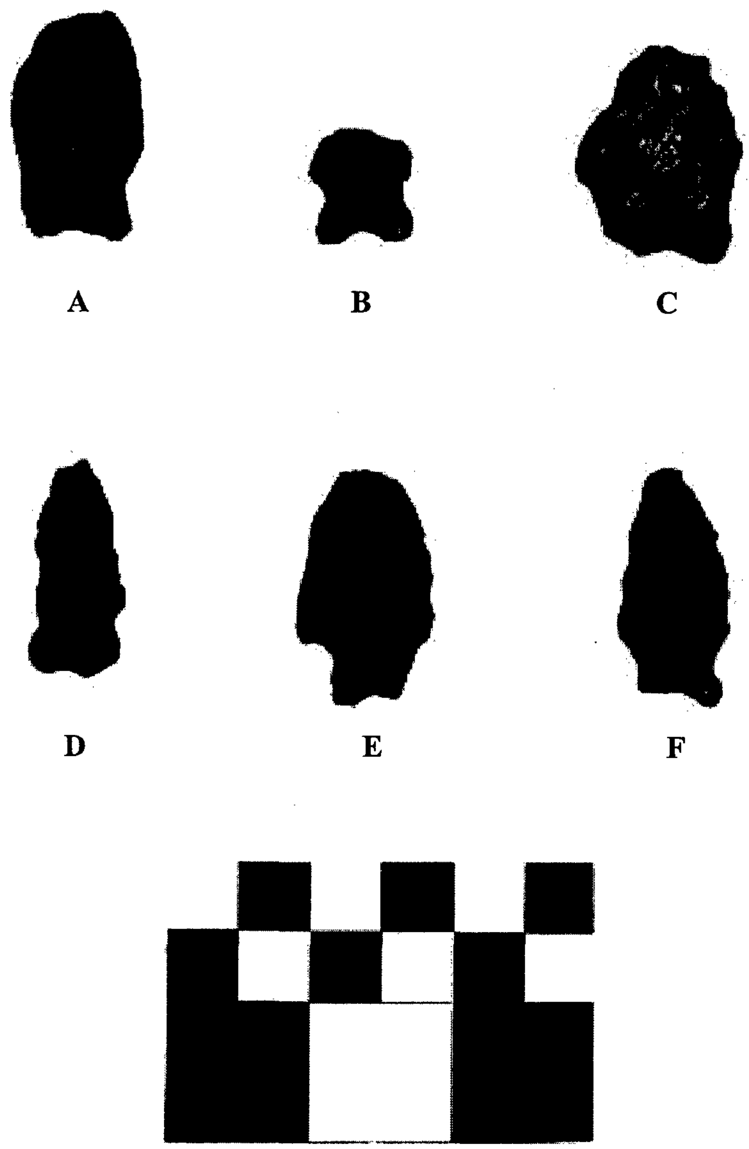


Figure 6.6: Diagnostic projectile points: A-5LA4940 FS11, B-5LA8619 FS7, C-5LA8620 FS30, D-5LA9041 FS1, E-5LA9220 FS5, F-5LA9283 FS37.

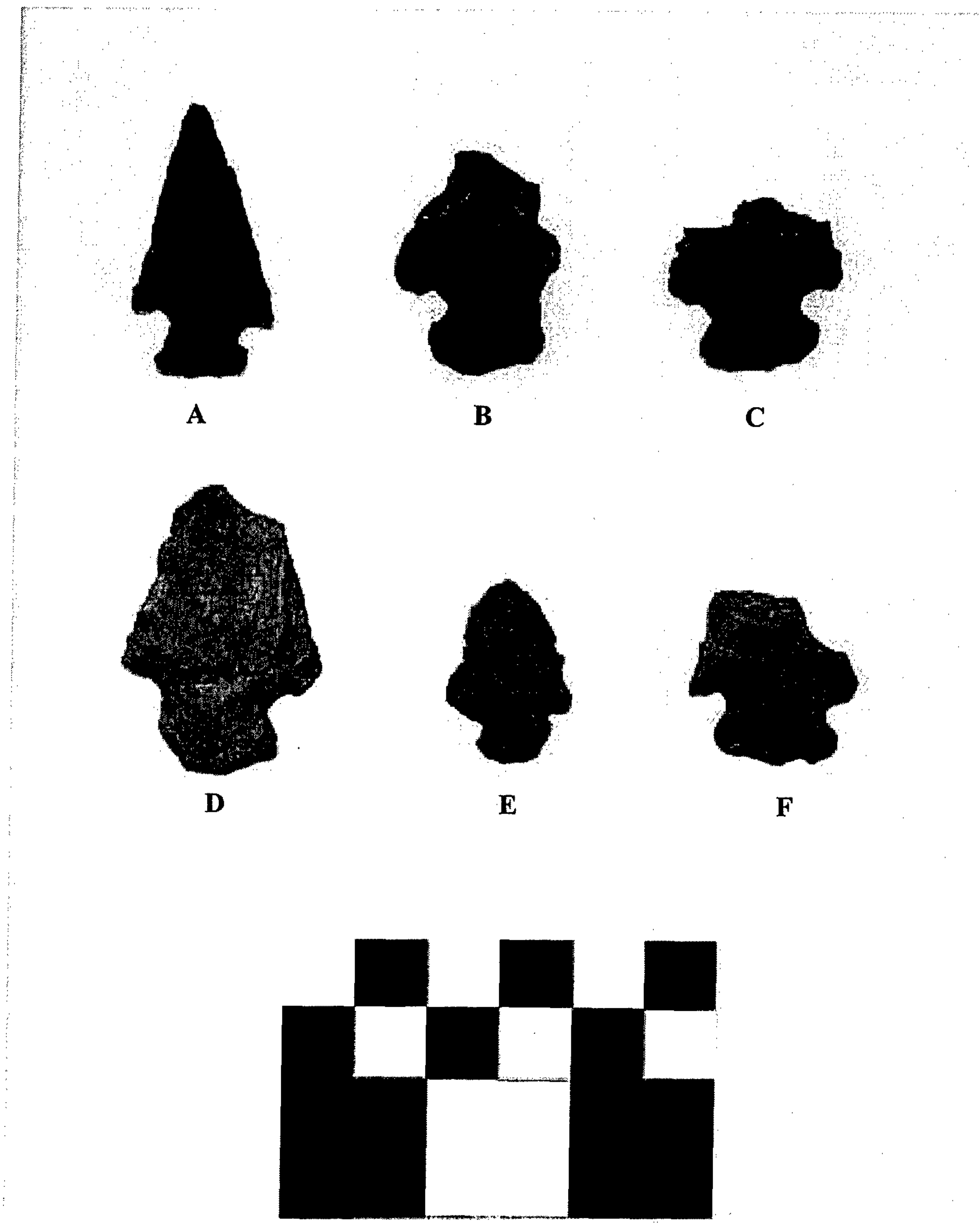


Figure 6.7: Diagnostic projectile points: A-5LA8606 FS3, B-5LA9259 FS11, C-5LA9277 FS7, D-5LA9337 FS72, E-5LA9371 FS3, F-5LA9454 FS17.

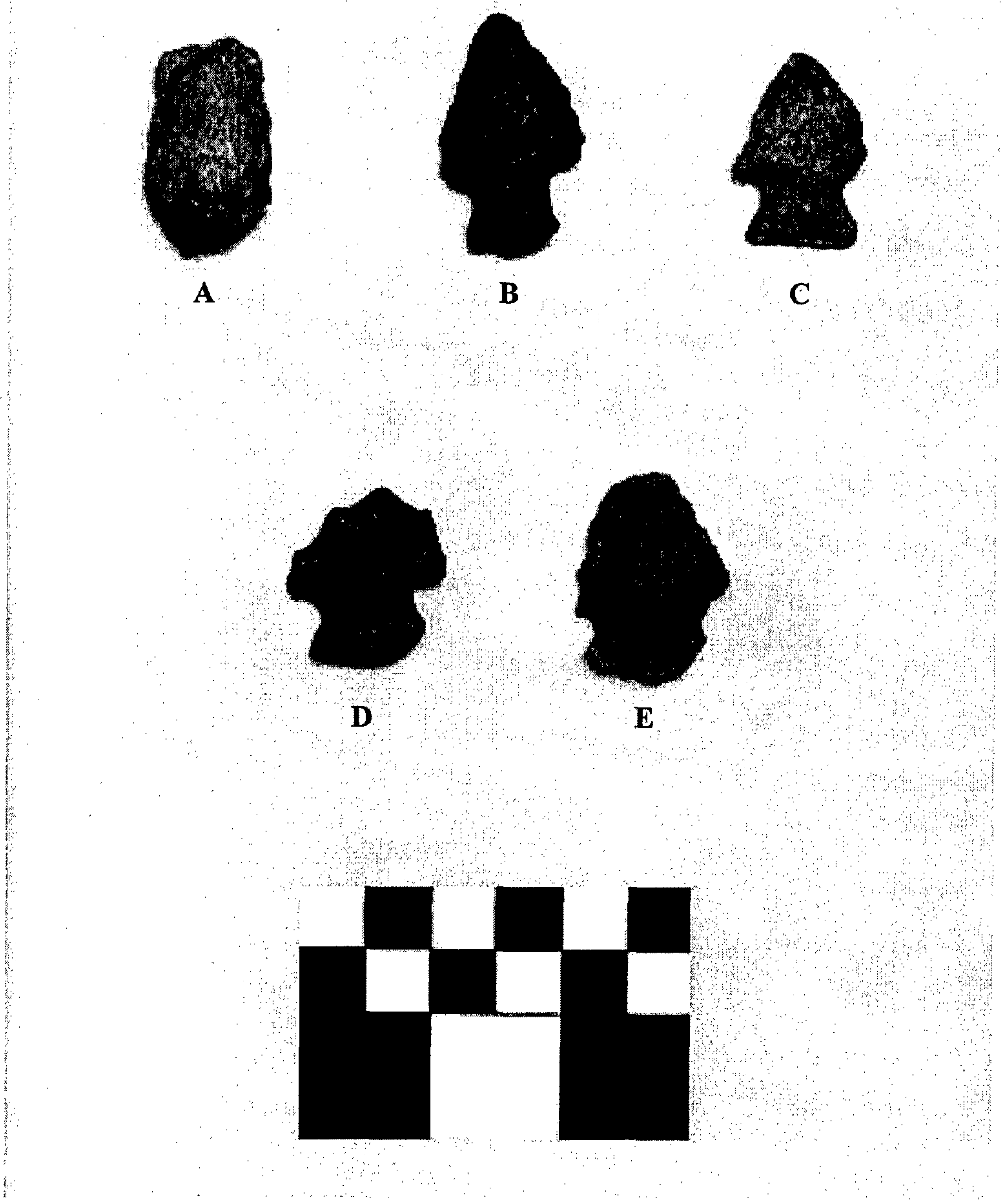


Figure 6.8: Diagnostic projectile points: A-5LA2240 FS10, B-5LA8292 FS2, C-5LA8606 FS1, D-5LA9183 FS13, E-5LA9281 FS6.

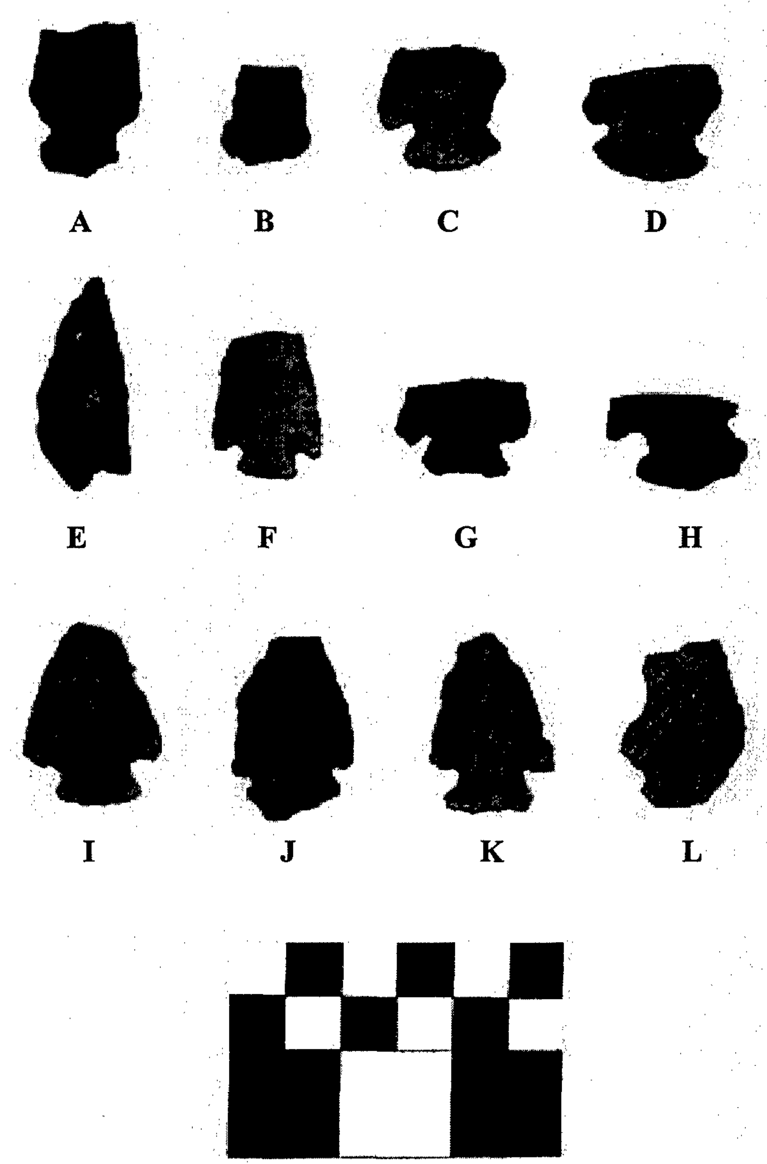


Figure 6.9: Diagnostic projectile points: A-5LA9337 FS13, B-5LA2240 FS7, C-5LA8297 FS19, D-5LA8308 FS28, E-5LA8601 FS2, F-5LA8674 FS5, G-5LA9211 FS17, H-5LA9214 FS2, I-5LA9227 FS6, J-5LA9233 FS1, K-5LA9278 FS12, L-5LA9284 FS6.

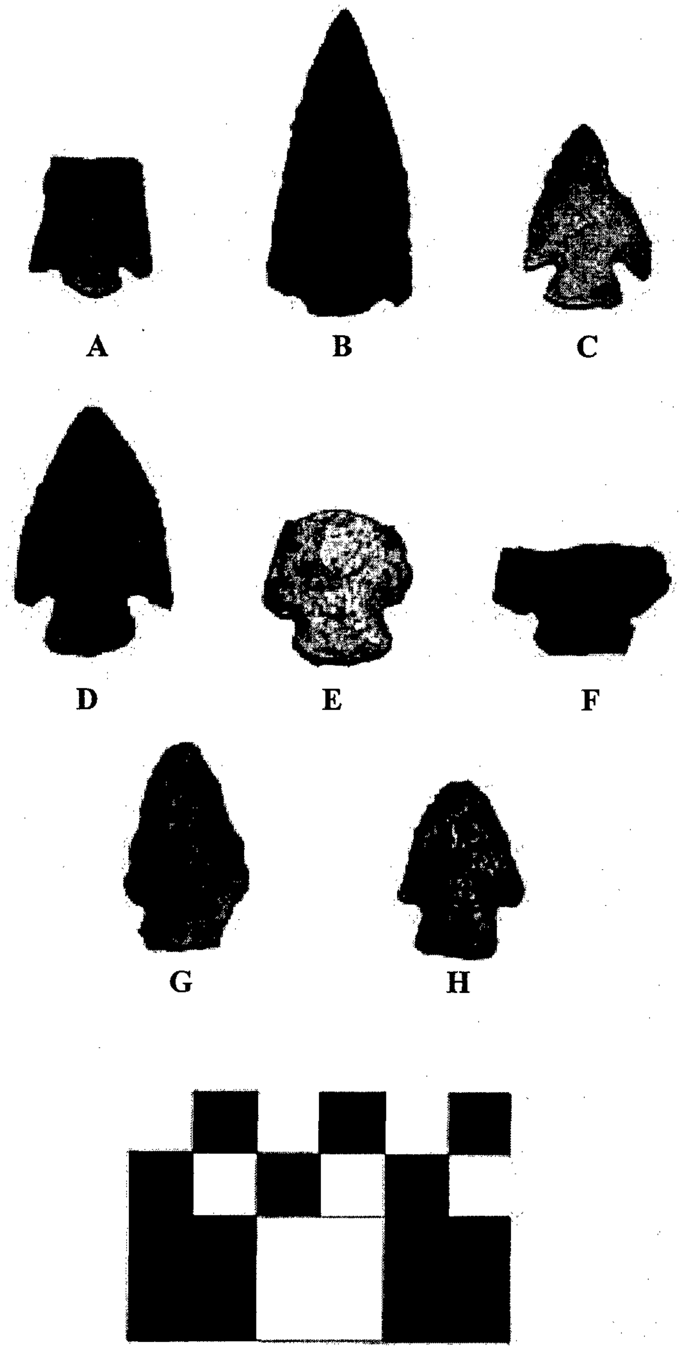


Figure 6.10: Diagnostic projectile points: A-5LA9305 FS2, B-5LA9349 FS8, C-5LA9355 FS1, D-5LA9366 FS5, E-5LA9371 FS2, F-5LA9371 FS88, G-5LA8297 FS1, H-5LA9259 FS46.

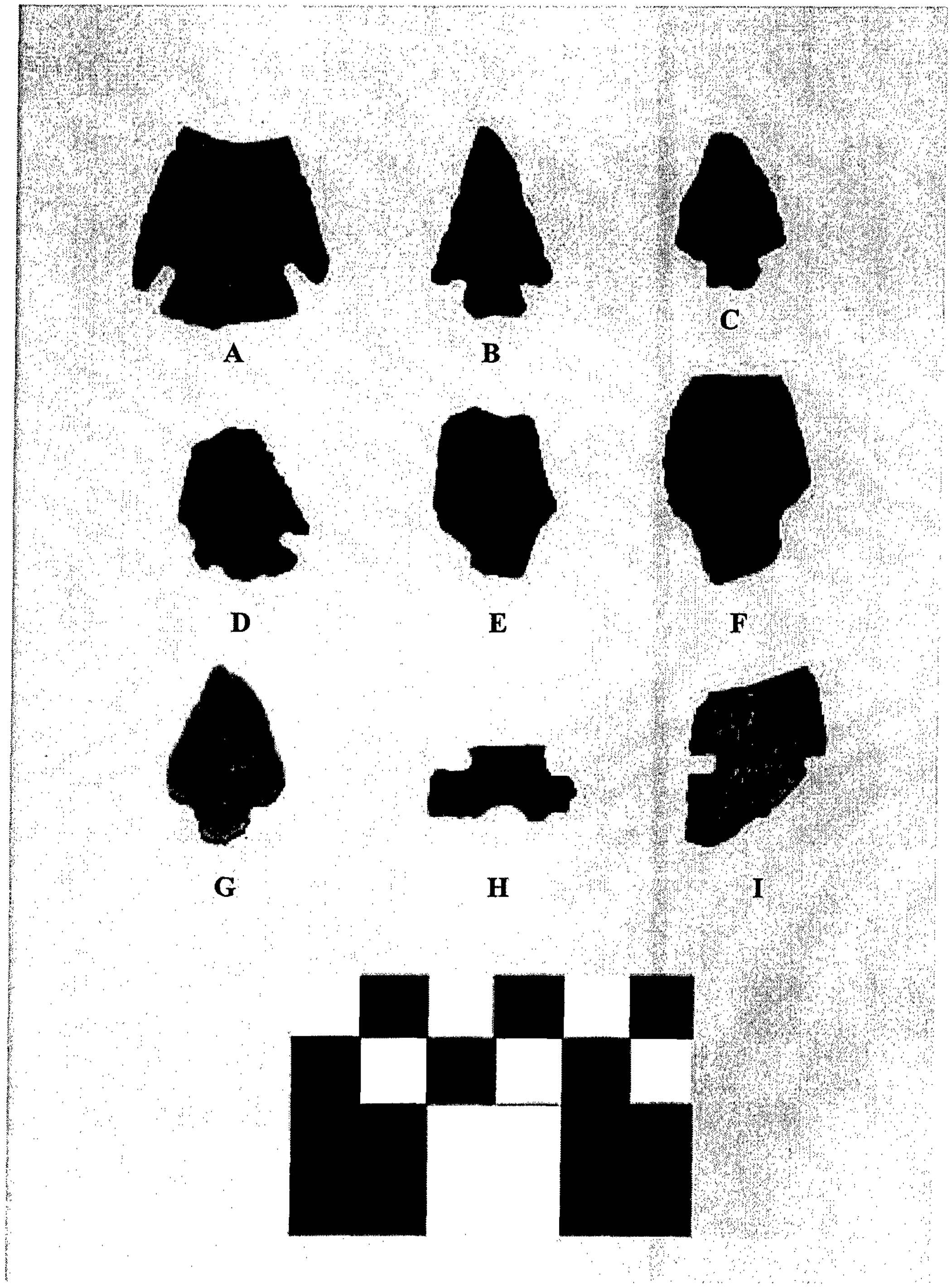


Figure 6.11: Diagnostic projectile points: A-5LA9040 FS1, B-5LA8297 FS5, C-5LA9037 FS38, D-5LA9188 FS5, E-5LA8693 FS13, F-5LA9285 FS5, G-5LA9448 FS17, H-5LA8666 FS1, I-5LA9193 FS6

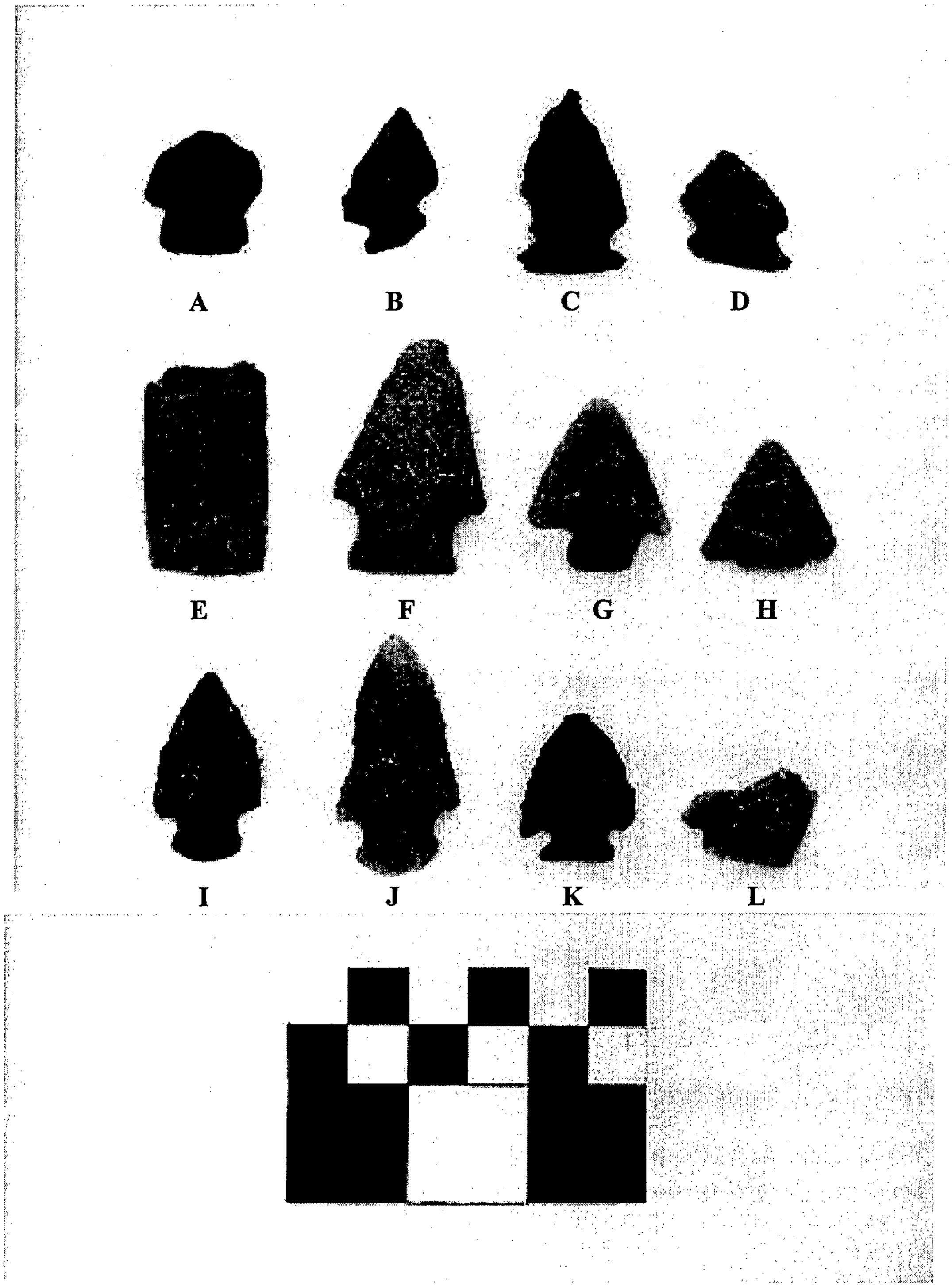


Figure 6.12: Diagnostic projectile points: A-5LA9189 FS2, B-5LA9208 FS5, C-5LA9208 FS6, D-5LA9290 FS22, E-5LA9211 FS38, F-5LA8615 FS1, G-5LA9275 FS5, H-5LA9361 FS1, I-5LA9227 FS2, J-5LA9308 FS27, K-5LA8292 FS11, L-5LA9274 FS20.

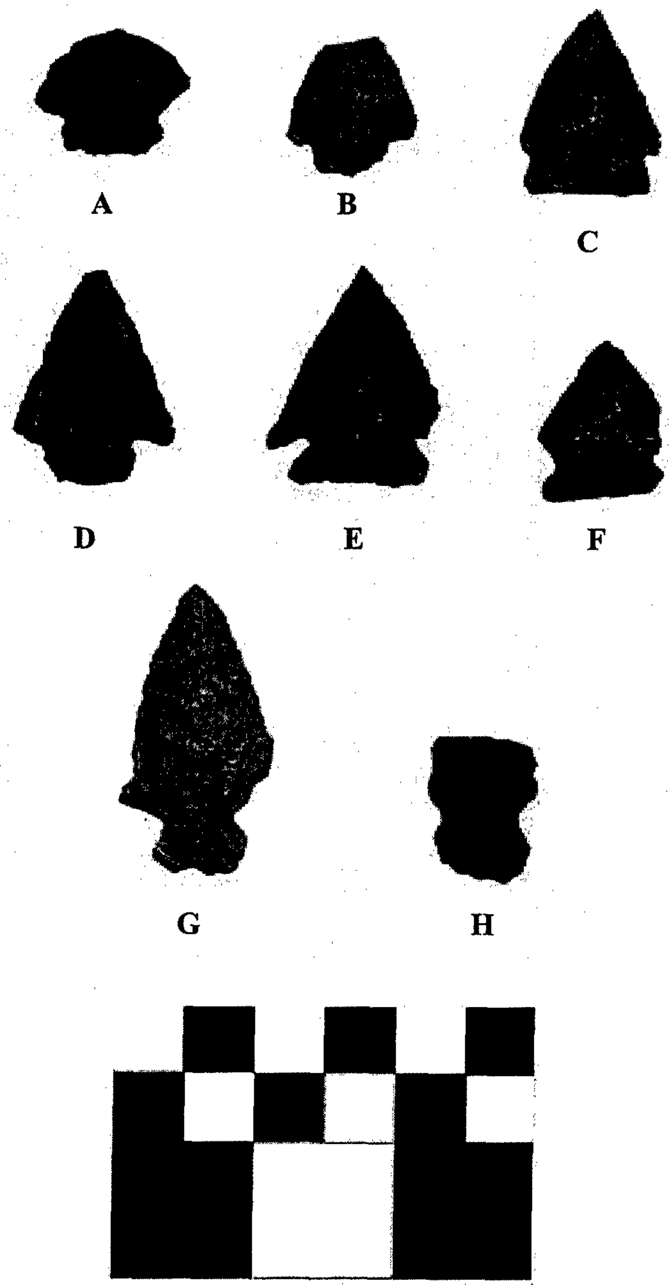


Figure 6.13: Diagnostic projectile points: A-5LA9037 FS25, B-5LA9437 FS6, C-5LA9446 FS1, D-5LA8287 FS2, E-5LA8606 FS2, F-5LA9259 FS30, G-5LA9476 FS11, H-5LA9342 FS1.

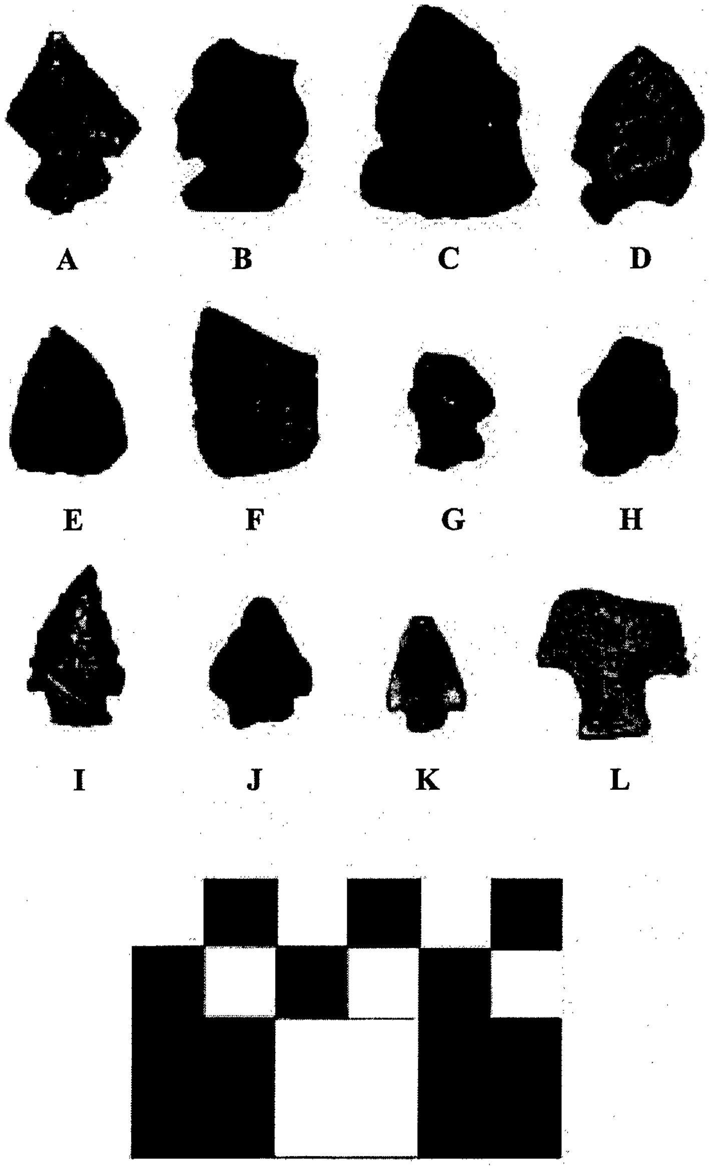


Figure 6.14: Diagnostic projectile points: A-5LA8283 FS2, B-5LA9259 FS6, C-5LA6105 FS101, D-5LA8308 FS2, E-5LA9187 FS74, F-5LA9187 FS161, G-5LA4940 FS26, H-5LA9180 FS2, I-5LA9349 FS9, J-5LA9020 FS38, K-5LA9262 FS3.

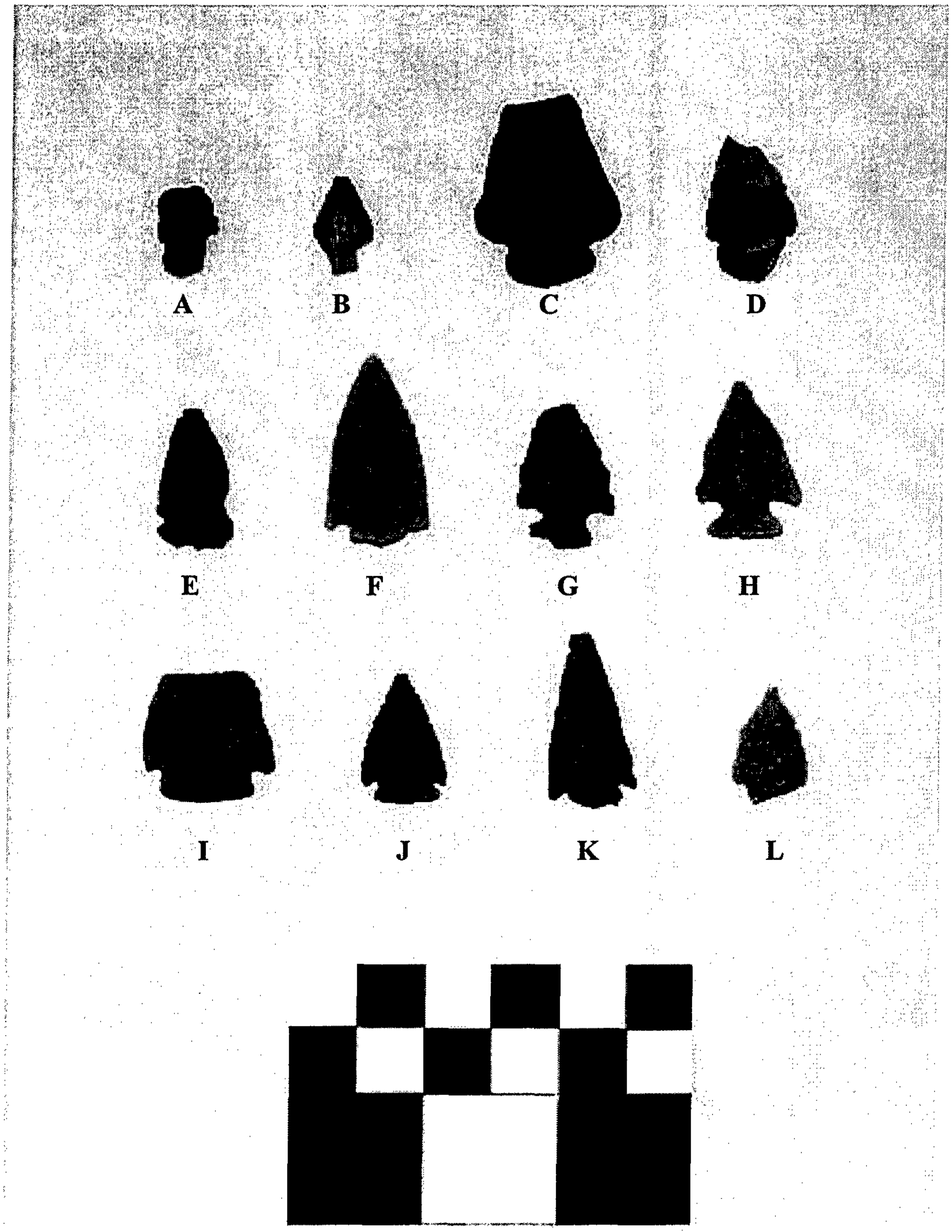


Figure 6.15: Diagnostic projectile points: A-5LA4725 FS82, B-5LA9196 FS2, C-5LA9037 FS27, D-5LA2240 FS53, E-5LA4725 FS104, F-5LA8300 FS19,G-5LA8598 FS1, H-5LA8606 FS90, I-5LA8620 FS80, J-5LA8622 FS4, K-5LA8622 FS23, L-5LA8666 FS8.

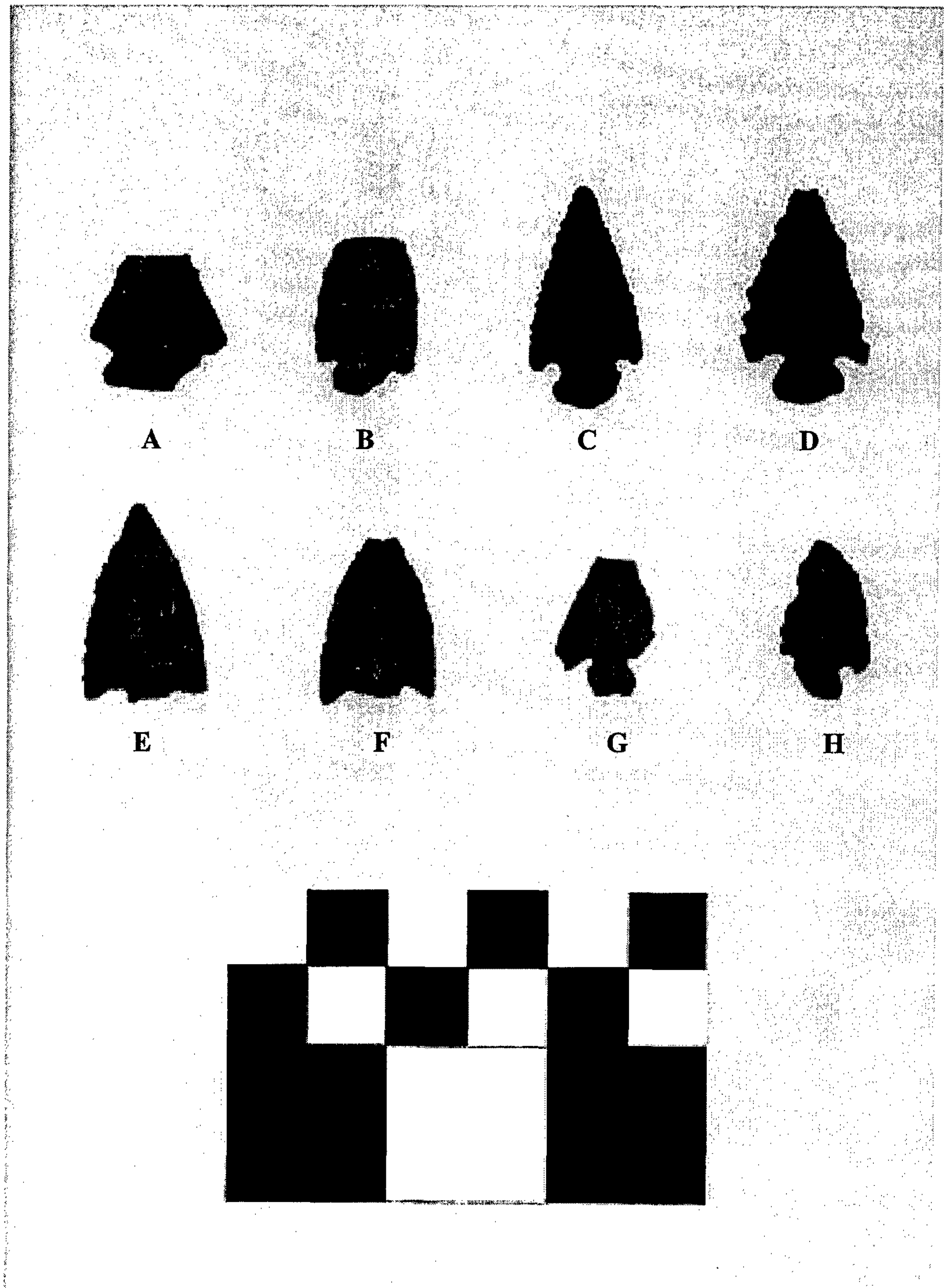


Figure 6.16: Diagnostic projectile points: A-5LA9274 FS34, B-5LA9277 FS10, C-5LA8681 FS1, D-5LA9474 FS13, E-5LA8668 FS2, F-5LA9020 FS41, G-5LA9211 FS18, H-5LA9211 FS65.

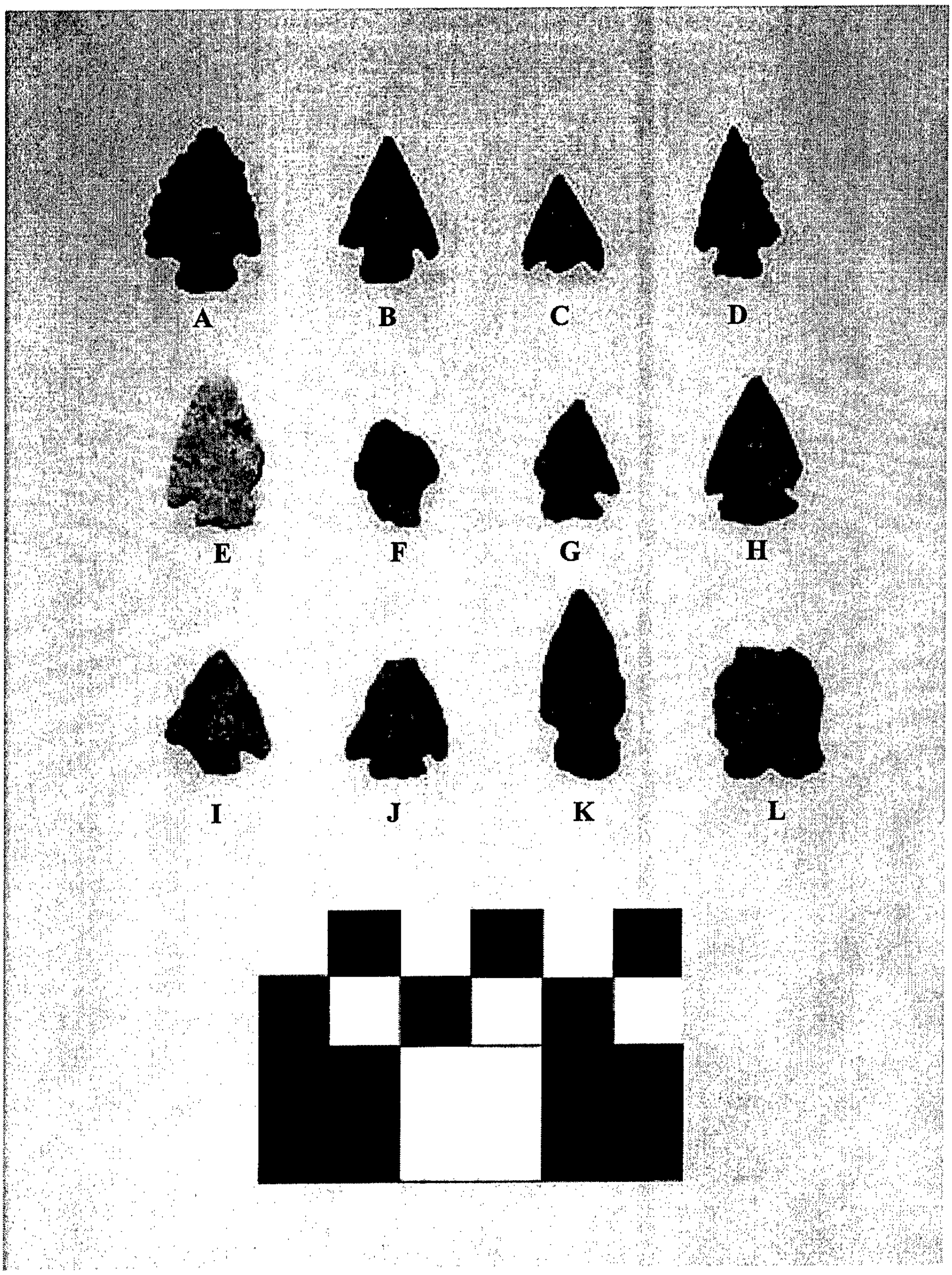


Figure 6.17: Diagnostic projectile points: A-5LA8602 FS29, B-5LA8622 FS3, C-5LA8664 FS8, D-5LA8665 FS1, E-5LA8678 FS3, F-5LA8690 FS8, G-5LA8691 FS2, H-5LA9027 FS1, I-5LA9329 FS1, J-5LA9448 FS28, K-5LA8292 FS7, L-5LA8619 FS16.

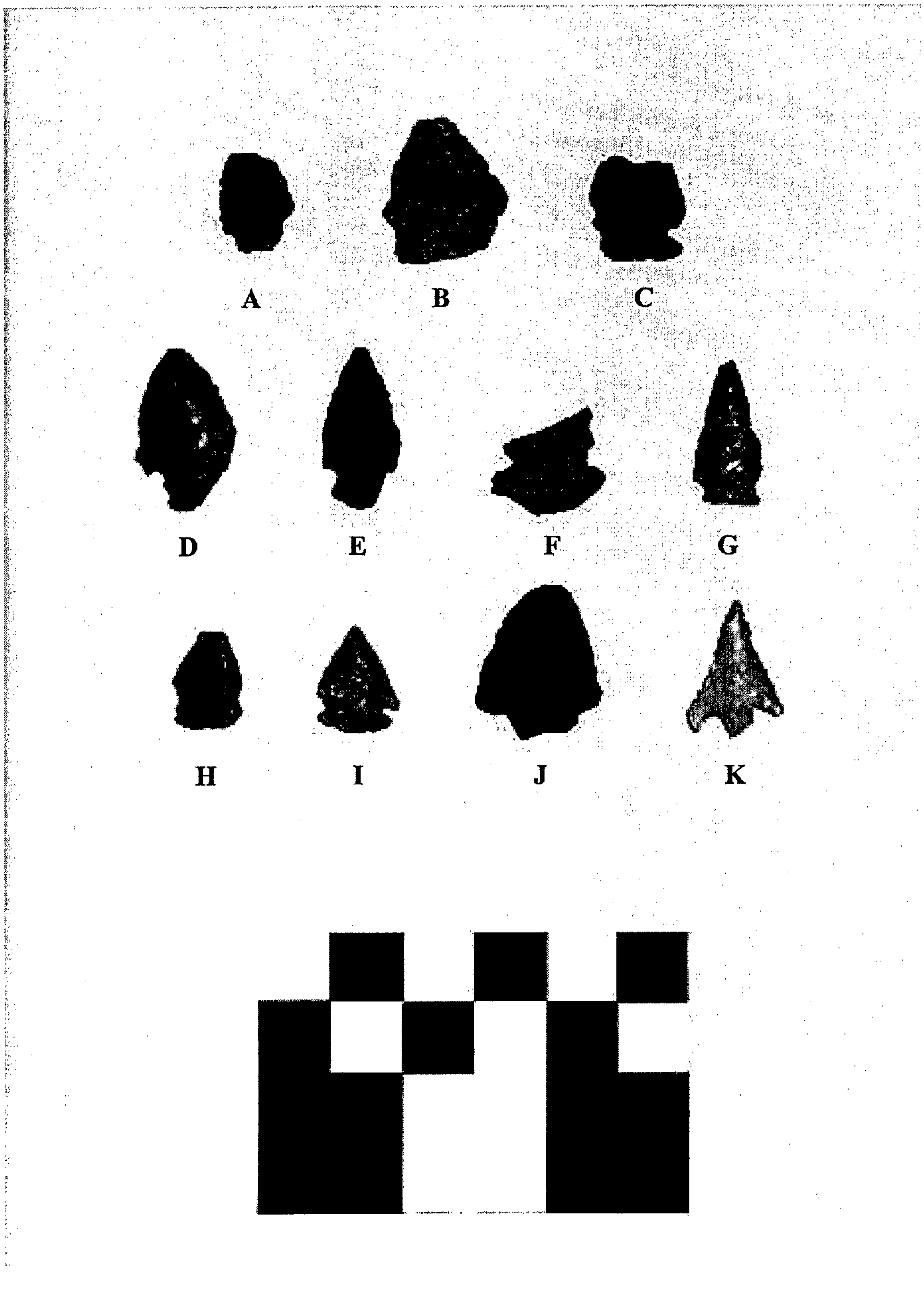


Figure 6.18: Diagnostic projectile points: A-5LA9259 FS13, B-5LA9187 FS111, C-5LA9211 FS36, D-5LA9351 FS2, E-5LA9366 FS4, F-5LA9039 FS2, G-5LA8292 FS4, H-5LA9274 FS23, I-5LA4940 FS7, J-5LA9278 FS14, K-5LA9291 FS1.

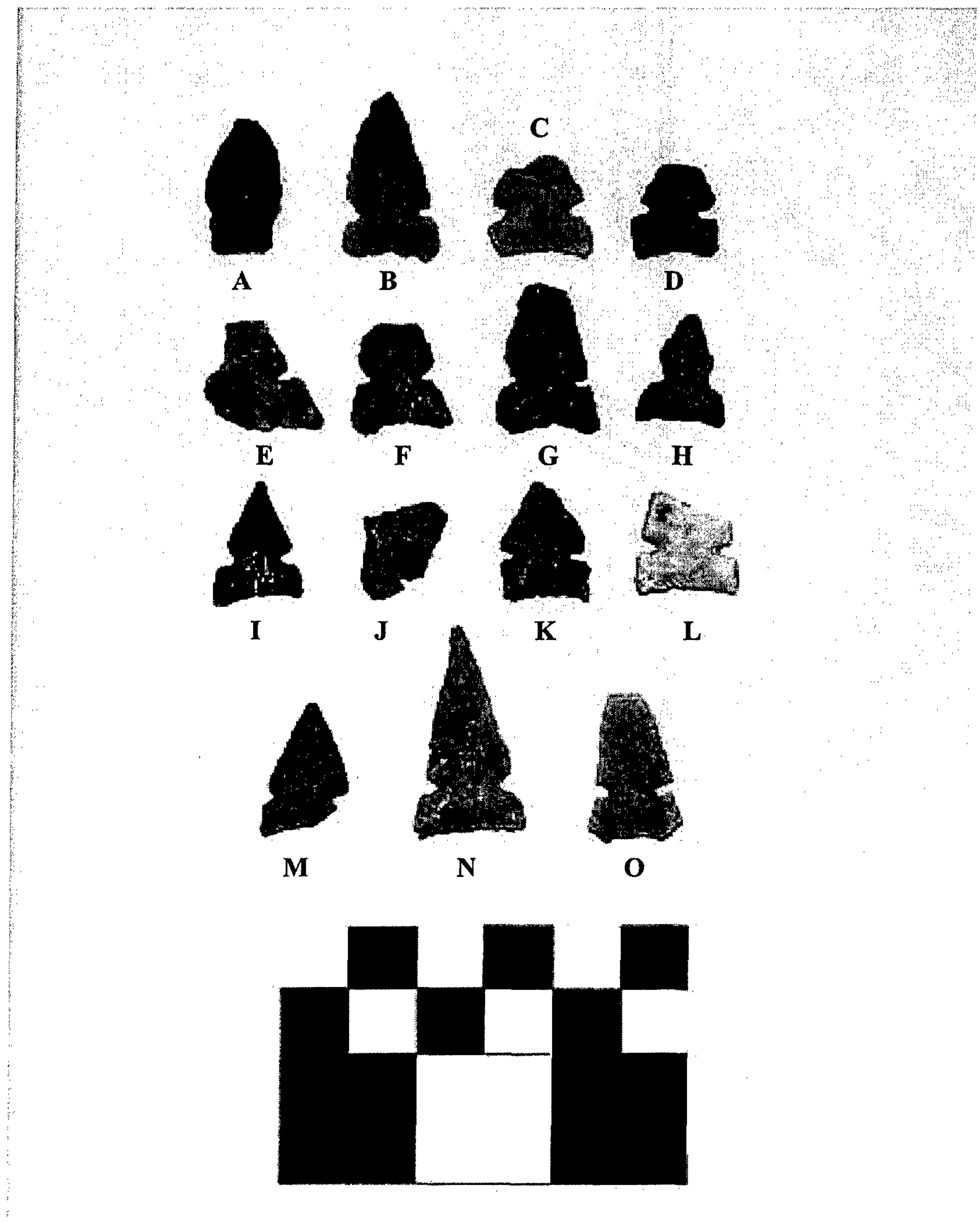


Figure 6.19: Diagnostic projectile points: A-5LA9278 FS13, B-5LA8297 FS15, C-5LA8311 FS10, D-5LA8664 FS6, E-5LA9026 FS8, F-5LA9183 FS21, G-5LA9183 FS28, H-5LA9183 FS44, I-5LA9187 FS147, J-5LA9187 FS244, K-5LA9187 FS509, L-5LA9275 FS3, M-5LA9302 FS3, N-5LA9333 FS3, O-5LA9344 FS33.

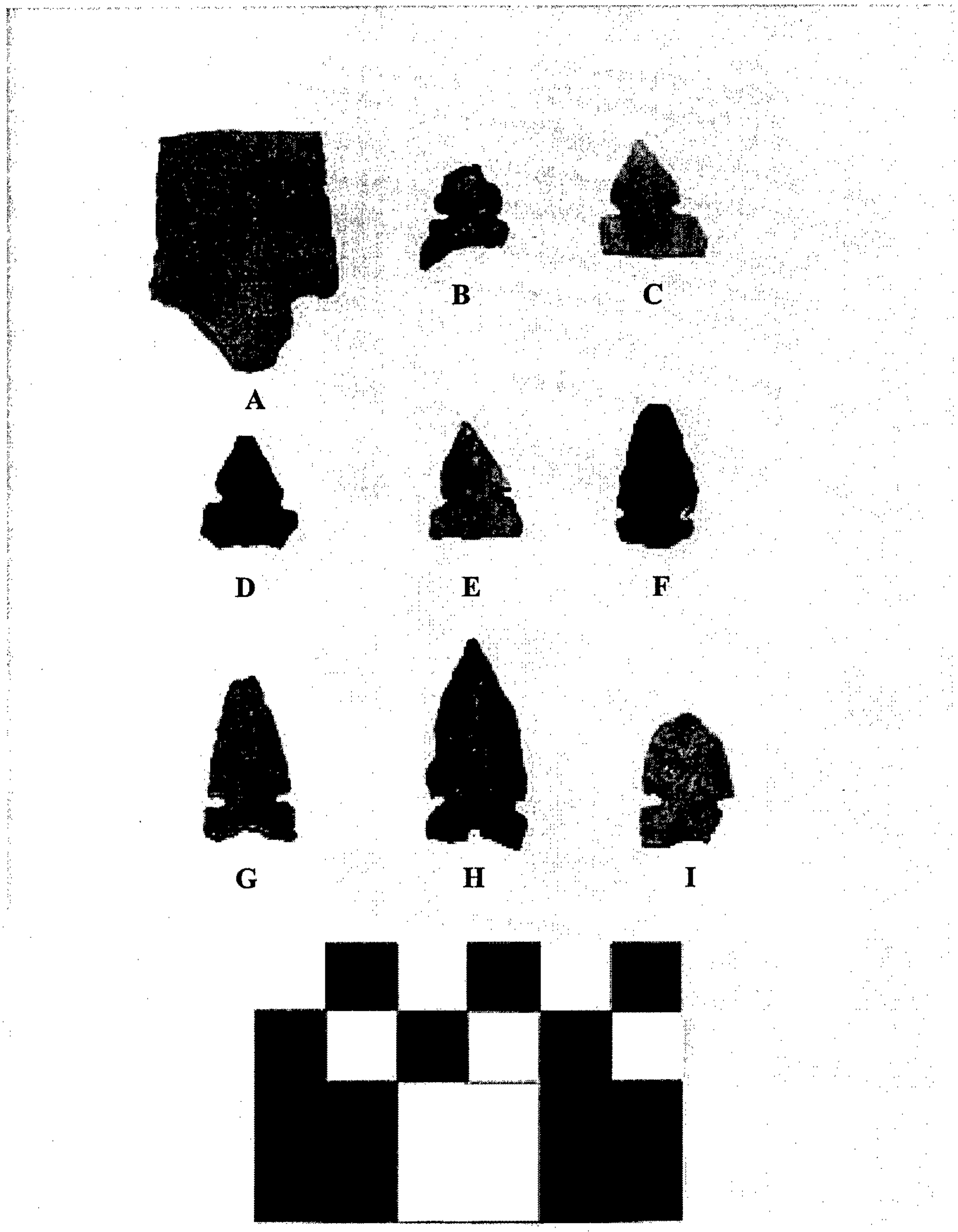


Figure 6.20: Diagnostic projectile points: A-5LA9212 FS20, B-5LA8294 FS9, C-5LA8311 FS7, D-5LA8665 FS14, E-5LA8672 FS9, F-5LA9211 FS6, G-5LA8664 FS9, H-5LA9187 FS94, I-5LA9187 FS703.

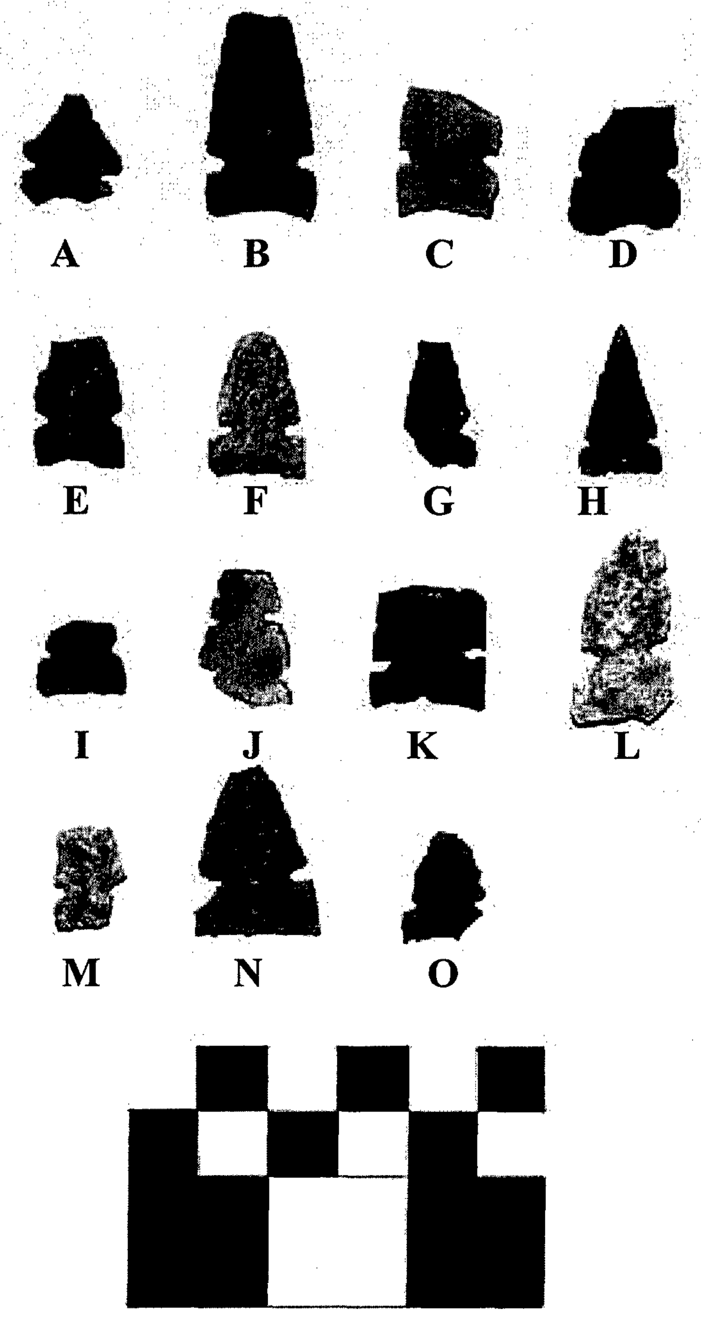


Figure 6.21: Diagnostic projectile points: A-5LA2240 FS22, B-5LA8620 FS70, C-5LA8632 FS1, D-5LA8655 FS8, E-5LA8665 FS7, F-5LA8676 FS2, G-5LA9212 FS7, H-5LA9020 FS17, I-5LA9026 FS10, J-5LA9037 FS20, K-5LA9042 FS1, L-5LA9183 FS48, M-5LA9185 FS1, N-5LA9187 FS524, O-5LA9211 FS7.

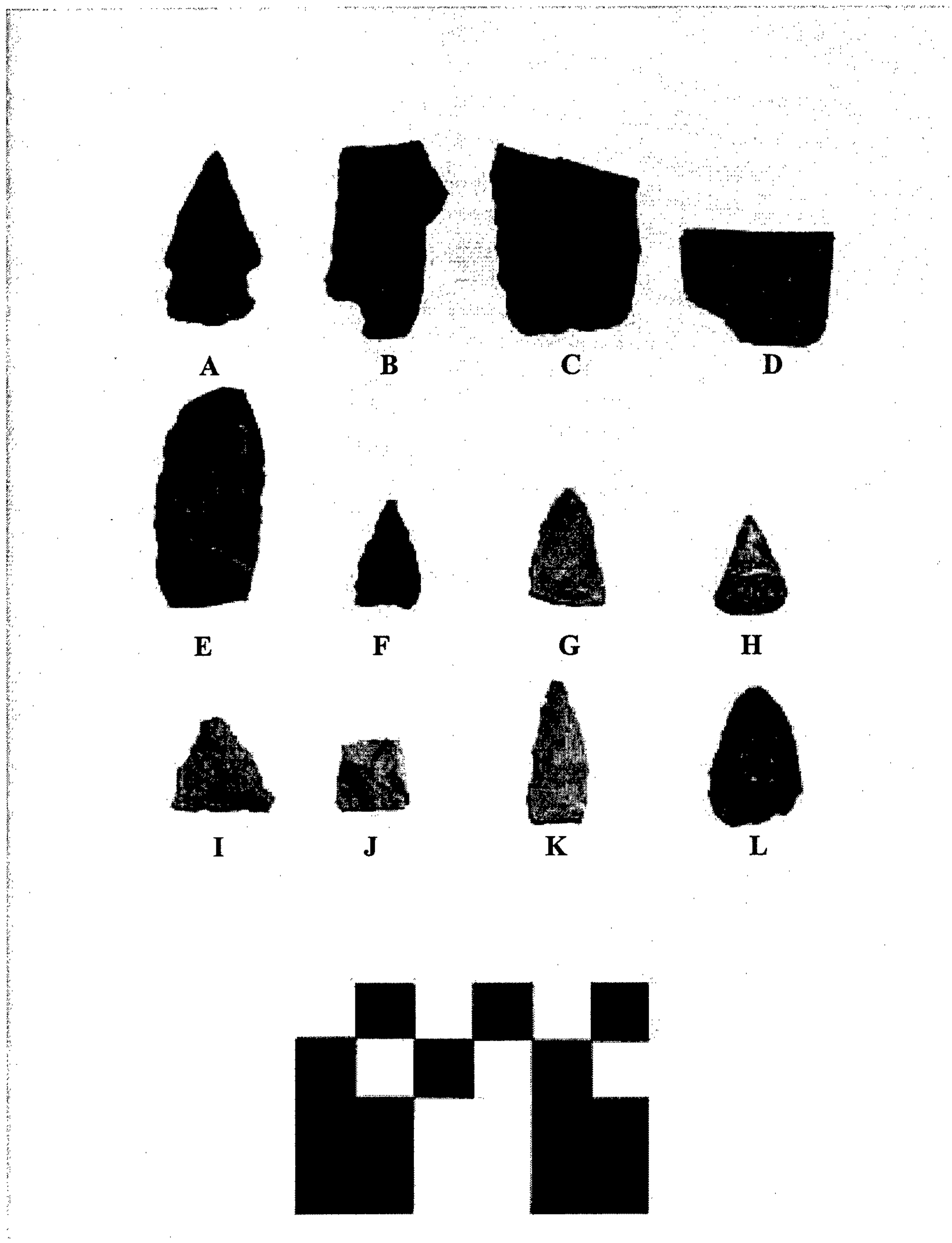


Figure 6.22: Diagnostic projectile points: A-5LA8622 FS5, B-5LA9183 FS35, C-5LA8620 FS10, D-5LA8666 FS13, E-5LA9333 FS17, F-5LA2240 FS9, G-5LA6101 FS4, H-5LA6105 FS91, I-5LA8290 FS11, J-5LA8291 FS7, K-5LA8311 FS18, L-5LA8606 FS74.

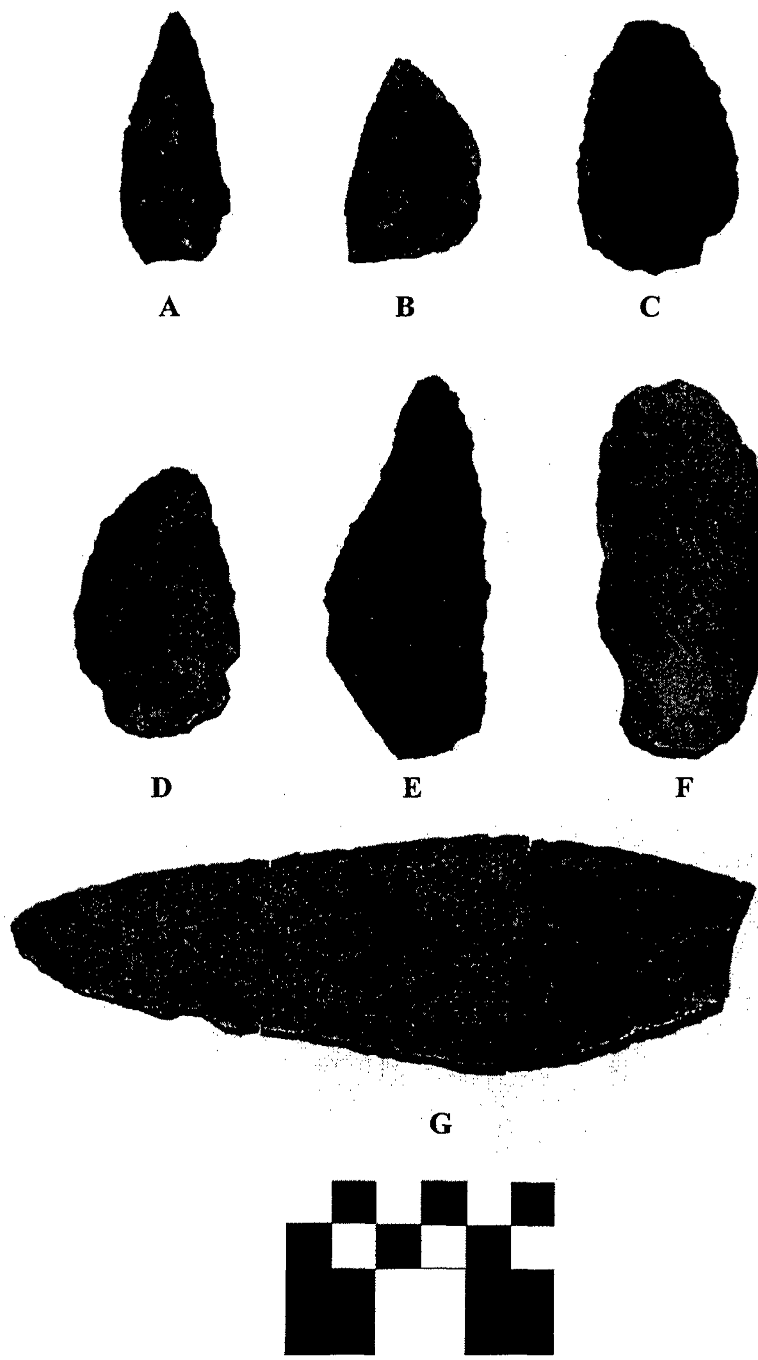


Figure 6.23: Bifaces from the Training Area 10 and 12 survey: A-5LA8291 FS26, B-5LA9211 FS63, C-5LA9336 FS12, D-5LA9370 FS47, E-5LA9370 FS49, F-5LA9372 FS9, G-5LA9372 FS25.

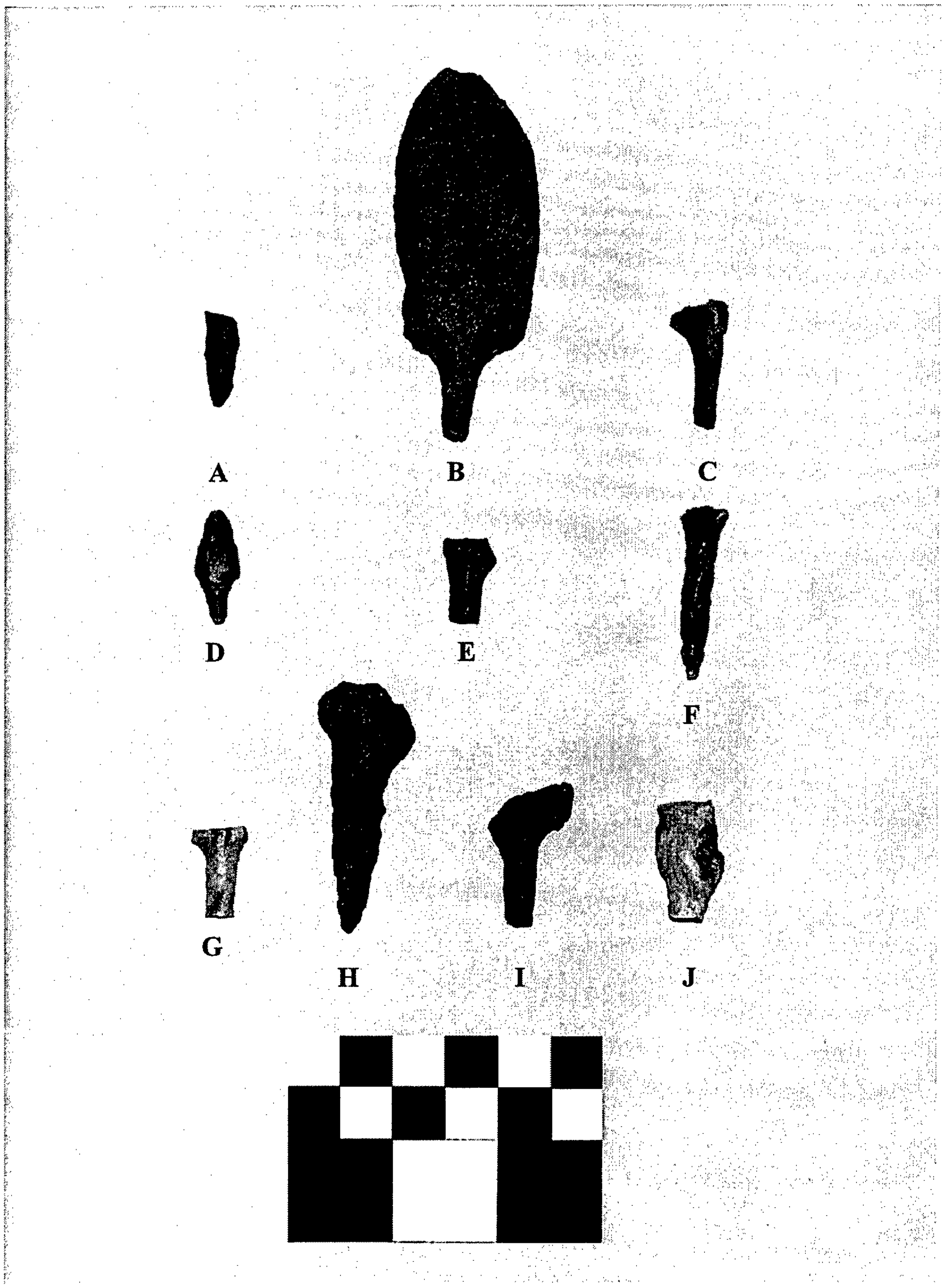


Figure 6.24: Drills from the Training Area 10 and 12 survey: A-5LA9020 FS9, B-5LA9178 FS2, C-5LA9020 FS11, D-5LA9183 FS19, E-5LA9187 FS18, F-5LA9187 FS162, G-5LA9274 FS26, H-5LA9290 FS3, I-5LA9333 FS 1, J-5LA9474 FS6.

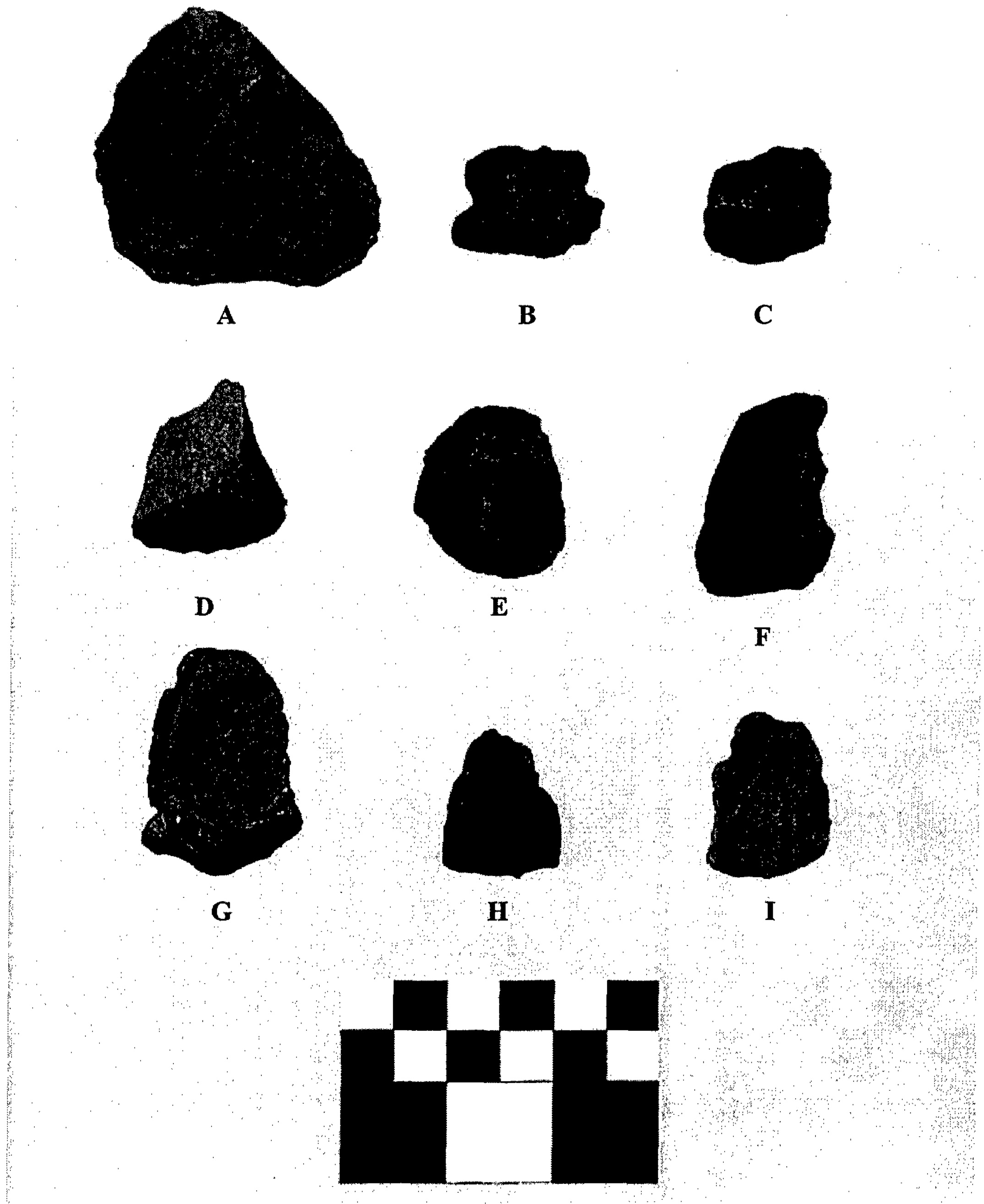


Figure 6.25: End scrapers from the Training Area 10 and 12 survey: A-5LA8302 FS14, B-5LA8689 FS1, C-5LA9025 FS2, D-5LA9179 FS1, E-5LA9189 FS3, F-5LA9210 FS 22, G-5LA9210 FS54, H-5LA9211 FS 56, I-5LA9339 FS5.

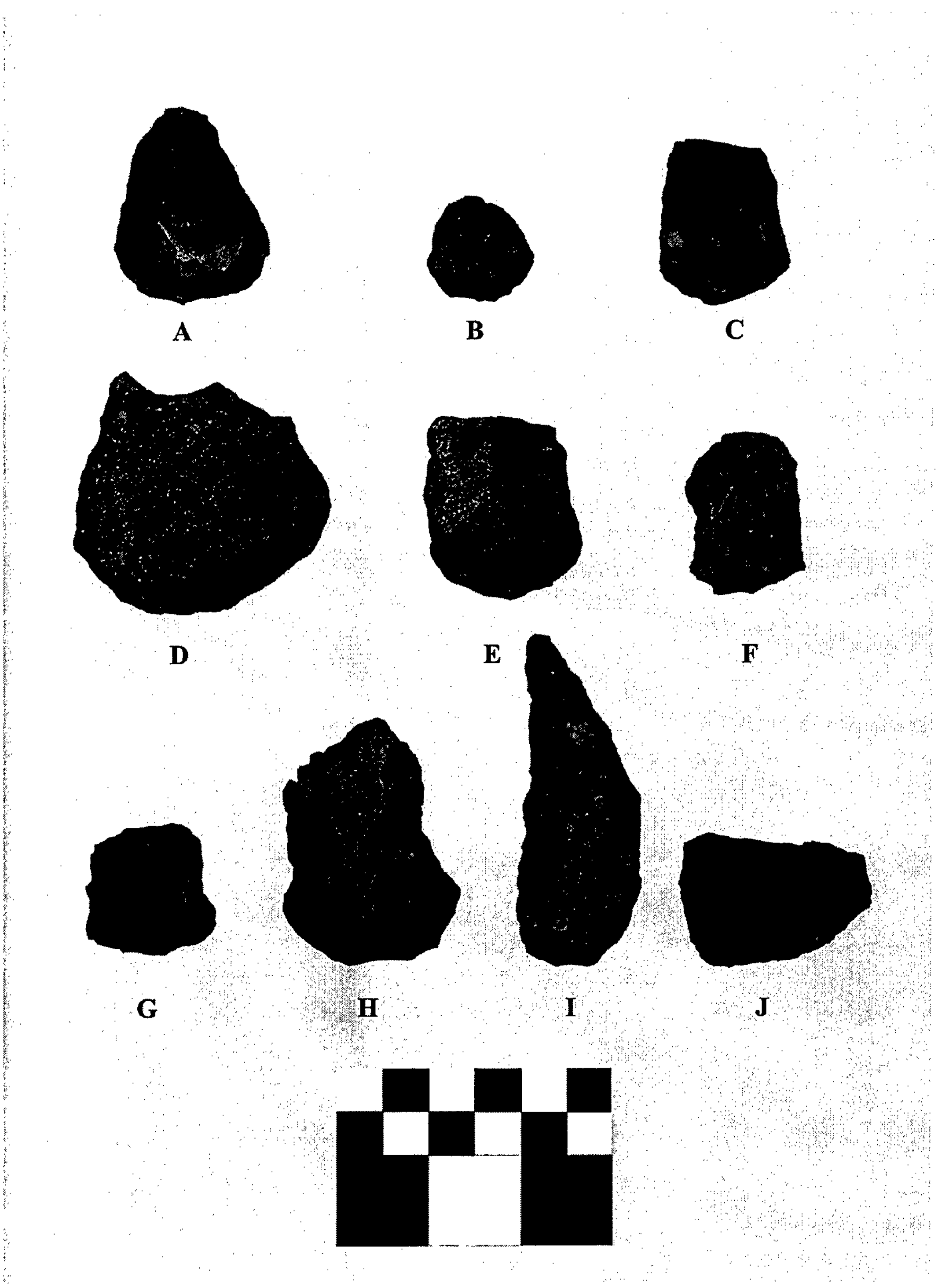


Figure 6.26: End/side scrapers from the Training Area 10 and 12 survey: A-5LA8292 FS13, B-5LA8299 FS3, C-5LA8302 FS2, D-5LA8302 FS3, E-5LA8308 FS11, F-5LA8311 FS14, G-5LA8614 FS66, H-5LA8655 FS4, I-5LA8691 FS12, J-5LA9024 FS2.

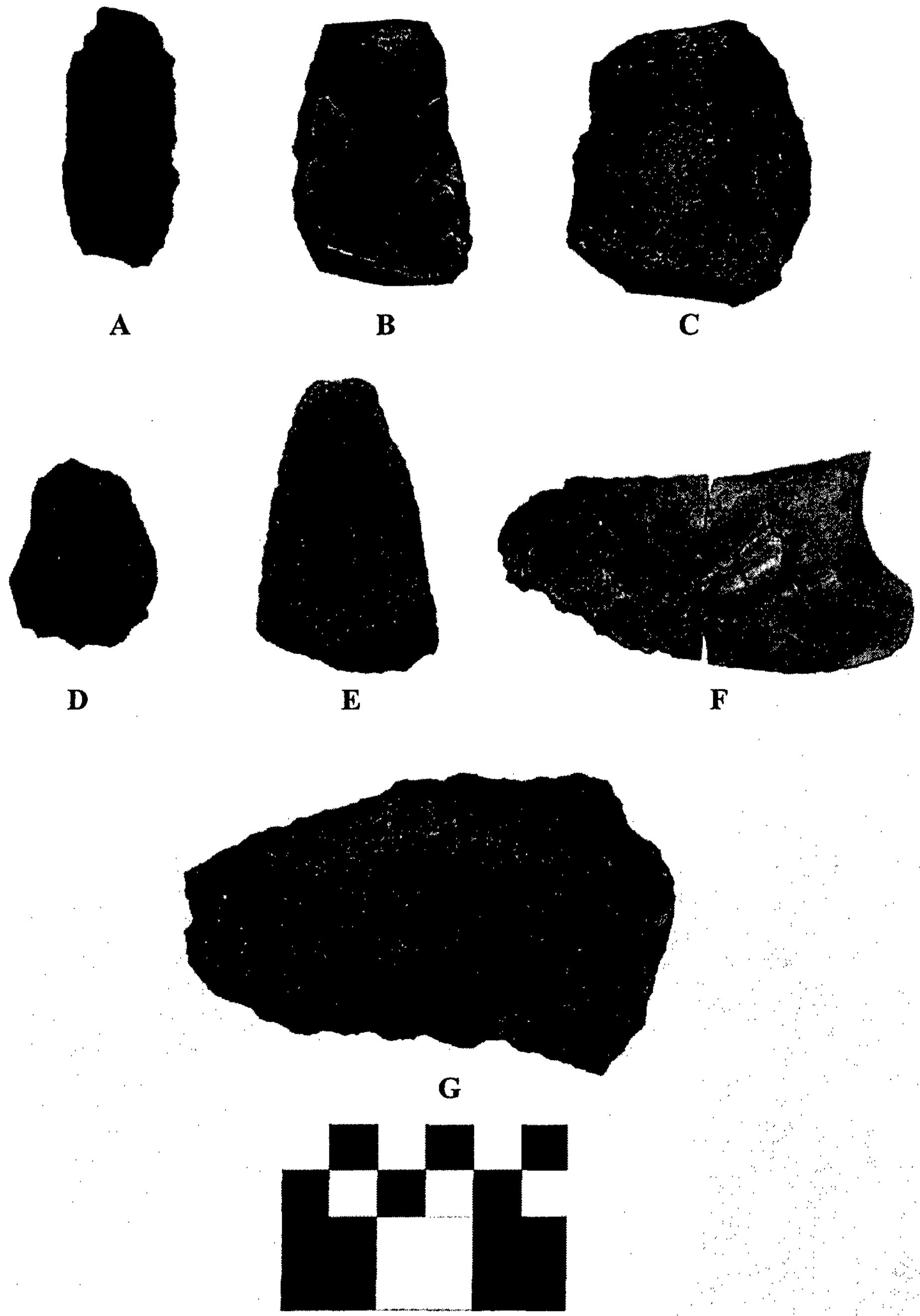


Figure 6.27: Side scrapers from Training Area 10 and 12 survey: A-5LA8607 FS7, B-5LA8607 FS29, C-5LA8615 FS2, D-5LA8686 FS8, E-5LA9183 FS18, F-5LA9290 FS7, G-5LA9336 FS6.

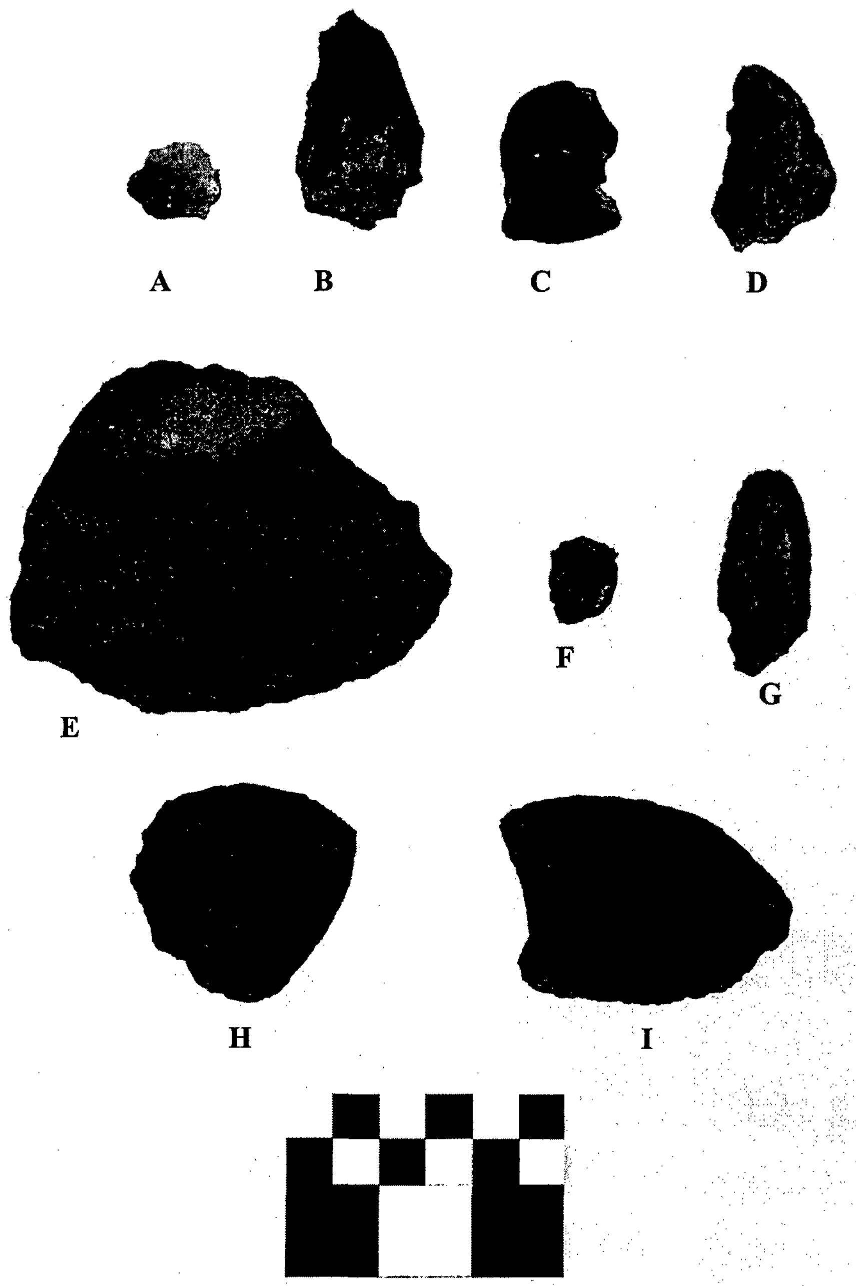


Figure 6.28: Utilized/retouched flakes from Training Area 10 and 12: A-5LA8603 FS1, B-5LA8607 FS25, C-5LA8681 FS14, D-5LA8681 FS33, E-5LA8681 FS42, F-5LA9210 FS28, G-5LA9275 FS2, H-5LA9295 FS13, I-5LA9343 FS2.

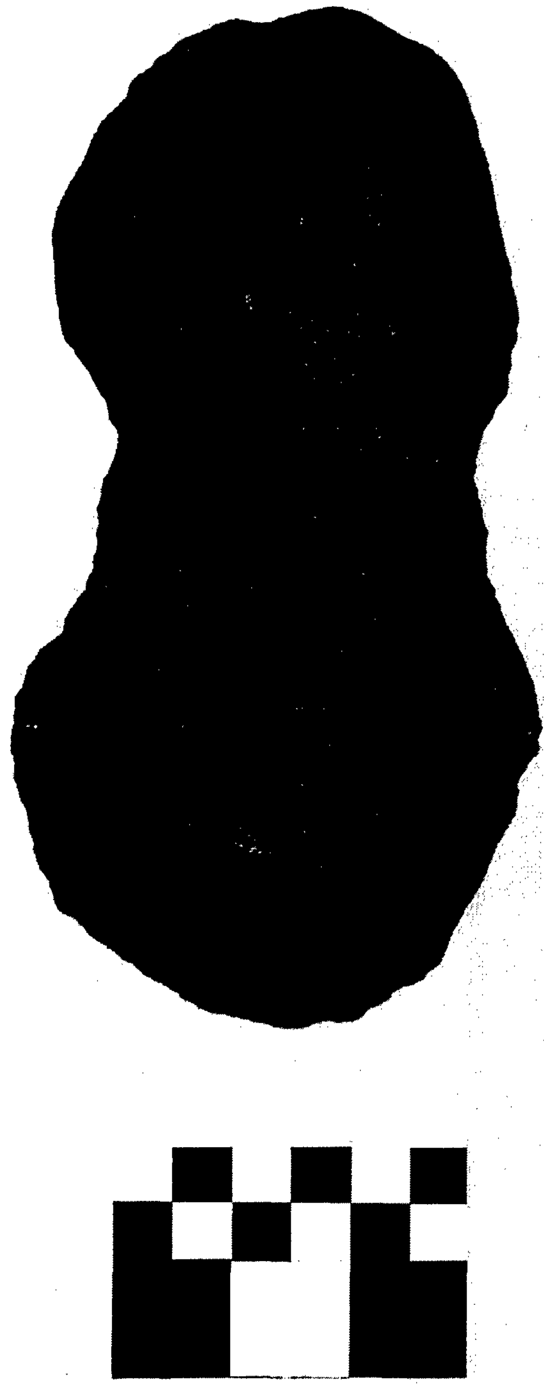


Figure 6.29: Isolated find, 5LA8639, FS1, a hoe.

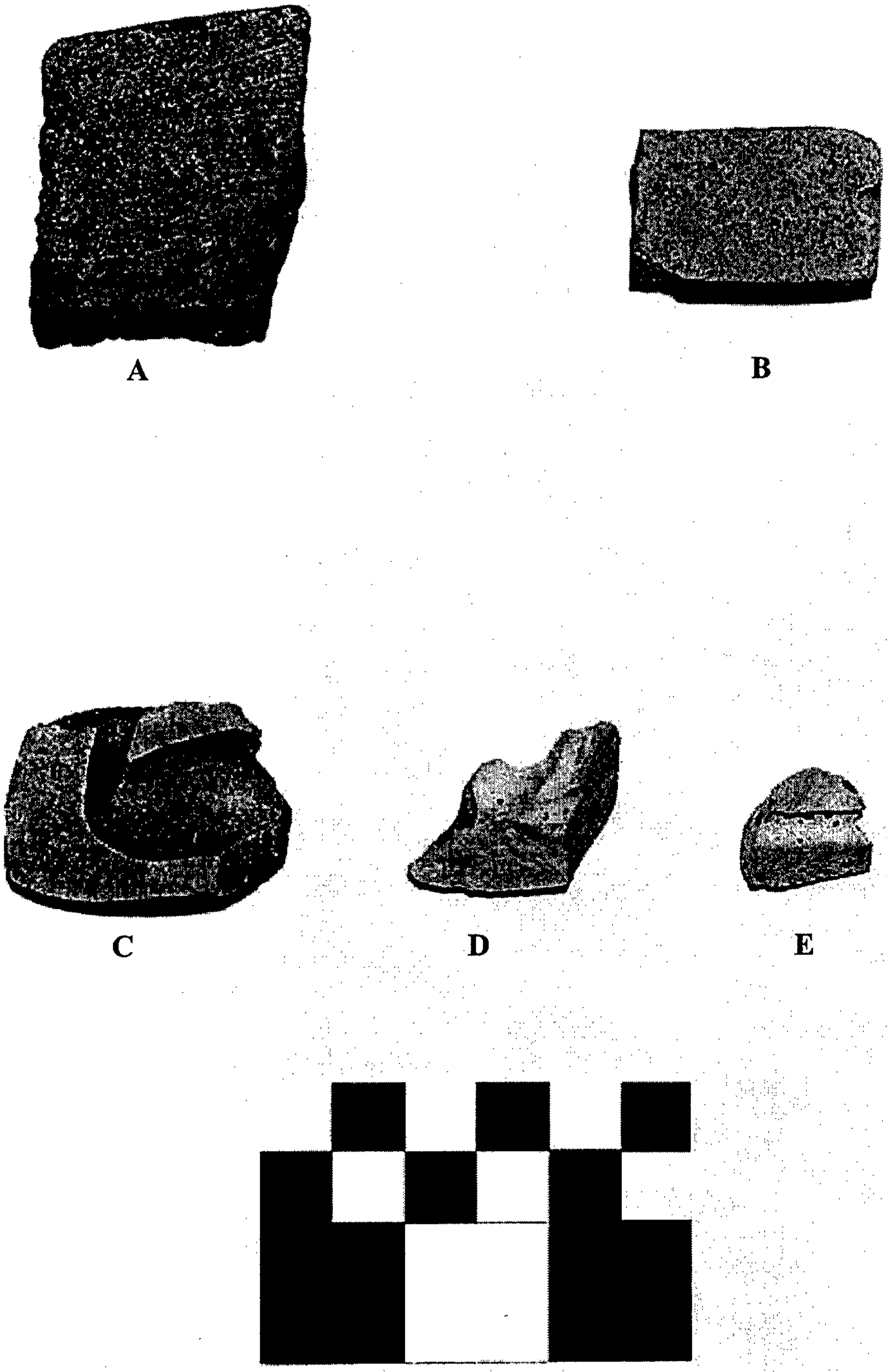


Figure 6.30: Pipe pieces and steatite bowl fragments from Training Area 10 and 12: A-5LA8620 FS 15, B-5LA9471 FS63, C-E 5LA9474 FS1.

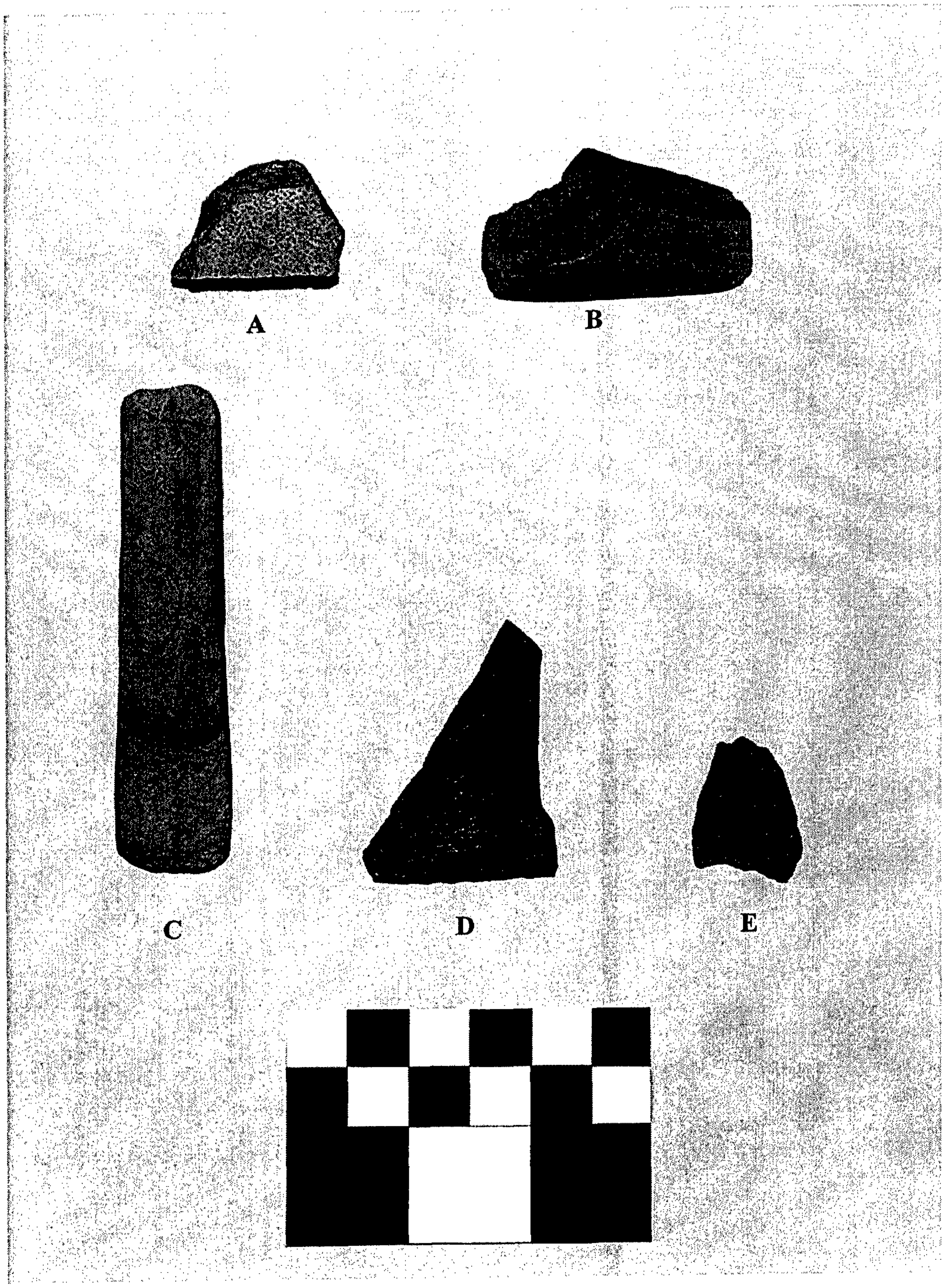


Figure 6.31: Jewelry manufacturing pieces from Training Area 10 and 12: A-5LA6104 FS34, B-5LA6105 FS77, C-5LA6744 FS24, D-5LA9328 FS7, E-5LA9456 FS3.

Chapter VII: CONCLUSIONS

In the past, archaeological research at prehistoric sites on the PCMS has been guided by a series of research themes identified in Andrefsky et al (1990). Research questions have changed through time as more data has been accumulated in the field. As such, the Colorado Council of Professional Archaeologists has prepared a new regional context for southeastern Colorado (Zier and Kalasz 1999) and this supplements NMSUs work at the PCMS. Major research domains outlined in this composition include chronology, population dynamics, technology, settlement and subsistence strategies, economy, architecture, rock art, and geomorphology and paleoclimates.

During the survey, field crews from NMSU discovered and evaluated 315 historic and prehistoric sites from survey units in Training Areas 10 and 12. These included 304 new sites and 11 previously recorded sites with evidence for new features and components. Results of our work demonstrate that 76 of the sites are deemed to be eligible for the National Register. A variety of different site types were identified during the project and include 230 (74%) lithic scatters, 76 (23%) cultural material scatters with architectural or habitation features, eight historic sites (2%), and one location where raw material procurement was identified as the primary site function. The latter point is misleading to those unfamiliar with our project area as the location of over 56% of all project sites is along the rims of the major canyon systems of the PCMS. As such, high quality lithic material resources (i.e., chert and quartzite) are often less than 100 m away from these areas.

When compared to site type designations from the other large training areas in the PCMS, similarities and differences are apparent. In Welsh Canyon (Loendorf and Loendorf 1999:53-57), lithic scatters comprise 56% of all site types with many quarry sites (10%) also identified. Since only the bottom and sidewalls of this large watercourse were surveyed, many rockshelter habitations were recorded (31%), but open-air architecture sites (3%) were nearly nonexistent. In the Black Hills (Owens et al. 2000:306-307), a high and upland landform in the eastern part of the base, sites were 88% lithic scatters, 6% rockshelter sites, 3% open-air architecture sites, and 3% procurement locations. A large open mechanized training location at the western part of the PCMS has also been surveyed recently. Training Area 7 (Owens and Loendorf 2002:188) contained 98% lithic scatters with the other 2% being both architectural and rock art sites. Collectively these data demonstrate that site type is highly variable based on landform, and to a lesser extent, elevation. Because Training Areas 10 and 12 comprise a variety of landforms, and the largest tracts of acreage on the base, much more variability is seen in site type.

As a research theme, architectural studies are frequently used to address questions regarding demography, community development, cultural boundaries, technology, function, and social organizations (Zier and Kalasz 1999:239-250). For the purpose of this project, we are primarily concerned with function and spatial patterning. To understand the utility of architecture in larger cultural systems, relationships between environmental and geographic factors and their overall influence on the placement of architectural sites must be examined. This can easily be done in the realm of a large-scale survey project, which promotes the discovery of more regional information in contrast to the site specific data normally encountered in excavation work.

It is well known that prehistoric people locate themselves to interact socially, and to be near the resources they need for survival (Jochim 1976:47-63). Given the fact that sites in Training Areas 10 and 12 possessed abundant architectural features, we feel we have at least minimal diversity with which to look for trends in the placement of habitational sites.

Our project had 22 sites with architectural units more robust (i.e., contiguous wall units) in nature than that typically observed in tipi rings. Based on Kalasz' (1989:901-92) structure attribute descriptions, these sites included 20 freestanding units, 15 abutment structures, three architectural units within rockshelters, and two cliff edge placements. On four of the sites, there were at least three architectural units, and on 12 sites, only a single architectural feature was encountered. These robust types of architecture were more often found on sites along the edges of the deep canyons (18), or in fewer instances (4), on the grassy steppes.

Of the sites found in the grassy steppes, 5LA9020 and 5LA9044 (three combined isolated structures) are found across from each other in the upper drainage basin of Stage Canyon. 5LA9188 and 5LA9450 (five abutments and two freestanding structures that may represent a small, widely dispersed village) are found on a similar juniper covered shelf-like landform below the Bear Springs hills. These sites are in relatively flat terrain, far from permanent water sources. This contrasts sharply when compared to other Apishapa phase sites that are in easily defensible positions (Angulski 1984: Chomko and DeVore 1990). From this perspective, the contiguous walled structures apparently served two different functions. The difference in site placement is possibly related to subsistence practices, but without excavation, and the recovery of pollen, faunal, or macrobotanical remains, this remains speculation.

Analysis of the structural sites along the canyon rim however, is a different matter. None of these are in what could be considered defensible positions, but the placement of many single architectural units on the canyon edge is intriguing. These sites were inspected using ArcView 3D Analyst and we were able to establish line of sight relationships between several of the sites (Figure 7.2), especially along Red Rock Canyon. This suggests some kind of communication network was in place, and this, in some way, may be related to the positioning of known defendable sites from the Late Prehistoric period. Support for this possibility will lie in the future study of architectural sites that seem to exhibit limited variation in environmental setting and geographic positioning.

Spaced-stone circles, or tipi rings, were identified on 25 of the project sites. In most cases (22), these sites were found along the edges of Red Rock and Lockwood Canyons at the nickpoint where canyon incising begins. It is in these areas that permanent and semi-permanent springs abound, and here, transitional ecozones would have allowed varied hunting and gathering strategies to be adopted. It is also in this setting that high quality quartzite is accessible.

Regarding site chronology, 133 of the project sites had temporarily diagnostic artifacts, features, or ceramics, or a combination thereof. Tentative age determinations were assigned by consulting Anderson (1989) in the case of projectile points, Kalasz (1989) for architectural elements, Appendix I for ceramics, Loendorf (1989) for rock art, and Ahler et al. (2002) for chronological information regarding site 5LA9187. It is evident that in the Training Area 10 and 12 assemblages, artifacts and features were more often found from sites occupied during the Late Prehistoric stage (Figure 7.1), though artifacts representing nearly every prehistoric stage have been found.

Archaeological survey projects often have very little to offer regarding the recovery of paleoclimatic data. This being said, there are a few noteworthy points to be made when the age estimates for recorded field artifacts are considered in relation to known, and well documented, climatic episodes. First, Schuldenrein (1985) has hypothesized that post-Altithermal erosional episodes have eliminated the older sites from the PCMS. This is somewhat supported by the data in Figure 7.1 as intense occupation is certainly seen in the period after 2500 BC. Benedict's (1979) two-stage Altithermal model (episodes between 5000 - 4500 BC and 4000 - 3500 BC), and that proposed by Johnson and Holliday (1986) from information recovered at the Lubbock Lake site (events from 4400 - 3500 BC and 3000 - 2500 BC) suggest drought conditions that correspond well with our project data. The lack of temporally diagnostic materials from this period suggests that resources within our portion of Colorado were poor and that there were not many people living here. It should be noted that most of the Paleoindian points recovered from the PCMS are from mixed surface assemblages, so Schuldenrein's model appears intact.

The Little Climatic Optimum (AD 200 to AD 900) is described as a period of heat and drought similar to those conditions seen during the Altithermal (Bryson et al. 1970). Again when Figure 7.1 is considered, we see an apparent break in the midpoint age estimates, reflecting poor conditions for habitation and utilization of the area. It is important to note that the xeric conditions for the time after AD 1000, described in Zier and Kalasz (1999:240), apparently had no effect on populations in the PCMS.

The analysis of the lithic artifacts from the field investigations provides information regarding lithic material acquisition and manufacture, mobility, and chronological trends through attribute morphology. In Training Areas 10 and 12, hornfels/basalt, argillite, quartzite, and chert are the dominant local lithic materials in the flaked artifact assemblage. Argillite and hornfels/basalt outcrop at the hogback landform approximately 10 km southwest of the project area and fine- and coarse-grained quartzite outcrop in the numerous permanent and intermittent arroyos throughout the PCMS. Cobbles and nodules of chert are encountered in Quaternary lag gravels near upper Van Bremer Arroyo and in intermittent streambeds. Gravel deposits along the Purgatoire River and on the erosional terraces of the major canyons also offer good potential for obtaining chert material. In short, though the survey in Training Areas 10 and 12 did not include these areas, or more specifically, their landforms, the raw materials for making lithic artifacts were locally available. We suspect that most of the materials were obtained by an embedded tactic (Binford 1977, 1979; Brown 1991), that is, the incidental collection of raw materials while pursuing everyday subsistence activities.

The Training Areas 10 and 12 survey project has produced an abundance of data regarding trade and exchange practices. In this project, as in other survey projects, lithic material classifications are often the only means for doing so, though unique items may also have some bearing. Nonlocal materials encountered in the debitage and chipped-stone tool assemblages included Alibates dolomite from Texas, Black Forest silicified wood from east-central Colorado, a material that appears to be Chinle chert (from the Zuni area of New Mexico), Edwards chert from Texas, Flattop Chalcedony (Colorado/Nebraska border), chert from the Hartville Uplift source in Wyoming, a Knife River flint-like material, Niobrara jasper from various sources in the Plains, Jemez Mountain (Polvadera Peak, Obsidian Ridge, and Cerro del Medio sources in New Mexico), Malad (Idaho) and Yellowstone (Wyoming) obsidian, Plate chalcedony from South Dakota, porcellanite (Wyoming), and Tiger-eye chert (western Colorado/Wyoming border). These materials were encountered as bifaces, biface-thinning flakes, complex flakes, cores, utilized and retouched flakes, perforating tools, scraping tools, simple flakes, and shatter.

The presence of cortex on 18 items indicates that Jemez Mountain obsidian, Hartville Uplift chert, and Black Forest silicified wood entered the project area as unmodified and curated cobbles or nodules. Based on flake type, nonlocal materials also entered the area as large, unpatterned bifaces or prepared cores. Debitage data shows that once here, nonlocal materials were reduced to produce patterned tools, flake tools, and flakes. It is unknown whether the procurement tactic for nonlocal materials involved seasonal movement, or trade and exchange, but either way, the transport routes appear to be aligned north-south and along the eastern slope of the Rocky Mountains. Exceptions would be Tiger-eye chert, which outcrops in northwest Colorado and southeast Wyoming (Whittaker et al. 1988) and Alibates dolomite from the Texas panhandle.

Two other artifacts collected in the field have some bearing on trade and exchange issues. The first of these is a hoe (5LA8639, FS1) made on a flaked basalt cobble. It matches the description found in Davis and Montgomery (1995:29) for artifacts most commonly found on Mesa Verde Anasazi Tradition sites around the Four Corners region. This piece is almost certainly evidence for farming practices at the PCMS, and contact between PCMS populations and those of the Southwest. The other piece (5LA5LA8620, FS 15) is an edge fragment from a thick-walled steatite vessel. Steatite has been used for making containers throughout North America, but the likely source for this piece would be somewhere in the northern Rocky Mountain Region.

Data to study technology is easy to recover in any survey project, but a general point should be made. Sample size was not a problem for us. In nearly every case we were able to collect a 150 piece sample of debitage, and we also recorded every chipped- or ground-stone tool that was identified. It has been said that the larger the sample size in relation to the overall population size, the greater the precision of the estimate overall (Hardyck and Petrinovich 1969). While this may be true in many functional interpretations, it is not necessarily true when one is trying to identify temporally sensitive attributes for lithic items like debitage or scraping tools when compared to known, stylistic and diagnostic projectile points. We did find many projectile points that could be classified in Anderson's (1989) system, but the vast majority of our project sites were identified in deflated context, and thus, represent mixed lithic occupations. In short, our overall technological observations are very general, and temporal corollary data was impossible to obtain because of the mixed horizontal and vertical occupations of the sites.

When compared to the total number of patterned tools, simple flakes and complex flakes dominate the artifact assemblage. Both expedient flake technology and bifacial technology appear to have been used by the prehistoric inhabitants of the PCMS, and this is really not that surprising when the high number of overall artifacts is considered. High percentages for simple flakes and the presence of considerable amounts of shatter indicate that formal core reduction or raw material procurement is the dominant lithic reduction strategy for locally available materials. Again, this should come as not surprise as 56% of all project sites are less than 100 m from outcropping raw materials. Debitage recovered from sites throughout the study unit indicates there is also a strong emphasis on flake production and tool manufacturing/resharpening.

Seven general tool classes are found in the chipped-stone tool assemblage-- projectile points, non-bipolar cores and core-tools, bifaces, utilized and retouched flakes, scrapers, and perforators. When the overall artifact assemblage is considered (n=27,186 items), many (52%) of the artifacts are related to early-stage raw material reduction. The remaining artifacts were used for later-stage tool manufacture or maintenance (35%), hunting or game processing (8%), or vegetal material processing (4%). The last 1% of the assemblage cannot easily be assigned to one of these general activity classes. The formal to expedient tool ratio is 1:1, suggesting perhaps more long term habitations for sites in the project area. Training Area 7 (Owens and Loendorf 2002:189) has a 4:1 patterned to expedient tool ratio that seems to indicate that more mobile populations produced these tools. The former data are not surprising given the much higher number of architectural and habitation features in Training Areas 10 and 12.

Our ground-stone analysis is purely functional in nature, and because artifacts were tallied, but not collected in the field, very little can be said regarding technological variability. One thousand one hundred and sixty-nine ground-stone artifacts were recorded from combined Training Areas 10 and 12. These were placed into one of six groups including mano (404 items), metate (701), edge-ground cobble (57), lapstone (1), pestle (1), and unidentifiable ground-stone fragments (5). In addition, many miscellaneous artifacts were recorded including hammerstones, shaft straighteners, jewelry items, a hoe, polishing stones, a possible effigy, an abrader, a jar cover, pounders, burned and calcined bone, beads, ceramic sherds, pipe fragments, and a bowl fragment.

In the analysis of the artifacts, three of the four major topographic units (Schuldenrein et al. 1985) were used to divide Training Areas 10 and 12. These topographic settings/units include the steppes, hogback, canyons, and hills. See Figure 2.1 for the location of these topographic features, and a brief description for each can be found at the beginning of Chapter II. Table 7.1 lists the project site data by topographic setting, but since the Hogback is approximately 10 km away from our current study area, it is not included in this analysis. Some might call our sampling strategy an arbitrary breakdown, but we prefer to call it judgmental sampling because after several years of fieldwork we have acquired knowledge about the region, and this technique has led to the collection of reliable and meaningful data in the past (Owens and Loendorf 2000, Owens and Loendorf 2002).

Table 7.1 provides information on project site, environmental, and lithic data. Most of the sites with temporally diagnostic materials can be attributed to the Late Prehistoric stage though it is noteworthy that only two prehistoric sites may be attributed to the Protohistoric period. Church (2002) indicates that this may be due to the fact that archaeologists have trouble recognizing remains from this period in the field. There is also a possibility, though slight, that Kvamme's (1984, 1989) survey units are not placed where these types of remains may be encountered. The high number of apparent Paleoindian sites is also important, as very few artifacts from this stage have ever been found at the PCMS.

Given the multi-component and mixed nature of the lithic assemblages it is not surprising that most sites were identified in canyon settings where water is more readily available. Sites were also identified in the steppes, and seldomly in the hills. We do not know if this represents cultural variation, or restrictions placed on this variable by the placement of Kvamme's (1989, 1990) model. It should be noted that this model is good for creating large site inventories for the cultural resource management part of the operation, but in our estimation it does not work well when trying to determine specific types, and ages for sites. This being said, researchers in the future should be able to take Kvamme's data and supplement it with site specific data to produce models for site type (i.e., Apishapa phase architecture, tipi ring, or lithic procurement sites).

Sub-dividing the Training Areas 10 and 12 allows us to make other generalizations regarding procurement strategy, and subsistence. Food, water, and lithic primary material sources were valuable commodities throughout prehistory. Because these resources are not distributed uniformly across a landscape, hunting and gathering groups, as well as semi-sedentary peoples, would have occupied landforms where the essential resources for maintaining life could be more easily obtained. This is the most important point when looking at human settlement patterns, and easily explains why there are many more sites in the canyon margins (56%) of the PCMS than on the steppes (37%) or hills landforms (7%).

Canyon sites recorded during our project were often within a few hundred meters of permanent water sources. Thirty-six locations had water within 100 m, eight large multi-component sites had water within their site boundaries, and seasonal water sources averaged less than one hundred meters away. Nonfood resources like water and firewood would have been easily obtained. The juniper/black grama plant community (Shaw et al. 1989:28) was recorded on over 55% of the canyon sites. Because environmental changes in the area of the PCMS have not been extreme since the Altithermal event, it seems likely that juniper trees, sagebrush, mountain mahogany, and skunkbrush sumac would have been present in these canyon settings. Multiple food resources could have been exploited from down inside the canyons, or in the steppes from a central camp on the canyon rim. Economic resources, such as lithic raw materials, are always found in close proximity to these settings. As stated before, the canyons contain more lithic tools overall, but sites located on the steppes generally contain the same average when chipped- and ground-stone tools are considered. In addition, the flaked to ground tool ratio is close to the same, with slightly more chipped tools on steppe sites.

Hill sites differ dramatically from those found in other topographic settings. The ratio of chipped to ground tools and debitage to chipped-stone tools is lower than that mentioned above, while the average number of ground-stone tools per site is even higher than that seen for canyon sites. Subsistence strategies for sites in and just below the Big Arroyo, Black, and Bear Springs hills suggest mixed hunting and gathering with a definite emphasis on food processing. Based on information contained in Table 7.1 we can argue that the reason there are more ground-stone tools in the hills landforms is that access to floral resources is good. Piñons and grass species like three-awn and Indian rice grass are abundant in the area today. In addition, the many woodland species found in these types of settings would have provided a fuel resource and cover for human inhabitants. The most important aspect of hills sites might be visibility. Vantage is critical for viewing ungulates or enemies out on the steppes, while cover would be important if you did not want them to see you.

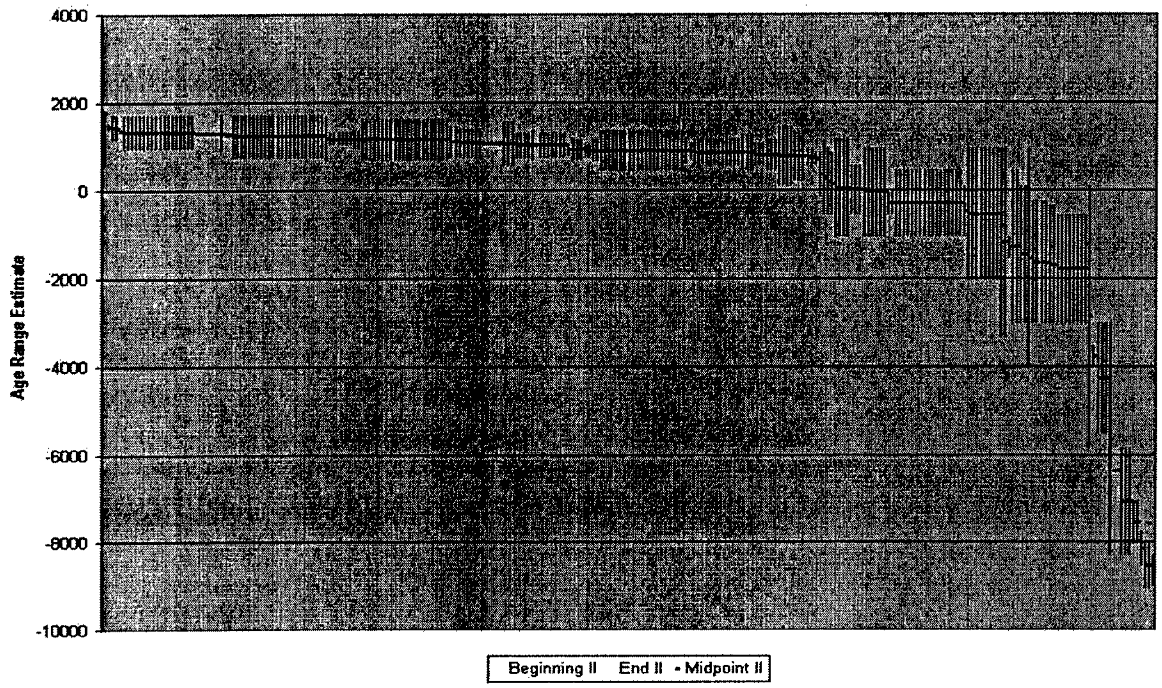


Figure 7.1: Chronological distribution for the 133 project sites with temporarily diagnostic artifacts or features.

Table 7.1: Prehistoric Site Data for the Three Major Topographic Units Encompassed in Training Areas 10 and 12.

Prehistoric Site Data	Steppes	Canyons	Hills
Number of Sites	140	214	28
Total Number of Debitage Items	4401	16,912	1068
Average Number Debitage Items Per Site	31.9	79.1	38.1
Total Number of Stone Tools	864	1795	150
Average Number Stone Tools Per Site	6.3	8.4	5.3
Number of Sites with Stone Tools	90	181	22
Average Number of Stone Tools Per Site	9.6	9.9	6.8
Total Number of Ground-Stone Tools	293	744	107
Total Number of Sites with Ground Stone	51	124	17
Average # of Ground-Stone Tools Per Site	2.1	3.5	3.8
Multiple Component Sites	11	32	4
Ratio of Flakes to Chipped Stone Tools	5.1	9.4	7.1
Ratio of Chipped to Ground Tools	2.9	2.4	1.4
Ratio of Bifaces to Cores (Average)	2.1	2.5	2.2
Sites with Paleoindian Component	2	7	2
Sites with Archaic Component	10	32	5
Sites with Late Prehistoric Component	36	60	10
Habitation Sites	14	62	0
Historic Sites	8	2	0
Open-Air Lithic Scatters	117	150	28
Dominant Material	Chert (30%)	Coarse Qzt. (49%)	Chert (47%)
Presence of Ceramics	4	14	2
Average of Site Aspect	169 degrees	170 degrees	126 degrees
Average Distance to Water	3013 m	133 m	5724 m
Sites with Thermal Features	13	41	2
Sites with Apishapa Phase Architecture	4	18	0
Sites with Tipi Rings	3	22	0
Sites with Rock Art	3	7	0
Sites with Nonlocal Materials	32	48	15

In conclusion, surface sites have the ability to provide important archaeological data, especially in regards to the broad research themes that drive research (like those outlined in Zier and Kalasz 1999). Though the same may be said for excavated sites, this site specific data normally does not allow for looking at things in the broader context of regional perspective. The use of information recovered during the Training Area 10 and 12 projects has allowed us to look at the "big picture", and to make some generalizations regarding the hunting and gathering, and semi-sedentary cultures that have inhabited the PCMS in the past. Chronologically, this has been rather difficult because of the repositioning of surface assemblages and temporal occupations through both erosional and depositional processes that impact the study units selected for this project by a predictive model.

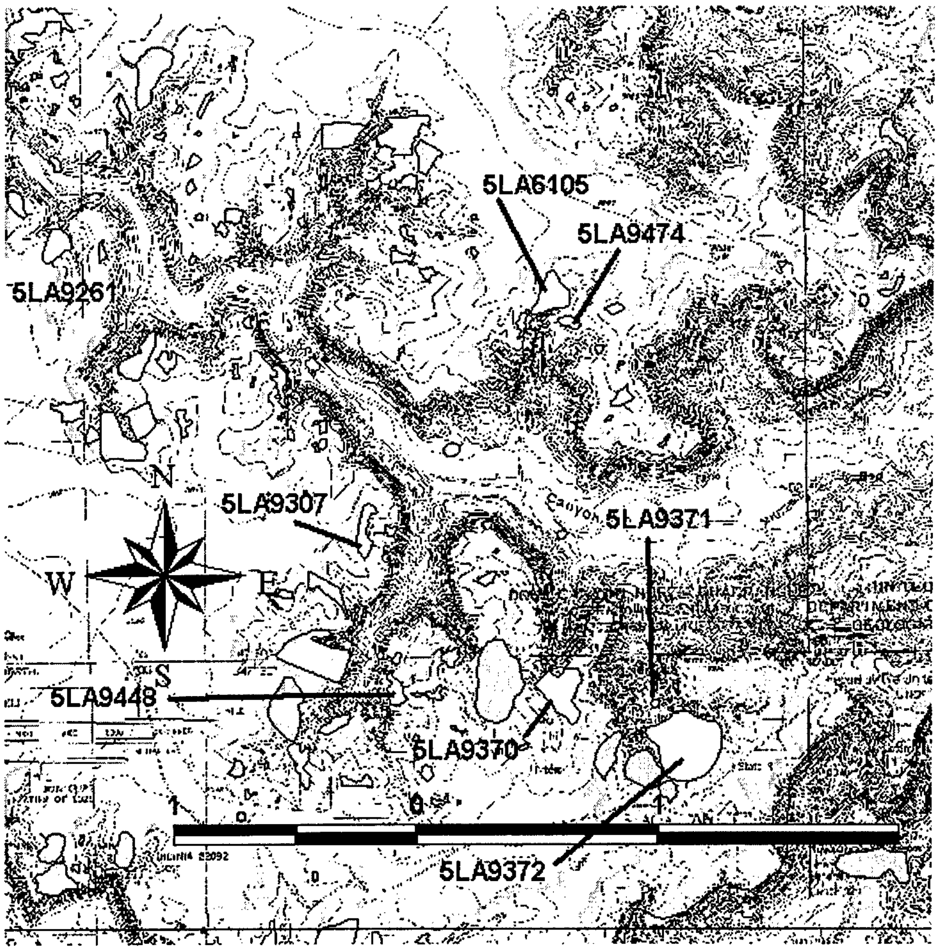


Figure 7.2: Architectural sites with a line of sight relationship in Red Rock Canyon.

Our work has led to several new ideas regarding the archaeological phenomena of the PCMS. For example, NMSU has started to note some patterning in the style and layout of architecture and architectural sites. In an attempt to model this patterning, researchers have begun manipulating project data using ArcView GIS software in the hopes of establishing line-of-site relationships in regards to possible communication networks for Apishapa phase structure sites.

The Training Areas 10 and 12 survey project has produced a wealth of new data, and in the proceeding pages we have detailed these data and attempted to interpret, in our views, what they mean. On a contractual level, we hope to have provided a greater understanding of the archaeological resources found on the PCMS and how to protect them. On a larger scale, we hope to have made contributions to the larger research issues concerning prehistoric populations of southeastern Colorado, and the southern Plains States.

BIBLIOGRAPHY

Adams, J. L.
1988 Use-Wear Analysis on Manos and Hide-Processing Stones. *Journal of Field Archaeology* 15:307-315.

Adams, J. L. and Center for Desert Archaeology (Tucson, Ariz.)
2002 *Ground Stone Analysis: A Technological Approach.* University of Utah Press; Published in conjunction with the Center for Desert Archaeology, Salt Lake City and Tucson, Ariz.

Adjutant General's Office, Army and Air Corps Branch
2002 Post Returns of Fort Lyon, Microcopy 617, Roll 660. In *Returns from United States Military Posts (1800-1916).* National Archives, Washington D.C.

Adovasio, J. M. and R. C. Carlisle
1988 The Meadowcroft Rockshelter. *Science* 239:713-714.

Adovasio, J. M. and J. Page
2002 *The First Americans: In Pursuit of Archaeology's Greatest Mystery.* 1st ed. Random House, New York.

Ahler, S. A.
1989 Mass Analysis of Flaking Debris: Studying the Forest Rather than the Tree. In *Alternative Approaches to Lithic Analysis*, edited by D. O. Henry and G. H. Odell, pp. 85-118. Archaeological Papers of the American Anthropological Association No. 1.

Ahler, S. A. and R. Christianson
1983 *A Pilot Study of Knife River Flint Procurement and Reduction at Site 32DU508.* Contribution No. 186. Department of Anthropology, University of North Dakota.

Ahler, S. A., D. D. Kuehn, J. L. Hofman and S. L. DeVore
2002 *Fieldwork, Geology, and Early Component Research during 2001-2002 at the Barnes Site, 5LA9187, Piñon Canyon Maneuver Site, Colorado.* PaleoCultural Research Group, Contribution No. 45, Flagstaff.

Alegria, R., H. B. Nicholson and G. R. Willey
1955 The Archaic Tradition in Puerto Rico. *American Antiquity* 21(2):113-121.

Anderson, J., L
1989 Projectile Points. In *Temporal Assessment of Diagnostic Materials from the Pinon Canyon Maneuver Site*, edited by C. Lintz and J. L. Anderson, pp. 111-315. Memoirs of the Colorado Archaeological Society No. 4, Denver.

Andrefsky, W.
1990 *An Introduction to the Archaeology of Pinon Canyon, Southeastern Colorado.* Larson-Tibesar Associates, Inc., Laramie, Wyoming, and Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to National Park Service, Rocky Mountain Regional Office, Denver.

1994 Raw-Material Availability and the Organization of Technology. *American Antiquity* 59(1):21-34.

2001 *Lithic Debitage: Context, Form, Meaning.* University of Utah Press, Salt Lake City.

Angulski, D.
1984 Colorado Cultural Resource Survey Forms for Site 5LA2606, PCMS Project Records.

Antevs, E.
1955 Geologic-Climatic Dating in the West. *American Antiquity* 20(4):317-335.

Barry, R. G. and R. J. Chorley
1987 *Atmosphere, Weather, and Climate.* 5th edition. Methuen, New York.

Bender, M. J.
1990 Groundstone Analysis. In *An Introduction to the Archaeology of Pinon Canyon, Southeastern Colorado*, edited by W. Andrefsky, Jr., pp. X-1-X-61. vol. II. National Park Service, Rocky Mountain Regional Office, by Larson-Tibesar Associates, Inc., Laramie, Wyoming, and Centennial Archaeology, Inc., Fort Collins, Colorado.

Benedict, J. B.
1979 Getting Away from it All: A Study of Man, Mountains, and the Two-Drought Altithermal. *Southwestern Lore* 45(3):1-12.

Binford, L. R.
1977 Forty-Seven Trips: A Case Study in the Character of Archeological Formation Processes. In *Stone Tools as Cultural Markers: Change, Evolution, and Complexity*, edited by R. V. S. Wright. Australian Institute of Aboriginal Studies, Canberra.

1979 Organization and Formation Processes: Looking at Curated Technologies. *Journal of Anthropological Research* 35(3):255-273.

Binford, L. R. and N. M. Stone
1985 "Righteous Rocks" and Richard Gould: Some Observations on Misguided "Debate". *American Antiquity* 50(1):151-153.

Bramblett, R. G.
1989 *Fishes of the Purgatoire River in Pinon Canyon: Impacts of Army Training and Natural Disturbance.*

Brown, G. M.
1991 Embedded and Direct Lithic Resource Procurement Strategies on Anderson Mesa. *Kiva* 56(4):359-381.

Brunswig, R. H.
1992 Paleoindian Environments and Paleoclimates in the High Plains and Central Rocky Mountains. *Southwestern Lore* 58(4):5-23.

Bryson, R. A., D. A. Barreis and W. M. Wendland
1970 The Character of Late-Glacial Climatic Changes. In *Pleistocene and Recent Environments of the Central Great Plains,* edited by W. J. Dort and J. K. Jones, pp. 53-74. University Press of Kansas, Lawrence.

Buckles, W. G., G. H. Ewing and N. Buckles
1963 Excavation of the Hazeltine Heights Site. *Southwestern Lore* 29(1):1-36.

Butler, R. B.
1966 *A Guide to Understanding Idaho Archaeology.* A Special Publication of the Idaho State University Museum.

Butler, W. B.
1988 The Woodland Period in Northeastern Colorado. *Plains Anthropologist* 33(122):449-465.

Campbell, R. G.
1969 *Prehistoric Panhandle Culture on the Chaquaqua Plateau, Southeast Colorado.* Ph.D. dissertation, University of Colorado.

Carrillo, R., M. Church, B. Clark and R. Morris
1993a Colorado Inventory Record Form for Site 5LA6101. PCMS Project Records.

1993b Colorado Inventory Record Form for Site 5LA6104:PCMS Project Records.

1993c Colorado Inventory Record Form for Site 5LA6105. PCMS Project Records.

Carrillo, R. and S. M. Kalasz
1987 Colorado Inventory Record Form for Site 5LA5830. PCMS Project Records.

Carrillo, R. F.
1990 Historic Overview. In *An Introduction to the Archaeology of Pinon Canyon, Southeastern Colorado*, edited by W. Andrefsky, pp. 1-42. Vol. 3. Larson-Tibesar Associates/Centennial Archaeology, Laramie.

Carson, P.
1998 *Across the Northern Frontier, Spanish Exploration in Colorado.* Johnson Books, Boulder.

Chomko, S. A.
1997 Stone Structures Do Not a Permanent House Make. Paper presented at the Annual Meeting of the Society for American Archaeology, Nashville.

Chomko, S. A. and S. L. De Vore
1990 *Sorenson Prehistoric Fortifications (Sites 5LA330 and 5LA331): an Apishapa Village on the Purgatoire River.* Interagency Archeological Services Rocky Mountain Regional Office National Park Service, Denver, Colo.

Church, M.
2002 The Grant and The Grid. *Journal of Social Archaeology* 2(2):220-244.

Clark, B.
2003 *On the Edge of the Purgatory: Archaeology of Ethnicity and Gender in Hispanic Colorado.* Unpublished Dissertation, University of California at Berkeley, Anthropology.

Collins, M. B. and M. Kay
1999 *Clovis Blade Technology: A Comparative Study of the Keven Davis Cache, Texas.* 1st ed. Texas archaeology and ethnohistory series. University of Texas Press, Austin.

Cotterell, B. and J. Kamminga
1987 The Formation of Flakes. *American Antiquity* 52:675-708.

Crabtree, D. and E. H. Swanson
1968 Edge-Ground Cobbles and Blade Making in the Northwest. *Tebiwa, The Journal of the Idaho State Museum.*

Crowley, T. J. and G. R. North
1991 *Paleoclimatology.* Oxford Monographs in Geology and Geophysics No. 18. Oxford University Press, New York.

Darroch, J. I.
1974 Edge-Ground Cobbles: A Discussion. *Archaeology in Montana* 15(2):52-71.

Davis, W. E. and K. R. Montgomery
1995 Site 42SA22396: A Prehistoric Hoe Procurement Site on Big Bench, Southern San Juan County, Utah. *Utah Archaeology* 8(1):27-39.

Dean, J. C.
1992 *Guidelines to the Regional Procedures for Archaeological Field and Laboratory Work on the Pinon Canyon Maneuver Site*. Submitted to the U.S. Army by the Department of Anthropology, University of North Dakota, Grand Forks.

Dillehay, T. D. and Smithsonian Institution. Press.
1989 *Monte Verde, A Late Pleistocene Settlement in Chile*. Smithsonian series in archaeological inquiry. Smithsonian Institution Press, Washington.

Dixon, J. E.
1999 *Bones, Boats, and Bison: Archaeology and the First Colonization of Western North America*. New Mexico Press, Albuquerque.

Evanoff, E.
1998 *Results of the Field Study of the Surficial Geology and Paleontologic Resources of the Pinon Canyon Maneuver Site, Las Animas County, Colorado*. University of Colorado Museum. Submitted to Midwest Archaeological Center, National Park Service, Lincoln.

Fitzgerald, J. P., C. A. Meaney and D. M. Armstrong
1994 *Mammals of Colorado*. University Press of Colorado, Niwot.

Folmer, H.
1939 The Mallet Expedition of 1739 Through Nebraska, Kansas, and Colorado to Santa Fe. *Colorado Magazine* 16:163-167.

Friedman, P. D.
1989 *Valley of the Lost Souls: A History of the Pinon Canyon Region of Southeastern Colorado*. Colorado Historical Society, Denver.

Frison, G. C.
1967 *The Piney Creek sites, Wyoming (48 JO 311 and 312)*. University of Wyoming publications; V. 33, No. 1. University of Wyoming, Laramie.

1974 *The Casper Site: a Hell Gap Bison Kill on the High Plains*. Academic Press, New York.

1978 *Prehistoric Hunters of the High Plains*. New World archaeological record. Academic Press, New York.

Goodyear, A. C.

2002 The Topper Site: Results of the 2000 Allendale Paleoindian Expedition. *Legacy* 5(2):18-25.

Gunnerson, J. H.

1987 *Archaeology of the High Plains*. Cultural Resource Series No.19. Rocky Mountain Region USDA Forest Service, Denver.

Hanson, J. R. and S. Chirinos

1989 Ethnohistory. In *Nine Rock Art Sites in the Pinon Canyon Maneuver Site, Southeastern Colorado*, edited by L. L. Loendorf, pp. 18-37. vol. Contribution No. 248. Department of Anthropology, University of North Dakota, Grand Forks.

Hardyck, C. D. and L. F. Petrinovich

1969 *Introduction to Statistics for the Behavioral Sciences*. W. B. Saunders Co., Philadelphia.

Hart, G.

1978 *Hart's prehistoric pipe rack: prehistoric pipes of the Mississippi River waterways, east*. Hart Publishers, Bluffton, Ind.

Haury, E. W.

1976 *The Hohokam: Desert Farmers and Craftsmen, Excavations at Snaketown, 1964-1965*. University of Arizona Press, Tucson.

Hayden, B.

1987 *Lithic Studies Among the Contemporary Highland Maya*. University of Arizona Press, Tucson.

Hayes, A. C. and J. A. Lancaster

1975 *Badger House Community, Mesa Verde National Park, Colorado*. Publications in Archaeology 7E Wetherill Mesa Studies, Washington, D.C.

Hunt, W. J.

1998 *Archaeological Inventory in the Vicinity of Brown's Sheep Camp (5LA5824), U.S. Army Pinon Canyon Maneuver Site, Las Animas, County, Colorado*. National Park Service, Midwest Archaeological Center, Lincoln.

Irwin-Williams, C.

1973 *The Oshara Tradition: Origins of Anasazi Culture*. Eastern New Mexico University Contributions an Anthropology Vol. 5, No. 1. Eastern New Mexico University, Portales.

Jeancon, J.

1925 Curator's Notes from the Section of Archaeology and Ethnology. *Colorado Magazine* 2(1):60.

Jochim, M. A.
1976 *Hunter-Gatherer Subsistence and Settlement: a Predictive Model.* Academic Press, New York.

Johnson, E. and V. T. Holliday
1986 The Archaic Record at Lubbock Lake. In *Current Trends in Southern Plains Archaeology,* edited by T. G. Baugh. Plains Anthropologist Memoir 21, Lincoln.

Johnson, R. and R. Carrillo
1987a Colorado Inventory Record Form for Site 5LA4965. PCMS Project Records.

1987b Colorado Inventory Record Form for Site 5LA4967. PCMS Project Records.

1987c Colorado Inventory Record Form for Site 5LA5040. PCMS Project Records.

1987d Colorado Inventory Record Form for Site 5LA5454. PCMS Project Records.

Jones, B.
2003 Iron Spring. www.ku/edu/heritage/research/sft/sft-cities.html, accessed 10/26/03.

Kalasz, S. M.
1989 Prehistoric Architectural Remains. In *Temporal Assessment of Diagnostic Materials from the Pinon Canyon Maneuver Site,* edited by C. Lintz and J. L. Anderson, pp. 86-110. Memoir No. 4. Colorado Archaeological Society.

Kenner, C. L.
1969 *The Comanchero Frontier: a History of New Mexican-Plains Indian Relations.* University of Oklahoma Press, Norman.

Kidder, A. V.
1932 *Artifacts of Pecos.* Yale University Press, New Haven.

King, T. F.
1998 *Cultural Resource Laws and Practice: an Introductory Guide.* Altamira Press, Walnut Creek.

Kooyman, B. P.
2000 *Understanding Stone Tools and Archaeological Sites.* University of Calgary Press, Calgary.

Korgel, R.
1996 Colorado Cultural Resource Survey Management Data Form for Site 5LA6744. PCMS Project Records.

Kvamme, K. L.

1984 Models of Prehistoric Site Location Near Pinon Canyon, Colorado. In *Papers of the Philmont Conference on the Archaeology of Northeastern New Mexico*, edited by C. J. Condie, pp. 347-370. vol. 6. Proceedings of the New Mexico Archaeological Council, Albuquerque.

1989 Predictive Cultural Resource Modeling at Pinon Canyon: 1984-85. In *An Introduction to the Archaeology of Pinon Canyon, Southeastern Colorado*, edited by W. J. Andrefsky, pp. 6-83. vol. IV. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Contract No. CX-1200-7-BO54. Larson-Tibesar Associates, Laramie, Wyoming, and Centennial Archaeology, Fort Collins, Colorado.

1990 Predictive Cultural Resource Modeling at Pinon Canyon: 1984-85. In *An Introduction to the Archaeology of Pinon Canyon, Southeastern, Colorado*, edited by W. Andrefsky, pp. (IV) 6-83. vol. I. National Park Service, Rocky Mountain Regional Office, Denver.

Larsen-Tibesar Associates

1983 Colorado Inventory Record Form for Site 5LA2240. PCMS Project Records.

1987a Colorado Inventory Record Form for Site 5LA4725. PCMS Project Records.

1987b Colorado Inventory Record Form for Site 5LA4844. PCMS Project Records.

1987c Colorado Inventory Record Form for Site 5LA4940. PCMS Project Records.

Lewis, O. T.

1944 Edged Tanning Stones From South Central Montana and North Central Wyoming. *American Antiquity* 9(3):336-338.

Lindsey, R.

2001 *Excavation Report, Feature 5 5LA9187, Pinon Canyon Maneuver Site Southeast Colorado*, Manuscript in possession of the author.

Lintz, C.

2000 Ground Stone Gorgets from the Pinon Canyon Maneuver Site, Las Animas County, Colorado. *Southwestern Lore* 66(4):1-13.

Lintz, C. and J. L. Anderson

1989 *Temporal Assessment of Diagnostic Materials from the Pinon Canyon Maneuver Site*. Memoirs of the Colorado Archaeological Society No. 4, Denver.

Loendorf, L. and C. Loendorf
1999 *Archaeological Sites in Welsh Canyon, Las Animas County, Colorado.* Department of Sociology and Anthropology, New Mexico State University, Las Cruces. Submitted to the Directorate of Environmental Compliance and Management, Department of the Army, Fort Carson, Colorado.

Loendorf, L. L.
1974 *Excavation of Archaeological Sites in the Sub-Alpine Zone, Pryor Mountains, Montana.* University of North Dakota, Grand Forks.

1989 *Nine Rock Art Sites in the Pinon Canyon Maneuver Site, Southeastern Colorado.* Contribution No. 248. Department of Anthropology. University of North Dakota, Grand Forks.

Loendorf, L. L., J. L. Borchert and D. G. Klinner
1996 *Archeological Investigations at Ceramic Stage Sites in the Pinon Canyon Maneuver Site, Colorado.* Contribution No. 308. Department of Anthropology, University of North Dakota.

Lowie, R. H.
1963 *Indians of the Plains.* American Museum Science Books Edition. Natural History Press, New York.

McFaul, M. and R. G. Reider
1990 Geoarchaeological Investigations. In *An Introduction to the Archaeology of Pinon Canyon, Southeastern Colorado*, edited by W. Andrefsky, pp. III-1-III-32. vol. I. Prepared for National Park Service, Rocky Mountain Regional Office, by Larson-Tibesar Associates/Centennial Archaeology, Laramie/Boulder.

McGimsey, C. R., III
1956 Cerro Mangote: A Preceramic Site in Panama. *American Antiquity* 22(2).

Meltzer, D. J., D. K. Grayson, G. Ardila, A. W. Barker, D. F. Dincauze, C. V. Haynes, F. Mena, L. Nunez and D. J. Stanford
1997 On the Pleistocene Antiquity of Monte Verde, Southern Chile. *American Antiquity* 62(4):69-663.

National Archives
2002 Unit Records: 19th Infantry RG 391. In *Regimental Returns (1870-1889), Microcopy 665, Roll 204*, Washington, D.C.

NRHP
1990 *Guidelines for Evaluating and Documenting Traditional Cultural Properties* Bulletin 38. National Park Service, Washington, D.C.

1991 *How to Apply the National Register Criteria for Evaluation* Bulletin 15. National Park Service, Washington, D.C.

Owens, M.
2003 *The Search for Identity: An Interpretation of Edge-Ground Cobbles Recovered from the Pinon Canyon Maneuver Site in Southeastern Colorado.* Submitted to the National Park Service, Midwest Archeological Center, Lincoln and Department of Environmental Compliance and Management, Fort Carson.

Owens, M., C. Loendorf, V. Schiavitti and L. Loendorf
2000 *Archaeological Sites Inventory in the Black Hills of the Piñon Canyon Maneuver Site, Las Animas County, Colorado.* Fort Carson Cultural Resource Management Series Contribution Number 4. Prepared by Department of Sociology and Anthropology, New Mexico State University, Las Cruces. Submitted to the Directorate of Environmental Compliance and Management, Department of the Army, Fort Carson, Colorado.

Owens, M. and L. Loendorf
2002 *Archaeological Site Inventory of the Training Area 7 Portion of the Pinon Canyon Maneuver Site, Las Animas County, Colorado.* Fort Carson Cultural Resource Management Series, Contribution No. 5. Department of Sociology and Anthropology, New Mexico State University, Las Cruces. Submitted to the Directorate of Environmental Compliance and Management, Department of the Army, Fort Carson, Colorado.

Owens, M and P. Rasfeld Owens
2004 *19th Infantry Graffiti near the Bent Canyon Stage Stop.* Report in progress.

Parry, W. J. and R. L. Kelly
1987 Expedient Core Technology and Sedintism. In *The Organization of Core Technology*, edited by J. K. Johnson and C. A. Morrow, pp. 285-304. Westview Press, Boulder.

Schiavitti, V.
2003 *Archaeological Investigations from 1998 at Six Sites on the Piñon Canyon Maneuver Site, Las Animas County, Colorado.* Fort Carson Cultural Resource Management Series, Contribution No. 12. Department of Sociology and Anthropology, New Mexico State University, Las Cruces. Submitted to the Directorate of Environmental Compliance and Management, Department of the Army, Fort Carson, Colorado.

Schiavitti, V., L. Loendorf and E. Hill
2001 *Archaeological Investigations at Eleven Sites of Welsh Canyon in the Pinon Canyon Maneuver Site, Las Animas County, Colorado*. Fort Carson Cultural Resource Management Series Contribution No. 8. Department of Sociology and Anthropology, New Mexico State University, Las Cruces. Submitted to the Midwest Archaeological Center, National Park Service, Lincoln.

Schroeder, A. H.
1965 A Brief History of the Southern Ute. *Southwestern Lore* 30(4):53-78.

Schuldenrein, J. D., H. E. Helgren, H. E. Jacson and A. Pitty
1985 *Geomorphological and Geoarchaeological Investigations at the U.S. Army Fort Carson-Pinon Canyon Maneuver Site, Las Animas County, Colorado*. Gilbert/Commonwealth. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver.

Scott-Cummings, L.
2001 Pollen Analysis at Three Archaeological Sites (5LA6568, 5LA6592, and 5LA6595) in the Pinon Canyon Maneuver Site, Southeastern Colorado. In *Archaeological Investigations at Eleven Sites of Welsh Canyon in the Pinon Canyon Maneuver Site, Las Animas County, Colorado*, edited by V. Schiavitti, pp. 246-271. Department of Sociology and Anthropology, New Mexico State University, Las Cruces.

Shaw, R. B., S. L. Anderson, K. A. Schultz and V. E. Diersing
1989 *Plant Communities, Ecological Checklist, and Species List for the U.S. Army Pinon Canyon Maneuver Site, Colorado*. Science Series No. 37. Department of Range Science, Colorado State University. Submitted to the U.S. Army Corp of Engineers, Engineering and Housing Support Center.

Siemer, E.
1977 *Colorado Climate*. Colorado Experiment Station, 1977, Fort Collins.

Simmons, M.
2001 *Following the Santa Fe Trail, A Guide for Modern Travelers*. Ancient City Press, Santa Fe.

Stiger, M.
2001 *Hunter-gatherer Archaeology of the Colorado High Country*. University Press of Colorado, Boulder, Colo.

Taylor, M. F.
1959 *A Sketch of Early Days on the Purgatory*. Trinidad State Junior College, Trinidad.

1971 *First Mail West; Stagecoach Lines on the Santa Fe Trail*. [1st] ed. University of New Mexico Press, Albuquerque,.

Taylor, R. C.
1963 *Colorado South of the Border*. Sage Books, Denver.

Thomas, A. B.
1924 Spanish Expeditions into Colorado. *Colorado Magazine* 7:289-299.

Tuck, J. A.
1978 Regional Cultural Development, 3000 to 300 B.C. In *Northeast, Handbook of North American Indians*, edited by B. G. Trigger. vol. 15. Smithsonian Institution, Washington, D.C.

Tucker, J. M.
1963 Major Long's Route from the Arkansas to the Canadian River. *New Mexico Historical Review* 38:185-199.

United States Government
2001 *Supplement to the Official Records of the Union and Confederate Armies*, edited by J. B. Hewett. Broadfoot Publishing Co., Wilmington, NC.

Van Ness, M. and R. F. Carrillo
1983 Colorado Inventory Record Form for Site 5LA5239. PCMS Project Records.

von Guerard, P., A. P.O. and R. C. Nickless
1987 *Hydrology of the U.S. Army Pinon Canyon Maneuver Site, Las Animas County, Colorado*. U.S. Geological Survey, Water-Resources Investigations Report 87-4227. Submitted to U.S. Department of the Army.

Whittaker, J. C., A. Ferg and J. D. Speth
1988 Arizona Bifaces of Wyoming Chert. *Kiva* 53(4):321-332.

Wissler, C.
1941 Material Cultures of the North American Indians. *American Anthropologist* 16:447-505.

Zier, C. J. and S. M. Kalasz
1999 *Colorado Prehistory: A Context for the Arkansas River Basin*. Prehistory of Colorado. Colorado Council of Professional Archeologists, Denver, CO.

APPENDIX I

GEOCHEMICAL RESEARCH LABORATORY LETTER REPORT 2002-24

By:

Richard E. Hughes, Ph.D.

Director, Geochemical Research Laboratory

20 Portola Green Circle

Portola Valley, CA 94028-7833

Geochemical Research Laboratory Letter Report 2002-24

April 24, 2002

Mr. Mark Owens
New Mexico State University Archaeological Field Office
P.O. Box 176
Peyton, Colorado 80831

Dear Mark:

Enclosed with this letter you will find a two-page table presenting x-ray fluorescence (xrf) data generated from the analysis of 22 artifacts from various archaeological sites in the Training Area 10 portion of the Pinon Canyon Maneuver Site, southeastern Colorado. This research was conducted pursuant to your letter request of February 2, 2002, under terms of New Mexico State University purchase order no. D372302.

Analyses of obsidian are performed at my laboratory on a Spectrace™ 5000 (Tracor X-ray) energy dispersive x-ray fluorescence spectrometer equipped with a rhodium (Rh) x-ray tube, a 50 kV x-ray generator, with microprocessor controlled pulse processor (amplifier) and bias/protection module, a 100 mHz analog to digital converter (ADC) with automated energy calibration, and a Si (Li) solid state detector with 160 eV resolution (FWHM) at 5.9 keV in a 30 mm² area. The x-ray tube is operated at 34.0 kV, .26 mA, using a .127 mm Rh primary beam filter in an air path to generate x-ray intensity data for elements zinc (Zn Kα), gallium (Ga Kα), rubidium (Rb Kα), strontium (Sr Kα), yttrium (Y Kα), zirconium (Zr Kα), and niobium (Nb Kα). Barium (Ba Kα) intensities are generated by operating the x-ray tube at 50.0 kV, .35 mA, with a .63 mm copper (Cu) filter, while those for titanium (Ti Kα), manganese (Mn Kα) and total iron ($Fe_2O_3^T$) are generated by operating the x-ray tube at 15.0 kV, .30 mA with a .127 mm aluminum (Al) filter. Iron vs. manganese (Fe Kα/Mn Kα) ratios are computed from data generated by operating the x-ray tube at 15.0 kV, .30 mA, with a .127 mm aluminum (Al) filter. Deadtime-corrected analysis time for each sample appears in the data table.

X-ray spectra are acquired and elemental intensities extracted for each peak region of interest, then matrix correction algorithms are applied to specific regions of the x-ray energy spectrum to compensate for inter-element absorption and enhancement effects. After these corrections are made, intensities are converted to concentration estimates by employing a least-squares calibration line established for each element from analysis of up to 30 international rock standards certified by the U.S. Geological Survey, the U.S. National Institute of Standards and Technology, the Geological Survey of Japan, the Centre de Recherches Petrographiques et Geochimiques (France), and the South African Bureau of Standards. Further details pertaining to x-ray tube operating conditions and calibration appear in Hughes (1988, 1994). Extremely small/thin specimens are analyzed using a .25 mm² primary beam collimator, and resulting data normalized using a sample mass correction algorithm. Deadtime-corrected analysis time is greatly extended in all instances when primary beam collimation is employed.

Trace element measurements in the xrf data table are expressed in quantitative units (i.e. parts per million [ppm] by weight), and matches between unknowns (the artifacts you sent) and known obsidian chemical groups are made on the basis of correspondences (at the 2-sigma level) in diagnostic trace element concentration values (in this case, ppm values for Rb, Sr, Y, Zr, Nb, Ba, Ti, Mn and $Fe_2O_3^T$) that appear in Anderson et al. (1986), Baugh and Nelson (1987, 1988), Glascock et al. (1999), Hughes (1984), Hughes and Nelson (1987), Jack (1971), Nelson (1984), Shackley (1995, 1998), and unpublished data on other Idaho, Utah and Wyoming obsidians (Hughes 1988b,1995a, b; 1997, n.d.). Artifact-to-obsidian source (geochemical type, *sensu* Hughes 1998) correspondences were considered reliable if diagnostic mean measurements for artifacts fell within 2 standard deviations of mean values for source standards. I use the term "diagnostic" to specify those trace elements that are well-measured by x-ray fluorescence, and whose concentrations show low intra-source variability and marked variability across sources. In short, diagnostic elements are those whose concentration values allow one to draw the clearest geochemical distinctions between sources (Hughes 1990, 1993). Although Zn, Ga and Nb ppm concentrations also were measured and reported for each specimen, they are not considered "diagnostic" because they don't usually vary significantly across obsidian sources (see Hughes 1982, 1984). This is particularly true of Ga, which occurs in concentrations between 10-30 ppm in nearly all parent obsidians in the study area. Zn ppm values are infrequently diagnostic; they are always high in Zr-rich, Sr-poor peralkaline volcanic glasses, but otherwise they do not vary significantly between sources in the study area vicinity.

The trace element composition measurements in the enclosed table are reported to the nearest ppm to reflect the resolution capabilities of non-destructive energy dispersive x-ray fluorescence spectrometry. The resolution limits of the present x-ray fluorescence instrument for the determination of Zn is about 3 ppm; Ga about 2 ppm; for Rb about 4 ppm; for Sr about 3 ppm; Y about 2 ppm; Zr about 4 ppm; Nb about 2 ppm; and Ba about 10 ppm (see Hughes [1994] for other elements). When counting and fitting error uncertainty estimates (the "±" value in the table) for a sample are greater than calibration-imposed limits of resolution, the larger number is a more conservative indicator of composition variation and measurement error arising from differences in sample size, surface and x-ray reflection geometry.

Xrf data (in the table enclosed with this letter) indicate that 18 specimens were manufactured from obsidians erupted in the Jemez Mountains of northern New Mexico. Of this total, 14 have the same trace element composition as obsidian of the Cerro del Medio (a.k.a. Valles Rhyolite) chemical type, three match the Obsidian Ridge (a.k.a. Cerro Toledo Rhyolite) "fingerprint", and one conforms to the geochemical signature of Polvadera Peak (a.k.a. El Rechuelos Rhyolite; cf. Macdonald et al. 1992: Appendix I, p. 148; cf. Baugh and Nelson 1987: Table 1; Glascock et al. 1999: Table 1). Two artifacts from 5LA9211 have the same trace element composition as obsidian of the Malad, Idaho, geochemical type (cf. Hughes 1984: Table 3; Nelson 1984: Table 5, source # 31), and one specimen from 5LA9187 (FS #1213) has the same trace element composition as volcanic glass from Obsidian Cliff, Wyoming (Hughes 1995a; Nelson 1984: Table 5, source # 49). Finally, one sample (FS #11 from 5LA8291) was manufactured from a non-obsidian parent material.

I hope this information will help in your analysis and interpretation of materials from these sites. Please contact me at my laboratory ([650] 851-1410; e-mail: rehughes@silcon.com) if I can be of further assistance.

Sincerely,

Richard Hughes

Richard E. Hughes, Ph.D.
Director, Geochemical Research Laboratory

encl.

Geochemical Research Laboratory Letter Report 2002-24

REFERENCES

Anderson, Duane C., Joseph A. Tiffany, and Fred W. Nelson
1986 Recent Research on Obsidian from Iowa Archaeological Sites. **American Antiquity** 51: 837-852.

Baugh, Timothy G., and Fred W. Nelson
1987 New Mexico Obsidian Sources and Exchange on the Southern Plains. **Journal of Field Archaeology** 14: 313-329.

1988 Archaeological Obsidian Recovered from Selected North Dakota Sites and Its Relationship to Changing Exchange Systems in the Plains. **Journal of the North Dakota Archaeological Association** 3: 74-94.

Clemens, Drew M.
1990 Volcanic Stratigraphy and Geochemistry of Timber Butte, Valley and Gem Counties, West-Central Idaho. B.S. Senior Honors Thesis in Geology, Boise State University.

Glascock, Michael D., Raymond Kunselman, and Daniel Wolfman
1999 Intrasource Chemical Differentiation of Obsidian in the Jemez Mountains and Taos Plateau, New Mexico. **Journal of Archaeological Science** 26: 861-868.

Hughes, Richard E.
1982 Age and Exploitation of Obsidian from the Medicine Lake Highland, California. **Journal of Archaeological Science** 9: 173-185.

1984 Obsidian Sourcing Studies in the Great Basin: Problems and Prospects. *In* Richard E. Hughes (ed.) Obsidian Studies in the Great Basin. **Contributions of the University of California Archaeological Research Facility** No. 45: 1-19.

1998a The Coso Volcanic Field Reexamined: Implications for Obsidian Sourcing and Hydration Dating Research. **Geoarchaeology** 3: 253-265.

1988b X-ray Fluorescence Analysis of Artifacts from 10-BO-418 and 10-BO-419, Boise County, Idaho. Letter report submitted to James R. Benson, Olympia, WA, July 5, 1988.

1990 Obsidian Sources at James Creek Shelter, and Trace Element Geochemistry of Some Northeastern Nevada Volcanic Glasses. *In* Robert G. Elston and Elizabeth E. Budy (eds.), The Archaeology of James Creek Shelter. **University of Utah Anthropological Papers** No. 115, pp. 297-305.

1993 Trace Element Geochemistry of Volcanic Glass from the Obsidian Cliffs Flow, Three Sisters Wilderness, Oregon. **Northwest Science** 67: 199-207.

1994 Intrasource Chemical Variability of Artefact-Quality Obsidians from the Casa Diablo Area, California. **Journal of Archaeological Science** 21: 263-271.

1995a X-ray Fluorescence Analysis of Geologic Obsidian Samples from Yellowstone and Grand Teton National Parks, Wyoming. Geochemical Research Laboratory Letter Report 95-8 submitted to Kenneth P. Cannon, National Park Service, Midwest Archeological Center, March 14, 1995.

1995b X-ray Fluorescence Analysis of Obsidian Artifacts from Yellowstone National Park and Geologic Obsidian Samples from the Vicinity of Grand Teton National Park, Wyoming. Geochemical Research Laboratory Letter Report 95-28 submitted to Kenneth P. Cannon, National Park Service, Midwest Archeological Center, June 28, 1995.

REFERENCES (continued)

Hughes, Richard E. (continued)

1997 X-ray Fluorescence Analysis of Geologic Obsidian Samples from the Greater Yellowstone NationalPark Vicinity, Wyoming. Geochemical Research Laboratory Letter Report 96-111 submitted to Kenneth P. Cannon, National Park Service, Midwest Archeological Center, March 14, 1997.

1998 On Reliability, Validity, and Scale in Obsidian Sourcing Research. *In* Ann F. Ramenofsky and Anastasia Steffen (eds.), **Unit Issues in Archaeology: Measuring Time, Space, and Material**, pp. 103-114. University of Utah Press, Salt Lake City.

n.d. Determination of the Geologic Sources for Obsidian Artifacts from Camels Back Cave, and Trace Element Analysis of Some Western Utah and Southeastern Nevada Volcanic Glasses, by Energy Dispersive X-ray Fluorescence. *In* Dave N. Schmitt and David B. Madsen (eds.), The Archaeology of Camels Back Cave. **Utah Geological Survey.** In press.

Hughes, Richard E., and Fred W. Nelson

1987 New Findings on Obsidian Source Utilization in Iowa. **Plains Anthropologist** 32 (117): 313-316.

Jack, Robert N.

1971 The Source of Obsidian Artifacts in Northern Arizona. **Plateau** 43: 103-114.

Macdonald, Ray, Robert L. Smith, and John E. Thomas

1992 Chemistry of the Subalkalic Silicic Obsidians. **U.S. Geological Survey Professional Paper** 1523.

Nelson, Fred W., Jr.

1984 X-ray Fluorescence Analysis of Some Western North American Obsidians. *In* Richard E. Hughes (ed.) Obsidian Studies in the Great Basin. **Contributions of the University of California Archaeological Research Facility** No. 45: 27-62.

Shackley, M. Steven

1995 Sources of Archaeological Obsidian in the Greater American Southwest: An Update and Quantitative Analysis. **American Antiquity** 60: 531-551.

1998 Geochemical Differentiation and Prehistoric Procurement of Obsidian in the Mount Taylor Volcanic Field, Northwest New Mexico. **Journal of Archaeological Science** 25: 1073-1082.

Cat. Number	Trace and Selected Minor Element Concentrations											Ratio	Obsidian Source (Chemical Type)
	Zn	Ga	Rb	Sr	Y	Zr	Nb	Ba	Ti	Mn	$Fe_2O_3^T$	Fe/Mn	
5LA4940,	61	19	150	9	40	145	48	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 40	±6	±3	±4	±3	±3	±4	±3						New Mexico
5LA8291,	42	18	38	688	3	101	11	nm	nm	nm	nm	nm	Not Obsidian
FS # 11	±6	±3	±4	±5	±3	±4	±3						
5LA8308,	61	14	160	8	39	157	48	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 15	±7	±4	±5	±3	±4	±4	±3						New Mexico
5LA8309,	73	21	151	8	41	150	49	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 4	±6	±3	±4	±3	±3	±4	±3						New Mexico
5LA8311,	64	19	159	7	40	163	54	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 19	±7	±4	±5	±3	±3	±4	±3						New Mexico
5LA8619,	40	18	141	8	22	65	40	nm	nm	nm	nm	15	Polvadera Peak,
FS # 2	±6	±3	±4	±3	±3	±4	±3						New Mexico
5LA8619,	65	18	149	8	38	153	48	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 4	±6	±3	±4	±3	±3	±4	±3						New Mexico
5LA8659,	67	17	154	8	37	154	49	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 13	±5	±3	±4	±3	±3	±4	±3						New Mexico
5LA9020,	57	16	143	6	36	148	44	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 31	±5	±3	±4	±3	±3	±4	±3						New Mexico
5LA9026,	63	23	156	9	39	146	47	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 5	±7	±4	±4	±3	±3	±4	±3						New Mexico
5LA9035,	59	22	151	7	41	157	47	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 12	±5	±3	±4	±3	±3	±4	±3						New Mexico
5LA9183,	62	20	151	6	38	151	45	nm	nm	nm	nm	nm	Cerro del Medio,
FS # 12	±7	±4	±4	±3	±3	±4	±3						New Mexico
5LA9183,	82	26	204	0	60	166	87	nm	nm	nm	nm	18	Obsidian Ridge,
FS # 49	±7	±3	±5	±5	±3	±4	±3						New Mexico
5LA9187,	81	26	243	6	74	155	37	nm	558	241	1.27	57	Obsidian Cliff,
FS # 1213	±8	±4	±5	±3	±4	±4	±3		±16	±11	±.10		Wyoming
5LA9203,	78	18	190	4	56	160	82	nm	nm	nm	nm	18	Obsidian Ridge,
FS # 1	±5	±3	±4	±3	±3	±4	±3						New Mexico
5LA9211,	47	12	119	68	30	89	11	1525	nm	nm	nm	nm	Malad, Idaho
FS # 10	±6	±2	±4	±3	±3	±4	±3	±15					
5LA9211,	39	12	120	67	26	83	12	1580	nm	nm	nm	nm	Malad, Idaho
FS # 41	±6	±3	±4	±3	±3	±4	±3	±15					

Values in parts per million (ppm) except total iron (in weight percent) and Fe/Mn intensity ratios; ± = estimate of x-ray counting uncertainty and regression fitting error at 300 and 600 (*) seconds livetime; nm = not measured; += patinated.

Cat. Number	Zn	Ga	Rb	Sr	Y	Zr	Nb	Ba	Ti	Mn	$Fe_2O_3^T$	Ratio Fe/Mn	Obsidian Source (Chemical Type)
	Trace and Selected Minor Element Concentrations												
5LA9259, FS # 19	80 ±6	17 ±3	188 ±4	0 ±4	55 ±3	158 ±4	84 ±3	nm	nm	nm	nm	18	Obsidian Ridge, New Mexico
5LA9371, FS # 62	60 ±6	12 ±3	142 ±4	7 ±3	37 ±3	147 ±4	43 ±3	nm	nm	nm	nm	28	Cerro del Medio, New Mexico
5LA9371, FS # 92	59 ±5	15 ±3	141 ±4	7 ±3	36 ±3	153 ±4	48 ±3	nm	nm	nm	nm	25	Cerro del Medio, New Mexico
5LA9371, FS # 100	59 ±6	19 ±3	151 ±4	9 ±3	37 ±3	147 ±4	43 ±3	nm	nm	nm	nm	24	Cerro del Medio, New Mexico
5LA9371, FS # 132	62 ±7	20 ±4	151 ±4	9 ±3	36 ±3	149 ±4	45 ±3	nm	nm	nm	nm	28	Cerro del Medio, New Mexico
Comparative Geologic Reference Standards													
PP-L2-3a	36 ±6	16 ±3	149 ±4	8 ±3	22 ±3	71 ±4	39 ±3	nm	500 ±15	482 ±11	.64 ±.10	13	Polvadera Peak, New Mexico
PP-L2-4a	39 ±5	21 ±3	145 ±4	7 ±3	20 ±3	67 ±4	40 ±3	nm	497 ±14	457 ±11	.63 ±.10	13	Polvadera Peak, New Mexico
LT-4	53 ±5	19 ±3	151 ±4	7 ±3	38 ±3	157 ±4	48 ±3	nm	577 ±16	447 ±11	1.20 ±.10	26	Cerro del Medio, New Mexico
CA-2	67 ±5	26 ±3	159 ±4	8 ±3	41 ±3	156 ±4	49 ±3	nm	521 ±16	430 ±11	1.12 ±.10	26	Cerro del Medio, New Mexico
GS6A-1	86 ±6	18 ±3	191 ±4	4 ±3	56 ±3	159 ±4	82 ±3	nm	440 ±14	596 ±9	1.17 ±.08	20	Obsidian Ridge, New Mexico
GS8-2	87 ±5	20 ±3	193 ±4	4 ±3	58 ±3	156 ±4	84 ±3	nm	451 ±14	600 ±8	1.19 ±.08	21	Obsidian Ridge, New Mexico

Values in parts per million (ppm) except total iron (in weight percent) and Fe/Mn intensity ratios; ± = estimate of x-ray counting uncertainty and regression fitting error at 300 and 600 (*) seconds livetime; nm = not measured; += patinated.

APPENDIX II

AN ANALYSIS AND DESCRIPTION OF POTTERY FROM THE BARNES SITE (5LA9187), PIÑON CANYON MANEUVER SITE, COLORADO

By

Richard A. Krause

Professor of Anthropology

The University of Alabama

AN ANALYSIS AND DESCRIPTION OF POTTERY FROM THE BARNES SITE (5LA9187), PIÑON CANYON MANEUVER SITE, COLORADO

By

Richard A. Krause

Professor of Anthropology

The University of Alabama

INTRODUCTION

Hand-made pottery vessels are containers that partially enclose space with baked clay. Herein lies the key to their geometry. Most vessels are radially symmetrical. Most also have top-to-bottom asymmetry. Thus they are relatively easily divided into systematically related parts. Imagine a simple idealized pot. By simple I mean a single orifice form without appendages. By idealized I mean imaginary. Now mentally examine its topological properties. Pay special attention to the number of sides and edges. A simple idealized pot will always have two sides (the inside and the outside) and one edge (the lip). This will be the case despite the highly variable appearance that bending, stretching, twisting or appending might produce. Since the lip of this imaginary vessel is circular, all points along it, and all points systematically related to it, will be topological invariants. We may therefore use the lip as a reference for dividing the rest of the container into parts.

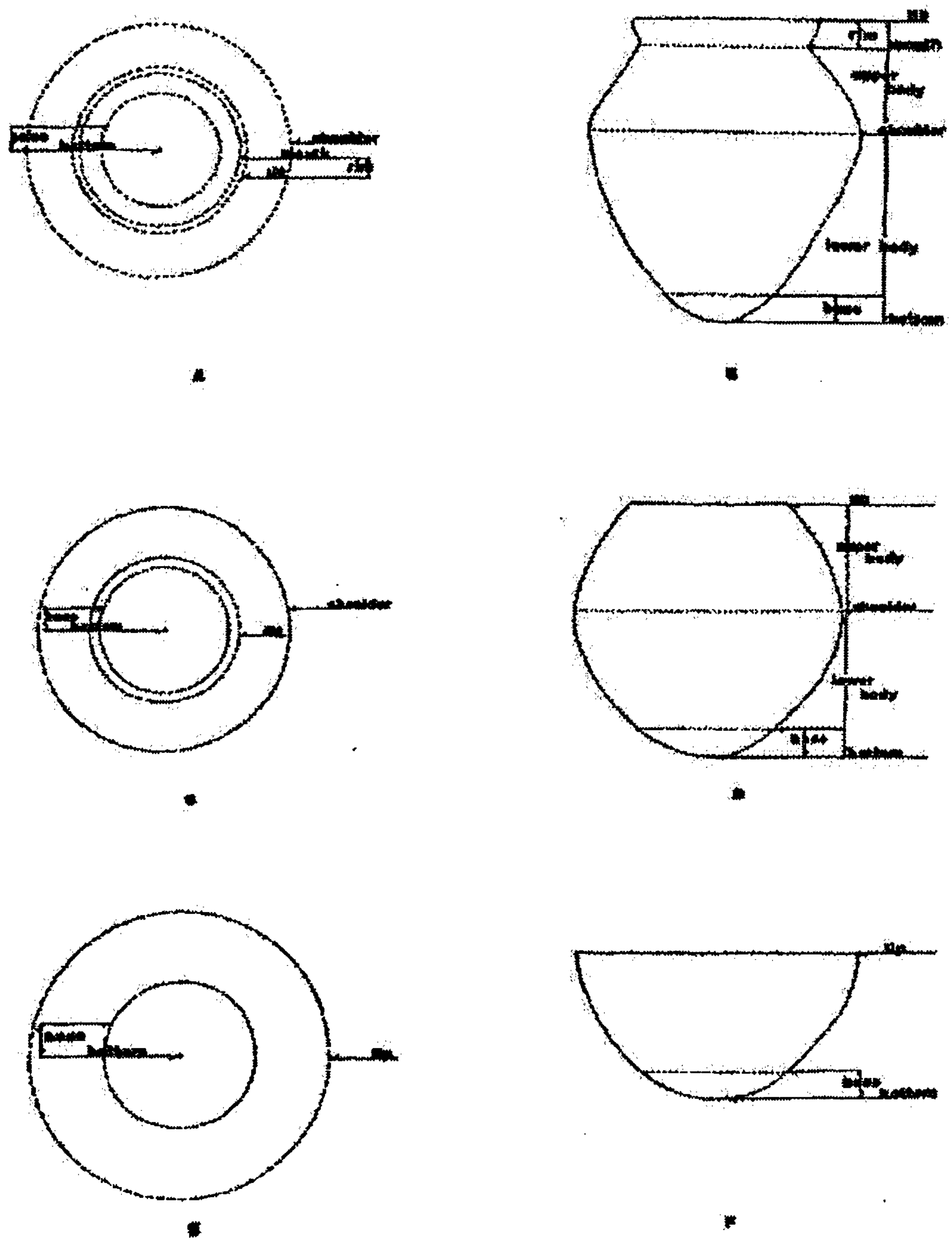


Figure 1. Morphological Landmarks.

All non-lip portions of a vessel may be identified as its body. We may then identify the maximum circumference of the body as its shoulder (Fig. 1A-D), the minimum circumference of the body (which will be a point) as its bottom (Fig. 1 A-F). Portions adjacent to the bottom may be identified as belonging to the vessel's base (Fig. 1A-F). All portions below the shoulder may be termed the lower body (Fig. 1A-D) and all portions above the shoulder the upper body (Fig. 1A-D). The minimal circumference of the upper body may be identified as the pot's mouth (Fig. 1A and B). If the mouth and lip are not the same we may identify the portion between the lip and mouth as the rim (Fig. 1A and B). Shoulder-less forms (Fig. 1E and F) may be accounted for by stipulating that, if the vessel has no shoulder, its mouth will be defined as the circumference nearest the lip and its bottom the circumference farthest from the lip (for definitions of the above introduced morphological landmarks see figure 2).

In sum, one may easily and consistently divide idealized pots into segments. Then too, since most vessels approximate our ideal form, departures from it, additions to it, or transformations of it, may be treated as special cases. Differently put, we may consider the ideal form as of primary morphological import. The expanded, contracted, or otherwise modified portions of the ideal form are important but not primary morphological elaborations. Thus we may treat handles, spouts, lugs, legs, annular bases, and feet; effigies that depict animals, gods, humans, or plants; vases and flowerpots; wine, oil and water bottles; and so on, as special cases, namely as addenda to a more fundamental morphological theme. We will now apply these observations and the morphological landmarks they have generated to the analysis of ceramics from the Barnes site (5LA9187) located in the Piñon Canyon Maneuver Site of Las Animas County, Colorado.

PRIMATIVES AND DEFINED TERMS FOR THE STUDY OF CERAMIC MORPHOLOGY

PRIMATIVES

Pottery **(P)**	Any intentionally manufactured and fired object made of clay.
Vessel **(V)**	Any concave utensil designed to hold a dispersible substance.
Surface **(S)**	Any two dimensional locus of points.
Circumference **(C)**	The distance around any geometric figure.

DEFINED TERMS

My definitions will consist of terms, symbols, strings and rules. The terms are lexemes that reference classes; the symbols (A,B, etc.,) are signs that stand for terms; and the strings are concatenated symbols (symbols or strings enclosed in parentheses indicate discrete sets; set compliments are indicated by an exclamation point). A rule is an instruction to rewrite one symbol or string (or two strings) as another symbol or spring. Arrows (→) will be used to signal this operation. It should be noted that pottery (P) and vessel (V) are simple property terms. Surface (S) and circumference (C) have a relational syntactic weighing and as such are subject to at least two values—greater than (+) and less than (-). Brackets ([]) enclose operations that are to be performed before the product can be entered into a larger concatenation. Terms listed within brackets identify mutually exclusive entities.

1. ***Exterior*** (Ex) Exterior is by definition that surface of a pottery vessel that is proportionally the greatest. [(P)(V)(S+)] → (Ex)

2. ***Interior*** (In) Interior is by definition that surface of a pottery vessel that is proportionally the smallest. [(P)(V)(S-)] → (In)

3. ***Lip*** (L) Lip is by definition the intersection of exterior and interior surfaces. [(Ex)(In)] → (L)

4. ***Body*** (Bd) Body is by definition that pert of a pottery vessel that does not include the lip. [(P)(V)(L!)] → (Bd)

5. ***Shoulder*** (Sh) Shoulder is by definition the maximal circumference of the body. [(Bd)(C+)] → (Sh)

6. ***Bottom*** (Bt) Bottom is by definition the minimal circumference of the body.
   [Bd)(C-)] → (Bt)

7. ***Upper*** (Ur) Upper is by definition the part of a body uniting shoulder with lip.
   [(Sh)U(L)] → (Ur)

8. ***Lower*** (Lr) Lower is by definition the part of a body uniting shoulder with bottom.
   [(Sh)U(Bt)] → (Lr)

9. ***Mouth*** (M) Mouth is by definition the minimal circumference of the upper body.
   [(Ur)(C-)] → (M)

10. ***Rim*** (Rm) Rim is by definition the part of the upper body uniting mouth with lip
    [(M)U(L)] → Rm

Figure 2. Primitives and Defined Terms for the Study of Ceramic Morphology.

CERAMIC ANALYSIS

General Observations

In June of 2002 the Barnes site (5LA9187) ceramic sample consisted of 492 specimens. Four hundred and eighty-two were body fragments and 10 were rim sherds. Three hundred and seven of the 482 were too fragmentary to make systematic and meaningful observations or to provide adequate measurements. It should be noted at the outset that the 175 remaining body sherds were small having an average length of 1.69 +/- .67 cm, an average width of 1.56 +/- .79 cm and an average thickness of 6.4 +/- 1.5 mm. To provide a regional perspective we measured the remainder of the ceramic sample (311 fragments from 46 sites) in the Piñon Canyon Maneuver Site and (1,052 specimens from 56 sites) on the Fort Carson Military base. On average the other Piñon Canyon specimens were 3 mm and the Fort Carson pieces were 4 mm longer than those from 5LA9187. The Piñon Canyon fragments were 1mm and the Fort Carson specimens 4 mm wider than those from 5LA9187. The average Piñon Canyon pieces were half-a-millimeter thinner and the Fort Carson specimens one-millimeter thicker, than those from 5LA9187. While not dramatic these differences are statistically significant. It would thus be reasonable to say that the 5LA9187 specimens were smaller than those from the immediate and nearby areas. They were not as thick as the Fort Carson pieces but were thicker than other specimens from the Piñon Canyon area.

Vessel Morphology

There were 10 rim sherds in the 5LA9187 sample all which met the criteria previously introduced namely they were broken from the area between mouth and lip. None of the lip bearing fragments had been broken from vessels in which the lip and the mouth were coterminous. We therefore suspect that a single shouldered and rim bearing vessel form is represented. Differently put, none of the specimens in the 5LA9187 collections could be reasonably interpreted as broken from bowls or from rimless globular jars, i.e. olla-shaped vessels. The remainder of the analyzable sample, 175 specimens were clearly body sherds. Eleven of the body sherds had been broken from the bottom or near bottom (base) of globular vessels and 11 had been derived from the junction of mouth with lower rim. To judge by clay-body constituents, a non-mica bearing alluvial clay and medium to coarse grit temper, all of the specimens were either of non-local manufacture or were made from different local clays than the 311 fragments drawn from 46 other sites in the Piñon Canyon area.

All of the rim, base and body sherds were carefully examined in an attempt to provide a conjectural account of vessel shape and size. Given the small size of individual pieces and the absence of shoulder sherds with both above and below shoulder surfaces we realized at the outset that this was a risky practice. Nevertheless we attempted to approximate vessel shape. In doing so we assumed that the base sherds, rim fragments, near shoulder and mouth-rim junction sherds were broken from vessels of generally similar morphology but not necessarily of similar size. Then we projected the curves to the exterior and interior surfaces of all base sherds, rim fragments, near shoulder and mouth-rim junction pieces and attempted to fit them together to form hypothetical vessels. Although most of these projections were based on horizontal and vertical arcs of 10 degrees or less this approach did allow us to visualize vessels that were not quite as tall as they were wide, with high round shoulders, constricted mouths and conoidal bases. The vessel composites we produced seemed also to fall into two sizes large and small. The large vessels ranged in height from 16 to 18 cm and in width from 18 to 2lcm (Fig. 3 A and B). The small vessels ranged in height from 13 to 15cm and in width from 14 to 16cm (Fig.4 A and B). Projected mouth diameters for large forms ranged from 14 to 17cm and for small vessels from 11 to 13 cm. Projected lip diameters ranged for large forms from 14.7 to 17.5cm and for small vessels from 11.7 to 14.5cm. While these measurements are certainly conjectural they do provide presumptive evidence of proportionality in the process of vessel production. Thus we may tentatively conclude that when manufacturing a large vessel the artisan desired a container that was 11 to 14% broader than tall, with a mouth diameter roughly 19 to 22% smaller than the shoulder and a lip diameter from 3 to 10% greater than the mouth. When building a small vessel the potter apparently wanted a vessel that was 6 to 12% wider than tall, with a mouth diameter about 18 to 21% smaller than the shoulder and a lip diameter from 3 to 6% greater than the mouth. In sum, the 5LA9187 ceramic sample seems to have been drawn from a globular culinary ware with rounded shoulder, constricted mouth and gently out-flaring rim, a vessel configuration that could be rendered in at least two sizes.

To separate the remaining 164 body fragments into those broken from upper and lower body we used our conjectural vessel sizes and forms as a standard for orienting body pieces. Lip bearing rims, since they exhibited the junction of exterior with interior surfaces, were easy to properly orient. Further, since by projection they transcribed a circle we could reasonably assume that all points systematically related to this circle were topological invariants to which we might relate multiple instances of surface treatment. In a single case the lower exterior surface of a rim sherd was vertically simple stamped and in 11 cases pieces broken from the mouth-rim junction were vertically simple stamped. We therefore felt justified in identifying as top or bottom, opposing edges of any piece whose edges lay at a right angle or near right angle to the simple stamping on its exterior surface. Once standards for orienting pieces had been established and the pieces themselves oriented, we placed them on a flat surface. If the top and bottom (or upper and lower) edges of a piece rested on a flat surface (in the case at hand a lab table) and its center did not, the piece was grouped with all others that met this criterion as a member of set A. If the center or near center of a piece as well as its top and bottom edges rested on a flat surface it was grouped with others of like kind and identified as a member of set B. Since we assumed that upper body sherds would be more dramatically curved than lower body fragments the members of set A were identified as upper body fragments and those of set B as lower body sherds.

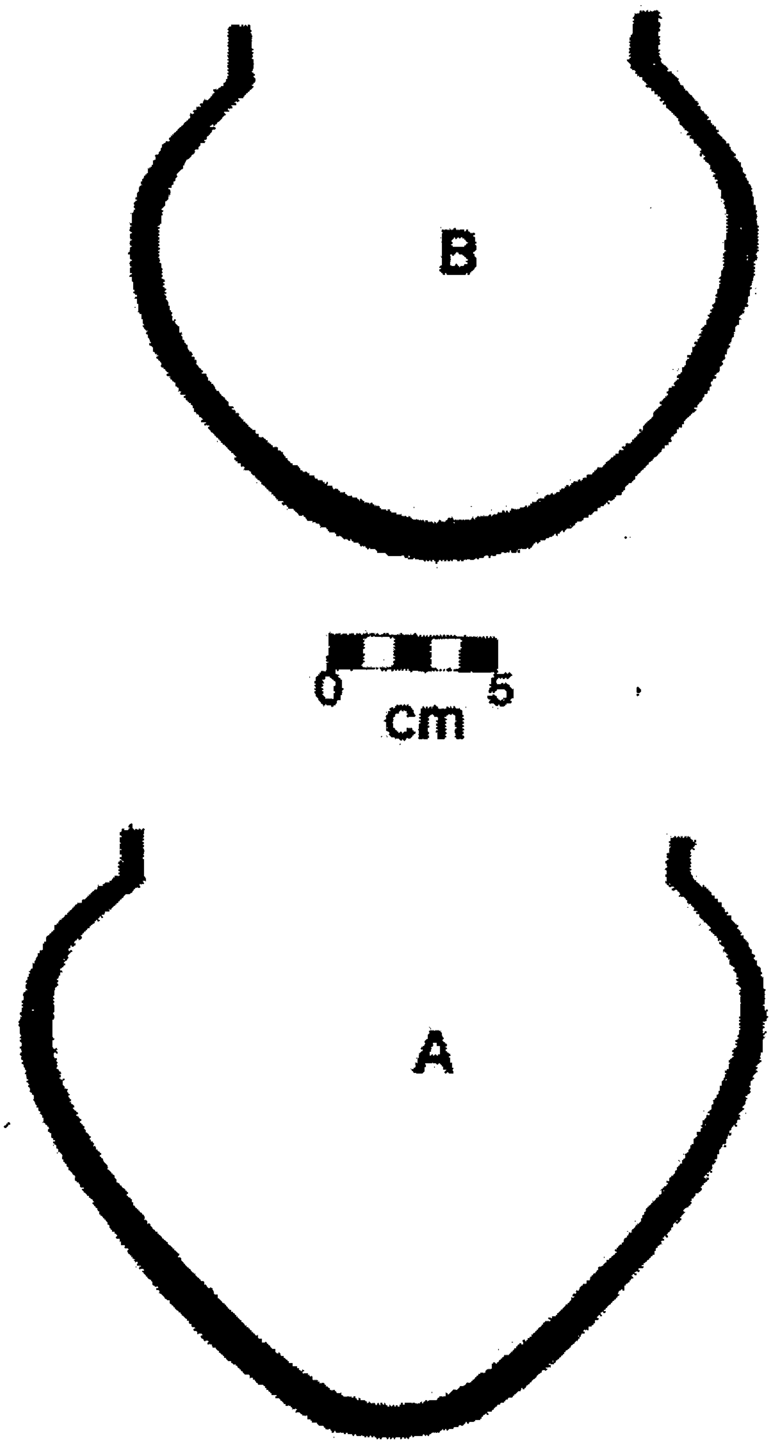


Figure 3. Conjectural Morphology of Large Vessels

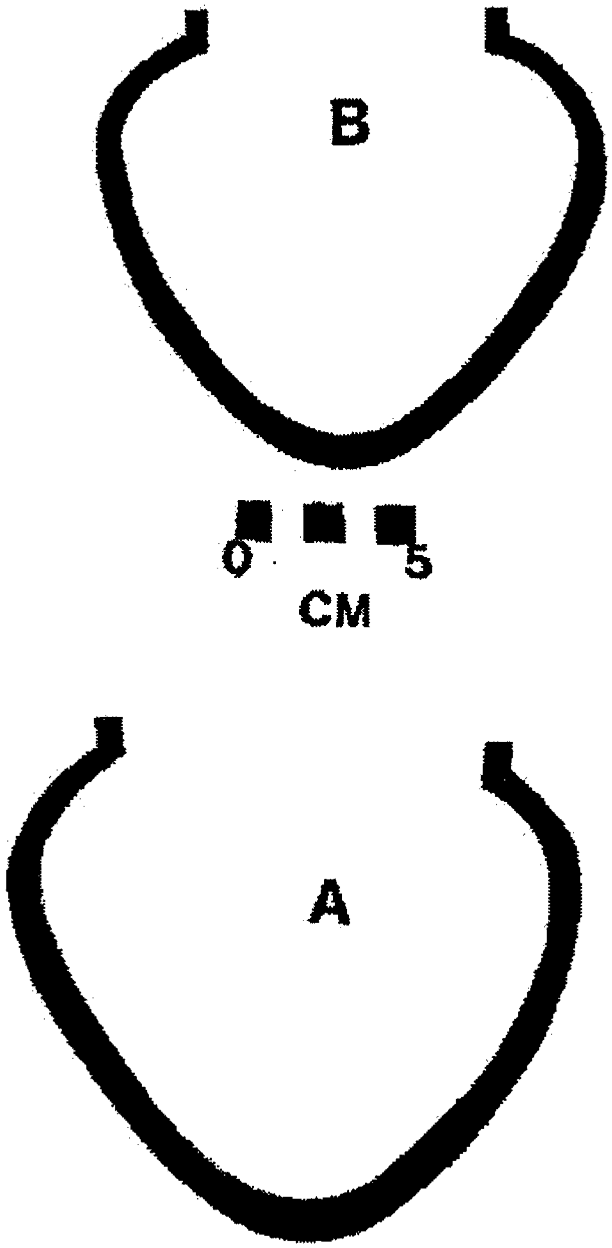


Figure 4. Conjectural Morphology of Small Vessels

By the criteria we had established 91 (52%) of the 164 body fragments were broken from the vessel between its rounded shoulder and its mouth, i.e., were upper body sherds. These pieces had a mean thickness of 5.2 +/- 0.7mm. Seventy-three pieces (42%) were identified as broken from below the shoulder but above the base i.e., were lower body sherds. These had a mean thickness of 7.49 +/- 0.6mm. Eleven sherds (6%) with a mean thickness of 9.5 +/- 1.2mm had the curved external and internal surfaces expected of base fragments. All of them had been formed by excavating a prepared lump of clay and mass modeling it into the shape and size appropriate to the production of a conoidal-bottomed vessel. The remainder of the body sherds, both lower and upper body fragments, were clearly mass-modeled. The exterior surfaces of 175 sherds (all upper and lower body sherds) had been floated, vertically simple stamped and then horizontally smoothed. The exterior surface of 4 of these pieces had also been smeared with red ochre, before being floated, vertically simple stamped and horizontally smoothed. The interior surface of two of these fragments had also been smeared with red ochre, and floated. Ten fragments with vertical exterior simple stamping and horizontal smoothing had only their interiors smeared with red ochre and floated. All of the base sherds had been smoothed on exterior and interior surfaces. With the general characteristics of the 5LA9187 sample as a background let us now turn to a more detailed description of its composition *viz a viz* techniques of manufacture and decoration. For this task we shall present the information the sample provided in the format of a production stage grammar, i.e., shall attempt to recreate the order and content of the various steps in the assumed procedure of producing a pottery vessel. In doing so we shall summarize: (1) the antecedent knowledge we used, (2) the observations taken and (3) the inferences drawn under headings and subheadings that represent essential steps in the production of the sample at hand.

RAW MATERIAL ACQUISITION AND PROCESSING

SELECTION OF RAW MATERIALS

Antecedent Knowledge.

Pots may be made from either primary or secondary clays. Igneous granites, decomposed by hot gasses into softer feldspar-containing rocks, provide the parent materials for both. Decomposition of feldspar containing rocks by sun, rain, wind, water and/or ice produces primary clays, all of which are found where they were formed. Thus primaries tend to be white or off-white, restricted in distribution, large in particle size, relatively aplastic (with the exception of bentonite) and high firing (1200 degrees centigrade or higher). When properly treated primary clays, insofar as they are refractory or vitrifiable, may be used to produce light colored stonewares, chinas, or porcelains. Primary clay beds are the parent source for secondary clays. When primaries are moved from their source by wind, water or ice, they pick up inorganic (iron and other minerals) and organic impurities and are modified in texture and particle size. Hence secondary clays are more widely distributed than primaries and tend to be shades of gray, brown or red as a consequence of the impurities they contain. They are also smaller in particle size, have greater plasticity, and are more fusible, i.e., lower firing (600 to 1200 degrees centigrade) than primary clays. Fusible secondary clays will melt at temperatures higher than 1300 degrees centigrade, thus are most suitable for the manufacture of porous earthenwares.

Fired in oxygen rich environments, secondary clays produce porous red, gray, tan, or buff wares. Fired in oxygen-poor (i.e., reducing) surroundings, they yield earthenwares in black or shades thereof.

Observations.

All the sherds from 5LA9187 were shades of tan, buff, gray, yellow or black. All of them thus fit the criteria for porous, low fired (600 to 900 degrees centigrade) earthenware. The cross-sections, interior and exterior surfaces of all the specimens in the 5LA9187 collection were examined under a swing arm mounted circumferencially illuminated 3X magnifying lens and when necessary under a binocular microscope. Every piece examined had been manufactured from fine-grained clay that did not contain mica flecks. Since 580 of the 585 previously collected sherds from Piñon Canyon contained mica flecks and since those that did not were clearly of non-local manufacture we assumed that the 5LA9187 pottery was made from non-local clay. It could, of course, be the case that 5LA91897's potters were using a different local clay bed than previous and consequent inhabitants. A definitive statement to this effect would however require physical and chemical evidence beyond our current means.

Inferences.

If we assume at least one potter among the inhabitants of 5LA9187 he or she practiced within the framework of a tradition that embodied a folk knowledge of the sources for and the properties of secondary clays. Further this knowledge was applied to the procurement of clay that was either non-local or if local was not used by other potters that inhabited the area.

PREPARATION OF RAW MATERIALS: Tempering

Antecedent Knowledge.

Secondary clays must be cleaned of extraneous materials, moistened and stored to sour, or dried and pounded, then moistened to proper plasticity before they are worked. After this initial preparation aplastics such as crushed shell, crushed and ground stone, ground bone, crushed sherds or sand may be mixed with the raw clay as the claybody is worked into its paste state

Observations.

There were relatively few (14 recorded instances) very small lacunae left by incinerated organic matter. The fine grain size and the few small lacunae in the 5LA9187 sample indicate the use of a secondary clay that was dried, pounded and cleaned of the larger organic (i.e., twigs, grass etc) and inorganic (i.e., stones etc.) impurities it may have contained. Then too, all of the sherds examined contained small fragments of granitic rock. When a 50-sherd sample of specimen cross-sections was examined under a binocular microscope a few sharp edged fracture planes and a large number of smooth pitted surfaces were noted on the claybody's granitic inclusions

Inferences.

5LA9187's potters cleaned, dried and probably pounded the raw clay then added water and crushed and ground granitic stone (probably derived from glacial till) to bring it to a paste state.

PREPARATION OF RAW MATERIAL: Kneading and/or wedging

Antecedent Knowledge.

As temper is added a clay mass must be either kneaded and/or wedged to free it of air pockets. Then too, as kneading or wedging proceeds the ratio of temper to clay is assessed and additional clay, temper or water added to the mix until the claybody assumes a paste state of suitable plasticity. An improperly kneaded or wedged claybody, no matter how dry it has become in its greenware state, will crack and/or will spall when fired.

Observations.

There were no firing lamina or spalls (i.e., thin oval fragments with a simple stamped exterior surface and raggedly fractured interior surface) in the collection. Nor were there any spall scars (pitted oval holes) on the exterior or interior surfaces of the 175 specimens examined.

Inferences.

The lack of firing lamina may be the consequence of discard beyond the confines of the site areas sampled or may indicate non-local firing. The absence of lamina scars suggests that the potters understood the properties of the clay they used well enough to sufficiently knead and/or wedge the tempered clay mass and exercise at least some control over the amount of moisture it contained in the paste state.

METHOD OF MANUFACTURE

BASIC MANUFACTURING TECHNIQUES

Antecedent Knowledge.

Coiling, modeling, molding or any combination of the three construction techniques may be used to build pottery vessel bodies. I consider "patch modeling" a form of coiling and slab building a form of modeling. In fact, rolls, pinches, patches or straps of clay may be added during molding, modeling or coiling but these additions, insofar as they are ad hoc, do not change the basic characteristics of the three major body forming techniques.

Observations.

None of the 175 fragments in the collection exhibited molding seams, non- rim coil fractures, coil overlap ridges, or coil juncture troughs. Nor could coils be seen in sherd cross-sections under white light, short or long wave, ultra violet illumination even with 3 to 10 X magnifications.

Inferences.

5LA9187's potters mass modeled their vessel bodies from a lump of prepared, tempered, and kneaded or wedged clay of a size suitable to provide the majority of the material needed for production.

PROCEDURE OF MANUFACTURE: Beginning the Vessel

Antecedent Knowledge.

When mass modeling a vessel body, the artisan may begin by forming the base, the shoulder or the lip. Since all of the vessels in the 5LA9187 sample were shouldered, it would have been difficult (but not impossible) for the potter to start with the lip. The major difficulty would come during shoulder manufacture when the weight of the clay between lip and shoulder rested on the lip and the circumference of the shoulder exceeded the circumference of the lip. While experiments in mass modeling indicate that building from the lip down is feasible, both the shoulders and lower bodies of such vessels are markedly thinner than lips and rims. If the artisan begins at the shoulder, the clay mass is rolled into a solid cylinder, then mashed into a flat rectangular strap whose free ends are mated and welded together to produce a hollow cylinder "starter strap" from which both the top and the base are pulled. However, if the potter begins at the shoulder, then the shoulder is usually significantly thicker than the base or the upper body. If the artisan begins at the bottom, then he or she either excavates a clay mass, then molds, or models a base. If the potter excavates a clay mass to form the bottom, we may expect a base that is thicker then the vessel walls in general and the shoulder and upper body in particular.

Observations.

Ninety-one of the 175 analyzable specimens (52%) were upper body sherds. These pieces had a mean thickness of 5.2 +/- 0.7mm. Seventy-three pieces (42%) were identified as broken from below the shoulder but above the base i.e., were lower body sherds. These had a mean thickness of 7.49 +/- 0.6mm. Eleven sherds (6%) with a mean thickness of 9.5 +/- 1.2mm had the curved external and internal surfaces expected of base fragments. A comparison of mean upper body, with mean lower body, thickness yielded a student t score of -73.84 indicating a statistically significant difference at the .001 level of confidence. A similar evaluation of the lower body and base yielded a t-score of -25.77 indicating a statistically significant difference at the .001 level of confidence. When mean upper body thickness was compared with mean base thickness the comparison yielded a student t score of -25.73, also significant at the .001 level of confidence.

Inferences.

The potters that manufactured 5LA9187's vessels began by building the bottom and base then proceeded to construct the lower body, shoulder and upper body.

Technique of Base Manufacture

Antecedent Knowledge

If the artisan begins at the bottom, then he or she either excavates clay mass, molds, or models a base. An excavated base is usually less uniform in thickness than one that is molded or modeled and will not show the attachment seam typical of molded or modeled specimens. In any case, a molded or modeled base will be unlikely if the vessel body is mass modeled rather than coiled.

Observations.

The sample included 11 specimens presumed broken from vessel bases. None of them exhibited coil fractures, coil overlap ridges or coil juncture troughs. Nor could coils be seen in sherd cross sections under 3 to 10 X magnification when illuminated with short or long wave ultra violet or intense white light. Thickness measurements taken at bottom proximal points, bottom distal points and points in between indicated that 3 to 5 mm variations in wall thickness were the norm. All base sherds were also examined for attachment seams but none were noted.

Inferences.

5LA9187's potters began vessel building by excavating a base from a clay mass that provided most of the raw material for the remainder of the vessel walls.

PROCEDURE OF MANUFACTURE: Forming the Vessel Walls

Antecedent Knowledge.

When mass modeling a pot, vessel walls may be pinched upward between thumb and forefingers or formed by pulling the clay upward and outward with the cupped fingers (or bent little finger proximal surface) of one hand. While pinching and pulling on the exterior the potter supports the clay on the interior with the flattened and rigid palmer surface of the fingers of the other hand. Wall segments thus formed may be further extended, shaped, and thinned with a rib or gourd scraper. When a clay mass is pulled upward in this manner, however, there is a general tendency for vessel walls to become significantly thinner as they become taller and it is difficult, if not impossible, to produce a uniform wall thickness about the vessel's circumference.

Observations.

All fragments large enough to approximate their original position were examined for pinch, pull and/or scrape marks and for uniformity of thickness. None of the specimens examined had pinch or pull marks although these may have been obliterated as a consequence of later smoothing and simple stamping. As indicated by statistically significant differences in thickness between base, lower body, and upper body sherds, there was a marked tendency for vessel walls to become thinner as they became taller. An examination of the largest sherds also indicated the vessel walls may have varied from 2 to 4 mm in thickness from point to point around a given vessel's circumference.

Inferences.

Vessel walls were most probably built by pulling the clay upward with a claw-like motion of the crooked fingers or the lateral surface of the cupped hand and forced outward by counter pressure from the rigid palmer surface of the other hand's fingers and/or palm. A pinch-pull technique may also have been used but the evidence for such was equivocal due to later thinning and scraping. We may also reasonably suppose that episodes of pulling were interspersed with bouts of wetting, scraping, and thinning (most probably with a rib or gourd scraper) and the ad hoc addition of bits, pinches, patches or even rolls of clay. While forming the shoulder the artisan probably used a wetted scraper in one hand to pull the outer surface inward from the maximum body diameter and then slightly (less than 3mm) upward while steadying and manipulating the clay with the rigid palmer surfaces of the other. Once the gross shoulder shape and circumference had been achieved further scraping and thinning brought them to near finished form and the potter proceeded to form the upper body by working the clay upward and inward to the mouth.

PROCEDURE OF MANUFACTURE: Forming the Rim.

Antecedent Knowledge.

When the artisan reached the desired minimal circumference of the upper body he/she should: (a) stop; (b) build upward; (c) build upward and outward; (d) build upward and outward, then brace the upper and outer edge; (e) build upward then brace the outer edge; (f) build upward and inward; (g) build upward and inward, then brace the upper and outer edge; (h) build upward and then outward and back again to form an S-shape; or (I) build upward, outward, then upward to form a collar. Each of these rim forms, with the exception of (a) may be achieved in several different ways. Pulling, thinning, and scraping the clay used in upper body formation may be used to form all of them. This procedure is, however, time consuming, tedious and produces a thin and, in its greenware state, often brittle rim. Adding a strap of clay to the upper and outer surface of the mouth, then manipulating, scraping, and thinning it to the desired shape may also be used to build all of them. In the past I have adopted the designation "unthickened" for this single strap approach to rim manufacture. While S-shaped and collared rims may also be made from a single strap, they are most easily fashioned by using two straps, the first welded to the upper and outer surface of the mouth, the second to the upper and outer surface of the first. For this two-strap approach, I have adopted the designation "thickened".

Observations.

The 5LA9187 sample contained 10 rim sherds. None of them could be fit together. Nor were any of them similar enough in lip form or decoration to have been broken from the same vessel. Thus each of them presumably represented a single pot. A visual inspection of rim sherd cross-sections, aided in questionable cases by 3 to 10 X magnifications, was sufficient to determine the method of rim construction. A single strap of clay had been added to the upper body of the vessel at its mouth to produce all the rims in the sample. These rim straps varied in height from 10 to 18mm and in thickness from 5 to 7mm. They had a mean height of 13.3 +/- 2.6mm and a mean thickness of 5.3 +/- .95mm. The 2.6mm standard deviation in strap height led us to divide the rims into those under and those over 14mm tall. This procedure divided the rims into those with a mean rim strap height of 12.0 +/- 1.7mm (7 examples) and those with a mean rim strap height of 16.3 +/- 1.5mm (3 examples). A student t score of -15.11 indicates a statistically significant difference in rim height. Since the projected curves for the 7 lowest rims suggest a mouth diameter from 11 to 13 cm and those from the 3 tall rims a mouth diameter from 14 to 17cm the difference between the two arguably represents a difference between large and small pots. Six of the 10 rims (60%) were gently out-flared, i. e. had a slightly greater lip than mouth diameter and 4 (40%) were direct, i.e. had virtually identical lip and mouth diameters. Five of the tall rims and 1 of the low rims were out-flared. Two of the tall rims and 2 of the low rims were direct. Eleven fragments broken from the upper body-mouth junction were significantly thicker (6.8 +/- 0.8 mm) than either upper bodies in general (5.2 +/- 0.7mm) or than rims (5.3 +/- .95mm). A magnified (3X) and illuminated view of these pieces clearly indicated the ad hoc addition of a strap of clay pressed into and over the exterior surface of the mouth lower rim junction on what appeared to be reasonably tall out-flared rims. Unfortunately the rim strap had been broken away from all but one of these pieces and so had most of the upper body below the mouth. On one fragment, however, the lower portion of a rim strap could clearly be seen behind the addition to the mouth-rim junction. In this case, and we suspect in the other 10, the external addition served to brace the rim strap after inside-out pressure had been applied to its upper third to out-flare it.

Measured Variable in the Manufacture of Rims

Strap Height	Strap Thickness	Rim Form	Pot Size
14mm	5mm	out-flared	small
10mm	5mm	out-flared	small
10mm	4mm	out-flared	small
11mm	5mm	out-flared	small
13mm	6mm	out-flared	small
12mm	5mm	direct	small
14mm	7mm	direct	small
15mm	4mm	out-flared	large
16mm	5mm	direct	large
18mm	7mm	direct	large

Inferences.

To produce unthickened rims, the potter tore a wad of clay from a prepared clay mass, rolled it into a solid cylinder, and then mashed it (most probably with the palm or heel of the hand) into a flat strap. This may have been done against a flat unyielding surface or between the palms. The strap was then placed about the outer and upper edge of the vessel mouth. Once placed about the outer edge of the mouth, the strap was pressed into place (probably between the thumb and first two fingers) and joined interior and exterior by repeatedly jabbing downward with the thumb and/or forefinger, thus dragging clay from rim strap to upper body. Repeated bouts of scraping and episodes of thinning, clay patch and pinch addition or the addition of a bracing strap of clay may then have been used to complete the weld and provide reasonably smooth running surfaces from upper body to lip. Direct rims were left as formed. Out-flaring rims were further shaped on the inside with a rib or gourd scraper; the artisan applying slightly greater pressure to the upper than to the lower interior surfaces while drawing the scraper to him/her about the inner circumference of the rim.

PROCEDURE OF MANUFACTURE: Forming the Lip

Antecedent Knowledge.

The lip may be a highly variable part of a vessel. It may, for instance, be flattened, rounded, beveled to the inside, beveled to the outside, beveled to both inside and outside (i.e., tapered), T-shaped, Γ-shaped, ⅂-shaped or pinched (i.e., wavy).

Observations.

The 5LA9187 rim sherd sample contained six with flat lips (60%) (Fig 5, A, B, D, E, F, G) and 4 with round lips (40%) (Fig 5, C, H, J and I). All had been made by placing a lip coil on and pressing it over the upper surface of the rim strap. The lip coil had been broken away on one specimen leaving a clear u-shaped coil fracture. The lip coils on the remainder were indicated by coil junction disconformities visible and measurable in magnified rim sherd cross-sections. Lip coil diameters ranged from 4 to 7mm with a mean of 5.22 +/- 1.1 mm.

Inferences.

To form the lip 5LA9187's potter(s) detached a wad of clay from a prepared clay mass or collected it from the scrapings rendered during smoothing and thinning. This clay wad was then rolled, either between the palms of the hands or between the palm of one hand and a hard flat surface, to produce a lip coil. The lip coil was laid over the upper edge of the rim strap then joined to it. To accomplish this the artisan pulled the outer and inner surfaces of the upper portion of the rim strap and the outer and inner surfaces of the lower portion of the lip coil between the thumb and forefinger as the hand was drawn along the rim. Downward strokes of the thumb or forefinger may also have been used where and when needed. Once the lip coil had been joined to the upper surface of the rim strap the potter either: (1) pressed gently down upon the top of the upper surface with thumb or forefinger while drawing the hand horizontally along its surface to produce a flat lip, or (2) pulled a leather patch, or the palmer surface of a finger tip gently over the upper surface of the lip coil to produce a reasonably regular round lip.

PROCEDURE OF MANUFACTURE: Final Shaping

Antecedent Knowledge.

Mass modeled pots, depending upon the water retentive qualities of the clay used to form them and the ambient weather conditions, may be brought to final shape after several hours or several days of drying. Final shaping, thinning and compacting may be accomplished by vigorously scraping, wetting and rubbing the pot's external and internal surfaces. A paddle and anvil may also be used at this time, either before or after bouts of scraping, wetting and rubbing.

Observations.

The interior surfaces of all body sherds were examined for anvil scars. Twenty partial and suspect instances of anvil use were noted but none of them were complete enough to measure. The clearest and only measurable example occurred as two slightly overlapping oval indentations in a sherd broken from a single vessel's interior surface just above the shoulder, i.e., on the surface most difficult to see and to wet and scrape with vigor once the pot was formed. These two 1mm deep and clearly visible anvil scars overlapped by 4mm. Their measurable dimensions indicate the use of a flat-sided 45mm long and 35mm wide oval stone anvil held against the pot's interior surface while its exterior was paddled (Fig. 5 K).

The exterior surfaces of all body sherds had been scraped and floated prior to paddling them, the interior surfaces had been floated. Floating was presumably accomplished by wetting the exterior and/or interior surface then gently pressing and smoothing it with the finger or with a flat-sided wood or bone tool. This practice left a smooth and compact eggshell thin surface that could be easily seen in sherd cross-sections and could be removed by inserting the tip of a knife blade beneath it and prying upward. In 10 instances the interior vessel surface had been smeared with an iron oxide compound before it had been floated. In two instances the iron oxide compound had been smeared over the interior surface before it had been floated and over the exterior surface before it had been paddled. In 2 instances only the exterior surface had been iron oxide smeared before floating and paddling. In most cases the surface paddling of the vessels exterior distorted but did not obliterate this floated surface.

There were 164 examples of the use of a grooved, i.e., a scored, rectangular paddle applied with moderate force to vessel exterior surfaces. The lip and the uppermost paddled surface were present on a single rim sherd allowing an unequivocal determination of the vertical orientation of paddle lands and grooves. Then too, there were 11 instances of multiple and clearly vertical paddle lands and grooves on mouth- rim junction sherds. In 105 cases the characteristic vertical ridges and troughs produced by the use of such a paddle had been distorted by subsequent horizontal scraping and smoothing.

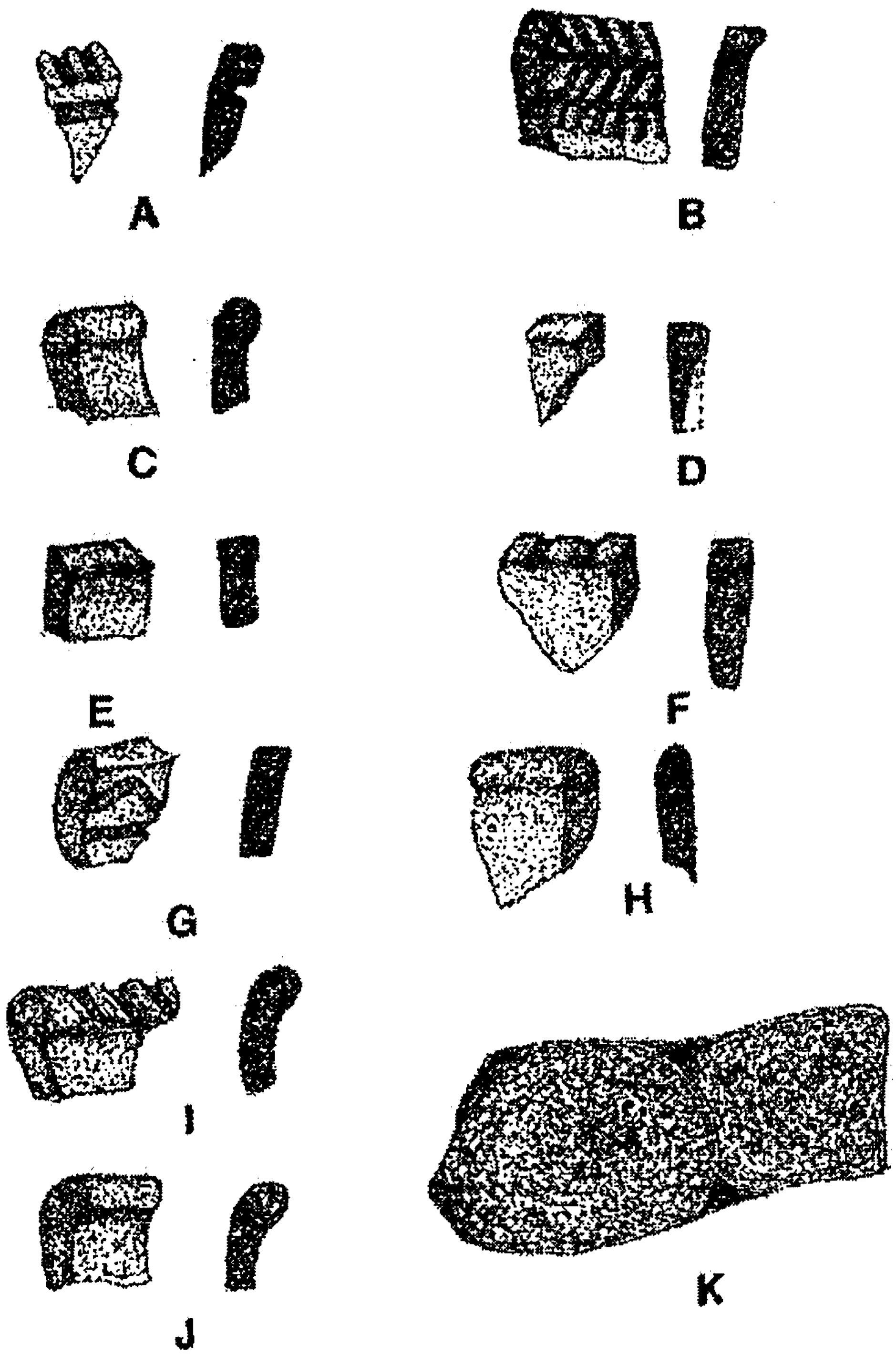


Figure 5. Rim Sherds

Inferences.

Once 5LA9187's pottery vessels were formed they were set aside, most probably mouth down, to dry. After sufficient drying they were further scraped, rubbed, and compacted to bring them to final form. Both exterior and interior surfaces were wet and then gently pressed and smoothed with the fingers or with a bone or wood tool to float them. Some interior surfaces were smeared with a red iron oxide compound then floated, and a few exterior surfaces were smeared with iron oxide and floated. A paddle and anvil were then used to further shape and compress the vessel walls. The anvil, most probably a flat-sided near circular or oval stone, was held firmly against the interior vessel wall while the grooved paddle was pressed or gently pounded against the exterior surface thus supported. The paddle, most probably a flat-sided rectangular piece of bone or wood, was grooved or scored on one end and at a right angle to its long axis. The paddle was applied horizontally, i.e. at a right angle to the vessel's lip, leaving vertically stamped lands and grooves on the upper, shoulder and lower exterior surfaces of the vessel's body. Vessel bottoms and bases were scraped with a bone or gourd tool and/or rubbed back and forth with a smooth surfaced stone. Stamped exterior surfaces, namely lower bodies, shoulders and upper bodies, were more gently smoothed with horizontal strokes that distorted but did not obliterate the vertical simple stamping that preceded smoothing. The interior surfaces of rim and upper body, as far down as could be conveniently reached were likewise scraped and rubbed but more vigorously. Vessel lips were rubbed most probably with a smooth surfaced stone, using a vigorous back and forth movement.

DECORATING THE VESSEL

The practice of smearing vessel surfaces with an iron oxide compound to turn them red, then floating them, or the act smearing surfaces with an iron oxide compound, floating and then simple stamping them may partake of both elements of decoration and manufacture. I have chosen to describe them as part of the manufacturing process although they may not have been understood as such by their makers or users. For convenience I will exclude floating and simple stamping from my discussion of decoration but will include the addition of an iron oxide compound as an element of decoration. The designs applied to 5LA9187's pots can be described as restricted in distribution and simple in both structure and content. Before producing a more detailed description, I must specify the meaning I have given to the expressions decorative feature, decorative element, and decorative environment.

By a decorative feature I mean those consequences of substance addition, tool or finger use that define a set of pottery decorating behaviors. For example, in analyzing a pottery sample, I might note the following instance of tool use. The artisan drew a pointed and edged tool (of wood or bone) over the clay at a high oblique angle leaving an incision with a V-shaped trough and marked wake. From this observation I may derive six decorative feature values: (1) drew (the action of pulling and opposed to pushing), (2) a pointed and edged (as opposed to round or any other form), (3) a high oblique (as opposed to a low oblique or any acute or right angle), (4) a V-shaped trough (as opposed to a U-shaped or flat bottomed trough or a non-trough), and (5) a pronounced wake (as opposed to a shallow wake or no wake). If I use these feature values to define a set of pottery decorating behaviors this set becomes a decorative element. Differently put if the feature values given previously are used as the necessary and sufficient conditions for defining a decorative act, then that act constitutes a decorative element. Further I may term the act designated by the example given as the decorative element of "incising". Finally, any part of a pottery vessel's surface that carries at least one decorative element will be considered a decorative environment. Note here that a single decorative environment may carry more than one decorative element but when such is the case that decorative environment must be in complementary distribution with all others on the same vessel.

When a division into substance addition, tool use and finger manipulation was applied to the 5LA9187 sample only two sets were generated, substance addition and tool use. As previously noted there were 14 cases of substance addition. To achieve them the artisan crushed an iron oxide bearing clay commonly called red ochre, mixed it with water then smeared it over a vessel surface either with a skin patch or with the finger tips. The ocher smeared segment (the vessel exterior and/or interior) was then floated leaving an eggshell thin layer of red on and over its surface.

There were 7 cases of tool use, 2 examples of incising, 3 examples of tool impressing and 2 instances of trailing. I have already given a narrative account for the decorative element incising. To produce tool impressed surfaces a cylindrical wooden or bone dowel was held horizontally and pressed down into the surface of the clay then extracted leaving a round-bottomed trough with no wake. Trailing was done with a flat-sided roughly rectangular tool drawn over the clay at a low oblique angle producing a flat-bottomed trough and a shallow wake.

A simple inspection of decorative element distributions indicated a restrictive patterning in their application. Tooled decorations were applied to the lip; rim exterior or lip and rim exterior but different tooled elements were not combined in a single environment. There were three instances of tool impression all of them restricted to the lip and arranged in parallel diagonal lines two of them across a flat (Fig. 5, A and F) and one across a round lip's surface (Fig 5, I). There were two instances of incising both restricted to the rim exterior. One of these consisted of a wavy incised line above a straight horizontal incised line, both of which encircled the rim exterior (Fig. 5, G). The other consisted of three sets of short parallel lines two of them diagonal and one vertical that abutted two rim encircling horizontal lines. The lip proximal set of short parallel diagonal lines sloped downward from upper right to lower left to abut the upper of two rim encircling horizontal lines. The second set of parallel diagonals sloped downward from upper left to lower right pendant to the upper rim encircling horizontal line and terminating at the second, i.e., lower rim encircling horizontal line. The members of the third set of parallel lines were pendant to the lower horizontal line but were shorter than the members of the two upper line sets and were vertical rather than diagonal. Although parallel they dropped straight down from the lower rim encircling horizontal line and were not bounded at their lip distal edge (Fig 5, B). The trailed decorations were exclusively applied to the rim exterior. They consisted of a single rim-encircling horizontal line (Fig 5, A) and three parallel horizontal rim-encircling lines. Substances in the form of iron oxides were added to the vessels interior surface (10 examples), the vessels exterior surface (2 examples) or to both (2 examples).

PROCEDURE OF MANUFACTURE: Drying the Vessel

Antecedent Knowledge.

After pottery vessels are shaped and either before or after they are decorated they must be dried before firing. If insufficiently dried, residual claybody moisture will vaporize within the vessel walls during heating causing spalling, shattering and/or warping. Then too, uneven or excessively rapid drying will crack the vessels before they reach a true greenware state.

Observations.

None of 5LA9187's specimens had been derived from vessels that had spalled, shattered, or warped during firing. If there were firing failures present they were discarded beyond the confines of the areas excavated and/or collected. I therefore suspect that 5LA9187's vessels were either fired elsewhere or were sufficiently dried before being locally fired. Unless we assume a drastically different past climate, local drying would have been difficult to achieve without a shelter of some kind.

Inferences.

5LA9187's vessels were either manufactured out-of-doors (in summer, spring or fall) or in-doors (in any season) but certainly were dried under a shelter of some kind. Prior to firing some, if not all, of these vessels may have been warmed near a hearth until most of the moisture was driven from them then stored under shelter until a convenient mass firing could be arranged.

PROCEDURE OF MANUFACTURE: Firing the Vessel

Antecedent Knowledge.

Firing is a three-stage process. In the first stage, the vessel is warmed (the slower the better) and any moisture remaining is driven from the claybody. If warming proceeds too rapidly, the clay particles fuse before residual moisture escapes and pockets of steam form within the vessel walls causing them to shatter and/or spall. During the second stage, organic matter is burned from the claybody and excess oxygen is introduced through circulation drafts. This oxygen reacts with carbonaceous matter in the claybody and soot from the burning fuel to produce carbon dioxide. As carbon in the claybody is removed, the iron oxides that remain are oxidized producing shades of brown, yellow, gray orange or red. Vitrification is the third and final stage. During vitrification clay constituents soften, stick to each other and become joined by glass filaments formed from melting and combining silica. If oxidation is incomplete, as it usually is with residual, i.e., secondary, clays, the remaining organic matter will form gas at high vitrification temperatures and the concomitant pressure will cause warping or other forms of wall distortion. Nevertheless, residual clays are usually of low purity and contain natural fluxing agents that produce the beginnings of virtification at a relatively low temperature (600 to 900 degrees centigrade), thus muting the effects of incomplete oxidation.

Observations.

At least 15 of the sherds in the sample carried portions of the splotchy irregular smudges commonly called firing clouds. These, we presume were the results of reduction burns created by fuel which fell against the pot during firing. Irregular splotches were noted on the interior of base and bottom sherds and on the exterior surfaces of upper body sherds. Non-smudged oxidation burned surfaces were reasonably uniform shades of tan, gray or brown. The burn out pattern observable in some sherd cross-sections indicated irregularities in temperature, draft and gas circulation. These pieces usually had a darker core sandwiched between lighter exterior and interior surfaces.

Inferences.

5LA9187's potters open-fired their wares using fuels available in the firing locality. The following is a highly speculative account of this process. The grass and/or plant cover was first removed from a circular or oval area of suitable dimensions and the underlying soil either smoothed to provide a flat surface or dug out to form a shallow concavity. A prepared bed of sticks, grass, and/or bark was then laid over the bare soil to keep the unfired vessels off the ground and to allow for a draft during the early stages of burning. The pots to be fired were placed mouth up on the prepared bed or sticks and grass and nestled down into it to hold them firm. They may also have been firmed in their upright stance by leaning them together shoulder to shoulder. The mouth up position is inferred from the smudge patterns noted on vessel interiors and on exterior upper body pieces. The practice of nestling them into the stick and grass bed is suggested by off center interior smudges. I presume that as overlying fuel burned its residue fell over and into the mouth-up pots below, shutting off the circulation of air at the point of contact. The off center interior splotches led me to suspect some shifting of the pots during the burn, most probably caused by the disintegration of parts of a stick and grass under-bedding. The fuel stack was probably lit on the downwind side (To promote a slower and hotter burn) and additional fuel may have been added as needed during the burn).

DISCUSSION

A cursory inspection of the LA9187 sample led me to the conclusion that it did not fit well with others in the same area. Some of the differences, namely those in clay body composition and surface treatment were dramatic. Although all of the 5LA9187 sherds were grit tempered none of them contained the rather abundant mica inclusions that marked the grit tempered ceramics from other sites in Piñon Canyon. Then too, all of the upper and lower body sherds in the 5LA9187 were mass modeled and vertically simple stamped. The mass modeled wares from other sites were all vertically cord roughened. The simple stamped wares from other Piñon Canyon sites were all coiled and were horizontally stamped. Twenty-one sites in the Piñon Canyon area contained plain wares. None of 5LA9187's ceramics were plain. Thirteen sites in the Piñon Canyon area yielded vertically cord roughened wares (Krause 2002). Although a single cord roughened specimen was found at one of the lower levels of the Barnes site (Ahler

2002) there were no cord-roughened sherds in the 5LA9187 sample analyzed in July of 2002. Nine Piñon Canyon sites yielded check stamped sherds (Krause 2002). There were no check stamped specimens in the 5LA9187 sample. Fourteen of the 5LA9187 specimens had been colored with red ochre before being floated to produce a faux slip. Ten were "slipped" on the interior, 2 on the exterior and 2 on both exterior and interior surfaces. None of the other specimens from Piñon Canyon had been "slipped" (Krause 2002).

Before proceeding with my discussion I must add a word of caution. The inferred construction techniques and the size and shape estimates for the Piñon Canyon sample were drawn from the analysis of 7 lip, 12 rim, 152 upper body, 133 lower body and 3 base/bottom sherds extracted from 46 separate ceramic bearing sites (Krause 2002). 5LA9187's inferred construction techniques, vessel shape and size estimates were based on 10 rim, 41 upper body, 73 lower body and 11 base/bottom sherds drawn from a single site. In other words we are about to compare summed over inferences and estimates from 46 separate deposits with those derived from specimens in a single deposit. Since we expect the greatest morphological variation in lip and rim construction we shall begin there.

There were 12 rim sherds in the 5LA9187 sample, i.e.; all the Barnes site vessels bore rims. Six additional sites in the Piñon Canyon area yielded only rim bearing vessels but 3 sites contained only rimless vessels (bowls or Olla-shaped forms) and 2 others both rim bearing and rimless forms (Krause 2002). The greatest difference in the two samples however lay in rim height and method of manufacture. All of the rims from the Barnes site sample had been constructed from a single strap of clay topped with a lip coil. One single strap rim sherd (most probably an import) accompanied the sample drawn from the other 46 sites in Piñon Canyon. All of the rest, 11 rims from 8 sites were coiled (Krause 2002). The rim fragments broken from large pots in other Piñon Canyon sites averaged 3.0cm in height, those from large vessels in the Barnes site sample 1.6cm in height, i.e., those from other sites in the area were nearly twice as tall as those from the Barnes site. The difference in rim height for small pots was less dramatic (Barnes site average 1.2cm, other sites average 1.85cm.) but still significant. Barnes site potter(s) shared a common lip construction technique with those whose wares were recovered from other sites in the Piñon Canyon area (i.e., the addition of a lip coil) but preferred flattened over rounded lips 26 to 4 (40% round, 60% flattened). The potters who produced the wares found at other Piñon Canyon sites preferred round over flattened lips 3 to 1 (75% round, 25% flattened) (Krause 2002). While both direct and out-flaring rims were present in the samples from Barnes and other sites in the area the out-flaring rims from the Barnes site had lip diameters that were less then 1% greater than mouth diameters. The lip diameters of out-flared rims from other sites were 7 to 9% greater than their corresponding mouth diameters (Krause 2002). Barnes site potter(s) decorated 5 of 10 rims (i.e., 50%); those who produced the samples from other sites decorated 6 of 12 rims (i.e., 50%). The wares from both the Barnes and other sites in the area had lip decorations composed of parallel diagonal tool impressions. Only the Barnes site potters decorated their vessels with rim encircling horizontal trailed lines, rim encircling straight and wavy incised lines, and rim encircling incised herringbones. In sum the Barnes site rim sherd sample contrasted with those drawn from other sites in Piñon Canyon by virtue of single strap rim construction that produced a significantly lower and more gently out-flaring rim. Then, too, Barnes site potters incised and trailed rim exteriors and preferred flattened over rounded lips.

The inferred differences in vessel size and shape between the specimens from 5LA9187 and the other Piñon Canyon samples were more subtle, but no less significant. The largest Barnes site vessels were on average 2cm shorter than those from other sites in the region. The large vessels from the Barnes site were an estimated 16 to 18 cm tall. The largest vessels from other sites in Piñon Canyon were 18 to 20cm tall (Krause 2002). The largest Barnes site vessels, estimated at 18 to 21cm wide, were also 2cm narrower than the average Piñon Canyon large vessel estimated at 20 to 22cm wide. The greatest difference, however, lay in mouth diameter. The largest Barnes site vessels had projected mouth diameters of 14 to 17cm; those from other sites in the region had projected mouth diameters of 11 to 14cm (Krause 2002). Differently put, the largest vessels in the Barnes site sample were shorter and narrower than those from other sites in the region but had broader mouths.

The small vessels from the Barnes site were significantly wider and taller than their counterparts from other sites in the Piñon Canyon area. The average Piñon Canyon small vessel was 9-10cm tall and 10 to 11cm wide (Krause 2002). The hypothetical Barnes site small pots were 13-15cm tall and 14 to 16cm wide. In other words, Barnes site small vessels were 4-5cm taller and broader than those from other Piñon Canyon sites were. Like their large vessel counterparts Barnes site vessels had larger mouths than the pots from other sites in Piñon Canyon. Barnes site vessel mouths were estimated at 11-13cm in diameter. The projected diameters of small vessel mouths from other sites in the region ranged from 5 to 7cm (Krause 2002). To put these figures in morphological perspective, if the area circumscribed by the mouth and the area circumscribed by the shoulder were laid mouth atop shoulder Barnes site mouths would fill 78 to 81% of the shoulder space. If the same procedure were applied to the small vessels from other sites in the area the mouth would fill 50 to 63% of the area circumscribed by the vessel shoulder. My intent in this comparison is to illustrate the fact that despite differences in size, the small vessels from the Barnes site have proportionally broader mouths than those from other sites in the sample.

That the Barne's site pottery is quantitatively and qualitatively different than samples drawn from other sites in Piñon Canyon is clear. Just how significant these differences may be is another matter. In an attempt to address this issue I will reference my colleagues attempts to analyze and classify the pottery from the Middle Missouri and Central Plains sub-areas. Paul Cooper produced the first systematic study of Middle Missouri Ceramics in 1949. On the basis of differences in surface finish, vessel form, rim and lip design, he divided the known ceramic sample into three types he identified as simply A, B, and C (Cooper 1949, 313). In 1951 Donald Lehmer refined and revised Cooper's classification in a study that became the model for most subsequent research. Lehmer (1951, 3) used three of Cooper's criteria to define what he called wares "...wares may be thought of as groups of types which share such ***fundamental*** (emphasis mine) characteristics as ...the surface finish, the general form, and the basic rim form." Types in Lehmer's scheme were to be determined by differences in decoration and lip shape. "The types themselves have all the characteristic features of the ware, but are distinguished by the decorative treatment and sometimes variation in form" (Lehmer 1951, 3). Given the context of its occurrence I presume that by variation in form Lehmer was referencing lip form. Logically, sub-types or varieties should be yet more restricted units within the defined types. In fact, varieties have been infrequently used (Krause 1994, 28).

Under the pressure of the Missouri Basin Salvage Program, work proceeded rapidly. By 1954, Richard Wheeler (1954) was able to compile a checklist of eight Middle Missouri wares, 48 types, and three varieties. In defining types, most followed Lehmer's lead. Wesley Hurt (1952, 13-17) and Carlyle S. Smith (1951, 1963), however, used different criteria to produce wares, types, and sub-types. Lehmer's wares were historical and descriptive composites; Hurt's were a confusing amalgam of historical, functional, and descriptive properties; Smith's were a different mix of descriptive and historical traits than Lehmer's.

Despite the taxonomic confusion of their day, Lehmer's wares and types have been indisputably successful. In fact, Lehmer's approach has been essential to subsequent work in both the Middle Missouri and Central Plains. Brown (1966), Calabrese (1972), Caldwell (1966a, 1966b), Caldwell and Jensen (1969), Frantz (1962), Hoffman (1967, 1968), Husted (1965), Stephenson (1962), 1969), Weakley (1971), W. R. Wood (1967), Wood and Woolworth (1964), among others, used it in their Middle Missouri work. Anderson (1961), Blakeslee and Caldwell (1979), Brown (1967), Gunnerson (1952), J.J. Wood (1967) and Wedel (1959) adopted a similar approach to the study of Central Plains ceramics.

I think Lehmer's approach was successful because he chose the right criteria. He combined the right elements of manufacture with the right elements of decoration. Even if potters share the same manufacturing tradition we cannot expect identical performances from them. We, nevertheless, may expect the most precise correspondences in those parts of manufacture likely to be most conservative, i.e., those in which miscalculation brings ruin. Generally speaking, high-risk potting practices are those that that entail modifications in clay body preparation (clay selection, tempering and technique of manufacture) or those that introduce new stresses and strains to vessel parts or to the vessel as a whole. The latter include alterations of vessel proportions that drastically change the size or shape of body parts, or rework essential relations among body parts (i.e., modification of bottom, base, shoulder or mouth).

Manufacturing and shaping practices (with the exception of lip shaping and minor modifications of rim form) carry a relatively high risk of product loss. Decorative practices, on the other hand, are not as risky. Innovation and experimentation in decorative embellishment and ornament may proceed with little or no risk to product loss. In short, we may expect stability in major manufacturing and morphological practices and change in minor manufacturing practices and decorative embellishments. Thus, insofar as they are defined by the least conservative morphological features (i.e. lip construction and form) and by decorations, Lehmer's types are expectably sensitive temporal indicators within the continuum of the conservative morphological practices that define his wares (Krause 1994, 28-9).

The lesson here is simple but compelling. If wares are to represent ceramic traditions they must reference gross properties of manufacture and morphology like the properties of clay preparation and technique of vessel body manufacture, and the size and shape of mouth, shoulder and bottom. Lip forms together with decoration are good indicators of time and place. Hence they should be used to form types. With these criteria in mind I will argue that the Barnes' site pottery belongs to a single ware not found at other sites in the Piñon Canyon area.

The raw material for this as yet unnamed ware was non-mica-bearing clay, tempered with pounded and ground granitic stone. To produce it the potter excavated a conoidal bottom then mass modeled the lower body, mass modeled a mid to high rounded shoulder and a broad mouth. The mouth was topped with a low, direct or gently out-flared rim constructed of a single strap of clay topped with a lip coil. In several instances the mouth rim junction was reinforced with an additional layer of clay but this practice may be ad hoc rather than an integral part of the ceramic tradition the ware represents. The exterior body surfaces of the ware were floated then vertically simple stamped by use of a grooved wood or bone paddle with interior counter pressure provided by a round, flat-sided, stone anvil.

Three types represented this unnamed ware at the Barnes site. We shall call them Barnes plain, Barnes red slipped and Barnes tool decorated. In keeping with Lehmer's stipulates all three types share the characteristics of the ware but Barnes plain had undecorated low, round or flat-lips atop undecorated direct or gently out-flaring rims. Barnes red slipped had the same array of lip and rim forms as Barnes plain but also carried a red "faux slip" composed of an iron oxide coloring agent applied to the rim interior, the exterior body surface, the interior body surface, or to both exterior and interior body surfaces. Like its plain and red slipped counterparts Barnes tool decorated had low, round or flat lipped, direct or gently out-flaring rims but with either rim exterior, lip, or both rim exterior and lip, decorated with incised, impressed or trailed designs.

Placing this unnamed ware in cultural historical perspective is a difficult task. The sample size is small and the ware seems to be an import. We will, however, attempt to do so by examining the history insofar as we know it of the various techniques of manufacture and decoration that are integral elements of the unnamed ware. Mass modeled body construction with globular bottoms and mid to high round shoulders and the manufacture of single strap rims topped with lip coils that are either rounded or flattened are found in late Woodland deposits in Kansas and Nebraska (Krause 1995, 338-45). These late woodland ceramics found in components of the Kieth Variant, estimated to date between the 7th and 10th centuries, are usually sand tempered, vertically cord impressed and accompanied by a double strap or thickened high rim. These double strap high rims in fact presage the collared rims found in the Solomon River, Smoky Hill and Upper Republican phases of the Central Plains Tradition (Krause 1995, 338-45). These same elements of vessel morphology, construction technique and decoration continue into and through the years between the 10th and 15th centuries in the Solomon River, Smoky Hill and Upper Republican Phases of the Central Plains Tradition. During these years a red faux slip was added as a minority element to the inventory of decorative techniques (Carlson 1972).

A single grit tempered simple stamped sherd from the late Woodland Olson Mound in Buffalo County South Dakota seems at present to be the earliest example of this combination of temper and surface treatment (Neuman, 1961, 164). Vertical to diagonal simple stamping of mass modeled grit tempered mid to high rounded vessel bodies seemingly grew in popularity through South Dakota's Initial (AD 1000 to 1300) and Extended (AD 1200 to 1400) variants of the Middle Missouri Tradition and Initial variant of the Coalescent tradition (AD 1300 to 1500) (Falk 1984, 1-A-71; Krause 2002, 197).

Some of the ceramics accompanying South Dakota's Initial variant of the Coalescent Tradition (AD 1300 to 1500) in fact combined all of the elements found in the unnamed Barnes site ware. These included a mass modeled production technique that produced globular bottomed, mid to high shouldered vertically to diagonally simple stamped vessels. Some of these vessels also carried a red faux slip and had single strap direct to gently out-flaring rims with flat or round lips. Nevertheless, simple stamping was less frequent than cord roughening and double strap or thickened rim construction although less frequent than single strap production was an integral part of Initial Coalescent ceramic practices. In other words in technique of construction, rim and lip manufacture, surface treatment and some aspects of decoration the unnamed Barnes ware seems to be a select and downsized version of ceramics commonly found in South Dakota's 14th to 16th century Initial Coalescent deposits. There is, however, a problem with the timing.

Some of the Barnes site ceramics come from features that have been dated to the 13th century. Ahler (2002, 56) for example reports a radiometric determination of 689 +/- 49 years ago (AD 1261 +/- 49) for feature 5 at the Barnes site, and 717 +/- 49 years ago (AD 1233 +/- 49) determination for features 8. While the earliest Initial Coalescent site (Whistling Elk) has produced seven radiometric determinations that span the years from the early 10th to the early 14th century the pottery at Whistling Elk bears only a generic resemblance to the unnamed Barnes ware. The ceramics that seem most like those from 5LA 9187 come from Initial Coalescent components that date to the 15th and 16th centuries. This leaves us with the less than satisfying prospect that the Barnes site ceramics and some of the pottery from 15th and 16th century Initial Coalescent sites may have a common and as yet unidentified late 12th or early 13th century Nebraska or South Dakota ancestor.

LITERATURE CITED

Ahler, Stanley A., Ed.
2002 "Fieldwork, Geology, and Early Component Research During 2001-2002 at The Barnes Site, 5LA9187, Piñon Canyon Maneuver Site, Colorado". ***Research Contribution No. 45 of PaleoCultural Research Group***. Flagstaff, Arizona.

Anderson, A. D.
1961 "The Glenwood Sequence: A Local Sequence for a Series of Archaeological Manifestations in Mills County, Iowa". ***Journal of the Iowa Archaeological Society***, 10 (3).

Blakeslee, D. J., and W. W. Caldwell
1979 ***The Nebraska Phase: An Appraisal***. J&L Reprint Co., Lincoln, Nebraska.

Brown, L. A.
1966 "Temporal and Spatial Order in the Central Plains". ***Plains Anthropologist***, 11 (34): 294.

1967 ***Pony Creek Archaeology***. River Basin Surveys Publications in Salvage Archeology 5. Smithsonian Institution. Washington, D.C.

Calabrese, F. A.
1972 ***Cross Ranch: A study of Variability in a Stable Cultural Tradition.*** Plains Anthropologist Memoir 9.

Caldwell, W. W.
1966a "The Middle Missouri Tradition Reappraised". ***Plains Anthropologist***, 11 (32): 152-57.
1966b ***The Black Partisan Site.*** River Basin Surveys Publications in Salvage Archeology 2. Smithsonian Institution, Washington, D.C.

Caldwell W. W. and R. E. Jensen
1968 ***The Grand Detour Phase.*** River Basin Surveys Publications in Salvage Archeology 13. Smithsonian Institution, Washington, D.C.

Carlson G. F.
1971 A Local Sequence for Upper Republican Sites in the Glen Elder Reservoir Locality, Kansas. M.A. thesis, Department of Anthropology, University of Nebraska, Lincoln.

Cooper, P. L.
1949 "Recent Investigations in Fort Randall and Oahe Reservoirs, South Dakota". ***American Antiquity***, 14 (4): 300-310.

Frantz, W.
1962 "The Crazy Bull Site (39LM220), Big Bend Reservoir, South Dakota". ***Plains Anthropologist***, 7 (15): 36-42.

Gunnerson, J. H.
1952 "Some Nebraska Culture Pottery Types'. ***Plains Archaeological Conference News Letter***, 5 (3): 39-49.

Hoffman, J. J.
1967 ***Molstad Village***. River Basin Surveys Publications is Salvage Archeology 4. Smithsonian Institution, Washington, D.C.

1968 ***The LaRoche Site***. River Basin Surveys Publications in Salvage Archeology 11. Smithsonian Institution, Washington, D.C.

Hurt, W. R.
1952 ***Report of the Investigation of the Scalp Creek Site 39GR1, and the Ellis Creek site 39GR2, Gregory County, South Dakota, 1941, 1951***. Archaeological Studies Circular 7. South Dakota Archaeological Commission.

Husted, W. M.
1965 "The Meander Site (39LM201) in Fort Randall Reservoir, South Dakota". ***Plains Anthropologist***, 10 (29): 171-180.

Krause, R. A.
1994 "Paper Sacks, Paste-Board Boxes, and Intellectual Bins: The River Basin Salvage Program and Archaeological Classification". In, Kimball Banks Ed., ***40 Something: The River Basin Surveys***. North Dakota Archaeology 5. Grand Forks, North Dakota.

1995 "Attributes, Modes and 10th Century Potting Practices in Northcentral Kansas". ***Plains Anthropologist***, 40 (154): 307-352.

2002 An Inventory and Analysis of Ceramics from Sites on the Fort Carson Military Base and the Piñon Canyon Maneuver Area. Report on File, National Park Service Midwest Region, Lincoln, Nebraska.

Lehmer, D. J.
1951 "Pottery Types from the Dodd site, Oahe Reservoir South Dakota". ***Plains Archeological Conference news Letter***, 4 (2).

Neuman, R.
1961 "The Olson Mound (39BF223) in Buffalo County, South Dakota". ***Plains Anthropologist***, 6 (13): 189-220.

Smith C. S.
1951 "Pottery Types from the Talking Crow Site, Fort Randall Reservoir South Dakota". ***Plains Archaeological conference News Letter,*** 4 (3).

1963 "Time Perspective Within the Coalescent Tradition in South Dakota". ***American Antiquity***, 9 (4): 489-495.

Stephenson, R. L.
1962 "Three Smithsonian Salvage Sites". ***Plains Anthropologist***, 7 (16): 80-81.

1969 "Blue Blanket Island (39WW9) an Historic Contact site in the Oahe Reservoir Near Mobridge South Dakota. ***Plains Anthropologist***, 14 (43): 1-31.

Weakley, W. F.
1970 ***Tree Ring Dating and Archaeology in South Dakota***. Plains Anthropologist Memoir 8.

Wedel, W. R.
1959 ***An Introduction to Kansas Archeology***. Bureau of American Ethnology, Bulletin 174. Washington, D.C.

Wheeler, R. P.
1954 "Check List of Middle Missouri Pottery Wares, Types and Subtypes". ***Plains Anthropologist***, 1 (2): 3-22.

Wood, J. J.
1966 Archaeological Investigations in Northeastern Colorado. Unpublished Ph.D. dissertation, Department of anthropology, University of Colorado, Boulder.

Wood, W. R.
1967 An Interpretation of Mandan Culture History. ***River Basin Surveys Papers, No. 39, Bureau or American Ethnology, Bulletin 198***. Washington, D.C.

Wood, W. R. and A. R. Woolworth
1964 The Paul Brave Site (32SI4) Oahe Reservoir Area, North Dakota. ***River Basin Surveys Papers, No. 31, Bureau of American Ethnology, Bulletin 189.*** Washington, D.C.

APPENDIX

5LA9187 S	Lower Body	F	20L x 13W x 7^{Th}	Non Local + Grit
5LA9187 S	Lower Body	F	15L x 12W x 7^{Th}	Non Local + Grit
5LA9187 S	Lower Body	F	16L x 13W x 7^{Th}	Non Local + Grit
5LA9187 FS 224	Upper Body	F	10L x 16W x 6^{Th}	Non Local + Grit
5LA9187 FS 551	1 Indeterminate	G	11L x 10W x 5^{Th}	Non Local + Grit
5LA9187 FS 571	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1165	4 Indeterminate	?	4 Fragments	Non Local + Grit
5LA9187 G3 1165	Upper Body	F	19L x 16W x 6^{Th}	Non Local + Grit
5LA9187 G3 1165	Upper Body	F	14L x 14W x 5^{Th}	Non Local + Grit
5LA9185 G3 1029	Upper Body	F	13L x 11W x 5^{Th}	Non Local + Grit
5LA9187 G3 1029	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G4 1172	5 Indeterminate	?	5 Fragments	Non Local + Grit
5LA9187 G3 1172	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1248	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1048	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1050	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1320	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1012	4 Indeterminate	?	4 Fragments	Non Local + Grit
5LA9187 G3 1328	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1014	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1004	6 Indeterminate	?	6 Fragments	Non Local + Grit
5LA9187 G3 1004	Lower Body	F	16L x 16W x 7^{Th}	Non Local + Grit
5LA9187 G3 1004	Lower Body	F	16L x 12W x 7^{Th}	Non Local + Grit
5LA9187 G3 1010	5 Indeterminate	?	5 Fragments	Non Local + Grit
5LA9187 G3 1215	Upper Body	F	15L x 19W x 6^{Th}	Non Local + Grit
5LA9187 G3 1215	Lower Body	F	16L x 14W x 7^{Th}	Non Local + Grit
5LA9187 G3 1129	Lower Body	F	15L x 10W x 6^{Th}	Non Local + Grit
5LA9187 G3 1006	4 Indeterminate	?	5 Fragments	Non Local + Grit
5LA9187 G3 1115	Lower Body	F	13L x 9W x 7^{Th}	Non Local + Grit
5LA9187 G3 1109	Upper Body	F	12L x 11W x 6^{Th}	Non Local + Grit
5LA9187 G3 1109	4 Indeterminate	?	4 Fragments	Non Local + Grit
5LA9187 G3 1070	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1199	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1108	13 Indeterminate	?	13 Fragments	Non Local + Grit
5LA9187 G3 1108	6 Indeterminate	?	6 fragments With Red Faux Slip Interior	Non Local + Grit
5LA9187 G3 1108	Lower Body	F	16L x 14W x 7^{Th}	Non Local + Grit
5LA9187 G3 1108	Upper Body	F	14L x 14W x 6^{Th} With Red Faux Slip Interior	Non Local + Grit
5LA9187 G3 1108	Upper Body	F	11L x 10W x 5^{Th} With Red Faux Slip Interior	Non Local + Grit
5LA9187 G3 1108	Lower Body	F	13L x 10W x 7^{Th} With Red Faux Slip Interior	Non Local + Grit
5LA9187 G3 1108	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G2 1108	Bottom	Sm ext & int	19L x 18W x 9^{Th}	Non Local + Grit

5LA9187 G3 1199	3 Indeterminate	?	3 Fragments	Non Local + Grit
5LA9187 G2 1220	Upper Body	F	17L x 16W x 5Th With Red Faux Slip Interior	Non Local + Grit
5LA9187 G3 1246	Lower Body	F	22L x 12W x 8Th	Non Local + Grit
5LA9187 G3 1246	Lower Body	F	13L x 10W x 8Th	Non Local + Grit
5LA9187 G3 1188	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G2 1246	Lower Body	F	32L x 38W x 8Th	Non Local + Grit
5LA9187 G3 1013	3 Indeterminate	?	3 Fragments	Non Local + Grit
5LA9187 G3 1013	12 Indeterminate	?	12 Fragments	Non Local + Grit
5LA9187 G3 1013	6 Indeterminate	F	6 Fragments	Non Local + Grit
5LA9187 G3 1013	Lower Body	F	15L x 14W x 8Th	Non Local + Grit
5LA9187 G3 1148	9 Indeterminate	?	9 Fragments	Non Local + Grit
5LA9187 G3 1148	Lower Body	F	12L x 9W x 8Th	Non Local + Grit
5LA9187 G3 1148	Upper Body	F	10L x 9W x 5Th	Non Local + Grit
5LA9187 G3 1148	Upper Body	F	10L x 8W x 5Th	Non Local + Grit
5LA9187 G3 1005	10 Indeterminate	?	10 Fragments	Non Local + Grit
5LA9187 G3 1005	Lower Body	F	13L x 13W x 8Th	Non Local + Grit
5LA9187 G3 1005	Upper Body	F	9L x 14W x 5Th	Non Local + Grit
5LA9187 G3 1005	Upper Body	F	13L x 11W x 5Th	Non Local + Grit
5LA9187 G3 1005	Upper Body	F	10L x 8W x 4Th	Non Local + Grit
5LA9187 G3 1005	Upper Body	F	8L x 8W x 4Th	Non Local + Grit
5LA9187 G3 1005	Upper Body	F	9L x 7W x 4Th	Non Local + Grit
5LA9187 G3 1005	Upper Body	F	14L x 12W x 4Th	Non Local + Grit
5LA9187 G3 1005	Upper Body	F	8L x 5W x 4Th	Non Local + Grit
5LA9187 G3 1005	Base	F	16L x 15W x 9Th	Non Local + Grit
5LA9187 G3 1047	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1045	Upper Body	F	9L x 9W x 4Th	Non Local + Grit
5LA9187 G3 1205	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1205	Lower Body	F	16L x 14W x 8Th	Non Local + Grit
5LA9187 G3 1205	Lower Body	F	13L x 7W x 7Th	Non Local + Grit
5LA9187 G3 1128	3 Indeterminate	?	3 Fragments	Non Local + Grit
5LA9187 G3 1128	Upper Body	F	14L x 11W x 6Th	Non Local + Grit
5LA9187 G3 1128	Upper Body	F	15L x 11W x 6Th	Non Local + Grit
5LA9187 G3 1128	Upper Body	F	14Lx 11W x 6Th	Non Local + Grit
5LA9187 G3 1128	Upper Body	F	11L x 10W x 6Th	Non Local + Grit
5LA9187 G3 1011	17 Indeterminate	?	17 Fragments	Non Local + Grit
5LA9187 G3 1011	Upper Body	F	13L x 12W x 4Th	Non Local + Grit
5LA9187 G3 1011	Upper Body	F	11L x 9W x 5Th	Non Local + Grit
5LA9187 G3 1011	Lower Body	F	17L x 10W x 7Th	Non Local + Grit
5LA9187 G3 10ll	Near Lip		11L x 5W x 5Th With 3 Horiz Incised Lines Exterior	Non Local + Grit
5LA9187 G3 1011	Near Lip		15L x 13W x 5Th With 3 Horiz Incised Lines Exterior	Non Local + Grit
5LA9187 G3 1011	Near Lip		10L x 19W x 5Th With 3 Horiz Incised Lines Exterior	Non Local + Grit
5LA9187 G3 1164	25 Indeterminate	?	25 Fragments	Non Local + Grit
5LA9187 G3 1164	1 Indeterminate	F	1 Fragment	Non Local + Grit
5LA9187 G3 1164	Upper Body	F	13L x 11W x 5Th	Non Local + Grit
5LA9187 G3 1164	Upper Body	F	12L x 10W x 4Th	Non Local + Grit
5LA9187G3 1164	Lower Body	F	15L x 14W x 8Th	Non Local + Grit
5LA9187 G3 1327	4 Indeterminate	?	4 Fragments	Non Local + Grit
5LA9187 G3 1121	3 Indeterminate	?	3 Fragments	Non Local + Grit

5LA9187 G3 1121	Upper Body	F	9L x 12W x 5Th	Non Local + Grit
5LA9187 G3	Lower Body	F	16L x 13W x 8Th	Non Local + Grit
5LA9187 F8	Lower Body	F	45L x 32W x 7Th	Non Local + Grit
5LA9187 G3 1114	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1114	15 Indeterminate	?	15 Fragments	Non Local + Grit
5LA9187 G3 1114	Upper Body	F	13L x 10W x 6Th	Non Local + Grit
5LA9187 G3 1114	Upper Body	F	9L x 14W x 5Th	Non Local + Grit
5LA9187 G3 1114	Lower Body	F	12L x 14W x 7Th	Non Local + Grit
5LA9187 G3 1114	Lower Body	F	16L x 13W x 7Th	Non Local + Grit
5LA9187 G3 1114	Lower Body	F	15L x 13W x 7Th	Non Local + Grit
5LA9187 G3 1114	Upper Body	F	12L x 10W x 5Th	Non Local + Grit
5LA9187 G3 1114	Base	F	31L x 27W x 11Th	Non Local + Grit
5LA9187 G3 1009	22 Indeterminate	?	22 Fragments	Non Local + Grit
5LA9187 G3 1009	Lower Body	F	10L x 16W x 7Th	Non Local + Grit
5LA9187 G3 1009	Upper Body	F	13L x 11W x 5Th	Non Local + Grit
5LA9187 G3 1009	Upper Body	F	15L x 13W x 5Th	Non Local + Grit
5LA9187 G3 1009	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1009	Upper Body	F	20L x 22W x 5Th	Non Local + Grit
5LA9187 G3 1009	Upper Body	F	20L x 15W x 5Th	Non Local + Grit
5LA9187 G3 1247	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1319	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1319	Lower Body	F	14L x 15W x 8Th With Red Faux Slip Interior	Non Local + Grit
5LA9187 G3 1319	Lower Body	F	15L x 10W x 8Th With Red Faux Slip Interior and Exterior	Non Local + Grit
5LA9187 G3 1028	4 Indeterminate	F	4 Fragments	Non Local + Grit
5LA9187 G3 1028	13 Indeterminate	?	13 Fragments	Non Local + Grit
5LA9187 G2 1028	Lower Body	F	16L x 15W x 7Th	Non Local + Grit
5LA9187 G2 1028	Lower Body	F	18L x 18W x 7Th	Non Local + Grit
5LA9187 G3 1003	6 Indeterminate	?	6 Fragments	Non Local + Grit
5LA9187 G3 1017	4 Indeterminate	?	4 Fragments	Non Local + Grit
5LA9187 G3 1017	Upper Body	F	10L x 10W x 5Th	Non Local + Grit
5LA9187 G3 1060	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1194	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1031	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1171	12 Indeterminate	?	12 Fragments	Non Local + Grit
5LA9187 G3 1171	Lower Body	F	14L x 13W x 7Th	Non Local + Grit
5LA9187 G3 1171	Lower Body	F	15L x 14W x 7Th	Non Local + Grit
5LA9187 G3 1171	Mouth/Rim Junction	F	15L x 14W x 7Th	Non Local + Grit
5LA9187 G3 1171	Upper Body	F	19L x 17W x 6Th	Non Local + Grit
5LA9187 G3 1003	6 Indeterminate	?	6 Fragments	Non Local + Grit
5LA9187 G3 1134	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1110	Upper Body	F	11L x 10W x 4Th	Non Local + Grit
5LA9187 G3 1256	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1001	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1001	Lower Body	F	11L x 9W x 7Th	Non Local + Grit
5LA9187 G3 1224	8 Indeterminate	?	8 Fragments	Non Local + Grit
5LA9187 G3 1192	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1214	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1214	Lower Body	F	17L x 16W x 7Th	Non Local + Grit
5LA9187 FS 487	Upper Body	F	30L x 20W x 6Th	Non Local + Grit
5LA9187 FS 487	Upper Body	F	15L x 13W x 6Th	Non Local + Grit
5LA9187 FS 258	Lower Body	F	20L x 18W x 9Th	Non Local + Grit
5LA9187 FS 138	Upper Body	F	18L x 13W x 4Th	Non Local + Grit

5LA9187 FS 139	Mouth/Rim Junction	F	13L x 19W x 6^{Th}	Non Local + Grit
5LA9187 FS 136	Upper Body	F	16L x 12W x 5^{Th}	Non Local + Grit
5LA9187 FS 113	Lower Body	F	23L x 19W x 7^{Th}	Non Local + Grit
5LA9187 FS 127	Lower Body	F	19L x 24W x 7^{Th}	Non Local + Grit
5LA9187 FS 42	Lower Body	F	28L x 26W x 9^{Th}	Non Local + Grit
5LA9187 FS 39	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 FS 117	Upper Body	F	16L x 18W x 6^{Th}	Non Local + Grit
5LA9187 FS 124	Lower Body	F	13L x 9W x 6^{Th}	Non Local + Grit
5LA9187 FS 70	Upper Body	F	20L x 17W x 6^{Th}	Non Local + Grit
5LA9187 FS 64	Upper Body	F	12L x 14W x 6^{Th}	Non Local + Grit
5LA9187 FS 63	Upper Body	F	20L x 12W x 6^{Th}	Non Local + Grit
5LA9187 FS 58	Lower Body	F	22L x 17W x 7^{Th}	Non Local + Grit
5LA9187 FS 65	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 FS 24	Upper Body	F	20L x 12W x 6^{Th}	Non Local + Grit
5LA9187 FS 38	Upper Body	F	20L x 16W x 5^{Th}	Non Local + Grit
5LA9187 FS 52	Lower Body	F	17L x 16W x 7^{Th}	Non Local + Grit
5LA9187 FS 1	11 Indeterminate	?	11 Fragments	Non Local + Grit
5LA9187 FS 1	Upper Body	F	18L x 20W x 5^{Th}	Non Local + Grit
5LA9187 FS 1	Upper Body	F	21L x 23W x 5^{Th}	Non Local + Grit
5LA9187 FS 1	Upper Body	F	11L x 14W x 6^{Th}	Non Local + Grit
5LA9187 FS 1	Upper Body	F	14L x 10W x 5^{Th}	Non Local + Grit
5LA9187 FS 1	Lower Body	F	12L x 15W x 8^{Th}	Non Local + Grit
5LA9187 FS 1	Lower Body	F	15L x 10W x 8^{Th}	Non Local + Grit
5LA9187 FS 581	Upper Body	F	19L x 20W x 6^{Th}	Non Local + Grit
5LA9187 FS 518	Upper body	F	19L x 18W x 6^{Th}	Non Local + Grit
5LA9187 FS 535	Mouth/Rim Junction	F	19L x 15W x 7^{Th}	Non Local + Grit
5LA9187 FS 605	Lower Body	F	15L x 11W x 8^{Th}	Non Local + Grit
5LA9187 FS 628	Base	F	21L x 18W x 11^{Th}	Non Local + Grit
5LA9187 FS 718	Lower Body	F	23L x 17W x 8^{Th}	Non Local + Grit
5LA9187 FS 612	Lower Body	F	24L x 16W x 8^{Th}	Non Local + Grit
5LA9187 FS 681	Upper Body	F	15L x 18W x 6^{Th} With Red Faux Slip Interior	Non Local + Grit
5LA9187 FS 656	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 FS 383	Upper body	F	18L x 20W x 5^{Th} With Red Faux Slip Interior	Non Local + Grit
5LA9187 FS 706	Upper Body	F	24L x 19W x 5^{Th}	Non Local + Grit
5LA9187 FS 543	Lower Body	F	14L x 20W x 8^{Th}	Non Local + Grit
5LA9187 FS 225	Lower Body	F	19L x 13W x 7^{Th}	Non Local + Grit
5LA9187 FS 387	Lower Body	F	17L x 14W x 8^{Th}	Non Local + Grit
5LA9187 FS 227	Upper Body	F	18L x 14W x 5^{Th} With Red Faux Slip Exterior	Non Local + Grit
5LA9187 FS 126	Mouth/ Rim Junction	F	20L x 12W x 7^{Th}	Non Local + Grit
5LA9187 FS 126	Mouth/ Rim Junction	F	22L x 15W x 7^{Th}	Non Local + Grit
5LA9187 FS 126	Lower Body	F	17L x 17W x 7^{Th} With Red Faux Slip Interior	Non Local + Grit
5LA9187 FS 216	Lower Body	F	16L x 10W x 7^{Th} With Red Faux Slip Exterior	Non Local + Grit
5LA9187 FS 552	Mouth/Rim Junction	F	12L x 10W x 6^{Th}	Non Local + Grit
5LA9187 FS 55	Upper Body	F	17L x 19W x 6^{Th} With Red Faux Slip Interior	Non Local + Grit

5LA9187 FS 55	Upper Body	F	17L x 13W x 6Th With Red Faux Slip Interior	Non Local + Grit
5LA9187 FS 55	Mouth/ Rim Junction	F	14L x 12W x 6Th	Non Local + Grit
5LA9187 FS 55	Lower Body	F	15L x 12W x 8Th	Non Local + Grit
5LA9187 FS 226	Bottom	F	30L x 18W x 11Th	Non Local + Grit
5LA9187 FS 326	Lower Body	F	18L x 14W x 9Th	Non Local + Grit
5LA9187 FS 617	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 FS 460	Lower Body	F	15L x 18W x 7Th	Non Local + Grit
5LA9187 FS 598	Upper Body	F	10L x 11W x 5Th	Non Local + Grit
5LA9187 G3 1201	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1287	Upper Body	F	9L x 9W x 4Th	Non Local + Grit
5LA9187 G3 1287	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 G3 1254	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 G3 1130	Upper Body	F	12L x 14W x 5Th	Non Local + Grit
5LA9187 G1 1155	Upper Body with Soot	F	41L x 45W x 6Th	Non Local + Grit
5LA9187 G2 1150	Bottom	F	22L x 18W x 10Th	Non Local + Grit
5LA9187 L7 1213	1 Indeterminate with Soot	?	1 Fragment	Non Local + Grit
5LA9187 L4 1161	Upper Body	F	37L x 32W x 5Th	Non Local + Grit
5LA9187 L4 1161	Lower Body	F	24L x 30W x 7Th	Non Local + Grit
5LA9187 L4 1161	Upper Body	F	18L x 22W x 4Th	Non Local + Grit
5LA9187 L2 1127	Mouth/ Rim Junction	F	33L x 22W x 8Th	Non Local + Grit
5LA9187 L6 1184	Upper Body with Soot	F	18L x 21W x 5Th	Non Local + Grit
5LA9187 L6 1184	4 Non-Ceramic Fragments	0	4 Non-Ceramic	Not Ceramics
5LA9187 L5 1168	Mouth/ Rim Junction	F	18L x 18W x 8Th	Non Local + Grit
5LA9187 L5 1168	Upper Body	F	25L x 20W x 5Th	Non Local + Grit
5LA9187 L8 1392	Base	F	10L x 18W x 7Th	Non Local + Grit
5LA9187 L5 1168	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 L5 1168	Upper Body	F	11L x 15W x 5Th	Non Local + Grit
5LA9187 L5 1168	Upper Body	F	16L x 20W x 5Th	Non Local + Grit
5LA9187 L1 1118	Mouth/ Rim Junction	F	18L x 10W x 7Th	Non Local + Grit
5LA9187 FS 294	Mouth/ Rim Junction with Soot	F	13L x 12W x 7Th	Non Local + Grit
5LA9187 L3 1160	Base	F	15L x 20W x 9Th	Non Local + Grit
5LA9187 L2 1084	Upper Body	F	15L x 12W x 5Th	Non Local + Grit
5LA9187 XU 21 1056	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 XU 21 1057	Upper Body	F	37L x 23W x 6Th	Non Local + Grit
5LA9187 XU 21 1057	Upper Body	F	34L x 34W x 6Th	Non Local + Grit
5LA9187 XU 21 1057	Lower Body	F	45L X 45W x 8Th	Non Local + Grit
5LA9187 XU 21 1057	Lower Body	F	27L x 40W x 8Th	Non Local + Grit
5LA9187 XU 21 1052	Base	F	17L x 24W x 9Th	Non Local + Grit
5LA9187 XU 22 1061	Mouth/ Rim Junction	F	12L x 12W x 6Th	Non Local + Grit
5LA9187 XU 22 1061	Lower Body	F	17L x 12W x 8Th	Non Local + Grit
5LA9187 XU 22 1061	Lower Body	F	17L x 11W x 8Th	Non Local + Grit
5LA9187 XU 22 1061	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 XU 23	Upper Body	F	14L x 11W x 5Th	Non Local + Grit

1104				
5LA9187 XU 23 1078	Upper Body	F	15L x 15W x 6Th	Non Local + Grit
5LA9187 XU 22 1039	2 Indeterminate	?	2 Fragments	Non Local + Grit
5LA9187 XU 22 1039	Lower Body	F	18L x 18W x 8Th	Non Local + Grit
5LA9187 XU 22 1039	Lower Body	F	17L x 15W x 8Th	Non Local + Grit
5LA9187 XU 22 1039	Bottom	F	19L x 11W x 10Th	Non Local + Grit
5LA9187 XU 73 1077	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 XU 73 1077	Lower Body	F	10L x 13W x 7Th	Non Local + Grit
5LA9187 XU 73 1077	Lower Body	F	18L x 10W x 7Th	Non Local + Grit
5LA9187 1530	Lower Body	F	17L x 20W x 8Th	Non Local + Grit
5LA9187 1530	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 1530	Upper Body	F	14L x 14W x 5Th	Non Local + Grit
5LA9187 1530	Upper Body	F	18L x 18W x 5Th	Non Local + Grit
5LA9187 1530	Upper Body	F	14L x 12W x 4Th	Non Local + Grit
5LA9187 1530	Upper Body	F	16L x 14W x 6Th	Non Local + Grit
5LA9187 1530	Upper Body	F	9L x 12W x 5Th	Non Local + Grit
5LA9187 1530	Upper Body	F	11L x 14W x 4Th	Non Local + Grit
5LA9187 1530	Base with Soot	F	15L x 13W x 9Th	Non Local + Grit
5LA9187 1530	Upper Body with Soot	F	38L x 48W x 5Th	Non Local + Grit
5LA9187 1544	1 Indeterminate	?	1 Fragment	Non Local + Grit
5LA9187 FS 293	Upper Body	F	16L x 13W x 4Th	Non Local + Grit
5LA9187 FS 293	Lower Body with Anvil Scars Interior	F	33L x 70W x 8Th	Non Local + Grit

ABBREVIATIONS

F = Mass Modeled and Vertically Simple Stamped

G = Mass Modeled and Smoothed Exterior and Interior

Horiz = Horizontal

Sm = Smoothed

Ext = Exterior

Int = Interior

APPENDIX III

IN THE INTERIM

AN ANALYSIS AND DESCRIPTION OF CERAMICS FROM THIRTY ARCHAEOLOGICAL SITES IN THE PIÑON CANYON MANEUVER SITE

By

Richard A. Krause

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The thirty ceramic samples described here are part of a broader multi-site study of prehistoric pottery from the Piñon Canyon Maneuver Site. The study began in 1999 with a sample of 585 specimens drawn from 43 sites. Two hundred and seventy four of the ceramic pieces were too fragmentary to systematically and meaningfully analyze. The remainder were small (2.08 +/- .94cm. long, 1/62 +/-.74cm. wide and 5.86 +/-1.2mm. thick) but analyzable. Since 1999, 183 analyzable specimens and 292 un-analyzable fragments all from a single site (5LA9187) have been added to the described sample. The specimens from the 30 sites described herein will bring the 74 site total of analyzed and described specimens to 665, the un-analyzable total to 672.

RIM SHERDS

In 1999 there were only 23 specimens in the Piñon Canyon collections that would traditionally be described as rim sherds. By previously introduced criteria, however, 7 of these would most properly be described as lip sherds (i.e., were broken from vessels in which the mouth and the lip were coterminous). Differently put at least 7 of the vessels were rimless. At least 12 rim bearing vessels were present in the original sample represented by sherds that included the vessel's mouth, lip and the surface between them. Four specimens were too fragmentary to determine if they were lip or rim sherds. Ten rim sherds (i.e., specimens that included both portions of the vessel's mouth, lip and surface in-between) were added to this sample with the 2002 inclusion of the Barnes site (5LA9187) ceramics. The 30 site sample described here will add an additional 12 rim sherds and 2 loop handle fragments to the Piñon Canyon sample bringing it to 34 rim sherds, 7 lip sherds, 2 loop handle fragments and 4 specimens too small to determine if they were lip or rim sherds.

BODY SHERDS

The remainder of the Piñon Canyon ceramic specimens, 1292 of them when the pieces from 5LA9187 and the 30 sites reported here are included, was clearly body sherds. The 30 site sample added here consisted of 253 body sherds, 147 of them analyzable, but of these 9 (from 5LA3587) were broken from a black on white painted sand tempered bowl, 2 were firing spalls (1 from 5LA5554 and 1 from 5LA5531) and 18 were broken from sand tempered corrugated vessels classifiable as Tusayan Corrugated ware (14 of them from 5LA6603 and 4 from 5LA9211). One hundred and forty three of the body sherds (73.7%) from the 30 site addition considered here were made from a mica bearing clay and 51 (26.3%) from a non-mica bearing clay source. The sample from all ceramic bearing sites in the Piñon Canyon area contained three hundred and eighty five specimens (44.4%) made from a mica bearing clay and four hundred and fifty eight specimens (54.4%) made from a non-mica bearing clay.

INFERRED VESSEL SHAPE AND SIZE

All of the lip, rim, base and body sherds were carefully inspected in an attempt to produce a hypothetical account of vessel shapes and sizes. Clearly the total Piñon Canyon sample included 32 rim bearing and 7 rimless vessels. Two of three large specimens from the original 1999 sample were broken from small, high-round shouldered, conoidal bottomed vessels with out-flaring rims and round lips (both from 5LA3189). By assuming radial symmetry and extending the interior and exterior slope to the lower body we may estimate a height of 9.0cm for one and 9.1cm for the other. Both had high shoulders one at 7.0cm from the bottom the other at 5.5cm from the bottom. Both vessels had shoulders that were broader than the pots were tall.

One had a shoulder 10.5cm in diameter, the other a shoulder 10.3cm in diameter. Both had direct out-flaring rims. One of the rims had a mouth diameter of 5.5cm and a lip diameter of 7.15cm; the other had a mouth diameter of 7.5cm and a lip diameter of 8.0cm. Both had low rims 1.5cm tall surmounted by round lips. When the Barnes site sample was added the rim base and body sherds were again carefully examined in an attempt to provide additional conjectural accounts of vessel shape and size. For these specimens we attempted to approximate vessel shape by assuming that the sherds were broken from vessels of generally similar morphology but not necessarily of similar size. We projected the curves to the exterior and interior surfaces of all base sherds, rim fragments, near shoulder and mouth-rim junction pieces and attempted to fit them together to form hypothetical vessels. Although most of these projections were based on horizontal and vertical arcs of 10 degrees or less, we were satisfied that they were broken from vessels that were not quite as tall as they were wide, with high round shoulders, constricted mouths and conoidal bases. The vessel composites we produced seemed to fall into two sizes, large and small. The large vessels ranged in height from 16 to 18cm and in width from 18 to 21cm (Figure 1). The small vessels ranged in height from 13 to 15cm and in width from 14 to 16cm (Figure 2). Projected mouth diameters for large forms ranged from 14 to 17cm and for small vessels from 11 to 13.4cm. Projected lip diameters ranged for large vessels from 14.7 to 17.5cm and for small vessels from 11.7 to 14.5cm. While these measurements are certainly conjectural they do provide presumptive evidence of proportionality in the process of vessel production. Thus for the Barnes site sample we concluded that when manufacturing a large vessel the artisan desired a container that was 11 to 14% broader than tall with a mouth diameter roughly 19 to 22% smaller than the shoulder and a lip diameter from 3 to 10% greater than the mouth. When building a small vessel the potter apparently wanted a vessel that was 6 to 12%

wider than tall, with a mouth diameter about 18 to 21% smaller than the shoulder and a lip diameter from 3 to 6% greater than the mouth. The 12 additional rim sherds from the 30 site sample considered here did not produce evidence for new vessel sizes or shapes hence we presume that the sherds we examined were broken from vessels that were slightly broader than tall with high round shoulders, conodial bottoms and direct gently out-flared rims. In short the sample available in February of 2004 contained large and small rim bearing and rimless vessels with high round shoulders, constricted mouths and round or flat lips.

THE THIRTY SITE SUB-SAMPLE

We have introduced our analysis by referencing the general properties of the extant sample of Piñon Canyon ceramics because they played a critical role in the assumptions we made and the observations we took on the specimens described herein. The sub-sample considered here included 12 rim sherds, two base/bottom sherds, 104 upper body fragments, 43 lower body fragments, one loop, and one strap handle fragment. The small number of sherds per site (an average of 8.83 +/- 12.5) and their diminutive size (a mean of 16.7 +/- 7.0 mm long and 18.2 +/- 15.4mm wide) was one of the sub-sample's distinctive properties. Despite their small size the sherds in this collection were hard, indicating that they had been vigorously scraped and compacted while in their paste state. Only two pieces had spalled during firing or use indicating that the claybody was well dried while in its greenware state. Both these circumstances make it difficult to dismiss the per site size and number of specimens as a consequence of sherd friability due to inadequate manufacturing, drying or firing practices. The per site specimen size and number can be better attributed to relatively small and mobile groups of producers and/or users. Then too, the sub-sample contained sherds broken from vessels whose producers used either a mica-bearing or a non-mica-bearing clay.

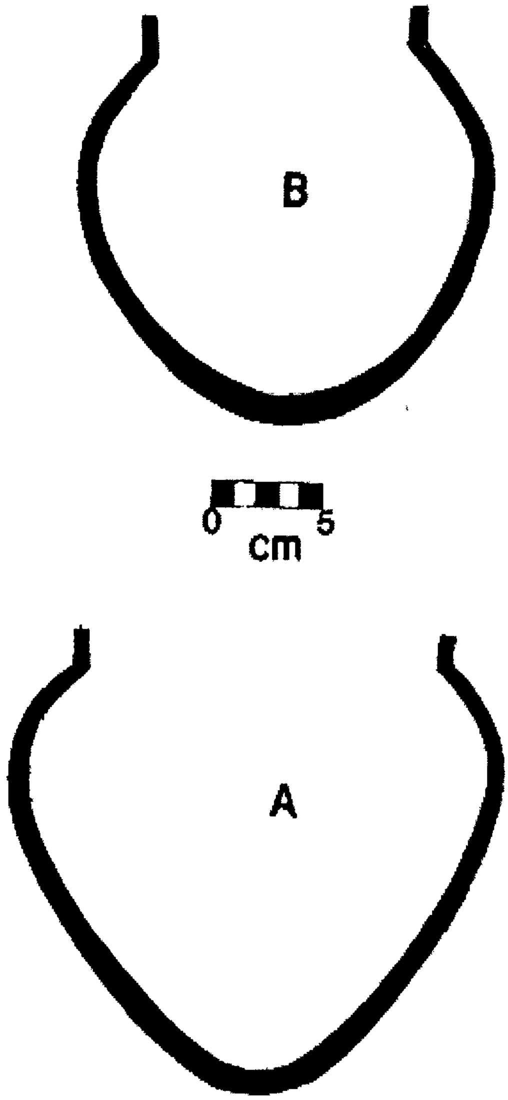

Figure 1: Conjectural Morphology for Large Vessels

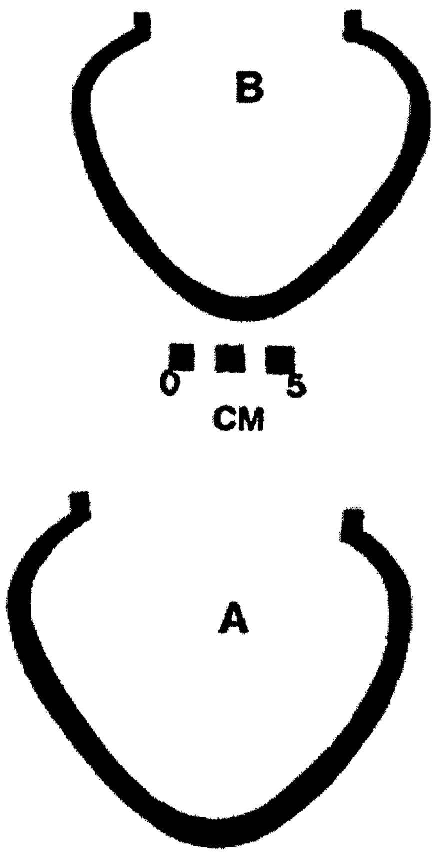

Figure 2: Conjectural Morphology for Small Vessels

Separate clay sources are certainly indicated. Nevertheless, until we have more information on local deposits we cannot tell if either of these sources were to be found in the immediate vicinity. The claybody in all but three of the pieces contained variable amounts of finely ground granitic stone. Under a microscope at 100 magnifications these stone particles exhibited the jagged edges expected of crushed and ground rather than stream tumbled materials.

SUB-SAMPLE BODY SHERDS

To separate the sub-sample's 147 body fragments into those broken from upper and lower body we used our previously devised conjectural vessel sizes and shapes as a standard for orienting body pieces. Lip bearing rims, since they exhibited the junction of exterior with interior surfaces, were easy to orient. Further, since by projection they transcribed a circle we could reasonably assume that all points systematically related to this circle were topological invariants to which we might relate multiple instances of surface treatment. Since vertical simple stamping, vertically applied check stamping and vertical cord-roughening were indicated by pieces broken from the mouth rim junction, we felt justified in identifying as top or bottom, opposing edges of any piece whose edges lay at a right angle or near right angle to the stamping or cord roughening on its exterior surface. Since the smoothed portions of rim sherds and fragments broken from the mouth rim junction were horizontally smoothed, we assumed the opposing edges that paralleled the direction of smoothing could be identified as top or bottom.

Once standards for orienting pieces had been established and the pieces themselves oriented, we placed them on a flat surface. If the top and bottom (or upper and lower) edges of a piece rested on a flat surface (in the case at hand a lab table) and its center did not, the piece was grouped with all others that met this criterion as a member of set A. If the center or near center of a piece as well as its top and bottom edges rested on a flat surface it was grouped with others of like kind and identified as a member of set B. Since we assumed that upper body sherds would be more dramatically curved than lower body fragments the members of set A were identified as upper body fragments and those of set B as lower body sherds. This procedure produced 104 specimens identified as upper body sherds and 43 as lower body fragments.

Two of the sub-sample's sherds had the curved external and internal surfaces, finger scrape marks and/or finger indentations expected of base/bottom fragments formed by excavating a prepared lump of clay and mass-modeling it into the shape and size appropriate for the production of conoidal-bottomed vessels. Our previous work on Piñon Canyon ceramic samples led us to suspect that most of not all vessels, whether mass-modeled or coiled, were built from the bottom up. We therefore expected upper body pieces to be significantly thinner than lower body sherds and lower body sherds to be significantly thinner than base/bottom fragments. The pieces in our sub-sample identified as base/ bottom sherds averaged 9.0 +/- 1.4mm. The members of set A, identified as upper body fragments, averaged 4.6 +/- 0.6mm in thickness. The members of set B i.e. lower body fragments, averaged 6.3 +/- 0.7mm in thickness. A student t score of -2.712 for base and lower body thickness indicated a statistically significant difference as did a student t score of -13.947 for lower and upper body thickness.

SUB-SAMPLE TECHNIQUES OF MANUFACTURE

The cross-sections, exterior and interior surfaces, of properly oriented upper and lower body pieces were next examined under a swing arm mounted circumferentially illuminated 3X magnifying lens to determine if they were coiled or mass-modeled. If either upper or lower edge, or in some cases both edges, exhibited a clear coil fracture the piece was assigned to the sub class upper or lower body coiled. Then too, if suspected instances of coil fractures were visible on either or both edges the piece was further examined under greater illuminated magnification for indications of smoothed over coil junctures in the form of surface irregularities that corresponded with observable claybody discontinuities in sherd cross-sections. In suspect cases it was often desirable to view both near and far cross-sections of a piece at once. This task accomplished by using a dental mirror to reflect the far cross section view while observing its near counterpart under magnification. By these procedures specimens were added to the two sub-classes with at least a modicum of confidence and precision. Body sherds, whose edges were not coil junction fractures, and whose cross-sections had no observable claybody discontinuities, were identified as mass-modeled. When the sort was finished, the sample was divided as follows: (1) coiled upper body fragments, 91 specimens, 61.9% of the body sherd sample, (2) coiled lower body fragments, 35 specimens, 23.8% of the body sherd sample, (3) mass-modeled upper body fragments, 16 specimens, 10.8% of the body sherd sample, (4) mass-modeled lower body fragments, 5 specimens, 3.5% of the body sherd sample. In sum 126, (85.7%), of the 147 specimens were coiled and 21 (14.3%) of the 147 were mass-modeled.

SUB-SAMPLE EXTERIOR SURFACE TREATMENTS

The sub-sample's body sherds exhibited 4 mutually exclusive exterior surface treatments, namely simple stamped, check stamped, cord roughened, and smoothed. The exterior surfaces of all coiled and mass-modeled specimens had been floated prior to decorating them. Floating was accomplished by wetting the exterior surface then gently pressing and smoothing it with a flat-sided wood or bone tool. This practice left a smooth and compact eggshell thin surface that could be easily seen in sherd cross-sections and could be removed by inserting the tip of a knife blade beneath it and prying upward. In most cases the exterior surface cord impressing or stamping distorted but did not penetrate this floated surface.

To form a simple stamp the artisan first carved a series of parallel grooves into the surface of a rectangular wooden or bone paddle at a right angle to its long axis. This stamp was then pressed downward onto the exterior vessel surface with the long axis of the paddle held at a right angle to the long axis of the vessel thus forming a series of vertical ridges interspersed with vertical troughs. In most cases the vertical ridges and troughs were distinct but faint indicating that the stamp was applied to a partially dried rather than a wet surface. Subsequent smoothing, which may have required an additional bit of wetting, was accomplished by horizontal back and forth rubbing with a soft yielding surface. The rubbing in some cases was vigorous enough to produce splayed edges along the long axis of stamp induced ridges.

To form a check stamp the artisan carved a series of parallel grooves into the surface of a rectangular wooden or bone paddle, then carved a second series of parallel grooves at a ninety degree angle to the first. This procedure produced a waffle-like surface, i.e., an intersecting set of grooves that formed right angles, or near right angles, at the corners of square to rectangular lands. This stamp was pressed downward onto the exterior vessel surface with the long axis of the paddle held at a right angle to the long axis of the vessel thus forming a series of square to rectangular depressions separated by ridges. In most cases the ridges and depressions were distinct but faint indicating that the stamp was not applied with great force to a partially dried rather than a wet exterior surface. Subsequent smoothing, perhaps accompanied by a bit of wetting, was accomplished by horizontal back and forth rubbing with a soft yielding surface that produced splayed edges on horizontal ridges and cantilevered edges on vertical ridges.

To form a cord roughened surface the artisan wrapped the long axis of a rectangular wooden or bone paddle with a two strand S or Z twist fiber cord. This cord-wrapped paddle was then applied to the exterior vessel surface at a right angle to the long axis of the pot while the vessel was held in an upright position. The vertical cord impressions thus produced were clear and evenly spaced on upper body exteriors. On lower body exteriors the impressions were also clear and evenly distributed but tended to converge as the vessel base was approached. There were no over-stamped surfaces that would indicate that the cord wrapped paddle was used with enough force to shape or compact vessel walls. Cord roughening, it seems, was more decorative than technological.

Forty-four, (30%) of the 147 body sherds were simple stamped. Fourteen, (9.5%) of the 147 specimens were check stamped. Only 7 specimens, (4.8%) were cord roughened. The majority 82 of 147 fragments, (55.7%) were smoothed. Coiled body construction was combined with a smoothed exterior surface on 69 specimens (47% of the body sherd sample). Coiled body construction was combined with a simple stamped exterior surface on 37 body fragments (25.2% of the body sherd sample. Coiled body construction was combined with a check stamped exterior surface on 7 specimens (4.8% of the body sherd sample) and with a cord roughened exterior surface on 7 specimens (4.8% of the body sherd sample). Mass modeled body construction was combined with a smoothed exterior surface on 14 body fragments (9.5% of the sample). Mass modeled body construction was combined with simple stamping on 5 body fragments (3.4% of the sample) and with check stamping on 7 sherds (4.8% of the sample). A single body fragment (0.5% of the sample) combined coiling with finger nail impressing. There were no instances of mass modeled specimens that had cord roughened exterior surfaces. The exterior surfaces of all upper and lower body sherds had been floated. Those described as smoothed were horizontally wiped then left to dry after floating. Those that were cord roughened, simple-stamped, or check-stamped were floated then decorated.

SUB-SAMPLE RIM SHERDS

The sub-sample's twelve rim sherds were all relatively low, and gently out-flared but exhibited two manufacturing techniques, namely coiled and single strap formed. The six single strap rims were significantly taller than their six coil formed counterparts. They were not, however significantly thicker or thinner. The mean rim height for the strap built form was 20.6 +/- 0.9. For the coiled form the mean rim height was 15.3 +/- 2.4. A two tailed student t score of -5.004 indicated a significant difference. The mean thickness for single strap rims was 5.2 +/- 0.8. The coil built forms had a mean thickness of 5.3 +/- 0.8. A student t score of –0.206 indicated that this difference was probably insignificant.

The strap built rims were most likely constructed by first pressing a suitably sized coil of clay into a flat-sided rectangular strap roughly 20mm wide and 5mm thick. This strap was laid over and around the upper vessel body at its minimal circumference, and welded into place with a two or three fingered push-pull motion. The strap's free ends were then mated by roughening the exterior surface of one end and the interior surface of the other and pressing them together. This join was smoothed over on both exterior and interior surfaces before the strap was bent upward and gently outward then capped with a lip coil (Figure 3). The coiled rims were created by joining a coil of clay roughly 5mm in diameter to the upper and outer surface of the upper vessel body. Two or three rim coils of like diameter were stacked upon the original coil, then joined on exterior and interior with a two or three fingered push-pull motion. The exterior and interior ridges and troughs created by the joining were probably smoothed over before the rim was capped with a lip coil (Figure 4).

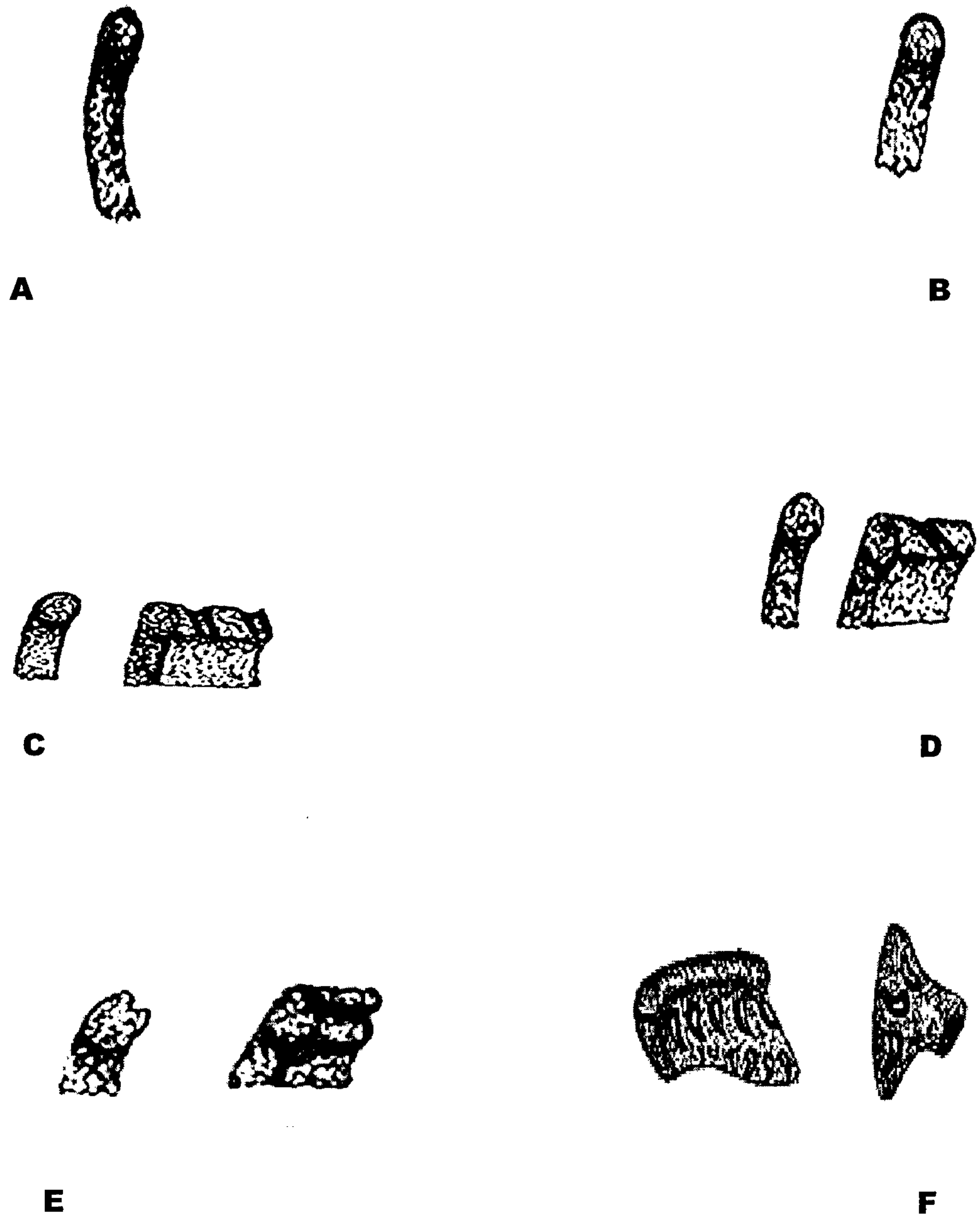

Figure 3: Strap Built Rims

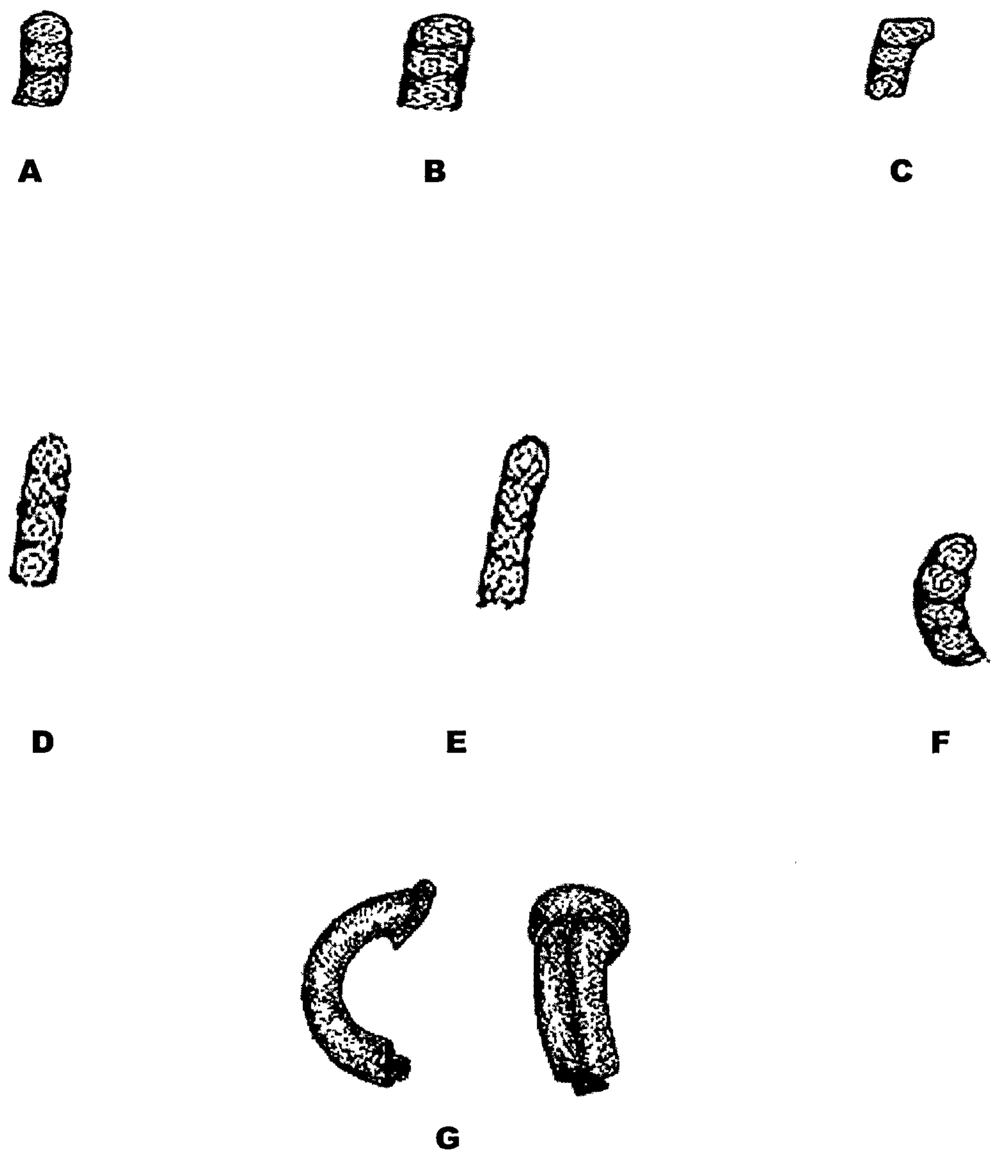

Figure 4: Coil Built Rims and Double Coil Loop Handle

The lips on all of the rim sherds had been formed by affixing a 5+mm in diameter coil of clay to the top of the rim then either smoothing it over to produce a round lip or pressing down on its upper surface to produce a flat lip. Twelve of the thirteen specimens had round lips. A single specimen had a flat lip (Figure 4C). The sub-sample's round lips were most probably finished by holding a piece of hide between the thumb and upper forefinger while drawing the hand around the lip circumference. The flat lip was produced by downward pressure from the palmer surface of a finger or thumb as it was drawn around the lip circumference. This action produced an upper lip profile with two 90 degree angles and a flat running surface between them.

While all of the rim sherds had been floated and rubbed only four had been decorated, three of them on the lip and one on the rim exterior. One of the three decorated lips carried a series of parallel impressions produced by drawing a wood or bone dowel-like tool across the lip at a right angle to its exterior and interior surfaces (Figure 3C). Another carried a series of parallel impressions produce by a dowel-like tool drawn across the lip at a forty-five degree angle to its exterior and interior surfaces (Figure 3D). A third carried a series of parallel incisions produced by drawing a pointed and edged wood or bone tool across the lip at a 30 degree angle to its interior surface and a 60 degree angle to its exterior surface (Figure 3E). The rim decorated on its exterior surface was marked by two lines of parallel tool impressions one line above the other and both at a right angle to the vessel's lip (Figure 3F). The tool used to form these impressions seems to have been a round-ended bone or wood dowel.

The sub-sample included one strap handle and one loop handle. The loop handle was composed of two side-by-side coils of clay pressed together and bent into C-shape (Figure 4G). This handle had been welded to the rim exterior at its upper end and riveted to the vessel's upper body exterior at its lower end. The upper end weld was indicated by a ragged edged pancake of clay that still adhered to the upper ends of both handle coils. The lower end riveting was indicated by a rectangular projection that had been cut from the base portion of the two joined handle coils. The strap handle had been made from a coil of clay that had been pressed into a rectangular strap then bent into a C-shape to be welded to the exterior surface of the rim at its upper end (Figure 3F). This weld was clearly indicated by a fan-shaped configuration to the handle's upper end. We presume this effect was produced by pressing the upper end of the handle strap firmly onto the exterior rim surface then spreading clay around it and over the rim exterior to produce a fan-like protuberance. This fan-like protuberance had then been smoothed over, either with a finger tip or piece of hide before it was marked by a radiating series of tool impressions created by the use of a round-ended dowel

With the previously detailed properties of the body and rim sherd sample in mind let us now turn to a site-by-site summary.

SUB-SAMPLE SITE SUMMARIES

Site Number:
5LA5497

Number of Specimens:
One

Number of Analyzable Specimens:
One

Claybody Composition:
Mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:
None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:
None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:
None

Number of Rim Fragments, Technique of Manufacture and Decoration:

One coiled rim created by joining a coil of clay roughly 5mm in diameter to the upper and outer surface of the upper vessel body, then stacking three rim coils of like diameter upon the original coil and joining them on exterior and interior with a two or three fingered push-pull motion. The exterior and interior ridges and troughs created by the joining were smoothed over before the rim was capped with a lip coil. The lip itself was formed by affixing a 5+mm in diameter coil of clay to the top of the rim then smoothing it over by holding a piece of hide between the thumb and upper forefinger while drawing the hand around the lip circumference. The rim was undecorated (Figure 4E).

Inferred Number of Vessels:
One

Inferred Vessel Shape and Size:
One large conoidal bottomed vessel with high round shoulder
constricted mouth , low gently out-flaring rim and round lip

Site Number:
5LA6105

Number of Specimens:
Two

Number of Analyzable Specimens:
Two

Claybody Composition:
Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:
None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:
None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:
Two, both coiled and cord roughened

Number of Rim Fragments, Technique of Manufacture and Decoration:
None

Inferred Number of Vessels:
One coiled and cord roughened vessel

Inferred Vessel Shape and Size:
One conoidal bottomed vessel with high round shoulders
and constricted mouth

Site Number:
5LA8291

Number of Specimens:
Fifty-five

Number of Analyzable Specimens:
Twenty-three

Claybody Composition:
Forty-five made from mica-bearing clay with grit temper; ten made from non-mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

Three coiled and smoothed

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

Seventeen: eight coiled and smoothed, two coiled and simple stamped, two mass-modeled and smoothed, five mass-modeled and check stamped.

Number of Rim Fragments, Technique of Manufacture and Decoration:

Three: all three strap built and gently out-flaring with round lips. One of the three lips carried a series of parallel impressions produced by drawing a wood or bone dowel-like tool across the lip at a right angle to its exterior and interior surfaces (Figure 3C). Another carried a series of parallel impressions produce by a dowel-like tool drawn across the lip at a forty-five degree angle to its exterior and interior surfaces (Figure 3D). A third carried a series of parallel incisions produced by drawing a pointed and edged wood or bone tool across the lip at a 30 degree angle to its interior surface and a 60 degree angle to its exterior surface (Figure 3E).

Inferred Number of Vessels:

Four: One coiled and smoothed, one coiled and simple stamped, one mass-modeled and smoothed and one mass-modeled and simple stamped.

Inferred Vessel Shape and Size:

Two large mass-modeled conoidal bottomed vessels with high round shoulders constricted mouths and gently out-flaring, strap built and decorated round lipped rims. Two small coiled conoidal bottomed vessels with high round shoulders constricted mouths, one of them with a gently out-flaring and strap built rim and round decorated lip, the other of indeterminate rim, and lip construction or decoration.

Site Number:

5LA8294

Number of Specimens:

Four

Number of Analyzable Specimens:

None

Claybody Composition:

Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

None

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One

Inferred Vessel Shape and Size:

Indeterminate

Site Number:

5LA8311

Number of Specimens:

One

Number of Analyzable Specimens:

One fragment too small to analyze

Claybody Composition:

Indeterminate

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

None

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One

Inferred Vessel Shape and Size:

Indeterminate

Site Number:

5LA8616

Number of Specimens:

Twenty-six

Number of Analyzable Specimens:

Nineteen

Claybody Composition:

Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

Twelve coiled lower body fragments; two simple stamped and five smoothed

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

Twelve coiled upper body fragments;
two simple stamped and ten smoothed

Number of Rim Fragments, Technique of Manufacture and Decoration:
None

Inferred Number of Vessels:
Two; one simple stamped, one smoothed

Inferred Vessel Shape and Size:
Two conoidal bottomed vessels with high round shoulders and constricted mouths

Site Number:
5LA8620

Number of Specimens:
Two

Number of Analyzable Specimens:
Two

Claybody Composition:
Mica-Bearing Clay with Grit Temper

Number of Base Fragments, Technique of Manufacture and Decoration:
None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:
None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:
None

Number of Rim Fragments, Technique of Manufacture and Decoration:
Two fragments of the same coiled rim. Both pieces were created by joining a coil of clay roughly 5mm in diameter to the upper and outer surface of the upper vessel body. Three rim coils of like diameter were then stacked upon the original coil and joined on exterior and interior with a two or three fingered push-pull motion. The exterior and interior ridges and troughs created by the joining were probably smoothed over before the rim was capped with a lip coil (Figure 4D).

The lips on both fragments had been formed by affixing a 5+mm in diameter coil of clay to the top of the rim then smoothing it over to produce a round lip

Inferred Number of Vessels:
One Coiled and Smoothed Vessel

Inferred Vessel Shape and Size:
A small conoidal bottomed vessel with high round shoulders,
constricted mouth, and direct gently out-flaring rim with round lip

Site Number:
5LA8622

Number of Specimens:
Four

Number of Analyzable Specimens:

One

Claybody Composition:

Made from mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

One mass-modeled and smoothed bottom fragment with interior finger indentations

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

None

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One

Inferred Vessel Shape and Size:

One conoidal bottomed vessel

Site Number:

5LA8676

Number of Specimens:

Two

Number of Analyzable Specimens:

Two

Claybody Composition:

Non-mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

Two, both mass-modeled and simple stamped

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

None

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One simple stamped vessel

Inferred Vessel Shape and Size:

One conoidal bottomed vessel with high round shoulder and constricted mouth

Site Number:

5LA8690

Number of Specimens:

Eleven

Number of Analyzable Specimens:

Four

Claybody Composition:

Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

Four mass-modeled and smoothed

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One mass-modeled and smoothed vessel

Inferred Vessel Shape and Size:

One conoidal bottomed vessel with high round shoulders
and constricted mouth

Site Number:

5LA9020

Number of Specimens:

One

Number of Analyzable Specimens:

One

Claybody Composition:

Non-mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

One, mass-modeled and simple stamped

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One

Inferred Vessel Shape and Size:

Indeterminate

Site Number:

5LA9029

Number of Specimens:

Five

Number of Analyzable Specimens:

Four

Claybody Composition:

Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

Three; two coiled and corrugated (Tusayan Corrugated) and one coiled and check stamped

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

One coiled and finger nail impressed

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

Two; one corrugated and one check stamped with some finger nail impressing.

Inferred Vessel Shape and Size:

Indeterminate

Site Number:

5LA9035

Number of Specimens:

Two

Number of Analyzable Specimens:

Two

Claybody Composition:

Non-mica bearing clay with sand temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

One coiled and smoothed

Number of Rim Fragments, Technique of Manufacture and Decoration:

One strap built rim, 20mm tall and 5mm thick. Round lip constructed with 5mm in diameter coil. Specimen made from non-mica bearing clay with sand temper The rim's round lip was probably finished by holding a piece of hide between the thumb and upper forefinger while drawing the hand around the lip circumference. (Figure 3B)

Inferred Number of Vessels:

One coiled and smoothed vessel

Inferred Vessel Shape and Size:

One conoidal bottomed vessel with high round shoulder constricted mouth and gently out-flaring, strap built and round lipped rim

Site Number:

5LA9183

Number of Specimens:

Two

Number of Analyzable Specimens:

Two

Claybody Composition:

Non-mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

Two, mass-modeled and smoothed

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

None

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One mass-modeled and smoothed

Inferred Vessel Shape and Size:

One conoidal bottomed vessel with high round shoulder and constricted mouth

Site Number:

5LA9211

Number of Specimens:

Four

Number of Analyzable Specimens:

Four

Claybody Composition:

Non-mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

Two coiled and corrugated (Tusayan Corrugated)

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

Two coiled and corrugated, one with shoulder (Tusayan Corrugated)

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One coiled, corrugated vessel

Inferred Vessel Shape and Size:

Indeterminate

Site Number:

5LA9331

Number of Specimens:

One

Number of Analyzable Specimens:

One

Claybody Composition:

Mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:
None
Number of Lower Body Fragments, Technique of Manufacture and Decoration:
One coiled and check stamped
Number of Upper Body Fragments, Technique of Manufacture and Decoration:
None
Number of Rim Fragments, Technique of Manufacture and Decoration:
None
Inferred Number of Vessels:
One
Inferred Vessel Shape and Size:
Indeterminate

Site Number:
5LA9333
Number of Specimens:
Three
Number of Analyzable Specimens:
Three
Claybody Composition:
Mica-bearing clay with grit temper
Number of Base Fragments, Technique of Manufacture and Decoration:
None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:
One coiled and smoothed
Number of Upper Body Fragments, Technique of Manufacture and Decoration:
Two coiled and simple stamped
Number of Rim Fragments, Technique of Manufacture and Decoration:
None
Inferred Number of Vessels:
One with simple stamped upper body and smoothed lower body
Inferred Vessel Shape and Size:
One conoidal bottomed vessel with high round shoulders
and constricted mouth

Site Number:
5LA9450
Number of Specimens
Two
Number of Analyzable Specimens
None
Claybody Composition
Mica-bearing clay with grit temper
Number of Base Fragments, Technique of Manufacture and Decoration:
None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

None

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One

Inferred Vessel Shape and Size:

Indeterminate

Site Number:

5LA9462

Number of Specimens:

Four

Number of Analyzable Specimens:

Four

Claybody Composition:

Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

Three: all coiled and smoothed

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

One: coiled and smoothed

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One coiled and smoothed vessel

Inferred Vessel Shape and Size:

One small conoidal bottomed vessel
with high round shoulder
and constricted mouth

Site Number:

5LA9471

Number of Specimens:

Twenty-six

Number of Analyzable Specimens:

Six

Claybody Composition

Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

One: coiled and simple stamped

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

Three: one coiled and smoothed, two coiled and simple stamped

Number of Rim Fragments, Technique of Manufacture and Decoration:

: One strap built out-flaring rim sherd with round lip and parallel vertical tool impressions on the exterior surface (Figure 3F left) One lenticular vertically tool impressed strap handle attached by welding (Figure 3F right).

Inferred Number of Vessels:

Two: one coiled and simple stamped, one coiled and smoothed

Inferred Vessel Shape and Size:

Two small conoidal bottomed vessels with high round shoulders and constricted mouths, one with a tool impressed, round lipped, out-flaring rim bearing a lenticular tool impressed handle.

Site Number:

5LA9472

Number of Specimens:

Two

Number of Analyzable Specimens:

None

Claybody Composition

Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

None

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One

Inferred Vessel Shape and Size:

Indeterminate

Site Number:

5LA9733

Number of Specimens:

Thirty-four

Number of Analyzable Specimens:

Twenty-nine

Claybody Composition:

Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

Eleven: all coiled and smoothed

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

Sixteen: ten coiled and smoothed; three coiled and check-stamped; three coiled and smoothed with loop handle fragments attached.

Number of Rim Fragments, Technique of Manufacture and Decoration:

Two rim sherds and one loop handle: Both rims were created by joining a coil of clay roughly 5mm in diameter to the upper and outer surface of the upper vessel body, then stacking two rim coils of like diameter upon the original and joining them on the exterior and interior with a two or three fingered push-pull motion. The exterior and interior ridges and troughs created by the joining were probably smoothed over before the rim was capped with a lip coil. The round lip was most probably finished by holding a piece of hide between the thumb and upper forefinger while drawing the hand around its circumference (Figure 4C). The flat lip was produced by downward pressure from the palmer surface of a finger or thumb as it was drawn around the lip circumference. This action produced an upper lip profile with two 90 degree angles and a flat running surface between them (Figure 4B). The loop handle was composed of two side-by-side coils of clay pressed together and bent into C-shape (Figure 4G). This handle had been welded to the rim exterior at its upper end and riveted to the vessel's upper body exterior at its lower end. The upper end weld was indicated by a ragged edged pancake of clay that still adhered to the upper ends of both handle coils. The lower end riveting was indicated by a rectangular projection that had been cut from the base portion of the two joined handle coils.

Inferred Number of Vessels:

Two: one coiled and check stamped, one coiled and smoothed with a loop handle attached.

Inferred Vessel Shape and Size:

Two small conoidal bottomed vessels with high round shoulders, constricted mouths and coil built rims, one with a flat lip and one with a round lip (Figure 4 B&C)

Site Number:

5LA9736

Number of Specimens:

One

Number of Analyzable Specimens:

One

Claybody Composition:

Non-mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

One mass modeled and check stamped

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One

Inferred Vessel Shape and Size:

One small conoidal bottomed vessel with high round shoulder and constricted mouth

Site Number:

5LA9758

Number of Specimens:

Two

Number of Analyzable Specimens:

Three

Claybody Composition:

Two non-mica-bearing clay with sand temper and one mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

One: coiled with black on white painted design

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

One: coiled with black on white painted design.

Number of Rim Fragments, Technique of Manufacture and Decoration:

One coiled rim was created by joining a coil of clay roughly 5mm in diameter to the upper and outer surface of the upper vessel body then stacking three rim coils of like diameter upon the original coil and joining them on the exterior and interior with a two or three fingered push-pull motion. The exterior and interior ridges and troughs created by the joining were probably smoothed over and the upper rim forced gently outward before the rim was capped with a lip coil. The lip coil was most probably finished by holding a piece of hide between the thumb and upper forefinger while drawing the hand around its circumference (Figure 4F).

Inferred Number of Vessels:
Two: One, coiled black on white painted vessel and one coiled smoothed vessel.
Inferred Vessel Shape and Size:
Two small conoidal bottomed vessels with high round shoulders and constricted mouths

Site Number:
5LA9772
Number of Specimens:
Eighteen
Number of Analyzable Specimens:
Four
Claybody Composition:
Mica-bearing clay with grit temper
Number of Base Fragments, Technique of Manufacture and Decoration:
One: mass-modeled and smoothed
Number of Lower Body Fragments, Technique of Manufacture and Decoration:
None
Number of Upper Body Fragments, Technique of Manufacture and Decoration:
Three: one mass-modeled and check-stamped; two mass-modeled and smoothed.
Number of Rim Fragments, Technique of Manufacture and Decoration:
None
Inferred Number of Vessels:
Two: one mass-modeled and check-stamped; one mass-modeled and smoothed.
Inferred Vessel Shape and Size:
Two small conoidal bottomed vessels with high round shoulders and constricted mouths

Site Number:
5LA9775
Number of Specimens:
Twenty-seven
Number of Analyzable Specimens:
Twenty-two
Claybody Composition:
Mica-bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:
None
Number of Lower Body Fragments, Technique of Manufacture and Decoration:
Six: three coiled and smoothed; three coiled and simple stamped
Number of Upper Body Fragments, Technique of Manufacture and Decoration:
Sixteen specimens: twelve coiled and smoothed; four coiled and simple stamped
Number of Rim Fragments, Technique of Manufacture and Decoration:
One coiled rim created by affixing a coil of clay roughly 5mm in diameter to the upper and outer surface of the upper vessel body then stacking two rim coils of like diameter upon the original coil and joining them on exterior and interior with a two or three fingered push-pull motion. The exterior and interior ridges and troughs created by the joining were probably smoothed over before the rim was capped with a lip coil. The round lip was most probably finished by holding a piece of hide between the thumb and upper forefinger while drawing the hand around its circumference. (Figure 4A)
Inferred Number of Vessels:
Two vessels: one smoothed and one vertically simple stamped
Inferred Vessel Shape and Size:
Two small conoidal bottomed vessels with high round shoulders and constricted mouths

Site Number:
5LA9811
Number of Specimens:
One
Number of Analyzable Specimens:
None
Claybody Composition:
Mica bearing clay with grit temper
Number of Base Fragments, Technique of Manufacture and Decoration:
None
Number of Lower Body Fragments, Technique of Manufacture and Decoration:
Indeterminate
Number of Upper Body Fragments, Technique of Manufacture and Decoration:
Indeterminate
Number of Rim Fragments, Technique of Manufacture and

Decoration:

None

Inferred Number of Vessels:

One mass modeled, check stamped vessel

Inferred Vessel Shape and Size:

One small conoidal bottomed vessel with high round shoulder and constricted mouth

Site Number:

5LA10000

Number of Specimens:

Five

Number of Analyzable Specimens:

Three

Claybody Composition:

Non-mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

One, coiled and cord roughened

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

Two, coiled and cord roughened

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One coiled and cord roughened vessel

Inferred Vessel Shape and Size:

One conoidal bottomed vessel with high round shoulder and constricted mouth

Site Number:

5LA10096

Number of Specimens:

Twenty-seven

Number of Analyzable Specimens:

Twenty-two

Claybody Composition:

Non-mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

Twenty-one coiled and simple stamped

Number of Rim Fragments, Technique of Manufacture and Decoration:

One; constructed by first pressing a suitably sized coil of clay into a flat-sided rectangular strap roughly 20mm wide and 5mm thick. This strap was laid over and around the upper vessel body at its minimal circumference, and welded into place with a two or three fingered push-pull motion. The strap's free ends were then mated by roughening the exterior surface of one end and the interior surface of the other and pressing them together. This join was smoothed over on both exterior and interior surfaces before the strap was bent upward and gently outward then capped with a lip coil (Figure 3A).

Inferred Number of Vessels:

One

Inferred Vessel Shape and Size:

One conoidal bottomed vessel with high round shoulder and constricted mouth

Site Number:

5LA10100

Number of Specimens

Ten

Number of Analyzable Specimens

None

Claybody Composition:

Non-mica bearing clay with grit temper

Number of Base Fragments, Technique of Manufacture and Decoration:

None

Number of Lower Body Fragments, Technique of Manufacture and Decoration:

None

Number of Upper Body Fragments, Technique of Manufacture and Decoration:

None

Number of Rim Fragments, Technique of Manufacture and Decoration:

None

Inferred Number of Vessels:

One cord roughened vessel

Inferred Vessel Shape and Size:

Indeterminate

APPENDIX 1

SITE & SPECIMEN NUMBER	VESSEL PART	MANUFACTURING TECHNIQUE & SURFACE TREATMENT	LENGTH X WIDTH X THICKNESS	CLAY & TEMPER
5LA5497	RIM	SEE DRAWING	SEE DRAWING	MICA BEARING+GRIT
5LA6105,FS-5	UPPER BODY	COILED&CORD ROUGHENED	52LX42WX65TH	MICA BEARING + GRIT
5LA6105,FS-4	UPPER BODY	COILED&CORD ROUGHENED	13LX22WX6TH	MICA BEARING + GRIT
5LA8291,FS-25	UPPER BODY	MASS MODELED& SMOOTHED	20LX16WX5TH	NON MICA + GRIT
5LA8291,FS-25	UPPER BODY	MASS MODELED& SMOOTHED	11LX11WX5TH	NON MICA + GRIT
5LA8291,FS-15	UPPER BODY	MASS MODELED& CHECK STAMPED	14LX18WX5TH	NON MICA + GRIT
5LA8291,FS-16	UPPER BODY	MASS MODELED& CHECK STAMPED	15LX13WX5TH	NON MICA + GRIT
5LA8291,FS-12	LOWER BODY	MASS MDLED& CHECK STAMPED	23LX21WX8TH	NON MICA + GRIT
5LA8291,FS-17	UPPER BODY	MASS MODELED& CHECK STAMPED	15LX18WX5TH	NON MICA + GRIT
5LA8291,FS-17	UPPER BODY	MASS MODELED& CHECK STAMPED	18LX10WX5TH	NON MICA + GRIT
5LA8291,FS-9	RIM	SEE DRAWING	SEE DRAWING	NON MICA + GRIT
5LA8291,FS-9	RIM	SEE DRAWING	SEE DRAWING	NON MICA + GRIT
5LA8291,FS-9	RIM	SEE DRAWING	SEE DRAWING	NON MICA + GRIT
5LA8291,FS-9	INDETER.	INDETER.	32 FRAGMENTS	MICA BEARING + GRIT
5LA8291,FS-9	UPPER BODY	COILED&SMOOTHED	14LX14WX5TH	MICA BEARING + GRIT
5LA8291,FS-9	UPPER BODY	COILED&SMOOTHED	21LX18WX4TH	MICA BEARING + GRIT
5LA8291,FS-9	UPPER BODY	COILED&SMOOTHED	14LX16WX4TH	MICA BEARING + GRIT
5LA8291,FS-9	UPPER BODY	COILED&SMOOTHED	18LX16WX5TH	MICA BEARING + GRIT
5LA8291,FS-9	UPPER BODY	COILED&SMOOTHED	14LX12WX5TH	MICA BEARING + GRIT
5LA8291,FS-9	UPPER BODY	COILED&SMOOTHED	20LX18WX5TH	MICA BEARING + GRIT
5LA8291,FS-9	UPPER BODY	COILED&SMOOTHED	14LX12WX4TH	MICA BEARING + GRIT
5LA8291,FS-	UPPER BODY	COILED&SMOOTHED	13LX13WX4TH	MICA BEARING +

9				GRIT
5LA8291,FS-9	LOWER BODY	COILED&SMOOTHED	16LX16WX6TH	MICA BEARING + GRIT
5LA8291,FS-9	LOWER BODY	COILED&SMOOTHED	13LX17WX6TH	MICA BEARING + GRIT
5LA8291,FS-9	LOWER BODY	COILED&SMOOTHED	15LX13WX6TH	MICA BEARING + GRIT
5LA8291,FS-9	UPPER BODY	COILED&SIMPLE STAMPED	16LX31WX5TH	MICA BEARING + GRIT
5LA8291,FS-9	UPPER BODY	COILED&SIMPLE STAMPED	15LX15WX4TH	MICA BEARING + GRIT
5LA8294,FS-1	INDETERMINATE	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA8294,FS-6	INDETERMINATE	INDETER.	3 FRAGMENTS	MICA BEARING + GRIT
5LA8311	INDETERMINATE	INDETER.	3 FRAG,EMTS	NON MICA + SAND
5LA8616,FS-14	UPPER BODY	COILED&SIMPLE STAMPED	14LX16WX5TH	MICA BEARING + GRIT
5LA8616,FS-14	UPPER BODY	COILED&SIMPLE STAMPED	19KX13WX5TH	MICA BEARING + GRIT
5LA8616,FS-14	LOWER BODY	COILED&SIMPLE STAMPED	18LX17WX7TH	MICA BEARING + GRIT
5LA8616,FS-14	LOWER BODY	COILED&SIMPLE STAMPED	9LX19WX6TH	MICA BEARING + GRIT
5LA8616,FS-14	INDETERMINATE	INDETERMINATE	7 FRAGMENTS	MICA BEARING + GRIT
5LA8616,FS-14	LOWER BODY	COILED&SMOOTHED	24LX11WX6TH	MICA BEARING + GRIT
5LA8616,FS-14	LOWER BODY	COILED&SMOOTHED	17LX9WX6TH	MICA BEARING + GRIT
5LA8616,FS-14	LOWER BODY	COILED&SMOOTHED	15LX145WX6TH	MICA BEARING + GRIT
5LA8616,FS-4	LOWER BODY	COILED&SMOOTHED	18LX15WX6TH	MICA BEARING + GRIT
5LA8616,FS-4	UPPER BODY	COILED&SMOOTHED	30LX22WX5TH	MICA BEARING + GRIT
5LA8616,FS-4	UPPER BODY	COILED&SMOOTHED	24LX28WX5TH	MICA BEARING + GRIT
5LA8616,FS-4	UPPER BODY	COILED&SMOOTHED	20LX32WX5TH	MICA BEARING + GRIT
5LA8616,FS-4	UPPER BODY	COILED&SMOOTHED	26LX22WX5TH	MICA BEARING + GRIT
5LA8616,FS-4	UPPER BODY	COILED&SMOOTHED	17LX19WX5TH	MICA BEARING + GRIT
5LA8616,FS-4	LOWER BODY	COILED&SMOOTHED	15LX22WX6TH	MICA BEARING + GRIT
5LA8616,FS-4	UPPER BODY	COILED&SMOOTHED	20LX15WX5TH	MICA BEARING + GRIT
5LA8616,FS-4	UPPER BODY	COILED&SMOOTHED	22LX25WX5TH	MICA BEARING + GRIT
5LA8616,FS-	UPPER BODY	COILED&SMOOTHED	24LX22WX5TH	MICA BEARING +

4				GRIT
5LA8616,FS-4	UPPER BODY	COILED&SMOOTHED	22;X18WX5TH	MICA BEARING + GRIT
5LA8616,FS-4	UPPER BODY	COILED&SMOOTHED	13;X13WX5TH	MICA BEARING + GRIT
5LA8620,FS-88	RIM	SEE DRAWING	SEE DRAWING	MICA BEARING + GRIT
5LA8620,FS-90	RIM	SEE DRAWING	SEE DRAWING	MICA BEARING + GRIT
5LA8622,FS-6	INDETER.	INDETER.	2 FRAGMENTS	MICA BEARING + GRIT
5LA8622,FS-7	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA8622,FS-7	BOTTOM	MASS MODELED& SMOOTHED	18LX16WX10TH	MICA BEARING + GRIT
5LA8676,FS-3	LOWER BODY	MASS MDLED&SPL STAMP	50LX83WX7TH	NON MICA + GRIT
5LA8676,FS-4	LOWER BODY	MASS MDLED&SPL STAMP	20LX18WX7TH	NON MICA + GRIT
5LA8690,FS-1	UPPER BODY	MASS MODELED& SMOOTHED	20LX25WX5TH	MICA BEARING + GRIT
5LA8690,FS-1	UPPER BODY	MASS MODELED& SMOOTHED	20LX24WX5TH	MICA BEARING + GRIT
5LA8690,FS-1	UPPER BODY	MASS MODELED& SMOOTHED	18LX14WX4TH	MICA BEARING + GRIT
5LA8690,FS-1	UPPER BODY	MASS MODELED& SMOOTHED	17LX17WX5TH	MICA BEARING + GRIT
5LA8690,FS-1	INDETERMINATE	INDETER.	7 FRAGMENTS	MICA BEARING + GRIT
5LA9020,FS-70	UPPER BODY	MASS MDLED& SIMPLE STAMPED	14LX14WX4TH	NON MICA + GRIT
5LA9029,FS-2	LOWER BODY	COILED&CHECK STAMPED	15LX18WX7TH	MICA BEARING + GRIT
FLA9029,FS-1	LOWER BODY	TUSAYAN CORREGATED	16LX24WX7TH	MICA BEARING + GRIT
5LA9029,FS-3	LOWER BODY	TUSAYAN CORREGATED	24LX16WX8TH	MICA BEARING + GRIT
5LA9029,FS-6	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9029,FS-5	UPPER BODY	FINGER NAIL IMPRESSED&COILED	11LX8WX7TH	MICA BEARING + GRIT
5LA9035,FS-18	UPPER BODY	COILED&SMOOTHED	20LX30WX6TH	NON MICA + SAND
5LA9035,FS-	RIM	SEE DRAWING	SEE DRAWING	NON MICA +

18				SAND
5LA9183,FS-1	LOWER BODY	MASS MODELED &SMOOTHED	22LX21WX7TH	NON MICA + GRIT
5LA9183,FS-2	LOWER BODY	MASS MODELED& SMOOTHED	22LX20WX7TH	NON MICA + GRIT
5LA9211,FS-44	UPPER BODY	TUSAYAN CORREGATED	26LX39WX6TH	NON MICA + GRIT
5LA9211,FS-42	SHOULDER	TUSAYAN CORREGATED	60LX56WX6TH	NON MICA + GRIT
5LA9211,FS-43	LOWER BODY	TUSAYAN CORREGATED	29LX114WX7TH	NON MICA + GRIT
5LA9211,FS-11	LOWER BODY	TUSAYAN CORREGATED	18LX22WX7TH	NON MICA + GRIT
5LA9331,FS-12	LOWER BODY	COILED& CHECKSTAMPED	27LX25WX8TH	MICA BEARING + GRIT
5LA9333,FS-19	LOWER BODY	COILED& SMOOTHED	21LX17WX7TH	MICA BEARING + GRIT
5LA9333,FS-15	UPPER BODY	COILED& SIMPLE STAMPED	12LX16WX5TH	MICA BEARING + GRIT
5LA9333,FS-15	UPPER BODY	COILED& SIMPLE STAMPED	14LX14WX5TH	MICA BEARING + GRIT
5LA9450,FS-10	INDETER.	INDETER.	2 FRAGMENTS	MICA BEARING + GRIT
5LA9462,FS-20	LOWER BODY	COILED& SMOOTHED	18LX18WX6TH	MICA BEARING + GRIT
5LA9462,FS-20	UPPER BODY	COILED& SMOOTHED	13LX14WX5TH	MICA BEARING + GRIT
5LA9462,FS-14	LOWER BODY	COILED& SMOOTHED	13LX10WX6TH	MICA BEARING + GRIT
5LA9462,FS-26	LOWER BODY	COILED& SMOOTHED	12LX18WX6TH	MICA BEARING + GRIT
5LA9471,FS-23	UPPER BODY	COILED& SIMPLE STAMPED	12;X17WX5TH	MICA BEARING + GRIT
5LA9471,FS-28	LOWER BODY	COILED& SIMPLE STAMPED	15LX9WX7TH	MICA BEARING + GRIT
5LA9471,FS-29	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9471,FS-19	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9471,FS-24	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9471,FS-24	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9471,FS-18	LOWER BODY	INDETER.	14LX15WX6TH	MICA BEARING + GRIT
5LA9471,FS-	INDETERMINATE	INDETER.	2 FRAGMENTS	MICA BEARING

27				+ GRIT
5LA9471,FS-22	UPPER BODY	COILED& SIMPLE STAMPED	20LX15WX5TH	MICA BEARING + GRIT
5LA9471,FS-21	UPPER BODY	COILED& SMOOTHED	19LX16WX5TH	MICA BEARING + GRIT
5LA9471,FS-17	RIM	SEE DRAWING	SEE DRAWING	MICA BEARING + GRIT
5LA9471,FS-20	SEE DRAWING	SEE DRAWING	SEE DRAWING	MICA BEARING + GRIT
5LA9472,FS-65	INDETER.	MASS MODELED& SMOOTHED	15LX20WX6TH	MICA BEARING + GRIT
5LA9472,FS-65	INDETER.	MASS MODELED& SMOOTHED	15LX20WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	18LX19WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	15LX12WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	16LX10WX5TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	11LX15WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	12LX15WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	18LX10WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	12LX17WX5TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	12LX14WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	14LX10WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	12LX10WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	LOWER BODY	COILED&SMOOTHED	13LX12WX6TH	MICA BEARING + GRIT
5LA9733,FS-3	INDETERMINATE	INDETERMINATE	4 FRAG,EMTS	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&SMOOTHED	17LX22WX5TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&SMOOTHED	15LX13WX4TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&SMOOTHED	12LX19WX4TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&SMOOTHED	13LX11WX4TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&SMOOTHED	20LX12WX4TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&SMOOTHED	16LX12WX4TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&SMOOTHED	12LX8WX5TH	MICA BEARING + GRIT
5LA9733,FS-	UPPER BODY	COILED&SMOOTHED	11LX13WX4TH	MICA BEARING +

3				GRIT
5LA9733,FS-3	UPPER BODY	COILED&SMOOTHED	10LX14WX4TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&CHECK STAMPED	18LX27WX5TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&CHECK STAMPED	15LX20WX5TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY	COILED&CHECK STAMPED	25LX20WX5TH	MICA BEARING + GRIT
5LA9733,FS-3	UPPER BODY WITH HANDLE ATTACHMENT	COILED&SMOOTHED	14LX13WX5TH	MICA BEARING + GRIT
5LA9733,FS-3	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9733,FS-6	UPPER BODY	COILED&SMOOTHED	13LX11WX4TH	MICA BEARING + GRIT
5LA9733,FS-2	UB+HANDLE	COILED&SMOOTHED	SEE DRAWING	MICA BEARING + GRIT
5LA9733,FS-1	UB+HANDLE	COILED&SMOOTHED	SEE DRAWING	MICA BEARING + GRIT
5LA9733,FS-3	RIM	SEE DRAWING	SEE DRAWING	MICA BEARING + GRIT
5LA9733,FS 3	RIM	SEE DRAWING	SEE DRAWING	MICA BEARING + GRIT
5LA9736,FS-2	UPPER BODY	MASS MODELED& CHECK STAMPED	16LX19WX5TH	NON MICA + GRIT
5LA9758,FS-19	UPPER BODY	COILED&CHECK STAMPED	24LX20WX5TH	MICA BEARING + GRIT
5LA9758,FS-18	LOWER BODY	COILED&CHECK STAMPED	13LX16WX5TH	MICA BEARING + GRIT
5LA9758,FS-9	RIM	SEE DRAWING	SEE DRAWING	MICA BEARING + GRIT
5LA9772,FS-16	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9772,FS-21	UPPER BODY	MASS-MODELED& CHECK STAMPED	18LX17WX4TH	MICA BEARING + GRIT
5LA9772,FS-19	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9772,FS-20	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9772,FS-23	UPPER BODY	INDETER.	18LX14WX4TH	MICA BEARING + GRIT
5LA9772,FS-22	UPPER BODY	MASS-MDLED&SMOOTHED	24LX13WX4TH	MICA BEARING + GRIT
5LA9772,FS-14	BOTTOM	MASS-MODELED& SMOOTHED	33LX19WX8TH	MICA BEARING + GRIT
5LA9772,FS-17	UPPER BODY	MASS-MODELED& SMOOTHED	13LX13WX3TH	MICA BEARING + GRIT
5LA9772,FS-18	INDETER.	INDETER.	11 FRAGAMENTS	MICA BEARING + GRIT
5LA9775,F51	UPPER BODY	COILED&SMOOTHED	18LX10WX5TH	MICA BEARING +

				GRIT
5LA9775,FS-14	UPPER BODY	COILED&SMOOTHED	17LX25WX6TH	MICA BEARING + GRIT
5LA9775,FS-28	UPPER BODY	COILED&SIMPLE STAMPED	14LX15WX5TH	MICA BEARING + GRIT
5LA9775,FS-25	UPPER BODY	COILED&SMOOTHED	22LX12WX6TH	MICA BEARING + GRIT
5KA9775, FS-17	INDETERMINATE	INDETERMINATE	1 FRAGMENT	MICA BEARING + GRIT
5LA9775,FS-2	UPPER BODY	COILED&SIMPLE STAMPED	18LX20WX5TH	MICA BEARING + GRIT
5LA9775,FS-21	UPPER BODY	COILED&SMOOTHED	12LX13WX4TH	MICA BEARING + GRIT
5LA9775,FS-5	LOWER BODY	COILED&SMOOTHED	12LX10WX6TH	MICA BEARING + GRIT
5LA9775,FS-24	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9775,FS-33	NOT CERAMIC	NOT CERAMIC	NOT CERAMIC	NOT CERAMIC
5LA9775,FS-31	UPPER BODY	COILED&SMOOTHED	11LX14WX4TH	MICA BEARING + GRIT
5LA9775,FS-3	UPPER BODY	COILED&SMOOTHED	16LX12WX5TH	MICA BEARING + GRIT
5LA9775,FS-18	LOWER BODY	COILED&SMOOTHED	17;X16WX6TH	MICA BEARING + GRIT
5LA9775,FS-16	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9775,FS-12	UPPER BODY	COILED&SMOOTHED	9LX13WX4TH	MICA BEARING + GRIT
5LA9775,FS-13	UPPER BODY	COILED&SMOOTHED	13LX12WX4TH	MICA BEARING + GRIT
5LA9775,FS-7	LOWER BODY	COILED&SMOOTHED	13LX13WX6TH	MICA BEARING + GRIT
5LA9775,FS-6	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9775,FS-9	LOWER BODY	COILED&SIMPLE STAMPED	14LX18WX6TH	MICA BEARING + GRIT
5LA9775,FS-8	UPPER BODY	COILED&SMOOTHED	9LX13WX5TH	MICA BEARING + GRIT
5LA9775,FS-4	INDETER.	INDETER.	1 FRAGMENT	MICA BEARING + GRIT
5LA9775,FS-15	LOWER BODY	COILED&SIMPLE STAMPED	17LX19WX6TH	MICA BEARING + GRIT
5LA9775,FS-20	UPPER BODY	COILED&SMOOTHED	13LX14WX4TH	MICA BEARING + GRIT
5LA9775,FS-27	LOWER BODY	COILED&SIMPLE STAMPED	19LX32WX6TH	MICA BEARING + GRIT
5LA9775,FS-11	UPPER BODY	COILED&SMOOTHED	12LX10WX5TH	MICA BEARING + GRIT
5LA9775,FS-26	UPPER BODY	COILED&SIMPLE STAMPED	16LX15WX5TH	MICA BEARING + GRIT
5LA9775,FS-19	UPPER BODY	COILED&SMOOTHED	18LX16WX4TH	MICA BEARING + GRIT
5LA9775,FS-10	UPPER BODY	COILED&SIMPLE STAMPED	16LX14WX5TH	MICA BEARING + GRIT
5LA9775,FS	RIM	SEE DRAWING	SEE DRAWING	MICA BEARING +

34				GRIT
5LA9811,FS-54	INDETERMINATE	MASS MODELED& SIMPLE STAMPED	1 FRAGMENT	MICA BEARING + GRIT
5LA10000,FS-127	INDETER.	INDETER.	2 FRAGMENTS	NON MICA + GRIT
5LA10000,FS-127	UPPER BODY	COILED&CORD ROUGHENED	12LX12WX4TH	NON MICA + GRIT
5LA10000,FS-125	UPPER BODY	COILED&CORD ROUGHENED	15LX20WX4TH	NON MICA + GRIT
5LA10000,FS-145	LOWER BODY	COILED&CORD ROUGHENED	18LX24WX7TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	10LX15WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	12LX14WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	16LX10WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	11LX10WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	14LX10WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	10LX7WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	10LX9WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	16LX15WX5TH	NON MICA + GRIT
5LA10096,FS-17	INDETER.	INDETER.	6 FRAGMENTS	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	12LX13WX5TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	13LX14WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	16LX12WX5TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	10LX11WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	12LX12WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	14LX9WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	8LX13WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	8LX8WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	11LX11WX4TH	NON MICA + GRIT
5LA10096,FS-17	UPPER BODY	COILED&SIMPLE STAMPED	7LX10WX4TH	NON MICA + GRIT
5LA10096,FS-15	UPPER BODY	COILED&SIMPLE STAMPED	13LX13WX5TH	NON MICA + GRIT
5LA10096,FS-	UPPER BODY	COILED&SIMPLE	12LX11WX4TH	NON MICA +

14		STAMPED		GRIT
5LA10096,FS-16	UPPER BODY	COILED&SIMPLE STAMPED	15LX12WX4TH	NON MICA + GRIT
5LA10100,FS-173	INDETER.	INDET&CORD ROUGHENED	9 FRAGMENTS	NON MICA + GRIT
5LA10100,FS-196	INDETER.	INDET&CORD ROUGHENED	1 FRAGMENT	NON MICA + GRIT

APPENDIX IV

TRAINING AREA 10 & 12 SITES WITH HISTORIC COMPONENTS

By

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NRHP Eligible Sites

This is a summary of historic information for sites from the Training areas 10 and 12 survey that will be recommended as eligible for the National Register of Historic Places. This information comes from the Bureau of Land Management's online database of original land grants (www.glorecords.blm.gov), the Federal Population Schedules (accessed online at HeritageQuest.com), Friedman's (1989) previously published PCMS report, Haynes and Bastian (1987), and genealogy websites such as Familysearch.com and Genealogy.com.

The structures and/or artifacts found on each site have been divided into ten general functional categories: architecture, hardware, kitchen, furniture, bones, arms, clothing, personal items, tobacco, and activities. When the architecture category is used, historic structures or foundations were observed on a site. The hardware category is used when boards, tin roofing, etc. are found on a site, but in the absence of an apparent structure. Refuse remains like bottles, dishes, and cookware from a historic site constitutes the kitchen category. The arms category designates the presence of weapons or ammunition in an artifact assemblage. Examples of personal items include toys, jewelry, or even pencils. When artifacts that reflect work and leisure (e.g., livestock, farming, blacksmithing, mining, or rock art) are found, the category activities is used.

5LA4940

This site is on land patented (T29S R57W section 7 NW and section 12 NE) by Crestantos Moya in 1882 and includes Cowboy Springs, a rock outcrop noted for its incised historic graffiti dating from 1888 to 1978. The multitude of names and brands inscribed here on June 12, 1888 may represent a cattle roundup or drive. Names identified include George Shoop (1922-1993), Abran Jones who lived in Trinchera, Colorado in 1910, Everett Crowder (1916-1990) and Rufus Wiggins who lived in Pueblo, Colorado in 1910. Bob Hill, who worked for the Bloom Cattle Company in the 1950s and works for the PCMS today, related that many of the names have disappeared since he put his name on the wall in about 1955.

Santos Moya, born in New Mexico in 1853, appears on the 1880 census as a laborer in Precinct 6 of Las Animas County, which was not on the PCMS. His two children were born in Colorado in 1873 and 1879. Functional categories designated for this site include architecture, kitchen, and activity (rock art).

5LA5239

The site is on land patented by William L. Price in 1923 to be used for stock raising. Found in T30S R58W section 15 NW, the site's historic element consists of a pot drop, with its functional category being kitchen. The east half of this section was also granted to Price in 1923 and contains the homestead. Price was not located on the 1920 census.

5LA5830

The site is on land patented by Thomas H. Hughes in 1919 and includes two sandstone foundations believed to be associated with the Cross Ranch. John Sanders Cross homesteaded here in 1905, but sometime in the 1910s he moved his family to Walsenburg, Colorado. After this, Hughes gained possession of the homestead. He originally moved from Indiana to Colorado between 1917 and 1919 based on the birthplaces of his daughters. Both Cross and Hughes worked on the Circle Diamond Ranch of the Bloom Cattle Company at one time. County tax records show that by 1920 Hughes lived in Model, Colorado, owned no land, and had $900 in personal property. He appears on the 1920 census in Delagua, Las Animas County, working as a butcher in a company store, and possibly for a mine. Glenn Watkins and his family lived on this land for some time after Hughes, and later purchased Amile Le Platt's Homestead, known as Biernacki's Ranch, in the 1930s. The site is located in T29S R58W section 15 NE and its functional category is architecture.

5LA6101

The site is on land patented by Juan B. Cordova in 1921 (T29S R57W section 4 NE). Cordova appears on the 1910 census living in Hoehne, Colorado with his family. He was a 26-year-old laborer renting a house there. The site includes a single room stone homestead, sheep pen in a rock shelter, and coal adits. In addition, there is a rock art panel on the canyon wall above the site that includes a steer head and the date 1903. Site functional categories include architecture, kitchen, and activities in the form of livestock ranching. The features assigned to the mining operations are likely related to Charles W. Albert's 1903 coal claim for land just west of the site.

5LA6104

This site, known as La Placita, straddles the section line in T29S R57W section 10 SW and section 15 NW. Rock art on Feature 1 (a large building), done by Claude and Lester Swink, dates to 1898; at this time they were 9 and 10 year old boys who resided in Rocky Ford, Colorado. The Swink family settled in Rocky Ford in the mid-1870s. Another boulder in this structure bears the inscriptions "Walter Canedy, Rocky Ford, Colo.", "JEW '97, 1901," and two symbols that may be brands-entwined hearts and a bow and arrow. Walter appears on the 1900 census as a 21-year-old brick layer living in Rocky Ford with his widowed mother. They had come west from Madison County, Illinois.

The structures are believed to have been erected prior to that time by a squatter or resident who did not file on the property. Land and building improvements do not appear in county tax records. It was determined that this land was patented by John Ryan in 1908, and later, by Ray Edgar in 1927. Architectural features include two homesteads, a barn, outbuildings, a modified spring, and a corral. Functional classifications are many for this site: architecture, kitchen, bones (lamb), arms (casings, shot), clothing (shoe, belt, corset hooks), personal items (purse clasp, pencil), tobacco (tin), and activities (rock art, barn).

5LA6105

This site is on land patented by Samuel E. Eudy in 1922, T29S R57W section 15NE. See the Eudy Family biography later in this work.

5LA8289

This site is on land patented by James B. Dutton in 1924. Dutton appears on the 1920 census as a hired man living with Jerome Gregory in Thatcher Precinct. Born in Missouri in about 1896, little is known of Dutton other than he was unmarried. The site is a homestead with functional categories, based on its historic artifacts, of architecture, kitchen, furniture (bedsprings), tobacco, and activity (ranching). The site is located in T29S R58W section 24 SW. Also see ineligible historic sites 5LA8308 and 5LA8312, which are found in the same section on land owned by Dutton.

5LA8306

This site is on land patented by Wilford Riley in 1875 (T30S R58W section 15 SW). The land later passed from Riley to John M. Taylor and then to Samuel T. Brown by 1895. Brown and his heirs maintained a sheep ranch 19 km west of this location into the 1940s. The current site may be a camp or storage shelter. Cultural materials for this site appear to date from between 1910-30 and include a foundation, corral, and lambing pen. Site functions include the following--architecture, kitchen, tobacco, activity (livestock ranching).

5LA8309

This site, a trash scatter, is located near Sharp Ranch (5LA5825) and is believed to be associated with it. Ozias T. Clark patented the land (located in T29S R57W in sections 19 SW and 30 NW) on which the site was found in 1909. Clark was born in North Carolina in about 1846. He and his wife Mary Moore, born in Tennessee in about 1854, were married in 1879. Clark is listed as a cattle grower in Las Animas County on the 1880 census; Moses Stevens was a 31-year-old hired hand living with them. Stevens, born in Michigan, later owned a ranch on the south side of Red Rock Canyon. Clark resided in Trinidad, Colorado at the time of the 1900 and 1920 censuses. He was the Sheriff in 1900 and a stockman in 1920. In the 1909 Las Animas County directory, he dealt in livestock and his son Ozias Jr. managed a livery in Trinidad, Colorado. Functional categories determined for the site include kitchen, arms, and clothing.

Rafael Mamunes originally patented the land on which the Sharp Ranch homestead was found in 1882. In about 1886 it was a cattle ranch owned by the partnership of O. T. Clark and Worley T. Moore.

5LA8615

This site is on land patented by Dora Betty Gregory in 1922 (T29S R57W on parts of sections 6 and 7). She married Jerome Gregory, who received a patent in T29S R58W sections 8 and 9. Functional categories designated from the artifactual remains include kitchen, architecture, tobacco, and activities (ranching). See the Gregory Family biography, later in the report.

5LA8674

This site is on land patented by Ward Watkins in 1937 and is found in section 29 of T29S R57W. Ward, born in Kansas in 1911, is the oldest son of Glen Watkins, who owned Cross Ranch from about 1920 to the 1930s. The only historic activity identified from the cultural remains is juniper logging.

5LA8694

Located in T28S R57W section 19, the site is on land patented by Marvin and Nancy Eudy in 1921. Marvin died in 1918. The site contains an intact dugout, a well, a privy and trash scatter. Artifacts found throughout the site represent the following functional categories--kitchen, architecture, clothing, and activities (ranching). See the Eudy Family biography found later in this section.

5LA9031

This site is on land patented by Henry Stoffel in 1923. He received land in T29S R58W sections 5 and 6 and Nicholas P. Stoffel received land in section 1 and 6 that same year. I believe these are the brothers Henry and Nicholas Stoffel who appear on the census between 1900 and 1920 in Addison, Wisconsin. They were born in Wisconsin in about 1877 and 1875 respectively, both married in 1902 to women named Katherine and each owned farms in Addison in 1920. The site contains a dugout, cistern, slag piles, privy, and trash. Functional categories include architecture, kitchen, tobacco, activity, personal, and clothing.

5LA9043

This site is in T28S R57W section 24 NW on land designated as State Land in 1920. The historic component is a trash scatter, which may be associated with an historic well 70 m to the southwest. There is an attractive prehistoric rock art panel at the site, which may have drawn local residents. Based on the artifacts identified, the site's functional category is kitchen.

5LA9186

This fenceline is on property patented by Samuel E. Brownewell in 1921, and is in T28S R57W section 33 NW. Born in Ohio in about 1867, Brownewell appears on the 1920 census in El Paso County, Colorado as a carpenter. His three sons were born in Oklahoma and Kansas between 1896 and 1909.

5LA9210

This site is on land patented by Charles Nally in 1923. He appears on the 1920 census in Otero County, Colorado as a 42-year-old teamster who was born in Missouri. His wife and three children were also born in Missouri. Harvey Nally, who owned the land containing ineligible historic site 5LA9259, appears on the 1920 census in Fabius Township, Missouri as a 23-year-old married farmer. A barn, foundation, dugout, slag pile, and trash scatter were found on 5LA9210. The site is located in T28S R58W section 32 SE and its inferred functions are kitchen, architecture, clothing, and activities (ranching).

5LA9277

This historic fence line is on public land in T29S R57W section 16.

5LA9281

The historic element of this site is a utilized flake produced from glass.

5LA9298

This site, found in T28S R58W section 34 SW, was patented by Guernsey C. Selby in 1926. He was born in California in about 1894 and worked as a farmer in Hayes County, Nebraska in 1920. His wife and daughter were born in Kansas. Historic features include foundations and a dugout. Trash and car parts indicate the following site functions--architecture, kitchen, clothing, tobacco, personal, activity (ranching).

5LA9362

This site is on land patented by Samuel Eudy in 1922 and includes several courses of a sandstone block structure and a sparse trash scatter. These cultural materials were found in T29S R57W section 14NW. See the Eudy Family biography later in this section. Architecture and kitchen are the inferred functional categories for the site.

5LA9448

This site is on land patented by the heirs of John M. Bowman in September 1927. The site is in T29S R57W section 27 NW and consists only of a historic cairn. Bowman appears on the 1920 census in Las Animas, Bent County, as a 66-year-old carpenter born in Illinois. His wife Kate was 70 years old at that time.

The Eudy Family on the PCMS

Four historic sites in TA10 are on land originally owned by members of the Eudy family. Six members of the family received land grants from the government in the early 1920s for land now in the PCMS--Marvin and Nancy J., Nancy A., Samuel, and Shelby and Susan. These land parcels are adjacent and occupy almost 3 square miles of property west of the southern Stage Canyon entrance. To fulfill homestead requirements for land in the 1920s, the applicant had to make improvements to the land, establish a residence, and live on the land for five years. But it would have been common for members of a family group to each apply for land and yet only establish one residence, possibly on a section line. Primitive "homes" could have been set up on each grant to satisfy the legal requirements. Then, after fulfilling the residency requirement and getting title to the land, it could be sold. Further investigation could help determine if there are multiple residences or a cluster of buildings that served as the homestead for this family group. Tax records would show how much development was claimed on each land grant and when the properties were sold or abandoned.

Eudy Genealogy

Benjamin Alexander Eudy and Nancy Ann Virginia Smith, both of Clinton, Kentucky, married in 1879 and had nine children. They moved to Indiana in 1899, and Benjamin died on February 21, 1901, a day short of his 44th birthday. Their youngest child, Bessie, was born in Walesboro, Indiana, 5 ½ months later. She died on August 6, 1902, a day short of her 1st birthday.

Nancy and her children moved to Oklahoma and appear on the 1910 census in Reno Township, Canadian County. She was listed as a 48-year-old farmer. Land grant records show that Nancy moved, with her younger children, to Colorado in about 1916. They were not found on the 1920 census. Nancy A. Eudy received a patent on land in T28S R57W section 18 in October 1921. The earliest land grant to one of her children was in June, 1920 when Susan Olive Eudy received land in T28S R57W sections 19 & 20. Nancy moved back to Canadian County, Okalahoma, where she died in 1944.

Susan Olive Eudy, born in 1886 in Kentucky, received a grant in 1920. Married women often filed under their maiden name to acquire more land for their husband. Susan married a Briggs at some point, and died in Riverside, California on May 1, 1973. There were no land grants for Briggs in Colorado, so she was probably still single in 1920.

Shelby Edmond Eudy was born in Kentucky in March, 1889. He received grants for land in September, 1921 and August, 1922.

Marvin Luther Eudy was born in August, 1891. He married Nancy Jane Moberly in 1916 in Canadian County, Oklahoma. They moved to La Junta, Colorado where their 1st child, Bessie, was born. Marvin and Nancy Eudy received a patent on land in what is currently the PCMS (5LA8694 in T28S R57W section 19 NE) in 1921, therefore they had set up residency five years earlier in 1916. Marvin died on December 1, 1918 in La Junta. His wife died on January 13, 1984 at the age of 86. She is buried at Canadian Valley Cemetery in Oklahoma. The headstone also bears her husband's name.

Samuel Everett Eudy was born on April 22, 1894 in Kentucky. He received a patent on land in what is now the PCMS in 1922 (5LA6105 and 5LA9362). He was living in the Thatcher Precinct at the time of the 1920 census with his 20-year-old wife, Bertie. He died on July 12, 1967 in Los Angeles, California. His Social Security card was issued after 1938 in Oklahoma, however.

Otha Willard Eudy was born on October 10, 1896 in Kentucky. He died on December 24, 1918 in Las Animas, and was buried in La Junta. Perhaps this is when the Spanish Flu epidemic was prevalent in Colorado.

The Eudy family message board at genforum.com, familysearch.com, rootsweb.com, and the Baca County message board at rootsweb.com/~cobaca/1997query.htm were accessed in 2004 to retrieve some of this information.

Gregory and Betty Families

There were 12 land grants issued to Gregory's for land on or near the PCMS between 1880 and the 1920s. A search of the 1880 census index revealed that many of these individuals were related. Site 5LA8615 is an eligible historic site located in TA10 that was owned by Dora Betty Gregory. As with the Eudys, the relationship between historic structures or shanties found on these grants is more significant when we note that the same family owned all the land.

In 1880, Sarah Gregory, recently widowed, was living in Capitol, Colorado with her eight children--George W., Andy Jackson J., Viola, Le Roy A., Francis Bell, Henry E., Elias and Charles. Her husband Jackson was from Pennsylvania. They had moved to Colorado from Bates County, Missouri in about 1875. She and six of her children received land grants near the PCMS between 1882 and 1921. Sarah resided in Hoehne, Colorado at the time of the 1910 and 1920 censuses. Most of her children appear to have remained in the area.

Asa Gregory lived in Hoehne, Las Animas County in 1880. He was born in Pennsylvania in December, 1843 and is probably Jackson's younger brother or a cousin. He moved to Trinidad, Colorado from Bates County, Missouri in 1874. He appears on the 1900 and 1910 censuses as a farmer in Hoehne, with Sarah living next door to him in 1910. He and his sons William P. and Francis J. had land grants in the PCMS area. William and Frank were partners with Herbert LePlatt in 1910, another prominent landowner on the south end of the PCMS.

These land grants were made to Gregorys. (* on the PCMS)

Sarah	32s62w	section 9	in 1889
George W.	32s62w	2,11	1888, and 31s59w in 1920, 1924
Jackson	32s63w	13	1882
Leroy A.	31s58w	19,24	1921
Francis B.	30s58w	34	1906*
Henry E.	30s58w	27, 34	1906*
Charles A.	30s58w	21,22	1906*
Asa	32s63w	12	1882, and 32s62w 10 1886
William P.	31s58w	29,32	1915, and 30s57w 19,30 1909*
Francis J.	31s58w	18	1913
Jerome J.	30s58w	13,24	1921, and 29s58w 8,9 1921*
Dora B.	29s57w	6,7	1922*

Online records show that Jerome Gregory was born in Colorado in 1894 to John and Mary Gregory of Missouri. Jackson had a son named Jerome born at this time, so perhaps he is also related. Jerome married Dora B. Betty and they lived in the Thatcher Precinct at the time of the 1920 census. Her siblings, Curtis and Ruth Betty, lived with them and her father Frank Betty lived nearby. There were five land grants to Betty's on the PCMS in 1921-22. Curtis H. received land in 29S 58W, section 1 and 29S 57W, section 6, Dora in 29S 57W sections 6 and 7, Ed in 28S 58W sections 34 and35, Frank in 28S 58W sections 26,27,34,35, and Ruth in 29S 57W section 7, and 29S 58W sections 12, 14.

NRHP Non-Eligible Sites

5LA8284

Patented by the heirs of Ralph F. Hancock in 1927, the site is a historic trash dump. Functions inferred from the artifacts include--kitchen, hardware, and activity (ranching, farming). The site is located in T30S R58W section 10 SW.

5LA8285

The site is on land (T30S R58W section 10 SE) patented by Callie Manire in 1922. No census information was found for Manire. Cultural materials include a dugout and trash scatter and functional categories inferred from the artifacts include--architecture and activity (ranching).

5LA8296

The site is on land (T29S R 58W section 14 SW) patented by Thomas H. Hughes in 1919. He gained control of the Cross Ranch after John Cross moved to Walsenburg, Colorado in the mid-1910s. Both men were at one time ranch hands for the Bloom Cattle Company. The site consists of a rock shelter that was used historically as an animal pen, therefore the functional category is activity. See eligible site 5LA5830 for more detail.

5LA8308

The site is on land patented by James Dutton in 1924 in T29S R58W section 24 SE. Artifacts imply the functions of architecture, kitchen, and arms. Dutton was listed as a 23-year-old single man living with Jerome Gregory in the Thatcher Precinct on the 1920 census. Site 5LA8289 is an eligible homestead on Dutton's land.

5LA8312

The site, consisting of an animal pen, is also on the land patented by James Dutton in 1924 and is probably related to some of the other sites found on the Dutton landholdings. Site 5LA8312 was found in T29S R58W section 24 NW.

5LA8612

The historic component of this site is only two tin cans.

5LA8663

The site is on land patented by Cyril O. Smith in 1925. He was not located on the 1920 census, however. Cultural materials, located in T29S R57W section 20 SE, include a dugout and trash scatter. Functional categories for the site include architecture and kitchen.

5LA9021

The site is on land patented by Clara J. Dutton in 1924. Clara was not located on the 1920 census; she may be the wife or sister of James Dutton. This trash scatter implies the function of kitchen, hardware, furniture (stove parts), and activity (wire from livestock enclosures). The site is located in T28S R57W section 30 SW.

5LA9184

The site is on land (T28S R57W section 28 SW) patented by Mangum Craig in 1920. He appears on the 1920 census in Thatcher Precinct as a 34-year-old Texas-born homesteader. He married Ella in about 1907 and had five children before moving to Colorado in about 1916. Cultural materials at the site include architecture, but no artifacts from any other functional group.

5LA9218

This historic trash scatter is on land patented by Charles L. Clayton in 1924. The site was found in T29S R59W section 24 NW.

5LA9259

The site is on land patented by Harvey Nally in 1921 in T28S R58W section 33 SE. This trash scatter included nails, glass, and a wagon axle. Implied functions are hardware, kitchen, and activities. Two Harvey Nallys appear on the 1920 census: a 23-year-old Iowa-born man living in Missouri, and a 41-year-old Missouri-born man living in West Virginia. There may be a relationship to 5LA9210, a historic homestead on land patented by Charles Nally in 1923.

5LA9300

The site is on land patented by Teofallo Quintana in 1882, but he could not be located in the census records. Located in T30S R57W section 8 SE, these historic remains are nothing more than a scatter of cans.

5LA9323

This site appears to be on the section line of land in T28S R57W section 33 that was patented by Charles W. Albert in 1903 as a coal claim. This appears correct, as the site is a vertical prospect shaft over 30 feet deep. This is the only coal claim on the PCMS and the only land grant to Albert. He was not located on the census, however. The south half of the feature appears to be on land patented by William Brownewell in 1922, but because of its small size, its exact location is not discernible using GPS equipment. The site's functional category, therefore, is activity (mining).

5LA9369

The site, consisting of an animal pen, is on land (T29S R57W section 15 the NE of the NW) patented by Orlando Strandberg in 1920. Ole Strandberg appears on the 1920 census in Otero County, Colorado. He was born in Michigan 31 years prior. He worked as a foreman in an alfalfa mill and had a young wife who was 14 or 19 years old. The site functional classification is activity (ranching).

5LA9477

This site is on land patented by Samuel Eudy in 1922 in T29S R57W section 15 NW. It consists of axe cut junipers in a rock shelter.

APPENDIX V

Data for Training Area 10 and 12 sites.

Site No.	Site Type	Management Recommendation	Eligibility
2240	Habitation	Avoid and Test	Eligible
2267	Lithic Scatter	No Further Work	Non Eligible
2298	Lithic Scatter	No Further Work	Non Eligible
4725	Habitation	Fence and Avoid	Eligible
4940	Habitation	Avoid and Test	Eligible
5239	Lithic Scatter	Avoid and Test	Eligible
5830	Historic	Extend Boundary Fence	Eligible
6101	Habitation	Data Recovery	Eligible
6104	Habitation	Fence and Avoid	Eligible
6105	Habitation	Data Recovery	Eligible
6744	Lithic Scatter	Avoid and Test	Eligible
8283	Lithic Scatter	No Further Work	Non Eligible
8284	Lithic Scatter	No Further Work	Non Eligible
8285	Historic	No Further Work	Non Eligible
8286	Lithic Scatter	No Further Work	Non Eligible
8287	Lithic Scatter	No Further Work	Non Eligible
8288	Lithic Scatter	No Further Work	Non Eligible
8289	Lithic Scatter	Fence and Avoid	Eligible
8290	Lithic Scatter	No Further Work	Non Eligible
8291	Habitation	Avoid and test	Eligible
8292	Lithic Scatter	No Further Work	Non Eligible
8293	Lithic Scatter	No Further Work	Non Eligible
8294	Lithic Scatter	No Further Work	Non Eligible
8295	Lithic Scatter	No Further Work	Non Eligible
8296	Lithic Scatter	No Further Work	Non Eligible
8297	Habitation	No Further Consideration	Eligible
8298	Lithic Scatter	No Further Work	Non Eligible
8299	Lithic Scatter	No Further Work	Non Eligible
8300	Lithic Scatter	No Further Work	Non Eligible
8301	Lithic Scatter	No Further Work	Non Eligible
8302	Lithic Scatter	No Further Work	Non Eligible
8303	Habitation	No Further Consideration	Eligible
8304	Lithic Scatter	No Further Work	Non Eligible
8305	Lithic Scatter	No Further Work	Non Eligible
8306	Lithic Scatter	No Further Consideration	Eligible
8307	Lithic Scatter	No Further Work	Non Eligible
8308	Lithic Scatter	No Further Work	Non Eligible
8309	Habitation	No Further Consideration	Eligible
8310	Lithic Scatter	No Further Work	Non Eligible
8311	Habitation	Avoid and Test	Eligible
8312	Lithic Scatter	No Further Work	Non Eligible
8595	Lithic Scatter	No Further Work	Non Eligible
8596	Lithic Scatter	No Further Work	Non Eligible
8597	Lithic Scatter	No Further Work	Non Eligible

Appendix V continued.

8598	Lithic Scatter	No Further Work	Non Eligible
8599	Lithic Scatter	No Further Work	Non Eligible
8600	Lithic Scatter	No Further Work	Non Eligible
8601	Lithic Scatter	No Further Work	Non Eligible
8602	Lithic Scatter	No Further Work	Non Eligible
8603	Lithic Scatter	No Further Work	Isolated Find
8604	Lithic Scatter	No Further Work	Non Eligible
8605	Lithic Scatter	No Further Work	Non Eligible
8606	Habitation	Avoid and Test	Eligible
8607	Habitation	Avoid and Test	Eligible
8608	Lithic Scatter	No Further Work	Non Eligible
8609	Lithic Scatter	No Further Work	Non Eligible
8610	Habitation	No Further Work	Non Eligible
8611	Lithic Scatter	No Further Work	Non Eligible
8612	Lithic Scatter	No Further Work	Non Eligible
8614	Habitation	No Further Work	Non Eligible
8615	Lithic Scatter	No Further Consideration	Eligible
8616	Habitation	No Further Consideration	Eligible
8617	Habitation	No Further Consideration	Eligible
8618	Lithic Scatter	No Further Work	Non Eligible
8619	Habitation	Avoid and Test	Eligible
8620	Habitation	Avoid and test	Eligible
8621	Lithic Scatter	No Further Work	Non Eligible
8622	Habitation	No Further Consideration	Eligible
8629	Lithic Scatter	No Further Work	Isolated Find
8630	Lithic Scatter	No Further Work	Isolated Find
8631	Lithic Scatter	No Further Work	Isolated Find
8632	Lithic Scatter	No Further Work	Isolated Find
8633	Lithic Scatter	No Further Work	Isolated Find
8634	Lithic Scatter	No Further Work	Isolated Find
8636	Lithic Scatter	No Further Work	Isolated Find
8637	Lithic Scatter	No Further Work	Isolated Find
8638	Lithic Scatter	No Further Work	Isolated Find
8639	Lithic Scatter	No Further Work	Isolated Find
8640	Lithic Scatter	No Further Work	Isolated Find
8641	Lithic Scatter	No Further Work	Isolated Find
8642	Lithic Scatter	No Further Work	Isolated Find
8643	Lithic Scatter	No Further Work	Isolated Find
8644	Lithic Scatter	No Further Work	Isolated Find
8645	Lithic Scatter	No Further Work	Isolated Find
8646	Lithic Scatter	No Further Work	Isolated Find
8647	Lithic Scatter	No Further Work	Isolated Find
8649	Lithic Scatter	No Further Work	Isolated Find
8650	Lithic Scatter	No Further Work	Isolated Find
8651	Lithic Scatter	No Further Work	Isolated Find
8652	Lithic Scatter	No Further Work	Isolated Find
8653	Lithic Scatter	No Further Work	Non Eligible

Appendix V continued.

8654	Habitation	No Further Work	Non Eligible
8655	Habitation	No Further Work	Non Eligible
8656	Habitation	Sign and Avoid	Eligible
8657	Habitation	No Further Work	Non Eligible
8658	Habitation	Sign and Avoid	Eligible
8659	Habitation	No Further Work	Non Eligible
8660	Habitation	No Further Work	Non Eligible
8661	Lithic Scatter	No Further Work	Non Eligible
8662	Lithic Scatter	No Further Work	Non Eligible
8663	Lithic Scatter	No Further Work	Non Eligible
8664	Lithic Scatter	No Further Work	Non Eligible
8665	Lithic Scatter	No Further Work	Non Eligible
8666	Lithic Scatter	No Further Work	Non Eligible
8667	Lithic Scatter	No Further Work	Non Eligible
8668	Lithic Scatter	No Further Work	Non Eligible
8670	Lithic Scatter	No Further Work	Non Eligible
8671	Habitation	Avoid and test	Eligible
8672	Lithic Scatter	No Further Work	Non Eligible
8673	Lithic Scatter	No Further Work	Non Eligible
8674	Habitation	Data Recovery	Eligible
8675	Lithic Scatter	No Further Work	Non Eligible
8676	Habitation	Avoid and Test	Eligible
8677	Habitation	No Further Work	Non Eligible
8678	Habitation	Avoid and Test	Eligible
8679	Lithic Scatter	No Further Work	Isolated Find
8680	Lithic Scatter	No Further Work	Isolated Find
8681	Habitation	Avoid and Test	Eligible
8682	Lithic Scatter	No Further Work	Isolated Find
8683	Lithic Scatter	No Further Work	Isolated Find
8684	Lithic Scatter	No Further Work	Isolated Find
8685	Lithic Scatter	No Further Work	Non Eligible
8686	Lithic Scatter	No Further Work	Non Eligible
8687	Historic	No Further Work	Isolated Find
8688	Lithic Scatter	No Further Work	Non Eligible
8689	Habitation	No Further Consideration	Eligible
8690	Habitation	No Further Consideration	Eligible
8691	Lithic Scatter	No Further Work	Non Eligible
8692	Habitation	No Further Consideration	Eligible
8693	Habitation	Avoid and Test	Eligible
8694	Historic	Fence and Avoid	Eligible
9019	Lithic Scatter	No Further Work	Isolated Find
9020	Habitation	Fence and Avoid	Eligible
9021	Historic	No Further Work	Non Eligible
9022	Lithic Scatter	No Further Work	Non Eligible
9023	Lithic Scatter	No Further Work	Non Eligible
9024	Lithic Scatter	No Further Work	Non Eligible
9025	Lithic Scatter	No Further Work	Non Eligible

Appendix V continued.

9026	Lithic Scatter	No Further Work	Non Eligible
9027	Lithic Scatter	No Further Work	Non Eligible
9028	Lithic Scatter	No Further Work	Isolated Find
9029	Lithic Scatter	No Further Work	Non Eligible
9030	Lithic Scatter	No Further Work	Non Eligible
9031	Historic	Sign and Avoid	Eligible
9032	Lithic Scatter	No Further Work	Isolated Find
9034	Lithic Scatter	No Further Work	Isolated Find
9035	Lithic Scatter	No Further Work	Non Eligible
9036	Lithic Scatter	No Further Work	Non Eligible
9037	Lithic Scatter	Avoid and Test	Eligible
9038	Lithic Scatter	No Further Work	Non Eligible
9039	Lithic Scatter	No Further Work	Non Eligible
9040	Lithic Scatter	No Further Work	Isolated Find
9041	Lithic Scatter	No Further Work	Non Eligible
9042	Lithic Scatter	No Further Work	Non Eligible
9043	Lithic Scatter	Fence and Avoid	Eligible
9044	Habitation	No Further Consideration	Eligible
9172	Lithic Scatter	No Further Work	Isolated Find
9173	Lithic Scatter	No Further Work	Isolated Find
9174	Lithic Scatter	No Further Work	Isolated Find
9175	Habitation	No Further Work	Non Eligible
9176	Habitation	No Further Work	Non Eligible
9177	Lithic Scatter	No Further Work	Non Eligible
9178	Lithic Scatter	No Further Work	Non Eligible
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9180	Lithic Scatter	No Further Work	Non Eligible
9181	Lithic Scatter	No Further Work	Non Eligible
9182	Lithic Scatter	No Further Work	Isolated Find
9183	Lithic Scatter	No Further Work	Non Eligible
9184	Historic	No Further Work	Non Eligible
9185	Lithic Scatter	No Further Work	Non Eligible
9186	Lithic Scatter	Fence and Avoid	Eligible
9187	Processing Site	Fence and Avoid	Eligible
9188	Habitation	Avoid and Test	Eligible
9189	Lithic Scatter	No Further Work	Non Eligible
9190	Lithic Scatter	No Further Work	Non Eligible
9191	Lithic Scatter	No Further Work	Non Eligible
9192	Habitation	No Further Consideration	Eligible
9193	Lithic Scatter	No Further Work	Non Eligible
9194	Habitation	No Further Work	Non Eligible
9195	Lithic Scatter	No Further Work	Non Eligible
9196	Lithic Scatter	No Further Work	Non Eligible
9197	Lithic Scatter	No Further Work	Non Eligible
9198	Lithic Scatter	No Further Work	Non Eligible
9199	Lithic Scatter	No Further Work	Non Eligible
9200	Lithic Scatter	No Further Consideration	Eligible

Appendix V continued.

9201	Lithic Scatter	No Further Work	Non Eligible
9202	Lithic Scatter	No Further Work	Non Eligible
9203	Lithic Scatter	No Further Work	Non Eligible
9204	Lithic Scatter	No Further Work	Non Eligible
9205	Lithic Scatter	No Further Work	Non Eligible
9206	Lithic Scatter	No Further Consideration	Eligible
9207	Lithic Scatter	No Further Work	Non Eligible
9208	Lithic Scatter	No Further Work	Non Eligible
9209	Lithic Scatter	No Further Work	Non Eligible
9210	Lithic Scatter	No Further Consideration	Eligible
9211	Lithic Scatter	No Further Work	Non Eligible
9212	Lithic Scatter	No Further Work	Non Eligible
9213	Lithic Scatter	No Further Work	Non Eligible
9214	Lithic Scatter	No Further Work	Non Eligible
9215	Lithic Scatter	No Further Work	Non Eligible
9216	Lithic Scatter	No Further Work	Non Eligible
9217	Historic	No Further Work	Non Eligible
9218	Lithic Scatter	No Further Work	Non Eligible
9219	Lithic Scatter	No Further Work	Non Eligible
9220	Lithic Scatter	No Further Work	Non Eligible
9221	Lithic Scatter	No Further Work	Non Eligible
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9226	Lithic Scatter	No Further Work	Non Eligible
9227	Lithic Scatter	No Further Work	Non Eligible
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9231	Lithic Scatter	No Further Work	Isolated Find
9232	Lithic Scatter	No Further Work	Isolated Find
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9245	Lithic Scatter	No Further Work	Isolated Find
9246	Lithic Scatter	No Further Work	Isolated Find
9247	Lithic Scatter	No Further Work	Isolated Find

Appendix V continued.

9248	Lithic Scatter	No Further Work	Isolated Find
9249	Lithic Scatter	No Further Work	Isolated Find
9250	Lithic Scatter	No Further Work	Isolated Find
9251	Lithic Scatter	No Further Work	Isolated Find
9252	Lithic Scatter	No Further Work	Isolated Find
9258	Lithic Scatter	No Further Work	Non Eligible
9259	Lithic Scatter	No Further Work	Non Eligible
9260	Lithic Scatter	No Further Work	Non Eligible
9261	Habitation	No Further Work	Non Eligible
9262	Lithic Scatter	No Further Work	Non Eligible
9263	Lithic Scatter	No Further Work	Non Eligible
9264	Lithic Scatter	No Further Work	Non Eligible
9265	Habitation	No Further Consideration	Eligible
9266	Habitation	No Further Work	Non Eligible
9267	Lithic Scatter	No Further Work	Non Eligible
9274	Habitation	No Further Work	Non Eligible
9275	Lithic Scatter	No Further Work	Non Eligible
9276	Lithic Scatter	No Further Work	Non Eligible
9277	Habitation	Avoid and Test	Eligible
9278	Lithic Scatter	No Further Work	Non Eligible
9279	Lithic Scatter	No Further Work	Non Eligible
9280	Lithic Scatter	No Further Work	Non Eligible
9281	Lithic Scatter	Avoid and Test	Eligible
9282	Lithic Scatter	No Further Work	Non Eligible
9283	Habitation	Avoid and Test	Eligible
9284	Lithic Scatter	Avoid and Test	Eligible
9285	Habitation	No Further Work	Non Eligible
9286	Lithic Scatter	No Further Work	Non Eligible
9287	Lithic Scatter	No Further Work	Non Eligible
9288	Lithic Scatter	No Further Work	Non Eligible
9289	Lithic Scatter	No Further Work	Non Eligible
9290	Habitation	No Further Consideration	Eligible
9291	Lithic Scatter	No Further Work	Non Eligible
9292	Lithic Scatter	No Further Work	Non Eligible
9293	Lithic Scatter	No Further Work	Non Eligible
9294	Lithic Scatter	No Further Work	Non Eligible
9295	Habitation	Avoid	Eligible
9296	Habitation	No Further Work	Non Eligible
9297	Lithic Scatter	No Further Work	Non Eligible
9298	Lithic Scatter	Fence and Avoid	Eligible
9299	Lithic Scatter	No Further Work	Non Eligible
9300	Lithic Scatter	No Further Work	Non Eligible
9301	Lithic Scatter	No Further Work	Non Eligible
9302	Lithic Scatter	No Further Work	Non Eligible
9303	Lithic Scatter	No Further Work	Non Eligible
9304	Lithic Scatter	No Further Work	Non Eligible
9305	Lithic Scatter	No Further Work	Non Eligible

Appendix V continued.

9306	Lithic Scatter	No Further Work	Non Eligible
9307	Habitation	Fence and Avoid	Eligible
9308	Habitation	Avoid and Test	Eligible
9309	Lithic Scatter	No Further Work	Non Eligible
9310	Lithic Scatter	No Further Work	Non Eligible
9311	Lithic Scatter	No Further Work	Non Eligible
9312	Lithic Scatter	No Further Work	Non Eligible
9313	Lithic Scatter	No Further Work	Non Eligible
9314	Lithic Scatter	No Further Work	Non Eligible
9315	Lithic Scatter	No Further Work	Non Eligible
9316	Habitation	Avoid and Test	Eligible
9317	Lithic Scatter	No Further Work	Non Eligible
9318	Lithic Scatter	No Further Work	Non Eligible
9319	Habitation	Avoid and Test	Eligible
9320	Habitation	No Further Work	Non Eligible
9321	Lithic Scatter	No Further Work	Non Eligible
9322	Lithic Scatter	No Further Work	Non Eligible
9323	Historic	No Further Work	Non Eligible
9324	Lithic Scatter	No Further Work	Non Eligible
9325	Lithic Scatter	No Further Work	Non Eligible
9326	Lithic Scatter	No Further Work	Non Eligible
9327	Lithic Scatter	No Further Work	Non Eligible
9328	Habitation	No Further Work	Non Eligible
9329	Lithic Scatter	No Further Work	Non Eligible
9330	Lithic Scatter	No Further Work	Non Eligible
9331	Lithic Scatter	Avoid	Eligible
9332	Lithic Scatter	No Further Work	Non Eligible
9333	Lithic Scatter	Avoid and Test	Eligible
9334	Lithic Scatter	No Further Work	Non Eligible
9335	Lithic Scatter	No Further Work	Non Eligible
9336	Lithic Scatter	No Further Work	Non Eligible
9337	Habitation	Avoid and Test	Eligible
9338	Lithic Scatter	No Further Work	Non Eligible
9339	Lithic Scatter	No Further Work	Non Eligible
9340	Lithic Scatter	No Further Work	Non Eligible
9341	Lithic Scatter	No Further Work	Non Eligible
9342	Lithic Scatter	No Further Work	Non Eligible
9343	Lithic Scatter	No Further Work	Non Eligible
9344	Habitation	Avoid and Test	Eligible
9345	Lithic Scatter	No Further Work	Non Eligible
9346	Lithic Scatter	No Further Work	Non Eligible
9347	Lithic Scatter	No Further Work	Non Eligible
9348	Lithic Scatter	No Further Work	Non Eligible
9349	Habitation	Avoid and Test	Eligible
9350	Lithic Scatter	No Further Work	Non Eligible
9351	Lithic Scatter	No Further Work	Non Eligible
9352	Lithic Scatter	No Further Work	Non Eligible

Appendix V continued.

9353	Lithic Scatter	No Further Work	Non Eligible
9354	Lithic Scatter	No Further Work	Non Eligible
9355	Lithic Scatter	No Further Work	Non Eligible
9356	Lithic Scatter	No Further Work	Non Eligible
9357	Lithic Scatter	No Further Work	Non Eligible
9358	Lithic Scatter	No Further Work	Non Eligible
9359	Lithic Scatter	No Further Work	Non Eligible
9360	Lithic Scatter	No Further Work	Non Eligible
9361	Lithic Scatter	No Further Work	Non Eligible
9362	Lithic Scatter	Fence and Avoid	Eligible
9363	Lithic Scatter	No Further Work	Non Eligible
9364	Habitation	No Further Work	Non Eligible
9365	Habitation	Avoid and Test	Eligible
9366	Lithic Scatter	No Further Work	Non Eligible
9367	Lithic Scatter	No Further Work	Non Eligible
9368	Habitation	No Further Work	Non Eligible
9369	Habitation	No Further Work	Non Eligible
9370	Habitation	Avoid and Test	Eligible
9371	Habitation	Fence and Avoid	Eligible
9372	Habitation	Data Recovery	Eligible
9373	Lithic Scatter	No Further Work	Non Eligible
9433	Habitation	Sign and Avoid	Eligible
9434	Lithic Scatter	No Further Work	Non Eligible
9435	Lithic Scatter	No Further Work	Non Eligible
9436	Lithic Scatter	No Further Work	Non Eligible
9437	Lithic Scatter	No Further Work	Non Eligible
9438	Lithic Scatter	No Further Work	Non Eligible
9439	Lithic Scatter	No Further Work	Non Eligible
9440	Lithic Scatter	No Further Work	Non Eligible
9441	Lithic Scatter	No Further Work	Non Eligible
9442	Lithic Scatter	No Further Work	Non Eligible
9443	Lithic Scatter	No Further Work	Non Eligible
9444	Lithic Scatter	No Further Work	Non Eligible
9445	Lithic Scatter	No Further Work	Non Eligible
9446	Lithic Scatter	Data Recovery	Eligible
9447	Lithic Scatter	No Further Work	Non Eligible
9448	Habitation	Avoid and Test	Eligible
9449	Lithic Scatter	No Further Work	Non Eligible
9453	Lithic Scatter	No Further Work	Non Eligible
9454	Lithic Scatter	No Further Work	Non Eligible
9455	Lithic Scatter	No Further Work	Non Eligible
9456	Lithic Scatter	No Further Work	Non Eligible
9457	Lithic Scatter	No Further Work	Non Eligible
9469	Historic	No Further Work	Isolated Find
9470	Lithic Scatter	No Further Work	Isolated Find
9473	Lithic Scatter	No Further Work	Non Eligible
9474	Habitation	Avoid and Test	Eligible

Appendix V continued.

9475	Lithic Scatter	No Further Work	Non Eligible
9476	Lithic Scatter	Data Recovery	Eligible
9477	Habitation	No Further Work	Non Eligible
9478	Habitation	Avoid and Test	Eligible
9479	Lithic Scatter	No Further Work	Non Eligible
9480	Lithic Scatter	No Further Work	Non Eligible
9481	Lithic Scatter	No Further Work	Non Eligible
9482	Lithic Scatter	No Further Work	Isolated Find