An Archaeological Inventory

in the Pike's Stockade Area,

Conejos County, Colorado

by

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with a contribution by

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Sponsored by

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Abstract

During the 2004–2006 field seasons, an archaeological survey was conducted east of Sanford, Colorado as part of the training available in the Program for Avocational Archaeological Certification (PAAC). The project thus used volunteers largely from the Colorado Archaeological Society (CAS) already enrolled in PAAC, supervised and trained by the Assistant State Archaeologist from the Colorado Historical Society. The inventory was completed on about 907 acres of the Pike's Stockade State Historic Monument (PSSHM) in Conejos County, Colorado. The study tract encompassed a low shrubland environment on and around a volcanic mesa named Sierro del Ojito, bordering the wooded floodplain of the Conejos River, at elevations of 2,296–2,495 m. This area was intensively surveyed primarily to train PAAC volunteers in archaeological inventory and mapping methods. In addition, this portion of southern Colorado had been the subject of relatively little archaeological research interest, and the PSSHM—as a regional property of the Colorado Historical Society—made a logical choice for a PAAC survey project.

As a result of the survey a total of 37 sites and 26 isolated finds (IFs) were recorded, including both American Indian and non-Indian materials. Historic period non-Indian sites comprise a rather diverse mix of artifact scatters, cairns, fences, stone enclosures, and rock inscriptions related primarily to ranching and recreational activities. The reconstructed Pike's Stockade on the north side of the river is based on information in Pike's journal, but no archaeological evidence for the February 1807 fortification has been found. Pre-Columbian sites are mainly open lithic scatters, hunting stations, and camps typically dating to the Archaic or Late Prehistoric periods. Limited evidence for more ancient Paleoindian period activity was found, post-dating 9300 BC. Common features include lithic artifact concentrations and fire-cracked rock (FCR) concentrations, and projectile points far outnumber other tool forms. More recent American Indian usage of the area such as by Ute or Jicarilla Apache groups was not recognized during the survey, but a few features of uncertain age may include this period.

Lithic artifacts dominate in prehistoric assemblages; ceramic artifacts were entirely absent from these sites and IFs. Various colored cherts, jasper, basalt, and chalcedony were the commonly utilized toolstones, collected either locally or from sources none too distant from the southern San Luis Valley. Burial of archaeological materials is most likely to occur in aeolian and colluvial deposits at the northeast margin of the project area, south of the Conejos River, where surface site densities also are highest. Much sparser archaeological evidence was encountered on the mesa crest, and in the lower elevations south and west of the mesa, despite excellent ground visibility. Given that the entire project area is within easy reach of the river, prehistoric settlement patterns suggest that the presence of sand dunes exerted a notable attraction for early hunter-gatherer groups in the area.

Overall, human occupation of the project area has been more localized than extensive, unlike some nearby areas such as the territory around the Great Sand Dunes to the northeast. A variety of additional work including test excavations, remote sensing, instrument mapping, tribal consultation, and archival research is recommended to evaluate the potential for intact buried remains in different site settings, and to more clearly assess site significance, should future developments threaten the physical integrity of these sites. Many pertinent research questions

then could be addressed beyond the settlement data currently available, such as whether or not Paleoindian and Archaic remains lie buried beneath the dunes east of the mesa, if there is a Puebloan presence represented among the Late Prehistoric period resources, and what range of game animals were being hunted locally. The Pike's Stockade State Historic Monument property was a useful training ground for PAAC. Not only is the land mostly well suited topographically for survey instruction, but the archaeological remains are quite diverse and locally abundant. Many of the volunteer participants have earned PAAC certificates using their experience in site recording at the PSSHM, and several others are nearing completion of the certification requirements.

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Colorado Office of Archaeology and Historic Preservation
CULTURAL RESOURCE SURVEY MANAGEMENT INFORMATION FORM

Please complete this form and attach a copy behind the Table of Contents of each standard survey report.

Federal acres of Potential Effect/Project:	0	Acres surveyed:	N/A
State acres of Potential Effect/Project:	980	Acres surveyed:	907
Private acres of Potential Effect/Project:	0	Acres surveyed:	N/A
TOTAL:	980	TOTAL:	907

Legal Location of Project *(add additional pages if necessary)*

Note: Only generalized subdivision ("quarter quarters") within each section is needed

Principal Meridian: New Mexico Quad. map name(s) and date(s): Pike's Stockade, CO (1968)

County: Conejos

Township: 35 North	Range: 11 East	Sec.: 7	¼s SE				
Township: 35 North	Range: 11 East	Sec.: 7	¼s S½	of NE			
Township: 35 North	Range: 11 East	Sec.: 8	¼s SE				
Township: 35 North	Range: 11 East	Sec.: 8	¼s SW				
Township: 35 North	Range: 11 East	Sec.: 17	¼s NE				
Township: 35 North	Range: 11 East	Sec.: 17	¼s NW				
Township: 35 North	Range: 11 East	Sec.: 18	¼s N½	of NE			

	Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
		Prehistoric	Historical	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to Natl Register District	No Further Work	Preserve/Avoid	Monitor	Test	Excavate	Archival Research	Other (specify on additional pages)
Sites	5CN966	×					×			×						
	5CN967	×	×				×			×						
	5CN968		×			×					×	×			×	
	5CN969	×	×				×			×						
	TOTALS	3	3	0	0	1	3	0	0	3	1	1	0	0	1	0
Isolated Finds	5CN986	×					×			×						
	5CN987	×					×			×						
	5CN988	×					×			×						
	TOTALS	3	0	0	0		3			3						

Principal Investigator Name: Kevin D. Black Date: September 5, 2007
(please print or type)

Principal Investigator's Signature _____

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CULTURAL RESOURCE SURVEY MANAGEMENT INFORMATION FORM

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	Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
		Prehistoric	Historical	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to Natl Register District	No Further Work	Preserve/Avoid	Monitor	Test	Excavate	Archival Research	Other (specify on additional pages)
Sites	5CN970	×					×			×						
	5CN971	×						×			×		×			
	5CN972	×					×			×						
	5CN973	×					×			×						
	5CN974	×						×			×		×			
	5CN975		×			×					×	×			×	
	5CN976	×					×			×						
	5CN977	×				×					×		×	×		
	5CN978	×						×			×		×			
	5CN979	×					×			×						
	5CN980	×						×			×		×			
	5CN981	×					×			×						
	TOTALS	11	1	0	0	2	6	4	0	6	6	1	5	1	1	0
Isolated Finds	5CN989	×					×			×						
	5CN990	×					×			×						
	5CN991	×					×			×						
	5CN1011	×					×			×						
	5CN1012	×					×			×						
	TOTALS	5					5			5						

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CULTURAL RESOURCE SURVEY MANAGEMENT INFORMATION FORM

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	Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
		Prehistoric	Historical	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to National Register District	No Further Work	Preserve/Avoid	Monitor	Test	Excavate	Archival Research	Other (specify on additional pages)
Sites	5CN982	×						×			×		×			
	5CN983	×						×			×		×			
	5CN984	×	×				×			×						
	5CN985	×					×			×						
	5CN1002	×	×				×			×						
	5CN1003		×					×			×		×		×	Detailed instrument map of surface
	5CN1004	×						×			×		×			Tribal consultation
	5CN1005	×	×				×			×						
	5CN1006	×	×				×			×						
	5CN1007	×					×			×						
	5CN1008	×						×			×					Tribal consultation
	5CN1009		×				×			×						
	5CN1010	×	×				×			×						
	TOTALS	11	7	0	0	0	8	5	0	8	5	0	4	0	1	3
Isolated Finds	5CN1013	×	×				×			×						
	5CN1014	×					×			×						
	5CN1015		×				×			×						
	5CN1016	×	×				×			×						
	TOTALS	3	3	0	0		4			4						

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CULTURAL RESOURCE SURVEY MANAGEMENT INFORMATION FORM

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	Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
		Prehistoric	Historical	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to National Register District	No Further Work	Preserve/Avoid	Monitor	Test	Excavate	Archival Research	Other (specify on additional pages)
Sites	5CN75		×			×	[already listed on the NRHP]				×	×	×	×		Remote sensing
	5CN801	×	×			×					×	×				Tribal consultation
	5CN1387	×	×				×			×						
	5CN1388		×				×			×						
	5CN1389	×	×				×			×						
	5CN1390	×	×				×			×						
	5CN1391		×				×			×						
	5CN1392	×	×				×			×						
	TOTAL	5	8	0	0	2	6	0	0	6	2	2	1	1	0	2
Isolated Finds	5CN1017	×					×			×						
	5CN1018	×					×			×						
	5CN1019	×					×			×						
	5CN1020	×					×			×						
	5CN1393	×					×			×						
	5CN1394	×					×			×						
	5CN1395	×					×			×						
	5CN1396	×					×			×						
	5CN1397	×					×			×						
	TOTAL	9	0	0	0		9			9						

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CULTURAL RESOURCE SURVEY MANAGEMENT INFORMATION FORM

(Continuation page)

	Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
		Prehistoric	Historical	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to National Register District	No Further Work	Preserve/Avoid	Monitor	Test	Excavate	Archival Research	Other (specify on additional pages)
Sites																
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolated Finds	5CN1398	×					×			×						
	5CN1399	×					×			×						
	5CN1400	×					×			×						
	5CN1401	×					×			×						
	5CN1402	×					×			×						
	TOTAL	5	0	0	0		5			5						

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Acknowledgments

The success of the survey reported herein was due in no small measure to the field efforts of our 27 PAAC volunteers, all identified in the Introduction below. Their enthusiasm, initiative and patience made my work both easy and pleasurable. Permission to survey the Pike's Stockade area, and financial support for the project, was generously granted by the Colorado Historical Society represented by president Georgianna Contiguglia, state archaeologist Susan Collins, and regional museum director Rick Manzanares. Thanks are also due to Ray Lara of the La Jara Field Office of the Bureau of Land Management, for help with access issues south of the Conejos River. Conversations with professional archaeologists—both during and leading up to the survey—including Ken Frye, Ted Hoefer, Pegi Jodry, Marilyn Martorano, Vince Spero, and Dennis Stanford were very helpful in expanding my limited understanding of San Luis Valley archaeology; I am fortunate to count them as friends as well as colleagues. My gratitude is extended to geologist Bob Kirkham for stimulating discussions on the volcanic record of the San Luis Hills, and for supplying helpful reference materials.

PAAC volunteer Bruce Wahle provided many other geological references, produced settlement maps for this report, helped with the lab analysis, and authored a settlement study appearing in an appendix of this report. Other PAAC volunteers including Rowenna Blum, Melissa Bradley, Kris Holien, Pat Larson and Steve Larson also helped with the lab work in Denver. PAAC volunteer and Manassa resident Loretta Mitson provided some very helpful information on the area's history, both from recollections of her own ancestors' lives and from more recent talks with other long-time valley residents. Two of those residents from Sanford, Herman and Mary June Miller, graciously consented to an interview about their childhood reminiscences of the Pike's Stockade area. Marjorie Nowick and Suzanne Stone of engineering-environmental Management, Inc. (e^2M) in Englewood, Colorado provided portable X-ray Fluorescence analyses of collected volcanic artifacts. Many thanks to everyone, including those unnamed who I've overlooked, but for a better memory and a handier pencil.

Introduction

Every field season since 1991, an avocational training survey is conducted for volunteers in the Program for Avocational Archaeological Certification (PAAC), sponsored by the Office of the State Archaeologist of Colorado (OSAC), within the Office of Archaeology and Historic Preservation (OAHP) at the Colorado Historical Society in Denver (e.g., Black 1997a). Most volunteers are members of either the Colorado Archaeological Society (CAS) or San Luis Valley Archaeological Network (SLVAN), who receive credit toward the certification requirements in PAAC as a result of their participation on the survey. Over the past three seasons, the PAAC Summer Training Survey has been conducted at the Pike's Stockade State Historic Monument (hereafter PSSHM), a 396 hectare (980 ac) tract of state-owned land in southern Colorado's San Luis Valley administered by the Colorado Historical Society (Figure 1). Legal location of the project area is T. 35 N., R. 11 E., Sections 7–8 and 17–18, New Mexico P.M. as depicted on the Pike's Stockade, CO 7½′ topographic map (USGS 1968; see Appendix I, this report). This report summarizes the results from the 2004–2006 seasons that covered about 367 ha (907 ac) of the project area's terrain.

As with previous PAAC inventories (see Black 1992, 1995, 1997b, 2000a, 2003, 2004a), the project at PSSHM was designed both to provide training in archaeological surveying and mapping techniques to PAAC volunteers, and to gather baseline data on the archaeological record of a relatively poorly known part of the Colorado landscape. A total of 27 volunteers has participated since the project was initiated in June 2004, conducted in three sessions totaling 26 days of fieldwork. Selection of the PSSHM project area was based not only on its location in a part of the Southern Rocky Mountains where relatively little previous research had been conducted, but also on its ownership status as a State Historical Society property which helps OSAC meet one of its statutory functions. Pike's Stockade is one of 12 regional properties of the Colorado Historical Society (CHS), consisting of terrain on both sides of the Conejos River in the southern part of the San Luis Valley (Figure 1). The reconstructed stockade sits on the north bank of the river, in the approximate location where Capt. Zebulon M. Pike and ten of his men are believed to have spent February 1807 during their ill-fated expedition to explore the southwestern reaches of the Louisiana Purchase (Coues 1987; Jackson 1966).

No construction projects or other significant land-disturbing actions were known to threaten any part of the project area, but landscape changes as a fire-mitigation strategy were made around the reconstructed stockade prior to our second field season (Goddard 2005), and both maintenance and reconstruction work on the stockade itself took place the following year as preparation for the bicentennial celebration of Pike's winter occupation (Facilities Services 2006; Goddard 2006). Present land use south of the river is almost entirely limited to stock grazing, fishing, and seasonal hunting—activities that have resulted in relatively minor impacts to the archaeological sites observed. Land use north of the river is largely recreational, in part related to visitation of the stockade grounds, but also includes unrelated (and unauthorized) camping and other recreational pursuits by local youth whose exuberance has left some physical scars on the floodplain landscape.

The PSSHM is located about 5.5 miles (9 km) east-northeast of the town of Sanford, 2.0 miles (3.2 km) west of the smaller hamlet of Lasauses, and just north of Conejos County Road W

(Figure 2). Inventory was conducted on June 17–26 in 2004; on June 18–25 in 2005; and on June 14–21 in 2006. All survey and training was supervised by the author, who is Assistant State Archaeologist with OSAC and served as principal investigator on the project. The work was conducted under the provisions of Colorado State Permits #2004–21, #2005–6, and #2006–41, issued in accordance with the "Historical, Prehistorical, and Archaeological Resources Act" of 1973 (amended 1990; C.R.S. 24–80–401ff).

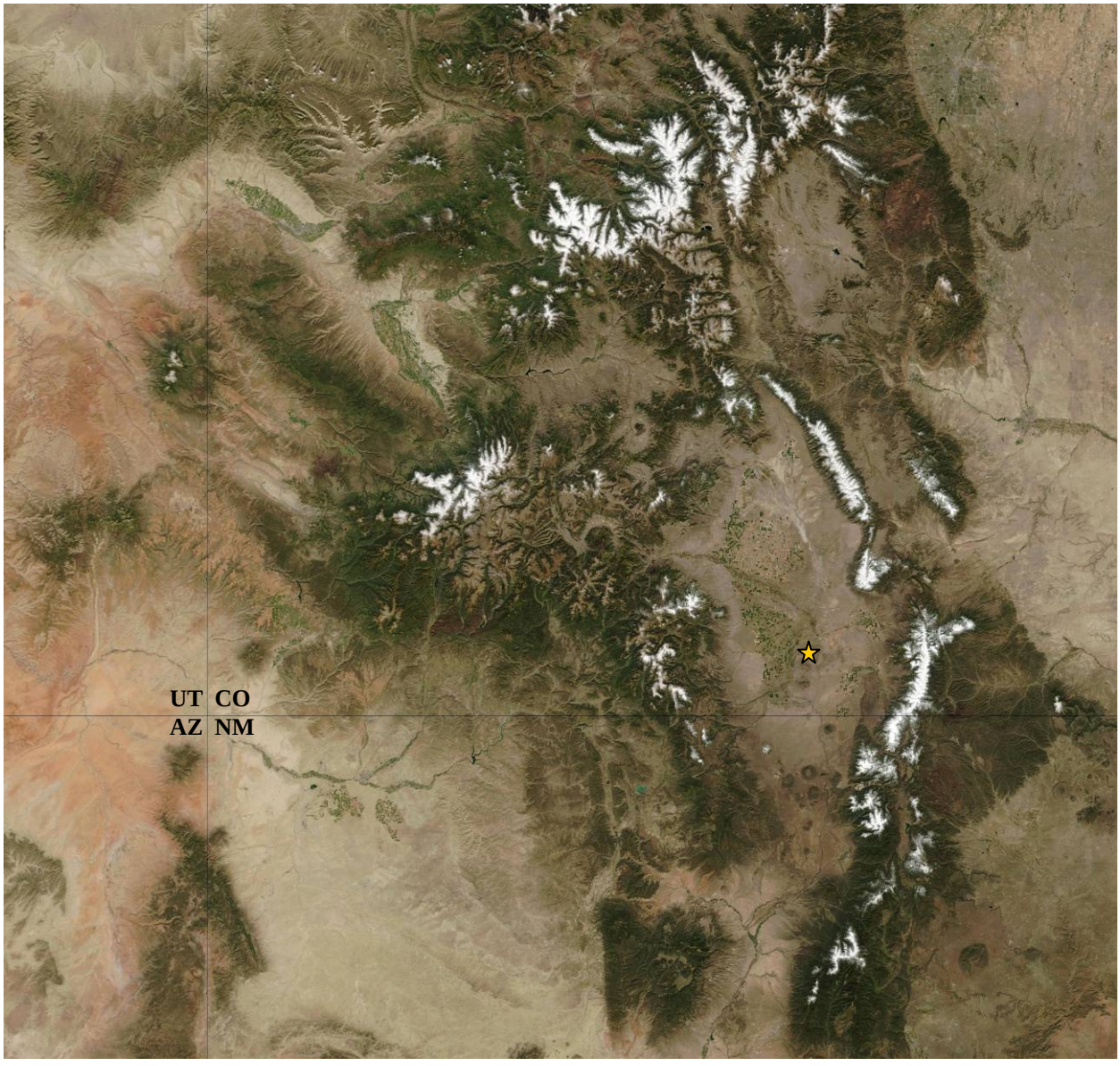


Figure 1. Satellite photo of southern Colorado and the Four Corners showing the location of the Pike's Stockade State Historic Monument [☆] within the San Luis Valley; NASA Visible Earth image, autumn 2002.

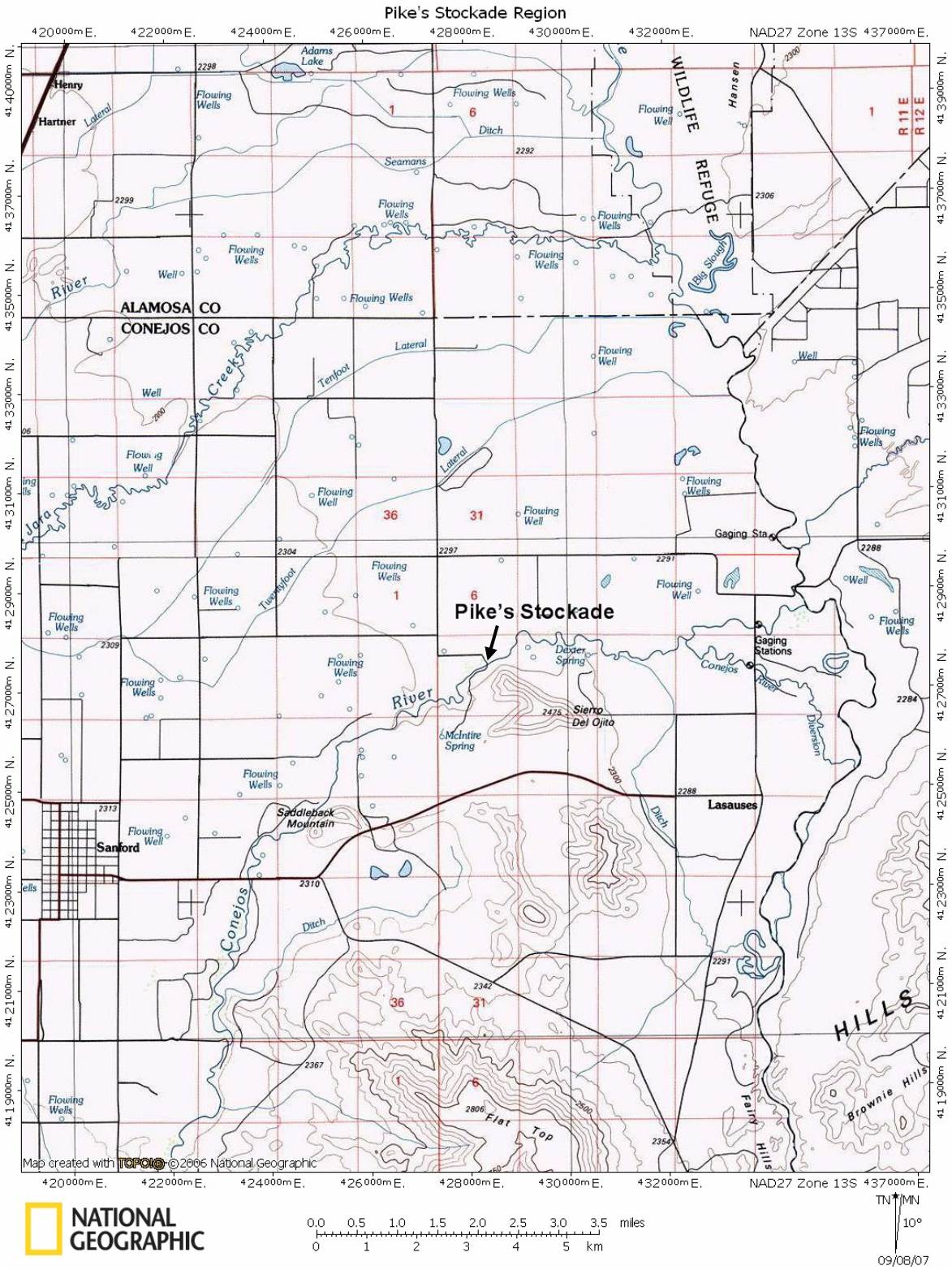


Figure 2. Map of a portion of the southern San Luis Valley showing Pike's Stockade, surrounding terrain, and towns.

The training program called PAAC has been in existence since the late 1970s, through a cooperative agreement between OSAC and CAS. Training proceeds through several levels emphasizing surveying skills, artifact recognition and description, and laboratory work. Volunteers earn certificates through successful completion of sets of courses in combination with field survey or lab activities (Hand 1983). Currently there are thirteen courses offered in the program, all taught by the author in cities and towns throughout Colorado, primarily where CAS chapters exist. Course length ranges from eight to 25 hours. Participation on training surveys such as at the PSSHM, thus, counts toward the field work requirements for PAAC certification. Volunteers can earn at least six certificates: three in the survey "module," two in laboratory work, and one or more in "specialty" areas.

The PSSHM project is the sixth PAAC training survey sponsored by OSAC (see Black 1997a), the others having been conducted at Dinosaur Ridge in Jefferson County, at the Heckendorf State Wildlife Area in Chaffee County, on the Blanco Trading Co. lease area in Montezuma County, around Trinchera Cave in Las Animas County, and at the Tomahawk State Wildlife Area in Park County (Black 1992, 1994, 1995, 1997a, 1997b, 2000a, 2003, 2004a). Prior to this report, data on the PSSHM project was made available in preliminary form during several conference presentations (Black 2004b, 2005a, 2005b, 2006, 2007; Wahle 2005).

A total of 27 volunteers, including 15 people affiliated with eight different chapters of CAS and eight members of SLVAN, participated on the survey at various times and received PAAC credit for their efforts. By chapter/group affiliation, these crew members included Melissa Bradley, Terry Dwyer, Pat and Steve Larson, Kay Miller, and Bruce Wahle (all of the Denver chapter); Larry Tradlener (of the Hisatsinom chapter, Cortez); Harley Tripp (of the C. T. Hurst chapter, Gunnison); Kris Holien and Marie Palowoda (from the Indian Peaks chapter, Boulder County area); Russ Seela (Northern Colorado chapter, Fort Collins–Greeley area); Richard Sundstrom (from the Pikes Peak chapter, Colorado Springs); Tom Doerk (with the Pueblo chapter); Rae and Rick Moeller (San Juan Basin chapter, Durango); Jan Bennett, Priscilla Carinci, Ellen Dodds, Joanne Ford, Jo Carroll Hann, Loretta Mitson, and Wayne and Yvonne Sturdevant (with the San Luis Valley Archaeological Network); Aaron Callicutt (Fountain Valley Historical Society, Widefield); and unaffiliated volunteers Allison Kenney (Grand Junction) and Amanda Vignery (Falcon). Six of these individuals (Terry Dwyer, Pat and Steve Larson, Kay Miller, Marie Palowoda, and Bruce Wahle) have earned 15 total PAAC certificates as a direct result of their field training, and several others are quite close to achieving certificates as well. One of the 27 volunteers is a professional archaeologist who participated on the survey in 2005: Elizabeth Morris of Bayfield, retired from Colorado State University.

Effective Environment

Physiography and Topography

The PSSHM is located in the southern portion of the San Luis Valley near Colorado's border with New Mexico, which is within the Southern Rocky Mountains physiographic province (Madole et al. 1987; Thornbury 1965:341–342). The San Luis Valley is the largest of

Colorado's intermountain valleys, encompassing all or portions of five counties (Simmons 1999). This valley includes a sizeable fraction of the headwater streams in the Rio Grande drainage system, of which the Conejos River is a major western tributary. The valley floor north of the PSSHM is an open, expansive plain with several distinctive features, most obviously including the Great Sand Dunes (Figure 3).

In the Rio Grande Basin prehistoric context book, Hoefer (1999a:6–7) divides the valley floor into the Closed Basin and Open Basin subareas, with the current project area located within the Open Basin section of the valley. This distinction recognizes the hydrological and other environmental differences comparing the internally drained "Closed Basin" in the north half of the valley and the portion of the valley farther south that drains into the Rio Grande. The PSSHM occupies a small part of the Open Basin subarea on both sides of the Conejos River about 5 km (3 mi) above its confluence with the Rio Grande. Most of the project area encompasses a rocky mesa called Sierro del Ojito in the northern stretches of the San Luis Hills, a volcanic landscape that dominates the southern end of the San Luis Valley on both sides of the Rio Grande (Figure 4). Some locals also refer to the mesa as "Pike's Hill" or "Pike's Lookout," because in 1807 Pike's men apparently used the crest as a vantage point for monitoring Spanish movements while wintering at the adjacent stockade.

Beyond the San Luis Hills, several mountain ranges surround and define the valley. The Sangre de Cristo Mountains to the northeast and east crest on extensive alpine ridges that top out on Blanca Peak at 4,372 m (14,345 ft). The southern section of the Sangre de Cristos south of La Veta Pass is called the Culebra Range, which extends well into New Mexico. To the west, the southern stretches of the sprawling San Juan Mountains form the headwaters of the Conejos River, reaching elevations of 4,025 m (13,200 ft). The more distant La Garita Hills to the north of the Rio Grande rim the northwest side of the valley, and converge on the Sangre de Cristos at Poncha Pass.

Within the PSSHM the topography ranges from the virtually flat floodplain of the Conejos River (where Pike's men built their stockade) to steep slopes in excess of 30° and low cliffs around the perimeter of Sierro del Ojito. The north side of the mesa drops precipitously to the extensive wetlands along the river (Figure 5), but three distinctive ridges descend in stair step fashion from its west, southwest, and southeast sides to provide potential access routes to the summit. Between these west and southwest ridges, erosion has carved a broad ⊃-shaped valley drained by a shallow, unnamed wash. The southern piedmont slopes gently away from the mesa toward County Road W, punctuated by a small cinder cone and large playa just outside the survey area. The lee side of the mesa is marked by a field of vegetation-stabilized sand dunes which extend well beyond the east boundary of the PSSHM onto private land. Northwest of the dune field a broad, low, bench-like ridge protrudes north-northeast toward the river and Dexter Spring. Overall elevation range within the PSSHM ranges from 2,296 m along the river to 2,495 m on the crest of Sierro del Ojito (7,535–8,185 ft).

Figure 3. Photograph looking north-northeast from the crest of Sierro del Ojito showing the Conejos River floodplain and valley terrain beyond the Pike's Stockade project area. The rock art panel at 5CN801 is visible in the left foreground, and the Great Sand Dunes can be seen on the horizon to the left of Blanca Peak.

Figure 4. The San Luis Hills as seen from Sierro del Ojito, looking south toward Ute Mountain on the horizon.

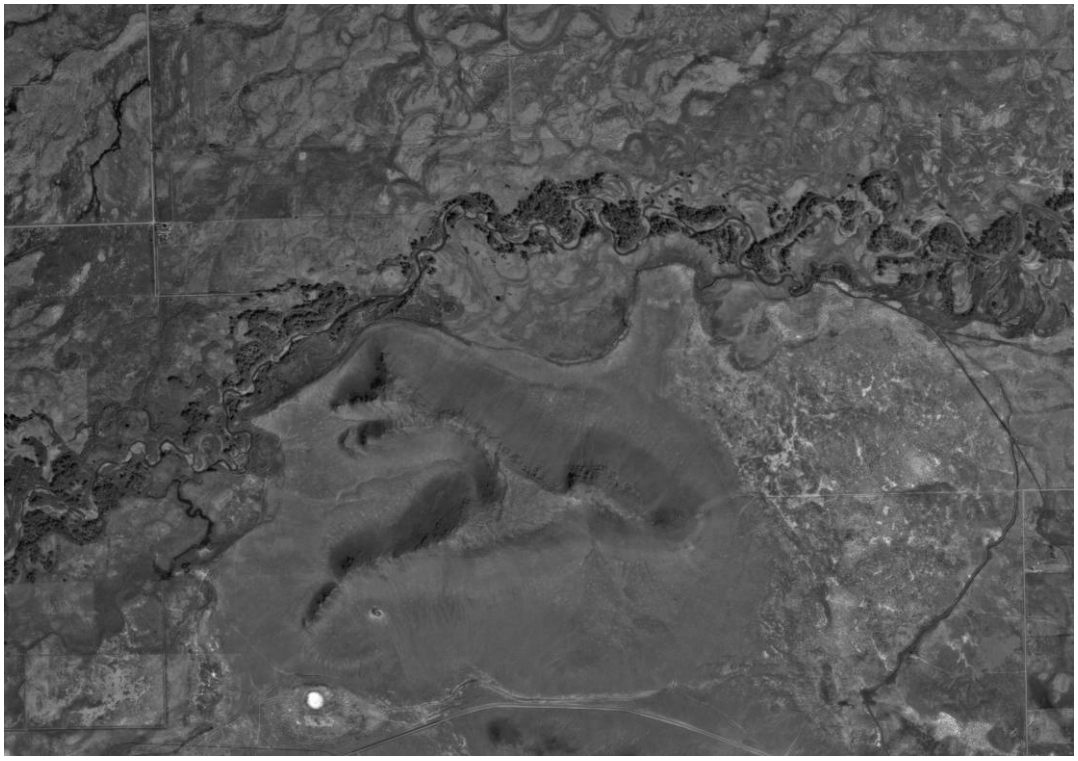


Figure 5. Aerial photograph showing Sierro del Ojito and the adjacent Conejos River flood-plain; the white spot at lower left is a playa. North is at the top in this view covering ca. 3.35 km (2.1 mi) north-to-south. This figure encompasses the southern portion of U.S. Geological Survey aerial photo #AB1NAPPW0011391–26, taken September 16, 1998.

Climate and Paleoclimate

The San Luis Valley's combination of encircling mountainous terrain and moderately high elevations result in a relatively cold, very dry climate—the driest in Colorado. Nearest weather stations to the PSSHM are at Alamosa and Manassa, with the latter station perhaps most relevant in terms of its proximity to the PSSHM and its topographic position adjacent to the San Luis Hills. Records at both stations show that January is the coldest month, February is the driest, July is the warmest, and August is the wettest (Western Regional Climate Center 2007). Comparing the two stations, Manassa is slightly wetter (more from rain than snow) and warmer than Alamosa; the biggest difference between the two is in annual snowfall and record low temperatures. The Alamosa record shows annual snowfall of 80.5 cm (31.7 in) compared to 63.5 cm (25.0 in) in Manassa, while the low temperature extreme of -36.7° C (-34° F) on January 12, 1963 in Manassa was topped by a -41.1° C (-42° F) reading in Alamosa on December 14, 1964.

Manassa's 58-year long record covers the period September 10, 1948 to October 31, 2006. Those records document annual precipitation of only 19.35 cm (7.62 in), peaking in August at 3.63 cm (1.43 in) but with a meager .58 cm (.23 in) in February (comparable to the Alamosa data covering the nearly identical 57-year period); the maximum annual snowfall of 134.9 cm (53.1 in) occurred in 2004. The average annual temperature is 5.9° C (42.6° F), with a mean high of

27.3° C (81.2° F) in July and a mean low of -16.4° C (2.4° F) in January. High temperatures in mid-summer have never exceeded 35° C (95° F) during the period of record. The length of the growing season is short (54–131 day range, avg. 98 days), limiting current crop production to grains such as wheat and barley, and root crops—notably potatoes. In Manassa, chances are 50–50 that the last day below 0° C (32° F) in the spring will occur as late as June 8, and that the first freeze in the fall will arrive by September 11.

Ancient environments and climatic changes influential in the archaeological record of the San Luis Valley are summarized by Jodry (1999a) and Martorano (1999a). For the Paleoindian period, Jodry (1999a:25–26) notes that the Younger Dryas climatic oscillation of ca. 11,100–10,000 BP (12,900–11,700 BP calibrated) was significantly cooler and wetter than both preceding and subsequent centuries, resulting in cirque glacier advances, a lowering of upper timberline, and a rise in freshwater pond and lake levels in the San Luis Valley. Grazing herbivores, notably bison, were more abundant during these times, and Folsom hunters took advantage of this bounty. Warmer and drier conditions of the Early Holocene coincide with the appearance of the Foothills-Mountain and Cody complexes in the region ca. 9000–7500 BP. The expansion of pinyon pine forests into the San Luis Valley area about 9500 BP also is notable.

For the Archaic and Late Prehistoric periods, Martorano (1999a) describes a number of potentially significant changes, particularly detailed for the last 1,000 years when tree-ring data can be added to the palynological record. A climb in the position of lower treeline at 7000–5500 BP is suggestive of drought stress (elsewhere commonly associated with the Altithermal climatic episode), reaching a nadir in effective moisture around 6500 BP (Martorano 1999a:27–28). The Como Lake pollen record indicates sufficient cooling to depress the upper treeline below the lake by 4000 BP, then a return to warmer (and drier?) conditions with treeline moving back up above the lake by 2000 BP. The archaeological evidence from the sand dune field just east of Sierro del Ojito at the PSSHM suggests that sand began accumulating just before or during Late Prehistoric times, perhaps in the warming climate around 2000 BP.

Martorano (1999a:29–30) remarks on changes in climatic variability during the Late Prehistoric period, noting higher decadal variability in precipitation prior to AD 1400, relatively stable precipitation regimes ca. AD 1400–1570, followed by an intense drought at AD 1570–1600. Interestingly, the "Great Drought" of the late AD 1200s in the American Southwest is not in evidence in the tree-ring records of the San Luis Valley. After AD 1600, climatic variability gradually declines to reach the most stable precipitation pattern in the late 1800s, returning to the more variable conditions presently experienced around the beginning of the twentieth century. Historically, the higher elevations in the San Luis Hills apparently had enough of a (pinyon-juniper?) forest cover to support local logging operations (Loretta Mitson, personal communication 2005), but our crews saw no evidence in the form of stumps or other wood remnants on Sierro del Ojito.

Geology and Toolstone Sources

The geology in the vicinity of the project area is summarized by Burroughs (1971, 1972), Machette and Thompson (2005), and Thompson and Machette (1989). The volcanic terrain of

the San Luis Hills is paramount in any such discussion, as Sierro del Ojito within the PSSHM is the northernmost of these hills on the west side of the Rio Grande. According to Burroughs,

> The San Luis Hills occupy an area of 428 square miles in the center of the San Luis basin located at the northern end of the Rio Grande depression. The San Luis Hills consist of volcanic rocks of the Tertiary Conejos Formation intruded by Late Oligocene stocks dated at 27.7 m.y. Three local members of the Conejos Formation are recognized: the Wildhorse, La Sauses, and Manassa. These volcanics are rhyodacites and trachyandesites of intermediate compositions… [Burroughs 1972:iv].

More specifically he notes that, "At Sierro del Ojito the lava flows [of the Manassa member of the Conejos formation] lie unconformably on crystal tuffs of the La Sauses Member" (Burroughs 1971:281).

However, more recent, detailed mapping has resulted in a reassessment of the volcanic formations in the area. Most of the bulk of Sierro del Ojito is built of basaltic-appearing trachyandesite flows forming prominent cliffs and benches, and cap the crest of the mesa. Large boulders detached from these cliffs and ledges litter the slopes, and smaller gravels form dense lag deposits on the gentler piedmont below the mesa (Figure 6). Both Thompson and Machette (1989) and Machette and Thompson (2005) identify these lava flows as part of the Hinsdale formation rather than the Manassa member of the Conejos formation. The Hinsdale formation has been dated to 26 m.y. in the San Luis Hills (upper Oligocene; Thompson and Machette 1989). Slightly older, lighter-colored volcanic rocks form prominent outcrops along the lower south slope of Sierro del Ojito, and all geologists noted above place these deposits in the lower Conejos formation—named the La Sauses member and identified as rhyodacites by Burroughs (1971, 1972). Many geologists today would classify the rocks of the La Sauses member at Sierro del Ojito as trachydacites, based on the widely-accepted classification system of Le Bas et al. (1986; Robert Kirkham, personal communication 2005).

The most recent geologic studies (Machette 2004; Machette and Thompson 2005) additionally reassess the origins of certain lower elevation deposits in the San Luis Hills region as part of the Alamosa formation of Siebenthal (1910). This formation represents sediments accumulated at the bottom and shores of ancient Lake Alamosa, a body of water that existed from the Pliocene to middle? Pleistocene epochs, and reached a maximum elevation of 2,332–2,338 m (7,650–7,670 ft). Thus, Machette and Thompson (2005) map the formation around most of the base of Sierro del Ojito with the exception of the northernmost foot of the mesa near the Conejos River. A prominent spit or barrier bar of the lake curves to the southeast from the southwestern toe of the mesa just outside our survey area, and shoreline deposits of the uppermost Alamosa formation also occur on the southeastern piedmont slope and on the broad bench trending north-northeast toward Dexter Spring (Machette and Thompson 2005).

Figure 6. The northeast foot of Sierro del Ojito above sites 5CN970–972 is littered with large boulders and smaller gravels eroded from the slopes of the mesa. This view is to the northwest showing the Conejos River course through the cottonwood grove at middle right.

a. **b.**

Figure 7. Native pebbles and small stones of chert and chalcedony can be found on the crest of Sierro del Ojito and amid outwash gravels around the foot of the mesa. The largest cobble found on the survey is shown at right.

Several other Quaternary-age deposits are mapped within the project area by Machette and Thompson (2005). These include Holocene cover sands forming vegetation-stabilized dunes

at the east edge of the PSSHM and just southwest of the survey area around the prominent playa seen in Figure 5; Holocene pond sediments within that playa; Holocene alluvium along the Conejos River and its floodplain; late Pleistocene alluvium on the lower piedmont slopes of Sierro del Ojito; and Pleistocene/Holocene rockfall and talus on the west and northeast slopes of Sierro del Ojito. Thus, the only solid bedrock units in the survey area are the volcanic rocks on the mesa. Not surprisingly, toolstone materials observed on local archaeological sites mainly come from sources outside the project area, albeit not from great distances. However, a small number of artifacts were made from local toolstone scattered amid the gravels both on the crest and lower slopes of Sierro del Ojito. These materials are cherts and chalcedonies of various light to medium colors—primarily in the gray/white/yellow/brown color range—occurring as mostly small nodules about 3–5 cm in diameter, the largest measuring 11 cm long (Figure 7). In addition, the only metate recorded in the area was made from the local Hinsdale formation trachyandesite.

Additional toolstones found on sites in the PSSHM include other cherts, jasper, agate, chalcedony, basalt, and obsidian, but only rare examples of other materials such as siltstone, petrified wood, or quartzite. Sources for these materials are assumed to be mostly in the San Luis Valley and immediate surroundings (Black 2000b; Spero and Hoefer 1999a), but very few geochemical studies have been done to demonstrate provenance. One of the better represented materials at PSSHM is comparable to Cumbres chert, a mottled gray/white/yellow toolstone found in the Cumbres Pass area on the Colorado–New Mexico state line (Spero and Hoefer 1999a:186). The formation yielding this material has not been identified. Obsidian is not as abundant in the PSSHM as might be expected given the proximity to sources in northern New Mexico. But those materials that do occur here likely come from Jemez Mountain sources. For example, Vierra et al. (2005) found that a large percentage of Late Paleoindian and Early Archaic period projectile points found in the San Luis Valley and made from obsidian could be traced to the El Rechuelos source (a.k.a. "Polvadera Peak"), and all but one obsidian point were made from northern New Mexico material. Portable XRF chemical analysis of three obsidian artifacts from the PSSHM collection was inconclusive (Appendix V).

Dark gray to black, fine-grained volcanic toolstone commonly identified as basalt is widespread in artifact assemblages of the southern San Luis Valley into northern New Mexico, and is not uncommon at PSSHM; potential sources of this material have been recognized since the 1930s (Bryan and Butler 1940; Renaud 1946:34–36; Spero and Hoefer 1999a:188–189). However, only in recent years have geochemical studies provided definitive associations between artifacts and specific source areas, as well as clarifying the classification of the rock types involved. Newman (1994:493) lists four major sources of high quality "rhyodacite" on the Taos Plateau just south of the San Luis Hills, at Cerro Negro Mountain, an unnamed source east of Cerro Montoso, San Antonio Mountain, and Ute Mountain. Spero and Hoefer (1999a:188) identify the San Antonio Mountain source(s) material as visually comparable to flaked stone artifact materials seen on sites in Conejos County and adjacent areas. Boyer et al. (2001) and Boyer (2005) update information on Taos Plateau volcanics, note the presence of sources beyond those listed by Newman (1994), and identify the San Antonio Mountain material as a glassy andesite—confirming the work of Bryan and Butler (1940). Finally, Vierra et al. (2005) documented the probable association of San Luis Valley "basalt" artifacts with two source areas

in northern New Mexico using XRF techniques. Most artifacts were traced to "Source A" at San Antonio Mountain, with lesser numbers made using materials from San Antonio Mountain "Source B" and the Cerros del Rio (Mesita de las Aguilas) quarry in Bandelier National Monument. Ten of the dark volcanic materials in the PSSHM collection were analyzed using a portable XRF instrument, and four of the ten appear to derive from the San Antonio Mountain sources (Appendix V).

Soils

Soils within the project area are quite diverse owing to variations in bedrock, vegetation cover, availability of moisture, and topographic settings. Yenter et al. (1980) map nine different soil units within the boundaries of the PSSHM, three of which have developed in the wetter river floodplain and terrace zones around the reconstructed stockade. Most extensive here are soils of the Quamon-LaJara complex on both sides of the river. These soils are variable in depth, permeability, and rockiness ranging from brown, gravelly sandy loams to grayish-brown or gray, non-gravelly loams and sandy loams; topsoils are 12–20 cm thick over subsoils extending to depths of 40–53 cm. The Alamosa loam is present only at the northern edge of the PSSHM and is typically deep and poorly drained. Its topsoil of grayish-brown loam averages 15 cm thick with subsoil clay loams developed to nearly a meter below the surface. A third unnamed floodplain soil occurs on the south side of the river, east of Pike's Stockade. It is a deep, gravelly, poorly drained soil subject to frequent flooding. The topsoil is a 20 cm thick, light grayish brown sandy loam over a very pale brown gravelly sand to depths of 56 cm. Although the depths of these soils could hold significant buried cultural materials, the frequency of flooding or elevated ground moisture probably limits the quality of preservation of any such archaeological materials.

Two more soil units are mapped on the piedmont slopes around the west, south, and east sides of Sierro del Ojito. The Garita cobbly loam (Yenter et al. 1980:57–58) is a deep, well-drained soil found on slopes up to 11°, primarily developed in lacustrine deposits of ancient Lake Alamosa (Machette and Thompson 2005). Topsoils are generally light grayish brown cobbly loams about 18 cm thick above very pale brown, very cobbly loams to a depth of 50 cm. The adjacent McGinty sandy loams are found in alluviums derived from basalts and other volcanics. These soils are deep, generally well-drained, and occur on gentle slopes up to 4°. Topsoils 5–38 cm thick are brown to light gray sandy loams above light gray sandy loams reaching depths of 80 cm. The crest and upper slopes of Sierro del Ojito are mapped as Travelers very stony loam (Yenter et al. 1980:68). This soil is commonly shallow and excessively drained, developed from the local volcanic bedrock and occurring on flat to sloping lands up to 11°. The topsoil is brown, very stony loam usually no more than 10 cm thick; subsoil is an equally thin, pale brown, very stony loam to an average depth of 30 cm. As one might expect, the potential for intact buried cultural materials is higher in the thicker soils of the piedmont, particularly on the gentler slopes.

The remaining soil units are in and adjacent to the sand dune field at the east edge of the survey area. The Corlett-Hooper complex barely extends into the east edge of the PSSHM; the Corlett is a deep, alkaline, light brownish gray loamy fine sand "formed in wind-modified sandy

alluvium on low dunes" (Yenter et al. 1980:12), with a thin topsoil of 7–20 cm above dunal sands 150 cm or more deep. Hooper soils are loamy fine sands and clay loams that occur in interdunal areas. Yenter et al. (1980:19–20) distinguish Hooper clay loams lacking an aeolian surface layer from Hooper loamy sands that have such a thin topsoil no more than 15 cm thick. Subsoils are heavy clay loams to a depth of 94 cm. As will be discussed later in this report, diagnostic artifacts within the dunes east of Sierro del Ojito date to the Archaic and—especially—the Late Prehistoric periods, suggesting the sand began accumulating about 2,000 years ago. Clearly, the potential for intact buried remains is quite good in stabilized sections of the dune field, and preserved components older than the Late Prehistoric period may exist below the dunes.

Hydrology and Water Sources

The availability of reliable water within the PSSHM varies tremendously. The northern portion of the study area is dominated by the broad valley of the Conejos River, a mature perennial stream with countless meanders and cutoff oxbow ponds. The river has a nearly flat floodplain more than 3 km (2 mi) wide in areas near Pike's Stockade (see Figure 5), and its flow is supplemented by two local, perennial springs. The larger of the two is McIntire Spring (a.k.a. McIntire's Springs or Los Ojos) on the south side of the river just west of Sierro del Ojito, the flow from which is warm enough to keep a stretch of the river ice-free in the winter. This fact in part accounted for Pike's decision to build his stockade immediately downstream from the spring in February 1807 (Dubbs 1927:30; Simmons 1999:9). No doubt, Albert McIntire's ranch house location next to the spring was chosen for similar reasons (see historical overview below). The second local spring is Dexter Spring, also located on the south side of the river not far from the northeast corner of the PSSHM. This is a significantly smaller water source and no warmer than the adjacent river itself, thus likely of lesser importance to local inhabitants.

It would not be exaggerating to describe the bulk of the PSSHM beyond the river and springs as "bone dry". No drainages or springs occur on the crest of Sierro del Ojito, and the mesa's slopes are devoid of water most of the year as well. The wash developed on the west side of the mesa is by far the largest drainage in the area other than the river, but our crews never saw even a trickle of water in it in the three seasons of fieldwork. Clearly the wash can carry a significant flow given the gullying present in the valley, but it must take exceptional snowmelt or long-term rains to generate runoff rather than just soaking into the porous soils of the area. One other small wash has cut an arroyo on the south slope of Sierro del Ojito, and the large unnamed playa just southwest of the PSSHM might also hold [likely rather saline] water after heavy rains.

Flora and Fauna

Vegetation communities in the San Luis Valley are described by Dixon (1971) and Hoefer (1999a). In a nutshell, the vegetation cover of the PSSHM is dominated by open shrublands of saltbush, sagebrush, winterfat, prickly pear cactus, and snakeweed bordering lower piedmont slopes with greasewood, rabbitbrush, and saltbush. A narrow strip through the northern portion of the PSSHM contains the riparian zone of cottonwoods, willows, cattails, and sedges on the

Conejos River's floodplain. Around the reconstructed stockade, native floodplain growth has been supplanted with landscape plants such as lilac bushes and formal rows of cottonwood trees. The crest of Sierro del Ojito has a rather sparse cover of grasses and forbs, but portions of its slopes exhibit vegetation of somewhat different character. For example, the north-facing slope in the large drainage basin on the west side of the mesa has a dense, extensive growth of narrowleaf yucca, while the lower south slope of the mesa around the trachydacite outcrops of the lower Conejos formation have a sparse shrub cover that includes Apache plume, skunkbrush, and wax currant.

The sand dune field east of Sierro del Ojito supports locally productive stands of Indian ricegrass and wax currant, but otherwise exhibits the same greasewood–rabbitbrush–snakeweed–saltbush–prickly pear cactus association found beyond the dunes. Over the course of three field seasons, numerous flowering forbs were observed among the shrubs and grasses at PSSHM including wild four o'clock, claret cup cactus, ball cactus, fleabane, and sulfur flower. Other forbs and grasses noted include goosefoot, needle-and-thread grass, and foxtail barley. Logging of woodlands atop the San Luis Hills was apparently done into the early twentieth century (Loretta Mitson, personal communication 2005) but there is no physical evidence of this in the form of stumps or fallen logs on Sierro del Ojito, and lifelong resident Herman Miller (personal communication 2007) does not recall ever seeing such evidence on the mesa either.

Faunal populations in the San Luis Valley are summarized by Keen (1971) and Hoefer (1999a:11). Summer visitors to Pike's Stockade observe (and experience) a very different fauna from that characterizing the dry uplands of Sierro del Ojito. The floodplain around the stockade has a well-deserved reputation as a haven for mosquitoes, and as an outstanding bird habitat such as for bald eagles and the endangered southwestern willow flycatcher (Zink and Associates 2003:27, 69–70). Among the other avian species observed by our crews during the three seasons of the survey were a variety of ducks, herons, yellow-headed blackbirds, egrets, coots, mourning doves, hawks, crows, vultures, night hawks, poorwills, rock wrens, goldfinches, and a (short-eared?) owl. Fish and frogs populate the river, and reptiles were commonly observed on the drier slopes and crest of the mesa—our crews spotted numerous prairie rattlesnakes (Figure 8), bull snakes, horned lizards, and fence lizards. Also seen were chipmunks, ground squirrels, woodrats, cottontail rabbits, black-tailed jackrabbits, coyotes, and mule deer. Bison and larger predators such as wolves and grizzly bears no doubt occurred here in the past but have been locally extirpated, although bison have been reintroduced north of the PSSHM around the Great Sand Dunes National Park and Preserve.

Environmental Constraints

Overall, there were few environmental constraints endured on the PSSHM inventory. Weather-related delays were both brief and infrequent, with only a couple days of cumulative time lost to rain and/or lightning over the course of the project. Ground visibility was good to excellent over most of the project area with the exception of the floodplain. The most important constraints were the presence of steep slopes exceeding 25º on the upper slopes of Sierro del Ojito, and the high populations of mosquitoes on the floodplain. The steepest of the mesa slopes

Figure 8. Prairie rattlesnakes were observed in the project area both on the rocky mesa slopes and, in this instance, in shrub lands at the foot of the mesa.

Figure 9. Smoke from the 2006 Mato Vega fire near La Veta Pass was clearly visible from the project area. The view is to the northeast; the Blanca Peak massif is at left.

were not surveyed, and only a single afternoon was spent surveying the bottomlands around the stockade. Smoke and haze from the Mato Vega wildfire in 2006 was clearly visible (Figure 9) but did not affect air visibility at the PSSHM, unlike a couple of brief sandstorms that blew through the area in 2004. Impacts from stock and game animal grazing and trampling were noticed especially in the low sand dunes, although there was no evidence of concentrated damage to any archaeological sites. Rodent burrowing, on the other hand, is ubiquitous and is a noticeable impact to the lower piedmont slopes south of Sierro del Ojito as well as in the dune field. Gnats were numerous and bothersome on some days, but less so overall than mosquitoes on the floodplain. Fewer rattlesnakes were encountered than predicted, although enough made their presence felt to keep the crew wary.

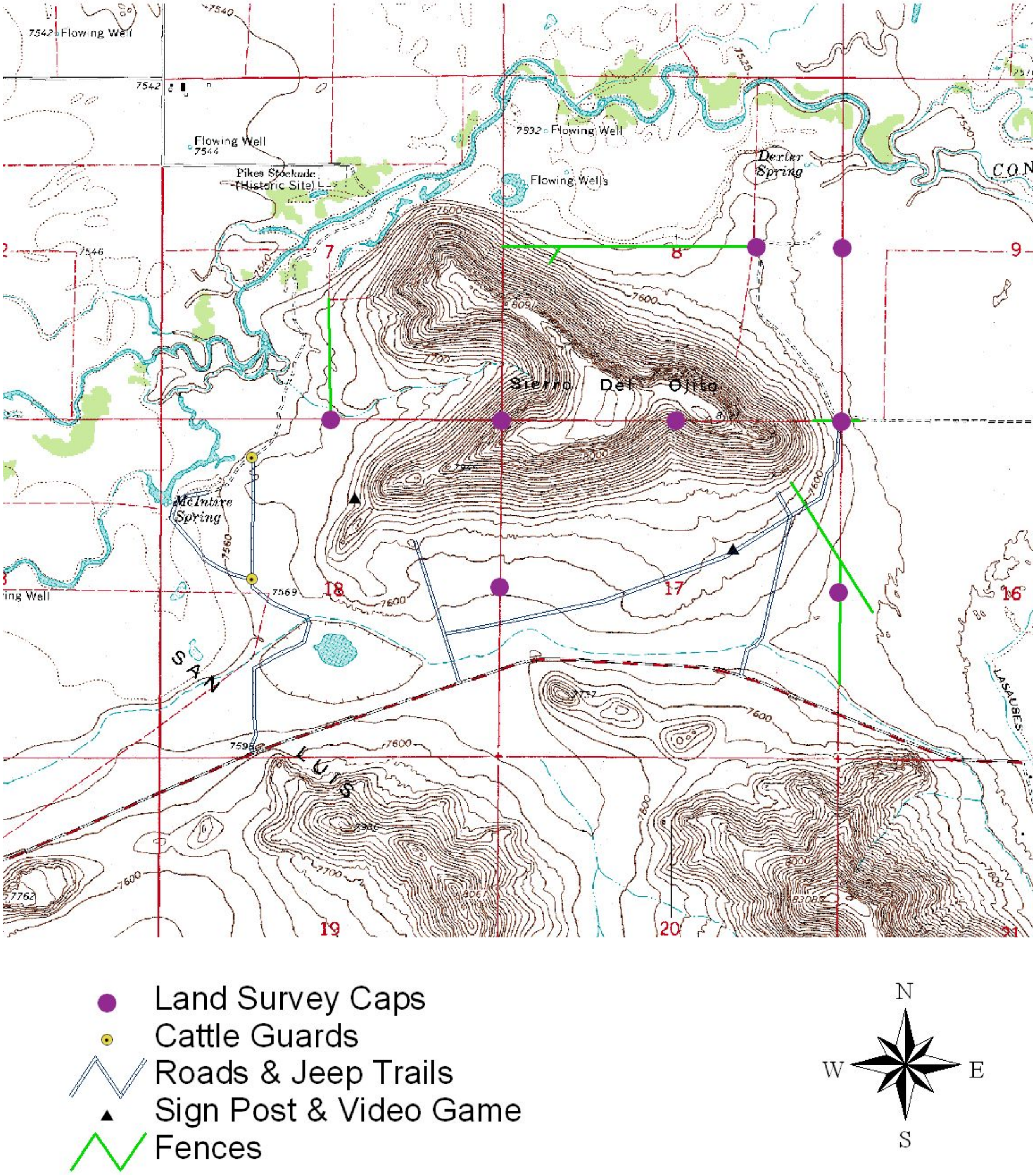
Modern cultural impacts to the archaeological sites in the project area were minor overall; only in a few instances was any evidence of artifact collecting observed. Fence building around the perimeter of the PSSHM occurred in the recent past, notably along the BLM border west of the mesa, and along a portion of the E-W private land border to the northeast in Section 8. Oddly, a spur fence off the latter boundary fence runs to the southwest onto the lower slope of the mesa, for reasons unknown. Older ranch fences also follow the PSSHM border on the northeast and east sides, and a second oblique fence line runs southeast from the foot of the mesa onto private land. However, fencing is entirely absent along the south and southwest edges of the area. Small roads traverse the terrain to the reconstructed stockade, toward and beyond the McIntire Ranch ruins, and across the lower piedmont slopes on the south and east sides of the mesa. Finally, land survey monuments marked by metal caps were found at several section corners and quarter corners, mainly in the eastern and southern portions of the project area. Figure 10 depicts the modern features noted in the PSSHM.

Existing Data and Literature Review

A search of files at the Office of Archaeology and Historic Preservation in Denver conducted prior to the first field season revealed that relatively little work had been done either in the vicinity of the PSSHM, or within the project area. Only three sites had been recorded in or adjacent to the project area previous to our survey: Pike's Stockade site 5CN75 (Dubbs 1927; Goddard 2005, 2006; Mrzlack 2002), the McIntire Ranch site 5CN793 (Fike 2001; Hassrick 1995; Pfertsh 2007), and Sierro del Ojito rock art site 5CN801 (Frye 1995; Kessler 2000:128–129; Mrzlack 2002). In all three cases, the sites were documented individually rather than as part of a larger inventory.

Hassrick (1995) examined linear areas east of McIntire Ranch where fences were later built, including one N-S stretch on the PSSHM boundary in the south half of Section 7. He noted, but did not record, the presence of prehistoric flaked stone artifacts in the NW¼ of Section 18, on BLM and private land west of the PSSHM. Mrzlack (2002) reported on limited test excavations at Pike's Stockade site 5CN75 and a reconnaissance-type survey of the PSSHM that relocated rock art site 5CN801 and noted—but again did not formally record—several historic sites with cairns and stone circles. As mentioned in the "Introduction" to this report, Goddard (2005, 2006) conducted monitoring and test excavations at Pike's Stockade in advance

Figure 10. Modern Features at Pike's Stockade



of landscaping improvements and maintenance on the reconstructed stockade. Neither the testing program by Mrzlack (2002) nor by Goddard (2006) encountered any archaeological evidence of Pike's February 1807 occupation of the site.

Prehistoric Context

In the Rio Grande context book by Martorano et al. (1999:42–145), the chronology of the basin is presented as a sequence of four general stages: Paleoindian, Archaic, Late Prehistoric/ Ceramic, and Protohistoric. No time periods are defined, although the sequences of periods and phases from other authors' research are noted. Hoefer (1999b:38) acknowledges the inconsistent use of terms found in reports on the local archaeology, for example the application of Oshara tradition phases such as Bajada or San Jose to describe some Archaic assemblages vs. the use of Plains Archaic time periods such as Early Archaic or Middle Archaic applied to other contemporaneous materials. Unfortunately, in the absence of extensive excavation data in the San Luis Valley—especially for post-Paleoindian materials—there is no easy way out of this situation at the present time. For the survey data presented later in this report, artifact types and assemblages are compared to whatever regional archaeological manifestations provide the closest match. It can only be hoped that future research clarifies the association of San Luis Valley archaeology with traditions and complexes defined in surrounding regions. The chronology of the PSSHM will be presented in terms of the time periods shown in Table 1, which represents a kind of averaging of chronologies from a number of sources noted in Martorano et al. (1999).

Table 1. Time Periods Used in the PSSHM Survey

Time Period	Date Range, BP*	Date Range, BC/AD**
Paleoindian period	11,500–7850	11,400–6750 BC
Early Archaic period	7850–5200	6750–4000 BC
Early/Middle Archaic period	7850–3500	6750–1800 BC
Middle Archaic period	5200–3500	4000–1800 BC
Middle/Late Archaic period	5200–1850	4000 BC–AD 150
Late Archaic period	3500–1850	1800 BC–AD 150
Late Prehistoric period	1850–400	AD 150–1600
Protohistoric period	400–200	AD 1600–1800
Historic period	400–50	AD 1600–1955

*Dates expressed in years BP generally derive from uncorrected radiocarbon ages, rounded to the nearest 50–100 years, except dates for the past 400 years from historical sources.

**Calendar ages before AD 1600 are rounded numbers from use of the radiocarbon calibration model available on-line (Calib version 5.0.2; Stuiver et al. 2005).

The general summary provided by Spero and Hoefer (1999b:36) notes that the territory from Alamosa southward toward the San Luis Hills has received less attention from archaeologists than the Rio Grande corridor on the county boundary east and southeast of the

PSSHM. Indeed, two of the earliest recordings of archaeology in the region come from sites on and near the Rio Grande southeast of the PSSHM: 5CT27 and 5CN31. The latter is the King Turquoise Mine, since the early twentieth century known to have been quarried by Indian tribes in ancient times (Harvey and Harvey 1938). Horn (2003) surveyed around the mine and thoroughly documented the historic features there, but did not encounter any direct evidence of the earlier quarrying by Indian groups. Site 5CT27 is a rockshelter on the east bank of the Rio Grande, southeast of the turquoise mine, and was first reported to University of Denver (DU) archaeologist E. B. Renaud by Al Pearsall (1939), who published a brief note on his sifting of looters' backdirt there. A later trenching excavation by Pearsall and Eugene ("Gene") Sutherland—who referred to it as Site No. 3—is described by Renaud (1942a:31–33) using the DU site number C 932.

For Renaud (1942a:31–34; 1944:37), site 5CT27 was important in establishing the relative age of his "Upper Rio Grande culture" (also see Honea 1969:60–61, 67–68). The rockshelter, albeit partly vandalized, exhibited clearly stratified deposits. Surface indications included a petroglyph panel with geometric motifs, a wall partially enclosing the mouth of the shelter, flakes, and two types of pottery—one made of "Apache Clay" (Renaud (1942a:31). Later analysis of site collections at DU by Downing (1981:145–146, 156–157) identified two punctated Dismal River sherds from 5CT27. A Pueblo IV period component was buried in the upper 60–75 cm of deposits, and yielded a variety of flaked stone, ground stone, ceramic, and bone artifacts but no corn macrofossils. Gray and white ware sherds in this component were sent to H. P. Mera at the Laboratory of Anthropology in Santa Fe, who identified Bandelier Black on Grey and Cundivo Indented types of the 15th century (Pearsall 1939:7–8). Downing's (1981: 151–158) reanalysis classified the sherds as Bandelier Black on Grey, Kana'a Black on White, and unnamed corrugated types.

A culturally sterile "yellowish deposit" up to 10 cm thick separated the Puebloan level from the deepest component at 5CT27 (Renaud 1942a:32), which Renaud (1942a, 1944, 1946) considered a typical example of Upper Rio Grande cultural material. This deposit was a 40–50 cm zone of flaked stone, ground stone, bone, and charcoal; the general characteristics of the three major artifact materials were distinctive from those in the overlying Puebloan component. Flaked stone was consistently made from dark to black-colored volcanic rock types including basalt and obsidian; the ground stone was dominated by oval manos and/or hide rubbing stones, many of which doubled as mauls; and the bone included bison-size elements that were absent in the younger deposits. Downing (1981:Figures 2–3) illustrates two projectile points from the site, one a side-notched specimen with a convex base diagnostic of the Early Archaic period, and the other a stemmed indented base point of the Early or Middle Archaic period.

Other Archaic sites near the PSSHM examined by Renaud include camp site 5CN3 (C 953; Renaud 1942a:17, 1946:21) and lithic scatter 5CN4 (C 999; Renaud 1946:21)—both on the west side of the Rio Grande—and a cache of bifacial tools found on the east side of the Conejos River between Manassa and Sanford (C 997; Renaud 1942a:34–35, 1946:4). Honea (1969) redefined Renaud's (1944, 1946:27–43) Upper Rio Grande culture as the Rio Grande complex, and suggested an Early Archaic period age for its oldest phase associated with "Rio Grande points," i.e. subtype 1 of Renaud (1942a:23–28, 1942b:34–35, 1946:38–42). Today, most archaeologists

associate all such materials with the Oshara tradition, particularly the Jay, Bajada, and San Jose phases dating to ca. 7450–3750 BP. Several examples of these kinds of assemblages were documented on the Pike's Stockade survey, as described in the "Results" section of this report. See Hoefer (1999c:116–119) for an overview of the subject.

Martorano et al. (1999) present a detailed treatment of the entire prehistoric context of the region, which will be only briefly recapped here. See Gadd (1985) and Wilson (1971) for earlier summaries of the prehistoric archaeology of the San Luis Valley. The Paleoindian archaeology of the San Luis Valley has been rather thoroughly documented to the north and northwest of the PSSHM, notably in the vicinity of the Great Sand Dunes. Folsom and Plano complexes are well-represented, and commonly show an emphasis on bison hunting and processing (Jodry 1999b). Such ancient remains are far less well known from the San Luis Hills region, and results of our survey of the PSSHM do not add much to the story. Nelson (1969:Table 1) lists only a single Paleoindian projectile point—Folsom—from private collections in Conejos County. However, there are suspicions that at least a portion of the materials lumped in the Jay and Bajada phases of the Oshara tradition (Irwin-Williams 1973, 1979)—including subtype 1 of the Rio Grande point type (Honea 1969; Renaud 1942b, 1946:38–42)—might actually date to the Late Paleoindian period and be better classified in the Great Basin Stemmed tradition (Jodry 2005a; Matson 1991; Pitblado 2003:97, 102; Vierra et al. 2005:2). The lack of well-dated components with stemmed projectile point styles in the southern half of the San Luis Valley shows that much more research will be needed to clarify the events of this early period.

The Archaic period in the San Luis Valley, as partly described above, is perhaps the least known period in the prehistoric era (Hoefer 1999c:116, 125–128). Renaud's (1942a, 1946) work in the southern part of the valley near the PSSHM has not been followed up by any significant excavations, although surveys in recent decades such as the current project have demonstrated the prevalence of Oshara tradition materials here. Farther north, significant new data on Archaic period archaeology were generated from the Smithsonian Institution's investigations in 2000–2001 near the Great Sand Dunes (Jodry 2005b), including the excavation of house features dating between 4150 and 1630 BP. However, the final report on the project is not yet available. Jones' (1977) discovery of fish bones in a Blanca Wildlife Refuge (Alamosa County) site dating to the terminal Archaic period ca. 1670 BP adds an unusual dimension to the archaeology of this period. Most recently, Andrews et al. (2004) excavated features at two sites in the pinyon-juniper forest at the Great Sand Dunes National Park and Preserve, also dating to the terminal Archaic period at 2080–1670 BP. The authors suggest that pinyon nut exploitation, among other activities, may have been carried out by groups who occupied nearby lake shorelines in other seasons.

Post-Archaic period aboriginal sites in the San Luis Valley (Martorano 1999b, 1999c) have received somewhat more attention, albeit not as much as the Paleoindian record. Once again, the Closed Basin portion of the valley has been a focus of this research, with more sites of the period documented here than in the southern valley around the PSSHM (Martorano 1999b:133). Sites of the era exhibit a wider range of features than for earlier periods, such as stone circles, rock art, wickiups, and culturally peeled trees (Huscher and Huscher 1943; Kessler 2000; Martorano 1988, 1999c, 1999d; Renaud 1942c; Spero and Hoefer 1999c). Ground stone, ceramics of

various kinds (Martorano 1999e), and bone artifacts are not uncommon, and other perishables such as corn macrofossils, basketry, feathers, hair, and cordage have been found in dry rockshelter deposits (e.g., Hurst 1939). The activities of Pueblo cultural groups represented in the archaeological record of the valley is most noticeable in the southern counties, as exemplified at 5CT27 (Pearsall 1939; Renaud 1946).

Historic Context

Traditionally, the San Luis Valley was part of the homeland of the Ute tribe, specifically its Capote band and occasionally the Mouache (Callaway et al. 1986:337–339; Crum 1996:138–139; Jefferson et al. 1973; Simmons 2000; Southern Ute Indian Tribe 2007), whose descendants now reside on the Southern Ute Reservation. One account places a Ute camp near the Pike's Stockade site in the mid 1800s (Harvey 1942:214). In addition, the San Luis Valley has historical and spiritual significance for other southwestern tribes such as the Jicarilla Apache, Navajo, and Pueblo, as summarized by Spero and Martorano (1999). The eastern part of the valley including the Great Sand Dunes, San Luis Lakes, and Blanca Peak areas figure prominently in descriptions of traditional cultural properties; origin stories, vision quests, mountain spirits, burial sites, rock art, and collection of important resources have been mentioned in this context. It is possible that two or more of the sites documented during the present project—notably rock art site 5CN801 and stone enclosure site 5CN1008—are vestiges of this legacy.

Historical documents also note the presence of plains-based tribes in the valley during the 18th and 19th centuries, such as the Arapaho, Cheyenne, Comanche and Kiowa (Athearn 1996: 21–25; Simmons 1999:17, 24–30, 114, 116). Military engagements between the competing tribes (e.g., Harvey 1942), between the tribes and Spanish army units, and finally between the tribes and U. S. troops all too frequently replaced traditional, non-violent settlement of the valley in the Historic period. In the mid-1800s, as Hispanic families migrated north from New Mexico to settle on large land grants in the San Luis Valley, clashes with local tribes increased as those tribes' traditional hunting grounds were claimed for farms and ranches. Following the Mexican War of 1846–1848, and the Calhoun treaty (a.k.a. Treaty of Abiquiu, or Treaty with the Utah, signed Dec. 30, 1849; Kappler 1904:585–587), the U. S. government established the military post of Fort Massachusetts in 1852 at the southern foot of Blanca Peak both to protect the growing number of settlers and ostensibly to supply the tribes with provisions to compensate for the loss of their hunting grounds. The outpost was moved southwest to Fort Garland in 1858, closer to the settlements (Guilfoyle et al. 2007:449).

Shortly thereafter, the Ute tribe ceded the San Luis Valley and adjacent territory in the 1863 Evans treaty (Treaty with the Utah—Tabeguache Band; Athearn 1996:25; Kappler 1904: 856–859), even though representatives of the Capote band refused to sign and none of the Mouache attended (Callaway et al. 1986:355). This treaty was signed at the "Tabeguache Agency" or Los Pinos Agency #2 in Conejos (5CN501; Figure 11), which doubled as the home of the Indian Agent for the Utes, Lafayette Head (Simmons 1999:90, 113–116). The first Conejos Agency, 5CN488 or Los Pinos Agency #1, had been established a bit farther upstream

on the Conejos River in 1860 (Guilfoyle et al. 2007:472; Simmons 1999:113). Since the Capote and Mouache bands had no intention of leaving the area—and with a growing mining fervor north of the valley—there were demands for more land cessions, accomplished in the 1868 Hunt treaty (Treaty with the Ute, Washington, D.C.; Kappler 1904:990–996), in which the Utes relinquished all lands east of the 107th meridian including the San Luis Valley. A new agency was established in Cochetopa Park west of the Continental Divide (5SH1021; Guilfoyle et al. 2007:472), which largely put an end to millennia of native occupation of the valley.

Figure 11. Lafayette Head's home in Conejos was deteriorating rapidly in 1969, shortly before it was razed. "Fort Head" was also a trading post and the Southern Ute Indian Agency from 1861 to 1868 (see Simmons 1999:90, 92). Photo by Ruth Marie Colville, OAHP site files, 5CN501.

The most comprehensive summary of the non-Indian history of the San Luis Valley is provided by Simmons (1999); Athearn (1996), Feitz (1998), and Mehls and Carter (1984) also provide useful information. Historic period activities of non-Indian groups in the vicinity of the project area largely involve ranching and farming, with lesser evidence of other pursuits such as recreation. There are very few documented sites anywhere in the region directly attributable to

Spanish explorations or the early fur trade. Interest in Pike's Stockade, on the other hand, has existed for over a century. See Carter (1978), Coues (1987), Hart et al. (2006), Jackson (1966), and Simmons (1999:35–41) for details on the Pike expedition of 1806–1807.

Initial efforts to find the ruins of the original stockade date to at least 1910. The site has been a property of the Colorado Historical Society since 1926 with the purchase of 120 acres, which is also when the riverbank adjacent to the presumed stockade foundation was first stabilized (Dubbs 1927; OAHP site files:5CN75). Subsequent actions include placement of a stone monument with a brass plaque in 1936 (Spencer 1936), creating plans to develop a Pike's Stockade Park and to reconstruct the stockade in the late 1940s (DeBoer 1948; Evans 1947:4–5, 1949; McMechen 1946), purchase of an additional 840 acres encompassing Sierro del Ojito in 1948 (Evans 1948:8, 1949; the transaction was completed in 1949), and two much smaller land acquisitions totaling 18.56 ac in 1950 (Rogers 1951:6). In 1952 CHS reconstructed the stockade, and both widened and rechanneled the Conejos River to straighten several meanders threatening the physical integrity of the stockade site (Evans 1947; Perkin 1952; Rogers 1951, 1952, 1953:10). The site was designated a National Historic Landmark on July 4, 1961, and was listed on the National Register of Historic Places on October 15, 1966 (Mendinghall 1975).

In 2002, archaeologists from RMC Consultants, Inc. surveyed around the stockade, did some auger and shovel testing, and excavated a $1m^2$ test unit inside the reconstructed stockade walls (Mrzlack 2002). Most recently, Richard Goddard (2005, 2006) of Adams State College conducted additional survey and monitoring prior to rehabilitation work on the stockade. Goddard's (2005:1) survey of a fire break/trail system in front of the stockade encountered only unspecified "early 20^{th} century materials." His testing (Goddard 2006) under the foundation of the reconstructed stockade encountered vertically set post fragments (Facilities Services 2006), which were initially thought might be log remnants of the original 1807 stockade. However, they were determined to be from either Douglas-fir or spruce rather than the cottonwood available to Pike [the 1952 reconstruction used either Engelmann spruce logs, according to Rogers (1953:10), and/or oak logs, as stated by Mendinghall (1975)].

The Conejos Land Grant of 1842 brought the first significant attempt at settlement of the San Luis Valley west of the Rio Grande, although a dozen years passed before the first permanent village was in place on the upper Conejos River near present-day Antonito (Aker 1997; Clark and Corbett 2007:109; Colorado State Archives 2001; Hafen 1927:90–92; McCourt 1975; Simmons 1999:88). Settlements closer to the current project area—Lasauses to the east (La Plaza de Los Sauces ["The Willows"] in the original Spanish; Dawson 1954:31; Simmons 1999:293) and Sanford to the west—were founded somewhat later. Lasauses has its origins in the early 1860s when a nearby trading post and ferry operated on the Rio Grande at Stewart's Crossing, on the route between Fort Garland and Conejos (Simmons 1999:131, 293). The town was not incorporated, however, until 1885. Its heyday extended at least into the 1930s, when it was a popular destination for Saturday night dances (Loretta Mitson, personal communication 2005; Valdez and Pong 2005). Evidence of that period was found during the current project at rockshelter site 5CN1006 (see "Results" section, this report).

Sanford's history is tied to the Mormon colony movement in the valley, as recounted by Christensen (1959), Jenson (1940), and Morgan (1950). The town, named after pioneer Silas Sanford Smith, was settled ca. 1885 by the relocation of residents from nearby Richfield and Ephraim, the latter abandoned due to waterlogged soils at least in part from irrigation of fields. No doubt the coming of the railroad in 1880 contributed to local prosperity, and eventually Sanford became one of the most successful towns in the area (Simmons 1999:163, 221–223). One other settlement near the PSSHM was called El Ancon del Plata ("Silver Cove"), but the only information available is its location southeast of Sanford (Simmons (1999:274, 281).

The ranching heritage of the San Luis Valley in the vicinity of the PSSHM is well-documented, and much in evidence today. While cattle ranching was the primary business on the McIntire's spread headquartered at site 5CN793, sheep ranching had long been a major economic force in the county, particularly among Hispanic residents (Simmons 1999:253–262). According to Athearn (1996:25), by 1879 there were an estimated 120,000 head of sheep in Conejos County compared to just 10,000 cattle. The numerous stone fences visible on the slopes of the San Luis Hills are the physical evidence of this legacy, including the five fences documented in the PSSHM (Figure 12). See Calisphere (2007) for a mid-1900s photograph of similar fencing in use on a California sheep ranch.

Local cattle ranching was given a major boost with the arrival of Albert McIntire in the fall of 1880; McIntire later served as Colorado's governor in 1895–1897. He and his wife, Florence, purchased 3,000 acres west of the PSSHM near the warm springs that later bore his name, and there they raised Black Angus cattle on a ranch they called Los Ojos (Huffman 1994; Pfertsh 2007). The ranch grew by some 1,500 acres through lands bought in 1882, 1887, and 1903 or 1904; the 1882 purchase included the land on which they built their house (Pfertsh 2007:21). During the 1890s, Albert McIntire's presence on the ranch declined, and Florence gradually assumed more of its day-to-day operations. After the couple divorced in 1898, Albert departed the state and left Florence with full control of the ranch's interests, which she continued to operate until her death in 1912. The ranch was bequeathed to her son, Joseph, who did not live in the house but likely maintained it until he died in 1929 (Pfertsh 2007:21).

Also in 1912, their daughter Dorothy (heir to her late husband Edward) proved up on a homestead of 120 acres adjacent to Los Ojos—land that includes the reconstructed stockade and the north end of Sierro del Ojito (Figure 12). Edward had tragically drowned in an accident while cutting hay next to the river in August 1911 (Herman Miller, personal communication 2007), but Dorothy lived in the area for decades and in November 1926 sold these 120 acres to the state that constitutes a portion of the current PSSHM; she died at the age of 87 in 1975 (Bagwell 2001). Today, the ruins of the Cortez Ranch may lie somewhere in the overgrown bottomlands around Pike's Stockade; one or more buildings were located near the present-day restroom facilities (Herman and Mary June Miller, personal communication 2007). However, only a few artifacts were observed on our survey, and the 1910 photograph shown in Figure 12 indicates that some original buildings may lie on an adjacent parcel to the northeast of the PSSHM. On the other hand, stabilized walls of the McIntire Ranch home are readily visible from the PSSHM (Figures 13–14). It is quite likely that some of the historical resources recorded during the present project derive from Los Ojos/McIntire Ranch and Cortez Ranch activities, such as 5CN1003.

Figure 12. Dorothy Cortez, daughter of Albert McIntire, occupied this ranch in the area of Pike's Stockade. In this southeast view taken ca. 1910, stone fence site 5CN968 can be seen on the mesa slope at right. Colorado Historical Society archives, Denver, photo #F3207.

Figure 13. The McIntire Ranch, site 5CN793, is readily visible from the west side of Sierro del Ojito. Ranch ruins are partly hidden amid the cottonwood trees next to the spring waters in the photo center, looking west-southwest from a bench on the mesa. Saddleback Mountain and the town of Sanford are in the background beyond the ranch.

Figure 14. The McIntire Ranch home is an example of Territorial Adobe style architecture, with three-brick-thick walls made of adobe mud.

Many other, less historically prominent homesteaders took up lands surrounding the PSSHM during the period 1882–1927. Quite possibly, some of the land claims in this early period were made with the intention of selling out after the land patent was gained to raise funds for other endeavors (Church and Clark 2007:258–260). No doubt other cultural resources recorded during our survey represent their use of the local landscape. See Pfertsh (2007) for an extensive discussion of the history, architecture, and archaeology of McIntire Ranch site 5CN793, including historical photographs and a brief description of test excavations conducted by the BLM there in 2003 (Vince Spero, personal communication 2007). Table 2 summarizes historical land transactions in and around the PSSHM for which records could be located.

Table 2. Early land records in the PSSHM region.

Name(s)	†Legal Location: T35N, R11E (Size)	Issue Date	Land Record
*State of Colorado	Entire Sec. 16 (*640 ac)	November 30, 1878	Doc. # 3031875; Acc. # COCOAA 000001 DL
Theodore Royal	SE¼ of SE¼ of Sec. 12; N½ of NE¼ & SE¼ of NE¼ of Sec. 13, T35N, R10E (160 ac)	April 10, 1882	C.E., Doc. # 381; Acc. # COCOAA 036564
James C. Hill	W½ of NE¼ and E½ of NW¼ of Sec. 8 (160 ac)	April 10, 1882	C.E., Doc. # 377; Acc. # COCOAA 037124
Alfred Helphenstein	SE¼ of SW¼ and SW¼ of SW¼ of Sec. 7; & NW¼ of NW¼ and SW ¼ of NW¼ of Sec. 18 (156.47 ac)	April 10, 1882	C.E., Doc. # 382; Acc. # COCOAA 037125
John Junior Allan	S½ of SW¼ of Sec. 13 and N½ of NW¼ of Sec. 24, T35N, R10E (160 ac)	April 5, 1883	C.E., Doc. # 400; Acc. # COCOAA 036566
Albert W. McIntire	S½ of NW¼ and N½ of SW¼ of Sec. 7 (157.44 ac)	October 5, 1887	C.E., Doc. # 572; Acc. # COCOAA 037135
Florentino Gallegos	E½ of NE¼ of Sec. 8 and W½ of NW¼ of Sec. 9 (160 ac)	October 5, 1887	C.E., Doc. # 642; Acc. # COCOAA 037136
John Atkinson	S½ of SW¼ of Sec. 6 and N½ of NW¼ of Sec. 7 (157.47 ac)	January 17, 1890	C.E., Doc. # 1279; Acc. # COCOAA 037137
Manuel Gallegos	W½ of NE¼ and E½ of NW¼ of Sec. 9 (160 ac)	July 14, 1890	C.E., Doc. # 643; Acc. # COCOAA 037149
Francenia Atkinson	N½ of NE¼ of Sec. 7 and W½ of NW¼ of Sec. 8 (160 ac)	July 14, 1891	C.E., Doc. # 1779; Acc. # COCOAA 037158
Florence McIntire	SW¼ of NE¼ of Sec. 13, T35N, R10E; (40 ac)	August 16, 1904	C.E., Doc. # 2883; Acc. # COCOAA 036584
Heirs of Edward Cortez	S½ of NE¼ and NW¼ of SE¼ of Sec. 7 (120 ac)	October 3, 1912	H.E., Doc. # 01896; Serial Patent # 294578
Ruth Abeyta	W½ of SE¼ and N½ of SW¼ of Sec. 9 (160 ac)	November 7, 1919	H.E., Doc. # 03183; Serial Patent # 717599
Antonina M. Pena	S½ of SW¼ of Sec. 9 (160 ac)	February 24, 1921	H.E., Doc. # 02993; Serial Patent # 796070
James H. Smith	SW¼ of SW¼ of Sec. 17; E½ of NW¼ + NE¼ of SE¼ + S½ of SE¼ + S½ of NE¼ of Sec. 18 (320 ac)	September 2, 1927	H.E.–S.R., Doc. # 048753; Serial Patent # 1007067
James H. Smith	S½ of SE¼ of Sec. 13 and NW¼ of NE¼ of Sec. 24, T35N, R10E; E½ of SW¼ + NW¼ of SE¼ + NW¼ of SW¼ + SW¼ of SW¼ of Sec. 18 (317.89 ac)	September 2, 1927	H.E., Doc. # 048754; Serial Patent # 1007068; GLO Serial # 048755

Name(s)	†Legal Location: T35N, R11E (Size)	Issue Date	Land Record
State of Colorado	NE¼ of SE¼ and S½ of SE¼ of Sec. 7; S½ of Sec. 8; N½ of Sec. 17; and N½ of NE¼ of Sec. 18 (840 ac)	April 20, 1949	Doc. # 055609; 44 Stat. 741; Serial # 1125475

Key to Table 2: *this was one of three sections of a federal grant of land to the state totaling 1920 ac in T. 33–35 N., R. 11 E.; † = all legal locations are in T. 35 N., R. 11 E. unless otherwise noted; Acc. = accession code that identifies the state, volume number and page number of the original General Land Office (GLO) document; C.E. = cash entry sale of public land under federal act of 1820; Doc. = document number on GLO record; H.E. = homestead entry patent of public land under federal act of 1862; H.E.–S.R. = homestead entry–stock raising patent of public land under federal act of 1916; 44 Stat. 741 = sale of public land for recreational and public purposes under federal act of 1926. Only the initial transactions are shown in this table; changes in ownership through sale, inheritance, or other means after the dates of these records are not listed. For instance, Florence McIntire apparently purchased Alfred Helphenstein's land in November 1882 (Pfertsh 2007:21).

Statement of Objectives

The primary objective of the PSSHM inventory was to provide supervised field experience for participants in PAAC, as described in the Introduction to this report. Both the field surveying time and site recording experience count as credit toward certification, in two of the six PAAC modules. A second objective was to document as many cultural resources as could be found in the project area, in keeping with one of the objectives of OSAC to inventory land in Colorado, as defined in state law (C.R.S. 24–80–405d). Because there are long-term plans for development of the PSSHM (Zink and Associates 2003), the results of the survey reported herein provide baseline data on cultural resources that can inform and guide future management decisions affecting the parcel. Finally, the survey was intended to add to the very limited database on San Luis Hills archaeology, generally to explore prehistoric settlement, lithic landscape, and historical ranching topics within an individual segment of the San Luis Hills bordering a major river; see Martorano et al. (1999) and Simmons (1999) for overviews of prehistoric and historic events as known immediately prior to the present survey.

Based on the limited data available at the beginning of the project in 2004, in combination with more general data on mountain archaeology from the author's own experience as well as that summarized in Martorano et al. (1999), Mrzlack (2002), and Simmons (1999), there was a general expectation that prehistoric site density would be higher on flatter landforms closer to the river, and quite low both on the floodplain and on terrain farther from the river. The reconnaissance on the crest of Sierro del Ojito (Mrzlack 2002) suggested that prehistoric resources might be sparse there but that historical features were present. Open lithic scatters and short-term camps, some with pottery, were the primary prehistoric site types anticipated, with lower expectations for lithic sources, rockshelters, tipi rings or other large features. One rock art site having been recorded on the north end of the mesa (Kessler 2000:128–129), there was at least the possibility of more such discoveries on this survey. The presence of the sand dune field east of the mesa and its influence on local archaeological patterns was not known in advance, as it was not mentioned in any of the reports available in 2004.

For the Historic period, there was a slight expectation for 18th–19th century Indian encampments with such evidence as metal arrow points and worked glass, but not the kinds of

perishable features found in old growth forests such as scarred trees or scaffolds—short-lived cottonwood trees along the river represent the only arboreal community in the PSSHM. Non-Indian sites were expected to mainly be indicative of the ranching industry with minimal evidence for mining, logging, Spanish exploration, or other activities anticipated. Stone fences and cairns were among the ranching resources known in advance to be present in the study area. We did not expect to encounter any physical evidence of Pike's February 1807 occupation, either on the floodplain or on the mesa long known as "Pike's Lookout."

Among the research questions of interest at the start of the inventory were:

- Is there any evidence for Paleoindian use of this portion of the San Luis Valley, as is so prevalent around the Great Sand Dunes?
- Is there a higher-than-average density of Early Archaic sites at PSSHM as seen in the Upper Gunnison Basin and Front Range?
- Is there any significant difference in site types or site density on landforms close to the Conejos River compared to more distant locations?
- Is there any significant difference in lithic materials on sites within the study area?
- Is Cumbres Pass chert more heavily represented on sites than other silicate materials?
- Is basalt and/or obsidian (the dark-colored rocks of Renaud's [1944] Upper Rio Grande culture) more abundant on sites than other toolstone materials?
- What evidence for non-local exchange will be found at PSSHM, such as in ceramics?
- What kind of Puebloan evidence will be found at PSSHM, if any?
- Are any rock art sites present other than 5CN801?
- Is there any evidence of Pike's 1807 stockade occupation, particularly on Sierro del Ojito?
- What evidence of McIntire Ranch activities is present within the PSSHM?
- Are any major historic activities other than those related to ranching in evidence at PSSHM?

Methods

The cultural resources survey of the PSSHM was accomplished using standard pedestrian tactics to cover approximately 907 ac (367 ha) of the total 980 ac parcel. The unsurveyed acreage primarily covers the Conejos River and adjoining wetlands, plus the steepest slopes (≥ 30°) on Sierro del Ojito. Inventory transects were generally oriented to the cardinal directions on the open piedmont at the foot of the mesa and on the mesa crest, but followed ground contours along the mesa slopes, benches, and its spur ridges. Crew size ranged from two to six persons (usually three or four), all supervised by the author. Spacing between crew members was maintained at 15 m (50 ft), except where closer spacing was needed while inspecting road and drainage cutbanks, rock outcrops on the mesa crest and slopes, and other terrain of special interest. For example, coverage was especially tight on the boulder-strewn bench on the northeast side of the mesa where a concerted effort was made to inspect as many large boulders as possible for rock art panels (Figure 6). In contrast, portions of the steeper slopes (< 30°) on the mesa were surveyed with the crew spacing at 20 m (65 ft).

At the margins of the survey area, the boundaries of the PSSHM were easy to follow, marked by fencing some of which was relatively new. This was the case on the BLM boundary on the west side of the project area near the McIntire Ranch ruins, and on part of the private land boundary along the north edge of the PSSHM (Figure 10). Where no fencing marked the perimeter, our survey crews walked lines approximating the boundary by initiating sweeps at the survey monuments shown in Figure 10, guided by GPS coordinates. The greatest potential for error in this process was in the southern part of the area, where no survey cap could be found at the boundary corner angle on the Section 18—17 line, and on the east-west boundary line in Section 17 with a full mile between survey caps.

Significant time was expended to relocate previously recorded sites and features noted in the reconnaissance of Mrzlack (2002). This included the rock art panel at 5CN801, two stone enclosures found 600 m south of the rock art by Frye (1995), and three cairns and a stone circle on the crest of the mesa (Mrzlack 2002:Figure 13). All three cairns and the rock art panel were easily pinpointed. However, no stone circle was found in the location shown on the map in Mrzlack (2002:Figure 13), just east of elevation mark 8121 ft on the USGS topographic map. The mapped location is a prominent bench at the edge of a slope leading to a spur ridge off the mesa. Our crews searched this spot multiple times without success. Instead, we found and recorded two stone enclosures and a cairn, site 5CN1388, on a rocky prominence farther southeast on the spur ridge (Figure 15); it is assumed that the stone circle mapped in Mrzlack (2002:Figure 13) is one of the features at 5CN1388.

Also, our crews were unable to relocate stone enclosure Features 3 and 4 of 5CN801, which were recorded by Frye (1995) at the head of the largest drainage on the west side of the mesa, some 600 m south of the rock art panel. Again multiple, intensive searches of the area were made by our crews, including use of photograph copies of the features from the site form in OAHP files to aid in relocation, all to no avail. In this case, we suspect that the presumed stone enclosures are actually natural rock rings and not cultural features.

Sites were defined as loci with artifacts and/or features having any of the following characteristics: artifact scatters covering areas more than 30 m in diameter; diverse artifacts indicating the occurrence of multiple activities; any discovery in a context suggesting the presence of buried cultural material; any prehistoric feature; or any combination of these. Isolated finds (IFs) were defined as loci exhibiting single artifacts or a low diversity artifact scatter, or a historic feature in a confined area less than 30 m in diameter, indicative of a single brief activity with no evidence of buried remains. Modern materials less than 50 years old were not recorded, but the locations of modern fences, roads, and other features are noted on Figure 10. Newly recorded sites were assigned temporary field numbers starting with the prefix PSS (i.e., Pike's Stockade Survey), followed by a year code and a consecutive number. Thus, PSS–04–1 was the first site recorded in 2004, while PSS–06–35 was the 35th site overall recorded on the project during our third field season in 2006. Isolated finds were similarly numbered with the addition of an IF code with the consecutive number, e.g., PSS–04–IF1. Previously recorded site 5CN810 had been given the temporary number RGCM–SDO–95 when it was first documented (Frye 1995), but Pike's Stockade site 5CN75 was assigned a temporary number in our system for tracking purposes even though it was recorded decades ago.

Figure 15. Southeast view toward Lasauses, from the edge of the mesa where a stone circle feature had been mapped. A cairn in site 5CN1388 can be seen on the crest of the knoll at the center of the photograph.

Figure 16. Southwest view of mapping in progress at site 5CN980; figure at right stands next to the tripod marking the mapping station. Note stone fence site 5CN975 in the left background.

Recording procedures were paced to emphasize volunteer training in filling out forms, drawing sketch maps, and illustrating tools. Collection of artifacts was limited to display-quality specimens, unusual materials, and diagnostic tools likely to be picked up by "arrowhead hunters," totaling 30 items. All site sketch maps were hand drawn in reference to true north, using a magnetic declination adjustment of 10º east; a precise declination of 10.14º east was calculated for the center of the project area in 2004 using the US Geological Survey model on its web site at http://geomag.usgs.gov/geomag/geomagAWT.html. The sketch maps were made in reference to a mapping station arbitrarily positioned at or near the center of each site; no semi-permanent physical tags such as rebar or incised metal tags were used to mark datum points at any site or IF. At all sites, mapping was done with a Brunton compass and metric tape measure (Figure 16) or by pacing distances when using the tape was not practical, and the compass was typically mounted on a tripod. The tripod is a visual marker for the mapping station shown in many of the site photographs.

In advance of the survey, and confirmed after the first field season, it was expected that the most common prehistoric site type would be the open lithic scatter or chipping station, dominated by debitage with few or no tools present. In order to maximize the information gathered on debitage characteristics at each site, as well as to standardize the collection of those data by volunteers with a wide range of experience (from absolutely none to many years), a debitage inventory form was devised. This form was modified as appropriate from one used on previous PAAC surveys (e.g., Black 2004a:Figure 6), and emphasized material type distinctions and flaking stages (Figure 17). It was used as a supplement to the standard OAHP forms filled out at each site (see Appendix II, OAHP site files, Denver).

All sites and IFs were plotted on the USGS 7.5′ topographic map for Pikes Stockade, Colorado (1968) based on UTM coordinates determined using a Garmin GPS II Plus receiver. This GPS unit was calibrated to the 1927 North American Datum (NAD 27) to correspond to the grid lines shown on the 1968 quad map. UTM coordinates from the GPS receiver were taken at the mapping station on each site, as well as at all survey monument caps and selected other points of interest such as fence corners and road intersections. At least one photograph was taken at each site, and at a few IFs, using black-and-white print film. Supplementary color digital images were taken of sites, artifacts, and landscape features as appropriate.

In the lab, collected artifacts were washed, labeled, and catalogued prior to analysis; PAAC volunteers were involved in some of this work, which also was credited toward certification in the PAAC Laboratory module. Thirteen of the collected artifacts—three of obsidian and ten of basalt or basaltic-appearing andesite—were tested for chemical composition to help determine their source provenance using a portable X-ray fluorescence (XRF) instrument courtesy of engineering-environmental Management, Inc. (e^2M) in Englewood, Colorado (see Appendix V). Given the location of the project area near the New Mexico border, it was assumed that most/all of the volcanic materials observed in the PSSHM originated from sources in northern New Mexico (Boyer et al. 2001; Ferguson and Skinner 2003; Glascock et al. 1999; Shackley 2006), but the portable XRF analysis is limited to 17 elements, not including some that are critical in source discrimination. Selected artifacts among the 30 collected items were photographed; all collected artifacts were illustrated as line drawings. Film was developed for

Pike's Stockade Debitage Counts

Site 5CN_____
Temporary Site # PSS–_____

FLAKE TYPES → ↓ MATERIALS	Core Reduction Flakes	Thinning Flakes	Finishing/ Maintenance	Unidentifiable Fragments	Angular Debris	TOTALS
Morrison quartzite: gray						
other colors						
Coarse quartzites: gray						
other colors						
Basalt: gray/black						
other colors						
Chalcedony: red						
other colors						
Chert: color(s)						
Jasper: maroon						
yellow-brown						
Petrified wood: color(s)						
Obsidian: banded						
smoky						
Other materials: specify						
TOTALS						

Figure 17. Example of the debitage inventory form used on the Pike's Stockade survey in 2004–2006. The material types and colors listed were adjusted during the survey in response to the frequencies observed.

black-and-white prints, and some of the color digital images were included on the PAAC web site (www.coloradohistory-oahp.org/programareas/paac/summersurvey.htm) to enhance progress reports posted on the project. All field and lab line drawings of artifacts, and site sketch maps, were inked for inclusion with the final site forms (Appendix II), with selected examples included in this report.

Progress reports were submitted annually to Rick Manzanares, museum director for the Colorado Historical Society at Fort Garland, and filed with permit records at OAHP in Denver. Wider dissemination of this information was provided in several conference presentations (Black 2004b, 2005a, 2005b, 2006, 2007; Wahle 2005). Site forms and the report draft were produced in Word *.doc format at OAHP; copies of all forms and this final report were sent both to Mr. Manzanares at Fort Garland and to Vince Spero with the USDA Forest Service at the San Luis Valley Public Lands Center in Monte Vista. Other report copies, minus the site and IF forms, were distributed to CAS chapter and SLVAN libraries, the BLM office in La Jara, the Sanford History Museum, and local libraries in the San Luis Valley. All field forms, notes, lab sheets, correspondence, negatives, prints, and disks are stored at OAHP–Denver.

Results

Within the ca. 907 ac of the PSSHM inventoried, a grand total of 37 sites and 26 IFs was recorded. Sites have been assigned permanent numbers 5CN75, 5CN801, 5CN966–985, 5CN1002–1010, and 5CN1387–1392; IFs are numbered 5CN986–991, 5CN1011–1020, and 5CN1393–1402 (see Table 4). Of this total, 18 sites and 23 IFs are American Indian sites of Pre-Columbian age, 12 sites and 2 IFs have both prehistoric American Indian and Historic period non-Indian components, and 7 sites and 1 IF have only Historic period Euro-American materials (Table 3). It should be noted that these numbers represent conclusions about the age of stone features that are by no means certain. For example, a cairn at 5CN1004 and two stone enclosures at 5CN1008 are tentatively assigned prehistoric dates based on field characteristics such as artifact associations, lichen cover, and surrounding vegetation growth, although each could very well date to the Historic period.

Overall, then, 81% of the sites and 96% of the IFs have evidence of American Indian activities in various dimensions. As will be explored later in this report, stylistic data suggest that the bulk of those activities post-date 1800 B.C.

Table 3. Affiliation and Chronology of Recorded Sites at Pike's Stockade SHM

Affiliation & Chronology	*# of Recorded Sites*
American Indian, prehistoric (pre–AD 1600)	18
American Indian, historic (AD 1600–1880)	0
American Indian, prehistoric & historic	0
Non-Indian + American Indian	12
Non-Indian	7

The Sites

5CN75 (PSS–06–36) is the Pike's Stockade site itself. Although the site had been previously recorded and was recently the subject of monitoring and test excavation projects (Goddard 2005, 2006; Mrzlack 2002:6–8), one of our PAAC crews surveyed the grounds of the stockade as a training exercise. This crew found a light scatter of Historic period (but post-stockade era) artifacts exposed in anthill and rodent backdirt contexts north and northwest of the reconstructed stockade, and in the slightly eroding soils adjacent to the artesian spring pipe just east of the stockade. Seven total artifacts were found: 1) two shards of purple bottle glass, lacking any markings, near the artesian spring—one of the shards measured about 1″ × ¾″ and the second piece was smaller; 2) two more larger shards of purple glass from flasks, each probably from the corner of the base of two different flasks [curvatures are distinct; largest is 2″ high], northwest of the stockade; 3) a small piece of white ware ceramic near the flask fragments, similar to others noted next, found at the edge of an ant hill; and 4) two white ware ceramic shards found north of the stockade.

The shards have a white paste and white glaze on both interior and exterior surfaces, but no markings; their shallow curvature suggests a plate or dish form rather than a bowl. Also noted in the field in front of the stockade were a few pieces of weathered, iridescent plate glass, probably less than 50 years old. Obviously, all these materials post-date the 1807 occupation of the original stockade, and by themselves do not add significant new information to the historical archaeology of the site. However, there is the very real possibility that the older historic artifacts here could be from Cortez Ranch activities of the early 1900s, given the fact that one or more ranch buildings was apparently located about where the current restroom facilities are located (Herman and Mary June Miller, personal communication 2007). Thus, floodplain deposits in this area could hide both stockade and ranch foundations. Pike's Stockade was designated a National Historic Landmark on July 4, 1961, and was listed on the National Register of Historic Places on October 15, 1966.

5CN801 (RGCM–SDO–95) is an open rock art site on a small knoll atop a high bench just below the northern crest of Sierro del Ojito, affording an expansive view of the Conejos River valley and beyond. It was first recorded on October 7, 1995 by Ken Frye as part of a rock art recording project through the Rio Grande County Museum (Frye 1995; also see Kessler 2000: 128–129). At that time, they documented the rock art panel and two local features—a 6 m × 3 m stone enclosure incorporating the boulder containing the rock art and interpreted as a possible vision quest circle (Feature 1), and a 2.3 m high rock cairn (Feature 2) located 6.4 m southwest of Feature 1. In addition they recorded two other stone enclosures also described as possible vision quest features, located about 600 m south-southeast of the rock art near the head of the prominent drainage cut into the west side of Sierro del Ojito.

Both these enclosures (Features 3 and 4) measured about 3 m in diameter, and were included on the original site form for 5CN801. Their distance from the rock art and cairn features is large enough to constitute a separate site designation were they to be relocated. However, as noted in the "Methods" section above, Features 3 and 4 could not be relocated anywhere in the vicinity of where they were mapped despite repeated, intensive searches.

Because no cultural features of any kind were observed at the head of that drainage, what were originally recorded as Features 3 and 4 are probably not cultural. Site 5CN801 also was revisited during RMC Consultants, Inc.'s reconnaissance survey in May 2002, but they did not report any changes to the site. However, they did note the presence of a primary flake of red/gold chert, and "a basalt projectile point base from what appears to be an expanding stem corner-notched projectile point" (Mrzlack 2002:5).

In June, 2006 our survey crew found a very sparse lithic scatter on the site, made a sketch map, and also noted changes in the physical condition of both Features 1 and 2. Four total artifacts were found: 1) a river pebble of dense, gray sandstone(?) utilized as a pecking stone, possibly the tool used to create the petroglyph panel [collected, F.S.–1]; 2) a second small river pebble of gray volcanic rock possibly utilized as a polishing stone; 3) a bifacially retouched flake tool fragment of mottled gray-pink-brown chert; and 4) a basalt flake. A jasper flake had been observed on a visit the previous season, but could not be relocated in 2006. The petroglyph panel was found to be in excellent condition, covering most of the upper sloping and undulating surface of a trachyandesite boulder measuring 120 cm long × 34 cm wide (Figure 18). However, the cairn and stone enclosure Features 1 and 2 had been altered since 2002.

The large, oval stone enclosure (Feature 1) said to incorporate the rock art panel was no longer discernable amidst the scatter of boulders on the knoll. However, life-long resident Herman Miller, now 86 years old, does not recall ever seeing a stone circle at the rock art panel in the many times he scaled the mesa in his youth. However, he does recall building up cairn Feature 2 with his brother, Morris, to a height of about 6 ft—"as high as we could reach"—in about 1948 or 1949 (Herman Miller, personal communication 2007). Before that time, a rock pile only a couple feet high existed there. By the time of our crew's 2006 visit, the Feature 2 rock cairn had been severely reduced in scale from its earlier 2.3 m height to only 0.9 m high [compare Figure 19 below with Mrzlack 2002:Figure 12]. Some rocks from the cairn apparently had been tossed down the mesa slope since 2002, given Mrzlack's (2002:Figure 12) photo and the small amount of rock rubble around the south and west sides of the remnant cairn. A small amount of modern trash also was noted, including beverage cans stuck in the base of the cairn, rifle cartridge cases, and spent shotgun shells, indicating that hunters periodically visit the crest of the mesa, among other visitors. Although the cairn and stone enclosure have been modified from their original condition, the rock art panel remains intact and by itself can be considered eligible for the National Register of Historic Places. It is the only such feature on the entire mesa, and its location on the edge of the mesa with an unlimited viewspread to the west, north and east is suggestive of spiritual significance as a location for special ritual activities.

5CN966 (PSS–04–1) is an open chipping station on a gently sloping bench above the Conejos River floodplain. It consists of a small quantity of lithic debris, widely scattered across the bench in an 80 m × 60 m area. Early to intermediate stage core reduction and thinning flakes are most common, primarily of yellow chert or jasper. There is also some indication of testing of native pebbles and small cobbles. A somewhat higher number of these flakes was found on the lower portion of the bench, but no concentrations or other cultural features have been observed. A small mottled chert biface was found toward the east edge of the site, and is the only tool represented in the surface assemblage. No diagnostic artifacts have been found, so the age and

Figure 18. Close-up of Feature 1 rock art panel at 5CN810, as seen in late June 2005.

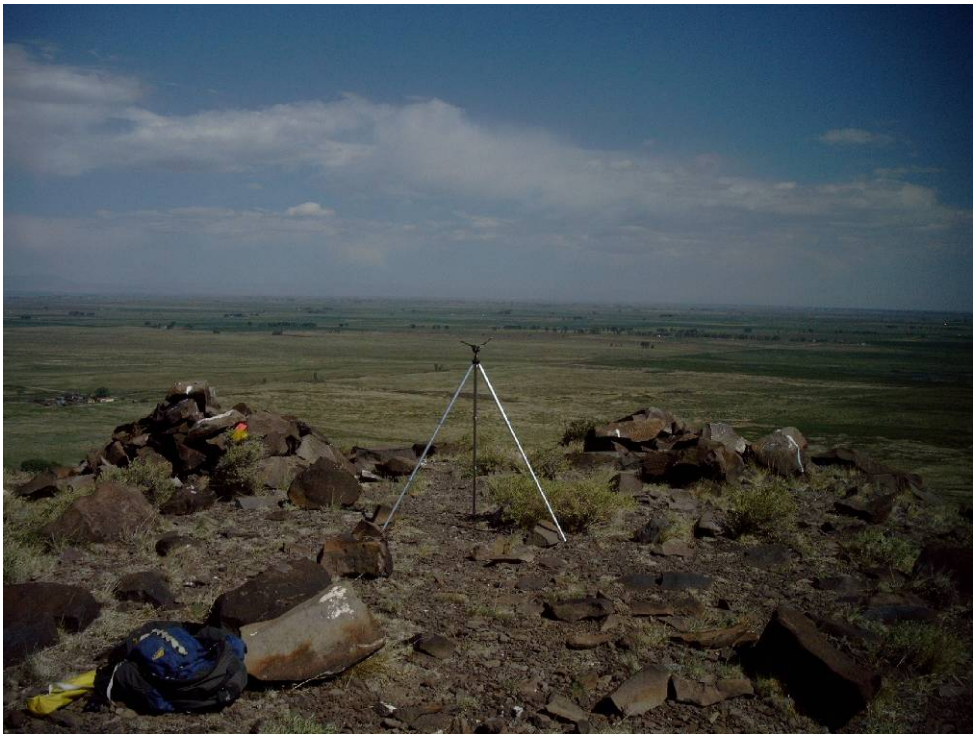


Figure 19. Cairn Feature 2 at 5CN810 (left) has been largely dismantled since it was last documented in 2002.

cultural affiliation of the materials remain unknown. There is a low potential for buried cultural material in this area. The site is evaluated not eligible for the NRHP.

5CN967 (PSS–04–2) contains both prehistoric and historic period materials. The older, more subtle component is an open chipping station consisting of a very sparse lithic scatter found at the foot of a hill slope above the Conejos River floodplain, extending up slope onto a higher small bench. Early stage core reduction flakes dominate, and are most commonly found on the steeper slopes. Materials observed are jasper, basalt, and a light gray chert-like material that may be argillite or siltstone. No diagnostic artifacts, other tools, artifact concentrations, or other cultural features have been observed. There is a low potential for buried cultural material given the very sparse nature of this site, although the toe of the hill slope has deeper soil.

The Historic period component is an extensive stone fence that runs generally east-west along a west-sloping basalt ridge on the lower flank of Sierro del Ojito, on the southeast side of the Conejos River. The wall-like fence is composed of the native basalt boulders, entirely unshaped. Their size ranges from 20 to 60 cm in diameter, about the limit of what one or two people can move manually. The fence has degraded in some spots but generally has maintained its integrity. Its height is 0.6–1.2 m, and it averages 0.9 m at the base. The fence meanders as it ascends the ridge on the hillside, taking advantage of the natural grade breaks and low cliff/ledge outcrops. At a later date than initial construction, a 2- and 3-strand barbed wire fence was added to the upper portions of the stone work, and was used to extend the barrier further up the hill. Based on local historical accounts, the fence was used by sheep ranchers to define pastures on different parts of the hill's grassy slopes. According to local resident Herman Miller (personal communication 2007), all the stone fences in this area were built by laborers from the nearby McIntire Ranch. The site is evaluated not eligible for the NRHP.

5CN968 (PSS–04–3) is a lengthy stone fence of the Historic period that extends northwest-southeast up most of the vertical height of the northwest slope of Sierro del Ojito, on the southeast side of the Conejos River. As with nearby fence 5CN967, this stone feature is composed of unshaped native basalt boulders. The size of most boulders ranges from 5 cm to 60 cm in diameter, but it also incorporates several much larger (2+ m) boulders left in place as anchor points for fence construction. The fence runs 130 m horizontally (i.e., in plan view)—but 250+ m of actual length down the slope—from a low cliff of basalt on the upper slope (Figure 20) down nearly to the base of the hill, terminating just above a well-worn foot trail (and about 20 m above the river's floodplain). There is a wooden post held upright in a rock cairn several meters east of the lower end of the stone fence.

For most of its length, roughly the upper two-thirds, the fence is built fairly straight, but there are several gradual curves in its lower third, perhaps to take advantage of the position of the huge boulders mentioned above. Its height varies from single scattered rocks where the fence has been knocked over or fallen down (almost entirely limited to the lower third closest to the trail), to 1.45 m. Several taller sections of the fence on this lower curvy segment may have been added to more recently as indicated by the lack of lichen growth on exposed surfaces compared to that seen on the upper slope.

Figure 20. View looking southwest at stone fence site 5CN968 on the north slope of Sierro del Ojito in June 2004.

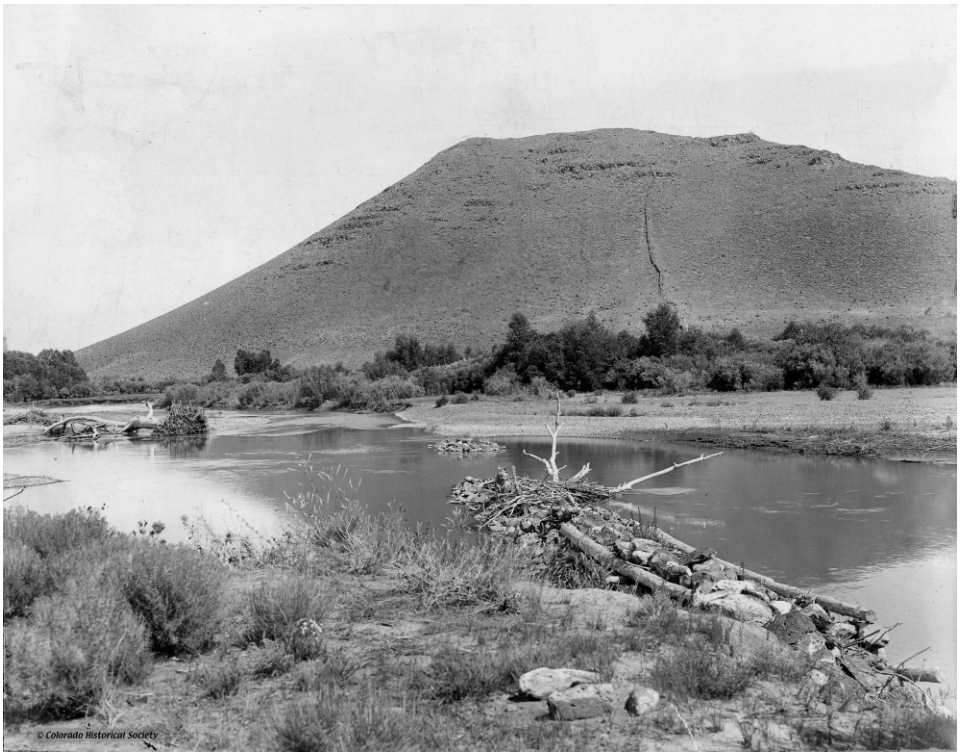


Figure 21. Stone fence site 5CN968 is readily visible on the north slope of Sierro del Ojito above the Conejos River in this southwest view taken ca. 1903. Colorado Historical Society archives, Denver, photo #E723/D2.

The age and function of this feature is likely identical to the fence at 5CN967, i.e., to define pastures on the hill slope for sheep grazing, probably late 1800s to early 1900s (Herman Miller, personal communication 2007). Carrillo (2007:235, 237) suggests such fences were most commonly used in the period 1860–1890. In the case of this fence, in fact, it is quite certain that it was constructed prior to 1903 because it can be clearly seen in a photograph of that date in the Colorado Historical Society archives (Figure 21; also see Figure 12 and Dubbs 1927:29). Because of its size and good state of preservation, this historic fence is evaluated eligible for the NRHP.

5CN969 (PSS–04–4) is another multiple component site with both prehistoric and historic period remains. The prehistoric portion is an open chipping station, denoted by a sparse lithic scatter found at the north foot of Sierro del Ojito, east of Pike's Stockade (reconstructed) and above the Conejos River floodplain, on the south side of a wire fence marking the property boundary. Of the ten pieces of debitage observed here, all are early stage core reduction flakes, most made of a tan/gray to yellow chert—perhaps from the Cumbres source. Jasper flakes also are present. Only one tool has been found here, an asymmetrical, stemmed knife of basaltic-appearing andesite (collected, FS-1), possibly dating to the Archaic period. XRF analysis (Appendix V, Table V-1) indicates the material of FS-1 may derive from the San Antonio Mountain B source in northern New Mexico. No other diagnostic artifacts, other tools, artifact concentrations, or other cultural features have been observed. There is a low potential for buried cultural material given the very sparse nature of the assemblage and the washed condition of the surface, although the toe of the hill slope has deeper soil.

The Historic period component is limited to a single piece of milk glass (or porcelain?) from the rim of a plate or saucer. The interior surface has a blue paint transfer print pattern. No other Historic period artifacts have been observed here; it would be recorded as an IF except for its spatial association with a prehistoric lithic scatter. The site is evaluated not eligible for the NRHP.

5CN970 (PSS–04–5), a dispersed open lithic scatter (i.e., a chipping station), is found at the north foot of Sierro del Ojito, above the Conejos River floodplain and southwest of Dexter Spring. A total of 12 flaked stone artifacts have been recorded here, including a core, ten flakes, and an arrow point blade (collected, FS-1). A high proportion of the observed flakes are from early stage core reduction; along with the core, there is also evidence of raw material testing. The most common materials are Cumbres(?) chert and jasper, with basalt and chalcedony also represented. Only one tool has been found here, a narrow triangular arrow point blade of white Cumbres(?) chert—possibly corner-notched and dating to the first half of the Late Prehistoric period ca. A.D. 200–1000. No other tools, artifact concentrations, or other cultural features have been observed. A few of the flakes were found in shallow washes; there is a low potential for buried cultural material in this immediate area. The site is evaluated not eligible for the NRHP.

5CN971 (PSS–04–6) is an open camp consisting of a flaked and ground stone scatter located at the northern foot of Sierro del Ojito, on the fairly level piedmont southwest of Dexter Spring. Shallow washes have dissected this landscape, particularly on the east and west sides of the site. Over 45 lithic artifacts have been documented here, including a concentration of

materials in the southeast part of the area. Among the debitage, a fairly similar number of flakes are from early and intermediate stage core reduction and thinning activity; very little tool finishing or maintenance has been observed. The most common material is chert—including probable Cumbres source material—with jasper, basalt, and chalcedony also represented. The observed tools are a slab metate (Figure 22) and a unifacial mano fragment, the latter found within the concentration and both of native trachyandesite. One probable manuport also has been recorded here: a micaceous, granitic cobble. No diagnostic artifacts have been found, so the age and affiliation remain unknown. The single artifact concentration is the only cultural features observed, but there is some potential for buried cultural material at this site. This site is evaluated potentially eligible for the NRHP.

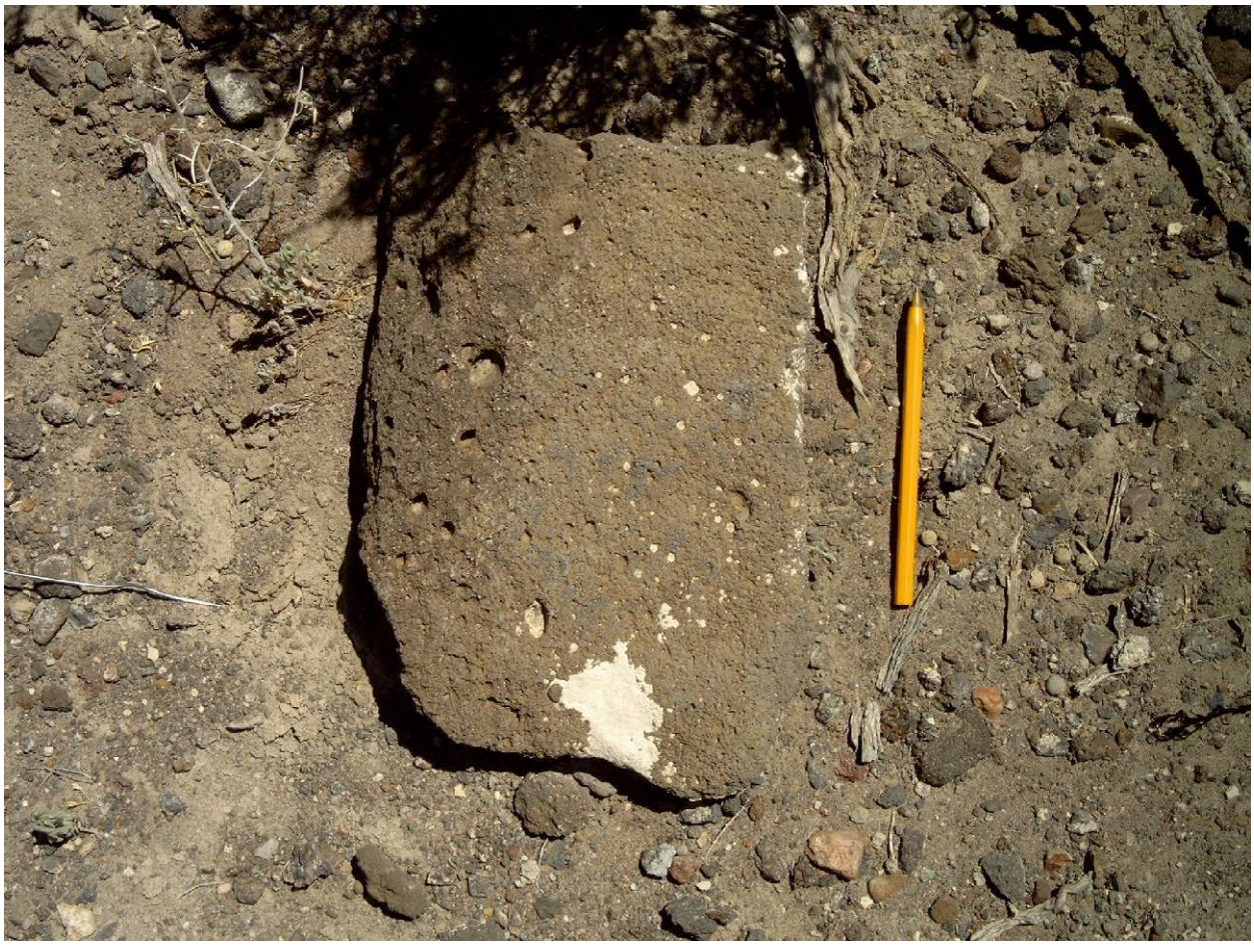


Figure 22. Close-up of slab metate fragment at site 5CN971. This was the sole milling slab artifact encountered on the survey.

5CN972 (PSS–04–7) is an open chipping station marked by a sparse, dispersed lithic scatter found at the north foot of Sierro del Ojito, above the Conejos River floodplain and southwest of Dexter Spring. A total of 23 flaked stone artifacts have been recorded here, almost all debitage with the exception of one biface midsection of basalt. A plurality of the observed flakes is from early stage core reduction with all other stages of tool manufacture represented in

smaller quantities. The surface assemblage at this site does display some diversity in toolstone materials, but not in tools. The most common materials are Cumbres(?) chert and chalcedony, with basalt, jasper, obsidian, and siltstone also represented. No diagnostic tools have been found, so the age and affiliation of the site remain unknown. Although two minor clusters of flakes are present at the surface, no true artifact concentrations or other cultural features have been observed. This site has a low potential for buried cultural material, and it is evaluated not eligible for the NRHP.

5CN973 (PSS–04–8) is another open chipping station in the form of a low density lithic scatter located on the piedmont on the north side of Sierro del Ojito, above the floodplain of the Conejos River and southwest of Dexter Spring. A small wash also bisects the site area. In addition to the debitage, the surface assemblage exhibits an obsidian biface fragment and a stemmed projectile point (collected, FS-1); those two items are the only tools noted. No ground stone or features have been observed. Chalcedony and chert are dominant materials, but small numbers of quartzite, obsidian, basalt, and jasper items also are present. The stemmed projectile point has a ground stem edge and base corner; it is diagnostic of an Archaic period occupation, probably in the Early or Middle Archaic period ca. 7000–3500 BP. The debitage is characterized by a preponderance of early stage core reduction and intermediate stage thinning flakes; few finishing flakes have been found. The surface of the site is washed with a dense lag gravel deposit and, along with the low overall artifact density, there appears to be little potential for intact buried material. This site is evaluated not eligible for the NRHP.

5CN974 (PSS–04–9) consists of a flaked and ground stone scatter—an open camp—located on a low, broad ridge at the northern foot of Sierro del Ojito, south-southwest of Dexter Spring. Although of low density at the surface, the lithic scatter displays some diversity both in tools and toolstone materials. Tools observed include two stemmed projectile point fragments of basalt (both collected), a chert biface fragment, and a basalt mano; one sandstone nodule also was found and is of a material not native to this landscape (i.e., it is a manuport). XRF analysis (Appendix V, Table V-3) indicates the material of FS-1, which is one of the stemmed point fragments, may derive from the San Antonio Mountain B source in northern New Mexico. The debitage is primarily basalt, jasper, and chert with one piece of obsidian also observed. Intermediate stage thinning flakes are most common, but all stages of tool manufacture are represented in at least small numbers of flakes. No cultural features have been observed, and the deflated desert pavement surface suggests a low potential for buried cultural material at this site. However, the number of surface artifacts of basalt is likely underestimated because of the difficulty in recognizing this material amid the dense deposit of natural trachyandesite pebbles and cobbles. Diagnostic projectiles indicate an Early Archaic and/or possibly Late Paleoindian occupation is represented here. This site is evaluated potentially eligible for the NRHP.

5CN975 (PSS–04–10) is another Historic period stone fence that extends from a barbed wire fence up much of the vertical height of the northeast slope of Sierro del Ojito to about 25 m below outcropping basalt layers (see Figure 16). As with nearby fences 5CN967 and 5CN968, this stone feature is composed of unshaped native basalt boulders. The fence runs about 124 m of actual length down the hillslope at an orientation of 27°–207°. It is built on a slope averaging about 25°, steeper on the upper portion and gentler down onto the toe of the slope where it

adjoins the barbed wire fence. It averages 1 m wide with a maximum width of 1.3 m; it is likewise 1 m in height on average, with a range of .8–1.1 m. Near the top, one section of boulders has collapsed to both sides, leaving a low spot in the wall 50 cm long and 40 cm high. Although the fence is predominantly straight, there is a sinuous section in the upper third beginning 25 m below its top end. The lower end overlaps with the wire fence by about 1.5 m (5 ft). At that point, the wire fence extends at a different angle than the stone fence, almost northward at 7°. On the first log post where the two fences meet is a weathered sign (approx. 12″ × 18″) with illegible marks—possibly "No Hunting." The age and function of this feature is likely identical to the fences at 5CN967 and 5CN968, i.e., to define pastures on the hill slope for sheep grazing, probably 1860–1890 (Carrillo 2007:235, 237; Herman Miller, personal communication 2007) or perhaps into the early 1900s. Along with 5CN968, this fence site is evaluated eligible for the NRHP.

5CN976 (PSS–04–11) is an open lithic scatter or chipping station. Its artifacts are widely scattered throughout the site, with only a projectile point base and two flakes in proximity to each other. These artifacts are in the middle of the site with remaining debitage found at the peripheral edges of the site. The debitage is composed of chert with the projectile point being manufactured from yellow quartzite, a material that is rare elsewhere in the project area. Lithic tool manufacture of early stages including material testing occurred at this site. The reworked projectile point indicates the probability of hunting activities, and its style appears to be one within the Foothills–Mountain technocomplex of the Late Paleoindian period (Jodry 1999b:102–104). Pitblado (2003:112–116, 158–159) describes such forms as Angostura points and also notes the common use of quartzite for manufacturing projectile tips of this early complex. Alternatively, albeit less likely given the thickness and ground stem edges, the point base may be a McKean Lanceolate fragment from the Middle Archaic period. The potential for buried material is considered minimal in view of the scarcity of artifacts found at the eroded edge of the piedmont plain. This site is evaluated not eligible for the NRHP.

5CN977 (PSS–04–12) consists of an open camp characterized by flaked stone and fire-cracked rock (FCR), found amidst low sand dunes at the edge of the piedmont of Sierro del Ojito, just above the Conejos River floodplain. One dense lithic concentration in the southern part of the site contains hundreds of flakes, most of the observed tools, and a few trachyandesite spalls of FCR—most concentrated in a small area on the east end of the artifact concentration. Debitage is dominated by thinning flakes of various kinds of chert (including probable Cumbres source material), but all stages of tool manufacture are represented and a variety of other materials have been noted in lower numbers. Tools include a small biface (projectile point preform?), a uniface fragment, an edge-modified flake, the mid-section of a side scraper made on a blade, a serrated microtool (collected, FS–2), and one diagnostic projectile point of the Pinto Shouldered or San Jose style indicative of an Early to Middle Archaic period occupation (collected, FS–1). XRF analysis (Appendix V, Table V-5) indicates the material of FS-1 may derive from the San Antonio Mountain A source in northern New Mexico. No stained soil was observed within the FCR, but the probability of additional buried material is good within the sand deposits surrounding deflated areas. The variety of tools present suggests diverse camp activities are represented, along with the abundant evidence for flaked stone tool manufacture that is in evidence here. This interesting site is evaluated eligible for the NRHP.

5CN978 (PSS–04–13) is an extensive open camp found amidst equally extensive, low sand dunes which have accumulated along the edge of the piedmont on the northeast side of Sierro del Ojito, just above the Conejos River floodplain. The dunes continue along this margin toward the south and southeast onto private land—and the site likely continues in that direction as well—but only the portion on state property was examined closely. The majority of the debitage is of various colors of mottled cherts—likely much from the Cumbres source—of intermediate stages involving biface thinning. But all stages of manufacture are found here, as are a wide range of materials other than the mottled cherts. Tools are not numerous but include two obsidian bifaces, one a base fragment and the other a tiny stemmed arrow point (collected, FS–1) diagnostic of the Late Prehistoric period, post-AD 150. Features include one flaked stone concentration at the margin of a sand dune (Figure 23), and a small concentration of fire-cracked rock not accompanied by any noticeable soil staining. However, there is a very good possibility of intact buried materials including features within the stabilized sand dunes. The site is evaluated potentially eligible for the NRHP.

5CN979 (PSS–04–14) is an open chipping station in the form of a flaked stone scatter located in sand dunes on the piedmont on the northeast side of Sierro del Ojito, above the floodplain of the Conejos River and south-southeast of Dexter Spring. It is also a short distance south of site 5CN978, likewise within the dune field. Most artifacts are exposed in barren, deflated mud flats between the dunes. The majority of the debitage is of various colors of mottled cherts dispersed over the site area with little concentration, primarily as intermediate stage thinning flakes with fewer early stage core reduction flakes present. No tools, features, or diagnostic items have been found, and there appears to be little potential for intact buried material. This site is evaluated not eligible for the NRHP.

5CN980 (PSS–04–15) is an open camp found amidst the extensive field of low sand dunes, which have accumulated along the edge of the piedmont on the northeast side of Sierro del Ojito, south of the Conejos River floodplain. The dunes occur just below and east of a broad, low ridge that trends northerly toward Dexter Spring; the site is just below the brow of this ridge at the west edge of the dune field. The majority of the debitage is of various colors of mottled cherts—likely much from the Cumbres source—along with a sizeable amount of jasper and a little basalt. These flakes mostly represent early to intermediate stages of tool manufacture: core reduction and biface thinning. Some evidence of raw material (chert) testing also is present. Tools observed include a small corner-notched arrow point (collected, FS–1) and an end scraper; the point is diagnostic of an occupation in the first half of the Late Prehistoric period. Two features found are a flaked stone concentration that yielded the diagnostic point, and a small stained soil concentration that may be an eroded firepit. Additional evidence of thermal features is in the form of apparently fire-cracked trachyandesite rock not accompanied by any noticeable soil staining. There are also small concentrations of native trachyandesite cobbles lacking any signs of heating. A majority of the flakes (≈ 65%) are found in the artifact concentration. There is a very good possibility of intact buried materials including features within the stabilized sand dunes. Therefore, it is evaluated potentially eligible for the NRHP.

5CN981 (PSS–04–16) is a sparse flaked stone scatter (i.e., an open chipping station) located in sand dunes on the piedmont on the northeast side of Sierro del Ojito, above the

Figure 23. Northeast view of flagged artifact concentration at site 5CN978.

Figure 24. West view of flagged fire-cracked rock (FCR) concentration at site 5CN982. The FCR is exposed in the lower portion of a sand dune.

floodplain of the Conejos River and south of Dexter Spring. It is also completely surrounded by other prehistoric sites within the dune field. The majority of the debitage is of various colors of cherts—including mottled material probably from the Cumbres source—and basalt. All of the debitage is dispersed over the site area with no concentrations, primarily as intermediate stage thinning flakes with fewer early stage core reduction flakes present. No features or diagnostic items have been found. The only tool observed is the base of an unnotched biface, perhaps a projectile point fragment but unfortunately too small to be diagnostic of the period of occupation. There appears to be very little potential for intact buried material. This site is evaluated not eligible for the NRHP.

5CN982 (PSS–04–17) is an open camp found amidst an extensive field of low sand dunes, which have accumulated along the edge of the piedmont on the northeast side of Sierro del Ojito, south of the Conejos River floodplain. The dunes occur just below and east of a broad, low ridge that trends northerly toward Dexter Spring. The site is below the brow of this ridge in the western part of the dune field; several other prehistoric sites are nearby to the north and east. Although fairly sparse, the debitage includes a variety of materials, notably chert, jasper, and basalt along with a little chalcedony and obsidian. These flakes mostly represent early to intermediate stages of tool manufacture: core reduction and biface thinning. However, all stages of tool manufacture are represented, and there is a sizable number of unidentifiable flake fragments in the surface assemblage. No tools have been observed, but one feature found is a concentration of fire-cracked rock consisting of about a dozen trachyandesite spalls 3–10 cm long in a 1 m diameter area in the east part of the site (Figure 24). Even though the surface material is rather sparse, there is a good possibility of intact buried materials including features within the stabilized sand dunes. This site is evaluated potentially eligible for the NRHP.

5CN983 (PSS–04–18) consists of an open camp manifest as an extensive flaked stone scatter with one concentration of material spread amid sand dunes up to 2 m high, which have accumulated along the edge of the piedmont on the northeast side of Sierro del Ojito, south of the Conejos River floodplain. The most common material is chert, with lesser amounts of jasper, basalt, chalcedony, and obsidian also present. Core reduction flakes dominate with a fair number of biface thinning flakes also observed. Tools include a projectile point fragment (collected, FS–1) diagnostic of the Late Prehistoric period, a mano fragment, and a bifacial knife fragment (FS–2). Features include the flaked stone concentration in the central part of the site and a fire-cracked rock concentration to the southwest of the former, indicative of short-term camp activities. There is a good possibility of intact buried materials including features within the stabilized sand dunes. The site is evaluated potentially eligible for the NRHP.

5CN984 (PSS–04–19) is a multiple component site with both prehistoric and historic period remains. The prehistoric component is limited to a single flaked stone scraper that would have been recorded as an Isolated Find (IF) had it not been found at the north edge of an Historic period trash scatter. The scraper (collected, FS–1) was located on the deflated piedmont at the northeast foot of Sierro del Ojito, just east of a barbed wire fence and two-track jeep trail parallel to the fence; the tool was collected about 9 m east of this road. The scraper is a complete uniface, made of white moss agate, with evidence of use on three edges (both lateral edges and the distal end). The use wear includes step fracturing and crushing, indicative of work on

resistant material(s) such as wood or bone. The deflated "desert pavement" surface here shows little potential for intact buried material.

The Historic period component is a sparse, dispersed trash scatter found generally to the south and southwest of the scraper. Almost the entire scatter is found on the east side of a 4-strand barbed wire fence that extends in a northerly direction from a stone fence (5CN975) higher up on the slope of Sierro del Ojito toward the river and Dexter Spring. Two dirt jeep trails pass through the site—one in a NW–SE direction through a gate in the fence roughly in the center of the site, and a second spur road running parallel to the fence on its east side. Artifacts include bottle glass shards, scrapped pieces of barbed wire, and sanitary type tinned cans. There is one denser cluster of purple glass northeast of the gate, but no real concentrations of material and no potential for intact buried remains. No features have been observed other than the modern fence and roads. The site may have been used by local ranchers as a short-term camp during fence construction/maintenance, or some other related activity. The combination of diagnostic materials indicates multiple periods of use from the late 19th to mid 20th centuries. This site is evaluated not eligible for the NRHP.

5CN985 (PSS–04–20) is an open chipping station represented by a sparse flaked stone scatter located in sand dunes (max. 1.5 m dune height) on the piedmont on the east side of Sierro del Ojito, above the floodplain of the Conejos River and south of Dexter Spring. It is also adjoined by other prehistoric sites within the dune field, particularly to the north. The majority of the debitage is of various colors of cherts, with some jasper, obsidian, and basalt also present. Most debitage is dispersed over the site area with no significant concentrations, although one area of slight clustering occurs through the site center along a shallow wash. All stages of tool manufacture are represented with early stage core reduction flakes being most common, but also late stage tool finishing/maintenance activity is much in evidence. No features or tools have been found, so the period of occupation remains unknown. There appears to be very little potential for intact buried material here, and the site is evaluated not eligible for the NRHP.

5CN1002 (PSS–05–21) is a multiple component prehistoric and historic site located midway up a bench at the southwestern foot of Sierro del Ojito. The prehistoric component is an isolated lithic tool; it is a primary chert flake tool. The flake tool would be recorded as an IF were it not for the associated Historic period glass scatter. The artifact is of solid gray chert with a reddish rind at the proximal and one lateral edge. Both the proximal end/platform and dorsal face are 100% cortical—a light brown wind-polished surface. The distal edge on the ventral face near one lateral edge appears to be retouched for use as a low-angle scraper. No platform preparation is evident. The flake tool is immediately east (up slope) of a concentration of glass shards.

The Historic period component is a moderately dense glass scatter in and adjacent to a shallow wash. The glass scatter is predominantly composed of weathered aqua glass with three intact bottle finishes and three intact bases. The remainder of the glass scatter is composed of smaller purple glass pieces, with no diagnostic bottle parts found. The intact finishes are found mid-scatter south of the wash in proximity to one another. No complete or partially intact bottles have been found. No manufacturer's marks have been observed; the finishes, however, are

applied lip types from mold-blown bottles, ca. late 19th–early 20th centuries. The site is evaluated not eligible for the NRHP.

5CN1003 (PSS–05–22) is an open, mixed trash scatter of glass and various metal items at the southwestern foot of Sierro del Ojito. The slope faces due west looking directly toward the McIntire Ranch ruins (5CN793). The limited number of possible food cans (n = 7) suggests a temporary camp. Glass shards seem to be from 3–4 bottles. Diagnostic artifacts include both cut and wire nails, and purple glass which date to the time of the McIntire Ranch occupation. The graceful suspension design of a deteriorated sled implies that it was not from an Hispanic homestead, families of which tended to be less affluent in this area; possibly it came from the McIntire Ranch. A sled in this area implies that there was sufficient snow on which to glide. Why would a sled be in this location during the snow season? Possibly to aid in hauling pinyon pine firewood from the mesa slopes above (the higher elevations of the San Luis Hills were wooded in the 19th and early 20th centuries, but are barren today). This site is evaluated potentially eligible for the NRHP.

5CN1004 (PSS–05–23) consists of an open, very sparse flaked stone tool scatter and cairn feature located on a narrow saddle on the northern crest of Sierro del Ojito, overlooking the Conejos River floodplain and sand dune field far below. The cairn is in the middle of the saddle toward its eastern edge, and is constructed as a pile of ca. 20 native trachyandesite rocks measuring 30–80 cm long, atop the exposed bedrock layer capping Sierro del Ojito. The feature is about 3 m in diameter and ca. 75 cm high. Its function is undetermined, but the exposed location is more suggestive of a ceremonial purpose than of hunting or some other secular activity. Artifacts are limited to two flaked stone tools; no debitage has been observed here. Adjacent to the cairn is a black basalt flake tool fragment exhibiting bifacial retouch on one lateral edge, likely used in cutting tasks.

Figure 25. Eden point blade.

The second tool is a lanceolate projectile point blade of yellow-brown jasper found (and collected, FS–1; Figure 25) on the western, sloping edge of the saddle. Although its base is missing, the 4.09-cm-long blade exhibits careful comedial (parallel-transverse) flaking with the distinctive diamond-shaped transverse cross-section typical of Eden points in the Cody complex. The Cody complex dates to the Late Paleoindian period, and is known from several sites in the San Luis Valley (Jodry 1999b:97–102). Even though extensive bedrock outcrops here severely limit the potential for buried material, pockets of shallow deposition occur and further exploration of the cairn feature may be warranted. Thus, the site is evaluated potentially eligible for the NRHP.

5CN1005 (PSS–05–24) consists of a multiple component prehistoric and historic site located on the central crest of Sierro del Ojito, near its northern rim. Both components are quite sparse with prehistoric materials limited to three flaked stone tools and the Historic period represented by only two metal items. No features or debitage were observed. The prehistoric component consists of two black basalt tools and one of a mottled red-gray material—possibly siltstone, spread over a 55 m × 25 m area. Given that the site area is characterized by dense lag gravels of dark-colored, basaltic-appearing trachyandesite, the survey crew had a difficult time finding basalt artifacts of similar appearance. It is quite possible that a few other basalt artifacts are present here but escaped detection. The three tools include two projectile point fragments and a bifacial blank fragment (all collected, FS–1, 2 & 3). FS–1 is the siltstone(?) projectile point, a tiny stemmed specimen with an apparently impact-fractured tip, diagnostic of the Late Prehistoric period post-dating AD 1000. The second projectile point fragment (FS–2) is a lanceolate-shaped blade of black basalt, also apparently impact-fractured. Its broken base prevents definitive assessment of its age or style, and the size of the blade could fit either a large arrow point (i.e., Late Prehistoric period) or perhaps more likely a small spear point dating to the Middle/Late Archaic period. In any event there are two different styles of points here, suggesting multiple occupations, however brief. FS–3 is the bifacial blank fragment with a broken distal end and a $CaCO_3$ rind on one face indicating the artifact lay in situ undisturbed over a prolonged period.

The two metal items (neither collected) constituting the equally sparse Historic period component may be parts of a single artifact. One is a sanitary-type, crimped seam tinned can measuring 7″ tall and 3¼″ in diameter. It is embossed on the base with the letter "G" encircled. If indeed it fits the second piece, it is a baking soda can, and dates to the early-mid 20th century (post-1920). The second item is a tinned can lid of the same diameter embossed with "KC Baking Powder 25¢." These two pieces are widely separated on the site, some 60 m apart. With the extremely sparse surface scatter, the deflated nature of the site surface, and common bedrock outcrops, there is a very low probability of intact buried materials here. The site is evaluated not eligible for the NRHP.

5CN1006 (PSS–05–25) is another multiple component prehistoric and historic site; it is a sheltered camp spread below a prominent rock outcrop at the southeast foot of Sierro del Ojito (Figure 26). The prehistoric component is a small and sparse scatter of flakes and a mano fragment found generally downslope from the outcrop of light-colored trachydacite containing a recently occupied rockshelter. The shelter is at the west end of the outcrop and measures about 4 m long × 1.5 m high × 1.5 m deep. A modern rock enclosure and painted images ca. 1982 are in the shelter (see below). The mano fragment—a bifacial tool—is located immediately below the shelter. Flakes are thinly spread across the slope to the east below the rest of the outcrop. High quality cherts and jaspers are present, in early to intermediate stages of reduction. No flaked stone tools are present; there is a low potential for buried material here (the floor of the rockshelter is bedrock).

The Historic period component is largely composed of several rock inscriptions, most of which consists of modern painted graffiti and more artistic images apparently dating to the early 1980s, and one set of pecked inscriptions dating to the 1930s (Figure 27). The latter set is on an

Figure 26. West view of rock outcrop at rockshelter site 5CN1006, showing stacked rock enclosure at the mouth of the shelter.

Figure 27. Close-up view of rock inscriptions with date of 1932 visible, site 5CN1006.

east-facing, nearly vertical rock wall and an adjacent, lower rock surface facing skyward but very difficult to decipher. The east-facing inscription is "R MEDINA LAS SAUCES" above the line "1/20 1932". Adjacent on the same rock surface is the image of a man's profile facing to the left (south) and smoking an elbow pipe. All other rock art here is drawn using a dark brown house(?) paint. About 7 m (20 ft) above and left (to the NW) of the pecked panel is a diverse panel of modern art. There are two painted arrows or bird tracks, 15 cm (6″) long and 15 cm apart, on a high surface facing down. About 30 cm (1 ft) below the right arrow/track is a zigzag pattern roughly 60 cm (2 ft) long. Another 30 cm (1 ft) above the arrows/tracks are two circular radiating lines. Approximately 3 m (10 ft) to the upper left is a 15 cm (6″) high stick figure with a bow-shaped line to its left side. Another 18 cm (7″) to the left is a horned quadruped. A third panel 2 m (6 ft) to the west has, in brown paint, " LA SAUCES 82." The final panel is another 15 m (50 ft) west in the rockshelter enclosed with a dry-laid masonry wall (modern). Facing south is a painted handprint and the name "RONNIE." A light scatter of old and modern trash is also present, including bottle glass, square cut and wire nails, and a piece of milled lumber. Clearly the rockshelter area has been used for recreational purposes in the 20th century, likely continuing to the present time. But there is little potential for intact buried remains here, and the site is evaluated not eligible for the NRHP.

5CN1007 (PSS–05–26) is an open lithic site consisting of a small but dense scatter of flakes located on a narrow, south-facing ledge adjacent to a bench on the southwest spur ridge of Sierro del Ojito. All of the flakes are of the same material—a light gray chalcedony. The majority of the debitage consists of early stage core reduction flakes and shatter from hard hammer percussion work, but some later stage thinning and finishing flakes also are present. No tools or cores have been observed, and the only feature present is a flake concentration at the edge of the ledge measuring about 6 m in diameter. A careful search of the adjacent bench failed to locate additional artifacts despite good ground visibility; it appears that this location was selected in part for its lookout qualities with an expansive view of the southern side of Sierro del Ojito and the San Luis Hills beyond. There is a low potential for buried material here with extensive trachyandesite bedrock outcrops present. Thus, it is evaluated not eligible for the NRHP.

5CN1008 (PSS–05–27) is an open architectural site containing two rock enclosures built on the northwest edge of a narrow, rocky spur ridge extending southwest from the crest of Sierro del Ojito. Only one artifact—a large basalt uniface—has been found here despite good ground visibility, and it's possible that this site represents ritual activity such as vision quests given the location of the rock enclosures at the edge of the ridge with an expansive view of the landscape to the west and northwest. Feature 1 consists of a curving rock wall of dry-stacked natural trachyandesite boulders in a 3 m long × 2 m wide area, adjacent to the downslope side of a natural rock outcrop. The wide U-shaped opening faces south-southeast down the ridge, but the most extensive view is over the low wall to the northwest; the wall is several courses high in spots, about 50–75 cm high overall. Feature 2 is up the ridge to the east-northeast about 35 m where an ancient trachyandesite flow has eroded to form a kind of natural enclosure with a bedrock "wall" along the northwest edge of the ridge. Here on the "inside" [south-southeast side] of this natural enclosure is what appears to be a low, stacked rock alignment—now collapsed—of possible cultural origin. This alignment creates an oval enclosure about 3 m long

× 1–1.5 m wide. The age of the features is unknown, but lichen growth on Feature 1 rocks suggests some antiquity. The uniface is located at the west end of the site on the edge of a low ledge. Although there is a low potential for buried material with the extensive trachyandesite bedrock outcrops present, the site's possible ritual use is of significance by itself. Thus, the site is evaluated potentially eligible for the NRHP.

5CN1009 (PSS–05–28) consists of an open stone fence of the Historic period on the lower east slope of Sierro del Ojito, with a barbed wire fence supported by wooden posts apparently added later to extend its length to the base of the hill where it now intersects a modern E-W fence on the section line. The stone fence begins at a steep rock outcrop on the lower slope of the mesa; bedrock here is a gray-brown trachydacite, boulders of which compose about 80% of the fence material. The remainder of the rock in the fence is dark gray to black trachyandesite, which is also naturally occurring as talus eroded from outcrops higher on the mesa. The width, height, and completeness of the stone fence varies. The upper end measures 68 cm high × 122 cm wide; 4 m down slope the fence varies from 86–120 cm high to 63–118 cm wide. Halfway along its length another high point of 114 cm is preserved. The fence foundation is several rocks wide, narrowing to a rock or two wide at the top. Trachydacite boulders—some huge—comprise the entire upper half of the fence, whereas the lower half is a mixture of trachydacite and trachyandesite rocks mostly in smaller sizes than those above. Maximum dimensions on this lower half are only 91 cm wide × 26 cm high, due to natural collapse and use of some fence rocks to support wooden posts for the barbed wire fence addition. There are also noticeable gaps in the stone fence on the lower end. The barbed wire fence runs with the stone fence along the latter's entire length, and beyond to the foot of the slope where it joins a modern wire fence running east-west along the section line. There is no potential for intact buried remains here and, given that this fence has been altered with the barbed wire fence addition, it is evaluated not eligible for the NRHP.

5CN1010 (PSS–05–29) is a multiple component prehistoric and historic site found on the gently sloping piedmont at the eastern foot of Sierro del Ojito. The prehistoric component is an open lithic site expressed as a small and sparse scatter of only four flakes and no tools. Debitage includes high quality cherts and jasper, plus one basalt flake, in early to intermediate stages of reduction. No features are present; there is a very low potential for buried material here given the excellent ground visibility and the absence of artifacts or features eroding from the margins of a gully cutting through the site.

The Historic period component consists of a scatter of glass and metal fragments spatially associated with the sparser prehistoric lithic scatter. Much of the glass—two clear shards, seven purple glass fragments, and a purple glass flask base—is in a loose cluster in the northeastern part of the site. Metal scrap and a carriage bolt are more widely scattered about the area. Most of the metal and glass artifacts are within 15 m of a jeep trail that passes the west edge of the site. A dry wash has cut a gully eastward through the center of the site, but no evidence of buried material was observed on the margins of the drainage. A second smaller wash coincides with the south edge of the site. No features are present here. This component appears to represent trash of the late 1800s–early 1900s, likely related to ranching activity. The entire site is evaluated not eligible for the NRHP.

5CN1387 (PSS–06–30) is another multiple component prehistoric and historic site, located on the northeastern crest of Sierro del Ojito where the mesa narrows to a ridge-like landform. The prehistoric component here would have been recorded as an isolated find if not for its spatial association with an Historic period cairn. It is a single small thinning flake of yellow-brown jasper, with no evidence of retouch or use wear, measuring 1.0 cm L × 1.6 cm W × 0.35 cm T. No other prehistoric artifacts or features are present.

The Historic period component is limited to a small rock cairn and two crimped-seal tinned cans. The cairn measures about 1.25 m high and 50–70 cm wide. It is built on top of two large boulders of native volcanic rock (trachyandesite), forming a base wider than the rock piled atop the boulders. This "foundation" is about 1.5 m in diameter and 50+ cm high. Six unshaped blocks 30–40 cm across have been stacked up to form the cairn. A short distance (13–15 m) west at the edge of the mesa are two rusted tinned cans—one a rectangular sardine can and the other a small (2½″ H × 2⅜″ diameter) crimped seal can. This component appears to represent late 1800s–early/mid 1900s sheepherder activity. There is a very low potential for either prehistoric or historic buried material here given the excellent ground visibility and extensive bedrock outcrops. The entire site is evaluated not eligible for the NRHP.

5CN1388 (PSS–06–31) contains three Historic period features, located on a knife-edge ridge and knoll at the far southeastern edge of Sierro del Ojito, below the mesa's crest but still elevated well above the valley floor. The features are numbered 1–3 from northwest to southeast along the ridge. Feature 1 is a stacked rock enclosure built against a bedrock outcrop on the south-southwest facing side of the ridge (Figure 28). This position affords an expansive view of the surrounding valley except to the west and northwest, blocked by the highest part of the mesa. The space enclosed is roughly oval in shape and measures 1.6 m × 1.2 m. It is constructed of unshaped blocks of native volcanic rock (trachyandesite), from cobble to boulder size and averaging 30 cm × 30 cm × 15 cm. The largest of these rocks may have already been in place naturally and make up the base of the western and northern walls. The walls range in height from 60 cm to 100 cm, up to a maximum of six courses. The highest walls are on the south and west side of the feature, built wide enough on the south to nearly hang over the exposed edge of the ridge. Rock stacked on the north and east sides shore up the cavity originally excavated into the ridge to construct the enclosure. Overall, rock stacking in Feature 1 appears somewhat looser than would be expected in older features, suggesting either that it was built in modern times, or that it is an old enclosure that has been recently reconstructed.

Feature 2 is a stacked rock cairn located about 5 m southeast of Feature 1, on the south side of the ridge crest (see Figure 15). It is also constructed of unshaped blocks of native rock, built up to a current height of 1 m with basal dimensions of 2.25 m × 1.6 m. The southwest edge of the cairn is built against a large 1m^2 boulder. There appears to have been some rock displacement on the south side of the feature, above the steepest part of the ridge slope. Some 20 m to the southeast of the cairn is Feature 3, a partial stone circle on a lower level of the ridge with an equally expansive view of the surrounding landscape. Likewise constructed of unshaped blocks of native rock, Feature 3 is 3.2 m in diameter with a maximum wall height of 60 cm and a maximum of four courses stacked atop existing rock rubble. The northwest section of the feature has been knocked down or has naturally deteriorated, with a gap in the southwest side.

Although Features 2 and 3 appear more weathered than Feature 1, the maximum age of the site as a whole may be no more than a hundred years, and could be less than 50 years. The only artifacts present are two pieces of broken wood lathe and a short length of baling wire, all likely less than 50 years old. Site function could be as an sheltered overlook and landmark as part of sheepherder activity, or could be from more recent recreational activity such as by hunters. There is a very low potential for historic buried material here given the very extensive bedrock outcrops with virtually no soil development; the site is evaluated not eligible for the NRHP.

Figure 28. Southwest view of Feature 1 stacked rock enclosure at site 5CN1388, showing expansive vista toward Sanford in the distance.

5CN1389 (PSS–06–32) is yet another multiple component prehistoric and historic site, located on the gently undulating north-central crest of Sierro del Ojito. The more ancient component is limited to a single arrow point, which would have been recorded as an isolated find except for its loose spatial association with a Historic period cairn. The point was found (and collected, FS–1) about 35 m northeast of the cairn, and 54 m from the northeast rim of the mesa. No other artifacts and no prehistoric features are present. The arrow point style is side-notched, with a concave base and short triangular blade that might have been reworked. It is made from white chalcedony, and is diagnostic of hunting activity in the Late Prehistoric period ca. AD 900–1600.

The Historic period component consists of an isolated rock cairn about 37 m from the arrow point, within sight of two other cairns to the northwest and south-southwest. This cairn, and the others on the mesa crest, may be related to sheepherding activity in the late 1800s and early 1900s, although more recent visitors may have modified the arrangement of the rocks. The cairn here was built using locally available, unmodified igneous cobbles and boulders, piled atop an outcrop of bedrock of the same igneous material (trachyandesite). The stack on top of the bedrock is seven courses high; the cairn dimensions are 110 cm L × 85 cm W × 110 cm H. Low bedrock ledges occur in several places on the crest of the mesa near this cairn, and along one of these ledges between the cairn and the collected arrow point is a natural ⊃-shaped arrangement of rock that could have served as an effective shelter, although there is no direct evidence of its use for such a purpose. No Historic period artifacts have been observed on the site, and there is little potential for buried material on the deflated mesa top. This site is evaluated not eligible for the NRHP.

5CN1390 (PSS–06–33) is also a multiple component prehistoric and historic site, on a low saddle and crest of a rocky spur ridge at the southwestern foot of Sierro del Ojito. The prehistoric site component consists of a debitage scatter on the saddle and adjacent slope of the spur ridge; only four of the 18 flakes observed were found on the saddle, the remainder spread northwesterly down the ridge slope. Erosion of this slope clearly has modified the distribution of the artifacts noted in this part of the site. Items on the saddle include two thinning flakes, an unidentifiable flake fragment, and a piece of angular debris—of which three are of white/brown banded chert and one white chalcedony. Flakes on the slope include yellow-brown to maroon jasper, banded and solid colored cherts, and one each of basalt and chalcedony; most are biface thinning flakes. The majority of flakes observed lie to the south of a gap in the Historic period stone fence on the site, which provides an access route to the saddle. No prehistoric tools or features have been found (and no artifacts collected), and there is a very low potential for buried cultural material here given the excellent ground visibility, the presence of bedrock outcrops on the ridge, and the limited soil development on the deflated saddle.

The Historic period component consists of stone fence segments following the sinuous path of the ridge and saddle (Figure 29); it is one of five such fences documented on the slopes of this mesa. This fence and the others on the mesa slopes are related to sheepherding activity in the late 1800s and 1900s—to define separate pastures (Herman Miller, personal communication 2007). Similar to the others, the fence here was built using locally available, unmodified igneous (trachyandesite) cobbles and boulders. However, unlike the other stone fences on this mesa, here the fence has numerous "gaps" where existing bedrock outcrops are sufficiently high to serve the same barrier function. Put another way, the stone fence fills the gaps between significant bedrock outcrops, with the exception of a small—possibly recent—1.5 m fence gap coinciding with a natural gap in the bedrock on the prominent saddle (also approximating the state–private property boundary), where the prehistoric site component is located. Only that portion of the [mostly continuous] fence on and immediately adjacent to state property was mapped; its southwestern extent more than 70–75 m beyond the saddle has not been mapped or photographed. The fence averages 100 cm H × 75 cm W, and has been partly overlain with a modern wire fence on either side of the property boundary.

The wire fence extends 23 m up the ridge to the northeast, supported by ten metal and two wooden posts. At the farthest northeastern metal stake is an extension of the wire fencing anchored with boulders of the stone fence. Toward the southwest, the wire fence extends only about 12 m beyond the saddle, supported by five metal posts, two of which have been pulled out of the anchoring stone fence boulders. One "jog" in the stone fence alignment is near the northeast end at a prominent bedrock outcrop, above which the fence continues to its highest point at another outcrop. The stone fence follows a more sinuous route southwest of the saddle to the first major outcrop. Historic period artifacts are limited to separate wire strands found on the west side of the stone fence, including a 1 m length of barbed wire and 16 strands of smooth wire about 2 m long each, the latter held down by boulders. Other modern trash has been observed as well, including bottle glass, plastic scrap, and cartridge cases. There is very little potential for buried Historic period material on the deflated, rocky ridge or saddle, and the entire site is evaluated not eligible for the NRHP.

Figure 29. Southwest view down a spur ridge at rock fence site 5CN1390, showing sinuous nature of the fence construction.

5CN1391 (PSS–06–34) consists of an isolated Historic period rock cairn on a south-facing slope at the southwestern foot of Sierro del Ojito, just east of a spur ridge of this mesa. This cairn, and other larger ones on the mesa crest, may be related to sheepherding activity in the late 1800s and early 1900s, although the cairn here is significantly smaller and older in appearance. Similar to the others, however, the cairn on this site was built using locally available, unmodified igneous (trachyandesite) cobbles and boulders. It was constructed by making a roughly circular pile of 35–40 rocks stacked to a maximum current height of 48 cm. The widest portion of the cairn measures about 2 m in diameter. The rocks used range in size from 15 cm × 11 cm to 38 cm × 28 cm, with a median size of about 24 cm × 15 cm. These rocks are stacked on top of at

least three mostly buried bedrock boulders. The precise function of the cairn is not known but its location adjacent to—or on—a property boundary (private–state) may be more than coincidental. One possibility along that line of thought is that the cairn was used as the foundation bracing for a post displaying a property boundary sign. Absolutely no artifacts have been observed here, and there is virtually no potential for buried cultural material on this rocky slope. This site is evaluated not eligible for the NRHP.

5CN1392 (PSS–06–35) is a multiple component prehistoric and historic site, located on the highest part of the central crest of Sierro del Ojito. The prehistoric component consists of two projectile point fragments in loose association with another historic cairn. The point fragments were found 70 m apart, and define the north and south limits of the site. The smaller of the two pieces is the base of an apparent stemmed–indented base point made of yellow chert (collected, FS–1), found about 25 m from the cairn. The specimen has a rounded stem edge and may date to the Early or Middle Archaic period. The second tool, located 50 m north of the cairn and not collected, is a stemmed form of black basalt broken on the tip, one shoulder, and the basal edge. This point is made on a uniface, and is of a contracting stem style diagnostic of the Middle or Late Archaic period. Thus, the two items here are of different styles suggesting two different periods of hunting activity. No other artifacts and no prehistoric features have been found, and there is a very low potential for prehistoric buried material here given the excellent ground visibility, the presence of bedrock outcrops, and the limited soil development on the deflated mesa top.

The Historic period feature is found a short distance from the southern rim of the Sierro del Ojito mesa. As previously noted this cairn, and other large ones on the mesa crest, may be related to sheepherding activity in the late 1800s and early 1900s, although the cairn here is a bit different in construction details. Similar to the others, however, the cairn on this site was built using locally available, unmodified igneous (trachyandesite) cobbles and boulders. It was constructed with two "arms" in a kind of ⊢ shape, by making a pile of 32 rocks stacked on top of embedded bedrock boulders to a maximum current height of 62 cm (excluding the bedrock). Each "arm" of the cairn measures 1.63 m long, oriented at angles of 44°–244° and 140°–320°. The stacked rocks range in size from 6 cm × 6 cm to 54 cm × 36 cm, piled up in 3–4 courses atop the bedrock boulders. The date of the original construction of the cairn may have been some time ago given the growth of a large clump of claret cup cactus in the east side of the cairn; there are also two packrat nests in the cairn—one behind the cactus, the second on the west side. Absolutely no historic artifacts have been observed here and, as with the prehistoric component, there is virtually no potential for buried cultural material on this rocky mesa top.

Isolated Finds

Twenty-six isolated finds (IFs) were documented during the Pike's Stockade inventory, and all but one are of prehistoric American Indian origin. Two of the other 25 IFs have Historic period evidence in association with one prehistoric artifact.

5CN986 (PSS–04–IF1) consists of three items found in a 23 m N-S × 13 m E-W area on the colluvial apron at the northern foot of Sierro del Ojito, above the Conejos River floodplain. One red-brown jasper core reduction flake, one yellow chert finishing flake, and one black basalt thinning flake was observed here. The basalt flake was farthest north, about 23 m north-northwest of the jasper flake; the chert flake was 17.5 m NE of the jasper flake. The IF represents flaked stone tool manufacture from all stages of tool production, but it dates to an unknown time period.

5CN987 (PSS–04–IF2) also consists of three items, located in a 41 m E-W × 2 m N-S area on the crest of a low, broad ridge on the northeast side of Sierro del Ojito, not far east of site 5CN974. The three prehistoric artifacts include a chert core reduction flake, a chert edge-worked pebble; and one obsidian thinning flake fragment. The obsidian flake is east of a fence, about 40 m from the chert items; those two chert pieces are 8.5 m apart and west of a pasture fence. Early-to-middle stages of tool production are in evidence here, but the time period is unknown.

5CN988 (PSS–04–IF3) has two pieces of debitage and a core found in a 3.5 m × 1 m cluster on the flat edge of the piedmont plain at the northeast foot of Sierro del Ojito, 63 m due east of a survey cap. The two flakes include one of gray chert and one white chert, both thinning flakes; the third artifact is a yellow (Cumbres?) chert core with two flaked facets and wind-smoothed cortex. This IF represents early-middle stages of tool production, but again the time period is unknown.

5CN989 (PSS–04–IF4) is a tiny, white chalcedony, stemmed arrow point discovered 29 m above (southwest of) the center of a jeep trail and southeast of site 5CN984, on the upper portion of the piedmont plain at the northeast foot of Sierro del Ojito. One shoulder and the basal edge of the stem are broken; its intact blade is narrow and triangular. The specimen, which was collected as FS–1, also exhibits possible light reuse as a low-angle scraper/shaver. It likely dates to the end of the prehistoric era, < 700 BP.

5CN990 (PSS–04–IF5) includes three flaked stone items: one light gray chalcedony end scraper; one brownish gray chalcedony core reduction flake; and one yellow-brown chert thinning flake. These artifacts were scattered over a 29 m SE-NW × 2 m NE-SW area south of site 5CN985 on an extremely gravelly to cobbly, deflated portion of the piedmont plain at the east-northeast foot of Sierro del Ojito, just above a sand dune field. The thinning flake is farthest to the northwest, about 29 m from the scraper; the core reduction flake is 5 m north of the scraper. The flakes indicate early-middle stages of tool production, while the scraper shows use on hard material(s) such as wood or bone. Unfortunately, the IF dates to an unknown time period.

5CN991 (PSS–04–IF6) is a single black chert thinning flake with a broken distal end located at the eastern edge of the survey area, on the upper piedmont slope at the east foot of Sierro del Ojito, not far north-northeast of site 5CN1010. The 3 cm × 2 cm flake has a faceted and slightly abraded platform, but no evidence of use wear. Black chert is an unusual raw material in the project area, having a finer texture compared to volcanic (basaltic) materials of the same color. Obviously, this flake is not diagnostic of any particular time period.

5CN1011 (PSS–05–IF7) consists of three flaked stone items found in a 6 m N-S × 3 m E-W area on a very gravelly to bouldery, deflated piedmont bench at the western foot of Sierro del Ojito, several hundred meters south of site 5CN966. Artifacts here include one yellow-orange chert edge-modified flake fragment; one yellowish (Cumbres?) chert core reduction flake; and one gray chalcedony flake or spall. The flake tool is heavily weathered but shows apparent use as a scraper. Debitage represents the early stage of tool manufacture, likely using the naturally occurring pebbles and small cobbles strewn throughout this area. As is true of most of these IFs, 5CN1011 dates to an unknown time period.

5CN1012 (PSS–05–IF8) yielded two artifacts 33 m apart, on a gentle slope above a dry wash on the west side of Sierro del Ojito. The items found here include a yellow-brown jasper, stemmed spear point fragment (collected, FS–1) and one small white chalcedony core. The core was found southwest (at 217º) of the projectile point, at a slightly higher elevation. The wide stem of the projectile point base is reminiscent of certain Plano tradition materials such as Scottsbluff points of the Cody complex. However, the stem edges are not obviously ground, so more likely this specimen dates to the Archaic period, 8000–2000 BP.

5CN1013 (PSS–05–IF9) contains one item each of prehistoric and Historic period origin, in an 11 m E-W × 10 m N-S area on a gentle slope north of a dry wash, on the west side of Sierro del Ojito to the west of IF 5CN1012. The Historic period is represented by a broken bottle in the form of 24+ blue glass flask shards including an applied lip finish and one embossed fragment (not decipherable). The applied finish shows this was likely a mold-blown flask dating to ca. AD 1870–1910. In addition, within the glass scatter is one mottled yellow (Cumbres?) chert thinning flake indicative of an intermediate stage of flaked stone tool manufacture. Some native (unworked) chalcedony pebbles also occur in this area.

5CN1014 (PSS–05–IF10) consists of three items scattered in a 28 m × 5 m area located on the nearly flat crest of Sierro del Ojito, gently sloping toward the south mesa rim. The artifacts found here include one chalcedony flake; one chalcedony flake tool utilized on its distal edge; and one chalcedony pebble with a worked (retouched) edge. Both raw toolstone material testing and lithic tool use (scraping) are represented. A noticeable scatter of native chalcedony pebbles (unworked) also occurs here within the basaltic-appearing, trachyandesite lava flow, which is denser than in most other surveyed sections of the project area.

5CN1015 (PSS–05–IF11) is an isolated Historic period feature located on the very rocky lower south hillslope of Sierro del Ojito, just east of a steep dry wash. The Historic period feature is a dry-laid wall arc measuring roughly 3 m long × 75 cm high, with about 22 unshaped trachyandesite stones and small boulders remaining in the wall and perhaps a dozen rocks fallen. One quart size paint can was found 17.5 m south-southwest (197º) of this wall, but no artifacts are obviously associated with it. The wall arc, which is "open" (concave side) to the southwest, may have been part of a small shelter, perhaps sheepherder-related. If this interpretation is correct and the feature is contemporaneous with other sheep ranching features in this area, it may date to the early 1900s.

5CN1016 (PSS–05–IF12) has both prehistoric and Historic period items clustered in a 23 m N-S × 4 m E-W area at the foot of the hillslope on the south side of Sierro del Ojito, just below a prominent light gray trachydacite outcrop. A total of four artifacts was observed here: one round can top, 2½″ in diameter; one 4″ square can top (syrup?); one Oneida Victor #3 leg hold trap & chain (collected, FS–1; Figure 30), rusted, with an embossed bait plate: "Property of U.S."; and one black basalt thinning flake. The leg hold trap was found at the edge of a rock outcrop, where fur-bearing animals might den. A careful search failed to locate any other prehistoric materials, despite the presence of a shallow rockshelter in the prominent outcrop immediately above this IF. The Historic period items likely date to the early-mid 1900s.

Figure 30. Leg hold trap collected at 5CN1016.

5CN1017 (PSS–05–IF13) yielded three prehistoric artifacts in a 19 m NE-SW × 6 m NW-SE area located on the rocky crest of a narrow spur ridge off the southwest side of Sierro del Ojito, west of site 5CN1007. Found here were one Cumbres chert core reduction flake, one gray chalcedony thinning flake, and one yellow jasper biface fragment (possibly a knife or projectile point blade; collected, FS–1). The items represent early to intermediate stages of flaked stone tool manufacture, but date to an unknown time period.

5CN1018 (PSS–05–IF14) is an isolated large, gray Cumbres chert biface fragment found above 5CN1017 on the same narrow spur ridge off the southwest side of Sierro del Ojito. This artifact, which was collected as FS–1, is an early stage production biface or blank, lacking cortex, and may represent material transport from a source area on the Colorado–New Mexico state line. It is not diagnostic of any particular prehistoric time period.

5CN1019 (PSS–05–IF15) has two items found 16.5 m apart on the piedmont slope off the southeast side of Sierro del Ojito, above the sand dune field and south-southwest of site 5CN1010. The larger of the two artifacts is a dark gray basalt flake tool with a unifacially retouched (and slightly serrated) lateral edge; to the north-northwest is a yellow jasper core reduction flake. The flake tool's morphology suggests use in cutting task(s) but, as is true of most of the isolated finds, the time period is unknown.

5CN1020 (PSS–05–IF16) contains three pieces of debitage scattered in a 19 m N-S × 4 m E-W area, within a dense lag gravel deposit on an alluvial fan at the southern foot of Sierro del Ojito, not far south of 5CN1015. The artifacts include a yellow chert flake fragment, a yellowish-brown jasper thinning flake, and a yellow (Cumbres?) chert core reduction flake. Early to intermediate stages of flaked stone tool manufacture are indicated here, but the items date to an unknown time period.

5CN1393 (PSS–06–IF17) is a black basalt scraper fragment (collected, FS–1) discovered on the crest of Sierro del Ojito, at a bedrock ledge on the southwestern rim of the mesa. It is made on a large flake, with a unifacially beveled and utilized lateral edge; the proximal end has been bifacially thinned and used as well. Measuring 5.11 × 3.28 × 0.97 cm, the tool was primarily used as a side scraper on soft material (hide?), with secondary use as a knife; it dates to an unknown prehistoric time period. XRF analysis (Appendix V, Table V-10) indicates the material of this scraper probably derives from the San Antonio Mountain A source in northern New Mexico.

5CN1394 (PSS–06–IF18) consists of two artifacts found 12 m apart on the southern piedmont slope at the foot of Sierro del Ojito, just east of a dry wash. One item is an unidentifiable fragment of a gray chalcedony flake. The second artifact is a banded white-pink chert flake tool with a unifacially retouched lateral edge. This tool is made on a large core reduction flake; the middle of the retouched edge is broken. It functioned as a low-angle scraper used on a relatively soft material (skinning knife?); both pieces date to an unknown time period.

5CN1395 (PSS–06–IF19) is a mottled chert core reduction flake—tan in color with brown and black dendrites—located on the gently sloping alluvial fan on the east side of dry wash at the southern foot of Sierro del Ojito. The flake exhibits smooth cortex on the dorsal face and is entirely unmodified; it measures about 2.2 cm L × 2.4 cm W × 1.1 cm T. It represents the early stage of flaked stone tool manufacture and dates to an unknown prehistoric time period.

5CN1396 (PSS–06–IF20) is a black basalt projectile point blade fragment discovered (and collected, FS–1) on the uppermost mesa slope just below the crest of a spur ridge on the southwestern side of Sierro del Ojito. The tool exhibits an impact-fractured tip, has broken

shoulders, and a broken base. The blade is triangular with collateral flaking, and may be of a corner-notched style, although not enough of the neck area of the haft element remains intact to be certain. It measures 2.90 cm L × 2.74 cm W × 0.60 cm T and has a neck width of 1.50 cm. These dimensions are indicative of a dart (spear) point perhaps dating to the Late Archaic period ca. 3500–1800 BP.

5CN1397 (PSS–06–IF21) is a large, pinkish brown rhyolite(?) thinning flake found on the upper mesa slope 3 m in elevation below a saddle/bench on a spur ridge off the northwest side of Sierro del Ojito. The flake has neither cortex nor use wear, and is unbroken. It measures 4.2 cm L × 4.9 cm W × 0.7 cm T and was not collected. Obviously non-diagnostic of any particular time period, the only notable detail about this artifact is that it is made from a very unusual volcanic material not observed on other sites in the project area.

5CN1398 (PSS–06–IF22) is a black basalt composite flake tool fragment with broken proximal and distal ends. It was found (and collected, FS–1) on the north edge of a west-sloping bench, on a spur ridge off the west side of Sierro del Ojito. One corner of the tool is bifacially retouched into a thin, rounded graver/borer spur, with the adjacent lateral edge unifacially retouched as a low-angle scraper. It measures 2.29 cm L × 1.98 cm W × 0.34 cm T. The tool has no diagnostic qualities and, thus, dates to an unknown time period although such black basalt artifacts tend to be most common in Archaic period contexts in this area.

5CN1399 (PSS–06–IF23) is a large fragment of an orange chert core reduction flake found on the upper mesa slope below a small bench on a spur ridge off the northwest side of Sierro del Ojito, not far down the ridge from 5CN1397. The flake has cortex but no use wear or other modification. Nearby was found a native pebble of the same orange chert material, which is unusual for this area. The flake measures 2.4 cm L × 3.2 cm W × 0.8 cm T and was not collected. Like 5CN1397, this item is not diagnostic of any time period but is made from another unusual material not observed in assemblages on other sites in the project area.

5CN1400 (PSS–06–IF24) consists of two artifacts found 31 m apart at the head of a spur ridge on the northwest side of Sierro del Ojito, defined by descending benches and ledges. The location is directly up the ridge from 5CN1397. One item (collected, FS–1) is a red chalcedony arrow point blade fragment, triangular, of a very small—possibly stemmed—style found at the base of a ledge on a 15º slope. The second artifact (also collected, FS–2) was located to the southwest on a more level bench. It is a dark gray obsidian core reduction flake fragment, with a cortical platform and (possibly) unifacially utilized—but badly broken—lateral and distal edges. The arrow point blade fragment dates to the Late Prehistoric period, ca. AD 1000–1600.

5CN1401 (PSS–06–IF25) is a triangular bifacial preform fragment of black basalt, discovered on a 15º slope at a ledge below the south rim of the mesa crest of Sierro del Ojito. This location is not far east of 5CN1014. The biface is nearly complete, except for small portions of the tip and one base corner, and it measures 2.3 cm L × 1.8 cm W × 0.3 cm T. No use wear is evident and thus it is indicative of a late stage of tool manufacture, i.e., a production-stage biface. The preform (not collected) has limited diagnostic qualities and so it dates to an

unknown time period. However, if it is a preform for a projectile point, its small size would suggest arrow point technology of the Late Prehistoric period, post-dating AD 150.

5CN1402 (PSS–06–IF26) consists of two artifacts found 2 m apart on a nearly flat interfluvial ridge in the broad valley on the west side of Sierro del Ojito, a short distance north-northeast of 5CN1012. There is one broken thinning flake [the proximal portion], and one unidentifiable flake fragment, both made of a yellowish brown chert (Cumbres source?). No use wear is evident on either piece, and neither was collected. These pieces of debitage are not diagnostic of any time period.

Site Types

Based on the surface evidence, the 37 sites in the PSSHM can be categorized into several different prehistoric and historic site types (Figure 31; Table 4; Hoefer 1999d); note that multiple types are assigned to some sites as contents dictate. The most common types represented in the study area are prehistoric lithic scatters and camps (eight sites each), which together account for over 43 percent of the cultural resources documented. Prehistoric hunting stations and Historic period cairns (six sites apiece) are also not uncommon. Only one of the sites in the project area, 5CN1006, is associated with a rockshelter.

Figure 31. Prehistoric Site Types at Pike's Stockade

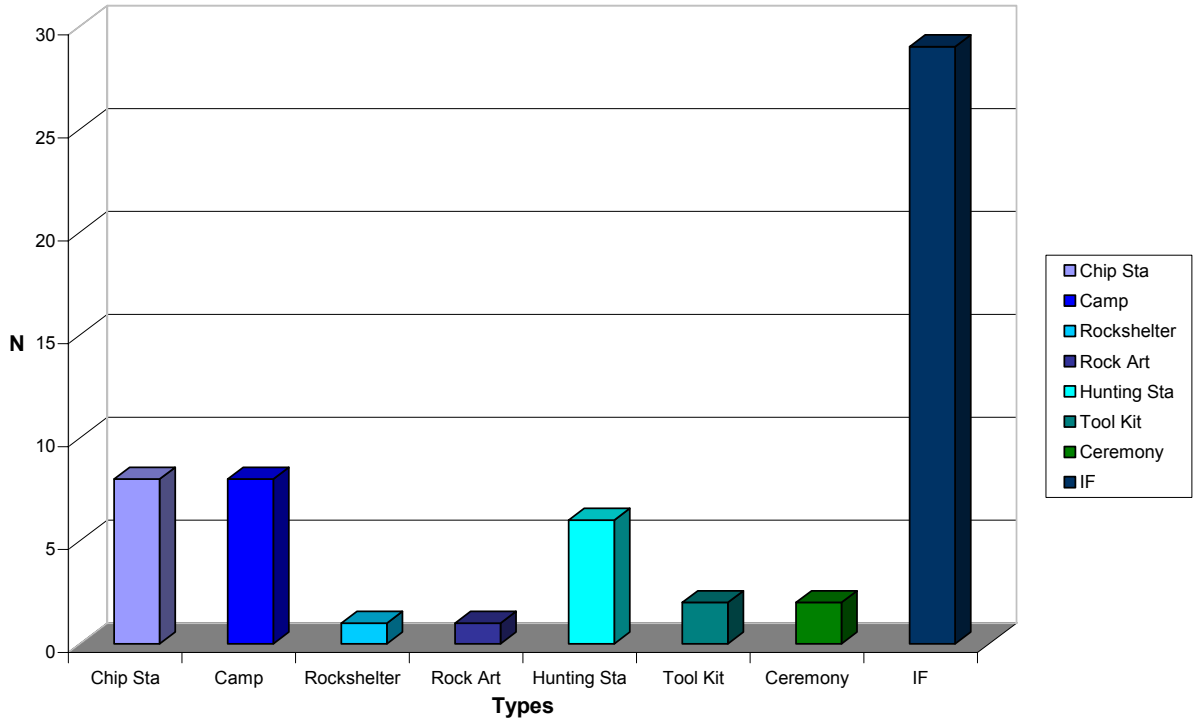


Table 4. Cultural Resources of the Pike's Stockade Area

Site #	Site Type and Age (if known)	NRHP Eligibility	Artifacts Collected
5CN75	Pike's Stockade: Historic period [previously recorded]	listed	none
5CN801	open rock art: unknown prehistoric & Historic period cairn [previously recorded]	eligible	one pecking stone
5CN966	open lithic: unknown prehistoric	not eligible	none
5CN967	open lithic: unknown prehistoric & Historic period stone fence	not eligible	none
5CN968	Historic period stone fence	eligible	none
5CN969	Late Archaic period open lithic & Historic period isolated potsherd	not eligible	one projectile point, corner-notched?
5CN970	Late Prehistoric period open lithic	not eligible	one arrow point
5CN971	open camp: unknown prehistoric	potentially eligible	none
5CN972	open lithic: unknown prehistoric	not eligible	none
5CN973	Early(?) Archaic period open lithic	not eligible	one stemmed projectile point
5CN974	Late Paleoindian and/or Early Archaic period open camp	potentially eligible	two stemmed projectile points
5CN975	Historic period stone fence	potentially eligible	none
5CN976	Middle(?) Archaic period open lithic	not eligible	one projectile point
5CN977	Early/Middle Archaic period open camp	eligible	one projectile point, one serrated microtool
5CN978	Late Prehistoric period open camp	potentially eligible	one stemmed arrow point
5CN979	open lithic: unknown prehistoric	potentially eligible	none
5CN980	Late Prehistoric period open camp	potentially eligible	one corner-notched arrow pt.
5CN981	open lithic: unknown prehistoric	not eligible	none
5CN982	open camp: unknown prehistoric	potentially eligible	none
5CN983	Late Prehistoric period open camp	potentially eligible	one arrow point, one stone knife

Site #	Site Type and Age (if known)	NRHP Eligibility	Artifacts Collected
5CN984	isolated flaked stone tool: unknown prehistoric & Historic period trash scatter	not eligible	one end scraper
5CN985	open lithic: unknown prehistoric	not eligible	none
5CN1002	isolated flaked stone tool: unknown prehistoric & Historic period glass scatter	not eligible	none
5CN1003	Historic period trash scatter or camp	not eligible	none
5CN1004	Late Paleoindian period open tool kit and cairn	potentially eligible	one projectile point blade
5CN1005	open tool kit: Middle/Late Archaic period and Late Prehistoric period; & Historic period can scatter	not eligible	one spear point, one arrow point, one biface frag.
5CN1006	sheltered camp: unknown prehistoric & Historic period trash scatter with rock inscriptions	not eligible	none
5CN1007	open lithic: unknown prehistoric	not eligible	none
5CN1008	open stone enclosures: unknown prehistoric	potentially eligible	none
5CN1009	Historic period stone fence	not eligible	none
5CN1010	open lithic: unknown prehistoric & Historic period trash scatter	not eligible	none
5CN1387	Historic period cairn & prehistoric isolated thinning flake	not eligible	none
5CN1388	Historic period stacked rock enclosures & cairn	not eligible	none
5CN1389	Historic period cairn & Late Prehistoric period isolated arrow point	not eligible	one arrow point
5CN1390	open lithic: unknown prehistoric & Historic period stone fence	not eligible	none
5CN1391	Historic period cairn	not eligible	none
5CN1392	Early/Middle Archaic(?) & Middle/ Late Archaic period open hunting station; and Historic period cairn	not eligible	one eared projectile point base

Table 4 (continued): ISOLATED FINDS			
IF #	**IF Type and Age (if known)**	**NRHP Eligibility**	**Artifacts Collected**
5CN986	Three flakes: unknown prehistoric	not eligible	none
5CN987	Two flakes, one utilized pebble: unknown prehistoric	not eligible	none
5CN988	One flake, one core: unknown prehistoric	not eligible	none
5CN989	Late Prehistoric period arrow point	not eligible	one stemmed arrow point
5CN990	Two flakes, one scraper: unknown prehistoric	not eligible	none
5CN991	One flake: unknown prehistoric	not eligible	none
5CN1011	Two flakes, one flake tool: unknown prehistoric	not eligible	none
5CN1012	Archaic period projectile point and one core	not eligible	one stemmed projectile point
5CN1013	One flake: unknown prehistoric & Historic period glass bottle shards	not eligible	none
5CN1014	Two flakes, one pebble tool: unknown prehistoric	not eligible	none
5CN1015	Historic period rock alignment, can	not eligible	none
5CN1016	One flake: unknown prehistoric & 3 Historic period metal items	not eligible	one metal #3 leg-hold trap
5CN1017	Two flakes, one biface fragment: unknown prehistoric	not eligible	one biface or proj. pt. blade fragment
5CN1018	One bifacial blank fragment: unknown prehistoric	not eligible	one bifacial blank fragment
5CN1019	One flake, one flake tool: unknown prehistoric	not eligible	none
5CN1020	Three flakes: unknown prehistoric	not eligible	none
5CN1393	One side scraper: unknown prehistoric	not eligible	one side scraper
5CN1394	One flake, one flake tool: unknown prehistoric	not eligible	none
5CN1395	One flake: unknown prehistoric	not eligible	none
5CN1396	Late Archaic period projectile point fragment	not eligible	one proj. pt. blade fragment

IF #	IF Type and Age (if known)	NRHP Eligibility	Artifacts Collected
5CN1397	One flake: unknown prehistoric	not eligible	none
5CN1398	One graver–scraper: unknown prehistoric	not eligible	one graver–scraper
5CN1399	One flake: unknown prehistoric	not eligible	none
5CN1400	Late Prehistoric period arrow point blade and obsidian flake	not eligible	one arrow point fragment and one flake
5CN1401	One preform: unknown prehistoric	not eligible	none
5CN1402	Two flakes: unknown prehistoric	not eligible	none

Lithic scatters, a.k.a. chipping stations, are flaked stone occurrences where debitage dominates overall artifact counts and tools of any kind are either absent or low in number. Put another way, lithic scatters are characterized by very low tool-to-debitage ratios but differ from lithic sources (where debitage likewise dominates) by their general lack of naturally occurring toolstone. Although native pebbles and small cobbles of chert and chalcedony are found in the PSSHM (see Figure 7), e.g. at 5CN966, 980 and 1014, procurement and use of these materials was very limited and casual at best with insufficient evidence observed to classify any of the sites in the survey area as a lithic source. Production stage bifaces—i.e., blanks and preforms—are found on several of the chipping stations, but neither ground stone tools nor features such as hearths or roasting pits are present on such sites.

Camps are typified by a moderate-to-high level of both artifact density and tool diversity, and can exhibit ground stone artifacts, small features such as hearths or FCR concentrations and, in one case, a natural rockshelter. Elsewhere, ceramic artifacts may be found on camp sites but, somewhat surprisingly, prehistoric pottery was not encountered at Pike's Stockade. In a few cases within the sand dune field at the northeast edge of the PSSHM, such as sites 5CN977 and 978, there is enough cultural material present over a large enough area to indicate either repeated camping episodes and/or use of the area as a base camp. Of course, redundant use of the landscape is a common attribute of sites in the region, but test excavations would be needed at the PSSHM sites to more precisely determine the kind of occupation(s) represented.

Hunting stations are essentially lithic scatters with one or more projectile points among the only tools represented. As with the camp sites, almost all of the sites in this category are found in the northeast portion of the survey area, in or near the sand dune field. The remaining prehistoric site types include one rock art panel (5CN801) associated with a possible ritual feature, another site in the ceremonial category, and two special activity sites generically called tool kits. Rock art site 5CN801, when first recorded in 1995, exhibited a stone enclosure (Feature 1) incorporating the boulder with the petroglyph, interpreted as a possible vision quest circle (Frye 1995). Unfortunately, rocks forming the enclosure and in the nearby cairn had been moved or removed in the recent past and it is not discernable today. Site 5CN1008 has two stone

features that could also be related to vision quests or comparable ritual activities; both features are in good condition. As is the case at both 5CN801 and 1008, features previously identified as ceremonial in nature elsewhere in the region often can be found on elevated landforms with good overview qualities (Clark 1999:331; cf. Hoefer 1999d:148–151). At many sites in Colorado, these features are expressed as surface depressions and have been variously interpreted as vision quest pits or fasting beds. They may be oval or U-shaped—with or without a rock enclosure (e.g., Benedict 1985).

Kvamme (1986:37, 41) defines sites having a high tool-to-debitage ratio within a small area as "tool kits." Compared to other site types, tool kits are intermediate in diversity—less diverse than a camp or habitation but with more kinds of tools than a special activity locus such as a kill site, hunting station, or vegetal processing station. Relatively little debitage, if any, is present on these sites. Both tool kits in the PSSHM, 5CN1004 and 1005, are found on the crest of Sierro del Ojito. Both are totally devoid of debitage but contain two or three tools that include, but are not limited to, projectile points. Basalt and chert or jasper are found in combination among the tools at each of these sites.

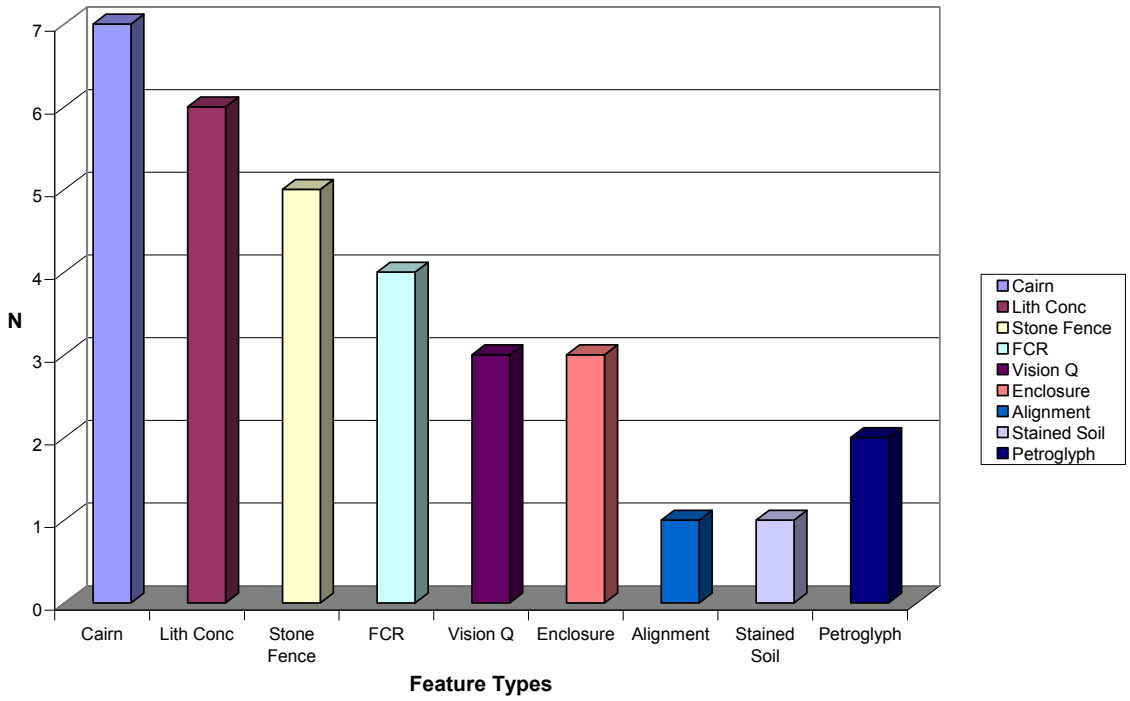
Compared to these prehistoric resources, the site types of the Historic period (post–A.D. 1600) represent a similarly diverse sample given the relatively small number recorded (18 sites, 4 IFs). As noted above, most common are cairns (six sites), two of which are associated with stone enclosure features. The vandalized enclosure at 5CN801 may have been of American Indian manufacture given that the rock art panel was apparently included in its construction. All but one of the cairns are in elevated positions on or near the crest of Sierro del Ojito. Also prevalent are trash scatters and stone fences (five sites each), most or all of which likely are related to ranching activity. Rock inscriptions dating as early as the 1930s and a modern stone enclosure accompany the artifact scatter at rockshelter site 5CN1006. None of the Historic period trash deposits is dense enough to be considered a dump, although such features occur just outside the PSSHM, such as a large one bisected by the jeep road on BLM land near the south-east corner of the project area.

The other site types represented here are camp site 5CN1003 and Pike's Stockade site 5CN75. As amply documented earlier in this report, no direct archaeological evidence has ever been found relating to Pike's 1807 encampment, but more recent artifacts of the Historic period have been noted there by Mrzlack (2002), Goddard (2005, 2006), and our own survey crew. The archaeological evidence at 5CN1003 is of a trash deposit more diverse than at all the other scatters in the survey area, but not concentrated as in a dump. Both the contents of the site and its location are suggestive of a short-term camp or perhaps even a "picnic area" related to McIntire Ranch located only a half mile to the west. Although no homestead sites were recorded in the PSSHM, at least three were located just beyond the boundaries: on the McIntire Ranch (Figures 13–14), the Simpson Ranch northwest of the reconstructed stockade, and the Cortez Ranch north of the project area (Figure 12). In fact, portions of the Cortez Ranch extended into the vicinity of the reconstructed stockade, but little physical evidence remains of it. No Historic period items of American Indian manufacture or use such as metal arrow points, tinklers, or glass trade beads have been found in the area.

Features

Of the 37 sites and 26 IFs recorded at Pike's Stockade, 21 sites and one IF have one or more features, and a grand total of 32 features have been documented (Figure 32). Rock constructions of various kinds—cairns, stone fences, stone enclosures, vision quest circles, and a wall-like alignment—represent over half of this number (n = 19) and occur in groups of as many as three features on a single site (e.g., 5CN1388). Most, if not all, of these rock features date to the Historic period. Artifact concentrations, particularly of flaked stone debitage, occur on six sites most of which are in or adjacent to the sand dune field. Thermal features include four fire-cracked rock (FCR) concentrations and one charcoal-stained soil area, again largely found on sites in the sand dune field. No distinct hearth features were found on the survey, although the FCR concentrations may be remnants of such. The features found in the dune field are in partly buried contexts, and the probability that other features are totally buried in the dunes certainly exists. The remaining feature type is rock imagery, found in a single petroglyph panel containing representational motifs at 5CN801, and historical inscriptions dating to the 1930s at 5CN1006. The painted images at the latter site are not included in the feature total because they are of modern vintage.

Figure 32. Pike's Stockade Features



Settlement Patterns

Casual observation of the USGS topographic map and field experiences of the survey crews suggest there are three primary landscape features in the study area that may have influenced prehistoric settlement within the PSSHM: the Conejos River, Sierro del Ojito, and the sand dune field on the northeast side of the mesa (Figure 33). Topographically, site settings can be described more precisely in terms of landforms and positions relative to the mesa, as shown in Figure 34. Clearly, the most frequently utilized part of the study area is the gentle piedmont slope around the foot of the mesa. However, it must be noted that this trend is at least partly explained by the fact that piedmont slopes constitute a rather sizeable acreage in the PSSHM compared to some other landforms. For example, sand dunes occur in just a very small area in the northeast corner of the project area, and ledges, benches, and ridges likewise cover relatively small land areas. On the other hand, while the acreage covered by sand dunes within the PSSHM is small (ca. 30 ac), the dune field extends over a much larger area east of the PSSHM on private land. Thus, for prehistoric hunter-gatherers unconstrained by modern land ownership boundaries, the dune field may have been an even more significant area than the limited acreage within the PSSHM might suggest. See Appendix IV of this report for PAAC volunteer Bruce Wahle's analysis of settlement trends focused on geological and pedological factors.

Comparing the prehistoric archaeological record on higher vs. lower elevation landforms, it is clear that far more intensive occupations are represented on the northeast piedmont slopes and in the dune field at the lower elevations of the project area. On top of Sierro del Ojito, whether on the open crest, on the mesa rim, or on one of the spur ridges, sites and IFs exhibit extremely low artifact densities—generally fewer than five artifacts total. The lone exception is chipping station site 5CN1007 on a high ledge, where more than 50 chalcedony flakes were documented. By contrast, most of the sites on the northeast piedmont slopes and in the adjacent dune field have more than ten artifacts, and three have more than a hundred ($\bar{x}$ = 47.5 artifacts for 15 sites). Regardless of site or artifact density, the presence of cultural resources of prehistoric and historic ages on the crest of the mesa begs the question of which route(s) people used in the past to ascend the heights. Site and IF distributions strongly suggest the southwest spur ridge was the trail of choice, with three sites and three IFs dispersed along its length. No alternative route up the mesa has even a little evidence in its favor. Our crews used five different paths to climb the mesa, and two others to descend it, and the southwest ridge is not a noticeably easier path to take, albeit it does have more level benches, ledges and saddles to use as rest stops (or site/IF locations).

Another approach to studying prehistoric settlement in the PSSHM is shown in Figure 35, which compares distance to the Conejos River against distance to sand dunes for prehistoric sites and IFs; exclusively Historic period resources are not included in the graph. Statistically, there is no significant difference in site locations relative to the river or dunes [r^2 = 0.1110592], i.e. neither natural feature appears to exert more of a "pull" on prehistoric settlement than the other. In fact, it is fair to say that no spot within the project area is especially far from either permanent water or sand dunes—the maximum distance is about 2.2 km (1.3 mi) from the south central edge of the PSSHM to the river. On the other hand, as described above, use of the dune field and adjacent piedmont slopes northeast of the mesa was clearly more intensive than any other area

Figure 33. Map of prehistoric sites and IFs recorded in the project area *[map by Bruce Wahle]*.

[under separate cover]

NOTE: This map contains locational information that is not available to the public, and is exempt from the federal Freedom of Information Act.
The Office of Archaeology and Historic Preservation (OAHP) is authorized to restrict access to this information by CRS 24–72–205ff, CRS 24–80–40–5ff, the Archaeological Resource Protection Act (ARPA) of 1979 (as amended), and National Register Bulletin 29.
See OAHP's "Dissemination of Information – Policy/Procedure" document (index #1333, http://www.coloradohistory-oahp.org/publications/pubs/1333.pdf) for further information.

Figure 34. Pike's Stockade Site & IF Locations

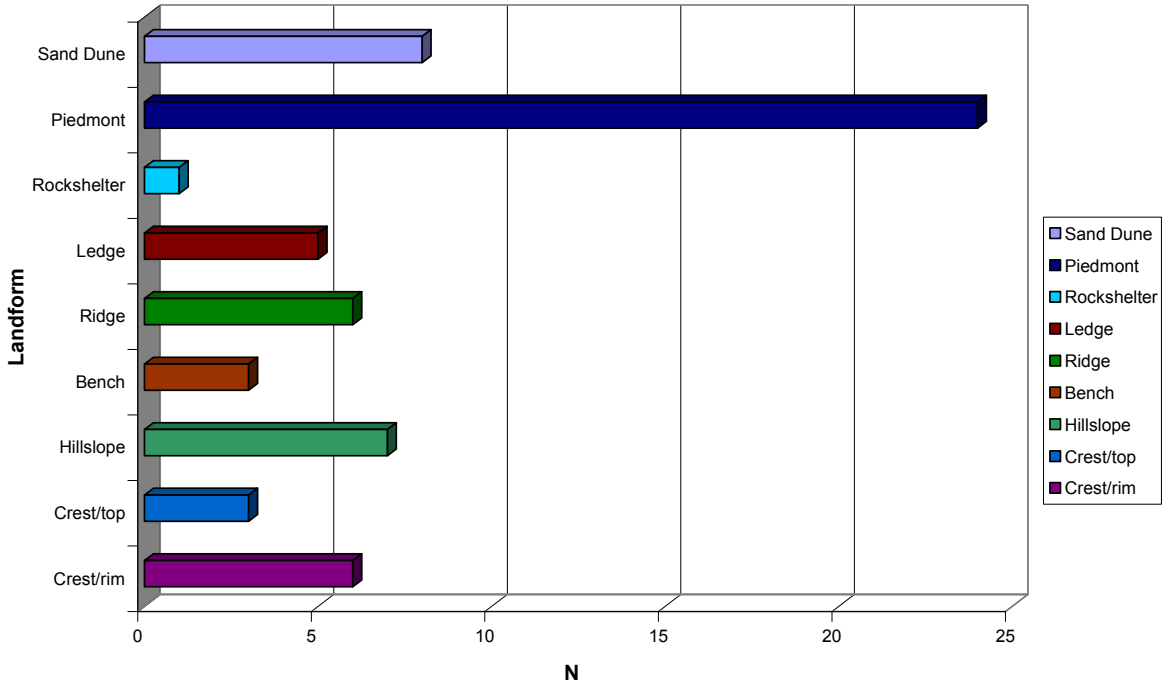
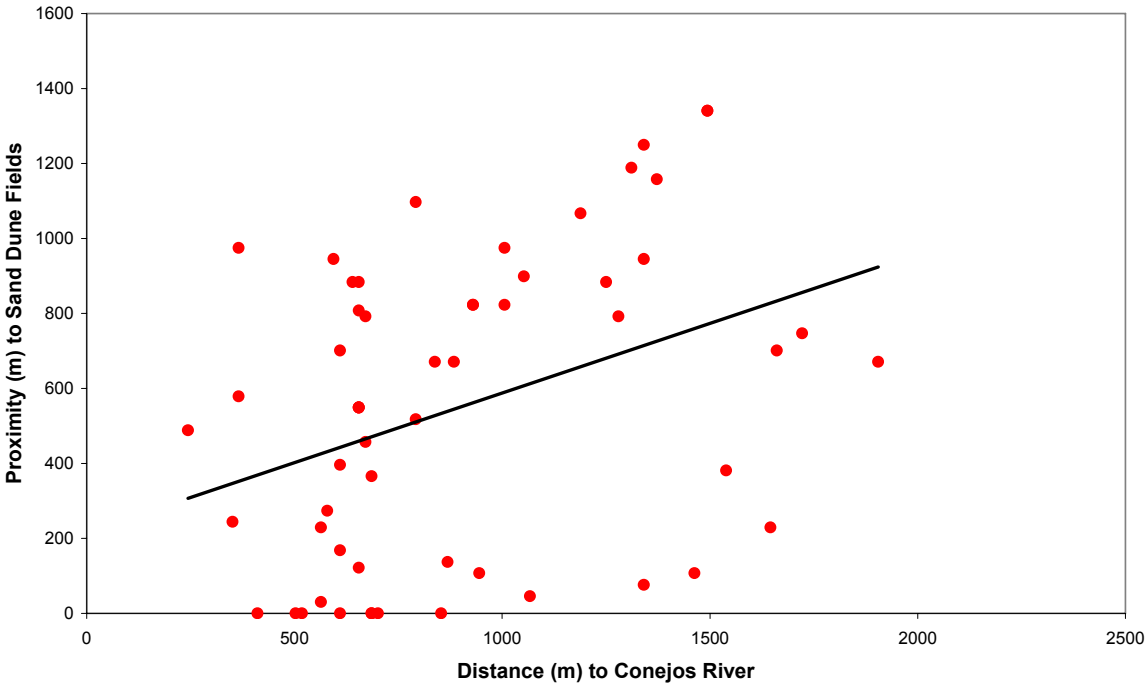


Figure 35. Proximity to River & Sand Dunes [$r^2 = 0.1110592$]



and the fact that these dunes are close to the river heightened their value. The diversity of sites in the northeast zone is also notable, as most camp sites and most ground stone artifacts are located there. Thus in number and diversity of sites, and in artifact density, the northeast portion of the PSSHM is the most archaeologically significant, with the southwest spur ridge second in line. The gently sloping landscape on the west and south edges of the project area, by contrast, has a very low density of cultural resources. Of course, the lowest density of all is found on the floodplain of the river and on the steeper slopes of the mesa.

The distribution of Historic period resources is more dispersed in the PSSHM than for prehistoric settlement (Figure 36). Stone fences are found on almost all sides of the mesa except on the south, and trash deposits likewise are widely scattered in the area, although generally absent in the higher elevations. One distinctive aspect of the five stone fences in the PSSHM is the likelihood that these features functioned together as a system. The interpretation is that the fences were built to subdivide the slopes of the mesa into separate pastures for sheep grazing (Herman Miller, personal communication 2007). Historic sites on the crest of the mesa are mostly the rock features visible from a distance—cairns in particular, along with the rock enclosure features at 5CN1388. The natural outcrop at 5CN1006, which includes the only rockshelter recorded in the area, appears to have been a popular destination for recreational activities in the twentieth century, beginning at least as early as the 1930s based on scratched inscriptions. Those activities have continued into modern times, both at 5CN1006 and elsewhere, for example in the use of the cottonwood grove near Pike's Stockade as a gathering place among local youths (Rick Manzanares, personal communication 2004).

Figure 37 depicts the distribution of all sites and IFs in the project area. This shows the aforementioned concentration of cultural resources on the northeast piedmont slope and sand dune field, along with the line of sites and IFs on the southwest spur ridge. In contrast, the extremely low density area south of the mesa is readily apparent. The overall density of archaeological remains in the project area is not as high as it might appear on this map because artifact density is not represented and IFs are shown at the same scale as larger sites.

Chronology and Cultural Affiliation

Temporally diagnostic artifacts have been documented from 13 of the 30 sites and 4 of the 25 IFs with Pre-Columbian evidence recorded in the survey area (Figure 38). Of those 13 sites, only two have convincing evidence of the presence of multiple prehistoric components. Those latter two sites include one with both Early/Middle Archaic and Middle/Late Archaic period diagnostics (5CN1392), and one with both Middle/Late Archaic and Late Prehistoric period occupations (5CN1005). Of the remaining 11 sites and 4 IFs, 5 sites and 2 IFs have yielded diagnostic arrow points or point fragments of the Late Prehistoric period (AD 150–1600); one site has a corner-notched arrow point dating to the first half of the period pre-AD 1000, 2 sites and both IFs contain either small side-notched or tiny stemmed points from the last half of the period post-AD 1000, and two sites have fragmentary arrow points dating only generally to the Late Prehistoric period (Figure 39). All diagnostic items are of flaked stone; no ceramics were found in the area.

Figure 36. Map of historic sites and IFs recorded in the project area *[map by Bruce Wahle]*.

[under separate cover]

NOTE: This map contains locational information that is not available to the public, and is exempt from the federal Freedom of Information Act.
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Figure 37. Map of all sites and IFs recorded in the project area *[map by Bruce Wahle]*.

[under separate cover]

NOTE: This map contains locational information that is not available to the public, and is exempt from the federal Freedom of Information Act.
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Figure 38. Site & IF Components at Pike's Stockade

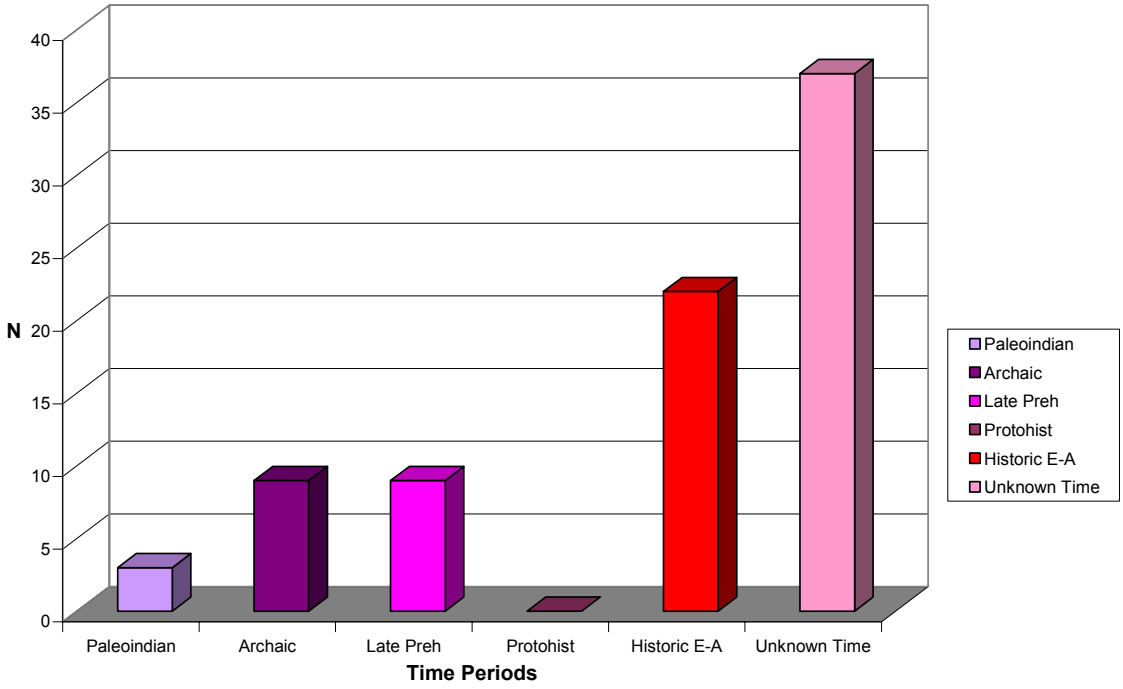


Figure 38. Time periods represented at all sites and IFs. Abbreviations: Late Preh = Late Prehistoric, Protohist = Protohistoric, E-A = Euro-American.

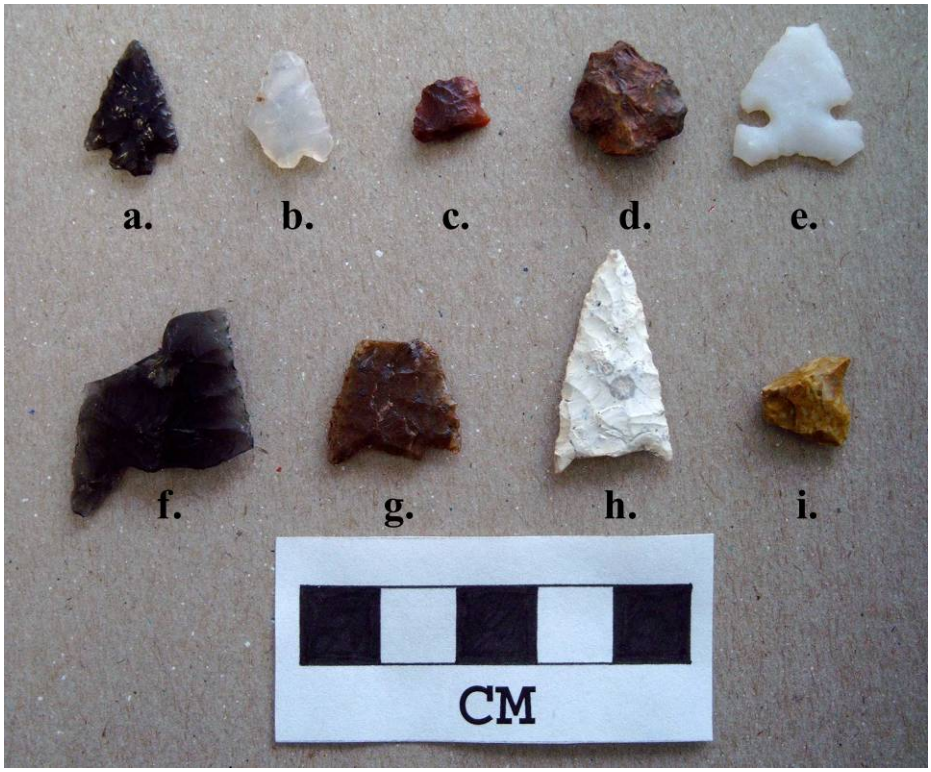


Figure 39. Small projectile points—mostly of the Late Prehistoric period—collected in the PSSHM. The stemmed, indented base of jasper at the bottom right may date to the Archaic period. Top: a. 5CN978–1, b. 5CN989–1, c. 5CN1400–1, d. 5CN1005–1, e. 5CN1389–1; bottom: f. 5CN983–1, g. 5CN980–1, h. 5CN970–1, i. 5CN1392–1.

As shown in Figure 38, Late Prehistoric period components are not uncommon in the area, but a far larger number of prehistoric sites and IFs are undated due to a lack of diagnostic material. The frequency of Late Prehistoric occupations in the PSSHM actually exceeds that of the Archaic period despite the equal numbers shown in Figure 38, because the Late Prehistoric era lasted only 1,450 years vs. nearly 7,000 years for the Archaic period. Sites and IFs containing Late Prehistoric period diagnostics are found either on the northeast piedmont slopes and adjacent sand dune field, or on the crest of Sierro del Ojito. The just-noted fact that no ceramics were discovered during the survey highlights the absence of convincing evidence for Puebloan activities within the PSSHM. Although Pueblo hunting forays may be represented among the arrow points documented in the area, the point styles represented were used by a number of different local groups, Pueblo and non-Pueblo alike.

In addition to multi-component site 5CN1392, four other sites have diagnostic hafted bifaces believed to date to the Archaic period, and two other isolated Archaic tools have been found. The distribution of these Archaic components (including the IFs) is more widely dispersed in the project area compared to those of the Late Prehistoric period, from the western drainage basin and the southwest spur of the mesa, to the mesa crest, and onto the piedmont slope and dune field to the northeast. Equally diverse are the projectile point styles represented among the diagnostics (Figure 40). The Archaic period items at these sites are medium to large, stemmed tools mostly comparable to styles in the Mountain tradition (Black 1991:Figure 3) and the Oshara tradition (Irwin-Williams 1973, 1979), with a notable number manufactured from black basalt. Evidence for Early Archaic period occupations in the PSSHM is no more abundant than for later Archaic times; unlike in the Upper Gunnison Basin and Front Range areas, current data in the San Luis Valley do not indicate any significant increase in site density in the Early Archaic compared to the immediately preceding and following time periods (see Hoefer 1999c; Reed and Metcalf 1999:73–78; Tate 1999).

Variations on the stemmed point theme include the large, expanding stem version at 5CN974, two examples of stemmed-indented base points from 5CN977 and 5CN1392, two specimens with square stems from 5CN973 and 5CN1012, and two other contracting stem artifacts nearly identical to each other from 5CN1005 and 5CN1392. A couple of these Archaic implements have serrated blades, notably the stemmed-indented base point from 5CN977, which compares favorably with projectile points of both the San Jose complex (Irwin-Williams 1979:Fig. 8) and the Pinto-like materials found in certain Mountain tradition assemblages (e.g., Metcalf and Black 1991:Figures 7.2–7.3). As mentioned previously, the two large stemmed points from 5CN974 represent styles once associated with Renaud's (1942b, 1944) Upper Rio Grande culture and "Rio Grande" type projectile points, but little progress in elucidating the chronology of such materials has been made in the intervening decades.

Very tentatively, the stem shape differences between the two artifacts collected at 5CN974 could reflect changes over time from separate occupations in the Late Paleoindian and Early Archaic periods. It is equally plausible, however, that the stem shape differences merely represent the range in variation within one style, whether dating to the Late Paleoindian or Early Archaic period. The slightly expanding stem on the black basalt specimen is unusual (Figure 40a) but might fit into the range for the Bajada complex (Irwin-Williams 1979:Fig. 6; Jodry

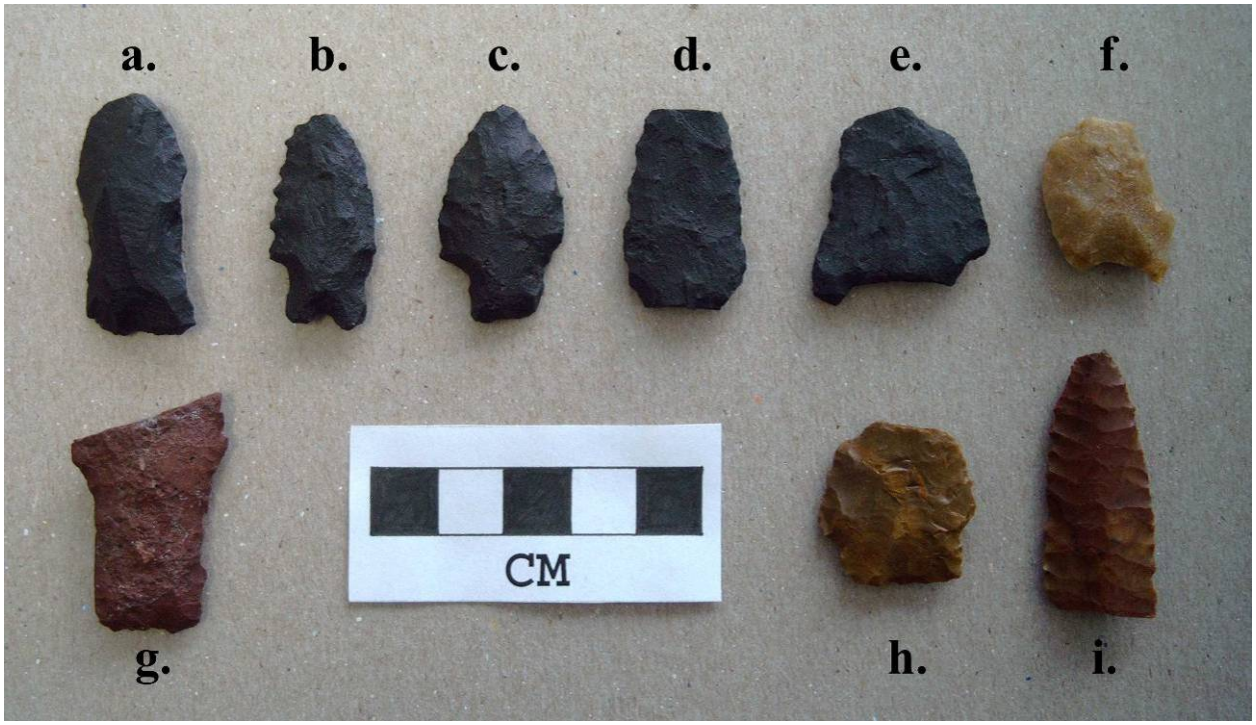


Figure 40. Paleoindian and Archaic period artifacts collected in the PSSHM. Top row: a. 5CN974–1, b. 5CN977–1, c. 5CN973–1, d. 5CN1005–2, e. 5CN1396–1, f. 5CN976–1; bottom: g. 5CN974–2, h. 5CN1012–1, i. 5CN1004–1.

2005a), while the red basalt point fragment (Figure 40g) is within the range of Jay complex and Great Basin Stemmed tradition materials (Irwin-Williams 1979:Fig. 5; Jodry 2005a; Pitblado 2003:92–97; Renaud 1942b). The morphological resemblance between Jay points of the Early Archaic period in the Oshara tradition and several types in the Great Basin Stemmed tradition pre-dating 8000 BP exemplifies the difficulty in assigning an age to surface assemblages found on survey (Justice 2002:107; Pitblado 2003:97). Some researchers also see similarities between these various stemmed styles and points in the Hell Gap complex, but the latter are usually more symmetrical, have a thinner lenticular cross-section, and are rarely if ever made from basalt (e.g., Irwin-Williams et al. 1973:46–49; Jodry 1999b:97–98, 2005a; Pitblado 2003:89–92, 158; Stanford 1975:34, 36; cf. Honea 1969).

Square-stemmed points such as those from 5CN973 and 5CN1012 also present a chronological challenge. Relatively few such points have been excavated from well-dated contexts in Colorado, none in the San Luis Valley and none in numbers that would be informative about the range in variation from manufacture and/or resharpening. Sites such as LoDaisKa (Irwin and Irwin 1959:22–33) and Vail Pass Camp (Gooding 1981:27–29) are dated and have yielded some square-stemmed artifacts, but associations with the dated features are not clear-cut. At Vail Pass, Gooding (1981:27–28) refers to these as Summit Stemmed points and postulates an Early Ceramic—i.e., Late Prehistoric—period age, but other evidence places the style in the Archaic period. Black (1986:55–59, 141–143) suggests a Late Archaic age for the style based in part on excavations at the Park Cone site in Gunnison County. Stratigraphically,

an Archaic period age better conforms to the evidence from LoDaisKa, Park Cone, and sites on the Uncompahgre Plateau such as Taylor (Wormington and Lister 1956:Figures 42–45) but a more precise age range awaits more data from excavated contexts.

Better chronological information is available on contracting stem artifacts such as those from 5CN1005 and 5CN1392. Traditionally called Gypsum points (Harrington 1933) or locally, Park points (Stewart 1970), in recent years the style has been redefined as the Gatecliff Contracting Stem type dating to the Middle and Late Archaic periods after ca. 4500 BP (Holmer 1993:105–106). While widespread in the Rocky Mountain region westward into the Great Basin, again there are few well-dated sites of note in Colorado, and none in the San Luis Valley. Best described are assemblages from dated contexts in Nevada and Utah rockshelters, such as Sudden Shelter (Holmer 1980); the style also appears in Late Archaic sites of the Oshara tradition, but only in small numbers (Irwin-Williams 1973, 1979). Both specimens from the PSSHM survey are made from black basalt.

Apart from the two large stemmed specimens from 5CN974 described above and of doubtful age/affiliation, the Paleoindian period at PSSHM is represented by artifacts only from sites 5CN976 and 5CN1004 (Figure 40f, i). The thick, concave base point fragment from 5CN976 is made from yellow quartzite, a relatively rare material in surface assemblages of the project area, but in fact a common material in points of similar style described by Pitblado (2003:112–116, 158–159) and lumped in the Angostura point type. Jodry (1999b:102–104) places such artifacts in the Foothill-Mountain complex, with a mapped distribution in the San Luis Valley split between the Closed Basin and Saguache Creek areas (Jodry 1999b:Figure 6–23). Pitblado (2003:116) indicates an age range of 9700–7550 BP, and her map also places the San Luis Valley toward the southern end of the distribution of these materials (Pitblado 2003:Figure 5.24).

The carefully flaked point blade made of yellow-brown jasper from 5CN1004 (Figures 25, 40i) displays the narrow blade width, comedial flaking pattern, and distinctive diamond-shaped cross-section of Eden points in the Cody complex. Cody complex sites are among the most common Plano tradition complexes found in the San Luis Valley, which are dated in the range 10,000–8800 BP (Jodry 1999b:97–102). The Rio Grande Basin evidence shows that Cody complex sites occur at a wide range of elevations in both valley and mountain settings, and regional data also indicate a wide range of subsistence resources was exploited including the usual large game species along with rabbits, birds, turtles, fish, and plants (Jodry 1999b:97, 100). Including material from 5CN974, Paleoindian sites in the PSSHM are found on the mesa crest and northeast piedmont slopes only. However, the sample size is quite small to be drawing any firm conclusions about this distribution.

No evidence of American Indian sites dating to AD 1600–1955 was found during the survey, assuming that the stone enclosures at 5CN1008 and rock art at 5CN801 are prehistoric—both unproven conclusions. However, such sites are not uncommon in the San Luis Valley as a whole. Culturally peeled trees, rock art, wickiups, glass and metal artifact scatters, ceramic scatters, burials, game traps, and the King Turquoise Mine are among the Protohistoric site types

documented in the region (Martorano 1999c). See Simmons (1999:12–122) for an overview of American Indian activities of the Historic period in the valley.

The chronology of historical archaeology at PSSHM begins with the Pike's Stockade site, 5CN75. Although no direct archaeological evidence has ever been found of the February 1807 encampment by Pike and his men, historical accounts largely agree that the stockade was built on the north side of the Conejos River close to where the 20th century reconstruction was erected. Thus, the possibility that remains of the stockade are still preserved in the floodplain deposits is good, but it may take a fairly extensive remote sensing and testing program to find it. The scale of such projects reported by Mrzlack (2002) and Goddard (2005, 2006), while admirable efforts, was too small to either locate the stockade or to demonstrate one way or the other whether or not it may be preserved elsewhere on the property.

All other Historic period evidence from the survey post-dates 1860, and is documented at 21 sites and one IF. Based on local and regional historical accounts (Athearn 1996; Carrillo 2007:235, 237; Mehls and Carter 1984; Simmons 1999), the five stone fence sites on the slopes of Sierro del Ojito may have been built in the period 1860–1890. Not surprisingly, few if any artifacts are associated with these fences to aid in determining their age, but local resident Herman Miller (personal communication 2007) reported that the fences were constructed by McIntire Ranch workers. The McIntire Ranch site was in operation during the period 1880–1912, which would suggest fence construction dates in the 1880s if all the accounts above are correct. As noted previously, old photographs prove that fence site 5CN968 was built no later than 1903 (Figure 21). One or more of the cairns recorded during the survey, such as at 5CN1389 and 5CN1391, may date to this same time frame but likewise generally lack associated diagnostic artifacts. Other cairns such as those at 5CN801 and 1388 likely date to the 1900s based on physical condition and, in the former case, local informant accounts.

The earliest land records for properties in and around the PSSHM date to the late 1870s and early 1880s (Table 2), which is also the early end of the age range for several trash scatters documented in the PSSHM. On many of these sites, such as 5CN1002, 1003, and 1010, purple glass and/or square cut nails occur and general date ranges of ca. 1880–1925 have been assigned. On other sites and IFs such as 5CN1005, 1015, and 1016, later artifact styles including crimped seal cans indicate twentieth century dates; rockshelter site 5CN1006 alone has a scratched inscription with a date of 1932. In a couple instances, e.g., at 5CN984, artifactual evidence suggests multiple periods of discard activity extending into the mid-1900s. Modern materials post-dating 1955 were not formally recorded.

Material Culture: The Lithic Landscape

The archaeological survey at PSSHM documented nearly 900 artifacts from all prehistoric sites and IFs. A bit surprisingly, all of these materials are lithic items with no ceramic, floral, or faunal materials found. The total includes 7 ground/pecked stone artifacts, 2 cobble manuports, and 883 pieces of flaked stone. As expected, flaked stone manufacturing by-products dominate in project area sites with debitage, cores, and production-stage unifaces and bifaces (i.e., blanks

and preforms) accounting for 96 percent of all flaked stone artifacts (n = 844). Table 5 enumerates these data from the project area by artifact class. See Appendix III for tables providing site-by-site artifact inventories.

Table 5 and Figure 41 show that the most common tools in the survey area by far are projectile points (unifacial and bifacial blanks and preforms are lumped with debitage and cores as manufacturing evidence, not tools *per se*). The high number of points, in fact, represents nearly half of the lithic tools documented during the project, and was unexpected given reports of heavy "arrowhead hunting" activity in the area. The prevalence of projectile points in the PSSHM is ample evidence of the frequency of prehistoric hunting activities in all time periods. Several of the projectile points, and some of the other tools quantified in Table 5, are actually multi-purpose "composite" tools having additional functions beyond that implied by their classification. For example, the black basalt stemmed point from 5CN974 (Figure 40a) has a reworked blade with use wear indicative of scraping activity; five other artifacts in the projectile point class have evidence of reworking or reuse. Other noteworthy composites include an agate microtool from 5CN977 with a graver spur and two finely serrated edges used for delicate cutting and shaving tasks, and a basalt graver–scraper from 5CN1398 (Figure 42b, f).

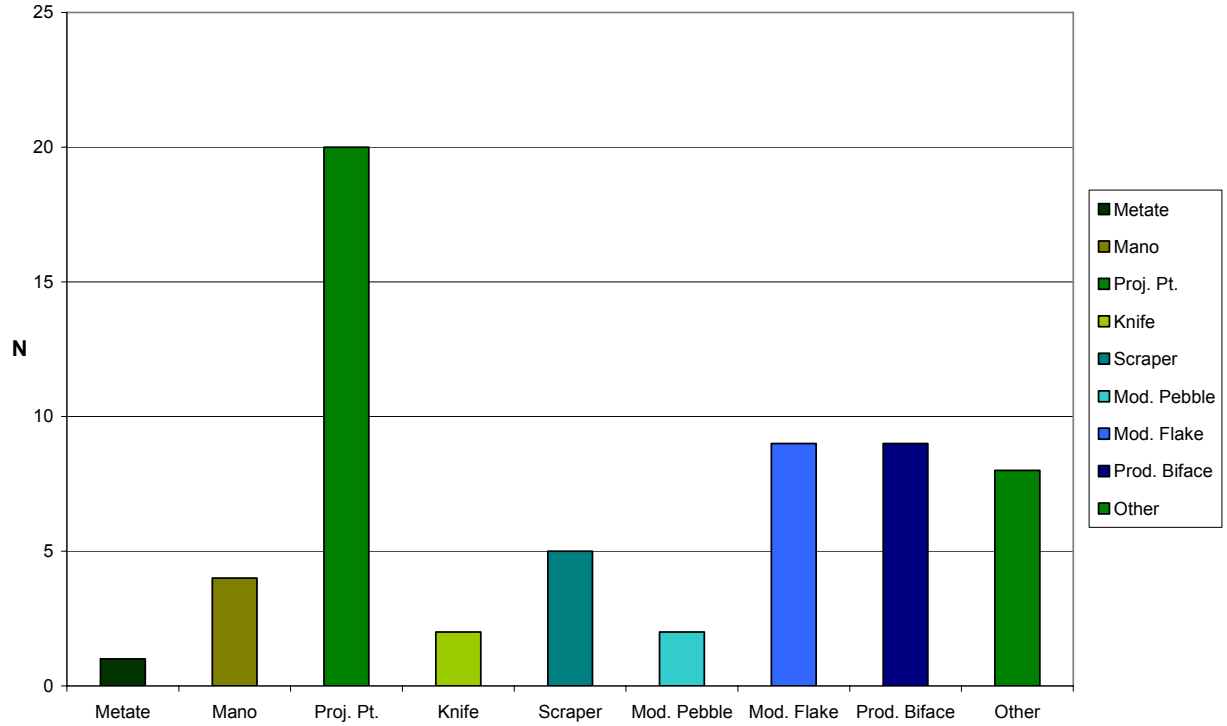
The seven ground/pecked stone tools represent a mix of formally shaped artifacts and expedient, unshaped, or minimally shaped items. Most are typical kinds of cobble handstones and shaped manos that are found throughout the region (Figure 43a). One of these tools is made from a banded basalt-like material, one from the local trachyandesite, one from sandstone, and one from a granitic material. The latter two rock types are unusual for the area, albeit the granitic fragment shown in Figure 43a may have been collected locally from gravel deposits in the Conejos River. However the sandstone likely was imported, perhaps from outcrops east of the Rio Grande, such as in the Santa Fe formation. The remaining three ground/pecked stone tools found on the survey include an unshaped slab metate of local trachyandesite from 5CN971 (Figure 22), an expedient pebble pecking tool (Figure 43b), and a possible polishing stone of an unknown rock type (possibly volcanic), both found at rock art site 5CN801. The pecking stone, made from what appears to be dense sandstone, is especially intriguing as the tool possibly used to create the imagery on the nearby petroglyph panel. Lastly, two cobble manuports round out the lithic artifact inventory in the PSSHM. As with two of the manos, one of these manuports is made from a granitic material and one from sandstone, but both lack any damage from manufacture or use wear to suggest a function.

As mentioned earlier in this report, a few toolstone materials have been recorded at source localities near the PSSHM, notably Cumbres chert from Cumbres Pass site 5CN35 and "basalt" (geochemically a glassy andesite) from San Antonio Mountain, both near the Colorado-New Mexico border. Within the PSSHM in lag gravel deposits both on the crest of Sierro del Ojito and on the lower piedmont slopes are varieties of light-colored chert and chalcedony, mostly in small pebble sizes but with a few larger nodules also present (Figure 7). Only very sparse evidence of the use of these low density materials was documented during the survey. It is assumed that most of the silicate toolstones found on sites and IFs in the PSSHM derive from Cumbres Pass and other local sources outside the project area (Spero and Hoefer 1999a), as is also likely the case for the basalt/andesite and obsidian observed in the PSSHM (Ferguson and

Table 5. Tabulation of artifacts observed during the PSSHM survey, sites and IFs combined.

ARTIFACT CLASS	TOTAL OBSERVED	PERCENTAGE
Bifacial blank/preform	9	1.0
Core	8	.9
Debitage	824	92.4
Expedient flake tool	9	1.0
Graver/borer	1	.1
Knife	2	.2
Projectile point	20	2.2
Scraper	5	.6
Unifacial blank/preform	2	.2
Unifacial cutting tool	1	.1
Cobble pecking stone	1	.1
Cobble polishing stone	1	.1
Mano/handstone	4	.5
Metate	1	.1
Manuport cobble	2	.2
Modified pebble tool	2	.2
TOTALS	**892**	**99.9**

Figure 41. Pike's Stockade Tool Classes



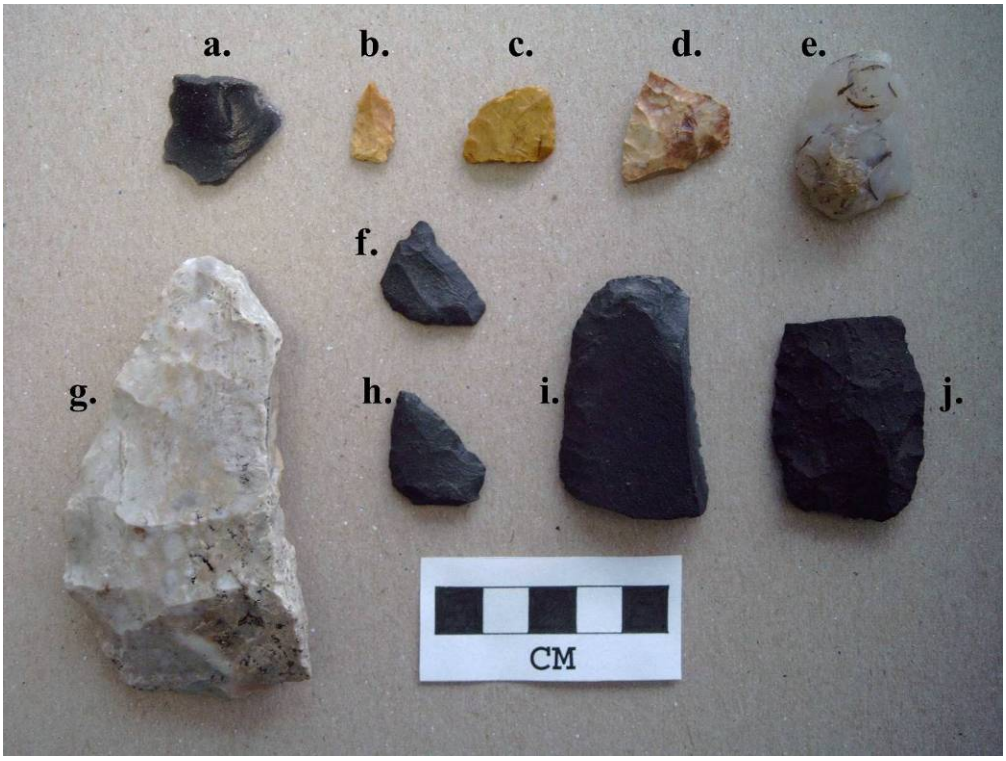


Figure 42. Flaked stone artifacts collected during the survey. Top row: a. 5CN1400–2 obsidian flake, b. 5CN977–2 serrated microtool, c. 5CN1017–1 preform fragment, d. 5CN983–2 knife fragment, e. 5CN984–1 distolateral scraper; middle: f. 5CN1398–1 composite graver-scraper; bottom row: g. 5CN1018–1 bifacial blank fragment, h. 5CN969–1 stemmed knife fragment, i. 5CN1393–1 side scraper/knife, and j. 5CN1005–3 uniface fragment.

a. **b.**

Figure 43. Ground/pecked stone tools from the Pike's Stockade area survey: a. granitic mano fragment from 5CN1006; b. probable pecking stone from 5CN801.

Skinner 2003; Glascock et al. 1999; Shackley 2006; Vierra et al. 2005). Straight line distances from the study area to the nearest large toolstone sources are 63 km for Cumbres Pass chert, 50 km for San Antonio Mountain andesite, and 145 km for El Rechuelos obsidian in northern New Mexico. It is possible that acquisition of obsidian was via exchange rather than direct procurement involving travel from the PSSHM area—or both may have occurred at different times—but in fact there is little convincing, indisputable evidence for trade goods in the project area.

Looking at material frequencies from a survey-wide perspective, Table 6 and Figure 44 show the diversity of toolstones present in the study area. Obviously, opaque to translucent silicate toolstones, whether labeled chert, jasper, agate, or chalcedony, are by far the most common and together account for roughly 85 percent of the documented lithics. Determining exactly how much of the material lumped in the chert category derives from the Cumbres Pass source area would require extensive geochemical studies beyond the scope of this project. Macroscopically, however, a sizable number of artifacts on area sites have the mottled color range (gray to yellow) characteristic of Cumbres Pass chert. The frequency of dark colored volcanics shown in Table 6, called basalt in this report, is probably a minimum figure given the difficulty of recognizing such artifacts on a landscape littered with native gravels of very similar dark gray to black color.

Likewise, the small number of obsidian artifacts recorded in the PSSHM may underestimate the actual frequency for the same reason. Based on macroscopic variations, it appears that more than one source of obsidian is represented in the twenty artifacts recorded in the PSSHM. The El Rechuelos source is likely among them given both the results of previous studies (e.g., Vierra et al. 2005) and the granular texture of some of the PSSHM artifacts (Figure 42a), which fits the description of the El Rechuelos source material (Shackley 2006). The closest obsidian source to the PSSHM at about 62 km is No Agua Peak just south of San Antonio Mountain but, although Glascock et al. (1999:864) clearly say that "prehistoric inhabitants of the San Luis Valley made frequent use of the raw material," Shackley (2006) casts doubt on that conclusion based on the relatively low quality of the source material. Spero and Hoefer (1999a:189) identify a possible Colorado source of obsidian near Beaver Creek in Rio Grande County, although no artifacts have been tied to that source. A more likely source in Colorado for some of the PSSHM obsidian is Cochetopa Dome, about 130 km distant in northwestern Saguache County (Ferguson and Skinner 2003).

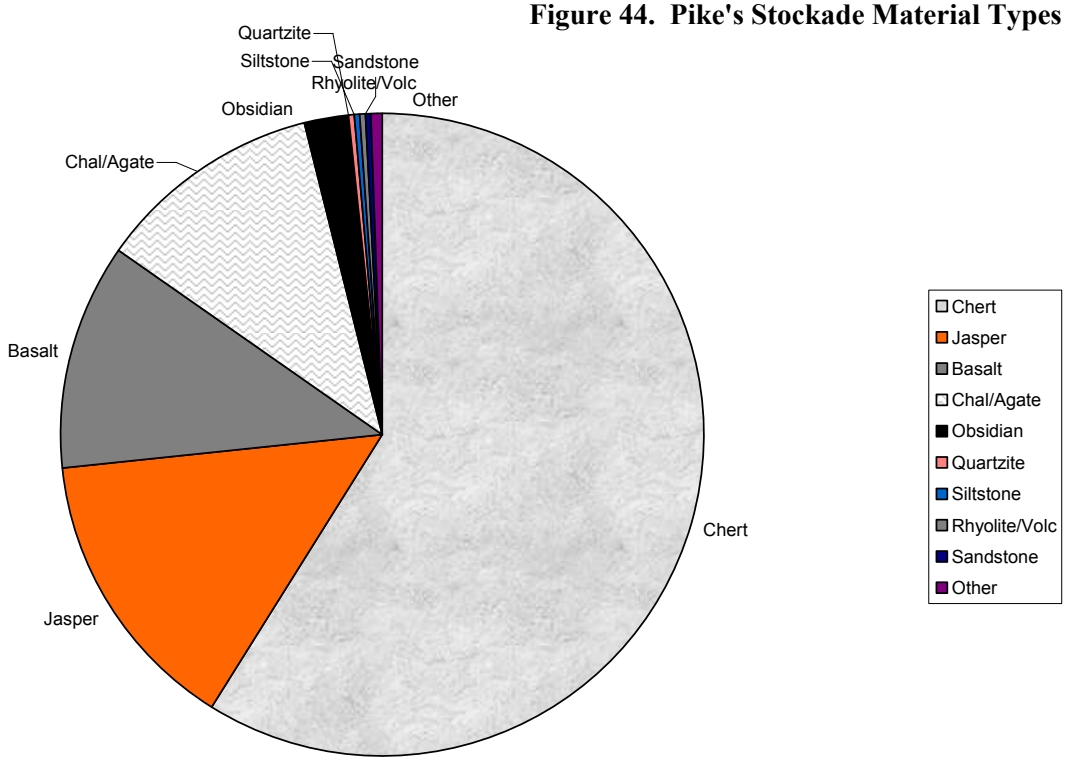
Figure 44 illustrates the very low frequencies of other toolstones in PSSHM assemblages such as Morrison quartzite (which is a silicified sediment, not a true quartzite; Gerhardt 2001), other quartzites, siltstone, and petrified wood. The near absence of orthoquartzites at PSSHM, as found in Dakota formation outcrops such as Alkali Spring west of Saguache (Spero and Hoefer 1999a:189), is perhaps most surprising. What the lithic data suggest is that the territorial range of many local prehistoric groups was oriented more to the south on the Taos Plateau than elsewhere (see Vierra et al. 2005), using the Conejos River and Rio Grande drainages as travel corridors to access the Cumbres Pass, San Antonio Mountain, and Jemez Mountain toolstone sources.

Table 6. Lithic Material Type Frequencies at Pike's Stockade SHM

Material	Chert	Jasper	An/Ba	Cy/Ag	Obsidian	Sandstone	Volc	Others
# total	525	129	102	101	20	3	3	9
% total	58.9%	14.5%	11.4%	11.3%	2.2%	0.4%	0.4%	1.0%

Abbreviations in Table 6: An/Ba = andesite, basalt and any other dark gray to black volcanic material identified by other names such as rhyodacite; Cy/Ag = chalcedony and agate (especially moss agate); Volc = rhyolite and other light-colored, unidentified volcanic rock types; % = percentage of total recorded lithic artifacts [flaked + ground/ pecked + manuports; n = 892]. Other materials = 2 siltstone, 2 quartzite, 2 granitic, 1 argillite, 1 petrified wood, and 1 Morrison fm. quartzite.

Figure 44. Pike's Stockade Material Types



Comparing material type frequencies between tool and non-tool artifact classes (Table 6 and Appendix III, Table III–3), additional interesting trends can be seen. In particular, a notably higher percentage of tools is made from basalt compared to the overall occurrence of basalt artifacts (about a third of tools vs. 11% of all artifacts). For chert and jasper, on the other hand, the opposite is true with about double the frequency of each material represented among all artifacts compared to the lower occurrence of these materials as flaked stone tools. A small part of this contrast in material use stems from the fact that basalt (and basaltic-appearing trachy-andesite) can be used to make both flaked stone and ground/pecked stone tools, whereas chert and jasper are suitable only for flaking. However, only three ground stone items are made from

basalt, so the larger trend is affected only slightly. More likely, the lower tool-to-debitage ratio in chert and jasper may reflect more intense use of local source materials—and core reduction in the PSSHM—compared to basalt sources such as San Antonio Mountain. Apparently, a greater proportion of tool manufacturing steps for basalt occurred outside the project area, bringing more bifaces than cores and nodules into the area compared to the pattern for chert and jasper.

Finally, Table 7 provides details on the thirty collected artifacts from the project area. Included are 18 projectile points and point fragments—6 of which have evidence of reuse as other tools— 2 bifaces, 2 knives, 1 multi-purpose flake tool, 1 scraper, 1 obsidian flake, 1 serrated microtool, 1 graver-scraper composite tool, 1 uniface, 1 pecking stone, and 1 metal leg-hold trap (the only Historic period item collected on the survey). All these materials are stored at OAHP, at the Colorado History Museum in Denver. The collection strategy was geared toward those items of museum display quality, unusual artifacts, and other tools deemed vulnerable to private collecting activities. Figures 25, 30, 39–40, 42, and 43b illustrate these collections.

A Comment on Geoarchaeology

Although the overview of soil deposits presented earlier in this report, and many of the site descriptions given above, imply that the potential for intact buried remains may be relatively low outside the sand dune deposits in the northeast portion of the PSSHM, this conclusion is entirely untested. While the rocky, deflated crest of the mesa may offer only small pockets of soil development deep enough to preserve archaeological components, the same may not be true on the lower piedmont slopes near the dune field where a large number of sites and IFs have been recorded. In particular, at least one of the older Paleoindian and Archaic period sites found on what appear to be lag gravel surfaces, such as 5CN973 and 974, should be test excavated to document the soil development in this part of the project area. Given the paucity of excavated sites in the southern half of the valley, and the numerous holes in our knowledge about Archaic period activities—particularly those associated with use of basalt and other dark-colored toolstone materials—the PSSHM sites offer the opportunity to make some real progress toward a better understanding of the archaeological record here.

Evaluations and Recommendations

The Management Information Form (MIF) at the beginning of this report summarizes the significance evaluations for the 37 sites and 26 IFs recorded in the PSSHM, in terms of their eligibility for the National Register of Historic Places (NRHP). In general, eligibility assessments tended to be conservative ones, favoring preservation of the cultural resources except where clearly unwarranted. Since there was no known current or near-term planned threat of land disturbing activities in the project area south of the river at the time of the survey, there was no perceived need for immediate test excavations to definitively evaluate the significance of sites considered potentially eligible for the NRHP. On the other hand, there are longer term plans for developments involving interpretive trails and the like (Zink and Associates 2003) that will need to take potential impacts on sites into account when firmer plans

Table 7. Pike's Stockade SHM Collected Materials

Catalog #	Artifact Description	Dimensions*	Comments
5CN801–1	pecking(?) stone, dense sandstone?	5.49 L × 4.10 W × 3.61 T, 104.3 M	possibly used in petroglyph manufacture
5CN969–1	stemmed(?) knife, basalt	(2.53) L × 2.04 W × .44 T, (2.5) M; stem width = 1.47	asymmetrical blade; possibly Archaic period
5CN970–1	corner-notched(?) arrow point blade, chert	(2.76) L × 1.51 W × .33 T, (1.2) M; neck width = (.74)	haft element missing
5CN973–1	stemmed projectile point, basalt	(3.26) L × 1.90 W × .54 T, (2.5) M; stem width = (1.12)	probably Archaic period; one base corner is abraded
5CN974–1	stemmed projectile point base; broken blade reused as scraper; basalt	(3.64) L × (1.85) W × (.87) T, (6.6) M; min. stem width = 1.46	Early Archaic period, or possibly Late Paleoindian
5CN974–2	stemmed projectile point base of unusual red volcanic rock	(3.67) L × (2.32) W × (.89) T, (6.4) M; min. stem width = 1.56	Early Archaic period, or possibly Late Paleoindian
5CN976–1	concave-base projectile point fragment, quartzite; one edge lightly abraded	(2.41) L × (2.10) W × (.73) T, (3.9) M; stem width = (2.10)	Late Paleoindian period: Foothills-Mountain tradition
5CN977–1	stemmed projectile point/knife with one serrated edge, basalt	(3.23) L × 1.64 W × .66 T, (3.5) M; stem width = 1.21	Early-Middle Archaic period, one reshaped blade edge not serrated
5CN977–2	multi-purpose graver–denticulate microtool, agate	1.47 L × .93 W × .21 T, .5 M	probably hafted; both lateral edges finely serrated
5CN978–1	stemmed arrow point, obsidian	(1.76) L × 1.20 W × .26 T, (.4) M; stem width = .56	Late Prehistoric period
5CN980–1	corner-notched(?) arrow point/knife blade, obsidian	(1.57) L × (1.63) W × .31 T, (1.0) M; neck width = .64	Late Prehistoric period; haft element missing
5CN983–1	corner-notched arrow(?) point blade, obsidian; haft element missing	(2.70) L × (2.46) W × .49 T, (2.1) M; neck width = .99	Late Archaic(?) or Late Prehistoric period; one shoulder reused as awl

Catalog #	Artifact Description	Dimensions*	Comments
5CN983–2	bifacial knife fragment, chert	(2.40) L × 2.36 W × .62 T, (3.1) M	use wear on one edge
5CN984–1	distolateral scraper, moss agate	3.61 L × 2.64 W × 1.27 T, 13.8 M	both lateral edges and distal end are utilized
5CN1004–1	comedial-flaked projectile point blade, jasper	(4.09) L × (1.72) W × (.69) T, (5.0) M	Late Paleoindian period: Cody complex, Eden type
5CN1005–1	corner-notched arrow(?) point fragment, siltstone	(1.56) L × (1.49) W × .45 T, (1.1) M; neck width = .75	Late Prehistoric period
5CN1005–2	projectile point blade fragment, basalt	(3.00) L × 1.85 W × .45 T, (3.45) M	Late Archaic(?) or Late Prehistoric period
5CN1005–3	unifacial blank fragment, basalt	(4.35) L × 3.32 W × 1.00 T, (7.55) M	early stage production uniface, broken distal third
5CN1389–1	side-notched arrow point, chalcedony	(1.82) L × (1.69) W × .24 T, (.7) M; neck width = .82	Late Prehistoric period
5CN1392–1	eared projectile point base, chert	(1.16) L × (1.18) W × (.45) T, (.6) M; neck width = 1.02	Early or Middle Archaic period

Table 7 (continued): COLLECTED ISOLATED FINDS

Catalog #	Artifact Description	Dimensions*	Comments
5CN989–1	stemmed arrow point, chalcedony	(1.51) L × (1.13) W × .34 T, (.4) M; stem width = .44	Late Prehistoric period; one edge reused as scraper
5CN1012–1	stemmed projectile point fragment, jasper	(2.10) L × 2.40 W × .45 T, (3.75) M; min. stem width = 1.80	probably Archaic period
5CN1016–1	metal #3 leg hold trap	†43.1 L × 16.0 W × 9.5 H, 1755.5 M; chain = 80.0 L; spike = 47.0 L	Historic period: early-mid 20th century
5CN1017–1	biface fragment; jasper or petrified wood	(1.62) L × (1.96) W × .43 T, (1.7) M	possibly a projectile point blade, knife, or preform

Catalog #	Artifact Description	Dimensions*	Comments
5CN1018–1	large biface fragment, Cumbres chert	(9.43) L × (5.08) W × 1.98 T, (97.1) M	early stage production blank
5CN1393–1	multi-purpose side scraper and knife fragment, basalt	(5.15) L × (3.21) W × .98 T, (20.5) M	made on a large core reduction flake, nicely retouched
5CN1396–1	corner-notched projectile point fragment, basalt	(2.80) L × (2.69) W × .61 T, (4.8) M; neck width = (1.49)	Late Archaic period
5CN1398–1	multi-purpose side scraper and graver, basalt	(2.34) L × (2.03) W × .36 T, (1.8) M	made on a small thinning flake, nearly complete
5CN1400–1	stemmed(?) arrow point blade fragment, jasper	(.80) L × (1.02) W × (.28) T, (.3) M; min. stem width = .72	Late Prehistoric period
5CN1400–2	broken flake, obsidian	(2.38) L × (2.53) W × .55 T, (2.9) M	thinning flake with cortical platform

Key and abbreviations in Table 7: *Metric dimensions are in centimeters, maximum length [L] × width [W] × thickness [T] unless otherwise noted (dimensions for broken items are in parentheses); mass [M] in grams. †Dimensions of the leg hold trap are estimates due to rusted, bent condition; its width is extrapolated for an open-jaw configuration; H = height.

arise. Land-disturbing activities involving fire risk remediation, facilities upgrades, and stockade maintenance were undertaken while our survey was in progress. However, project-specific monitoring and testing was accomplished by Goddard (2005, 2006), and our survey crews were not needed for those particular activities.

Nine of the 37 sites are evaluated *potentially* eligible for the NRHP. Should future developments threaten these sites and avoidance is not possible, additional measures should be taken to determine their research potential. Test excavations, instrument mapping, tribal consultation, and archival research are among the management recommendations made for these nine sites. Twenty-three sites are evaluated not eligible for the NRHP based on poor physical integrity, minimal potential for intact buried remains, and/or the presence of surface assemblages limited in quality and quantity of cultural materials. Likewise, all 26 IFs are inherently insignificant resources that are evaluated not eligible for the NRHP. No further work is recommended for any of these ineligible resources. The potential to establish an archaeological or historical district within the PSSHM is considered low. As noted on the survey forms (Appendix II, OAHP site files, Denver), "The Historic period sites in the Pike's Stockade area are small in number and diversity with generally limited archaeological materials although a few sites may be individually eligible for the NRHP; prehistoric sites here likewise tend to be sparsely distributed with low artifact densities and few or no features. *Best district potential is in the sand dunes mainly east of state lands*" [emphasis added]. Additional survey in the dune field

on private lands east of the PSSHM would be helpful in defining the extent of dense prehistoric land use should interest in nominating a district in that area arise.

The remaining five sites at PSSHM are either evaluated eligible for the NRHP based solely on the surface evidence or, in the case of Pike's Stockade site 5CN75, are already listed on the NRHP. Three of these date to the Historic period (5CN75, 5CN968, 5CN975), one is prehistoric (5CN977), and one has both historic and prehistoric components (5CN801). Two of the five sites are better preserved examples of stone fences. They probably lack associated archaeological remains, but by themselves readily convey the function of such features in past ranching activities in a highly visible manner. Prehistoric site 5CN977 is one of the many archaeological sites found in and around the sand dune field at the northeast edge of the project area. Its surface assemblage contains relatively more artifacts, and more diverse materials and tools, than others in the vicinity along with evidence of features in the form of fire-cracked rock. Undoubtedly it has good potential for intact buried remains but the same can be said for several other sites in this area. However, 5CN977 has enough material exposed at the surface to be considered eligible for the NRHP on that basis alone. Multi-component site 5CN801 has the only prehistoric rock art panel found in the area as well as Historic period features that have suffered some damage in recent years. The rock art panel, fortunately, is in good condition and it along with the associated prehistoric artifacts represent the most significant component on the site.

Management recommendations for all five eligible or listed properties include avoidance of the site locations should any future development threaten their physical integrity. For stone fence sites 5CN968 and 975, additional archival research into the history of such features in the northern San Luis Hills is recommended, along with occasional monitoring of their physical condition. At Pike's Stockade site 5CN75, recommendations are to continue monitoring (which is on-going by CHS staff), conduct additional test excavations and remote sensing studies to relocate the original stockade foundations (and perhaps remnants of Cortez Ranch buildings as well), and if those remains can be found to conduct larger block excavations for research purposes. Rock art site 5CN801 likewise should be monitored, which is especially needed there given the recent damage to historical features and the greater vulnerability of petroglyph panels to vandalism. Consultation with American Indian tribes including—but not limited to—the Southern Ute, Jicarilla Apache, and Tewa Pueblo groups is recommended for interpretation and planning purposes, but also to solicit information about traditional use of the mesa area including stone enclosure sites such as 5CN1008. Test excavations in various parts of the sand dunes such as around FCR exposures are recommended at site 5CN977. Full-scale excavations are recommended here, wherever warranted based on test excavation results.

In addition to the specific site recommendations outlined above, it is also appropriate to discuss management issues for the PSSHM property as a whole in light of the long-range plans for development and interpretation (Zink and Associates 2003). Clearly the most archaeologically sensitive areas in the PSSHM are: 1) at and near the reconstructed stockade; 2) the triangular area on the northeast side of Sierro del Ojito in the sand dunes and lower piedmont slopes; 3) on the southwest spur ridge of the mesa; and 4) on the crest of the mesa, especially around rock art site 5CN801. While surveying the entirety of the area south of the river, past and current land use issues affecting the archaeological and historical record were observed. Most obvious was

the seasonal presence of cattle, who graze CHS lands unfettered due to the lack of perimeter fencing in most areas. Due to the potential for trampling damage to sites, particularly in wet weather, barbed wire fencing should be installed around the northeast, east, south, and west edges of the property, connecting with existing fence lines at the survey cap in the center of the east half of Section 8, near the southeast property corner on the Section 16–Section 17 line, and at another survey cap on the center point of the Section 7–Section 18 line.

The CHS should work closely with local landowners whose properties adjoin state land in this regard, as the long-term unmonitored grazing in the PSSHM may have led to a feeling that such traditional use should continue unchanged. In one case, just after recording a site in the sand dunes, our survey crew was approached by the nephew of a landowner who thought we were trespassing on his aunt's property; he was unaware of the position of the property boundary because no fence exists there and nearby survey caps are partly obscured by native shrubs.

Generally speaking, any amount of traffic—whether from cattle, people, or vehicles—should be restricted in and around the dune field in the northeast portion of the PSSHM. Because a jeep trail currently provides access to that part of the property, it is easy for visitors to drive off-road vehicles such as ATVs into and around the dune field. This kind of activity could be better managed by installing the perimeter fencing described above, and by altering the jeep trail as follows. The access road currently begins on BLM property at the Lasauses Road (County Road W) in the SE¼ of Section 17, passing north onto state land in the PSSHM, curving east onto private land where one fork continues due east toward Lasauses and a second turns north through a gate, then winds westward back onto the PSSHM (Figure 10). A simple solution would be to construct a short north-south segment of road on PSSHM property near stone fence site 5CN1009 that cuts off the loop onto private land, and to install a gate on the existing E-W fence at the Section 8–Section 17 line, thus controlling access to the dune field area in the SE¼ of Section 8.

Should future development of the PSSHM include interpretive trails and/or roads on the south side of the river around Sierro del Ojito, there will be concerns about proper placement of trails, signs, and facilities such as parking lots. While virtually the entire south edge of the PSSHM in Section 17 could be considered as a staging area for such developments without endangering any significant cultural resources, the practicality of such use could be called into question. Although this area is easiest to access due to its proximity to the county road, its southerly location puts it at the greatest distance from Pike's Stockade, rock art site 5CN801, and the McIntire Ranch ruins should those sites be included in a new trail system. Perhaps more suited to—or more conveniently located for—future development is the area on the west side of the PSSHM. Another, longer dirt road can be used to access that area from County Road W, albeit the entire stretch through Section 18 east of the BLM fence is on private property. Within the PSSHM, there is ample room at the foot of the mesa in the SE¼ of Section 7 to construct facilities of any kind without a negative impact on cultural resources. This area is also much closer to Pike's Stockade and McIntire Ranch, and to potential trail routes up onto the mesa.

As noted previously, our survey crews used several different routes to climb the mesa slopes, and there are many other options beyond those we took if one is willing to traverse

unbroken, steep, rocky slopes. That is exactly what happened in the late 1800s when three of the five stone fences were constructed. However, there are a few somewhat better choices to ascend the mesa, even if none are truly easy. The spur ridges on the northwest, southwest, and southeast ends of the mesa are all possibilities. However, the southeast spur is a steeper climb than the others, and the southwest spur is the most archaeologically sensitive route to or from the top; it is recommended that any trail planning avoid using the southwest spur ridge. Perhaps slightly less challenging to use than the northwest spur ridges (there are two, with the more southerly being an easier climb) are routes up the head of the broad drainage on the west side of Sierro del Ojito. A route following switchback paths through the yucca-covered, northwest-facing slope at the head of the drainage was used several times by our crews, with little difficulty. One last choice is ascending the steep drainage on the south slope, past a survey cap at the center of the Section 8–Section 17 line. Regardless of the route(s) chosen, and contrary to ideas floated in the past, it is ill-advised to build a road to the crest of the mesa, which would increase potential impacts to sensitive areas and sites to risky levels.

Summary and Conclusions

The PSSHM survey project has added significant new data to our knowledge of the archaeological record in this little-studied section of southern Colorado. Information on Holocene use of local landscapes is fairly abundant in localized areas, notably in the Archaic and Late Prehistoric periods. The survey covered about 907 ac straddling the Conejos River between Sanford and Lasauses; the vast majority of the inventoried acreage is south of the river extending onto the mesa called Sierro del Ojito. This work resulted in the recording of 37 sites and 26 IFs, of which a bit more than half the sites and most of the IFs represent prehistoric American Indian activities. The most common prehistoric site types here are open lithic scatters and camps, typified by flaked stone debitage of diverse raw materials and flaked stone tools heavily skewed toward hunting implements, with only a small number of ground stone tools on just a handful of sites. Ceramics were notably absent in surface assemblages. Historic period stone fences, cairns, and trash scatters are nearly as common as lithic scatters and camps, and largely represent ranching activities of the late 1800s and early 1900s.

Highest prehistoric site densities are found in the sand dune field and adjacent lower piedmont slopes at the northeast foot of the mesa. The dunal landscape offered ready access to the river, attractive camping locations, and a range of floral and faunal resources. Beyond this favored zone, a sparser scatter of sites and IFs is found with lowest densities in the open shrubland at the south edge of the project area. The lower site numbers both on top of Sierro del Ojito and on the south and west sides were not entirely expected in that distances to the river are not significantly different, and resource availability does not appear to be appreciably lower. However, the “pull” of the sand dunes may have been enough by itself to influence prehistoric settlement patterns in the survey area. Supporting evidence for this is in the area of the McIntire Ranch on BLM land just outside the PSSHM, where lithic and ceramic artifact scatters have been documented in thin cover sands, immediately west of the rocky slopes in the PSSHM where virtually no prehistoric artifacts were found.

Thirty-two features have been documented at 21 sites and 1 IF in the PSSHM, of which cairns and lithic artifact concentrations are the most common. Thermal features such as fire-cracked rock concentrations are fairly rare with only four recorded, and no definite hearth features have been documented. Rock constructions such as stone enclosures, fences, possible vision quest pits, and the aforementioned cairns are found throughout the project area; they occur in both prehistoric and Historic period contexts. Rock-outlined vision quest features—if indeed that was their function—and the rock art panel at the far north end of the mesa suggest that ritual activities were among the early motivations for ascending the mesa. The southwestern spur ridge appears to have been the primary route used to access the crest.

Settlement patterns in the survey area were examined for possible differences in proximity of sites to the Conejos River vs. distance to sand dunes east or west of the mesa. No significant differences were found in this comparison. The most notable trend in the prehistoric record is in the intensity of occupations in the northeast portion of the PSSHM, in and near the dune field. There, artifact densities are much higher than anywhere else in the survey area, although not particularly high in absolute terms with the highest artifact count topping out at 151 items (all lithic, site 5CN977). Very casual and low intensity surface collection/use of native cobbles of light-colored chert and chalcedony pebbles occurred on the rocky crest and piedmont slopes of the mesa, but this minor activity had no impact on local settlement patterns, and none of this activity was concentrated enough to define any site as a lithic source. Historic period landscape use was a bit more dispersed across the PSSHM than for the prehistoric era, as the entire area was within the grazing range of local ranches, with the McIntire Ranch operations being the largest. Both cattle and sheep grazing occurred in the area, and as noted above, features related to these activities is widespread in the project area. Most visible are the cairns on the crest of the mesa, and stone fences on the slopes.

Returning to the prehistoric record, other lithic data of note include the notable abundance of cryptocrystalline and microcrystalline silicate rock types in local assemblages, primarily cherts along with sizable percentages of jasper, chalcedony, and agate. Cumbres Pass chert is certainly represented in this count on our survey, although in what specific numbers is not readily defined. In part this is due to the fact that no trace element studies of artifact material provenance have been attempted. Also, however, there is a macroscopic resemblance between some of the native chert pebble material in the PSSHM and Cumbres Pass chert. Another prominent toolstone found on area sites is the dark-colored volcanic rock usually called basalt by area archaeologists (including in this report); geochemically, much of this material is probably andesite. Because it is virtually the same color as the local bedrock, the numbers our crew documented on the survey likely underestimate its true abundance. Diagnostic artifacts made of "basalt" entirely pre-date AD 500, and define a material use pattern that stretches southward onto the Taos Plateau. Use of this material, at least for projectile points, thins rapidly northward in the San Luis Valley (Spero and Hoefer 1999a:190). Twenty obsidian artifacts were observed on the survey, most if not all probably derived from sources in the Jemez Mountains of northern New Mexico not far south of the project area.

Chronologically, the Late Prehistoric period ca. AD 150–1600 is best represented in the Pre-Columbian record, although only slightly more so than the far lengthier Archaic period.

These relatively young sites tend to occur in a bit more restricted portion of the PSSHM, on the mesa crest and in the northeast site/IF cluster. Diagnostics of this period are fairly diverse among stemmed, corner-notched, and side-notched forms. The rock art at 5CN801 also may date to this time frame. Archaic period materials are found on nine site and IF components, including two separate ones on site 5CN1392. The entire range of the period from 7850 to 1850 BP is apparently represented in PSSHM assemblages, with a variety of stemmed and notched forms recorded. Stylistic affinities lie with local mountain and southwestern groups. The distribution of Archaic sites and IFs in the study area is more dispersed compared to the Late Prehistoric period, but only slightly so.

The earliest portion of the prehistoric record, the Paleoindian period, is found in the smallest numbers as would be expected. However, even though their numbers are small (three), each diagnostic item is of a different material and style. The record includes a Plano tradition point blade of jasper (probably an Eden point fragment), a Jay point base of an unusual red basaltic material that may date to either the Late Paleoindian or Early Archaic period, and a Foothills-Mountain tradition point base of quartzite. All three were found in relatively sparse assemblages. It is quite possible that some of the archaeological record pre-dating the Archaic period at PSSHM is too deeply buried in the colluvial and aeolian deposits northeast of the mesa to be found in a surface survey.

The local Historic period record mostly dates to the 1880–1925 period, but both earlier and more recent activities have been documented. Unfortunately, no certain American Indian sites or IFs of the Protohistoric or later Historic era have been found here, unless one or more of the undated rock features represents such activity. Local historical accounts clearly report numerous area visits for a variety of purposes and by several different tribes (Harvey 1942; Martorano et al. 1999; Simmons 1999). Similarly, early non-native activity in the project area does not include direct evidence for a Spanish presence, such as is known from Pike's experience here in February 1807. Not surprisingly, our crews failed to find any evidence of Pike's encampment either. Rather, the Historic period record on the survey begins with the ranching activities of the late 1800s, perhaps beginning as early as 1860 but more likely in the 1870s–1880s time frame with the construction of stacked rock features such as fences and cairns. Local land records support this interpretation, and the founding of the McIntire Ranch ca. 1880 no doubt had ramifications for the scale and intensity of ranching activities in the immediate area. After the demise of the McIntire Ranch in the 1920s, ranching activities continued at a smaller scale, and recreational use of the area ensued that becomes archaeologically visible. The state's role in preservation and interpretation of Pike's Stockade likewise began in the 1920s, picked up momentum in the 1940s and 1950s with additional land purchases and the stockade reconstruction, and culminated in the bicentennial dedication of refurbished facilities in February 2007 (Facilities Services 2007).

One by-product of the archaeological survey at PSSHM is in regards to the age of dune field east of Sierro del Ojito. Of the eight sites found amidst the dunes, four contained diagnostic projectile points and in three of those cases the evidence indicates a Late Prehistoric occupation post-AD 150. The exception is 5CN977, which yielded a projectile point with a stemmed, indented base generally pre-dating 2000–1000 BC. However, the site also contained a small

biface fragment that could be an arrow point preform. This suggests the possibility that the older style specimen was collected and reused at a later date consistent with the evidence on other sites in the dune field. Thus, it is quite possible that the dune field did not begin to form until shortly before or during the early part of the Late Prehistoric period, about 2,000–1,500 years ago.

Of the 37 sites and 26 IFs recorded in the project area, 23 sites and all of the IFs are evaluated not eligible for the National Register of Historic Places. No further work is recommended at those resources. Among the remainder, nine sites are considered potentially eligible for the NRHP, four are eligible for the NRHP based solely on the surface evidence, and one site (Pike's Stockade site 5CN75) is already listed on the NRHP. Management recommendations for these 14 sites include avoidance, test excavations, full scale excavations, archival research, surface instrument mapping, tribal consultation, remote sensing for buried features, and monitoring.

More general management recommendations also have been made regarding future development prospects within the PSSHM. Perimeter fencing can be installed where "open range" now allows stock animals to have unlimited access to state lands. Vehicle and foot traffic should be restricted or eliminated in and around the sand dune field east of Sierro del Ojito where high archaeological site densities exist. Foot trail construction to the crest of the mesa likewise should avoid using the southwest spur ridge where archaeologically significant resources occur. Low site densities on the south and west sides of the mesa allow some latitude in siting of any interpretive facilities in those areas.

Finally, the training opportunity for our PAAC volunteers at Pike's Stockade has been of great value both for them and for the prospects of cultural resource preservation in Colorado. Avocational training has produced a diverse band of volunteers whose talents and enthusiasm has been of great benefit on a wide range of projects in the state. While there were challenges in surveying certain portions of the property either due to lower site densities or more rugged terrain, the volunteer crews met these tests with good cheer and uncommon focus. Thanks to them all!

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Appendix I

Project Area Map

Numbered sites and IFs depicted all have 5CN- prefix

[under separate cover]

Appendix II

OAHP Site and IF Forms

[under separate cover]

NOTE: These forms and the map in Appendix I contain locational information that is not available to the public, and is exempt from the federal Freedom of Information Act. The Office of Archaeology and Historic Preservation (OAHP) is authorized to restrict access to this information by CRS 24–72–205ff, CRS 24–80–40–5ff, the Archaeological Resource Protection Act (ARPA) of 1979 (as amended), and National Register Bulletin 29. See OAHP's "Dissemination of Information – Policy/Procedure" document (index #1333, http://www.coloradohistory-oahp.org/publications/pubs/1333.pdf) for further information.

Appendix III

Project Data Tables

Table III-1. Material type distribution across all lithic artifact classes at Pike's Stockade SHM

	Ag	Ar	Ba	Ct	Cy	Gn	Js	MQe	Qe	Ob	OtVol	PW	Rh	Ss	St	Total
CobMpt	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	2
Mano	0	0	2	0	0	1	0	0	0	0	0	0	0	1	0	4
Mill/Mt	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
BfBl	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
BfPr	0	0	2	1	0	0	2	0	0	2	0	0	0	0	0	7
Core	0	0	0	7	1	0	0	0	0	0	0	0	0	0	0	8
Debi	0	1	82	503	91	0	124	1	1	16	0	1	2	0	2	824
FlTo	1	0	3	4	1	0	0	0	0	0	0	0	0	0	0	9
GrSc	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Knife	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
PebTo	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
PekSt	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
PolSt	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
ProjPt	1	0	7	4	3	0	2	0	1	2	0	0	0	0	0	20
Scra	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	5
UnBl	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
UnKn	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
UnPf	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Totals	**3**	**1**	**102**	**525**	**98**	**2**	**129**	**1**	**2**	**20**	**1**	**1**	**2**	**3**	**2**	**892**
TGPST	0	0	3	0	0	2	0	0	0	0	1	0	0	3	0	9
TFST	3	0	14	11	6	0	3	0	1	2	0	0	0	0	0	40
%FST	7.5	0	35.0	27.5	15.0	0	7.5	0	2.5	5.0	0	0	0	0	0	100.0
%GPST	0	0	33.3	0	0	22.2	0	0	0	0	11.1	0	0	33.3	0	99.9
%All	.3	.1	11.4	58.9	11.0	.2	14.5	.1	.2	2.2	.1	.1	.2	.3	.2	99.9

Key to abbreviations, material types (top row): Ag = agate; Ar = argillite(?); Ba = basalt and basaltic-appearing andesite; Ct = chert; Cy = chalcedony; Gn = granite and granitic-textured; Js = jasper; MQe = Morrison formation “quartzite”; Qe = quartzite, coarser than MQe; Ob = obsidian; OtVol = other unknown volcanics; PW = petrified wood; Rh = rhyolite; Ss = sandstone; and St = siltstone. Key to abbreviations, artifact classes (first column): CobMpt = cobble manuport; Mill/Mt = millingstone/metate; BfBl = bifacial blank; BfPr = bifacial preform; Debi = debitage; FlTo = flake tool; GrSc = composite graver-scraper; PebTo = pebble tool, flaked; PekSt = pecking stone; PolSt = polishing stone; ProjPt = projectile point; Scra = scraper; UnBl = unifacial blank; UnKn = uniface cutting tool/knife; UnPf = unifacial preform. Abbreviations in totals: TGPST = total number of ground/pecked stone tools & manuports (CobMpt + Mano + Mill/Mt + PekSt + PolSt); TFST = total number of flaked stone tools (not including BfBl, BfPr, Core, Debi, UnBl or UnPf); %FST = frequency of material type among all flaked stone tools; %GPST = frequency of material type among all ground/pecked stone tools & manuports; %All = frequency of material type among all artifacts observed on the survey.

Table III-2. Landform Associations and Other Landscape Data for Prehistoric Sites and IFs in the PSSHM

Perm. #	Temp. #	Crest/ rim	Crest/ top	Hill-slope	Bench	Ridge	Ledge	Rock-shelter	Piedmont	Sand Dune	Other	Distance/ River	Distance/ Dunes	Elevation
5CN75	**PSS-06-NA**													
5CN801	PSS-05-NA	1	0	0	0	0	0	0	0	0	0	366	975	8030
5CN966	PSS-04-1	0	0	0	1	0	0	0	0	0	0	244	488	7580
5CN967	PSS-04-2	0	0	1	0	0	0	0	0	0	0	366	579	7700
5CN968	**PSS-04-3**													
5CN969	**PSS-04-4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**640**	**884**	**7550**
5CN970	PSS-04-5	0	0	0	0	0	0	0	1	0	0	655	549	7560
5CN971	PSS-04-6	0	0	0	0	0	0	0	1	0	0	671	457	7560
5CN972	PSS-04-7	0	0	0	0	0	0	0	1	0	0	610	396	7550
5CN973	PSS-04-8	0	0	0	0	0	0	0	1	0	0	579	274	7560
5CN974	PSS-04-9	0	0	0	0	0	0	0	1	0	0	564	229	7570
5CN975	**PSS-04-10**													
5CN976	PSS-04-11	0	0	0	0	0	0	0	1	0	0	564	30	7540
5CN977	PSS-04-12	0	0	0	0	0	0	0	0	1	0	503	0	7540
5CN978	PSS-04-13	0	0	0	0	0	0	0	0	1	0	411	0	7530
5CN979	PSS-04-14	0	0	0	0	0	0	0	0	1	0	518	0	7530
5CN980	PSS-04-15	0	0	0	0	0	0	0	0	1	0	686	0	7550
5CN981	PSS-04-16	0	0	0	0	0	0	0	0	1	0	610	0	7540
5CN982	PSS-04-17	0	0	0	0	0	0	0	0	1	0	701	0	7540
5CN983	PSS-04-18	0	0	0	0	0	0	0	0	1	0	686	0	7540
5CN984	PSS-04-19	0	0	0	0	0	0	0	1	0	0	869	137	7570
5CN985	PSS-04-20	0	0	0	0	0	0	0	0	1	0	853	0	7540
5CN986	**PSS-04-IF1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**671**	**792**	**7560**
5CN987	**PSS-04-IF2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**610**	**168**	**7560**
5CN988	**PSS-04-IF3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**655**	**122**	**7550**
5CN989	**PSS-04-IF4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**945**	**107**	**7560**
5CN990	**PSS-04-IF5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1067**	**46**	**7550**
5CN991	**PSS-04-IF6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1341**	**76**	**7570**
5CN1002	PSS-05-21	0	0	0	0	0	0	0	1	0	0	686	366	7610
5CN1003	**PSS-05-22**													
5CN1004	PSS-05-23	1	0	0	0	0	0	0	0	0	0	792	1097	8080
5CN1005	PSS-05-24	1	0	0	0	0	0	0	0	0	0	1280	792	8160
5CN1006	PSS-05-25	0	0	1	0	0	0	1	0	0	0	1539	381	7720
5CN1007	PSS-05-26	0	0	0	0	0	1	0	0	0	0	1006	823	7880
5CN1008	PSS-05-27	0	0	0	0	1	0	0	0	0	0	1052	899	7980
5CN1009	**PSS-05-28**													
5CN1010	PSS-05-29	0	0	0	0	0	0	0	1	0	0	1463	107	7580
5CN1011	**PSS-05-IF7**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**351**	**244**	**7590**
5CN1012	**PSS-05-IF8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**930**	**823**	**7670**
5CN1013	PSS-05-IF9	0	0	0	0	0	0	0	1	0	0	655	549	7620
5CN1014	**PSS-05-IF10**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1341**	**1250**	**8140**
5CN1015	**PSS-05-IF11**													
5CN1016	PSS-05-IF12	0	0	1	0	0	0	0	0	0	0	1494	1341	7730
5CN1017	**PSS-05-IF13**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**838**	**671**	**7880**
5CN1018	**PSS-05-IF14**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**884**	**671**	**7910**

Perm. #	Temp. #	Crest/ rim	Crest/ top	Hill-slope	Bench	Ridge	Ledge	Rock-shelter	Piedmont	Sand Dune	Other	Distance/ River	Distance/ Dunes	Elevation
5CN1019	PSS-05-IF15	0	0	0	0	0	0	0	1	0	0	1646	229	7590
5CN1020	PSS-05-IF16	0	0	0	0	0	0	0	1	0	0	1722	747	7660
5CN1387	PSS-06-30	1	0	0	0	0	0	0	0	0	0	1006	975	8140
5CN1388	**PSS-06-31**													
5CN1389	PSS-06-32	0	1	0	0	0	1	0	0	0	0	1250	884	8180
5CN1390	PSS-06-33	0	0	1	0	0	0	0	0	0	1	792	518	7735
5CN1391	**PSS-06-34**													
5CN1392	PSS-06-35	0	1	0	0	0	0	0	0	0	0	1341	945	8185
5CN1393	PSS-06-IF17	1	0	0	0	0	1	0	0	0	0	1311	1189	8140
5CN1394	PSS-06-IF18	0	0	0	0	0	0	0	1	0	0	1661	701	7675
5CN1395	PSS-06-IF19	0	0	0	0	0	0	0	1	0	0	1905	671	7620
5CN1396	PSS-06-IF20	0	0	1	0	1	0	0	0	0	0	1189	1067	8090
5CN1397	PSS-06-IF21	0	0	1	0	1	0	0	0	0	0	655	884	7990
5CN1398	PSS-06-IF22	0	0	0	1	0	0	0	0	0	0	610	701	7870
5CN1399	PSS-06-IF23	0	0	1	0	1	0	0	0	0	0	655	808	7960
5CN1400	PSS-06-IF24	0	0	0	1	0	1	0	0	0	0	594	945	8050
5CN1401	PSS-06-IF25	1	0	0	0	0	1	0	0	0	0	1372	1158	8150
5CN1402	PSS-06-IF26	0	0	0	0	0	0	0	1	0	0	930	823	7660
	n/$\bar{x}$ =	6	3	7	3	6	5	1	24	8	1	897.00	537.60	7739.55
											σ =	398.74	400.34	229.48

Perm. #	Temp. #	Crest/ rim	Crest/ top	Hill-slope	Bench	Ridge	Ledge	Rock-shelter	Piedmont	Sand Dune	Other	Distance/ River	Distance/ Dunes	Elevation
											Min. =	244	0	7530
											Max. =	1905	1341	8185
											r^2 =	0.1110592		

Black Font = Prehistoric site only
Red Font = Prehistoric + Historic, dominantly historic
Blue Font = Prehistoric + Historic
Bold Red = Historic only
Green Font = Prehistoric IF only
Bold Blue = Prehistoric + Historic, dominantly prehistoric

Key to abbreviations and symbols, Table III-2: Perm. # = permanent site/IF number, Temp. # = temporary field number; site types: n = number (occurrence count), $\bar{x}$ = arithmetic mean, σ = standard deviation, Min. = minimum value, Max. = maximum value, r^2 = square of the Pearson product moment correlation coefficient through data points, distance to river [x axis] vs. distance to sand dunes [y axis].

Table III-3. Site Types, Time Components, and Feature Types in the PSSHM

Perm. #	Temp. #	Chip. Sta.	Camp	Rock-shelter	Rock Art	Hunt. Sta.	Tool Kit	Ritual	IF	Paleo-indian	Archaic	Late Preh.	Proto-hist.	Hist. E-A	Unk. Time	Cairn	Lith. Conc.	Stone Fence	FCR	Vision Quest	Encl.	Align.	Stained Soil	Glyph
5CN75	**PSS-06-36**													**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN801	RGCM–SDO–95	0	0	0	1	0	0	1	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	1
5CN966	PSS-04-1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5CN967	PSS-04-2	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0
5CN968	**PSS-04-3**													**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
5CN969	**PSS-04-4**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN970	PSS-04-5	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5CN971	PSS-04-6	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
5CN972	PSS-04-7	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5CN973	PSS-04-8	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5CN974	PSS-04-9	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5CN975	**PSS-04-10**													**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
5CN976	PSS-04-11	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5CN977	PSS-04-12	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0
5CN978	PSS-04-13	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0
5CN979	PSS-04-14	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5CN980	PSS-04-15	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0
5CN981	PSS-04-16	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5CN982	PSS-04-17	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
5CN983	PSS-04-18	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0
5CN984	PSS-04-19	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
5CN985	PSS-04-20	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5CN986	**PSS-04-IF1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN987	**PSS-04-IF2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN988	**PSS-04-IF3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN989	**PSS-04-IF4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN990	**PSS-04-IF5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN991	**PSS-04-IF6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN1002	PSS-05-21	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
5CN1003	**PSS-05-22**													**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN1004	PSS-05-23	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
5CN1005	PSS-05-24	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0
5CN1006	PSS-05-25	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1
5CN1007	PSS-05-26	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
5CN1008	PSS-05-27	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0
5CN1009	**PSS-05-28**													**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
5CN1010	PSS-05-29	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
5CN1011	**PSS-05-IF7**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN1012	**PSS-05-IF8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN1013	PSS-05-IF9	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
5CN1014	**PSS-05-IF10**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN1015	**PSS-05-IF11**													**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
5CN1016	PSS-05-IF12	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
5CN1017	**PSS-05-IF13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5CN1018	**PSS-05-IF14**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Perm. #	Temp. #	Chip. Sta.	Camp	Rock-shelter	Rock Art	Hunt. Sta.	Tool Kit	Ritual	IF	Paleo-indian	Archaic	Late Preh.	Proto-hist.	Hist. E-A	Unk. Time	Cairn	Lith. Conc.	Stone Fence	FCR	Vision Quest	Encl.	Align.	Stained Soil	Glyph	
5CN1019	PSS-05-IF15	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
5CN1020	PSS-05-IF16	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
5CN1387	PSS-06-30	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	
5CN1388	**PSS-06-31**													**1**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	
5CN1389	PSS-06-32	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	
5CN1390	PSS-06-33	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	
5CN1391	**PSS-06-34**													**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
5CN1392	PSS-06-35	0	0	0	0	1	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	
5CN1393	PSS-06-IF17	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
5CN1394	PSS-06-IF18	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
5CN1395	PSS-06-IF19	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
5CN1396	PSS-06-IF20	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
5CN1397	PSS-06-IF21	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
5CN1398	PSS-06-IF22	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
5CN1399	PSS-06-IF23	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
5CN1400	PSS-06-IF24	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
5CN1401	PSS-06-IF25	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
5CN1402	PSS-06-IF26	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
	n =	8	8	1	1	6	2	2	29	3	9	9	0	22	37	7	6	5	4	3	3	1	1	2	32

Perm. #	Temp. #	Chip. Sta.	Camp	Rock-shelter	Rock Art	Hunt. Sta.	Tool Kit	Ritual	IF	Paleo-indian	Archaic	Late Preh.	Proto-hist.	Hist. E-A	Unk. Time	Cairn	Lith. Conc.	Stone Fence	FCR	Vision Quest	Encl.	Align.	Stained Soil	Glyph	Total Feats.

Black Font = Prehistoric site only
Red Font = Prehistoric + Historic, dominantly historic
Blue Font = Prehistoric + Historic
Bold Red = Historic only
Green Font = Prehistoric IF only
Bold Blue = Prehistoric + Historic, dominantly prehistoric

Key to abbreviations, Table III-3: Perm. # = permanent site/IF number, Temp. # = temporary field number; site types: Chip. Sta. = chipping station, Hunt. Sta. = hunting station; time components = Late Preh. = Late Prehistoric period, Proto-hist. = Protohistoric period, Hist. E-A. = Historic period Euro-American, Unk. Time = unknown prehistoric time period; feature types: Lith. Conc. = lithic artifact concentration, FCR = fire-cracked rock concentration, Encl. = stone enclosure, Align. = stone alignment, Glyph = petroglyph or rock inscription, Total Feats. = total number of features.

Table III-4. Tool Classes, and Lithic Material Types in the PSSHM

Perm. #	Temp. #	Metate	Mano	Proj. Pt.	Knife	Scraper	Mod. Pebble	Mod. Flake	Prod. Biface	Flake	Core	Other	Chert	Jasper	Basalt	Chal./ Agate	Obsidian	Quartzite	Siltstone	Rhyolite/ Ot. Volc.	Sand-stone	Other	Total
5CN75	**PSS-06-36**																						
5CN801	RGCM–SDO–95	0	0	0	0	0	0	1	0	2	0	2	1	1	1	0	0	0	0	1	1	0	5
5CN966	PSS-04-1	0	0	0	0	0	0	0	1	16	0	0	12	2	0	3	0	0	0	0	0	0	17
5CN967	PSS-04-2	0	0	0	0	0	0	0	0	4	0	0	2	0	1	0	0	0	0	0	0	1	4
5CN968	**PSS-04-3**																						
5CN969	**PSS-04-4**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**10**	**0**	**0**	**8**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**
5CN970	PSS-04-5	0	0	1	0	0	0	0	0	10	1	0	6	4	1	1	0	0	0	0	0	0	12
5CN971	PSS-04-6	1	1	0	0	0	0	0	0	43	0	1	27	8	5	5	0	0	0	0	0	1	46
5CN972	PSS-04-7	0	0	0	0	0	0	0	1	22	0	0	9	1	5	6	1	0	1	0	0	0	23
5CN973	PSS-04-8	0	0	1	0	0	0	0	1	17	0	0	4	2	2	5	3	1	1	0	0	1	19
5CN974	PSS-04-9	0	1	2	0	0	0	0	1	14	0	1	3	5	9	0	1	0	0	0	1	0	19
5CN975	**PSS-04-10**																						
5CN976	PSS-04-11	0	0	1	0	0	0	0	0	8	0	0	8	0	0	0	0	1	0	0	0	0	9
5CN977	PSS-04-12	0	0	1	0	1	0	2	1	145	0	1	121	2	22	2	3	0	0	0	0	1	151
5CN978	PSS-04-13	0	0	1	0	0	0	0	1	141	1	0	100	13	18	7	5	0	0	1	0	0	144
5CN979	PSS-04-14	0	0	0	0	0	0	0	0	36	1	0	27	4	6	0	0	0	0	0	0	0	37
5CN980	PSS-04-15	0	0	1	0	1	0	0	0	121	2	0	80	42	2	1	0	0	0	0	0	0	125
5CN981	PSS-04-16	0	0	1	0	0	0	0	0	15	0	0	9	1	6	0	0	0	0	0	0	0	16
5CN982	PSS-04-17	0	0	0	0	0	0	0	0	17	0	0	5	6	3	2	1	0	0	0	0	0	17
5CN983	PSS-04-18	0	1	1	1	0	0	0	0	70	1	0	52	13	4	2	2	0	0	0	1	0	74
5CN984	PSS-04-19	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
5CN985	PSS-04-20	0	0	0	0	0	0	0	0	24	0	0	18	2	2	0	2	0	0	0	0	0	24
5CN986	**PSS-04-IF1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
5CN987	**PSS-04-IF2**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**3**
5CN988	**PSS-04-IF3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
5CN989	**PSS-04-IF4**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
5CN990	**PSS-04-IF5**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
5CN991	**PSS-04-IF6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
5CN1002	PSS-05-21	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
5CN1003	**PSS-05-22**																						
5CN1004	PSS-05-23	0	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
5CN1005	PSS-05-24	0	0	2	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	3
5CN1006	PSS-05-25	0	1	0	0	0	0	0	0	6	0	0	4	2	0	0	0	0	0	0	0	1	7
5CN1007	PSS-05-26	0	0	0	0	0	0	0	0	53	0	0	0	0	0	53	0	0	0	0	0	0	53
5CN1008	PSS-05-27	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1
5CN1009	**PSS-05-28**																						
5CN1010	PSS-05-29	0	0	0	0	0	0	0	0	4	0	0	2	1	1	0	0	0	0	0	0	0	4
5CN1011	**PSS-05-IF7**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
5CN1012	**PSS-05-IF8**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
5CN1013	PSS-05-IF9	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1
5CN1014	**PSS-05-IF10**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
5CN1015	**PSS-05-IF11**																						
5CN1016	PSS-05-IF12	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1
5CN1017	**PSS-05-IF13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
5CN1018	**PSS-05-IF14**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

Perm. #	Temp. #	Metate	Mano	Proj. Pt.	Knife	Scraper	Mod. Pebble	Mod. Flake	Prod. Biface	Flake	Core	Other	Chert	Jasper	Basalt	Chal./ Agate	Obsidian	Quartzite	Siltstone	Rhyolite/ Ot. Volc.	Sand-stone	Other	Total	
5CN1019	PSS-05-IF15	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	2	
5CN1020	PSS-05-IF16	0	0	0	0	0	0	0	0	3	0	0	2	1	0	0	0	0	0	0	0	0	3	
5CN1387	PSS-06-30	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	
5CN1388	**PSS-06-31**																							
5CN1389	PSS-06-32	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
5CN1390	PSS-06-33	0	0	0	0	0	0	0	0	18	0	0	5	11	1	1	0	0	0	0	0	0	18	
5CN1391	**PSS-06-34**																							
5CN1392	PSS-06-35	0	0	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	
5CN1393	PSS-06-IF17	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
5CN1394	PSS-06-IF18	0	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	2	
5CN1395	PSS-06-IF19	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	
5CN1396	PSS-06-IF20	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
5CN1397	PSS-06-IF21	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	
5CN1398	PSS-06-IF22	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	
5CN1399	PSS-06-IF23	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	
5CN1400	PSS-06-IF24	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	2	
5CN1401	PSS-06-IF25	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
5CN1402	PSS-06-IF26	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	2	
	n =	1	4	20	2	5	2	9	9	824	8	8	525	129	102	101	20	2	2	3	3	5	892	892
	% =	0.11%	0.45%	2.24%	0.22%	0.56%	0.22%	1.01%	1.01%	92.38%	0.90%	0.90%	58.86%	14.46%	11.43%	11.32%	2.24%	0.22%	0.22%	0.37%	0.37%	0.56%		
Perm. #	**Temp. #**	**Metate**	**Mano**	**Proj. Pt.**	**Knife**	**Scraper**	**Mod. Pebble**	**Mod. Flake**	**Prod. Biface**	**Flake**	**Core**	**Other**	**Chert**	**Jasper**	**Basalt**	**Chal./ Agate**	**Obsidian**	**Quartzite**	**Siltstone**	**Rhyolite/ Ot. Volc.**	**Sand-stone**	**Other**	**Mat. Tot.**	**Art. Tot.**
	Total Tools =	**60**																						

Black Font = Prehistoric site only
Red Font = Prehistoric + Historic, dominantly historic
Blue Font = Prehistoric + Historic
Bold Red = Historic only
Green Font = Prehistoric IF only
Bold Blue = Prehistoric + Historic, dominantly prehistoric

Key to abbreviations, Table III-4: Perm. # = permanent site/IF number, Temp. # = temporary field number; tool classes: Proj. Pt. = projectile point, Mod. = modified; material types = Chal. = chalcedony, Ot. Volc. = other volcanic rock types; Mat. Tot. = material type totals, Art. Tot. = artifact class totals.

Appendix IV

PIKE'S STOCKADE PAAC SURVEY 2004–2006,
SPATIAL ANALYSES OF ARCHAEOLOGICAL DATA

By Bruce Wahle

Colorado Archaeological Society
Denver Chapter

PIKE'S STOCKADE PAAC SURVEY 2004–2006, SPATIAL ANALYSES OF ARCHAEOLOGICAL DATA

Bruce Wahle

October 2, 2007

Introduction

The Colorado Archaeological Society's (CAS) and Office of the State Archaeologist of Colorado's (OSAC) joint Program for Avocational Archaeological Certification (PAAC) held its summer survey from 2004 to 2006 at Pike's Stockade, south of Alamosa, Colorado. Pike's Stockade is where Zebulon Pike and his men over wintered in 1807 on the Conejos River (Horgan 1954). This paper deals with an archaeological survey in a very small part of the San Luis Valley, and concentrates on geologic and spatial aspects, rather than archaeological. This is the final version of the study, based on a preliminary presentation of the data (Wahle 2005), after two years of survey.

The San Luis Valley covers approximately 19,425 square kilometers (7,500 square miles; Upson 1971) within the Rio Grande depression (Figure IV-1); the San Luis Hills area comprises 1,109 square kilometers (428 square miles; Burroughs 1972). The PAAC survey took place on and around Sierro del Ojito, which is one of the northern San Luis Hills. The pedestrian survey took place on the Pike's Stockade (approximately 980 acres), an area owned and administered by the Colorado Historical Society. The area of survey is south of the Conejos River and its riparian zone (see Figures IV-3 and IV-4). The San Luis Basin is approximately 200 km (124 miles) long, from Poncha Pass, Colorado to the Embudo, New Mexico constriction (Brister and Gries 1994), and the physiography of the region is seen in Figure IV-2. Figure IV-3 is an aerial photograph (Digital Ortho Quarter Quadrangle, 1:24,000) of the Pike's Stockade survey area and Sierro del Ojito. The geology of the study area is a Tertiary igneous table mesa (Figure IV-4), surrounded by younger, Quaternary sedimentary deposits.

Methods

Approximately 907 acres of Pike Stockade's 980 acres (93%) were surveyed (Kevin Black, personal communication 2007). The area of survey did not cover the Conejos River, the riparian zones, and steepest slopes. Data were from the PAAC survey's field data sheets. A number of volunteers, with various levels of experience, completed these sheets as part of the PAAC summer training survey. Fields used for this study are the temporary field number, UTM coordinate easting and northing from a hand-held Global Positioning System (GPS), elevation determined from a topological map, and site type (e.g., prehistoric, historic, prehistoric isolated find [IF], historic IF).

These data were entered into a dBase III Plus database created for this project. Since elevations were not determined by the volunteers, sometimes elevation was also taken from a 30-

meter digital elevation model (DEM) for Pike's Stockade (ESRI and Terraserver, Internet). Additionally, information was obtained from a digitized soil survey from Yenter et al. (1980; NRCS 2002). Information layers were combined with an ArcView Geographic Information System (GIS). Digital maps were created using a Universal Transverse Mercator (UTM) projection in meters, and a datum of either NAD27 or NAD83 depending on the image's projection. Statistical analyses were performed using S-PLUS 6.0 Professional, and spatial analyses were done with ArcView scripts (Lee and Wong 2001). Analyses were non-weighted, with an alpha of 0.05. To test whether standard statistics or spatial statistics should be used, tests for spatial autocorrelation (Geary's Ratio, Moran's I) were run for the easting, northing, and DEM elevation fields (X, Y, Z).

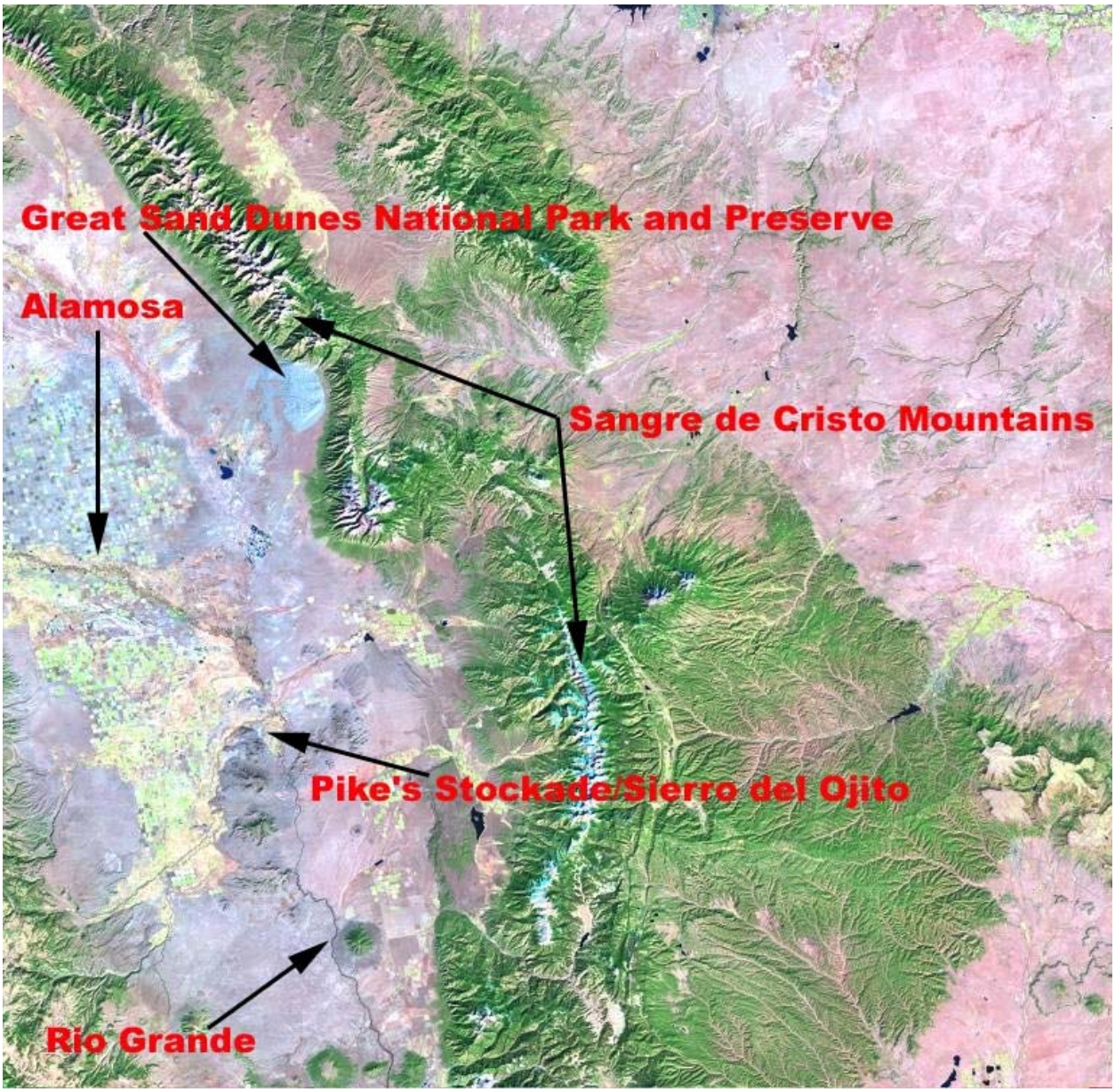

Figure IV-1. LANDSAT 7 ETM satellite image (7033034009931951) of the San Luis Valley area taken November 15, 1999 (http://edcsns17.cr.usgs.gov/EarthExplorer/).

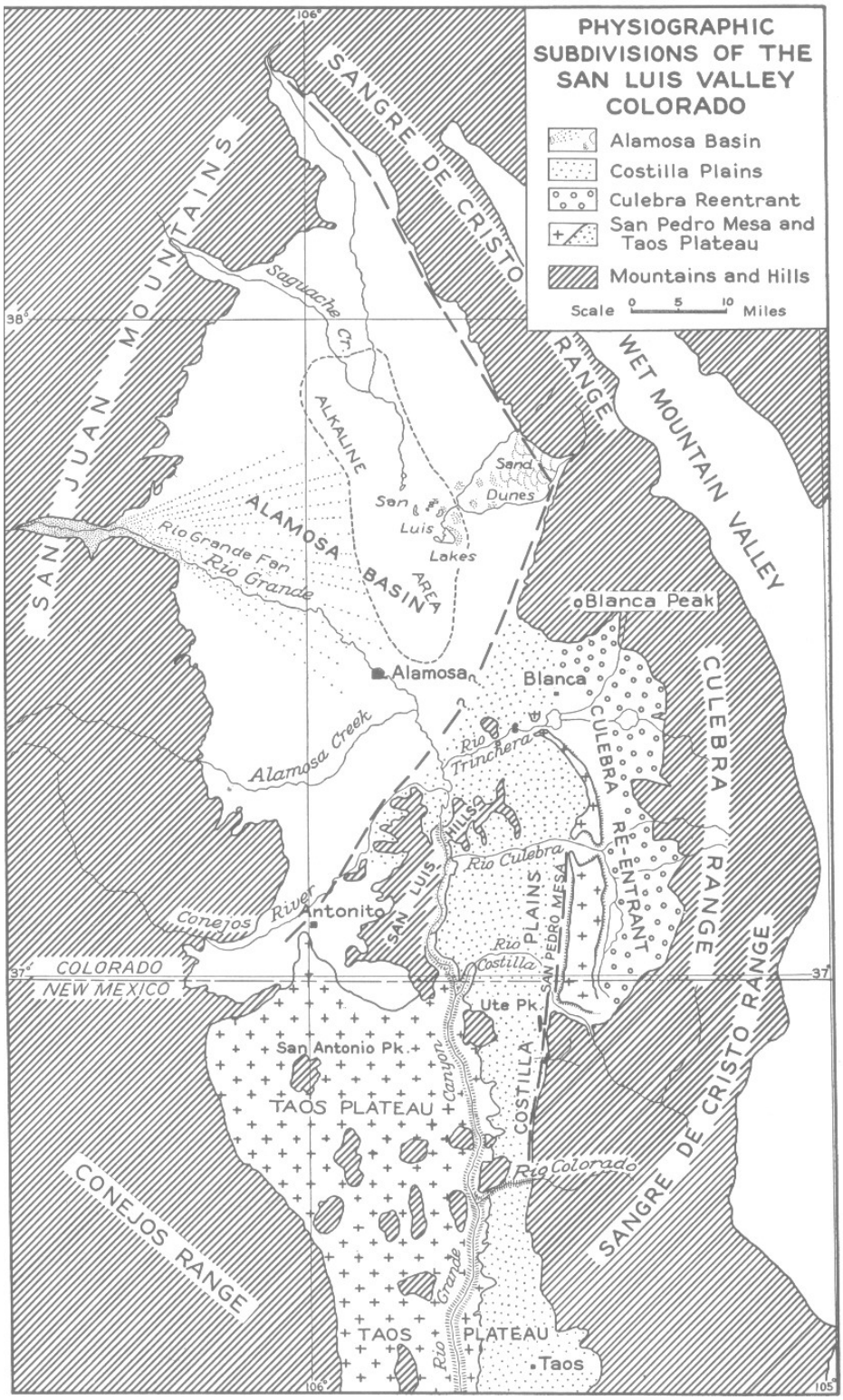

Figure IV-2. Physiographic subdivisions of the San Luis Valley (Upson 1971).

Figure IV-3. Pike's Stockade survey area and Sierro del Ojito Digital Ortho Quarter Quad (ESRI and Terraserver, Internet).

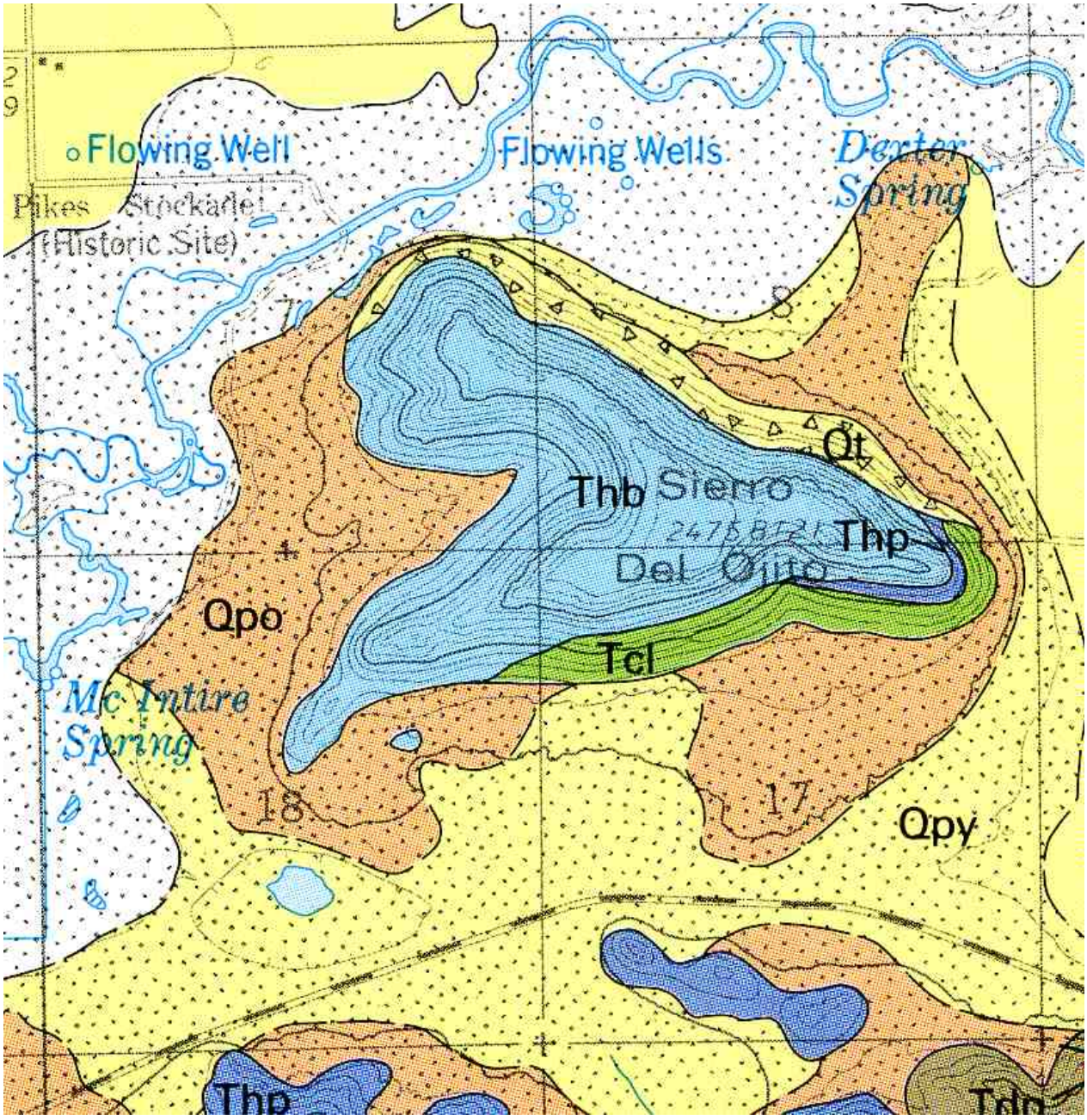

Figure IV-4. Geologic map of the Pike's Stockade area (Thompson and Machette 1989).

Tcl – lower dacite, undifferentiated
Thp – silicic alkali-olivine basalt flows
Thb – silicic alkali-olivine basalt flows and near vent pyroclastic flows
Qt – Quaternary talus
Qpo – older piedmont-slope alluvium (middle Pleistocene)
Qpy – younger piedmont-slope alluvium (Holocene and upper Pleistocene)
Qay – younger alluvium (upper Pleistocene); yellow area
Qafp – undifferentiated alluvium (upper Holocene); white, stippled riparian area

Results

Sites

All tests for spatial autocorrelation were significant (clustering present), except for historic IFs easting and northing. Therefore, spatial statistics were used for the analyses. Table IV-1 summarizes the final results. Results were calculated for all cultural data at Pike's Stockade, all prehistoric data, prehistoric sites, prehistoric IFs, all historic data, historic sites, and historic IFs. Information calculated was spatial mean, spatial median, spatial distance (one standard deviation), and spatial ellipse (for easting, northing, rotational angle of trend). Three figures summarize the results. Figure IV-5 shows all the data collected in three years of survey, and the spatial ellipses and spatial deviations for all data, all prehistoric data, and all historic data. Figure IV-6 compares prehistoric data to all data. Figure IV-7 compares historic data to all data.

Table IV-1. Summary of final spatial analyses (scale 1:17,000, alpha=0.05, non-weighted).

	All Data	Prehistoric Sites	Prehistoric IFs	All Prehistoric	Historic Sites	Historic IFs	All Historic
Sample number	63	26	29	55	18	4	22
Spatial mean, UTM easting (m)	429512	429758	429359	429548	429282	429240	429275
Spatial mean, UTM northing (m)	4126690	4126880	4126540	4126700	4126580	4126550	4126570
Standard distance (m)	916.16	866.464	836.079	890.707	959.396	648.309	910.963
Spatial median UTM easting (m), alpha 0.05	429527	429929	429249	429532	429481	429286	429443
Spatial median UTM northing (m), alpha 0.05	4126660	4127030	4126490	4126690	4126570	4126430	4126560
Angle of rotation, standard deviational ellipse	82.835	79.5503	88.3467	79.646	7.15744	32.2796	7.6384
Standard deviation along x-axis (m), standard deviational ellipse	437.517	380.877	390.795	414.792	847.14	486.81	792.945
Standard deviation along y-axis (m), standard deviational ellipse	804.94	778.263	739.127	788.23	450.327	428.159	448.432
Major axis	northing	northing	northing	northing	easting	easting	easting

Figure IV-5. All data (green dots), and spatial analyses of all data (green lines), all prehistoric data (red lines), and all historic data (blue lines).

[under separate cover]

NOTE: This map contains locational information that is not available to the public, and is exempt from the federal Freedom of Information Act.
The Office of Archaeology and Historic Preservation (OAHP) is authorized to restrict access to this information by CRS 24–72–205ff, CRS 24–80–40–5ff, the Archaeological Resource Protection Act (ARPA) of 1979 (as amended), and National Register Bulletin 29.
See OAHP's "Dissemination of Information – Policy/Procedure" document (index #1333, http://www.coloradohistory-oahp.org/publications/pubs/1333.pdf) for further information.

Figure IV-6. Prehistoric sites and spatial data (red) and prehistoric IFs (dark red) compared to all data (green).

[under separate cover]

NOTE: This map contains locational information that is not available to the public, and is exempt from the federal Freedom of Information Act.
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Figure IV-7. Historic sites and spatial data (blue) and historic IFs (light blue) compared to all data (green).

[under separate cover]

NOTE: This map contains locational information that is not available to the public, and is exempt from the federal Freedom of Information Act.
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See OAHP's "Dissemination of Information – Policy/Procedure" document (index #1333, http://www.coloradohistory-oahp.org/publications/pubs/1333.pdf) for further information.

Table IV-2. Site types by soil type (Yenter et al. 1980).

Name	MUSYM	All Data	All Prehistoric	Prehistoric Sites	Prehistoric IFs	All Historic	Historic Sites	Historic IFs
Travelers very stony loam, 3-25% slopes	54	27	22	8	14	14	12	2
Quamon-LaJara complex	43	1	0	0	0	1	1	0
McGinty sandy loam	32	11	11	5	6	3	2	1
Hooper loamy sand	23	4	4	3	1	0	0	0
Hooper clay loam	22	7	7	6	1	0	0	0
Garita cobbly loam	18	13	11	4	7	4	3	1
Corlett-Hooper complex, undulating	9	0	0	0	0	0	0	0
Total		63	55	26	29	22	18	4

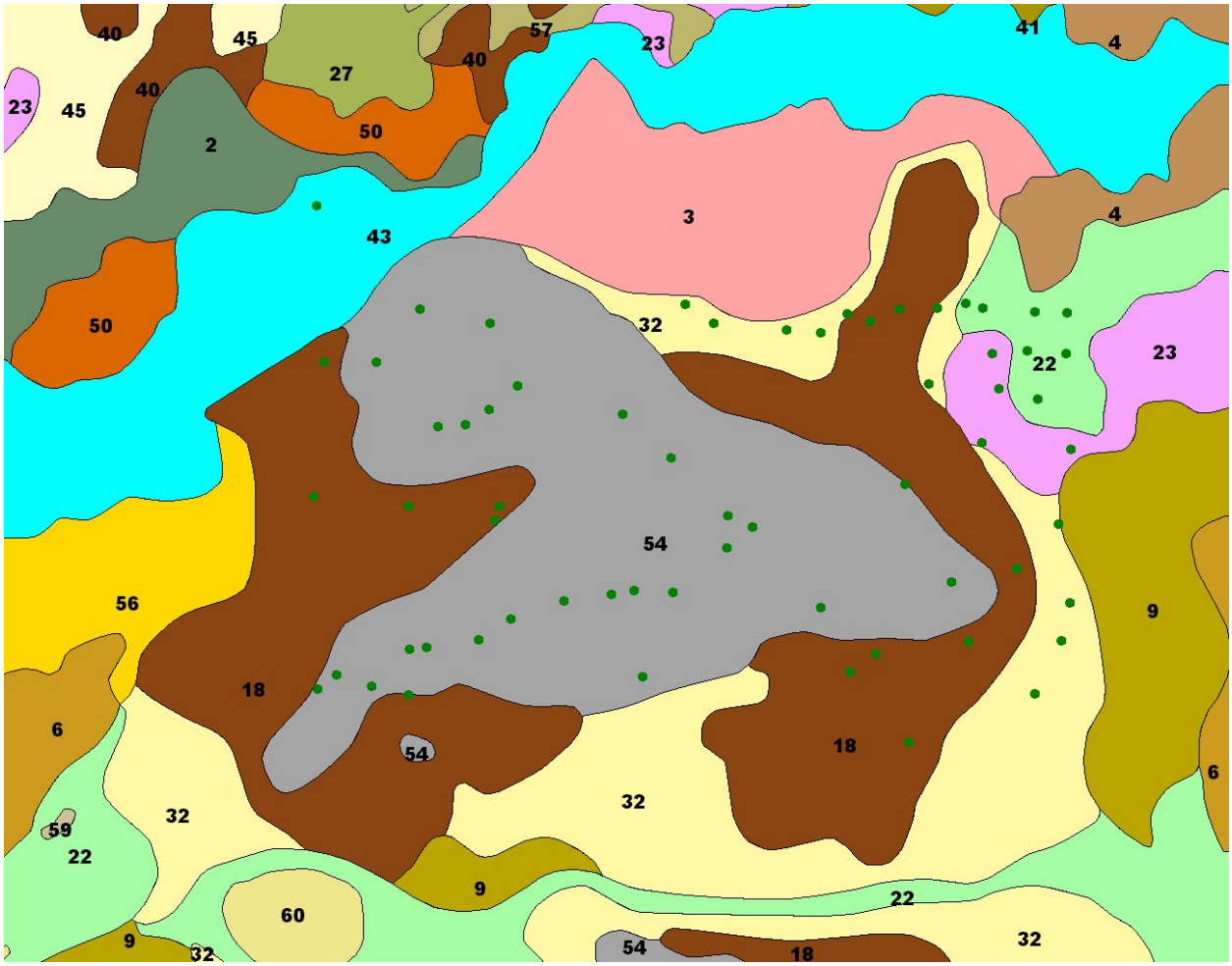

Figure IV-8. All data (green dots) found draped over soil mapping unit types (MUSYM): 54 – Travelers very stony loam, 3-25% slopes (Sierro del Ojito); 43 – Quamon-LaJara complex; 32 – McGinty sandy loam; 23 – Hooper loamy sand; 22 – Hooper clay loam; 18 – Garita cobbly loam, 3-25% slopes; 9 – Corlett-Hooper complex, undulating (NRCS 2002; Yenter et al. 1980). Image centered on Sierro del Ojito.

Discussion

Geology

The San Luis Hills are Middle Oligocene (Tertiary) extrusive volcanics that have been uplifted by the subsurface Alamosa horst (Brister and Gries 1994; Burroughs 1971, 1972). Burroughs (1971, 1972) reported that Sierro del Ojito has two extrusive volcanic members (La Sauses, Manassa) of the Conejos formation (Oligocene). Figure IV-9 shows the two types of lava found on the slopes of Sierro del Ojito. The lighter lava down slope is a rhyodacite or dacite, while the darker lava upslope is a trachyandesite (Burroughs 1972). The darker lava, while looking like "basalt", is not technically (i.e., chemically) a basalt, but rather andesitic. Sierro del Ojito is surrounded by fluvial and lacustrine sediments in the subsurface of the valley floor (Alamosa formation, Pliocene to Middle Pleistocene; Brister and Gries 1994). The surficial

areas surrounding Sierra del Ojito are covered by slope talus, colluvium and alluvium (Thompson and Machette 1989). A Pliocene-Pleistocene lake (Lake Alamosa) is believed to formerly have been present in the upper San Luis Basin (Alamosa Basin). The Alamosa horst blocking the Rio Grande was eroded through by the river between approximately 690,000 to 300,000 years ago (Brister and Gries 1994; Machette 2004, personal communication 2005; Siebenthal 1910), allowing Lake Alamosa to begin draining.

Figure IV-9. View looking east, showing two types of igneous rock on the south side of Sierro del Ojito; a lighter rhyodacite or dacite down slope, and a darker trachyandesite upslope (author's photograph).

Sites

The data can be listed as 1) all sites, 2) prehistoric sites, 3) prehistoric IFs, 4) all prehistoric data, 5) historic sites, 6) historic IFs, and 7) all historic data (Table IV-2).

Spatial Analyses

Running spatial analyses on the data set combinations shows that all sites and all prehistoric data have similar trends (Figure IV-5), and that all sites, all prehistoric data, prehistoric sites, and prehistoric IFs also show similar trends (Figure IV-6). Prehistoric data represent 71% of the data collected on this survey. The historic sites show a different trend, being mainly on the vertices of Sierra del Ojito's triangular shape, the hilltop, and its slopes (Figure IV-7).

Calculated spatial means and medians were relatively close to each other (Table IV-1). A large difference may indicate that the distribution of sites is skewed (e.g., the large concentration of sites in the northeast corner) (Kaluzny et al. 1998). Standard distance shows the spatial spread of the set of cultural data in this study around the spatial mean. The standard distance was similar for all data sets varying from 836 to 959 m, except for historic IFs. Creating a standard deviational ellipse allows one to look at whether there is a directional bias to the point distribution. The major axis for all data, all prehistoric data, prehistoric sites, and prehistoric IFs is the north/south axis, rotated 80-88° clockwise. The major axis for historic sites, and all historic data is along the east/west axis, rotated 8°; historic IFs show a different rotation (32°).

Soils

Twenty-seven (43%) of all sites were found on MUSYM 54 (Table IV-2). Much of the cultural material was found on this soil, which is volcanic material of Sierro del Ojito. The relatively sparse vegetation helped to find the cultural material. An additional 13 sites (21%) were found on MUSYM 18, which is from an alluvium developed on the volcanic soils (Yenter et al. 1980). This is the predicted high water level area on Sierro del Ojito from Lake Alamosa (Machette 2004). Eleven (17%) of all sites were found on MUSYM 32. This soil type is listed as having moderate water and wind erosion (Yenter et al. 1980), helping to expose the subsurface. Seven (11%) of all sites were found on MUSYM 22, which is alluvium developed on volcanic rock, has little slope, very slow runoff, slight erosion hazard, and a seasonally high water table (Yenter et al. 1980). MUSYM 23 had 4 sites (6%), and also has low slopes, runoff, and erosion hazards (Yenter et al. 1980). MUSYM 43 had 1 site (2%, Pike's Stockade); these are nearly level soils in riparian areas (Yenter et al. 1980). Despite Yenter et al.'s (1980) general classification of low to moderate erosion hazard, the northeastern corner of the survey area is older to younger piedmont and slope alluvium (Middle Pleistocene to Holocene) on which sand dunes have formed, and are now becoming exhumed (see Figure IV-4). It is within this area that the study found the highest area of data clustered.

Summary

This paper presents some aspects of a three-year PAAC survey on Pike's Stockade, Conejos County, Colorado. Various methods have been used to assess their usefulness in determining the distribution of artifacts and features on the Pike's Stockade survey area. The author's intent was to explore various ways of looking at the landscape based on geological and

spatial information to predict archaeological sites within the Sierro del Ojito area, and in the larger areas of the San Luis Hills and San Luis Basin.

The general trends of the study were seen after obtaining 20–30 sample points for each field of interest (~two years of data). A third year of data collection, and some reassessment, modified the database. The initial idea was to see if data collected in the field could rapidly be converted to interpretations that might influence the direction of future surveying. Knowledge of soils, geology, and statistical analyses were felt to be useful in describing the cultural material locations within the survey area. Admittedly, in a PAAC survey of a small area, one will attempt to survey as much of the entire area as possible. But, in a large survey, with limited time and funding, methods that help predict the best areas to spend your time would be of use. This spatial study was done within the bounds of the property owned by the Colorado Historical Society. Cultural material undoubtedly is present beyond this boundary. Thus, the study may be affected by the "boundary effect" (Lee and Wong 2001). The results from the choice of the study boundary (e.g., by ownership) could be artificial and misleading depending on cultural data outside this boundary.

Acknowledgments

First, I need to thank all the PAAC volunteers who put their time and knowledge into this survey. Kevin Black has provided answers, editing suggestions, and many hours of archaeological training.

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Appendix V

PORTABLE X-RAY FLUORESCENCE (XRF) ELEMENTAL ANALYSES OF SELECTED BASALT AND OBSIDIAN ARTIFACTS COLLECTED IN THE PIKE'S STOCKADE AREA

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The analysis was conducted October 4, 2007 on 13 artifacts (ten basalt, three obsidian) using a Niton XLt 700 series (model 999ZW) portable X-ray fluorescence instrument. This instrument has an elemental range of 17 as listed in the tables. All readings are given in parts per million (ppm); <LOD means the quantity is below the level of detection of the device. The suggested provenance for artifacts should be considered preliminary in nature given the limited range of elements detected by the portable device and, for basalt (or perhaps more accurately, basaltic-appearing volcanics), the limited source data available for comparison. Data on chemical characterization of source materials are published in a number of resources, such as Baugh and Nelson (1987), Ferguson and Skinner (2003), Gardner et al. (1986), Glascock et al. (1999), and Shackley (1995, 2005, 2006, 2007). See Boyer et al. (2001:Figures 9.4–9.10) and Vierra et al. (2005:Figure 13) for basalt data, in which the rubidium-strontium ratios (Rb/Sr) are the most relevant to discriminate sources, given the elemental range tested on the Pike's Stockade artifact collection.

Two artifacts (Tables V-1 and V-3) match well with source data for San Antonio Mountain source B, with Rb values around 60 ppm and Sr under 200 ppm. One other basalt artifact (Table V-12) might be from San Antonio Mountain source B or a related site, but its Rb content is lower than the currently documented range for that source. Two more artifacts (Tables V-5 and V-10) can be associated with San Antonio Mountain source A, particularly the basalt scraper from 5CN1393. Four basalt artifacts (Tables V-2, V-8, V-9, V-11) form a good cluster with Rb/Sr ratios intermediate between San Antonio Mountain source A and the Cerros del Rios source. They may be from an outcrop related to one of those two sources, or from an entirely different source area. Lastly, the reddish basalt stemmed point from 5CN974 (Table V-4) is clearly not from the three sources described in Vierra et al. (2005) because it's Rb value is below the level of detection.

None of the basalt artifacts match with data from sources farther south reported in Boyer et al. (2001), although the limited elemental range of the portable device renders these comparisons preliminary in nature. Boyer et al. (2001:110–111, Table 9.2) tested for eight trace elements in various quarry materials, four of which are not detected by the Niton XRF device [barium (Ba), niobium (Nb), yttrium (Y), and zirconium (Zr)]. However, they note "that rubidium may be the trace element with the greatest capacity to be used for differentiating sample groups" (Boyer et al. (2001:111), a trace element that was measured in our analysis. None of the Rb/Sr ratios in our sample match the source data graphed in Boyer et al. (2001:Figure 9.5).

Similarly, chemical readings for the three tested obsidian artifacts are insufficient for source analysis. In large part, this is because the Niton XRF model used does not detect elements widely accepted as most useful for discriminating among different sources—notably yttrium (Y) and zirconium (Zr), but also barium (Ba), niobium (Nb), sodium (Na), and titanium (Ti). The XRF instrument does detect rubidium (Rb), another key chemical for source discrimination (e.g., Shackley 2007), but Rb values must be compared against one or more of the other elements such as yttrium to be useful. Macroscopically, the cloudy appearance of the obsidian flake collected from 5CN1400 is suggestive of El Rechuelos ("Polvadera Peak") source material (e.g., Newman 1994:494); however, the flake's Rb content of 124.6 ppm ± 11.4 is below the reported minimum of 146 ppm (Shackley 2007) except at the extreme high end of the two sigma range of the flake's measured value.

Table V-1

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN969-1	black basalt knife	Ag	<LOD		San Antonio Mountain source B
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	317.7	150.3	
		Cu	77.3	38.0	
		Fe	34.7K	0.8K	
		Hg	<LOD		
		Mn	700.3	189.5	
		Ni	<LOD		
		Pb	<LOD		
		Rb	59.4	8.5	
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	158.5	11.6	
		Zn	2759	122	

Table V-2

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN973-1	black basalt projectile point	Ag	71.8	26.6	unknown
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	<LOD		
		Cu	52.2	34.1	
		Fe	34.7K	0.8K	
		Hg	<LOD		
		Mn	1015	207	
		Ni	144.9	85.4	
		Pb	39.5	17.3	
		Rb	46.8	7.8	
		Sb	124.7	73.6	
		Se	<LOD		
		Sn	<LOD		
		Sr	644.4	21.9	
		Zn	95.1	30.7	

Table V-3

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN974-1	black basalt projectile point	Ag	83.0	28.3	San Antonio Mountain source B
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	720.4	195.2	
		Cu	87.5	39.8	
		Fe	41.7K	0.9K	
		Hg	<LOD		
		Mn	793.3	211.8	
		Ni	188.1	91.8	
		Pb	26.6	16.7	
		Rb	61.0	8.8	
		Sb	124.6	77.8	
		Se	<LOD		
		Sn	<LOD		
		Sr	194.7	13.1	
		Zn	86.9	32.1	

Table V-4

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN974-2	red basalt projectile point	Ag	65.3	27.9	unknown
		As	50.9	15.9	
		Cd	<LOD		
		Co	<LOD		
		Cr	<LOD		
		Cu	68.7	37.6	
		Fe	60.9K	1.1K	
		Hg	<LOD		
		Mn	1535	261	
		Ni	<LOD		
		Pb	48.0	19.2	
		Rb	<LOD		
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	762.8	24.8	
		Zn	<LOD		

Table V-5

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN977-1	black basalt projectile point	Ag	53.4	27.9	San Antonio Mountain source A
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	2091	286	
		Cu	68.8	38.1	
		Fe	35.5K	0.9K	
		Hg	<LOD		
		Mn	777.3	226.3	
		Ni	<LOD		
		Pb	<LOD		
		Rb	53.1	8.5	
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	492.7	20.1	
		Zn	734.7	67.6	

Table V-6

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN978-1	obsidian projectile point	Ag	<LOD		unknown
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	<LOD		
		Cu	<LOD		
		Fe	473.5	97.7	
		Hg	<LOD		
		Mn	<LOD		
		Ni	<LOD		
		Pb	<LOD		
		Rb	9.8	3.5	
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	<LOD		
		Zn	26.3	15.4	

Table V-7

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN983-1	obsidian projectile point	Ag	<LOD		unknown
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	363.3K	6.9K	
		Cu	<LOD		
		Fe	971.1K	8.9K	
		Hg	<LOD		
		Mn	11.3K	3.3K	
		Ni	<LOD		
		Pb	<LOD		
		Rb	<LOD		
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	<LOD		
		Zn	<LOD		

Table V-8

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN1005-2	black basalt projectile point	Ag	51.1	25.8	unknown
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	<LOD		
		Cu	90.4	36.7	
		Fe	31.5K	0.8K	
		Hg	<LOD		
		Mn	783.1	185.0	
		Ni	<LOD		
		Pb	29.2	16.0	
		Rb	47.1	7.6	
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	492.4	18.9	
		Zn	87.8	29.4	

Table V-9

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN1005-3	black basalt unifacial blank	Ag	57.5	36.0	unknown
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	11.2K	0.7K	
		Cu	94.7	52.6	
		Fe	65.4K	1.4K	
		Hg	<LOD		
		Mn	773	407.6	
		Ni	<LOD		
		Pb	33.6	22.4	
		Rb	48.8	10.2	
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	595.3	26.8	
		Zn	83.3	42.3	

Table V-10

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN1393-1	black basalt scraper	Ag	117.5	32.0	San Antonio Mountain source A
		As	<LOD		
		Cd	56.0	34.0	
		Co	<LOD		
		Cr	10.7K	0.7K	
		Cu	127.3	48.2	
		Fe	60.6K	1.2K	
		Hg	<LOD		
		Mn	1191	378	
		Ni	<LOD		
		Pb	<LOD		
		Rb	63.6	10.0	
		Sb	175.4	87.5	
		Se	<LOD		
		Sn	<LOD		
		Sr	584.4	23.7	
		Zn	53.0	33.7	

Table V-11

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN1396-1	black basalt projectile point	Ag	<LOD		unknown
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	241.7	130.1	
		Cu	82.3	34.6	
		Fe	28.5K	0.7K	
		Hg	<LOD		
		Mn	589.9	165.1	
		Ni	<LOD		
		Pb	<LOD		
		Rb	49.0	7.5	
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	483.4	18.3	
		Zn	86.9	28.2	

Table V-12

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN1398-1	black basalt graver-scraper	Ag	<LOD		unknown
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	1532	248	
		Cu	96.9	39.7	
		Fe	36.3K	0.8K	
		Hg	<LOD		
		Mn	659.5	207.1	
		Ni	<LOD		
		Pb	<LOD		
		Rb	45.8	7.7	
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	167.8	12.1	
		Zn	346.9	48.6	

Table V-13

Catalog #	Artifact	Element	Reading	± 1 σ	Suggested Provenance
5CN1400-2	obsidian flake	Ag	<LOD		unknown
		As	<LOD		
		Cd	<LOD		
		Co	<LOD		
		Cr	10.5K	0.6K	
		Cu	<LOD		
		Fe	30.4K	0.8K	
		Hg	<LOD		
		Mn	761.2	301.1	
		Ni	<LOD		
		Pb	<LOD		
		Rb	124.6	11.4	
		Sb	<LOD		
		Se	<LOD		
		Sn	<LOD		
		Sr	<LOD		
		Zn	99.9	30.5	

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