An Archaeological Survey of Selected Tracts in the Pawnee Buttes Region, Weld County, Colorado

by
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with a contribution by
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for the
Colorado State Board of Land Commissioners
Eaton, Colorado

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Abstract

During the 2012–2014 field seasons, an archaeological survey was conducted in dispersed portions of northeastern Colorado as part of the training available in the Program for Avocational Archaeological Certification (PAAC). The project thus depended heavily on the efforts of volunteers, most of whom are members of the Colorado Archaeological Society (CAS) already enrolled in PAAC, supervised and trained by the Assistant State Archaeologist from History Colorado. The inventory was completed on just under 1,500 acres of state trust lands in four separate tracts in the vicinity of the Pawnee Buttes in northern Weld County, Colorado. These four parcels cover a range of open grassland settings along four different drainages: Geary Creek, North Pawnee Creek, South Pawnee Creek, and Wild Horse Creek, all at elevations of 1,450–1,634 m (4,765–5,360 feet). This area was intensively surveyed in part to train the 46 PAAC volunteers in archaeological inventory and mapping methods, but also to gather data on the archaeological record of state-owned lands adjacent to Pawnee National Grasslands properties in a part of Weld County witnessing intensive oil and gas development in recent years.

As a result of the survey a total of 52 sites and 77 isolated finds (IFs) were recorded for the first time, and one other previously documented site was formally re-recorded. Both American Indian and non-Indian resources are well-represented in that total. Historic period non-Indian sites comprise a mix of artifact scatters, concentrated trash dumps, and domestic sites primarily related to ranching and farming, especially in the 1910–1935 period. The somewhat more common prehistoric sites are mainly open lithic scatters lacking diagnostic tools, but a majority of those containing diagnostics (solely projectile points; ceramics are absent) date to the Early Ceramic period. Limited evidence for more ancient Archaic and more recent Middle Ceramic period activity was found. Features on project area sites are not common but include artifact concentrations, ground depressions, and a few fire-cracked rock (FCR) concentrations. No spaced stone enclosures ("tipi rings") were encountered, although many such sites are known from the wider region.

Burial of archaeological materials is most likely to occur in alluvial deposits along the courses of the four main streams and their larger tributaries. However, sites on the rolling plains and hills above the drainages may also contain some shallow buried remains. Overall, human occupation of the project area has been less intense than in some nearby prairie settings, for a variety of factors. Still, four sites have been evaluated eligible for the National Register of Historic Places based solely on surface evidence, and 13 others are potentially eligible pending the availability of additional information such as from test excavations.

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History Colorado-Office of Archaeology and Historic Preservation

COLORADO CULTURAL RESOURCE SURVEY

Cultural Resource Survey Management Information Form

I. PROJECT SIZE

Total federal acres in project	0	Total federal acres surveyed	0
Total state acres in project	2,762.9	Total state acres surveyed	1,495.8
Total private acres in project	0	Total private acres surveyed	0
Total other acres in project	0	Total other acres surveyed	0

II. PROJECT LOCATION

County: Weld

USGS Quad Maps: Buckingham, Grover SE, Hereford SE, Raymer NW, Reno Reservoir (all 1997)

Principal Meridian: 6th

Township	8N	Range	59W	Section	36	SE	¼	&	SW	¼	&	NW	¼				¼
Township	10N	Range	59W	Section	16	SE	¼	&	SW	¼	&	NW	¼	&	NE		¼
Township	10N	Range	60W	Section	36	SE	¼	&	NE	¼	&	NW	¼				¼
Township	10N	Range	63W	Section	14	SW	¼	of	SW	¼			¼				¼
Township	10N	Range	63W	Section	15	NE	¼	of	NE	¼	&	SE	¼	of	SE		¼
Township	10N	Range	63W	Section	23	SE	¼	&	NE	¼	&	NW	¼	&	SW		¼
Township	10N	Range	63W	Section	26	NE	¼	of	NE	¼			¼				¼
Township	10N	Range	63W	Section	36	NE	¼	of	SE	¼	&	SE	¼	of	SE		¼

III. SITES

Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
	Prehistoric	Historic	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to a District	No Further Work	Preserve / Avoid	Monitor	Test	Excavate	Archival Research	Other
5WL1239	×				×					×		×			×
5WL7174	×	×				×			×						
5WL7175	×					×			×						
5WL7176	×		×			×			×						
5WL7177	×					×			×						

IV. ISOLATED FINDS

Smithsonian Number	Resource Type			
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5WL7187	×			
5WL7188	×			
5WL7189	×			
5WL7190	×			
5WL7191	×			

Smithsonian Number	Resource Type			
	Prehistoric	Historic	Paleontological	Unknown
5WL7192	×			
5WL7193	×			
5WL7194	×			
5WL7195	×			
5WL7196	×			

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III. SITES

Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
	Prehistoric	Historic	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to a District	No Further Work	Preserve / Avoid	Monitor	Test	Excavate	Archival Research	Other
5WL7178	×					×			×						
5WL7179		×				×			×						
5WL7180	×					×			×						
5WL7181	×					×			×						
5WL7182	×	×				×			×						
5WL7183	×						×			×		×			
5WL7184		×				×			×						
5WL7185	×					×			×						
5WL7186	×	×				×			×						
5WL7201	×						×			×		×			
5WL7202	×					×			×						
5WL7203	×					×			×						
5WL7204	×					×			×						
5WL7205	×	×				×			×						
5WL7206	×						×			×		×			×
5WL7207	×						×			×		×			×
5WL7208	×						×			×		×			
5WL7209	×					×			×						
5WL7210	×						×			×		×			
5WL7211	×					×			×						

IV. ISOLATED FINDS

Smithsonian Number	Resource Type			
	Prehistoric	Historic	Paleontological	Unknown
5WL7197	×			
5WL7198	×			
5WL7199	×			
5WL7200		×		
5WL7213	×			
5WL7214	×			
5WL7215	×			
5WL7216	×			
5WL7217	×			
5WL7218	×			

Smithsonian Number	Resource Type			
	Prehistoric	Historic	Paleontological	Unknown
5WL7389		×		
5WL7390	×			
5WL7392	×			
5WL7393	×			
5WL7394		×		
5WL7395	×			
5WL7396		×		
5WL7397	×			
5WL7398	×	×		
5WL7399	×			

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III. SITES

Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
	Prehistoric	Historic	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to a District	No Further Work	Preserve / Avoid	Monitor	Test	Excavate	Archival Research	Other
5WL7212	×				×					×		×			×
5WL7374	×	×					×			×		×			
5WL7375	×						×			×		×			
5WL7376	×	×				×			×						
5WL7377	×					×			×						
5WL7378	×					×			×						
5WL7379		×				×			×						
5WL7380	×					×			×						
5WL7381	×					×			×						
5WL7382	×					×			×						
5WL7383	×					×			×						
5WL7384	×					×			×						
5WL7385	×						×			×		×			
5WL7386		×				×			×						
5WL7387	×	×				×			×						
5WL7388	×	×					×			×		×			
5WL7647	×	×	×		×					×		×			
5WL7648	×	×				×			×						
5WL7665	×						×			×		×			
5WL7666	×	×			×					×		×			

IV. ISOLATED FINDS

Smithsonian Number	Resource Type			
	Prehistoric	Historic	Paleontological	Unknown
5WL7400	×			
5WL7401	×			
5WL7402	×			
5WL7403	×			
5WL7404		×		
5WL7405	×			
5WL7406	×	×		
5WL7407	×			
5WL7408	×			
5WL7409	×			

Smithsonian Number	Resource Type			
	Prehistoric	Historic	Paleontological	Unknown
5WL7410	×			
5WL7411	×			
5WL7649	×			
5WL7650		×		
5WL7651		×		
5WL7652		×		
5WL7653	×			
5WL7654	×			
5WL7655	×			
5WL7656		×		

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III. SITES

Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
	Prehistoric	Historic	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to a District	No Further Work	Preserve / Avoid	Monitor	Test	Excavate	Archival Research	Other
5WL7667	×	×				×			×						
5WL7679		×				×			×						
5WL7680	×	×				×			×						
5WL7681		×	×			×			×						
5WL7682		×				×			×						
5WL7683	×					×			×						
5WL7684	×						×			×		×			
5WL7685	×	×					×			×		×			

IV. ISOLATED FINDS

Smithsonian Number	Resource Type			
	Prehistoric	Historic	Paleontological	Unknown
5WL7657	×			
5WL7658		×		
5WL7660		×		
5WL7661	×			
5WL7662		×		
5WL7663	×			
5WL7664	×			
5WL7668		×		
5WL7669		×		
5WL7670		×		
5WL7671		×		
5WL7672		×		
5WL7673		×		

Smithsonian Number	Resource Type			
	Prehistoric	Historic	Paleontological	Unknown
5WL7674		×		
5WL7675		×		
5WL7676		×		
5WL7677		×		
5WL7678		×		
5WL7686	×	×		
5WL7687		×		
5WL7688		×		
5WL7689	×			
5WL7690		×		
5WL7691	×			
5WL7692	×			
5WL7693	×			
5WL7694	×			

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Acknowledgments

As with all PAAC projects, the successful completion of the survey reported herein was primarily due to the field efforts of our 46 PAAC volunteers, all identified in the Introduction below. Their endless enthusiasm, patience, and determination are to their great credit. Permission to survey the trust land parcels was generously granted by the State Board of Land Commissioners (SBLC) represented by North Central district manager Matt Pollart, and by the five lease-holders for these properties. The latter include Dana Bowman (Crow Valley Livestock Cooperative, Eaton, CO), Jim Konig (Konig Ranch, Grover, CO), Eugene Nelson (Nelson Ranches, Grover, CO), Robert Rohn (Grover, CO), and Jim Walker (New Raymer, CO). The help of Jeri Leingang, assistant district manager with the SBLC, is also much appreciated.

Many thanks are due to archaeologist Larry Fullenkamp of the USDA Forest Service in Fort Collins, who made available group camping space at Crow Valley campground, and who also provided several opportunities for our volunteers to help with site evaluations at a number of significant archaeological sites on the Pawnee National Grasslands. Several PAAC volunteers provided project assistance in different ways. Kate Buckman, Kim Field, and Rae Todd donated a large number of photographs they took during their time on the project. OAHP staff members Katie Arntzen, Stephanie Boktor, Robert Cronk, Aaron Theis, and Anne Winslow served as crew chiefs at various times, finished isolated find (IF) forms, and guided their crew volunteers through the completion of project site forms. Stephanie, Bob, and Anne also were especially helpful in producing the GIS maps, and Aaron led the effort to apply the CSU predictive model to the project area.

Numerous PAAC volunteers also helped with lab analysis of the project artifact collection, notably Stephanie Boktor, Murlin Bull, Rosi Dennett, Mary Ann Gabriel, Jamie Kolberg, Joe Lantz, Jerry LaVelle, Terry Lee, Jean Osborn, Cory Phillips, and Debbie Smith. Paleontologist Richard Stucky of the Denver Museum of Nature and Science identified the fossil bone from 5WL7176. Special thanks go to former state archaeologist Richard Wilshusen for his support on the project, and with his field assistance on the survey and in camp. Kudos to all for their assistance on the project, as well as to those inadvertently omitted from this list.

Introduction

Since 1991, the Office of the State Archaeologist of Colorado (OSAC) has annually sponsored an avocational training survey for volunteers in the Program for Avocational Archaeological Certification (PAAC; Hand 1983). Most volunteers are members of the Colorado Archaeological Society (CAS), who receive credit toward the certification requirements in PAAC as a result of their participation on the survey. During the three field seasons of 2012–2014, the PAAC Summer Training Survey was conducted in four separate tracts near the Pawnee Buttes on the plains of northern Weld County (Figure 1). All four parcels are state-owned lands administered by the Colorado State Board of Land Commissioners, and all are leased for stock grazing. Although the area of state-owned lands in the surveyed sections totals about 1,118 ha (2,762.9 ac), the training survey covered just over 54% of those lands in a non-random sample of approx. 605.3 ha (1,495.8 ac). Specific legal locations of the project area parcels are listed in Table 1; all are within the 6th P.M.

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. As with previous PAAC inventories (see Black 1992, 1994, 1995, 1997, 2000, 2003, 2004, 2007, 2008, 2013a), the primary motivation for the Pawnee Buttes Survey (hereafter PBS) was to provide training in archaeological surveying and mapping techniques to PAAC volunteers. In addition, since surveys on state lands can only be recommended—not required—in advance of land disturbing activities, OSAC has an interest in gathering baseline archaeological data on state-owned parcels surrounded by federally-managed grasslands where extensive surveys have been conducted in the recent period of intensive oil and gas development. Surveys on state lands also help OSAC meet one of its statutory duties (C.R.S. 24-80-405(d); see http://www.historycolorado.org/sites/default/files/files/OAHP/_crforms_edumat/pdfs/1308a.pdf). Finally, the development of a predictive settlement model of wickiup and tipi ring sites in northern Colorado at Colorado State University by Sibold and Temirbekov (2012) provided an opportunity for testing its effectiveness with new data.

Forty-six volunteers participated during the three field seasons, conducted in five sessions totaling 23 days of field work that represents 200.5 person-days by the crew chiefs and volunteers. The 46 participating volunteers include 41 people affiliated with seven different chapters of the Colorado Archaeological Society (CAS), and all received PAAC credit for their efforts. By CAS chapter affiliation, these crew members are Cheryl Ames, Craig Bannister, Linda Bull, Murlin Bull, Kim Field, Bill Haddock, Ann Holloway, and Bruce Holloway, (all of the Denver chapter); Joe Lantz

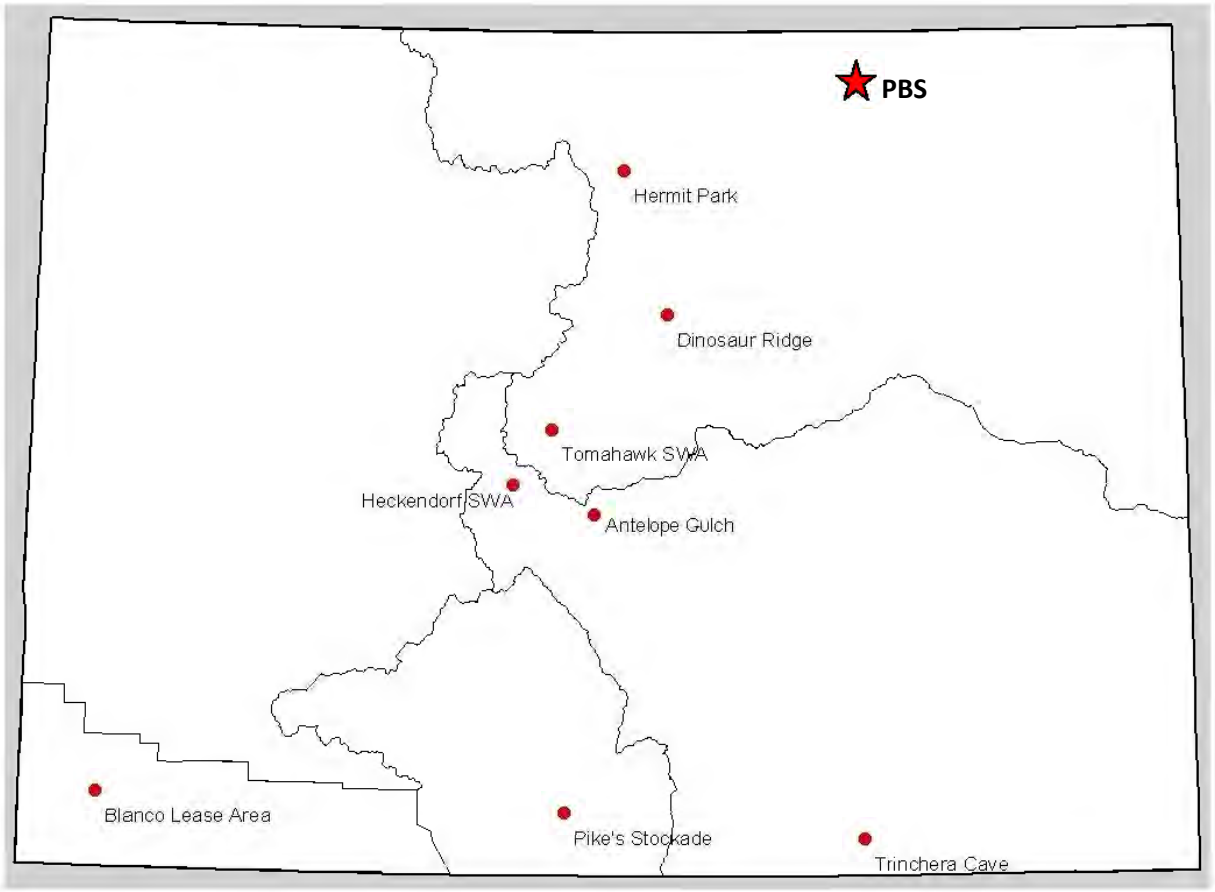

Figure 1. Map of Colorado showing the location of the Pawnee Buttes Survey area (PBS) and previous PAAC Training Surveys in relation to the boundaries of major river drainage basins.

Parcel Name	South Pawnee Creek	Wild Horse Creek	North Pawnee Creek	Geary Creek
Township	8N	10N	10N	10N
Range	59W	60W	59W	63W
Section(s)	36	36	16	14, 15, 23, 26, 36
Topographic Map(s) – 7½'	Buckingham, Raymer NW	Grover SE	Pawnee Buttes	Hereford SE, Reno Reservoir
State-Owned Land Area	625.9	565.8	613	958.2
Surveyed Land Area	441.4	335.5	161.4	557.5
Survey Dates	June 12–19, 2012; May 4–6, 8, 22–24, 2013	June 12–20, 2012; May 4–6, 2013	May 8, 22–24, 2013; June 10–12, 14, 20–21, 2014	June 10–12, 14, 20–22, 2014

Table 1. Pawnee Buttes Survey parcel details.

(Hisatsinom chapter, Montezuma County); Gretchen Acharya, Robert Barron, Kate Buckman, Rosi Dennett, Kris Holien, Katherine McComb, Joan Prebish, Kristin Putnam, Noah Putnam, Debbie Smith, and John Wilson (from the Indian Peaks chapter, Boulder County); Lucy Burris, David Heath, Earl Hughes, Julie Julison, Maria Orms, Rae Todd, and Diana Wess (with the Northern Colorado chapter, Fort Collins-Greeley-Loveland); Debbie Bloch, Peggy Colgate, Patrice Grimmnitz, Jerry LaVelle, Laurie Lee, Terry Lee, and Pamela Owens (from the Pikes Peak chapter, Colorado Springs); Carla Hendrickson, Dennis Schiferl, Wendy Schiferl, and Susan Simons (with the Pueblo chapter); Larry Scarbrough, Cynthia Vodopich, and Mark Vodopich (with the recently disbanded Roaring Fork Valley chapter, Eagle-Garfield-Pitkin Counties); and unaffiliated volunteers Stephanie Boktor (OAHP-Denver), Daniel Braisted-Horton (Boulder), Sarah Foster (Arvada), Kiel Pickett (Englewood), and Anna Troth (Aurora).

Seven of these volunteers (Gretchen Acharya, Kate Buckman, Kris Holien, Joe Lantz, Laurie Lee, Terry Lee, and Rae Todd) have earned 11 total PAAC certificates as a direct result of their field training or follow-up lab work, and several others are quite close to achieving certificates as well.

As listed in Table 1, the four parcels targeted in the PBS vary in size and are spread across an area stretching 32.2 km E-W × 25.75 km N-S (20 mi × 16 mi). Farthest to the southeast is the South Pawnee Creek tract, a state-owned "school section" located 7 km (4.35 mi) west-northwest of the village of New Raymer and 1.45 km (0.9 mi) north of State Highway 14. This section straddles its namesake creek, and about 70.5% of its area was covered during the PBS (Figure 2). As of the time of our survey, the lease holder for grazing rights with the State Board of Land Commissioners (SBLC) is Jim Walker of New Raymer (AG Lease No. 46017).

Almost due north of Mr. Walker's leased section is the North Pawnee Creek tract, likewise a state-owned school section and quite close to the Pawnee Buttes landforms, some 20.6 km (12.8 mi) east-southeast of the village of Grover and adjacent to the west of the privately owned Nelson Ranch that leases this property. North Pawnee Creek just barely passes through the northeast corner of this parcel near the Nelson Ranch, while the Pawnee Buttes rise from the prairie just 1 km (0.6 mi) beyond the southeast corner of the section. Our crews surveyed 26% of the state-owned section (Figure 3) which, as noted above, is leased by the SBLC for grazing to Nelson Ranches, Inc. % Eugene Nelson (AG Lease No. 46124).

A short distance to the southwest—about 6.6 km (4.1 mi center-to-center)—is a 2nd part of the Nelson Ranches' lease No. 46124, the Wild Horse Creek tract. This is yet another state-owned "school section" in the adjacent township about 5 km (3.1

mi) southwest of the Pawnee Buttes. This section is positioned between two south-flowing drainages, Wild Horse Creek to the west and an unnamed creek to the east; about 59% of its area was inventoried during the PBS (Figure 4). In addition to the Nelson Ranches' lease, a portion of this section is also leased for grazing to Robert Rohn of Grover (AG Lease No. 45271).

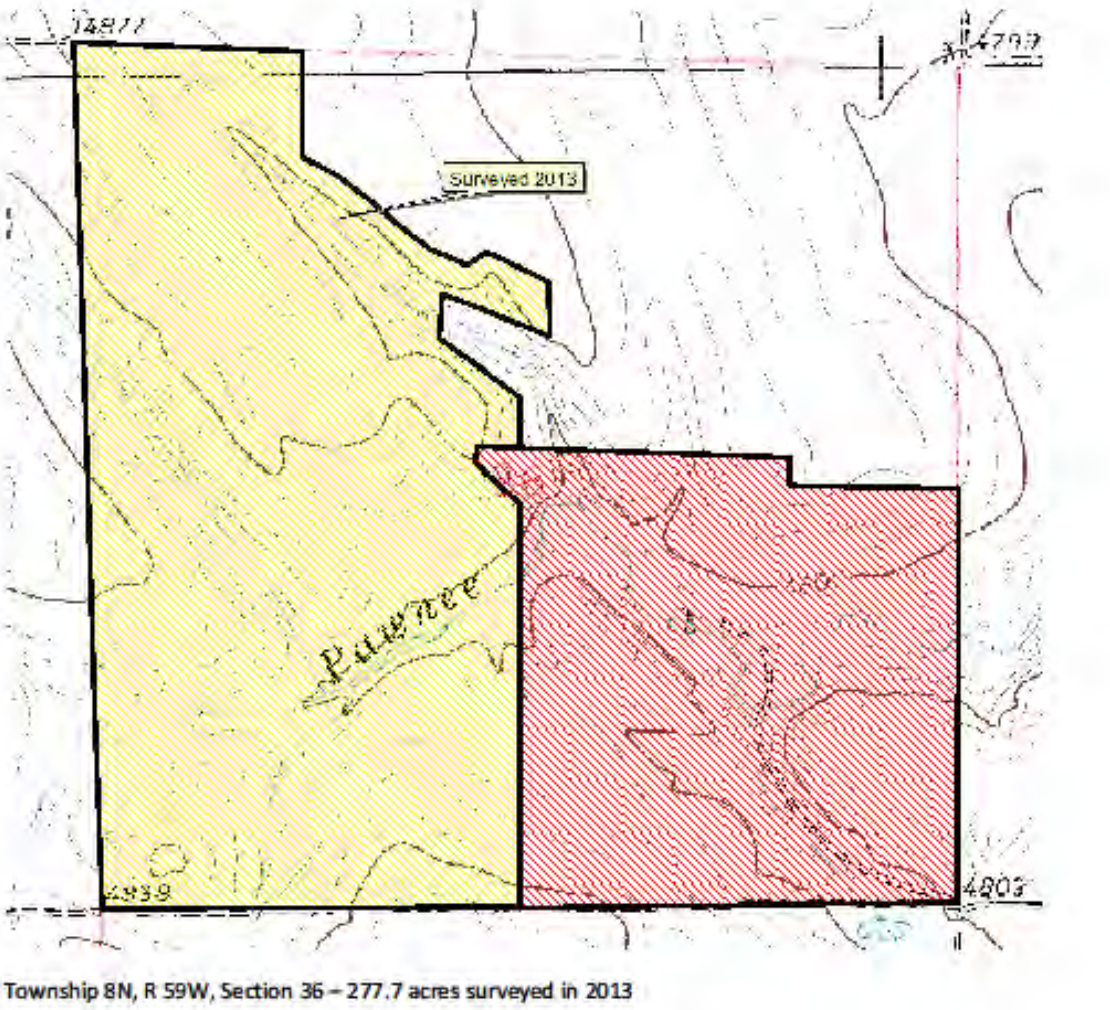

Figure 2. Portion of the Buckingham and Raymer NW 7½′ topographic maps (USGS 1997) showing areas of the South Pawnee Creek parcel surveyed in 2012 (red hatched zone) and 2013 (yellow hatched zone).

The most extensive parcel of the project is the Geary Creek tract, a northwest-to-southeast oriented area covering portions of seven sections, of which the PBS

inventory covered about 58% of the total area in five of those sections (Figures 5–6). This area is located 15.3 km (9.5 mi) southwest of Grover, a short distance west of Weld County Road 77. Geary Creek meanders in a southeast direction through the parcel. Three leases for grazing with the SBLC cover various parts of the tract, held by Dana Bowman (individually and as Crow Valley Livestock, AG Leases No. 45992 and 46806), and Jim Konig, Konig Ranch (AG Lease No. 46166).

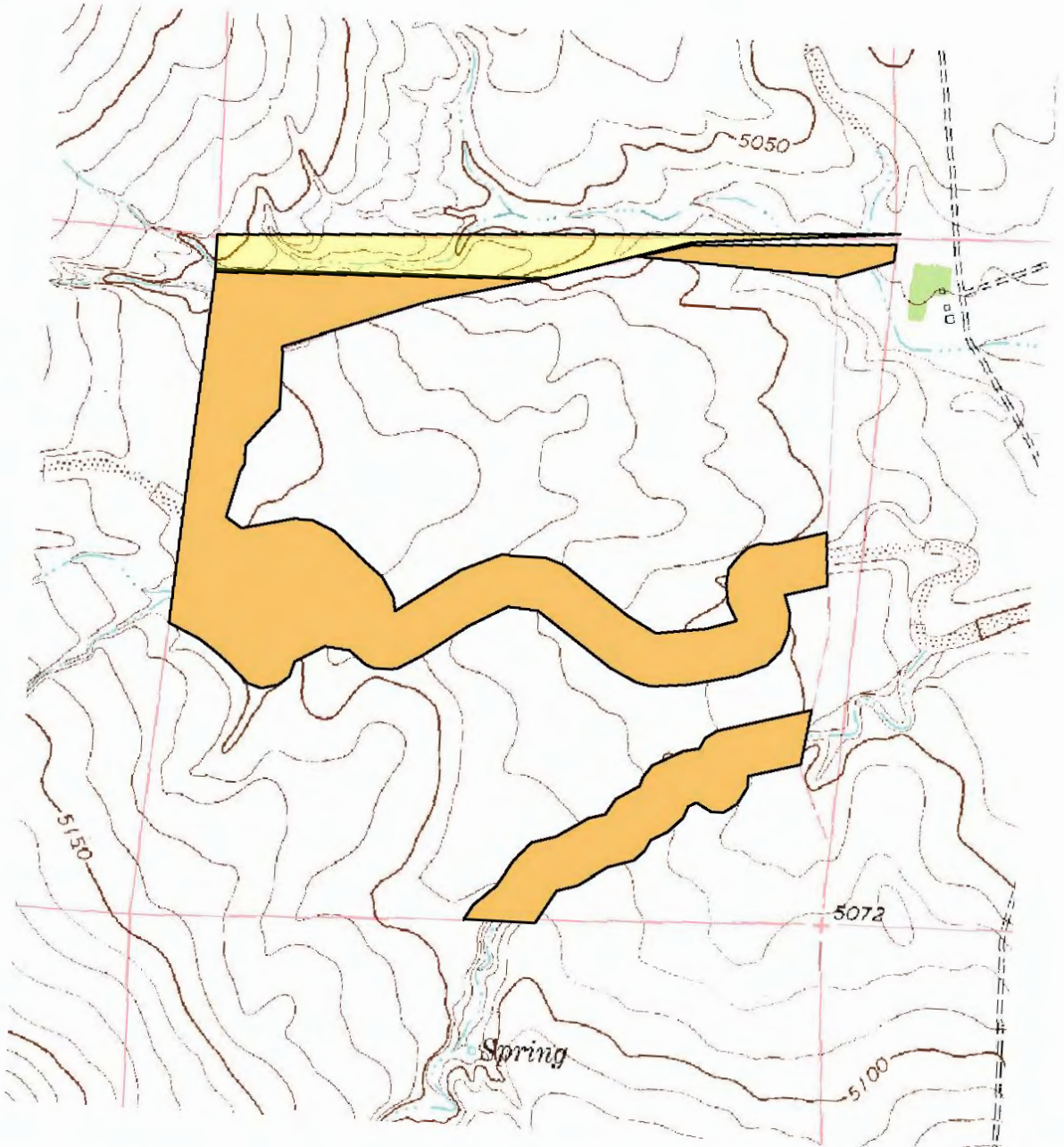

Figure 3. Portion of the Pawnee Buttes 7½′ topographic map (USGS 1997) showing areas of the North Pawnee Creek parcel surveyed in 2013 (yellow zone) and 2014 (orange zones).

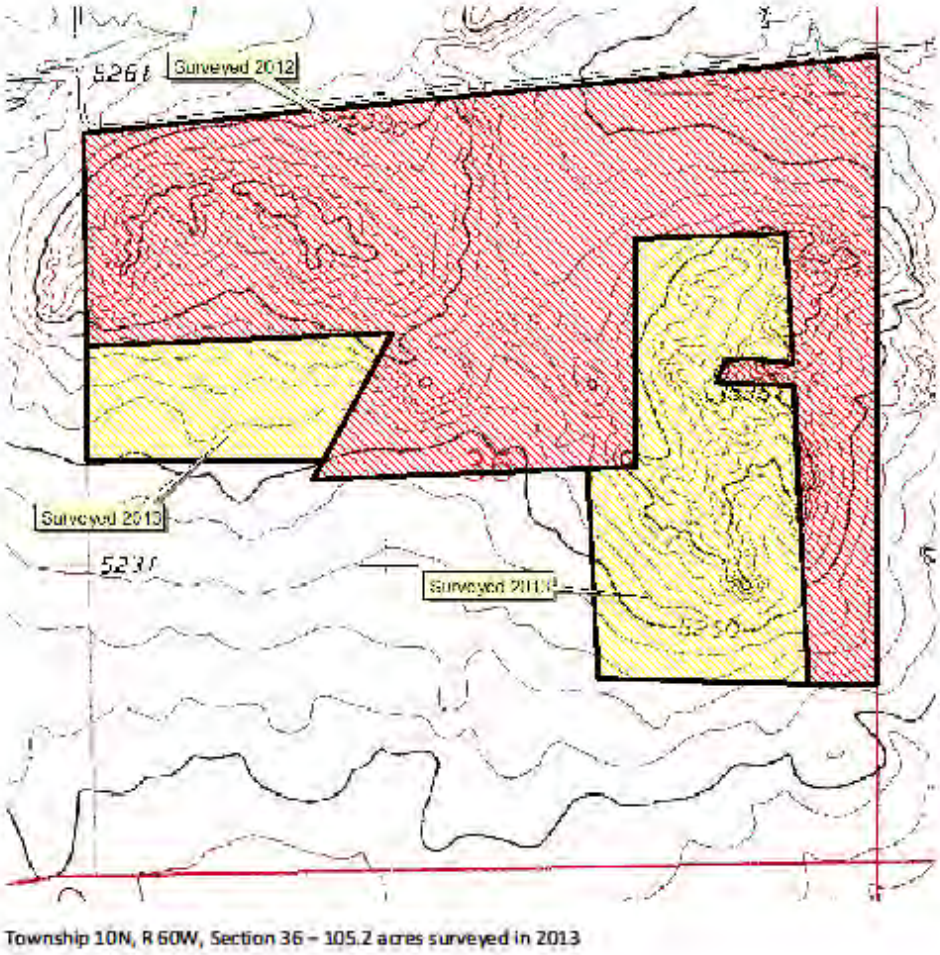

Figure 4. Portion of the Grover SE 7½′ topographic map (USGS 1997) showing areas of the Wild Horse Creek parcel surveyed in 2012 (pink hatched zone) and 2013 (yellow zone).

Effective Environment

Physiography and Topography

The PBS is located in northeastern Colorado within the Colorado Piedmont section of the Great Plains physiographic province (Thornbury 1965:310–313). Specifically, the project area parcels are spread across the plains of north-central and northeastern Weld County, about 60–100 km (37–62 mi) east of the foothills of the

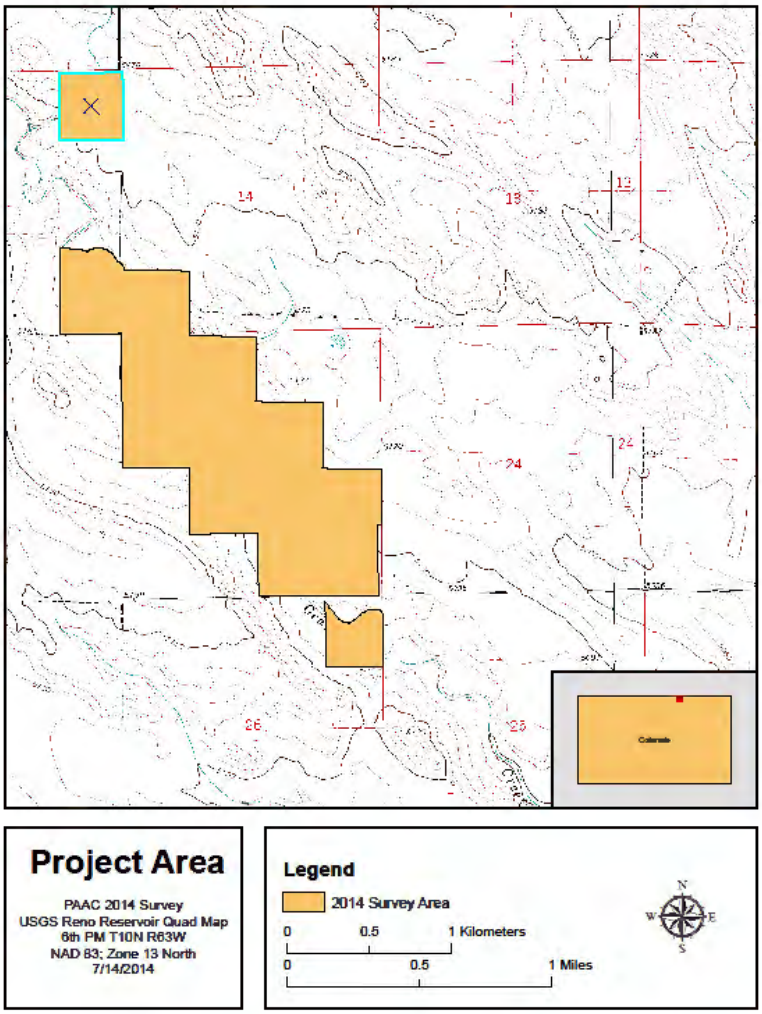

Figure 5. Portion of the Reno Reservoir 7½′ topographic map (USGS 1997) showing areas of the Geary Creek parcel surveyed in 2014.

Front Range of Southern Rocky Mountains. Immediately north of the Wild Horse Creek parcel and west of the North Pawnee Creek parcel is the escarpment named the "Chalk Bluffs," representing the southern edge of the High Plains section of the Great Plains (see Figure 28; Thornbury 1965:300–309). The high surface above the Bluffs—topping out at just under 1,685 m (5,523 ft) in elevation—is the site of an extensive wind farm, and the crests of the Pawnee Buttes are eroding remnants of that same surface, now 45 m lower than the nearby High Plains surface.

Locally, the terrain is dominated by gently rolling plains bordering the drainage systems in each parcel. However, all of the parcels display distinctive topographic features. In the South Pawnee Creek parcel, sandstone outcrops occur as ledges and low cliffs bordering the east-flowing creek, above which are nearly unbroken rolling

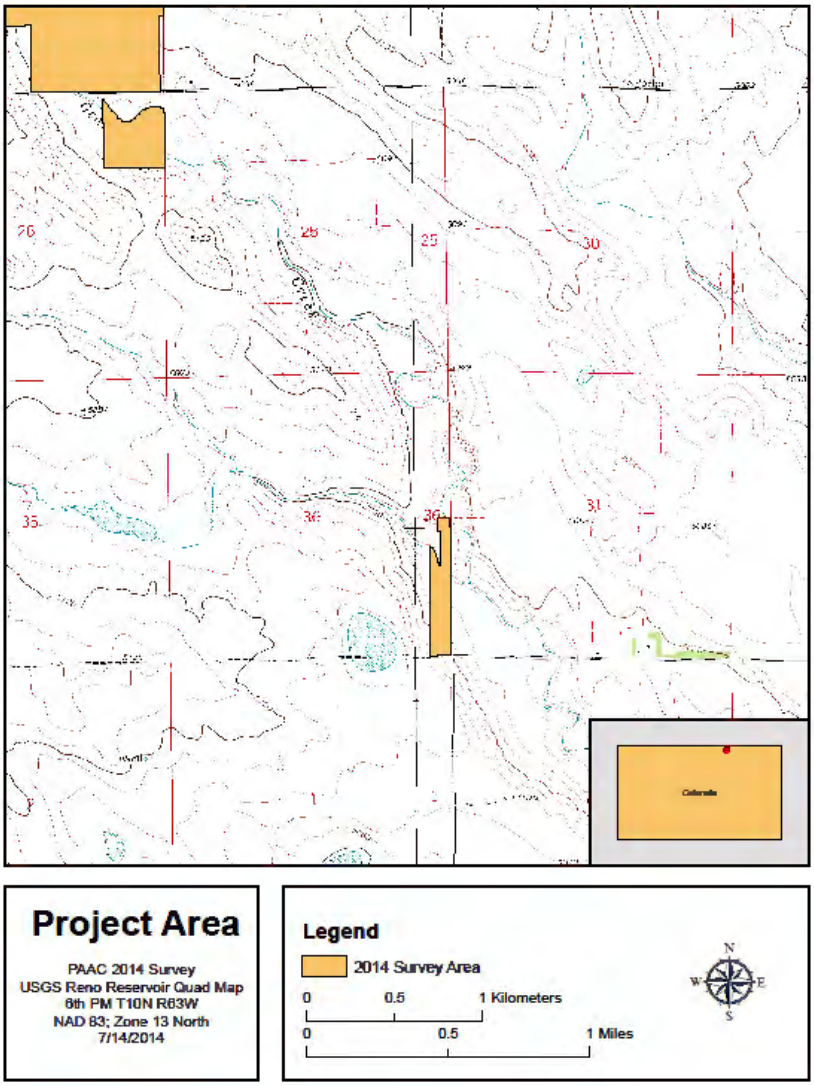

Figure 6. Portions of the Reno Reservoir and Hereford SE 7½′ topographic maps (USGS 1997) showing southernmost areas of the Geary Creek parcel surveyed in 2014.

plains. East of the Chalk Bluffs and north of the Pawnee Buttes, the North Pawnee Creek parcel is dissected by deeply incised east-flowing drainages along its northern border with heavily eroding margins resulting in a landscape of "badlands" character. Two other incised drainges meander through the central and southeastern part of the section, but with less drastic erosive effects.

Not far to the southwest, and south of the Chalk Bluffs, the Wild Horse Creek parcel contains two hill complexes that rise well above the surrounding prairie. One is

in the northwestern quarter of the section, is elongated on an east-west axis, and has a narrow, gravelly crest. The second hill complex is oriented more north-south, situated in the east-central part of the section, and has a more extensive crest with a denser grass cover. Finally, the Geary Creek area is well to the west of the Chalk Bluffs and, being closest to the mountain front, has more gravelly topsoils above the drainages that represent outwash materials derived from those mountains. Geary Creek and its tributaries have rather well developed terraces, and the gently rolling prairie topography above the drainages is a consistent feature along the 7.4 km (4.6 mi) length of the parcel. The total elevation range within the surveyed areas is 1,450–1,634 m (4,765–5,360 feet); the lowest point is where South Pawnee Creek exits the east edge of its parcel, and the highest is on the crest of the northwestern hill complex in the Wild Horse Creek section.

Geology and Geoarchaeology

The geological record for this portion of northeastern Colorado, unfortunately, has not yet been mapped at the 7.5′ scale (1:24,000); only more general 1° × 2° scale (1:250,000) geological maps are available (Braddock and Cole 1978; Scott 1978). That said, exposures of bedrock formations are quite limited in the four surveyed parcels, being almost entirely absent from three of the four and present in only restricted portions of the South Pawnee Creek parcel. There, small outcrops of Fox Hills sandstone (Upper Cretaceous) occur as ledges and low cliffs bordering South Pawnee Creek, above which are the nearly unbroken rolling plains developed on Oligocene sedimentary beds of the White River Group (Brule and Chadron formations, most likely the latter).

To the north in the Wild Horse Creek and North Pawnee Creek parcels, the White River Group formations are mapped over the entirety of the sections, but bedrock exposures are limited. East of Wild Horse Creek, Historic period quarrying has penetrated to bedrock at site 5WL7205. Notably, the higher crests of hills and ridges in this parcel are mantled by gravel deposits of diverse mineralogies, including a few knappable silicate rocks (Figure 7). Some erosion-resistant ledges also contain glossy white chert and gray to pink chalcedony that was utilized for toolstone in small amounts. Kornfeld et al. (2007:258, 262), citing Wheat (1979:127), mention a "Holiday Springs chert" or moss agate that derives from the same geological context in this region. A few miles to the northeast, the prairie within the North Pawnee Creek parcel is dissected by three drainages, the deepest of which flows eastward along the north edge of the section, exposing some White River Group beds in eroding badlands fashion. Many fossil-bearing localities have been documented in this general area (e.g., Prothero and Emry 2004; Stucky 2007).

Figure 7. Lithic raw material samples collected at 5WL7205. At left is a mottled, dendritic pink-brown chalcedony or moss agate (5WL7205-2) and on the right is a very lustrous white chert (5WL7205-3). The moss agate may be the "Holiday Springs chert" material described by Kornfeld et al. (2007:262) and Wheat (1979:127).

More extensive White River Group beds are visible on the nearby lower slopes of both the Pawnee Buttes and the Chalk Bluffs (see Figures 9 and 28). As noted previously, the Chalk Bluffs mark the physiographic boundary between the High Plains to the north and the Colorado Piedmont section within which all four of the PBS parcels are located. The upper cliffs of the Chalk Bluffs and the remnant cap rock on the Pawnee Buttes are formed by resistant beds of the Ogallala formation (Miocene). These are limestones and "mortar beds" of consolidated sands and silts cemented by calcium carbonate or opal (Scott 1978). Volcanic ash beds and unconsolidated gravels, silts and sands also occur in the Ogallala.

Finally, the Geary Creek parcel southwest of Grover is characterized by very subdued terrain with mostly well-vegetated rolling hills and terraces along the creek. No significant bedrock exposures are present, but Braddock and Cole (1978) map the area in the White River Group in the most northerly part of the parcel and in the Laramie formation (Upper Cretaceous) in the bulk of the parcel to the southeast. The mapped boundary between those two units is roughly at Weld County Road 116. The

Laramie contains carbonaceous shale and kaolinitic claystone, but throughout the parcel gravel deposits are commonly encountered at the surface. Toolstone quality silicate rocks have been recorded in the vicinity, but no significant lithic sources were encountered on our survey here.

Soils and Vegetation

Soil development in the PBS has been mapped and reported by Crabb (1982), and similar, updated data are also readily available on-line via the USDA Natural Resources Conservation Service's (NRCS) Web Soil Survey at http://websoilsurvey.sc.egov.usda.govApp/HomePage.htm. As one might expect given the distances between the four surveyed parcels, soils within the PBS areas are quite variable in development, texture and thickness; classifications are in the Aridisol, Entisol (most common) and Mollisol soil types. In the South Pawnee Creek parcel alone, nine different soil map units have been identified. Olney fine sandy loams cover the most acreage within the parcel, occurring on ridges, gentle slopes and terraces. They are deep, well-drained soils developed in calcareous loamy alluvium. Olney topsoils average 10–15 cm (4–6 in) thick, and depth to bedrock can be 150 cm (60 in) or more. Deeper topsoils are found in more mesic settings, such as in the Haverson loams found on terraces and the floodplain along South Pawnee Creek. Surface soils here are commonly 30 cm (12 in) thick, and depth to bedrock is also at least 150 cm (60 in).

To the northwest in the Wild Horse Creek parcel, the extensive prairie flats below the two prominent hill complexes are mapped in the Ascalon fine sandy loam. Ascalon soils are described as deep and well-drained, developed in calcareous loamy alluvium. Topsoils average 15–20 cm (6–8 in) thick, and depth to bedrock is 150 cm (60 in) or more. As in the South Pawnee Creek parcel, Haverson loams are also found on terraces and floodplains of the drainages here. An arroyo cutbank at site 5WL7207 exhibits a typical profile, shown in Figure 8. The upper slopes and shoulders of the two hill complexes are classified in the Peetz gravelly sandy loams, and the hill crests have Altvan sandy loams. Surface soils here are 8–20 cm (3–8 in) thick, and depth to bedrock is also at least 150 cm (60 in).

There is some overlap in the soil types mapped in the North Pawnee Creek parcel compared to the Wild Horse Creek area, particularly in the north central portion of the North Pawnee Creek area where Ascalon fine sandy loam is prevalent. But soils in the Kim-Mitchell complex cover nearly half the parcel, including much of the southern part of the section. These are deep, well-drained, moderately permeable soils developed in calcareous loamy alluvium and colluvium. Topsoils are 8–18 cm (3–7 in) thick loams and silt loams atop rocky C horizons. West of the Nelson Ranch on the south side of the deeply incised tributary of North Pawnee Creek, and in scattered

patches elsewhere in the parcel, shallow Epping silt loams have developed over siltstone bedrock. These are residual soils with thin (8 cm) topsoils and calcareous subsoils to an average depth of 43 cm (17 in). The prairie margins of the less deeply incised drainage that meanders eastward through the middle of the parcel is largely mantled by Bankard loamy fine sands. These more permeable soils developed in stratified calcareous alluvium, and have less rocky topsoils about 23 cm (9 in) thick.

Figure 8. Haverson loam soil profile exposed in an arroyo cutbank at 5WL7207 in the Wild Horse Creek parcel, after clearing of surface debris.

In the extensive parcel along Geary Creek, three soil units described above are mapped over at least 70% of this area. Ascalon fine sandy loams are on the gently rolling prairie above the creek, while both Haverson loams and Olney fine sandy loams occur on the terrace and floodplain soils of Geary Creek and its tributaries.

As one might expect, the short-grass prairie vegetation community prevails throughout the survey area. Rather than repeat the well-known laundry list of common prairie plants, which is readily available in resources such as McGregor

(1986), Mutel and Emerick (1992), and USDA Pawnee National Grasslands (2010, 2012), notable variations in the prairie landscape within the PBS parcels will be highlighted. More generally speaking, in all four parcels riparian grasses, sedges, and a few shrubs line the larger drainages cut into the rolling plains. None of the project area drainages carry enough water to support cottonwood trees or significant shrubby growth such as willows. The more heavily grazed sections allow prickly pear cactus to thrive in more extensive patches, and the effects of prairie dog colonies on prairie vegetation are most evident in the North Pawnee Creek and South Pawnee Creek parcels.

Also, radical annual variations in both prairie and stream-side vegetation growth occurred even though our "sample" of observations was limited to only three consecutive years. The bookend field seasons of 2012 and 2014 could not have been more different in weather patterns, from the extreme heat and drought conditions endured in June 2012 after an equally dry late winter-spring, to the lush growth seen in June 2014 following prolonged snow and rain. Figures 9 and 10 illustrate this remarkable difference in prairie vegetation near the Pawnee Buttes in the North Pawnee Creek parcel with photos taken almost exactly two years apart. Survey in the intervening season of 2013 took place in the month of May when spring warmth had not yet taken hold and the prairie was just beginning to emerge from winter dormancy.

In the South Pawnee Creek parcel, the low riparian growth along the creek and its larger tributaries is the most distinctive difference from the surrounding prairie. Heavily eroded plains with more barren ground are limited to the southeast corner of the parcel. The upper slopes and crests of the two high hill complexes in the Wild Horse Creek parcel are deflated and very gravelly with a sparser grass cover and numerous patches of prickly pear and yucca. These areas contrast sharply with adjacent dense, tall grasses in the swale between the hills extending into the small drainage near the northeast corner of the parcel. The effects of cattle grazing are much more apparent in the south half of this section, in no small part due to the attraction of a stock tank there. The adjacent Pawnee National Grasslands terrain is likewise heavily grazed, as evident in Figure 11.

West of the Nelson Ranch in the North Pawnee Creek parcel, the deeply incised tributary of the creek has fostered extensive erosion of the drainage margins resulting in very extensive badlands terrain with a sparse grass and forb cover (see Figure 28). This includes unusually common clumps of tufted sandwort among other low forbs that thrive in such conditions. In the southern half of the parcel, the wet 2014 year's prolific growth included needle-and-thread grass that grew thigh high in certain areas (Figure 10). To the west along Geary Creek, riparian grasses and sedges prevail in a

broader floodplain, with relatively little variation in the priaire cover on adjacent terraces and plains. The main differences are on the more gravelly plains areas in the southeastern part of the parcel having sparser grasses and more abundant prickly pear.

Figure 9. South view of the Pawnee Buttes during the drought conditions of 2012.

Fauna

As with vegetation patterns, the native animals of the short-grass prairie are well-documented in the literature (e.g., Fitzgerald et al. 1995; Mutel and Emerick 1992; USDA Pawnee National Grasslands 2006, 2010), and an extensive review is not warranted here. Most frequently observed during our survey were pronghorn along with occasional cottontail rabbits, jackrabbits, ground squirrels, prairie dogs, lesser earless lizards, short-horned lizards, western rattlesnakes, garter snakes, kit (swift) foxes, burrowing owls, and a wide range of other avifauna such as Colorado's state bird, the lark bunting. Past archaeological excavations in northeastern Colorado confirm the earlier presence of many of these species—especially the larger

artiodactyls, lagomorphs and rodents that constituted the preferred prey of human groups—along with a few others no longer roaming wild such as bison.

Figure 10. Southeast view of the Pawnee Buttes from the North Pawnee Creek parcel, after the wet spring of 2014. Needle-and-thread grass (foreground) and threadleaf yellowrays dominate the scene.

Climate

Climatic patterns for the PBS region can be extrapolated from data in neighboring towns and climate stations, of which four quite nicely bracket the surveyed PBS parcels: Briggsdale, Grover 10 W, Kauffman 4 SSE, and New Raymer. Table 2 is derived from records at these four stations (Western Regional Climate Center 2016), representing data collected over periods ranging from 52 to 78 years in length and in an elevation range of 1,458–1,600 m (4,783–5,250 ft). These data show that the PBS area averages between 13 and 15 inches (33–38 cm) of precipitation annually, within extremes ranging from a low of 5.24 inches in 1939 at the Grover 10 W station to a high of 24.44 inches in 1997 at New Raymer. The high plains surface atop the Chalk Bluffs where no climate stations exist is likely slightly wetter than this

on average, but not significantly so. Precipitation patterns are fairly consistent throughout the year with the winter months of December through February nearly equally dry and the months of May through July being the wettest. Temperatures likewise do not vary significantly between the four stations, with annual averages in the range of 47.3°–48.5° F (8.5°–9.2° C). Temperature extremes of -38° F (-39° C) at Briggsdale and 106° F (41° C) at both Briggsdale and Grover 10 W have been recorded.

Figure 11. At the north edge of the Wild Horse Creek parcel, differences in grazing intensity are evident between the Pawnee National Grasslands section to the left of the fence and the state trust land section on the right.

Growing season records also are available for these same four weather stations. The data show that growing season length at 32.5° F is 119–134 days ($p = 0.5$) within an extreme range of 71–171 days; at 28.5 ° F the ranges are 139–153 days ($p = 0.5$) within extremes of 109–192 days. A measure referred to as "corn growing degree days" is between 2984 and 3263 for these four localities. Since most varieties of corn require a minimum growing season length of 110–120 days, and a minimum of 2200–

2500 corn growing degree days, it is evident that the PBS area currently fits these agricultural requirements. However, the recovery of sparse maize macrofossils from just two prehistoric Weld County sites, Agate Bluff I and Three O'Clock Shelter (Gilmore 1999:236, 260), shows that crop production in past centuries was minimal. See Tate and Gilmore (1999:30–40) for a summary of paleoenvironmental data in the Platte River basin.

Table 2. Northeastern Colorado Climate Records

STATION	ELEV. (FEET)	YRS OF RECORD	ANNUAL TEMP. (°F)	RECORD TEMPS. °F (MIN-MAX)	ANNUAL SNOWFALL (INCHES)	ANNUAL PRECIP. (INCHES)
Briggsdale	4834'	64	48.4	-38 – 106	15.1	13.10
Grover 10 W	5090'	78	47.5	-32 – 106	33.2	13.54
Kauffman 4 SSE	5250'	52	47.3	-30 – 105	32.3	13.42
New Raymer	4783'	57	48.5	-32 – 105	34.4	14.84

Current land use practices in and around the PBS have focused on farming, ranching, and energy development. Cattle grazing in the project area is accomplished through leases on state trust lands, and both farming and ranching also have prevailed throughout the Historic period since the homesteading days of the mid-late 19th century. In recent decades, oil and gas exploration and production have dominated the local economy from time to time, including during the years of our survey when the business boomed. Artifact styles observed on Historic period sites, in combination with Weld County land records, indicate the farming and ranching tradition here originates in the late 1880s and 1890s, followed by a spurt of later settlement in the 1910s and 1920s (see historical summary below). Occasional recreational use of the area has focused on adjacent national grasslands parcels since the state trust lands are not open to general public use; hunting and bird-watching are among the popular activities on the surrounding grasslands. Fortunately, evidence of heavy site vandalism is absent in the four PBS parcels, albeit surface artifact collecting has undoubtedly occurred.

Environmental Constraints

Constraints on the quality of the survey were mainly of a minor and/or manageable nature. Ground visibility was generally good in the first two survey seasons, owing to drought conditions in 2012 and cold spring weather in 2013 that delayed the growth of the grasslands. Conversely, the wet spring of 2014 led to a lush floral landscape that compromised ground visibility in many areas (see Figure 10

above). The deep accumulation of alluvial sediments on the terraces of area creeks likely has buried some sites, although erosive forces have sufficiently cut into the slopes and margins of these landforms to expose some archaeological materials.

Cattle trampling of the surface was generally concentrated along established paths, except where such paths converged near stock tanks, stock ponds, and pooled water within the creeks. Populations of gnats, deer flies, and mosquitoes were never high enough during our survey to be more than a nuisance. Likewise, rattlesnakes were sparse enough that many days could pass without a single sighting. Relatively small amounts of survey or site recording time were lost due to rain, high winds, or excessive heat. The bustle of oil and gas activity in all three seasons was quite evident, with heavy traffic consequences on many local county roads, particularly around the North Pawnee Creek and Wild Horse Creek parcels. Well pads currently exist within both parcels, and the Wild Horse Creek area saw increased activity in late 2012 and 2013 with the drilling of a second well and installation of new pipelines in the southern third of the parcel.

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 on June 8, 2012 revealed only a few sites within any of the four the PBS parcel boundaries, but with several sites of interest nearby and many reports completed on various energy-related projects. A summary of these resources is provided in Table 3.

No sites or isolated finds (IFs) were previously documented within the South Pawnee Creek parcel, but several projects have been done in adjacent sections. Closest to the PBS section are a pair of archaeological resources recorded in the SW quarter of Section 25 during two separate surveys. Branton (2008) recorded historic IF 5WL5704 near the corner of the section during a survey in advance of prescribed burns. Overlapping with the IF location and covering the entirety of the quarter section, site 5WL6859 is a "contour furrow" agricultural water control resource dating to ca. 1920–1940, recorded during a very extensive survey of geophysical exploration corridors by Burnett et al. (2011). Their survey involved a total of nearly 6,400 ac and brought them in proximity to three of the four PBS parcels.

Two previous surveys covered southern portions of the Wild Horse Creek parcel, including that of Burnett et al. (2011), which found no sites or IFs. Likewise, Brechtel (2012) found nothing during a survey in the SW quarter of the parcel for a well pad and access road. Gleichman (2005, 2009) completed several miles of survey

on two pipeline corridors that passed through Section 35 immediately west of the PBS parcel, but found no cultural resources in that section. However, Burnett et al. (2011) recorded a Historic period homestead, 5WL6582, in the NE quarter of Section 35 about 400 m west of the boundary with the Wild Horse Creek parcel. This location is within lands acquired via a homestead patent in 1916.

Table 3. List of previously recorded sites and IFs within and adjacent to the four PBS parcels.

Site	Name	Type: Period(s)	NRHP Eligibility	Reference(s)
5WL1202	none	isolated chert flake: unknown prehistoric	not eligible	Grant (1987)
5WL1238	none	open camp: Folsom and unknown prehistoric	eligible	Jepson (1987a)
5WL1239	none	open camp: Early Ceramic period	eligible	Jepson (1987a); this report
5WL1623	none	farm buildings: Historic period	not eligible	Simmons and Simmons (1991)
5WL4187	none	open camp: unknown prehistoric	not eligible	Cason (2002); Kinneer et al. (2010)
5WL4341	none	isolated chalcedony flake: unknown prehistoric	not eligible	O'Brien et al. (2003)
5WL4872	Nelson Cody Complex site	open bison kill: Late Paleoindian period	potentially eligible	Cassells (1997); Kornfeld et al. (2007)
5WL5704	none	isolated trash cluster: Historic period	not eligible	Branton (2008)
5WL6002	none	isolated quartzite flakes: unknown prehistoric	not eligible	Branton et al. (2009)
5WL6582	none	isolated chert flake: unknown prehistoric; and Historic period homestead	not eligible	Burnett et al. (2011)
5WL6859	none	water control, contour furrow: Historic period	not eligible	Burnett et al. (2011)

In the North Pawnee Creek parcel, no sites or IFs have been previously recorded, nor have any previous surveys covered any part of this parcel. However, a portion of Sections 17, and 20–22 to the west and south of the parcel were among the many lands examined in the survey of Burnett et al. (2011), and three other inventories occurred near the Pawnee Buttes to the south of the parcel (Gleichman 1994; Grant 1992; Heid and Phillips 1995). The survey by Gleichman (1994) involved about 1000 ac around the Buttes, but none of the resources recorded on any of these three survey projects are within ½ mile (1 km) of the PBS parcel.

However, perhaps the most significant previously recorded site near here was not discovered during a formal inventory. The Nelson Cody Complex site, 5WL4872, was visited on separate occasions by Dennis Stanford and Marcel Kornfeld many years ago, but not formally reported until 2007 (see Cassells 1997:85; Kornfeld et al. 2007). Its exact location has not been defined in OAHP records because access to the site from the private landowner has been denied, but Kornfeld et al. (2007:258) place it 1.6 mi (2.6 km) northwest of the Pawnee Buttes, probably in the north half of Section 17 immediately west of the PBS parcel. From observations both on site and of materials in the possession of collectors, Stanford and Kornfeld examined 14 flaked stone artifacts and bison bone, probably from a winter season kill of at least five animals. They also obtained a late Paleoindian radiocarbon date on one of the bones of 9260 ± 20 BP (Kornfeld et al. 2007:273; cal 8571–8350 BC). It should be noted that this site is incorrectly identified with site number 5WN26 by Chenault (1999:71, 73, 77; Gilmore et al. 1999:A-2) in Washington County. That site is also called by the name Nelson, but apparently dates to the Early Archaic period (OAHP-Denver site files, 1979–1981).

Given its larger extent spread along about a 4.5 mi long area, the Geary Creek parcel is in the vicinity of a larger number of past survey projects. Beginning at the northwest end of the parcel, two sites were previously recorded on a seismic line survey by Jepson (1987a) that are within or just outside the parcel. Prehistoric site 5WL1238 is in the NW quarter of Section 15 a bit west of the parcel boundary, and is an open camp notable for the discovery of a Folsom point fragment in addition to other, probably younger archaeological material. Just inside the northwest corner of the parcel, Jepson (1987a) also recorded a second open camp, 5WL1239, and recovered a small corner-notched arrow point base of probable Early Ceramic period age. This is the only resource that was re-recorded by our PBS crews (see Results chapter below).

Not quite a mile downstream at a sharp meander in Geary Creek, O'Brien et al. (2003) recorded an isolated chalcedony flake, 5WL4341, during a pipeline survey. Continuing downstream, near the west edge of Section 24 just east of our parcel, Branton et al. (2009) also recorded a prehistoric IF (5WL6002) consisting of two quartzite flakes. Their survey was for a prescribed burn project. Due south near the common corner of Sections 23-24-25-26, Simmons and Simmons (1991) documented a Historic period farm, 5WL1623, during a wide-ranging reconnaissance of Weld County dry land farms and ranches. This farm is within a plot homesteaded by Jacob Kenig (or Koenig), who received a patent on the land in 1914.

At the far southeast end of the Geary Creek parcel, Grant (1987) recorded an isolated chert flake, 5WL1202, immediately south of the parcel boundary during a

seismic line survey. In the same area, Cason (2002) recorded a prehistoric open camp, 5WL4187, during a road obliteration project. A dozen shovel probes were dug along a ranch road through the site, with no evidence of significant buried deposits in the upper 60 cm of soil. This camp was re-evaluated by Kinneer et al. (2010) as part of a fiber optic line project. Other surveys in the vicinity of the Geary Creek parcel are reported by Anderson (1988), Branton (2008), Brechtel (1990), Horn et al. (2006), Jepson (1987b), and Sigstad (1979) but these inventories did not record any cultural resources close to our parcel boundaries. More broadly, three other reports on tipi ring sites involved resources in the general area of Geary Creek, including two Master's theses from CSU (Frederick 2010; Long 2011), and an article by Day and Eighmy (1998).

Because of the availability of comprehensive, relatively up-to-date contexts on both the prehistoric and historic eras by Church et al. (2007), Gilmore et al. (1999), and Mehls (1984), a detailed overview of the cultural history of the PBS region is unnecessary. Instead, this summary will focus on the more specific evidence of past human activity represented by the sites and projects mentioned above.

The earliest archaeology documented is in the Paleoindian stage, ca. 11,000–6400 BC (Chenault 1999). As previously noted, a couple of sites quite close to two PBS parcels have evidence of Paleoindian activities. The oldest is the Folsom point fragment found at 5WL1238 (Jepson 1987a), although it is on a site also containing materials such as fire-cracked rock that are much more prevalent in later time periods. However, the Nelson Cody Complex Site, 5WL4872, has late Paleoindian artifacts and bison bone in an apparently unmixed context (Kornfeld et al. 2007). Neither site has been excavated, although a small $1m^2$ "test unit" was excavated at Nelson by avocationals. As most archaeologists know, Weld County contains some of the most significant excavated Paleoindian sites in the state and region, especially on the Kersey terrace along the South Platte River in the southern and eastern parts of the county. These sites represent nearly the full breadth of Paleoindian complexes, from Clovis at the Dent site to Cody at the Jurgens site (Cassells 1997; Chenault 1999).

The Archaic stage in the Platte River Basin is described by Tate (1999), and is commonly subdivided into the Early Archaic (6400–3700 BC), Middle Archaic (3700–1200 BC), and Late Archaic periods (1200 BC–AD 150). As with the Paleoindian era, previous Weld County surveys have recovered their fair share of Archaic age materials, particularly for the Middle and Late Archaic periods, but very few Archaic sites have been excavated close to the PBS parcels. One exception is the multi-component Willow Bunker Archaeological Area, primarily site 5WL1656 (Feiler 2001a, 2001b), located about 3.5 mi west of the Geary Creek parcel. This extensive open camp zone has abundant flaked stone and ground stone artifacts, a variety of

thermal features, and a game butchering station. Among the diagnostic artifacts found are projectile points dating to every time period from the Early Archaic through the Middle or Late Ceramic period. Radiocarbon dates from thermal features and artifact-bearing soils are as old as late Paleoindian (9185 ± 145 and 8390 ± 195 BP) and Early Archaic (6910 ± 50 BP and 6775 ± 75 BP) to terminal Archaic on the young end of the scale (1830 ± 40 BP).

Other Archaic sites have been excavated in Weld County at greater distances from the PBS parcels. Most notable are several sites in the West Stoneham Archaeological District, such as Rattlesnake Shelter (Brunswig 1996); the Uhl site (Wood 1967); Happy Hollow Rock Shelter near Carr (Steege 1967); the Kersey Burial (Jepson et al. 1994) and Weld Burial (Cassells 1997:128), both near Greeley; and Wilbur Thomas Shelter near the Wyoming border (Breternitz 1971). Among these, the Wilbur Thomas site has the longest occupational record, comparable to that at Willow Bunker, with late Paleoindian through Middle Ceramic period prehistoric levels. Unfortunately, no radiocarbon dates are available from this site.

In a general sense, Early Archaic sites are more rare—and Middle to Late Archaic sites are more common and widespread—on the plains of the South Platte River basin than are those of the Paleoindian stage. The possible connection of lower Early Archaic site density to Altithermal-era droughts has been cited for decades (e.g., Tate 1999:167), but whether that reflects lower population levels, poorer preservation of early soil deposits, survey sampling problems, or a combination of those is unresolved. No less murky are the demographic implications of the increase in site densities observed during the Middle and Late Archaic periods. But the McKean technocomplex complex is best represented in the Middle Archaic occupations of Weld County sites, whereas Late Archaic archaeology seems to show greater cultural diversity. Diagnostic materials fitting the Besant, Yonkee, and especially Pelican Lake styles (or, more likely, the stylistic equivalent from unnamed locally-based groups unrelated to Pelican Lake), have been recovered from northeastern Colorado sites in and around Weld County.

Late Prehistoric stage archaeology represents post-Archaic activities characterized by bow-and-arrow and ceramic technologies, along with very spotty evidence of corn horticulture (Gilmore 1999). In the South Platte River Basin it is divided into the Early Ceramic (AD 150–1150), Middle Ceramic (AD 1150–1540), and Protohistoric periods (AD 1540–1860). Sites with artifacts diagnostic of these ages and/or with dated features are quite common in Weld County and northeastern Colorado as a whole. Large-scale excavation projects of such components provide substantial insight into cultural activities in the PBS region, and include several sites not too far from the four PBS parcels: the Cass site a few miles south of Briggsdale (Kalasz et al. 1991; Kalasz and Zier 1993); the Hatch, Hilltop, and Three O'Clock

Shelter sites in the West Stoneham Archaeological District (Brunswig 1996; Wood 1967); the Willow Bunker Archaeological Area (Feiler 2001a, 2001b); and two other sites explored by Wood (1967), the Biggs and Uhl sites, north-northeast of the West Stoneham District.

Both Early Ceramic and Middle Ceramic period components are well-represented in this sample, albeit the Early Ceramic materials are commonly present in greater quanities indicative of either more intensive occupations, more frequent occupations, or both. The Cass site and Three O'Clock Shelter, for example, have a well-dated sequence of strata in the Early Ceramic time frame. In particular, Three O'Clock Shelter has yielded a series of five radiocarbon dates in the range 920–1510 BP covering nearly the full length of the period. In addition, this site contains a rock wall foundation and charred corn kernals representing one of the few finds of domesticates in an Early Ceramic context in this area (Brunswig 1996). These materials are traditionally associated with "Plains Woodland" archaeology, in its ceramic evidence best compared with contemporaneous manifestations in Nebraska and Kansas such as the Keith phase (Gilmore 1999:177–179).

As noted, Middle Ceramic period occupations are not uncommonly encountered in the local archaeological record, but individual excavated components tend to contain rather sparse and less diverse artifact assemblages. Where these components co-occur with Early Ceramic period components, it is often difficult to recognize any significant differences in the nature of the occupations beyond the shift in arrow point styles from corner-notched or stemmed to side-notched, and in ceramic vessel form from conoidal to globular. Some level of cultural continuity is indicated by these trends, rather than representing a population replacement. However, the handful of more intensively utilized sites of the Middle Ceramic period tend to be found close to the edge of the High Plains with clear ceramic connections to Central Plains Tradition groups, notably Upper Republican but also Itskari (Gilmore 1999; Page 2009). While sites with small side-notched points diagnostic of the period are quite common in and around the PBS parcels, the best-known excavated assemblages showing those Central Plains Tradition ties are all close to the Wyoming and Nebraska borders to the north of the PBS: the Agate Bluff sites (Irwin and Irwin 1957); Happy Hollow Rock Shelter (Steege 1967); the Biggs site, McEndaffer Shelter, and Peavy Rock Shelter (Wood 1967); and the Donovan site (Scheiber and Reher 2007).

For the Protohistoric period (formerly termed Late Ceramic), the evidence in Weld County is especially sparse until the historically documented groups of the 19th century come into view. Willow Bunker site 5WL1656 has yielded both small side-notched points and several ceramic sherds identified as Lovitt Plain in the Dismal River complex (Ellwood and Boni 2001; Feiler 2001a). The Camp site in the West

Stoneham Archaeological District likewise contains Dismal River pottery along with a pair of spaced stone circles or "tipi rings" (Clark 1999:317). Such architectural features are present on many other sites in this district and many of them could date to this period, such as the Hatch site which has a hearth that yielded a radiocarbon date of near-modern age (Brunswig 1993; Wood 1967). Rock art at Wildcat Mound in southern Weld County near Milliken may also include Protohistoric imagery. This extensive series of petroglyphs contains a number of motifs generally associated with this time period such as equestrian figures, V-necked anthropomorphs, and the "weeping eye" motif (Barclay and Metcalf 1998).

As is widely known, the plains of Weld County and northeastern Colorado in general were the homeland and/or hunting grounds of many Historic period tribes, beginning with the Pawnee and Apache in the earlier centuries. The Pawnee in particular had utilized the western plains since prehistoric times, beginning at least by the Middle Ceramic period if not before. They maintain that the Upper Republican and Itskari cultures of that era are their ancestors, and of course they are the namesake tribe of the prominent buttes and surrounding National Grasslands in the PBS project area. Gleichman (1994:11–12) relates one story of how the Pawnee Buttes may have received their name, but admits that the details better fit similar topographic landmarks in Nebraska or Kansas such as Courthouse Rock in the Nebraska panhandle.

The Dismal River complex mentioned above has often been associated with early historic Apache activity, albeit not without dispute. Once the equestrian lifeway had become established among the tribes of the region by the early 18th century, the Apache presence in northeastern Colorado ended with the successful incursion of mounted Comanches from the north and west. The Kiowa, Arapaho, Cheyenne, and Lakota soon followed, and mountain-dwelling Utes also made their presence felt on bison hunting and raiding expeditions. Although identifying a specific tribe with the area's archaeological sites is usually a fruitless effort without associated archival records or 19th century photographs, undoubtedly some of the undated camps and tipi ring sites in the PBS region represent their diverse activities. See Crum (1996) and Mehls (1984) for general overviews of this tribal history.

The Historic period activities of non-Indian groups in the PBS region begins with transitory explorations, widely separated in time and space, only much later becoming more focused and permanent endeavors involving farming, ranching, and the establishment of more efficient transportation routes. There are no verified sites anywhere in the region directly attributable to Spanish explorations. However, the South Platte valley may have been briefly explored as early as 1659 when it became known as the Rio de Chato (Mehls 1984:19; also see Scott 1989, and Scott and

Schwayder 1993). Unfortunately for the Spanish, Villasur's 1720 expedition down the South Platte River into present-day Nebraska ended in a disasterous battle with Pawnees, and they made little attempt to control this region thereafter. Stephen Long's American expedition a century later was equally transitory, and infamously labeled the western plains as the "Great American Desert" on his 1823 map (https://www.nps.gov/fous/learn/historyculture/a-nations-parks.htm).

Although the connotations of the plains as a desert unsuited to agriculture would not fade until much later in the 19th century, fur trade activity did come to dominate the regional economy in the 1820s, 1830s, and early 1840s. While no trading posts were built in the immediate PBS region, the South Platte valley to the south of the PBS became a beehive of trading activity beginning with the establishment of Fort Lupton in 1836 (Mehls 1984:23–24). Of course, the bulk of the trappers' activities occurred along the more reliable streams closer to the mountain front: creeks in the PBS area are quite small and often dry up in the hot summer months. Thus, it is no surprise that no archaeological evidence of this period has been found within the PBS area. However, a branch of the "Trappers Trail" did follow Crow Creek through the project vicinity, from Fort St. Vrain to Fort Laramie, a route taken by Fremont's expedition in July 1842 (Jackson and Spence 1970:205–208; Scott and Schwayder 1993). In the PBS, the earliest non-Indian sites are late-19th century trash scatters and farmsteads that post-date the 1858–1860 Gold Rush. As with earlier exploratory expeditions, the gold seekers' route to the mining districts largely followed the South Platte River corridor, bypassing the PBS lands entirely (Scott 1989).

The battles at Beecher Island (1868) and Summit Springs (1869) led to the removal of resident tribes to reservations outside Colorado, although there is an unsubstantiated report of an 1873 Lakota attack on a cattle company camp northeast of the PBS (http://www.weldcounty150.org/YourStories/PointofRocks.html). The Union Colony community established in 1869 that developed into present-day Greeley was an effort not matched by other Weld County settlements for nearly 20 years. Improving climatic conditions for farming in the 1880s and construction of the Sterling-to-Cheyenne branch of the Chicago, Burlington & Quincy Railroad in 1887–1888 (the "Prairie Dog Special"; Fraser and Strand 1998:52) coincided with a settlement boom reflected in local land records around the PBS (see below). The communities of Raymer (later New Raymer), Buckingham, Keota, Sligo, and Grover all were founded in 1888 along the railroad route, tracing a course around the south and west portions of the PBS. The railroad spur was abandoned in 1973 but the route is paralleled today by State Highway 14 through New Raymer and Buckingham, and County Road 390 from Buckingham through Grover. Most of the current eastern and southeastern boundaries of Weld County were likewise established in the late 1880s (Noel 2015:72).

After a sharp economic downturn in the 1890s due to drought and the Silver Panic of 1893, a second wave of settlement ensued in the 1910s. The new communities of Briggsdale (est. 1909), Kalous and Kauffman (both 1915; see http://www.weldcounty150.org/HistoryofWeldCountyTowns/GhostTowns.html) along with scattered homesteaders added to the local population, supported by both ranching and farming, along with the benefits of railroad service.

The ranching business in northeastern Colorado generally preceded farming as an economic factor. The rise of cattle ranching included long-distance drives from Texas, locally passing not far east of the Pawnee Buttes on the Texas-Montana Trail during the period 1866–1897 (Exhibit Design Associates 2008:5; Horner 2015). Along this trail about 13 mi (21 km) northeast of the PBS, John W. Iliff set up a base camp in 1868 for his ranching business, which grew to vast proportions—around 600,000 acres (he directly owned just 15,000 acres near Fort Lupton; Mehls 1984:55). But the severe winter of 1886–1887 killed thousands of cattle, putting a serious dent in the business of Iliff's ranching successors (Mehls 1984:58), and set the stage for the growth of agriculture. Winter wheat was a primary crop in those early decades, followed by the growth of a huge sugar beet industry beginning around the turn of the 20th century (Mehls 1984:140–143).

The boom-and-bust cycle of farming and ranching reached new depths in the Dust Bowl of the 1930s, cruelly coinciding with the nation's economic Great Depression. Innumerable homesteaders were torn away from their livelihoods, including many in and around the PBS who went bankrupt, some of whose lands were purchased for back taxes. Others were resettled on more productive lands through an executive order that created the Resettlement Administration in 1935, followed by passage of the 1937 Bankhead-Jones Farm Tenant Act that authorized the US Soil Conservation Service to purchase poorly producing farm lands. Control of these lands was transferred to the USDA Forest Service in 1954, and the Pawnee National Grassland was established out of such properties in 1960 (Mehls 1984:164–165; Rhoads and Rhoads 1986).

During the 2012–2014 PBS project, the most visible activity in the region was oil and gas development, then in the midst of its own boom but which experienced a sharp downturn not long after the end of our field work. This industry has its roots in early 1920s discoveries in the "Wellington Dome" near Fort Collins and in 1924 near Keota. The "Greasewood Fold" in eastern Weld County began producing in 1930, but the industry boomed on a much larger scale after the 1970 discovery of the "Wattenberg Field" (Rhoads and Rhoads 1986; Weld County 2013).

One other historical development of note in the PBS region was the Cold War-era construction of ICBM missile silos in scattered spots across the western plains. Two Atlas E missile complexes were built around the PBS in the early 1960s, one near Grover and a second near Briggsdale that was recorded as site 5WL7422 by USDA Forest Service archaeologist Larry Fullenkamp with the help of our PBS volunteers in 2013. These missile complexes were under the operational control of the 566th Strategic Missile Squadron stationed at Warren Air Force Base in Cheyenne, Wyoming (AtlasMissileSilo.com 2016).

PBS Land Records

Although an exhaustive search of historical records and archives was not within the scope of this project, the senior author and a few of the PAAC volunteers did review some of the more readily accessible materials found at History Colorado as well as in on-line resources such as the General Land Office records at http://www.glorecords.blm.gov/default.aspx. The primary purpose was to add to the historical context for the numerous Historic Period archaeological resources recorded during the survey, and to provide more detailed site-specific information as appropriate. Table 4 summarizes the key land transactions that occurred in and adjacent to the PBS in the late 1800s and 1900s, but does not include later transactions that are less relevant to the archaeological record.

State-owned parcels surveyed during the PBS were acquired by the State of Colorado at different times. The three "school sections" in the North Pawnee Creek parcel, the Wild Horse Creek parcel, and Sec. 36 in the Geary Creek parcel all were granted to Colorado upon statehood on August 1, 1876. However, the school section in the South Pawnee Creek parcel was not acquired until April 30, 1881. Much of the rest of the Geary Creek parcel came into state ownership as part of a large transfer to the state on December 28, 1903 in several Colorado counties totaling over 25,000 acres. Finally, the northernmost part of the Geary Creek parcel was acquired in an even larger multi-county transaction of nearly 42,000 acres on July 10, 1942.

Township surveys that facilitated homesteading claims and other developments were a necessary prelude to settlement of lands around the PBS. The first such survey was supervised by Adams M. Fahringer for T. 10 N., R. 63 W. (Geary Creek parcel) in June and August, 1869. Four years later, in July 1873, surveys led by William H. Atkinson established the perimeter and subdivision boundaries of both T. 10 N., R. 59 W. (North Pawnee Creek parcel) and T. 10 N., R. 60 W. (Wild Horse Creek parcel). Apparent inconsistencies or errors led to a resurvey of T. 10 N., R. 59 W. by Deane J. Wollf in November and December, 1917. One of the metal survey monuments from the work of Wollf's crew was found and recorded at our site

5WL7388 (Figure 12). The final PBS township to be surveyed was around the South Pawnee Creek parcel, T. 8 N., R. 59 W., work that was supervised by Jacob H. Martz in January and February, 1881.

Table 4. Early land records in the PBS region.

Name(s)	*Legal Location: all in 6th P.M. (Size)	Issue Date	Land Record (Legal Basis)
WILD HORSE CREEK AREA: Sections Surrounding T. 10 N., R. 60 W., Sec. 36			
Jerome McGahen	SW¼ of SW¼ of Sec. 30; W½ of NW¼ and NW¼ of SW¼ of Sec. 31 in T. 10 N., R. 59 W. (180.5 ac)	August 5, 1890	C.E. #6734 (1820 Act)
L. A. Johnson and W. R. Wilson	NW¼ of NW¼ (Lot 4) and SW¼ of NW¼ (Lot 5) of Sec. 6 in T. 9 N., R. 59 W. (91.49 ac)	March 11, 1909	Right-of-way for reservoir (1891 Act)
Larkin A. Bailey	S½ of NW¼ and Lots 3 & 4 of Sec. 5; SE¼ of NE¼ and Lots 1, 2 & 3 of Sec. 6 in T. 9 N., R. 59 W. (320 ac)	November 4, 1913	H.E. #363784 (1862 & 1909 Acts)
Bud Burgess	SW¼ of Sec. 25 and SE¼ of Sec. 26, T. 10 N., R. 60 W. (320 ac); *Sec. 26 parcel acquired by USA on July 17, 1940 (1937 Act)*	February 13, 1914	H.E. #385005 (1862 & 1909 Acts)
Fowler B. Hamilton	NW¼ of NW¼ (Lot 4) and SW¼ of NW¼ (Lot 5) of Sec. 6, T. 9 N., R. 59 W. (91.49 ac)	April 11, 1914	H.E. #397760 (1862 Act)
Nevada Mason	S½ of Sec. 35, T. 10 N., R. 60 W. (320 ac)	April 22, 1914	H.E. #400206 (1862 & 1909 Acts)
Fowler B. Hamilton	S½ of NE¼ and Lots 1, 2, 3 & 4 of Sec. 1, T. 9 N., R. 60 W. (240.64 ac)	November 7, 1914	H.E. #440809 (1862 & 1909 Acts)
James H. Staley	SW¼ of Sec. 26; NE¼ of NW¼, N½ of NE¼, and SE¼ of NE¼ of Sec. 35, T. 10 N., R. 60 W. (320 ac); *all acquired by USA on August 17, 1939 (1937 Act)*	May 5, 1916	H.E. #527617 (1862 & 1909 Acts)
Ray W. Lamb	S½ of N½ and Lots 1, 2, 3 & 4 of Sec. 2, T. 9 N., R. 60 W. (321.68 ac)	September 29, 1919	H.E. #709797 (1862 & 1909 Acts)
John D. Watt	SE¼ of Sec. 25, T. 10 N., R. 60 W. (160 ac); *acquired by USA on June 13, 1940 (1937 Act)*	April 11, 1921	H.E. #802750 (1862 Act)
Dewey Huntwork	SW¼ of SW¼ (Lot 4) of Sec. 31, T. 10 N., R. 59 W. (45.85 ac)	July 31, 1923	H.E. #913507 (1862 Act)
NORTH PAWNEE CREEK AREA: All in T. 10 N., R. 59 W., Sections Surrounding Sec. 16			
Soren Nelson	S½ of SW¼ of Sec. 10 and N½ of NW¼ of Sec. 15 (160 ac)	March 8, 1894	H.E. #586 (1862 Act)
Cyrus Roby	S½ of NW¼ and NE¼ of Sec. 17 (240 ac)	January 3, 1920	H.E. #725408 (1862 & 1909 Acts)
Edward Morton	W½ (Lots 3–6 & 11–14) of Sec. 9 (303.53 ac)	February 2, 1920	H.E. #731783 (1862 & 1909 Acts)
Ben Huff	SE¼ (Lots 9, 10, 15 & 16) of Sec. 9 and N½ of S½ of Sec. 10 (307.29 ac)	March 12, 1920	H.E. #739804 (1862 & 1909 Acts)
Hector Burgess	S½ of Sec. 17 (320 ac)	March 12, 1920	H.E. #739807 (1862 & 1909 Acts)

Name(s)	*Legal Location: all in 6th P.M. (Size)	Issue Date	Land Record (Legal Basis)
William C. Williams	S½ of SW¼, W½ of SE¼, & SW¼ of NE¼ of Sec. 15; N½ of NE¼ of Sec. 21; and NW¼ of NW¼ of Sec. 22 (320 ac)	April 12, 1920	H.E. #744369 (1862 & 1909 Acts)
Martha E. Lundin	SE¼ (Lots 9, 10, 15 & 16) and E½ of SW¼ (Lots 11 & 14) of Sec. 8 (226.03 ac)	September 30, 1920	H.E. #775869 (1862 & 1909 Acts)
Ralph E. Harden	N½ of NE¼ of Sec. 20; NW¼ & S½ of NE¼ of Sec. 21 (320 ac)	December 8, 1920	H.E. #785373 (1862 & 1909 Acts)
Sena Nelson	S½ of NW¼ and N½ of SW¼ of Sec. 15 (160 ac)	January 16, 1922	H.E. #843408 (1862 Act)
GEARY CREEK AREA: Parcels in & Surrounding Secs. 14, 15, 23, 25, 26, 36, T. 10 N., R. 63 W.			
Clara B. Swanman	NW¼ of Sec. 14, T. 10 N., R. 63 W. (160 ac)	December 21, 1911	C.E. #239860 (1820 Act) not including coal
Volney C. Gates	E½ of SW¼ and W½ of SW¼ (Lots 3–4), Sec. 30, T. 10 N., R. 62 W. (159.64 ac)	October 7, 1912	C.E. #295210 (1820 Act) not including coal
Repps B. Rea	S½ of Sec. 26, T. 10 N., R. 63 W. (320 ac); *acquired by USA on June 12, 1936 (RA program and/or 1937 Act)*	February 13, 1914	H.E. #384995 (1862 & 1909 Acts)
Eliza Ann Hennick	N½ of NE¼, SE¼ of NE¼, and NE¼ of SE¼ of Sec. 25, T. 10 N., R. 63 W. (160 ac)	February 13, 1914	H.E. #385003 (1862 Act)
Jacob Kenig	SW¼ of Sec. 24 and NE¼ of NW¼ of Sec. 25, T. 10 N., R. 63 W. (200 ac)	April 18, 1914	H.E. #398993 (1862 & 1909 Acts)
Clara B. Swanman	NW¼ of Sec. 14, T. 10 N., R. 63 W. (160 ac)	November 28, 1914	Suppl. patent #445279, reclassified as non-coal land (1914 Act)
Volney C. Gates	E½ of SW¼ and W½ of SW¼ (Lots 3–4), Sec. 30, T. 10 N., R. 62 W. (159.64 ac)	December 1, 1914	Suppl. patent #445718, reclassified as non-coal land (1914 Act)
Jessie B. Longan	E½ of Sec. 35, T. 10 N., R. 63 W. (320 ac); *acquired by USA on May 19, 1936 (RA program and/or 1937 Act)*	January 21, 1915	H.E. #454808 (1862 & 1909 Acts)
George P. Gibbs	W½ of SW¼ and SE¼ of SW¼ of Sec. 25, T. 10 N., R. 63 W. (120 ac)	April 17, 1915	C.E. #468747 (1820 Act)
Louis Treber	W½ of SW¼ and SE¼ of SW¼ of Sec. 23, T. 10 N., R. 63 W. (120 ac); *acquired by USA on December 29, 1936 (RA program and/or 1937 Act)*	April 19, 1915	H.E. #468963 (1862 Act)
Hallett Roach	SE¼, N½ of SW¼, & SE¼ of SW¼ of Sec. 14 and NW¼ of NE¼ of Sec. 23, T. 10 N., R. 63 W. (320 ac)	May 3, 1915	H.E. #471028 (1862 & 1909 Acts)
Simon T. Horn	NW¼ of Sec. 26 and NE¼ of Sec. 27, T. 10 N., R. 63 W. (320 ac); *acquired by USA on June 12, 1936 (RA program and/or 1937 Act)*	July 26, 1915	H.E. #483909 (1862 & 1909 Acts)
Frances Keziah Edwards	S½ of S½ of Sec. 10 and SW¼ of Sec. 11, T. 10 N., R. 63 W. (320 ac)	November 27, 1915	H.E. #500983 (1862 & 1909 Acts)
Erick Hockom	SW¼, W½ of SE¼, & W½ of NW¼ of Sec. 15, T. 10 N., R. 63 W. (320 ac); *acquired by USA on October 19, 1986 [1936?] (1937 Act)*	June 23, 1917	H.E. #589095 (1862 & 1909 Acts)

Name(s)	*Legal Location: all in 6th P.M. (Size)	Issue Date	Land Record (Legal Basis)
Edward Fuqua	S½ of Sec. 22, T. 10 N., R. 63 W. (320 ac)	June 5, 1918	H.E. #633203 (1862 & 1909 Acts)
Paris A. Davis	N½ of Sec. 22, T. 10 N., R. 63 W. (320 ac)	June 5, 1918	H.E. #633204 (1862 & 1909 Acts)
John Kanzler	W½ of NE¼ and E½ of NW¼ of Sec. 15, T. 10 N., R. 63 W. (160 ac); *acquired by USA on August 5 & 21, 1936 (RA program and/or 1937 Act)*	August 13, 1918	H.E. #644225 (1862 Act)
John F. Bailey	E½ of NE¼ of Sec. 23 and S½ of NW¼ of Sec. 24, T. 10 N., R. 63 W. (160 ac); *acquired by USA on August 31, 1938 (1937 Act)*	April 18, 1919	H.E. #673351 (1862 Act)
Ray Wood	W½ of NE¼ and SE¼ of NE¼ of Sec. 26, T. 10 N., R. 63 W. (120 ac); *acquired by USA on September 23, 1938 (1937 Act)*	January 13, 1920	H.E. #727226 (1862 Act)
Orville H. Orr	SE¼ of NW¼ and W½ of NW¼ (Lots 4–5) of Sec. 6, T. 9 N., R. 62 W. (115.44 ac); *acquired by USA on October 20, 1936 & August 22, 1946 (RA program and/or 1937 Act)*	December 15, 1920	H.E. #787362 (1862 Act)
Amos B. Wilmot	S½ of N½ & N½ of N½ (Lots 1–4) of Sec. 1, T. 9 N., R. 63 W. (320.53 ac); *acquired by USA on May 12, 1939 (1937 Act)*	December 15, 1920	H.E. #787367 (1862 & 1909 Acts)
Richard T. Hallock	E½ of NW¼, W½ of NE¼, & SE¼ of Sec. 31, T. 10 N., R. 62 W. (320 ac); *northern 160 ac acquired by USA on January 2, 1937 (RA program and/or 1937 Act)*	February 13, 1922	H.E. #848908 (1862 & 1909 Acts)
SOUTH PAWNEE CREEK AREA: Sections Surrounding Sec. 36, T. 8 N., R. 59 W.			
William A. Gillaspie	E½ of Sec. 35, T. 8 N., R. 59 W. (320 ac)	December 2, 1913	H.E. #368794 (1862 & 1909 Acts)
Frank H. Fritz	SE¼, E½ of SW¼, & W½ of SW¼ (Lots 3–4) of Sec. 30, T. 8 N., R. 58 W. (314.65 ac); *acquired by USA on April 16, 1953 (1937 Act)*	January 31, 1914	H.E. #381823 (1862 & 1909 Acts)
Sterling P. Majors	NE¼, E½ of NW¼, & NW¼ of NW¼ (Lot 1) of Sec. 31, T. 8 N., R. 58 W. (301.48 ac); *acquired by USA on May 11, 1939 (1937 Act)*	January 31, 1914	H.E. #381824 (1862 & 1909 Acts)
Kern McCoy	W½ of Sec. 25, T. 8 N., R. 59 W. (320 ac); *acquired by USA on February 15, 1939 (1937 Act)*	April 30, 1914	H.E. #402016 (1862 & 1909 Acts)
Thomas V. Addington	S½ of N½ & N½ of N½ (Lots 1–4) of Sec. 1, T. 7 N., R. 59 W. (319.04 ac)	June 18, 1914	H.E. #414915 (1862 & 1909 Acts)
Oliver M. Dunbar	SW¼ of NE¼, SE¼ of NW¼, & Lots 2–5 of Sec. 6, T. 7 N., R. 58 W.; and E½ of SW¼ of Sec. 31, T. 8 N., R. 58 W. (313.4 ac)	December 11, 1914	H.E. #448383 (1862 & 1909 Acts); corrected from patent #427400 issued August 26, 1914
Arthur L. Potter	E½ of Sec. 26, T. 8 N., R. 59 W. (320 ac); *acquired by USA on February 15, 1939 (1937 Act)*	April 20, 1915	H.E. #469107 (1862 & 1909 Acts)

Name(s)	*Legal Location: all in 6th P.M. (Size)	Issue Date	Land Record (Legal Basis)
George D. Motsinger	E½ of Sec. 25, T. 8 N., R. 59 W. (320 ac)	October 17, 1916	H.E. #550592 (1862 & 1909 Acts)
Harry A. Doty	S½ of N½ & N½ of N½ (Lots 1–4) of Sec. 2, T. 7 N., R. 59 W. (319.59 ac)	January 20, 1919	H.E. #660646 (1862 & 1909 Acts)
Frank H. DeForest	SW¼ of NW¼ (Lot 2) & W½ of SW¼ (Lots 3–4) of Sec. 31, T. 8 N., R. 58 W. (111.27 ac)	December 4, 1919	H.E. #722691 (1862 Act)

Key to Table 4: ***as noted, some listed parcels were sold to the federal government, mostly under the Bankhead-Jones Act of 1937, or through Resettlement Administration (RA) actions in 1935–1936; C.E. = cash entry, sale of public land under federal act of 1820; H.E. = homestead entry, patent on public land under federal acts of 1862 and 1909; reservoir right-of-way acquired under the General Revision Act of 1891; agricultural entries on coal lands were authorized under the federal act of 1910, but coal deposits reserved on such patented lands were subject to reclassification as non-coal lands under the Coal Reservation, Supplemental Patents Act of 1914.

Figure 12. Site view looking northeast on 5WL7388 at a land survey monument dated 1917, from a resurvey of T. 10 N., R. 59 W.

Examination of Table 4 shows that land claims in and around the PBS began very slowly with two individual homesteads in the late 1880s—one each next to the Wild Horse Creek and North Pawnee Creek parcels. The earliest land patent in the PBS was issued in August 1890 to Jerome McGahen, who purchased a strip of land along the east side of the Wild Horse Creek parcel that includes a very productive natural spring. No other settlers took up lands adjacent to this parcel for almost 20 years. Next was the March 1894 homestead patent issued to Soren Nelson off the northeast corner of the North Pawnee Creek parcel (surrounding the current

Nelson Ranch complex). Since homesteaders were required to "prove up" on their claims after five years, Nelson probably began working his homestead about 1888–1889. As with McGahen's tract near Wild Horse Creek, no other settlers followed Nelson to that part of the PBS for over 20 years. He became so successful in the ranching business that he "was known as 'Pawnee Buttes' Nelson from Texas to Montana" (Rhoads and Rhoads 1986).

Apart from the McGahen and Nelson homesteads, however, the vast majority of the initially successful land claims around the PBS were made after the turn of the 20th century. The earliest land patents around the Geary Creek and South Pawnee Creek parcels were issued in 1911 and 1913, respectively, indicating settlement started in those areas in about 1906–1908. Also apparent from Table 4 is that the vast majority of settlers around the PBS made homestead claims under the inexpensive provisions of the 1862 federal act, rather than purchasing federal lands outright via the cash entry process of the 1820 law. Only four of the 49 land claims (8%) listed in Table 4 are cash entries, none in the North Pawnee Creek or South Pawnee Creek areas. Lastly, long-term success as farmers and ranchers among these early settlers varied geographically. Specifically, none of the nine initial land claims made around the North Pawnee Creek parcel were bought out by the US government during the Dust Bowl years or later, while 30–40% of the homesteaders around the Wild Horse Creek and South Pawnee Creek parcels sold out, and more than half of the 20 claims around the Geary Creek parcel were government buy-outs.

Statement of Objectives

As has been true of all PAAC survey projects, the primary objective of the PBS inventory was to provide supervised field experience for participants in the training program, 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 at C.R.S. 24-80-405d. Although there were no publicized plans for development of specific parcels within the PBS, the then-current (2012) intensive oil and gas activity in Weld County also influenced the decision to survey in the area in order to gather baseline data on cultural resource densities on state-owned lands adjacent to the Pawnee National Grasslands where archaeological surveys are mandated. Finally, there was a desire to test a recent model of site location trends specific to tipi rings, recently developed by graduate student Sayat Temirbekov under the direction of Jason Sibold at Colorado State University.

Based on previous survey data available at the beginning of the project in 2012, in combination with more general data summarized in the CSU model and in Gilmore et al. (1999) and Mehls (1984), there was a general expectation that prehistoric site density would be higher in areas closest to drainages, lithic material sources, and the crests of hills and ridges. For the PBS, this combination best fits the Geary Creek parcel positioned farthest to the west where secondary lithic sources in surface gravel deposits tend to be more prevalent, and where the state-owned lands closely follow the southeasterly trend of the creek. In the other more easterly parcels, the corridors closest to drainages and elevated landforms appeared most promising. Conversely, site density was expected to be lower in low-lying, open grassland areas farther from the drainages. Open lithic scatters, short-term camps—including tipi ring sites—and secondary lithic sources were the primary site types anticipated, with lower expectations for longer-term habitations, architectural sites other than tipi rings, and rock art.

For the Historic period, there was a limited expectation for 18th–19th century Indian encampments with such evidence as metal arrow points, worked glass, and tipi rings. Non-Indian sites were expected to mainly represent ranching and farming, with only minor evidence for any other activities anticipated. Since the state-owned lands were mostly not available for homesteading or stock-raising claims, related sites in the PBS should be most common along drainages and around the margins of the parcels adjacent to lands that could have been claimed or purchased under federal laws.

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

- Is there any evidence for Paleoindian use of the PBS comparable to the Nelson Cody Complex site?
- Is there any evidence for Early Archaic sites of any type, given the low expectations based on past surveys in northeastern Colorado?
- Is there any significant difference in the prehistoric record of the PBS comparing Middle Archaic and Late Archaic sites?
- Do Early Ceramic period sites outnumber Middle Ceramic period sites, regardless of site type?
- Does the CSU predictive model accurately reflect tipi ring site occurrence or more general prehistoric settlement in the PBS parcels?
- Do secondary lithic sources exert a settlement pull regarding prehistoric camps?
- What evidence for non-local exchange will be found in the PBS, other than in obsidian?
- What kind of prehistoric ceramics will be found in the PBS, if any?

- How prevalent is the vandalism of archaeological sites in the PBS beyond minor surface collecting?
- What is the effect of activities related to the oil-and-gas industry on archaeological site conditions?
- What is the earliest evidence of non-Indian activity in the survey area?
- What Historic period activities in the PBS exist other than those directly related to ranching and farming?

Methods

The cultural resources survey of the PBS was accomplished using standard pedestrian tactics to cover the ca. 1,496 ac (605 ha) total in four separate parcels. Inventory transects generally were oriented to the cardinal directions, except in the Geary Creek parcel where many sweeps ran parallel to the creek. Selected other transects also followed ground contours to maximize coverage of specific landscape features such as arroyos and road cuts. Crew size ranged from two to six persons (usually three or four), and crews were supervised by the senior author and four staff archaeologists with OAHP as follows. In the June 2012 session, two crews were under the supervision of Kevin Black, Anne Winslow, and Bob Cronk. A total of 21 volunteers participated that season. Two separate sessions in May 2013 saw three crews in the field, led by the above three archaeologists along with Aaron Theis. There were 23 volunteers in the field at various times in the 2013 season. Finally, two separate sessions in June 2014 had two crews led by Mr. Black, Ms. Winslow, and Katie Arntzen, with 19 volunteers participating for varying lengths of time.

Spacing between crew members was maintained at 15 m (50 ft), except where closer spacing was needed while inspecting road cutbanks, arroyos, rock outcrops, hill crests, and other terrain of special interest. 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 a low diversity artifact scatter or a 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 obviously less than 50 years old were not recorded. Newly recorded sites were assigned temporary field numbers starting with the prefix PBS, followed by some combination of the crew chief's initials, a year code, and a consecutive number. Thus, PBS-12-AW-1 was the first site recorded by Anne Winslow's crew in 2012, while PBS-14-KLA-1 was the first site recorded by Katie

Arntzen's crew in 2014. Sites recorded by Mr. Black's crews include the initials KB or KDB, those recorded by Mr. Cronk's crews have BC or C initials, and Mr. Theis' sites include the code AT. Isolated finds were similarly numbered with the addition of an IF code with the consecutive number, e.g., PBS-12-AW-IF3.

Recording procedures were paced to emphasize volunteer training in filling out forms, drawing sketch maps, and illustrating tools. Manual methods were preferred over the "high tech" recording options widely employed today in order to teach the volunteers the underlying concepts involved in mapping and completing inventory forms. Toward that end, mapping was done with a Brunton compass and tape measure (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, which was 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.

All site sketch maps were drawn in reference to true north, using a magnetic declination adjustment of 8.5 º or 9º east. The precise declination changed only slightly from 8º 19′ 19″ east in June 2012 to 8º 21′ 26″ east in June 2014 as calculated for the rough center of a given season's survey area (lat. 40º 48′ north, long. 103º 57′ 30″ to 104º 30′ west) using the National Geophysical Data Center's declination calculator on-line at http://www.ngdc.noaa.gov/geomag-web/#declination. Collection of artifacts was limited to two fossils, three Historic period artifacts, a couple of lithic material samples, one flake of supposed obsidian (identified as chalcedony under microscopic magnification) and flaked stone tools including diagnostic projectile points likely to be picked up by "arrowhead hunters," totaling 30 items.

As in previous PAAC training surveys, it was expected that the most common prehistoric artifacts would be flaked stone debitage, far outnumbering any 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 having a wide range of experience (from absolutely none to many years), a debitage inventory form was utilized as modified from similar forms devised on previous PAAC Survey projects. This form emphasized material type distinctions and flaking stages, as indicated during the first season of work and updated as needed (Figure 13). It was used as a supplement to the standard OAHP forms filled out at each site (see Appendix III).

All sites and IFs were plotted on USGS 7.5' topographic maps for Buckingham, Raymer NW, Grover SE, Hereford SE, Reno Reservoir, and Pawnee Buttes, Colorado

Figure 13. Example of the debitage inventory form used during the Pawnee Buttes survey.

Pawnee Buttes Debitage Inventory

Site 5WL_____

Temporary Site # PBS–_____

FLAKE TYPES → ↓ MATERIALS	Core Reduction Flakes	Thinning Flakes	Finishing/ Maintenance	Unidentifiable Fragments	Angular Debris	TOTALS
Morrison silicified sediment: **color(s)**						
Quartzite: **gray**						
other color(s)						
Agate/Chalcedony: ***pink/purple/ gray**						
banded agate						
moss agate						
other color(s)						
Chert: **white–light gray**						
other color(s)						
Jasper: **maroon**						
yellow/brown						
dendritic						
Obsidian: **color, inclusions**						
Other material(s): **Welded tuff w/ quartz**						
Petrified wood						
Siltstone						
Other [specify]:						
TOTALS						

*compares favorably to Flattop Butte chert/chalcedony

(all 1997 editions). The map plots were based on UTM coordinates determined using simple handheld receivers such as the Garmin eTrex 30 model, which yield uncorrected coordinate values, and were calibrated to the 1983 North American Datum (NAD 83) utilized in the OAHP site database. At least one digital color photograph was taken at each site; all such digital images are stored at the OAHP office in Denver, in the "Digital Image Archive" for Weld County.

In addition to the above procedures, our crews took a break from the PBS project on five separate occasions during the three field seasons to assist USDA Forest Service archaeologist Larry Fullenkamp with a series of site assessments on Pawnee National Grasslands properties. The first of these field trips took place on June 20, 2012 with an assessment of archaeological site 5WL2658 where spaced stone enclosures (tipi rings) had been previously reported. The following season, two separate full day trips were taken on May 7 and May 21, 2013 to update site information on several cultural resources in the West Stoneham Archaeological District, as well as prehistoric sites 5WL1893 and 5WL6961, and the Fred Hummer homestead site (5WL5759). In addition, our crews helped with the full recording of a 1960s era Atlas E missile complex (site 5WL7422) near Briggsdale, and examined multiple tipi ring features in the Keota Stone Circles Archaeological District. Likewise, two full days were spent on such assessments in 2014, on June 13 and June 19. Again, multiple sites in the West Stoneham Archaeological District were evaluated, along with the Vim stone circle site 5WL3169 near the Nebraska border, followed by comprehensive recording of a nearby homestead, site 5WL7423.

In the lab, collected artifacts were washed, labeled, and catalogued prior to analysis; PAAC volunteers were involved in much of this work, which also was credited toward certification in the PAAC Laboratory module. All of the 30 collected artifacts were photographed, and many of those same artifacts other than lithic material samples were illustrated as line drawings. All field and lab line drawings of artifacts, and site sketch maps, were inked for inclusion with the final site forms (Appendix III).

Progress reports were submitted annually to the Colorado State Board of Land Commissioners (SBLC), and filed with permit records at OAHP in Denver. Wider dissemination of this information was provided in several conference presentations (Black 2012, 2013b, 2013c, 2013d, 2014) and was also posted on the PAAC web site at http://www.historycolorado.org/oahp/summer-training-survey. Site forms and the report draft were produced in Word *.docx format at OAHP; copies of all forms and the report were sent to the SBLC North Central District office in Eaton. All project records including field forms, notes, correspondence, lab sheets, and digital files are stored at OAHP–Denver.

Results

Within the inventoried 1,496 ac of the PBS, a project total of 52 sites and 77 IFs has been recorded—and one previously documented site was re-recorded—which yields a site density of 23 sites/mi^2. These resources have been assigned permanent numbers 5WL7174–7218, 5WL7374–7390, 5WL7392–7411, 5WL7647–7658, and 5WL7660–7694. The re-recorded site is 5WL1239. Of this total, 31 sites and 48 IFs are American Indian sites of prehistoric age, 16 sites and three IFs have both prehistoric American Indian and Historic period non-Indian components, and six sites and 26 IFs have only Historic period Euro-American materials (Table 5). No exclusively paleontological localities were documented, but individual fossils have been recorded at three sites, spatially associated with prehistoric and/or historic archaeological materials—in one case (5WL7647), literally embedded in a flaked stone artifact. Seven of the Historic period non-Indian components at largely prehistoric sites would have been recorded as IFs had they been found in spatially separate locations. Likewise, the very limited prehistoric components at four sites would have been recorded as IFs were they not associated with more extensive Historic period materials. None of the newly recorded sites or IFs has definitive evidence of Historic period American Indian components. Overall, then, 89% of the sites and 66% of the IFs contain evidence of American Indian activities of various dimensions.

The site and IF descriptions presented below are grouped according to the specific parcel in which they are located, rather than strictly by sequential site number. As noted previously, there are four such parcels defined in the PBS, here labeled by the most prominent local drainage and listed in the order of presentation: South Pawnee Creek in Section 36 of T 8 N, R 59 W; Wild Horse Creek in Section 36 of T 10 N, R 60 W; North Pawnee Creek in Section 16 of T 10 N, R 59 W; and Geary Creek in multiple sections of T 10 N, R 63 W.

The Sites: South Pawnee Creek Parcel

5WL7174 (PBS-12-AW1) is located on an elevated south edge of the valley overlooking South Pawnee Creek, and contains both prehistoric and historic components. The prehistoric portion of the site is an open lithic scatter situated on a moderately steep slope above a large rock outcrop which leads to a steeper dropoff (Figure 14). The rock outcrop forms part of the west end of a large, crescent-shaped landform which is very visible on the otherwise almost featureless landscape, and which forms the highest land area for some distance. This component consists of a relatively sparse scatter of 12 flakes, with no tools, diagnostics, artifact concentrations,

or cultural features observed. Materials observed consist of Morrison silcrete, chalcedony, chert and jasper, with chert representing half of the material types recorded. All stages of production have been observed except for finishing and maintenance flakes, although a majority of the artifacts (eight) are unidentifiable fragments and angular debris. The balance consists of three core reduction flakes and a thinning flake.

Table 5. Affiliation and chronology of recorded sites and IFs in the four Pawnee Buttes parcels.

Affiliation & Chronology	*South Pawnee Creek*	*Wild Horse Creek*	*North Pawnee Creek*	*Geary Creek*	*TOTALS*
American Indian, prehistoric sites	14	11	1	4	30
American Indian, prehistoric + paleontological sites	1	0	0	0	1
American Indian, prehistoric IFs	22	10	7	9	48
Non-Indian + prehistoric American Indian + paleontological sites	0	0	0	1	1
Non-Indian + prehistoric American Indian sites	5	2	3	4	14
Non-Indian + paleontological sites	0	0	1	0	1
Non-Indian + prehistoric American Indian IFs	1	1	1	0	3
Non-Indian sites	3	0	3	0	6
Non-Indian IFs	4	1	3	18	26
TOTALS	**50**	**25**	**19**	**36**	**130**

Cattle were present in the vicinity at the time of recording, and ant hills and animal burrows are present throughout the site; no cultural material was observed in their backdirt. There is no other indication of the potential for buried cultural features

or materials. Activities which can be inferred at the site are early and intermediate stage lithic reduction. Based solely on location, the site could also have served as an animal observation area (hunting station).

The Historic period component consists of a single historic artifact, which would have been recorded as an Isolated Find if its location did not coincide with that of the prehistoric component. The artifact is a dull gray metal teaspoon, with an overall length of $6\frac{1}{16}$ inches (15.4 cm). The inscription on the handle is only partially legible, with the word "Rogers" and the letters "Ham ..." visible. There is a sabre-like insignia partially visible on the handle. The teaspoon may be a production of Rogers & Hamilton Co., incorporated in 1886 at Waterbury, CT and taken over by International Silver Co. in 1898 (http://www.silvercollection.it/ROGERSSILVERMANUFACTURERS.html). Given the limited artifact assemblage here for both components, and the low potential for intact buried materials, both components of this site are evaluated not eligible for the NRHP.

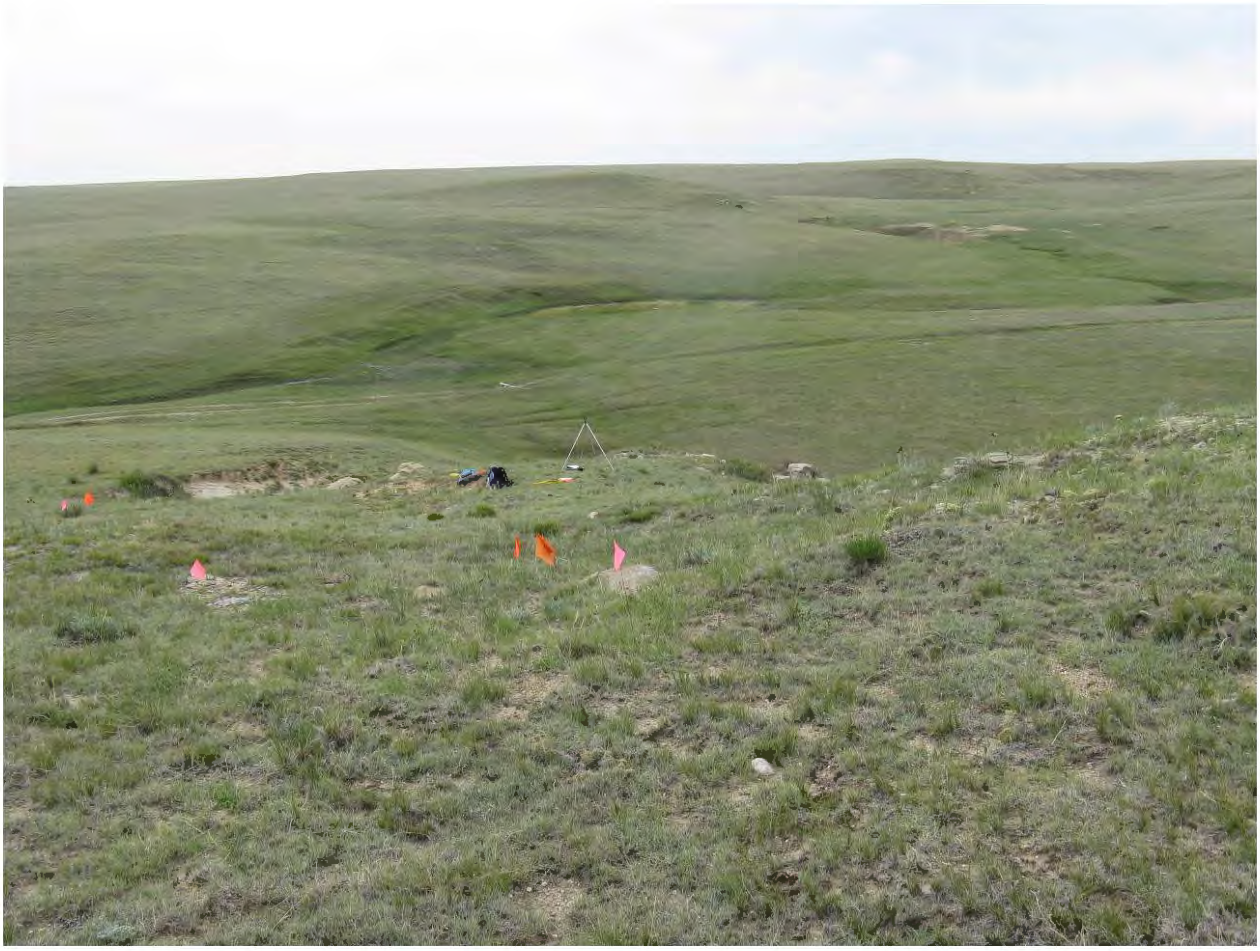

Figure 14. Site overview looking northwest across 5WL7174. The tripod in the center of the photo marks the mapping station.

5WL7175 (PBS-12-AW2) is a relatively sparse open lithic scatter situated on a moderately sloping, open, northeast facing hillside on the south side of South Pawnee Creek. No tools, diagnostics, artifact concentrations, or cultural features were observed. The entire surface assemblage consists of debitage totaling 23 flakes, representative of all three stages of flaking. Lithic materials include Morrison silcrete, quartzite, chalcedony and chert, with Morrison silcrete dominant. Cattle were present in the vicinity of the site at the time of recording, and thus the site has been impacted by grazing. Ant hills and animal burrows were present throughout the site but no cultural material was observed in the backdirt, and there is no other indication of the potential for buried cultural features or deposits. Activity which can be inferred at the site appears to be limited to lithic reduction. The site is evaluated not eligible for the NRHP.

5WL7176 (PBS-12-AW3) is an open prehistoric camp and paleontological isolated find situated on a moderately sloping hillside facing north toward South Pawnee Creek, not far west of 5WL7175. Thirty-six flakes and one possible ground stone mano or hide-rubbing tool have been recorded here. Also, about 2–3 m below the crest of the slope, one fossilized bone was discovered and collected (FS-1, Figure 15). This fossil was identified by paleontologist Richard Stucky of the Denver Museum of Nature & Science (now retired) as a caudal or dorsal vertebra, perhaps from an ichthyosaur or mosasaur, and probably originating in the upper part of the Fox Hills formation dating to the end of the Cretaceous period, Maastrichtian age (ca. 66–72 mya).

No features have been observed on this site, nor were any flake concentrations observed. The debitage represents all three stages of flaking. Yellow-brown Morrison silcrete is predominant. Coarse gray quartzite, white/light gray chalcedony, and chert (white/light gray, tan, yellow-brown) also are present. The land on which the site is located is currently leased for grazing; cattle are present in the vicinity and grazing is ongoing. There is evidence of animal burrows, but no cultural material was discovered in the backdirt.The site is evaluated not eligible for the NRHP.

5WL7177 (PBS-12-C1) is an open lithic scatter located in an open basin northwest of a rocky cliff outcrop, above a broad ◡-shaped meander of South Pawnee Creek. Less than 50 flaked stone artifacts occur in a 55 m × 27 m area. The majority of flakes are in the western portion of site, particularly around a two-track road that curves north-south through site. Quartzite composes approximately half of the material found on the site, with about a quarter of chalcedony and another quarter of chert. A single unidentified fragment of petrified wood also was recorded. About half of these artifacts are thinning flakes, though all stages of debitage were present. The only modified artifact found is a distal end fragment of a yellow-brown quartzite

uniface (collected, FS-1). The cultural materials here are limited in quantity and quality, with a low potential for intact buried materials. The site is therefore evaluated not eligible for the NRHP.

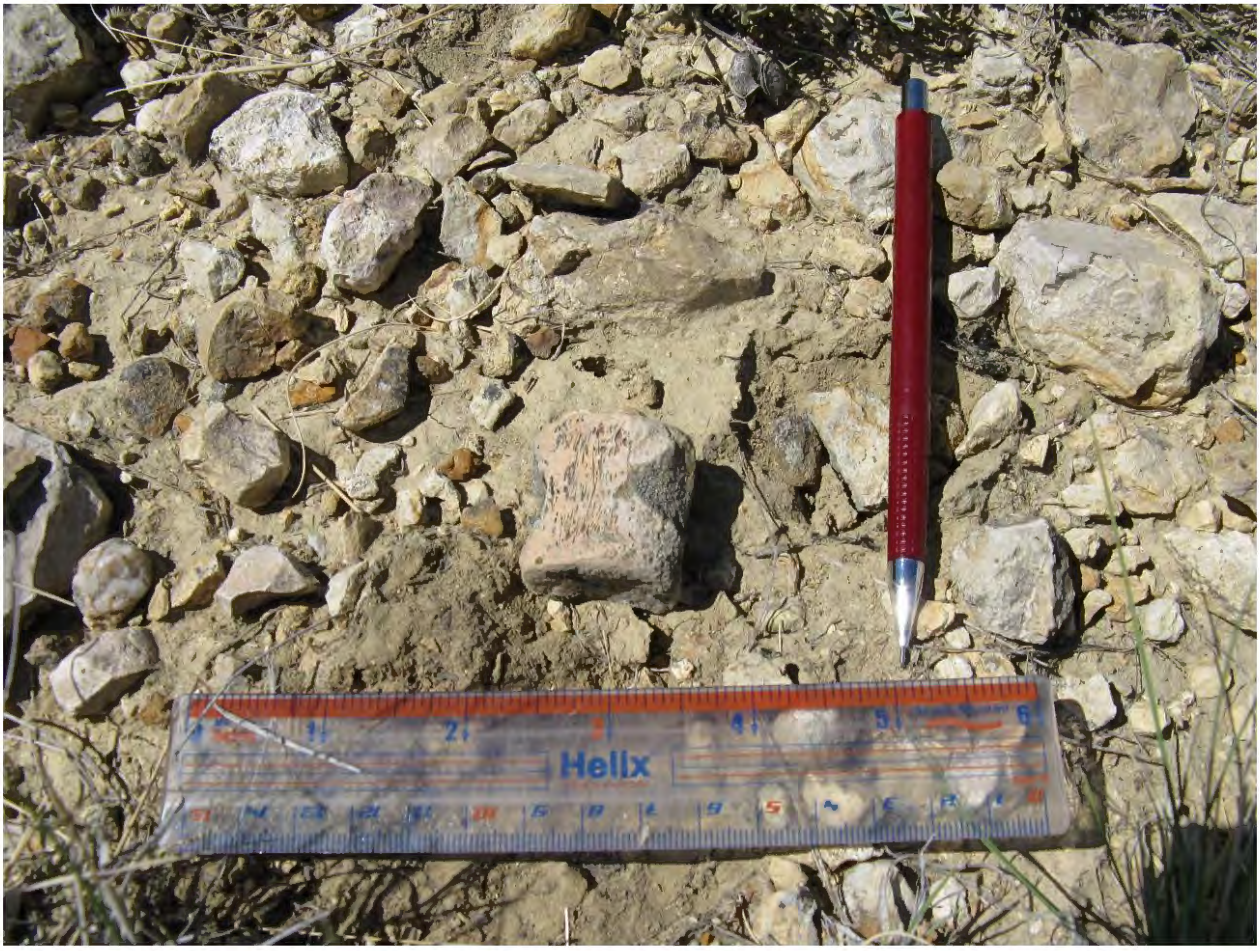

Figure 15. Fossil vertebra, probably from a marine reptile, in situ above ruler in center (5WL7176-1).

5WL7178 (PBS-12-C2) is an open lithic site, possibly a camp, on a flat, raised terrace with a steep dropoff to the west and gentle downward slope to the south toward South Pawnee Creek. The artifact scatter is fairly diffuse over a large area of 80 m × 50 m. Debitage materials are split evenly between chert and chalcedony with one quartzite flake found; the total debitage inventory is 23 flakes, but no flake concentrations were observed. One Morrison silcrete corner-notched projectile point with a broken tip was found and collected (FS-1; Figure 16), diagnostic of the Early Ceramic period. In addition, a possible mano fragment has been documented. No features are visible as observed at the current surface. Several large animal burrows are present on the site, but no cultural material was noticed in the backdirt. The land on which the site is located is currently leased for grazing; cattle are present in the vicinity

and grazing is ongoing. Given the low artifact density and limited potential for buried material, the site is evaluated not eligible for the NRHP.

Figure 16. Site 5WL7178 arrow point, FS-1.

5WL7179 (PBS-12-C3) is a small Historic period site comprised of a circular depression associated with a handful of pieces of broken glass, located at the base of a hill slope northwest of 5WL7184 and just northeast of South Pawnee Creek. The approximate depth of the depression is 18″ and it is about 21 ft × 18 ft in diameter. There are five pieces of broken, thick brown glass along with one piece of thick blue-green glass, and one aqua bottle neck-finish with a wiped lip of the "oil finish" style (collected, FS-1), the latter diagnostic of turn-of-the-century productions ca. 1890–1910 and maximally 1875–1925. All the glass fragments were found outside the boundary of the depression, about 3 m to the southwest. The very limited artifact assemblage here along with the lack of evidence that the depression marks an architectural feature indicates a low potential for buried cultural materials. The site is evaluated not eligible for the NRHP.

5WL7180 (PBS-12-C4) consists of an open lithic scatter containing a variety of

flaked stone materials and manufacturing stages, although no tools have been identified. The site is on a small prominence approximately 25 m above and south-west of a ◡-shaped meander of South Pawnee Creek. There is a larger prominence with cliffs about 400 m east of this location (Figure 17); the site is surrounded on the other three sides by gentle ridges. Several pieces of historic farm machinery are visible across a side drainage to the south, on site 5WL7182.

Over half of the debitage here is of quartzite, with lesser amounts of chert, jasper, chalcedony, and petrified wood also present. Most of these flakes represent the early and intermediate stages of tool manufacture, but no cores or production-stage bifaces have been observed on the site. Although some erosion and rodent burrowing are on-going, no artifacts have been found in disturbed areas that might derive from buried contexts.The limited nature of the surface assemblage, lack of tools and features, and the low potential for intact buried remains show that the site is not eligible for the NRHP.

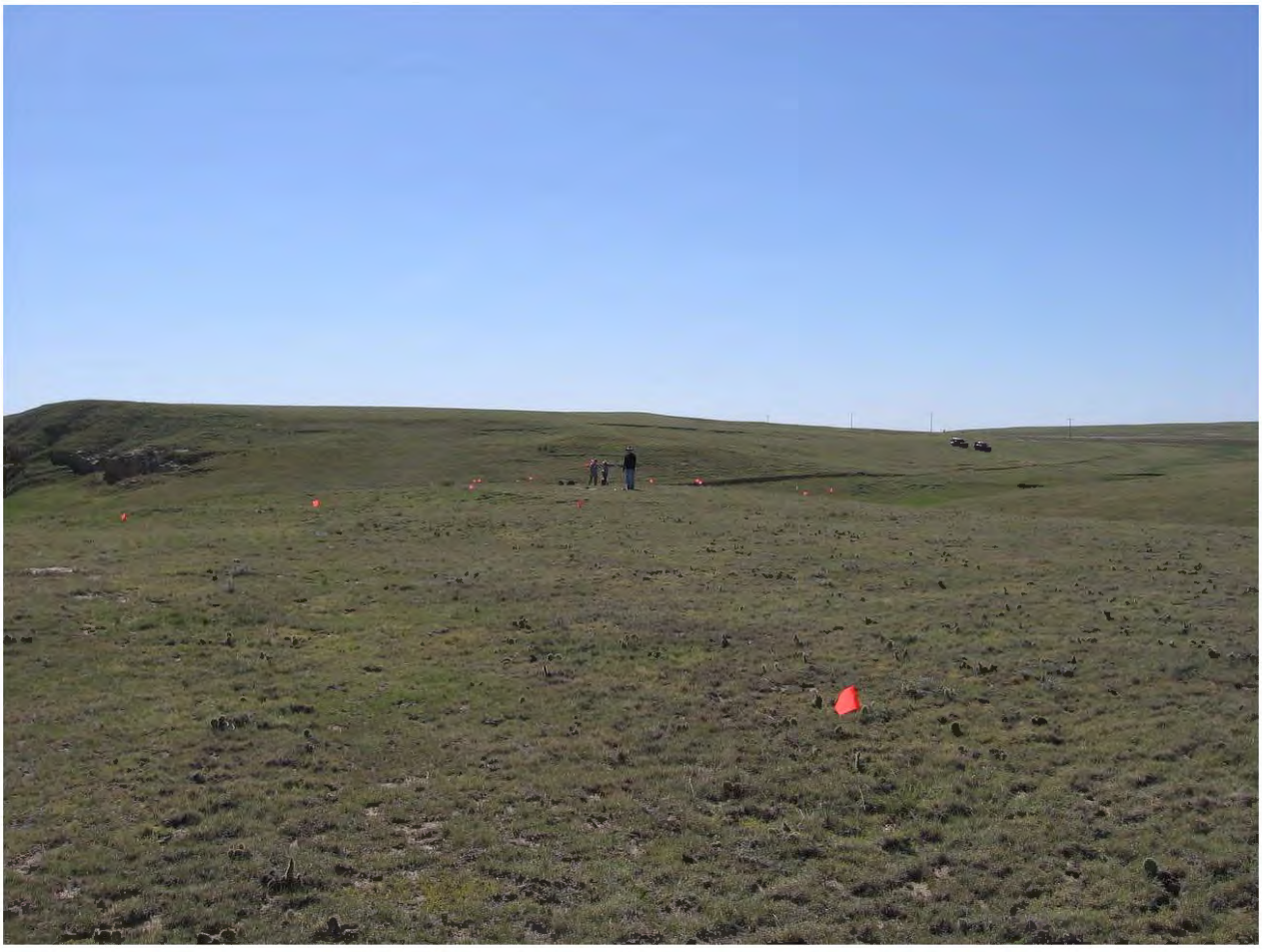

Figure 17. Site overview looking east at 5WL7180. Orange pin flags mark the artifact scatter.

5WL7181 (PBS-12-C5) is a small lithic scatter eroding out of a ridge top overlooking South Pawnee Creek to the south. Fewer than 20 flakes with no evidence of features, tools, or artifact concentrations mark this location. The limited debitage includes four different local material types dominated by Morrison silicified sediment along with lesser numbers of chert, chalcedony, and quartzite flakes. These materials are evenly split between core reduction and thinning flakes from early and intermediate stages of tool manufacture. With evidence of very shallow soils and an assemblage quite limited in both quantity and quality, this site is evaluated not eligible for the NRHP.

5WL7182 (PBS-12-C6) is an open, multi-component prehistoric and historic site, located on a gentle north-facing slope above a small east-flowing tributary of South Pawnee Creek. The prehistoric component is located at the west end of the site and is limited to a biface fragment and two flakes that would have been recorded as an IF but for their association with the larger Historic period component. The biface fragment is the distal portion of a roughly flaked, early stage production piece of light brown Morrison "quartzite" or silicified sediment measuring 7.0 × 5.7 × 1.5 cm. The other two artifacts are yellow-orange quartzite core reduction flakes.

The Historic period component is a kind of rural "junk yard" of farm and ranch equipment mostly dating to the early-mid 20th century. It is distributed in four distinct clusters labeled Concentrations A, B, C, and D. Concentration A is at the west edge of the site, just north of the prehistoric component, and includes a seed drill with an IHC logo (International Harvester Corp.). Concentration B is 60+ ft east of A and includes two similar pieces of equipment, one bearing a different IH logo. Concentration C is the largest of the four features, in the south-southeast portion of the site, and is comprised of a New Holland hay baler, several seed drills of differing makes, and a 1954 Dodge pickup truck bearing a 1971 license plate, among other items (Figure 18). Concentration D is at the far northeast edge of the site and includes several wheels and tires, and a King seed drill body embossed with 1891–1898 patent dates. Given that the rusted equipment is not uncommon nor in particularly good condition; there is no close association with a farm or ranch complex; there is a very low probability of buried materials; and the prehistoric component is effectively an isolated find, both components of the site are evaluated not eligible for the NRHP.

5WL7183 (PBS-12-C7) is an open lithic scatter atop a prairie knoll, bounded on the north and west by South Pawnee Creek, which is currently an intermittent water source. The lithic scatter is concentrated on the northeast portion of the hilltop, with the remaining portion scattered over the sides. The densest cluster of artifacts in a 10 m diameter area on the knoll is defined as a concentration, Feature 1. All stages of flaked stone tool manufacture are present; quartzite and chert are the predominant

materials. A small side-notched projectile point exhibiting an impact-fractured edge is the sole diagnostic artifact identified, indicative of an occupation in the Middle Ceramic period. It and a chert drill were collected (FS-2 and FS-1, respectively; Figure 19). Grazing by cattle and pronghorn antelope, wind erosion, and a few rodent burrows are among the noticeable impacts to the site. However, artifact density is higher here than elsewhere in the vicinity and the assemblage does include tools such as the diagnostic arrow point. The site is evaluated potentially eligible for the NRHP.

Figure 18. Equipment Concentration C at 5WL7182 looking south.

5WL7184 (PBS-12-C8) consists of a very small Historic period artifact scatter and shallow depression located on a gentle slope on the north side of South Pawnee Creek, just southeast of site 5WL7179. The depression measures 21 ft × 19 ft across and is about 10″ deep, with two large sandstone slabs exposed on its south and west edges. The slabs appear to be dislodged chunks of bedrock rather than structural elements. A 2-inch wide band of rusted metal protrudes from the ground within the depression and twists/bends upwards roughly 6 ft. Another metal band and some

rubber fragments are found outside of the feature, but overall the artifact assemblage is quite limited. Also, an isolated quartzite flake was found nearby but it was too distant from the depression to be recorded as part of the site. As at 5WL7179, the depression here—of nearly identical size—does not appear to be the foundation of an architectural feature, but some other kind of ground disturbance of limited archaeological interest. The site is evaluated not eligible for the NRHP.

Figure 19. Chert drill with a broken bit (left, 5WL7183-1) and a side-notched arrow point fragment (5WL7183-2) collected from site 5WL7183.

5WL7185 (PBS-12-C9) consists of a small prehistoric lithic scatter located on the northerly aspect of a slightly sloping plain, south of South Pawnee Creek near the south edge of the surveyed section. The observed flaked stone is 85% quartzite core reduction flakes plus a couple chalcedony flakes from similarly early stage reduction and a few quartzite thinning flakes. No late stage finishing, maintenance flaking, or tools have been found. The majority of flakes are distributed in the western section of the site. Some disturbance from wind erosion and cattle grazing was observed, with a little rodent burrowing activity, but no indication of buried materials has been noted in the disturbed areas. Although no cores or tested cobbles have been recognized here, the reduction flakes are clearly of local origin and may represent short-term

testing of stone cobbles for procuring suitable lithic material to transport to another location. This site is evaluated not eligible for the NRHP.

5WL7186 (PBS-12-C10) has both prehistoric and historic components, and is located on a low hill directly above (south of) South Pawnee Creek, between 5WL7183 to the northwest and 5WL7180 to the southeast. The larger prehistoric component is an open lithic scatter that is fairly evenly distributed over the top, east, west, and south slopes of the hill; no flakes have been found on the north slope of the hill. A 3 m diameter concentration of debitage mapped near the east end of the site is mostly core reduction and thinning flakes. The flaked stone assemblage consists of a number of materials, with quartzite and chert being the two most numerous rock types. Beyond the debitage, other flaked stone here includes an exhausted core of chalcedony and two production-stage bifaces: a small end fragment of chert and a distal end segment of a late stage preform of quartzite. Grazing, wind erosion, and a few rodent burrows have impacted the site. No evidence of buried materials was noted in these disturbed areas.

The Historic period component is limited to a single can fragment, located at the north edge of the site. Obviously it would be an isolated find if not associated with the prehistoric component here.The side seam is crimped, and it has a diameter of just over 3″—perhaps a 16 oz can of the 303 size. The rusted base is embossed, but only partly legible: "ESTAB…". It likely post-dates the WW-I era. Clearly, the historic component does not contribute to the NRHP eligibility of the site and likewise the prehistoric component is evaluated not eligible for the NRHP.

5WL7374 (PBS-AT-1-2013) also contains both prehistoric and historic components, located just northeast of 5WL7377 at a bend in South Pawnee Creek where the stream has begun to incise a shallow arroyo. The prehistoric component is a small lithic scatter exposed in the east bank of South Pawnee Creek, with some artifacts washed down into the bottom of the drainage [note: although the general flow of the creek is eastward, the meander here loops nearly due north; Figure 20]. At least fifteen flakes are scattered thinly on the surface. These include a slight majority of thinning flakes and lesser numbers of core reduction flakes and flake fragments. One dark gray, translucent flake was collected (FS-1) on the hillside above the creek, field identified as obsidian, but later verified to be chalcedony. Other materials recorded include quartzite (most abundant), chert, jasper, and Morrison silicified sediment. No tools or features have been observed.

The Historic period component is a very sparse trash scatter probably related to the ranching industry. Only three artifacts are present: a 3 cm diameter wire/cable hoop and two sun-colored amethyst glass fragments, all located in the dry bed of the creek. The glass is diagnostic of bottles manufactured in the period 1880–1920.

Although the historic component here is not significant, the prehistoric component is evaluated potentially eligible for the NRHP based on the possibility of intact buried materials as suggested by the context of artifacts eroding from the bank of the creek.

Figure 20. General site overview at 5WL7374 looking south up the meander in South Pawnee Creek. Note the flagged artifact at the erosional scarp on the left, marked by the arrow.

5WL7375 (PBS-AT-2-2013) is an open camp of the prehistoric era located just below a ridge crest on a moderate, south-southeast facing slope about 30 m above South Pawnee Creek, north of 5WL7374 and just east of 5WL7381. A total of six tools and 15 flakes were dispersed relatively evenly throughout the site. Tools observed include both flaked stone and ground stone, and consist of three expedient flake tools of chalcedony and petrified wood, a quartzite graver, a jasper scraper, and a possible comal (cooking slab) fragment of sandstone. None are diagnostic of the time period(s) of occupation. Quartzite, chalcedony, chert, and petrified wood are present in roughly equal quantities, with jasper also present. In the debitage assemblage, the flake stages represented include core reduction and thinning. No features or structures have been observed. Activities occurring at the site include lithic reduction, tool

manufacture, and vegetal resource processing. Based on the location of the site on the slope above the creek with expansive views to the east, south and west, the site could also have functioned as a game overlook/hunting station. There is some soil development here as evidenced by an erosional cut, with some potential for buried cultural materials. The site is evaluated potentially eligible for the NRHP.

5WL7376 (PBS-AT-3-2013) is a multi-component prehistoric and historic site spread along the gently rolling hill slopes just above South Pawnee Creek, with a gradual southeast slope toward the creek bottom about 40 m away. Site 5WL7377 is a short distance northeast of here, and 5WL7183 is across the creek to the southeast. In the prehistoric component, an open lithic scatter, artifacts are sparsely but widely distributed across the surface of the slope in an area of 100 m × 60 m. Six tools including five expedient flake tools and one graver have been recorded, representing five different local raw materials. Tool production evidence is in the form of one core fragment of quartzite and eight flakes of quartzite, chalcedony, and chert. The most common material among the 15 documented artifacts is quartzite; other materials present are petrified wood and agate. No diagnostic artifacts were found, nor have any features been observed at the surface.

The Historic period component is limited to just two artifacts in the western part of the site, and would have been recorded as an IF but for their spatial overlap with the lithic scatter. The two items are a rusted, square metal fuel can bottom and about 20 ft of twisted wire cable. There are no historic features present. The fuel can is found in the northwest corner of the site and the wire cable is located near the southwest edge. The distance between the two artifacts is approximately 65 yards. The cable is not closely associated with any prehistoric artifacts; the fuel can is associated with a cluster of four expedient tool flakes. Ground visibility on site is poor to fair, 20% or less. Disturbances include wind deflation, minor slope wash, grazing, and rodent burrowing. The potential for buried material is low given the amount of rodent disturbance that has not turned up any artifacts from subsurface contexts. The site is evaluated not eligible for the NRHP.

5WL7377 (PBS-AT-4-2013) is an open prehistoric lithic scatter located just below the crest of a prominent hill, on a south-southeast facing slope above South Pawnee Creek in a position affording good views of the creek. Sites 5WL7374 and 5WL7376 are nearby, to the northeast and southwest, respectively. The location, just below the crest of the hill, may indicate that it was used as a hunting lookout. The dominant lithic material is quartzite, but the range of material is diverse relative to the total number of artifacts with chalcedony, chert, and agate also represented. Artifact density is low with about 25 items dispersed over an 1130 m^2 area, and the diversity of those materials is limited with only flakes, expedient tools, and a core observed. The

ratio of expedient tools to flakes is approximately 1 to 3. Debitage is characterized by a plurality of intermediate stage thinning flakes and fewer early stage core reduction flakes, in the absence of evidence for any late stage finishing or tool maintenance activities. Rodent burrows indicate soil depth to be greater than 50 cm, but there is nothing exposed in these disturbed areas or elsewhere to suggest the presence of buried materials. The site is evaluated not eligible for the NRHP.

5WL7378 (PBS-13-AW4) is an open lithic scatter located on the east side of a gently sloping knoll in the SW corner of the section, more than 500 m southwest of the nearest other site recorded (5WL7382), overlooking a southern tributary fork of South Pawnee Creek. The site shows evidence of light erosion/deposition, as well as cattle grazing and animal burrowing. Artifact distribution is relatively even throughout the site and is represented by debitage in the core reduction, thinning (most predominate), and finishing stages of production; only one tool has been documented. Flake materials include slightly more Morrison silcrete than the other three rock types identified: chalcedony, quartzite, and jasper. The lone tool is a small (approx. 2.5 cm long by 2 cm wide) utilized flake of jasper that exhibits working on at least two edges. All artifacts are found on the site surface. No features or diagnostic artifacts have been observedand there is no evidence to suggest subsurface deposits exist. The site is evaluated not eligible for the NRHP.

5WL7379 (PBS-13-AW5) is a Historic period trash scatter located in a shallow depression/basin, dry at the time of recording, within a southeast-flowing tributary drainage of South Pawnee Creek at the far northwest edge of the surveyed parcel. The artifacts appear to be randomly distributed throughout the eastern portion of the site with a cluster, designated Feature 1 (F1), to the west. Site formation is representative of aeolian and, especially, alluvial processes. Based on the nature of the depression, it may be reasonable to assume that the artifacts have been subject to repeated partial burying and re-emergence as well as movement throughout the lower site vicinity over time. Artifact diversity is represented by ceramics, glass, and industrial items including animal shoes. No diagnostic artifacts were identified, although general eras are associated with certain glass colors and ceramic wares.

Comparable if not better chronological evidence comes from land records showing that Sections 35, 26, and 25 surrounding the state school section have government land transfer records dating to 1913, 1914, and 1915, which implies that physical settlement of the area may have occurred as early as 1908. Census records confirm land patent owners Kern McCoy for the west ½ of section 25, and William A. Gillaspie for the east ½ of section 35 were accounted for in the area as of 1920. Later census records indicate these individuals moved elsewhere, and land patent records from 1939 and 1942 show a transfer of ownership of sections 25 and 26 back

to the U.S. government as was typical in the aftermath of the Dust Bowl era. Thus the site deposits likely date to 1910–1940, give or take a couple years. However, the lack of physical integrity of the deposits within the drainage system, lack of architectural features, and low potential for intact buried material show the site is not eligible for the NRHP.

5WL7380 (PBBC-1-2013) consists of an open lithic scatter on a relatively flat section of short-grass prairie about 40 m north of South Pawnee Creek, between 5WL7376 to the northeast and 5WL7382 to the southwest. The artifacts are clustered in a few distinct areas with the largest cluster on the west edge of the site. Two tools and twenty-three flakes have been recorded at the site. The two tools are of moss agate; one is an expedient flake tool and the other a possible spokeshave. The predominant debitage materials are quartzite and chalcedony with lesser amounts of chert, petrified wood, and a possible volcanic material also present. Some modern debris in the form of pieces of a tail light and tail light bracket from an automobile have been observed on the site as well. No prehistoric features or diagnostic artifacts are present at the surface, and there is a low potential for intact buried remains here. The site is evaluated not eligible for the NRHP.

5WL7381 (PBS-BC13-2) is an open lithic scatter with a wide range of flaked stone material types. The site is located on a relatively flat ridge top just above (west of) 5WL7375, overlooking the dry drainage of South Pawnee Creek about 200 m to the south. Also, a cable marker pole recorded on 5WL7181 is 37 m from the southeast edge of this site. This location commands an expansive view to the south and east of the creek. Thirty-three flakes are evenly scattered around the site, among which chalcedony and quartzite are the most common materials and thinning flakes are the most numerous flaking stage represented. A small chalcedony projectile point, just under 3 cm long with a broken tip and shoulders but likely a corner-notched style, was located near the northwest edge of the site and collected as FS-1 (Figure 21). It most likely dates to the Early Ceramic period ca. AD 200–1000. Two rectangular blocks of petrified wood have been found, one about 8 cm × 2 cm wide which does not appear to have been worked and another of about the same size which is probably a flake. The brown sandy loam soil has an estimated depth of 10 cm. Impacts include wind and water erosion, cattle grazing, and rodent activity, and in these disturbed areas there is no evidence of materials being exposed from buried contexts. The site likely functioned as a tool manufacture locus and hunting station, and is evaluated not eligible for the NRHP.

5WL7382 (PBBC-3-2013) is an open lithic scatter on a south-southeast facing gentle grassy slope overlooking South Pawnee Creek, which is approximately 45 m from the site. Nearby to the east-northeast is site 5WL7380. There are two small

clusters of flaked stone debitage in the southern portion of the site. The remaining artifacts are primarily on the east side of the site, with just a few pieces found on the west side. A tan-yellow Morrison silicified sediment is the predominant material on the site, comprising almost half of the debitage found. The rest of the debitage is comprised of chalcedony and chert, with a single flake of petrified wood and quartz also noted. No tools have been found. The site was likely a single use or occasional stopping point as a chipping station. The lack of tools and very limited potential for buried remains here indicate the site is not eligible for the NRHP.

Figure 21. This arrow point fragment collected from site 5WL7381 was likely a corner-notched form commonly encountered in Plains Woodland contexts of the Early Ceramic period (cat. # 5WL7381-1).

5WL7383 (PBBC-4-2013) consists of a small and sparse open lithic scatter located on the southern slope of a hill between two northwest-to-southeast running drainage tributaries of South Pawnee Creek. The location is about midway between sites 5WL7379 to the north-northwest and 5WL7381 to the southeast. The flaked stone artifacts are randomly dispersed over the site with the majority to the south; all

are in surface contexts with no indication of exposure from buried horizons. Only debitage has been found including Morrison silicified sediment (most common), chalcedony, and chert. Early and intermediate stage core reduction and thinning flakes are represented, with no evidence of late stage finishing or maintenance activity present. No diagnostic artifacts or features have been observed. The site is evaluated not eligible for the NRHP.

Wild Horse Creek Parcel

5WL7201 (PBS-KB12-1) is a sparse lithic scatter on a slight east-facing grassy slope, just south of Weld County Road 112 in Section 36 southwest of the Pawnee Buttes. The 920 sq m site is near the top of an alluvial wash sloping off to the east on the open plains; a short distance past the section line, this wash empties into an unnamed spring-fed drainage. Flaked and ground stone artifacts on this site occur in two spots about 33 m apart. The larger lithic cluster to the west includes three tools and nine flakes, while to the east is a single pair of flakes in close proximity. All are surface finds, among which are tools in three different classes: one thin ground stone fragment of sandstone (possibly a cooking slab/comal), a quartzite biface fragment, and a bifacial chopper made from a gray volcanic material (welded tuff?) with quartz inclusions. The flakes represent only core reduction and thinning steps in the manufacture process, but include diverse materials such as quartzite, chalcedony, chert, and the possible welded tuff. Disturbances are from large seismic tire tracks, ant hills, some cattle grazing, and minor water erosion. With a moderate potential for buried materials and the presence of both flaked stone and ground stone tools, this short-term camp is evaluated potentially eligible for the NRHP.

5WL7202 (PBS-KB12-2) is another sparse lithic scatter, located near the center of a grassy "T" shaped hilltop just over 500 m east of Wild Horse Creek, 150 m south of Weld County Road 112, and approx. 3 mi southwest of Pawnee Buttes. One tool, a small production-stage biface of gray chalcedony (possibly Flattop Butte source material), was found in the northern portion of the site. The debitage observed—four core reduction and four thinning flakes—is almost evenly split between quartzites and cherts and a single flake of Morrison silicified sediment that represent early and middle stages of tool manufacture. One of the thinning flakes is an overshot specimen. The observed tool and debitage coupled with the hilltop location suggests occassional brief usage of the hillside for tool manufacture while watching for game below—a possible hunting station. The age(s) of the site is unknown due to the lack of diagnostic materials.Potential for buried material is low here due to the shallow soils along with the sparse nature of the surface scatter despite good ground visibility. Natural erosional processes on the north boundary have caused the primary site

disturbance, along with some wind deflation on the hilltop. The site is evaluated not eligible for the NRHP.

5WL7203 (PBS-KB12-3) is a very small prehistoric lithic scatter located just below the top of a low hill on its east slope with a good view of the prairie below where 5WL7201 was recorded. Only one tool and a few flakes were present indicating this area was used quite briefly. The single flaked stone tool found is a utilized flake of moss agate, with scraping-type unifacial use wear on one edge. The tool and two other pieces of debitage are core reduction flakes of a similar brown/gray chalcedony. A broken flake of yellow Morrison silicified sediment and a core reduction flake of white chalcedony also have been recorded. Except for the white chalcedony flake, all the other flakes and flake tool are located in a spatially confined cluster. The elevated site location overlooking the prairie beyond suggests that this site may have been a hunting station. The chosen spot just below the crest of the hill is not uncommon in hunting scenarios where the hunters place themselves such that their silhouettes are below the horizon as viewed from the position of the game animals. This very limited site is evaluated not eligible for the NRHP.

5WL7204 (PBS-KB12-4) consists of a sparse flaked stone scatter located on a gently sloping bench and adjacent east-facing hill slope on the furthest east end of a hill and ridge complex, near the center of the section and south of 5WL7203. This location affords an expansive view of the prairie to the east, north, and especially to the southeast. Within the scatter, there is a small cluster of artifacts near the toe of the slope. Two flake tools have been documented here, perhaps indicative of meat/hide-working in a hunting station context. One of the tools is a small, brown chalcedony flake with a unifacially retouched and utilized lateral edge. The second tool is a large, dark gray quartzite(?) spall with one ventrally utilized concave lateral edge and with dorsal retouch and use wear on the opposite, straighter lateral edge. No diagnostic artifacts or features have been observed, and no artifacts were collected. Considering the sparse nature of the artifact scatter, the debitage assemblage on site is somewhat diverse with flakes representing early and intermediate stages of tool manufacture. Raw materials noted include probable Flattop Butte chalcedony, various cherts, welded tuff with quartz inclusions, and quartzite. The potential for intact buried material of any significance on the rocky hill slope here is low. Thus, the site is evaluated not eligible for the NRHP.

5WL7205 (PBS-KB12-5) is another multi-component prehistoric and historic site. It is located on the south slope below the top of a flat, low hill with a good view of the prairie south and west, immediately southwest of 5WL7204 near the center of the section. There is a stock tank and windmill to the south and an unnamed spring to the east. Three oil wells are visible just beyond the windmill to the southwest, south,

and southeast, two of which were drilled after this site was recorded in 2012. Three Historic period quarries are gouged out of the hillside: Feature 1 on the southwest side of the slope, Feature 2 on the south face of the slope, and Feature 3 on the southeast side; prehistoric artifacts are sparsely scattered around these features. The prehistoric component has a small scatter of lithics including two tools, perhaps indicating a temporary hunting station, although the historic quarrying may have destroyed more substantial prehistoric materials.

One Morrison silicified sediment tool appears to be the tip of a projectile point, approximately 1.3 cm long × 1.2 cm wide (collected, FS-1). It was found on the almost-intact slope between Features 1 and 2, just beyond the northeast edge of the westernmost pit. One pink chalcedony tool, found in Feature 1, has a worked edge, possibly a fragment of a scraper. Two chalcedony core reduction flakes also occur here; one was found above Feature 2 on its northwest side and the other was found below and to the southwest of Feature 2. In addition, scattered down the slope are chunks of cherty white shale or limestone, which are from Oligocene sedimentary beds of the White River Group (Brule or Chadron formations). Although evidence of lithic procurement activity is minimal at this site, elsewhere in the region there are well-documented chert sources in the White River Group and adjacent Pliocene outcrops (Greiser 1983; Miller 2010:592). Two raw material samples of lustrous white chert and dendritic pink-brown chalcedony were collected (FS-2) from the top of the rimrock above Feature 1 almost directly above FS-1 (Figure 7). No diagnostic artifacts were found so no time period can be assigned, nor have any prehistoric features been located outside the quarry features. The rocky slope suggests low potential for intact buried material, and as previously noted the Historic period quarrying has destroyed much of the slope.

The Historic period component at 5WL7205 consists of three adjacent excavated areas on the south slope of the hill, labeled Features 1-3 west to east (Figures 22–23). Feature #1 is excavated on the southwest side of the slope and is approximately 200 ft wide at the top, 150 ft long, and 8 ft deep. The excavation appears to be three trenches extending upward and radiating from the bottom. The base is ramp-like and accessed by a two-track road. Feature #2 is excavated into the south face of the slope. The cut is about 150 ft wide at the top, about 130 ft wide at the bottom, 100 ft long, and 15 ft deep. It terminates on the downhill side in a 25 ft wide ramp. There is evidence of a two-track entering this ramp. Feature #3 is excavated on the southeast slope of the hill and is 200 ft wide at the top, 100 ft long, and 15 ft wide at the bottom. Three gouges radiate up the hill from the entry ramp, which is about 15 ft wide with evidence of a two-track leading into it. No artifacts have been found in association with the pits, and the purpose of the quarrying is unclear, perhaps for

Figure 22. Easternmost portion of Feature 1 at 5WL7205, showing exposed bedrock with slabs of lighter colored cap rock eroding down.

Figure 23. North view of quarried hillside at 5WL7205. The scar denoting Feature 1 is at left just below the highest point of the hill, and Feature 3 is the smaller scar to the right. Feature 2 is the more vegetated but still rocky area between the other two cuts.

gravel or as borrow pits for soil and rock fill. Both components of the site are evaluated not eligible for the NRHP.

5WL7206 (PBS-KB12-6) consists of a sparse flaked stone scatter located on a gently sloping alluvial ridge-like terrace trending to the southeast toward a large spring-fed drainage. Weld County Road 112 is about 600 m north of the site. A fence line on the N-S state-private property boundary prevented examination of the eastern portion of the terrace on private land. Current evidence from that area of the site on state-owned land suggests there is good potential for the site to extend farther east on private land (i.e., closer to the spring). The limited number (six) of artifacts observed on state property is entirely of debitage, but representing all stages of tool manufacture. No tools, diagnostic artifacts, or features have been observed, and no artifacts were collected. Raw materials noted include quartzite, chert, and the distinctive welded tuff with quartz inclusions. There is some potential for intact buried material on the alluvial ridge, and that potential may be higher closer to the spring on as-yet unsurveyed private land. The site is evaluated potentially eligible for the NRHP.

5WL7207 (PBS-KB12-7) is an apparently sparse flaked stone scatter exposed in cutbanks on both sides of an east-southeast trending arroyo that has cut through an alluvial terrace on the west side of a large spring-fed drainage. As with 5WL7206 directly to the north, a fence line on the N-S state-private property boundary has temporarily prevented examination of the eastern portion of the terrace on private land. Current evidence from the portion of the site on state-owned land suggests there is excellent potential for buried material in the terrace soils, and for the site to extend farther east on private land (i.e., closer to the spring). The limited number (five) of artifacts observed on state property includes three flakes, a core fragment, and a graver (collected, FS-1). Four of those five artifacts (excepting one jasper thinning flake) were found in a loose cluster in the north cutbank of the arroyo near the fence line. The jasper flake was found a bit farther west in the south cutbank. All three pieces of debitage represent the intermediate thinning stage of tool manufacture. The collected graver was the only tool located. No diagnostic artifacts or features have been observed. Raw materials noted include chalcedony (at least one probably from the Flattop Butte source), chert, and jasper. The fact that all artifacts were found in cutbank contexts 30–60 cm below the surface is highly suggestive of the potential for intact buried material within the alluvial terrace, and that potential may be higher closer to the spring on as-yet unsurveyed private land.The site is evaluated potentially eligible for the NRHP.

5WL7208 (PBS-KB12-8) is a dispersed flaked stone scatter located on an east- to southeast-facing hill slope below the crest of the hill and ridge complex, directly south-southwest of 5WL7207. This location affords an expansive view of the prairie

and the spring-fed drainage to the east and south. Artifacts are spread from the relatively steep (30°) upper slope on the west—where slope wash impacts are greatest—down to the gentler toe slope on the east where a gully has exposed artifacts in its cutbanks. The site location on the slope is suggestive of a hunting station taking advantage of the silhouette concealment afforded by the higher ridge crest. Ten total flaked stone artifacts have been observed including two flake tools, a biface fragment, and a core. One of the tools is a thin, mottled purple-brown-gray chalcedony flake (Flattop Butte source) with a unifacially retouched and utilized distal edge, probably a butchering tool (collected, FS-1; Figure 24). No diagnostic artifacts or features have been observed. The limited debitage assemblage on site has flakes representing both early and intermediate stages of tool manufacture. Raw materials noted include probable Flattop Butte chalcedony, quartzite, and Morrison silicified sediment. The potential for intact buried material is greatest on the lower hill slope where artifacts have been found in the gully cutbanks. The site is evaluated potentially eligible for the NRHP.

Figure 24. This flake tool of Flattop Butte chert has a well-defined, utilized distal end (bottom edge in this view of the dorsal face; 5WL7208-1).

5WL7209 (PBS-KB12-9) is a dispersed flaked stone scatter located on the eroding southeast side of the hill and ridge complex, directly upslope and west from 5WL7206. This location affords an expansive view of the prairie to the east and southeast. Less than 20 total flaked stone artifacts and no features have been observed; diagnostic artifacts also are lacking. However, four tools have been documented here, all rather expedient in manufacture. Among these are a spokeshave and a large, heavy scraping tool found toward the east edge of the site, and two tools made on blade-like flakes located in a bowl-shaped erosional area. One siltstone core is bifacially trimmed around the edges only, and was found just above an incised wash at the far southwest edge of the site. No artifacts were collected. The limited debitage

assemblage here is dominated by flakes representing early stages of tool manufacture, with only minor evidence of biface thinning work. Raw materials noted include probable Flattop Butte chalcedony, moss agate, purple welded tuff with quartz inclusions, quartzite, chert, and siltstone. The potential for intact buried material of any significance on the eroded hill side here is low given the good ground visibility and lack of artifacts in the extensive cutbank exposures.The site is evaluated not eligible for the NRHP.

5WL7210 (PBS-KB12-10) is an open camp directly south of 5WL7209, located on an east-southeast slope below the crest of the hill and ridge complex. This location affords an excellent view of the spring area in the drainage to the east, and the prairie beyond. The gradient of the hillside is moderate on the upper slope, then rather abruptly levels to a gentle slope below. It is bisected by a drainage that has cut a deep gully with vegetated sloping sides in some sections, but with nearly vertical cutbanks in small areas. Although only seven flakes and a mano have been recorded here, the ground visibility was only fair due to heavy vegetation growth, and the context of a few of the finds in association with the gully suggests additional materials may be present in buried contexts and/or hidden within the vegetated surface. Debitage in the limited assemblage is representative of early to intermediate stages of tool manufacture, with an unusually diverse range of raw materials present considering the small number of flakes observed: Morrison silicified sediment, quartzite, moss agate, siltstone, and welded tuff have been identified. The mano (Figure 25) is a bifacial specimen of reddish brown quartzite with pecked and ground edges. Such formal types of ground stone are most often seen on camp sites that see repetitive use over spans of time. Given the possibility of buried material here, as yet untested, this site is evaluated potentially eligible for the NRHP.

Figure 25. Bifacial quartzite mano found at 5WL7210.

5WL7211 (PBS-KB12-11) is a very sparse flaked stone scatter located along an incised, east-southeast flowing dry wash at the eastern foot of the extensive hill and ridge complex, not far south of 5WL7210. Like other sites on this elevated landform, the location affords an expansive view of the prairie to the east and southeast. Just six artifacts have been observed, mostly in actively eroding contexts. Three of the artifacts, all flakes, have been found near a steep wash below a rounded knoll on the west end of the site. The only modified artifact is a light brown chalcedony (Flattop Butte source?) production-stage biface fragment with a white patina, representing an early step in the tool manufacturing process. No diagnostic artifacts or features have been noted here, and no artifacts were collected. The very limited debitage assemblage of five flakes is fairly diverse with pieces representing both early and intermediate stages of tool manufacture. Raw materials noted include probable Flattop Butte chalcedony, moss agate, Morrison silicified sediment, and jasper. The potential for intact buried material of any significance here is low given the very sparse findings despite good ground visibility and numerous cutbank exposures. It is evaluated not eligible for the NRHP.

5WL7212 (PBS-KB12-12) contains both prehistoric and historic components as divergent in significance as they are in age. The site covers a 57 m × 52 m area spread across the highest hill of the hill-ridge complex near the east section line, directly upslope and west of site 5WL7211. The prehistoric component exhibits a quite dense lithic scatter associated with two features, the latter both positioned on the very crest of the hill. In fact, the number of flaked stone artifacts recorded on this single site (n = 196) far exceeds the combined total from all other sites and IFs recorded in this parcel (n = 141). Most of the lithics are concentrated on the upper slope just southeast of the hillcrest. Included are a very wide variety of material types representing all stages of tool manufacture, plus numerous tools including projectile points representing multiple time periods (3 collected: FS 1–3; Figure 26), gravers, scrapers, and production-stage bifaces and unifaces. The larger site scatter extends across the hill in all directions from the crest.

On the very top of the hill is Feature 1, consisting of a loose cluster of large unmmodified rocks, about 21 in total, and averaging 30 cm diameter with a range of 13–45 cm (Figure 27). There is no evidence of the function, but the exposed location on the highest point on the hill suggests a possible ritual feature such as those related to shrines, vision quests, or fasting. Three meters to the south is Feature 2, a small cluster of fire-cracked rock but without any notable soil staining. The projectile point evidence suggests intermittent occupations in the Early Archaic, Middle Archaic, and Early Ceramic periods ranging between about 6500 BC and AD 1000. This component is clearly eligible for the NRHP on surface evidence alone.

By contrast, the Historic period component is limited to three metal artifacts that

would have been designated as an Isolated Find if they had not been found within the area of the prehistoric component. These items are scattered on the hilltop and its south slope; two are cans just 1 m apart on the south slope, one being a sardine can and the second a hinged lid tobacco tin post-dating 1910. The third artifact is a rimfire cartridge case on the hilltop a few meters east of Feature 1. None were collected, and this site component obviously does not contribute to the NRHP eligibility of the site as a whole.

Figure 26. Three projectile point fragments collected at 5WL7212. At left is an arrow-sized point of an unusual style (5WL7212-1); it may date to the Early Ceramic period, or may be a diminutive Hanna point of the Middle Archaic period. At center is the base of a large stemmed Archaic point, possibly Middle Archaic (5WL7212-2), and at right is a side-notched point of the Early Archaic period (5WL7212-3).

5WL7384 (PBS-KB13-13) is a sparse, open lithic scatter consisting of 12 artifacts widely scattered across two spur ridges and an intervening drainage, on the east side of the hill-ridge complex near the east section line. Nearby sites are 5WL7211 to the northeast and 5WL7212 to the northwest. No diagnostic artifacts, other tools, or features have been observed here. Lithic materials are somewhat diverse, including Morrison silicified sediment, quartzite, chalcedony, and welded tuff. All stages of tool production are present despite the limited number of artifacts, with early-stage core

reduction activity notably represented by both flakes and cores, as well as a tested pebble of chalcedony. The more complete of the two cores (of Morrison silicified sediment) is conical in shape, multi-directional with three working faces, one blade scar, and some cortex remaining. The second core is a small fragment of welded tuff. There is only a low potential for buried artifacts and features given the sparse surface remains despite good ground visibility.The site is evaluated not eligible for the NRHP.

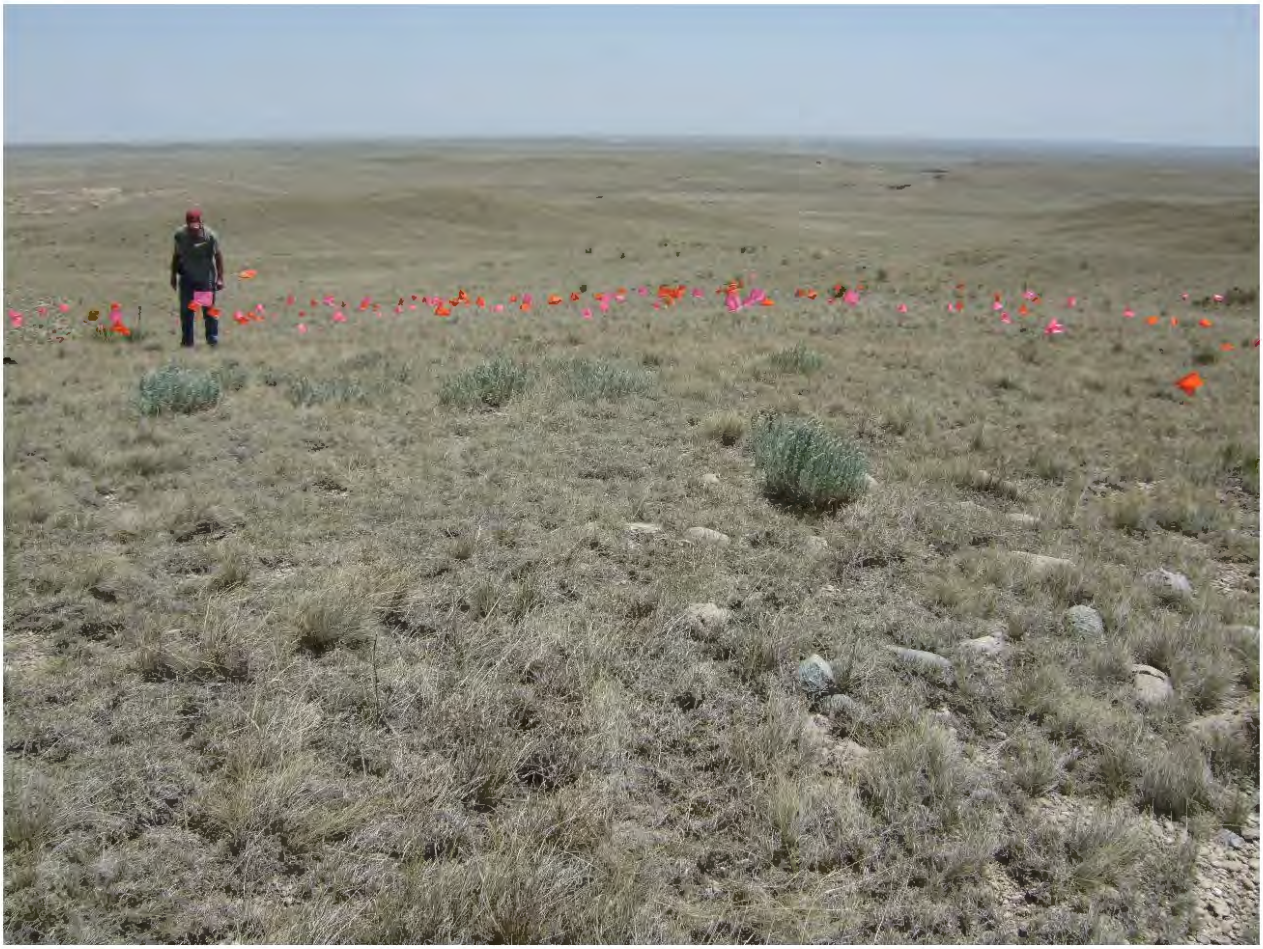

Figure 27. Overview of a portion of 5WL7212 looking southeast. In the right foreground is the Feature 1 rock cluster, with the flagged artifact concentration on the upper slope beyond.

North Pawnee Creek Parcel

5WL7385 (PBS-KB13-14) is an open lithic scatter or chipping station situated on a narrow peninsula-like interfluvial ridge between two intermittent drainages marked by deeply incised arroyos. The larger drainage to the south is an unnamed tributary of North Pawnee Creek, and the arroyo to the north, likewise unnamed, flows into the larger one in Section 9 to the northeast. Both drainages flow mostly in an easterly direction. The "peninsula" is actively eroding, with a central ridge crest; the erosion is

rapid enough to impart a badlands look to the terrain (Figure 28). To the east a small portion of the prairie remains intact, and this surface is up to 30 cm above the eroding slope around the mapping station where all artifacts are exposed. Lithics are predominantly of Morrison silicified sediment, with single flakes each of chert and chalcedony. Inferred activities include biface reduction and flake retouch, with mostly mid-stage thinning flakes noted. No ground stone or temporally diagnostic artifacts have been found. Although most of the flakes occur within a 6 m × 12 m area, overall artifact density is light, less than 1 per m^2, with the greatest concentration being 4 flakes/m^2. There is no defined activity area. Two tools have been documented thus far. One is a biface fragment of red Morrison silicified sediment, found in two pieces 14 m apart that refit. The biface broke across the middle and along the lateral edge. The second tool is a retouched flake of yellowish Morrison silicified sediment with some reddening on its edges and dorsal face. The best potential for buried artifacts and features in intact deposits is in the eastern, less eroded part of the site area. The site is evaluated potentially eligible for the NRHP.

Figure 28. Overview of site 5WL7385 in the foreground looking southwest toward the Chalk Bluffs in the distance. Note the actively eroding "badlands" landscape along the North Pawnee Creek tributary adjacent to the site.

5WL7386 (PBS-KB13-15) is an extensive scatter of diverse domestic and ranch-related trash spread along an east-west trending ridge just south of the east-flowing tributary of North Pawnee Creek mentioned above. Although this site is almost due east of site 5WL7385, it is on the opposite side of the drainage. The densest part of the site is defined as a dump, Feature A, measuring about 105 ft × 65 ft and containing hundreds—if not thousands—of pieces of metal ranging from < 1 inch to 5–6 ft long such as cans, buckets, basins, and other domestic items including a bed frame and cast iron stove parts. Other non-domestic metal materials include nails, baling wire, barbed wire, license plates (1931 and 1934 dates), windmill blades, oil cans, a grease gun, 55 gal drum lids, plumbing pipes, and vehicle and wagon parts. Two broken shovel blades had been identically reshaped as hatchets (Figure 29). Also present within the dump area are thousands of glass bottle and dish shards, mostly colorless along with some sun-colored amethyst, amber, brown, aqua, cobalt, milk, and light green pieces. Nearly whole glass containers include a one quart-sized sun-colored amber bottle and a sun-colored amethyst vase. A variety of ceramic items has been noted as well: thick crockery fragments; dinnerware with blue and white East Asian designs, yellow with green floral designs, white with pink roses, and white with black geometric designs; and a white porcelain dog figurine.

No architectural features have been observed, but a few broken bricks and pieces of dimensional lumber are within the dump. The Feature A dump is in the western portion of the site with more widely scattered items spread to the east (especially metal cans and lids), north, and south. Artifacts are found entirely exposed on the surface or only slightly buried, with no evidence of deeper burial in the eroding areas of the site. The totality of artifact styles indicates an age range for the dump in the first few decades of the 20th century, although the oldest diagnostic item recognized is a soap dish with a Mellor & Co. maker's mark dating to ca. 1894–1900. The nearest habitation to this site is the Nelson Ranch about 0.65 mi to the east, established by Soren and Sena Nelson around 1889, based on a homestead patent granted March 8, 1894. Mr. Nelson had also purchased about 80 acres farther north-northeast on October 29, 1889 (records on-line at http://www.glorecords.blm.gov/). Although there are an abundance of artifacts here, they generally represent mass-manufactured items in a dump context spatially removed from their locations of primary use. There is a very low potential for intact buried remains of a different character and, thus, the site is evaluated not eligible for the NRHP.

5WL7387 (PBS-KB13-16) has both prehistoric and Historic period components, lying west of a gravelled well access road, about 20 yards north of a bend in a fence line. The location is on the north section line between sites 5WL7388 to the west and 5WL7679 to the east; the Nelson Ranch is farther to the east and the Pawnee Buttes are 1.5 mi to the south. Prehistoric evidence is limited to a single artifact that would

have been separately documented as an isolated find except for it's location at the east boundary of the historic site. It is a core reduction flake of mottled yellow-gray-red Morrison silicified sediment. There is no evidence of cortex, edge retouch, or use, although the dorsal face has numerous partial flake scars from earlier core reduction activity. The flake was found on the upper eroding slope of a ridge, just below a low erosional scarp about 10–15 cm high. A careful search of adjacent eroding areas failed to detect any other cultural material despite excellent ground visibility.

Figure 29. The frugality inherent in early ranch life on remote stretches of the Colorado plains is readily apparent from these broken shovel blades repurposed as hatchets, site 5WL7386.

The Historic period component is a small dump area containing mostly bottles, cans, metal scrap, and a few ceramic fragments. The highest density of trash lies in a depression below a cutbank: about 5 artifacts per square yard on the south end of the site where there are large numbers of sanitary cans, glass, and white stoneware. Also, there are unbroken bottles of brown glass, green glass, and colorless glass. Markings on bottles include "Clorox" (dating to the early 1930s), "Absorbine" (pre-1930), and several maker's marks; one fluted condiment bottle also is present. The entire

assemblage indicates an early 20th century date range for the dump. All artifacts are on the surface or are partially buried. There is a low potential for more deeply buried material of any significiance, and no architectural features are present. The site is evaluated not eligible for the NRHP.

5WL7388 (PBS-KB13-17) also has both prehistoric and Historic period components and, like 5WL7387 directly east of here, this site straddles the north section line of the surveyed parcel. The prehistoric component is a scatter of at least eight flaked stone artifacts, including three tools, located on the upper north-facing slope of an east-trending ridge, overlooking the deeply incised wide, grassy drainage to the north—the unnamed tributary of North Pawnee Creek also near sites 5WL7385–7387. Seven of the eight observed artifacts are located on the uppermost slope of the ridge just below an erosional scarp from which the artifacts may have been exposed relatively recently. This pattern is suggestive of the potential for buried materials within the uneroded portions of the ridge crest to the south. At least four material types occur here, mostly Morrison silicified sediment, along with quartzite, jasper and Flattop Butte chalcedony. Tools include two expedient flake tools (one of Flattop Butte material collected, FS-1) and a jasper composite tool fragment, possibly a scraper-awl. No features or diagnostics have been noted at the surface.

The Historic period component is composed of two related features that establish the east-west boundary between privately-owned Section 9 to the north and state-owned Section 16 to the south. A General Land Office (GLO) Survey monument dated 1917 and marked by a later, metal fence post is at the center ¼ on the section line (Figure 12). From that point westward for about 325 ft are the remnants of a barbed wire fence marked by broken fence posts (hewn, probably juniper) lying flat on the ground, a few pieces of barbed wire and several large rocks wrapped with barbed wire to anchor the fence in eroding areas. One crushed tobacco tin and a fence staple are the only other artifacts noted.

As parts of a boundary marker with a minimal artifact presence, this component has little potential for buried material. However, the intact survey cap is of historical interest; the plat for this township found on-line at https://glorecords.blm.gov/default.aspx ascribes the land survey work in this area to Deane J. Wollf between November 26 and December 14, 1917. Along with the potential in the prehistoric component, the site as a whole is evaluated potentially eligible for the NRHP.

5WL7679 (PBS-KDB14-18) is a trash dump on the south side of an unnamed tributary of North Pawnee Creek, just east of a well access road between 5WL7387 to the west and the Nelson Ranch to the east. It consists of a surface distribution of

historic artifacts, principally sanitary can remnants, along with two sun-colored fluted glass bottles, a few fragments of milled wood, some pieces of metal strapping of various dimensions, and other metal scrap. The bottles have the maker's mark of Owens Bottle Co. manufactured ca. 1919–1929. A bone fragment located in the cutbank of the first terrace 9 inches below the surface is of a large mammal such as bison or, more likely, cow that probably dates to recent times with overbank flooding events providing the sediment source. Another bone fragment, also either cow or bison, lies 13 ft north of the buried bone on the surface just below the cutbank. Land records show that the Nelson family established the first ranch in this region ca. 1889, followed by others on parcels surrounding the school section in the early 20th century. The artifacts in this site are diagnostic of the latter period, especially the 1920s, and represent common mass-manufactured materials of the period, not in direct association with features such as architectural foundations. The site is evaluated not eligible for the NRHP.

5WL7680 (PBS-KDB14-19) has both prehistoric and Historic period components, located on the south bank of an unnamed east-flowing tributary of North Pawnee Creek, on its first terrace. A recently developed oil well pad is south of the site, and the access road for the well passes through the eastern site area. This site is near the west edge of the school section, rather remote from other recorded sites in the survey—the nearest is 5WL7682 nearly ½ mile to the north. The prehistoric component here is no more than an isolated find amongst historic artifacts.The sole artifact found is a white chert thinning flake, 3 cm wide × 3 cm long. There is no indication of other buried materials in the extensive cut bank exposures along the terrace edge.

The Historic period component is a trash scatter spread across a wide area of the terrace, mostly west of the well access road but with a few items scattered farther east. No concentrations of materials have been found, and no other features have been observed. Diagnostic artifacts include a pull tab beverage can, a "Maxwell House" coffee can, and one solder dot milk can. Other unique artifacts include pieces of milled dimensional lumber, floor skirting with tacks, a large piece of sheet metal, and bed springs. These materials probably date to the early-to-mid 20th century. All artifacts are located at surface level with little possibility of below surface features. The site is evaluated not eligible for the NRHP.

5WL7681 (PBS-KDB14-20) also has both prehistoric (in this case, paleonto-logical) and Historic period components, found on the north bank of the same unnamed tributary of North Pawnee Creek as 5WL7680 but well downstream, just over one mile north of the west butte of the Pawnee Buttes. It is located between the sandy, intermittent tributary and the first rise (terrace) above the north edge of the

floodplain. The south bank of the drainage is in the form of a high, nearly vertical cut bank, very unlike the low, vegetated north bank next to this site. The paleontological component here is a probable long bone fragment, the cortical wall only, likely from a medium to large mammal. Local bedrock is in the White River Group, Chadron (upper Eocene) or Brule (lower Oligocene) formations, but the site is on an alluvial terrace so the fossil is not in context. It measures 4.5 cm long × 2.5 cm wide with a projected shaft diameter of 4–5 cm; it was not collected.

The Historic period component is a dispersed artifact scatter. Among the materials observed here are many milled wood pieces and fence posts that are generally aligned parallel with the sandy, intermittent drainage at and just beyond its north bank. Clearly, water erosion has moved these structural elements from their original positions. There are other pieces of milled wood found in small concentrations, but no evidence exists for any buildings or other structures to account for the lumber. The diversity of artifacts beyond the wood includes metal cans, rope, signage fragments, wire nails, and fence staples. The most dominant artifact types are milled wood and sanitary cans. The potential for subsurface artifacts is low due to the location on a floodplain where evidence of flooding-related erosion is abundant. Diagnostic artifacts consist of sanitary cans and wire nails, placing the time period in the 20th century, most likely post-dating 1925. Both components of this site are evaluated not eligible for the NRHP.

5WL7682 (PBS-KDB14-21) is a Historic period site located on a low-lying plain near the north edge of the section, just south of the east-flowing tributary of North Pawnee Creek and southwest of site 5WL7385. The site consists of a possible feed shed (collapsed), standing posts, and associated but scattered artifacts (Figure 30). The main feature consists of wood boards, sheet metal siding, and the corrugated tin roof of a small collapsed building. This collapsed shed has one relatively intact wall indicating that the building was about 10 feet wide and about 5 feet tall. Wood boards around the wall suggest that the building was about 7 feet long. The intact wall contains a small metal hinged door centered at the top. Next to the collapsed building stand three large posts in alignment. Artifacts scattered across site include wood board and post fragments, pieces of metal, and a 6 foot long aluminum pipe. No diagnostic artifacts were found. Based on the relatively good condition of the metal and wood in the building remnants, the age of this site is estimated to be in the mid-20th century. There is no architectural or archaeological significance to this resource, which is evaluated not eligible for the NRHP.

Figure 30. Overview looking west at collapsed shed and standing posts in the 5WL7682 site area.

Geary Creek Parcel

5WL1239 (CA-134). This site is the only previously documented resource that was re-recorded during the PBS. It was first recorded on November 13, 1987 during a survey along a seismic exploration line by archaeologists from Centennial Archaeology, Inc. (Jepson 1987a), on a low ridge about 250 m northeast of Geary Creek. Their original recording identified an open camp as a flaked stone and ground stone scatter in a 105 m N-S × 77 m E-W area. Fire-cracked rock (FCR) and several tools were among their discoveries, including the base of a small corner-notched arrow point diagnostic of the Early Ceramic period ca. AD 200–700/1000. Both the projectile point base and a second point midsection were collected for curation at the University of Colorado Museum in Boulder. A very similar surface scatter of flaked stone, ground stone, and FCR fragments was observed by our crew when the site was re-visited in June 2014.

The site lies along the northern section line in the northeast quarter of section 15 and is situated on the southeastern tip of a northwest-southeast ridge system. Today, a two-track road cuts through the site from the southwest to the northeast boundaries. Sizable stands of narrowleaf yucca thrive within the site area, one larger centrally located group, and the other smaller group situated along the northeast boundary, adjacent to the two-track. Vigorous growth of the prairie grassland around the site area did limit ground visibility during our 2014 re-visit; two FCR concentrations were located as were two bifaces, one utilized flake, and numerous flake fragments, none of which are diagnostic. Centennial's 1987 recording indicates a similar artifact presence, with the addition of tested cobbles, and the aforementioned projectile point fragments. FCR concentration 1 (F1) is located along the western site boundary, about 20 m from a fence line, while FCR concentration 2 (F2) is approximately 35 m southeast of F1 along the southwestern site boundary.

The debitage observed is predominately thinning flakes, followed by core reduction and finishing flakes. Material types include silicified sediment, quartzite, chalcedony, chert, and jasper. Other than the FCR concentrations, artifact distribution is fairly even throughout. The extent of observed artifacts indicates that the site was used primarily for lithic reduction and tool manufacture. The presence of ground stone tools indicates that vegetal resource processing also took place. The original bell-shaped site boundary has shifted somewhat and now more closely resembles a triangular shape, although the overall site area remains largely the same. The intrusion of the two-track road, new since the original recording, has both disturbed the site and revealed its likelihood for subsurface deposits based on the discovery of an FCR concentration (F2) and a utilized flake in the disturbed soils adjacent to the track.The original field evaluation that the site is eligible for the National Register of Historic Places (NRHP) is supported by the latest examination.

5WL7647 (PBS-14-AW-1) is a multiple component prehistoric-paleontological and Historic period resource on the southwest side of Geary Creek, just east of Weld County Road 69 near the common corner of Sections 14-15-22-23. Geary Creek flows to the southeast about 50 m from the site (Figure 31). The prehistoric component is a 10 m long scatter of flaked stone and ground stone found in the southeast corner of the site along and slightly below a low ridge or terrace crest near the southern edge of the site. Ten thinning flakes consisting of two each yellow Morrison silicified sediment, yellow-red chert and brown chert, and one each of red Morrison silicified sediment, pink quartzite, and gray-white moss agate are relatively evenly distributed. A single piece of ground stone (sandstone mano) with bifacial polish is mapped near the eastern extent of the artifact scatter. A tested cobble of yellowish brown chert and a single piece of fire-cracked rock also have been found near Historic period depressions. The

tested cobble also displays a unique inclusion: a small brachiopod fossil (collected, FS-1; Figure 32).

All the artifacts were found on the surface and, without any diagnostic artifacts, no specific period of use can be determined. There is some potential for buried cultural material given evidence for soil depth at the historic era depressions and the location adjacent to the creek. The site functioned as a temporary camp where floral resource processing and the intermediate stages of flaked stone tool manufacture occurred. With only a single tested cobble noted and no early stage reduction flakes present, lithic material procurement and initial core reduction activities were minor activities at best.

Figure 31. Overview looking southwest across Geary Creek to the 5WL7647 site area spread along the slope on either side of the figures in the photo center.

The historic component is a farm unit/homestead on a northeast-facing slope above Geary Creek. The artifacts are scattered over a very extensive area of 525 ft × 260 ft. There are four large depressions (Features 1 through 4) of various sizes on the terrace tread above the slope. Features 5 and 6 are partially buried poured concrete constructions that may be remnants of foundations. There are also several metal

pipes, bolts, or rods deeply embedded in the ground across the site. Feature 7 is one of these bolts. Feature 8 is a wooden post in the ground. Features 9 and 10 are the locations where a majority of domestic artifacts are concentrated west of the most westerly depression.

Figure 32. Fossil brachiopod embedded in a tested cobble of chert, cat. # 5WL7647-1.

Artifacts noted are mostly domestic items such as glass and ceramic shards, numerous unidentifiable metal cans of various sizes, some buttons and shoe parts, a large variety of assorted flat metal parts, and some pickup truck body parts. There is a large quantity of unidentified bricks in several concentrations. The largest is on the terrace above the creek in proximity to the westernmost depression. A few have evidence of cement mortar adhering to the side of the brick. There are two wooden posts with farm wire fencing wrapped together lying on the surface at the bottom of the slope. Although there are disturbances to the site including large tire tracks from oil/gas exploration vehicles, anthills, and alluvial wash, the potential for intact buried materials within and near the architectural features is quite good.

This homestead may be associated with the artifact scatter documented at 5WL7648 a short distance downstream to the southeast given the proximity and the similar nature of the artifacts observed. Historical records indicate the area has been in state ownership since at least 1903, thus no homestead records exist for this specific parcel. However, US Census records for 1920, 1930, and 1940 document two families living nearby who may be connected to the site: Jacob and Helen Konig (with many children), and Berhart and Pearl Konig with their three children. Jacob was born in Germany about 1878 and immigrated around 1907. Berhart was likewise born in Germany around 1899, but is not listed among Jacob's children; he may have been a nephew. Today, the state land parcel is leased to James Konig, a likely descendent relative but not a member of the Konig families listed in any of those census records. The Historic period component at site 5WL7647 is evaluated eligible for the NRHP, and the prehistoric component is potentially eligible as well. However, the paleontological component is limited to a single fossil in secondary gravels rather than in a bedrock context, and is not significant.

5WL7648 (PBS-14-AW-2) also has both prehistoric and Historic period components, found on the southwest side of Geary Creek a short distance downstream from 5WL7647. The prehistoric component is limited to a single utilized flake made from butterscotch-colored quartzite, and found at mid-slope on a gentle, northeast-facing terrace slope. No diagnostic characteristics are present on the flake that would indicate either a time period or cultural affiliation. The flake retains 100% of the cortex on the dorsal face and measures roughly 5 cm × 3.8 cm. Edge morphology suggests use as a scraper, but microscopic analysis is lacking.

As noted previously, the relatively small scatter of historical artifacts present on this site is likely related to nearby site 5WL7647. It is likely that the SW¼ of the SW¼ of Section 14, being "vacant," was utilized by the surrounding landowners as a trash disposal area. Artifacts from the site are consistently representative of early 1900s manufacture and are largely domestic in nature. Artifacts are widely distributed throughout the site, with no concentrations or features were identified. Artifact density is low to moderate, as fewer than 100 total have been observed. Of those items, most are made of ferrous metals or aluminum, and are highly rusted and in deteriorating condition, missing part or most of their original forms. Two light grey salt-glazed stoneware rim sherds have been found, estimated to originate from a vessel measuring 8 inches in diameter. Overall, the artifacts on site are largely commonplace, mass-manufactured, domestic items lacking diagnostic traits or other relevant markings or typology that would tie them to specific individuals or important events. All artifacts were found on the ground surface and no indications of buried materials are evident. This site is evaluated not eligible for the NRHP.

5WL7665 (PBS-14-KLA-1) is a small open lithic scatter on a west-facing slope, on the second terrace above Geary Creek. The site overlooks the creek to the west and south at a sharp meander, and is a short distance south of 5WL7666 on the same side of the creek. Artifacts are concentrated on the southeast side of the site and are subject to downslope erosion. The surface assemblage includes one tool, a core, and thirty-two pieces of debitage. The core is of quartzite and shows multi-directional flake removal scars; it is within the artifact concentration near the south edge of the site. The lone tool is a brown chert/chalcedony utilized flake. Debitage on site is made up of five different lithic material types: quartzite, chalcedony, chert, jasper, and quartz. The debitage assemblage is dominated by core reduction flakes, thinning flakes, and angular debris suggesting initial core reduction and biface production. There is no evidence of tool finishing or maintenance activity. The site has a low potential for intact buried deposits due to erosion of the ridge slope, and is evaluated not eligible for the NRHP.

5WL7666 (PBS-14-KLA-2) is a multicomponent site with prehistoric lithics concentrated toward the north, associated with two Historic period depressions (F-1 and F-2) and an artifact concentration to the east and south. This location is on a knoll with good views of the prairie in all directions, but especially of the Geary Creek drainage to the south and west. Site 5WL7665 is nearby, lower in elevation to the south-southwest. The prehistoric component consists of three flaked stone tools and debitage, which are sparsely distributed in the northern half of the site. Nearest a fence line at the north edge of the site is an exhausted core of Morrison silicified sediment with possible use wear/retouch along the lateral edge on the dorsal side. Toward the southeast edge of the site is a bifacial tool also of Morrison silicified sediment with use wear/retouch along the proximal and distal edges of the dorsal side. West of the core tool is a scraper made on a core reduction flake of white-gray chert. Viewed from the dorsal face, one lateral edge is concave and the opposite slightly convex edge shows use wear/retouch. Other raw materials in the assemblage include chalcedony, quartzite, and moss agate. No diagnostic artifacts have been observed and no artifacts were collected. The potential for buried material on the rocky knoll is low. The additional presence of a few tested cobbles suggests very limited lithic procurement along with tool manufacture.

In the Historic period component, materials and features are mostly found in the eastern and southern portions of the site. Feature 1 (F1) is a roughly circular depression near the south edge of the site with a historic artifact concentration on the west side of and slightly overlapping it. Feature 2 (F2) is a north-south trending oval depression 30 feet × 21 feet × 5 feet deep. There is a slightly egg-shaped depression (1 foot deep) extending west from 5–8 ft on the western edge. These two ground depressions (F1 and F2) have partially filled in due to aeolian and alluvial deposits.

Artifact diversity is represented by domestic items such as ceramics, glass, tinned cans, and industrial items located mostly in the vicinity of F1 and F2, in the artifact concentration, and to the east and south. The presence of pressed amethyst glass supports a date range in the earty 20th century, and land records on adjacent privately-owned parcels suggest initial settlement in the 1910s after the State of Colorado gained title to our surveyed parcels in 1903. Artifacts here are not unique nor are they more specifically diagnostic, and were not collected. However, there is potential for buried artifacts and architectural details in the depressions. Those features and the dominance of glass, ceramics, cans, and unidentified metal objects suggest that the site was associated with a homestead. The site is evaluated eligible for the NRHP.

5WL7667 (PBS-14-KLA-3) also has both prehistoric and Historic period components, near the center of Section 23 well downstream from 5WL7666. The prehistoric part of the site is a small open lithic scatter with predominately core reduction flakes and angular debris represented, plus some evidence of testing of native cobbles. The site is situated on the top and gentle west slope of the second river terrace above Geary Creek, and affords an expansive view of the prairie to the north, east and especially to the south and southwest. Within the scatter there is a small concentration of reduction flakes and other debitage on the western edge of the rise. The only tool observed is a brown chert flake showing a unifacially retouched and utilized lateral edge. No diagnostic artifacts or features have been noted and no artifacts were collected. Raw materials present include Morrison silicified sediment, quartzite, chalcedony, and chert. Very minor lithic procurement, and the early and middle stages of tool manufacture are the primary site activities represented.

The Historic period component has a single artifact and would have been documented as an isolated find were it not for the fact that it is located within the prehistoric component. The artifact is a rusted and crushed sanitary can, estimated at 6″ high × 4″ diameter with a cut-around opening. However, the projected size is atypical and it may instead be a "Tall No. 3" can with standard dimensions of 4¼″ diameter × 7″ high. Such cans post-date 1904. The potential for intact buried material on the terrace and slope appears to be limited; this site is evaluated not eligible for the NRHP.

5WL7683 (PBS-KDB14-22) is a sparse lithic scatter on a terrace of an unnamed intermittent tributary of Geary Creek, just upstream of the confluence of the two drainages. The site is adjacent to a fence line marking the east line of the section, and is directly across the tributary drainage from 5WL7684. The site is almost level with a slight slope of 0–5% to the south and southeast toward the tributary. There is a small rise or knoll on the terrace toward the northwest end of the site which is the highest

elevation point of the site, and that contains one of two small clusters of flaked stone artifacts. The central portion of the site is somewhat lower where an eroded two-track road passes north-south through the site, crossing the drainage. A second cluster of 3–4 artifacts occurs on the southeast margin of the site, near the section line fence, including a core and core tool.

A total of 15 lithic artifacts were observed on the surface, all of which are located on the higher terrain within the site. The sparse distribution is in an elongated, roughly elliptical spread parallel to the tributary drainage. The material types present are moderately diverse with Morrison silicified sediment and brown chalcedony most common, and single flakes of chert and jasper also present. A dozen pieces of debitage, two cores, and the core tool have been documented. The majority of the flakes are core reduction and thinning flakes representing early to middle stages of tool production. The two small cores are of chert and moss agate. The core tool of brown banded chert is shaped on one end as a borer that may have been used on a relatively hard material such as bone or wood. None of the flakes appear to be utilized as informal tools. No diagnostic artifacts have been observed, nor have any features been located. The depth of cultural materials appears to be shallow, with no evidence of artifacts below present ground surface where deeper soils are visible in the cut banks along the drainage or in exposed subsurface soils along the two-track road. This site is evaluated not eligible for the NRHP.

5WL7684 (PBS-KDB14-23) is located directly southwest of 5WL7683 on the opposite side of the drainage, spread along the uppermost part of an approximately 5–6 m high embankment, above a sharp meander in the unnamed tributary of Geary Creek. It is a sparse scatter of flaked stone materials exposed along a 30 m long section of the prairie slope. Over half of the eleven artifacts noted are on the eroding slope, suggesting the very real possibility of a buried component. The depth of such a deposit is likely to be 50 cm or less based on the position of artifacts on the upper portion of the embankment. Among the items on the cut bank are a core of Morrison silicified sediment and a small tested cobble of chalcedony. The remainder of the artifacts, all flakes, is widely spread across the surface above the embankment. The majority of the flakes are from initial core reduction activity, with a couple of biface thinning flakes also present. Material types evidenced include agates/chalcedony, jasper, quartzite, and silicified sediment. No tools or features have been found thus far, however it is possible that significant materials remain buried and the limited artifacts exposed thus far reporesent only a small fraction of the total assemblage. This site is evaluated potentially eligible for the NRHP.

5WL7685 (PBS-KDB14-24) is a multi-component open lithic site and Historic period isolated glass jar due north of 5WL7683, on a small rise above the west side of

Geary Creek, and along the east edge of the surveyed section. The artifacts are distributed southeast-northwest parallel to the edge of the slope above the creek, with about half of the assemblage clustered in the center of the site around the highest point above the creek. Nearly 20 pieces of debitage have been observed on the site, but no tools or features have been found thus far. Similar to 5WL7684, some artifacts appear to be eroding out of the slope leading down to the creek and others are just beyond the top of the eroding terrace edge on the prairie surface, suggesting the presence of other items in buried contexts. Core reduction flakes are predominant and chert is the most common material. As mentioned above, no definite prehistoric features are present but there is a small depression (1.5 m diameter × 0.5 m depth) of uncertain origin/function just southeast of the artifact cluster. It appears to be too symmetrical to be natural—possibly it is a Historic period disturbance.

The historic component at 5WL7685 is a single glass jar which would have been recorded as an isolated find if not for its spatial association with the prehistoric lithic scatter. It is a small threaded jar; milk glass with a slight pink tint; and mold blown with a base seam, finish seam and side seam connecting the others. It is 2″ high × 1¾″ outside diameter × 1⅜″ inside diameter. Embossing on the base reads "MUSTEROLL CLEVELAND" [note: the last letter in MUSTEROLL appears to be "L" but it is more likely a faded "E"]. Musterole, a mustard ointment, was developed by A. L. McLaren in 1905 in Cleveland, Ohio. Unable to keep up with demand, he was joined by George Miller who sold his hardware store to invest in and expand production of the product. The Musterole Company was incorporated in 1907. Musterole was used to relieve chest congestion, coughs, minor sore throat irritation, and muscle aches and was distributed throughout the United States and Canada. Production was moved from Cleveland to Tennessee in 1956 when purchased by Plough Corp. (Encyclopedia of Cleveland history, https://case.edu/ech/articles/m/musterole-co/). As mentioned above, also present here is a small depression on the crest of the plain west-southwest of the jar, of uncertain age/function but perhaps more likely historic than prehistoric. Although the historic component is not significant, the prehistoric component does have the possibility to yield additional information and is evaluated potentially eligible for the NRHP.

The Isolated Finds

Seventy-seven isolated finds (IFs) were documented during the Pawnee Buttes inventory. Forty-eight of these 77 isolates are of prehistoric American Indian origin, 26 are non-Indian finds of the Historic period, and the remaining three IFs have limited materials dating to both the prehistoric era and Historic period (see Table 5). All of the IFs described below are evaluated not eligible for the NRHP.

South Pawnee Creek Parcel

5WL7187 (PBS-12-AW-IF1) is limited to a single ovate bifacial scraper, made of gray Flattop Butte chert. It is broken on the distal end, but has a symmetrical form with evidence of use wear on a beveled edge. It was found east of site 5WL7178 near the east edge of the section and north of South Pawnee Creek, on a south-facing ridge slope. This prehistoric tool was not collected.

5WL7188 (PBS-12-AW-IF2) is also a single prehistoric artifact, found a short distance southwest of 5WL7187 on the same south-facing ridge slope above South Pawnee Creek. It is a light pinkish-gray chert flake, probably from the Flattop Butte source. Although fragmented, it appears to be a biface thinning flake, and lacks obvious use wear or edge retouch.

5WL7189 (PBS-12-AW-IF3) is directly across South Pawnee Creek from 5WL7188, just above the creek on a north-facing slope. It is a short distance northeast of 5WL7176 and somewhat farther to the northwest of 5WL7175. The IF is limited to one thinning flake of Morrison "quartzite" or silicified sediment, not collected. There is no evidence of use wear or retouch on this piece of debitage.

5WL7190 (PBS-12-AW-IF4) consists of two pieces of debitage found to the south of South Pawnee Creek, a short distance south of site 5WL7176. One of the items is a flake fragment of yellow-brown chert, and the other is a broken thinning flake of light brown Morrison silicified sediment. Neither displays any evidence of use or edge modification.

5WL7191 (PBS-12-AW-IF5) is an isolated flake located above a northwest-flowing tributary of South Pawnee Creek, directly south of site 5WL7174 and west of IF 5WL7195. The lone artifact here is a thinning flake of yellow-brown Morrison silicified sediment, nearly complete except for minor damage along a couple of edges.

5WL7192 (PBS-12-AW-IF6) is another isolated flake found apparently eroding from a cut bank about 18 cm below ground suface on a southwest-facing slope, just east of site 5WL7174 overlooking a tributary of South Pawnee Creek. This piece of debitage is a small thinning flake of a yellow-brown silicate material, probably an unusually fine-grained Morrison silicified sediment.

5WL7193 (PBS-12-C-IF1) is a scatter of five flakes located in an area 25 m N-S × 18 m E-W, east of 5WL7184 and north-northeast of 5WL7177. The setting is at the upper edge of a south-facing ridge slope overlooking South Pawnee Creek, where the stream makes a looping meander that has cut through the end of ridge, creating a

prominent bedrock outcrop (Figure 33). The debitage here includes a white-tan chalcedony thinning flake, a white-gray banded chalcedony piece of angular debris, a red chert thinning flake, a tan chert thinning flake, and a brown chert thinning flake. None of the flakes display any evidence of use, and none was collected.

Figure 33. Overview looking south across 5WL7193 toward South Pawnee Creek and a sandstone ledge mapped in the White River Group (Oligocene).

5WL7194 (PBS-12-C-IF2) is a single core reduction flake of Morrison silicified sediment found at the northern edge of a cow wallow pit adjacent to historic site 5WL7179, just north of South Pawnee Creek and a stock pond. The flake material is tan in color with some yellowish-orange to brown iron staining on the surface; it measures 4.4 × 3.0 × 1.0 cm.

5WL7195 (PBS-12-C-IF3) is a small quartzite flake fragment found on a knoll above a dry tributary of South Pawnee Creek, east of IF 5WL7191. The material is yellowish-brown in color and the dimensions are 0.8 × 8 × 0.15 cm.

5WL7196 (PBS-12-C-IF4) is a prehistoric ground stone tool found south of site 5WL7182 on a northeast-facing slope above a dry tributary of South Pawnee Creek. The tool is a probable mano, made on a rounded cobble of gray, fine-grained gneiss. It is 11 cm long, 7.5 cm wide, and 7.5 cm thick. Use of the tool appears to be unifacial, with one fairly flat side displaying parallel striations. It was not collcted.

5WL7197 (PBS-12-C-IF5) is west of site 5WL7178 and just north of IF 5WL7199 on a south-facing, gently sloping hillside down to South Pawnee Creek. There are four prehistoric artifacts in total, scattered over a triangular area 2 m wide × 10 m long. One is a distolateral scraper made on a blade of pinkish-brown Flattop Butte chalcedony (collected as FS-1) and a second tool is another distolateral scraper, more discoidal in form and made from the same Flattop Butte chalcedony (collected as FS-2; Figure 34). The other two artifacts include a biface midsection of white-light gray chert with some serrations along both lateral edges, and a flake of yellowish-brown chert, neither of which was collected.

Figure 34. Collected scrapers from 5WL7197are both made from Flattop Butte chalcedony. At left is cat. # 5WL7197-1 and to the right is cat. # 5WL7197-2.

5WL7198 (PBS-12-C-IF6) contains two prehistoric artifacts found 5 m apart near small secondary drainage, northeast of South Pawnee Creek. The location is about 30 and 60 m south of IFs 5WL7199 and 5WL7197, respectively. The two artifacts here are both small, light brown quartzite thinning flakes lacking use wear or retouch.

5WL7199 (PBS-12-C-IF7) is 30 m north-northeast of IF 5WL7198, on a south-facing, gently sloping hillside down to South Pawnee Creek. It consists of two yellowish-orange quartzite thinning flakes, found less than 0.5 m apart. Neither is utilized or retouched, and they were not collected.

5WL7200 (PBS-12-C-IF8) is a Historic period resource located on a gentle, north-facing slope south of South Pawnee Creek, and northeast of site 5WL7185. The IF is limited to a metal vehicle fender, in rusted condition with no visible paint. The style represented could date from the 1940s or 1950s, contemporaneous with junked vehicles at site 5WL7182 directly east of here.

5WL7389 (PBS-13-AT-IF1) is located on a gently rolling slope of the plain south of South Pawnee Creek, north of site 5WL7185 and southwest of IF 5WL7200. Seven fragments from one green glass Coca-Cola bottle define this IF. Included are portions of the neck and finish with a Crown top shape; a body fragment embossed Coca-Cola in script; and a lower body fragment that is fluted. This is the well-known "hobbleskirt" style Coke bottle dating to the Historic period ca. 1915–1965; see http://www.antiquebottles.com/coke/.

5WL7390 (PBS-13-AT-IF2) is a prehistoric IF located on a small knoll south of South Pawnee Creek, and southwest of site 5WL7183. It consists of two possible groundstone (mano) fragments and a possible graver. The groundstone specimens are from a secondary gravel source; one is a reddish brown granitic material and the second is a gray igneous or metamorphic rock type. Both are wind-polished and unshaped. The possible graver is made on a quartzite flake.

5WL7392 (PBS-13-AW-IF7) is limited to a single piece of groundstone—a mano or handstone—with possible use wear on one face and pecking on one edge. The artifact was found on the surface of a south-facing slope northeast of IF 5WL7393, just north of South Pawnee Creek between two of its tributary drainages. The location is near the west boundary of the surveyed parcel. It was not collected.

5WL7393 (PBS-13-AW-IF8) is a prehistoric IF found on a south-facing slope southwest of IF 5WL7392, near the bottom of the drainage basin of South Pawnee

Creek on its north side, just downstream from its confluence with a south-flowing tributary. The IF is a single thinning flake of yellow-brown Morrison silicified sediment. The distal portion of one lateral edge has possible retouch on the ventral side suggestive of rather expedient use as a scraping tool.

5WL7394 (PBS-13-AW-IF9) is a Historic period IF found on the surface of a shallow, dry depression that appears to collect water intermittently. The depression is in a southeast-flowing tributary of South Pawnee Creek, at the far western edge of the survey parcel. This IF consists of two non-diagnostic fragments of white glazed earthenware. There are no decorative pattern or maker's mark traces to help refine the time frame other than in a general late 19th-20th century range.

5WL7395 (PBS-13-BC-IF1) is a prehistoric IF located on a slight north-facing slope about 150 m south of South Pawnee Creek, southwest of 5WL7390 and northwest of 5WL7185. It consists of three flakes spread out in rough alignment running northeast-to-southwest, spaced about 25 m apart from one another. The flake on the northeast end is a white chert secondary flake, in the middle is a brown quartzite core reduction flake, and the flake on the southwestern end is a white chert thinning flake. None show any evidence of use or retouch.

5WL7396 (PBS-13-BC-IF2) is a single historic artifact located on the bottom of the floodplain of South Pawnee Creek, east-southeast of IF 5WL7397 and south of 5WL7382. The sole item present here is a rusted 1922 Colorado license plate, tag #75794. Archival research to identify the person issued this tag has not been pursued, but there may be relevant records in the Colorado State Archives.

5WL7397 (PBS-13-BC-IF3) is also located on the bottom of South Pawnee Creek, just northwest of 5WL7396. The lone artifact here is a crudely flaked gray-brown chalcedony or petrified wood biface, with minor breakage along one edge. This early stage production item is not diagnostic, has no use wear, and was not collected.

5WL7398 (PBS-13-BC-IF4) is located southeast of site 5WL7378 in and along an erosional drainage, which is a north-flowing tributary of South Pawnee Creek, about 35–40 m from the southern edge of the survey parcel. It consists of 38 bottle caps (one with cork still attached), four pieces of clear glass, one tiny fragment of sun-colored purple glass, and a nearly complete sun-colored purple stemmed goblet glass (missing only the base; Figure 35). Additionally, two white chert flakes were observed. All were found within a 10 m diameter area. One of the flakes is a core reduction flake, and the other is a thinning flake. Sun-colored glass generally dates to the period 1880–1925 and the caps are of the crimped Crown Top style post-dating 1892. The wine glass and one bottle cap were collected.

Figure 35. Sun-colored goblet (FS-1) and Crown style bottle cap (FS-2) collected from 5WL7398. Note small fluted decorative pattern on the lower part of the goblet's bowl.

5WL7399 (PBS-13-BC-IF5) is a small artifact scatter located at the bottom of a gentle, south-facing slope just northwest of the confluence of South Pawnee Creek with a southeast-flowing tributary. This location is between IFs 5WL7401 to the west and 5WL7397 to the east. A total of seven pieces of flaked stone debitage is present here, scattered in an area roughly 25 m × 40 m. Of the seven pieces, four are chert thinning flakes, one is a Morrison silicified sediment core reduction flake, one is quartz angular debris, and one is a quartz thinning flake. None of these items were collected, and none showed any evidence of use or retouch.

5WL7400 (PBS-13-BC-IF6) is a hilltop isolate overlooking South Pawnee Creek to the southeast; a tributary of the creek is not far to the west and IF 5WL7394 is at that tributary to the northwest. This IF consists of five flakes scattered in an area roughly 10 m in diameter. Three pieces of debitage are Morrison silicified sediment, one is quartz, and one is chert. None of these items were collected.

5WL7401 (PBS-13-BC-IF7) is on a south-facing ridge slope located about 100 m north of South Pawnee Creek, between IFs 5WL7392 to the west and 5WL7399 to the east. It consists of a total of five pieces of debitage with no indications of use or retouch. Two are dark gray chert thinning flakes, one is a tan thinning flake of Morrison silicified sediment, one is a white and tan chert thinning flake, and one is a light gray chalcedony thinning flake. None of these items were collected.

5WL7402 (PBS-13-BC-IF8) is located on a slight northerly slope about 100 m to the south of South Pawnee Creek and north-northeast of site 5WL7378. Six prehistoric artifacts are scattered here in an area 20 m in diameter. These materials include two core reduction flakes of yellow-brown chert, one core reduction flake of Morrison silicified sediment, one chert thinning flake, one piece of granitic fire-cracked rock, and one tan chalcedony drill (collected, FS-1; Figure 36). The drill's bit is broken comparable to an impact fracture on a projectile point, suggesting the tool was being used with a kind of punching motion, nearly straight into the tip.

Figure 36. Chalcedony drill with broken tip, cat. # 5WL7402-1. The tip break is of a form (a lateral macrofracture) suggestive of use in a punching motion.

Wild Horse Creek Parcel

5WL7213 (PBS-KB-12-IF1) has one prehistoric artifact, located on a hill crest with a slight northeast aspect about 900 m east of Wild Horse Creek. This is a unifacial projectile point or point preform fragment of brownish-yellow petrified wood. Only the dorsal face is completely thinned; there are just a few marginal flake

scars on the ventral surface. Both the tip and basal edge are broken; the style appears to be contracting stemmed and its small size suggests an arrow point. It measures 2.32 × 1.58 × .42 cm.

5WL7214 (PBS-KB-12-IF2) is about 100 m southeast of 5WL7213 on the same hill, specifically on the upper northeast-facing slope at the east end of the hill just below its crest. This IF consists of two artifacts 16 m apart E-W: an early production stage biface of red quartzite measuring 5.7 × 4.2 × 2 cm, and a core in three fragments, made of dark brownish-purple welded tuff with quartz inclusions. The largest of the three fragments measures 6.1 × 5.8 × 3 cm.

5WL7215 (PBS-KB-12-IF3) is at southwest edge of the crest of a small flat-topped hill some 1.04 km east of Wild Horse Creek and directly above (north of) historic site 5WL7205. There are three artifacts clustered in a 4 m × 2 m area. Of most interest is a contracting stemmed projectile point of yellow Morrison silicified sediment, 4.63 × 2.15 × 0.63 cm, with a stem width of 1.34 cm and a mass at 6.9 g (Figure 37). Both of the other artifacts are core reduction flakes of purple welded tuff with quartz inclusions. The point was collected as FS-1 and is diagnostic of the Middle or Late Archaic period ca. 4600–1800 BP. Its tip may be impact fractured, and it shows secondary re-use as a scraper along one lateral edge. Of note is that the contracting stemmed style is not typically seen in western plains assemblages, being a better fit with Mountain Tradition and Colorado Plateau-Great Basin styles to the west with the names Park or Gatecliff Contracting Stem (Holmer 1993; Stewart 1970).

5WL7216 (PBS-KB-12-IF4) is located at the north end of a knoll with a gentle northerly aspect somewhat distant from any other recorded resource; the nearest water is at a large unnamed spring in the drainage 875 m to the east. There are two artifacts present, found 10.5 m apart NE-SW. One is an unbroken late production stage biface or preform of orange quartzite; its dimensions are 4.96 × 3.18 × 0.76 cm with a mass of 12.6 gm (collected, FS-1). To the southwest is a core reduction flake of yellow-gray chalcedony, not collected.

5WL7217 (PBS-KB-12-IF5) is northwest of 5WL7206 on the south edge of a small knoll, at the northeast end of the large hill complex that dominates the ladscape in the eastern portion of the parcel. Three artifacts are present in a 4 m × 1 m area, a core on the crest of the hill and two flake fragments on the upper slope immediately below. The largest artifact is an exhausted core of red quartzite with three working faces, and dimensions of 7 cm × 3.5 cm × 2.5 cm. The two unidentifiable flake fragments are also of red quartzite; their small size suggests biface thinning activity.

Figure 37. The collected projectile point of yellow-brown silicified sediment from site 5WL7215 has a small, slightly contracting stem. The lateral margin nearest the scale has been reworked as a beveled scraping edge.

5WL7218 (PBS-KB-12-IF6) is at a deeply incised (2.5–3.0 m) gully running eastward through an alluvial fan, between sites 5WL7211 upstream and 5WL7207 downstream. It consists of two pieces of flaked stone debitage found 7 m apart: a brown chalcedony flake found on the south cutbank of the gully, and on the prairie surface above is a larger flake, core reduction stage, of Morrison silicified sediment. The latter artifact has two Hertzian cones present where its platform has shattered.

5WL7403 (PBS-KB-13-IF7) is located on a gentle southwest slope at the western foot of the high hill complex, in the east half of the parcel. It is between IF 5WL7216 to the west and site 5WL7212 to the east. The sole artifact present is a brown chert biface—a nearly complete, late production stage (preform), with a minor surface patina from burning (probably natural grass fires). The preform measures 4.3 cm × 2.8 cm × 0.7 cm, and is generally ovate in form. It was not collected.

5WL7404 (PBS-KB-13-IF8) is a Historic period feature located northwest of site 5WL7209 on the crest of the hill complex at the northwest end of a ridge spur,

dropping steeply to the north and northwest. The feature is a small rock cluster, probably a cairn, constructed with four larger rocks in the center surrounded by five smaller rocks; there is a possible opening for a post in its center. The cairn's outer dimensions are 110 cm × 60 cm and the building material consists of unshaped native cobbles having maximum lengths in the range of 13–28.5 cm. Without associated artifacts, the specific age of the feature cannot be ascertained, but lichen growth on the rocks and vegetation within and around the pile suggest it may have been built as long ago as the late 19th or early 20th century (Figure 38).

Figure 38. Overview looking west from isolated cairn 5WL7404 in the center foreground. Note orange lichen-covered rocks.

5WL7405 (PBS-KB-13-IF9) is a prehistoric IF located on a low, south-sloping alluvial fan near the head of a small valley surrounded by hills; site 5WL7384 is a short distance to the north-northwest on a higher landform. There are two artifacts here found 25.5 m apart on a northwest-southeast axis. One is a tan quartzite spokeshave with two flaked notches on one lateral edge, one each made on the dorsal and ventral sides of the edge. This tool measures about 5 cm long × 5.8 cm ide × 1 cm thick. To

its northwest is a graver fragment of purple Flattop Butte chalcedony. The graver spur is on a lateral edge near the distal end and this small tool has dimensions of about 2.7 cm × 1.3 cm × 0.5 cm. Neither of these items was collected.

5WL7406 (PBS-KB-13-IF10) is southeast of IFs 5WL7407 and 7408, and has three artifacts—one historic/modern and two prehistoric—found in a 39 m long northwest-southeast zone. The IF is spread across a ridge crest and its upper slopes at the south end of the large hill complex where it is eroded into a series of knolls separated by small saddles; this location has west to south aspects with 2°–10° slopes.At the southeast end on the upper slope of a gravelly knoll is a rusted but modern horseshoe, fullered, with 5 countersunk nails still present. It is embossed "DIAMOND" above "HOT FORGED" on the hoof surface. The first commercial use of the Diamond Hot Forged label occurred sometime in 1971 (Justia Trademarks, https://trademarks.justia.com/730/77/diamond-hot-forged-73077164.html).

On a saddle about 13 m northwest of the horseshoe location is a dark brown quartzite core reduction flake. Another 26 m northwest on the west slope of a 2nd knoll is a reddish brown quartzite core 5 cm across and roughly bifacial with a discoidal shape. One flatter face has four nearly equal sized flake scars all terminating at the center; the opposite dome-shaped face has nine scars steeply removed around the perimeter with cortex remaining in the center. None of these items was collected.

5WL7407 (PBS-KB-13-IF11) is northwest of 5WL7406 and directly above to the northeast of IF 5WL7408, on the upper slope of a spur ridge with a south-southwest aspect. Two pieces of flaked stone debitage were found here 25.5 m apart east-west. One is a large core reduction flake of brown-black-gray speckled quartzite, with both lateral edges broken, cortex on both the platform and a tiny amount on the dorsal face, with a slight hinge fracture termination. This artifact measures about 6.8 cm long × 7.3 cm wide × 1.5 cm thick. The second lithic is a thinning flake of brown Flattop Butte chalcedony; about 2.7 cm long × 4.1 cm wide × 1.1 cm thick. None of these items were collected, and none display use wear or retouch.

5WL7408 (PBS-KB-13-IF12) is just below and southwest of 5WL7407 on the top and upper slope of a low, west-trending spur ridge of the extensive hill complex in the east half of the surveyed parcel. Two pieces of flaked stone have been found 3.5 m apart. On the south crest of the spur ridge is a small core fragment of purple-brown welded tuff with quartz inclusions measuring about 4.7 cm × 4.5 cm × 2 cm. The second lithic is down slope to the south-southeast, a large core reduction flake of the identical material, with cortex covering most of the dorsal face. This artifact has dimensions of about 5.7 cm × 5 cm × 2.3 cm. Neither of these items was collected.

North Pawnee Creek Parcel

5WL7409 (PBS-KB-13-IF13) is located on the eroding south bank of an incised wash, 1.5 m above and 6 m south of the drainage bottom. This wash is a major east-flowing tributary of North Pawnee Creek that meanders along the north boundary of this surveyed parcel, west of the Nelson Ranch. The IF is limited to a single tan chert end scraper in nearly complete condition. It is bifacially retouched on the distal end, a modification that mostly removed a hinge fracture, creating a working edge beveled ventrally (Figure 39). Use wear is also visible under low power magnification, both on the beveled edge and on a portion of an adjacent lateral edge. The tool was made on a core reduction flake with wind-polished, dark green cortex, and measures 4.0 cm long × 5.4 cm wide × 1.4 cm thick. This item was found a short distance southwest of site 5WL7385, and somewhat farther to the northeast of IF 5WL7686. It has been collected.

Figure 39. Ventral view of scraper collected at 5WL7409. Note retouched distal edge (nearest the scale).

5WL7410 (PBS-KB-13-IF14) is not far west of site 5WL7386, on crest of the eroding north edge of a ridge overlooking the deeply incised, east-flowing tributary of

North Pawnee Creek that is 40 m to the NW. The sole prehistoric artifact here is the distal end fragment of a bifacial knife, finely retouched with light use wear on the longest preserved lateral edge. It is made from gray moss agate with a large reddish-brown inclusion, and measures 4.0 cm × 3.1 cm × 0.8 cm. This tool was collected, cat. # 5WL7410-1.

5WL7411 (PBS-KB-13-IF15) is east of 5WL7410, between sites 5WL7386 to the west and 5WL7388 to the northeast, found on the crest and upper south slope of the same eroding ridge. It consists of three artifacts in a 16 m NW-SE × 1 m NE-SW area. The item farthest southeast on the upper slope is the distal end fragment of a small flake with minor cortex made from mottled yellow-gray Morrison silicified sediment. Sixteen meters northwest on the north edge of an eroding cow path is an edge fragment of a core reduction flake or uniface, made of gray-purple-brown chalcedony (probably Flattop Butte material) with white chalky cortex along one edge. A meter east of this fragment and within the cow path is a small thinning flake of mottled red-yellow jasper with brick red cortex along one lateral edge. None of these items was collected.

5WL7686 (PBS-KB-14-IF16) is located on the north edge of the actively eroding, interfluvial ridge, overlooking the grassy bottom of the unnamed tributary of North Pawnee Creek. At this spot, the drainage is incised 8–10 m below the ridge crest; the IF is situated with a north aspect on 2°–10° slopes. Site 5WL7682 is to the west-southwest and IF 5WL7409 is a short distance to the north-northeast. This isolate consists of three items found in a 30.5 m E-W × 16 m N-S area. At the north end on the north-facing slope of the ridge is a core reduction flake of mottled orange-brown-gray Morrison silicified sediment. It is wind-polished, measuring 5 cm × 3 cm × 2 cm with one naturally damaged lateral edge.

About 20 m (65 ft) to the southwest in a gully is a misshapen, rusted metal water tank. Originally circular in form, the tank measured about 7 ft in diameter and 2 ft deep. This tank is similar to the smaller of a pair of modern metal water tanks currently in use and located at the bottom of the tributary drainage about 24 m (78 ft) north-northwest of the flake.

Another 30.5 m (100 ft) east of the rusted tank and 24.5 m (80.5 ft) southeast of the flake on the crest of the ridge is a white enameled, cast iron sink with a rolled rim and high back. It is labeled on the bottom with two 1909 patent dates and an apparent manufacture date in 1919, made by the Standard Louisville [KY] Works, model P6800. It measures 30″ wide × 20″ deep (front-to-back) × 16.5″ high, with a sink basin depth of 5.5″. None of these items were collected.

5WL7687 (PBS-KB-14-IF17) is located on a floodplain, on the northeast side of an unnamed tributary drainage of North Pawnee Creek. This drainage meanders west-to-east through the central portion of the surveyed section, south of the tributary drainage described previously. Site 5WL7680 is upstream to the west and IF 5WL7688 is not far downstream to the southeast. This IF is a milled wood scatter in a 217 ft × 65 ft area that includes 46 measurable pieces. A small number among the total are partly intact boards, some with bolts or nails. Most are scattered along the drainage parallel to its northeast embankment. Board dimensions include 1″ × 3″, 1″ × 4″, 2″ × 3″, 2″ × 4″, 2″ × 6″, and one post 6″ × 6″. Wire nail sizes are 3d, 9d, and 60d. These materials are generally dated to the post-1895 era. None of these items was collected.

5WL7688 (PBS-KB-14-IF18) is near the confluence of two tributary forks of North Pawnee Creek, on the floodplain downstream and southeast of IF 5WL7687. It is limited to a single rusted, flattened coffee can of probable 1 lb size, dating to ca. 1904–1925. The can has no top, but has a portion of the bottom end, with a soldered side seam. Legible words are printed "EDWARDS COFFEE" in Sans Serif and bold caps. The can's estimated diameter is 4⅞″ with a height of 3¼″. The Dwight Edwards Company was established in Portland, Oregon in 1904 by Dwight Edwards Sr., an importer and roaster who distributed his coffee by horse-drawn wagon. His son, Dwight "Ted" Edwards Jr., helped with deliveries and assumed management in 1915 upon his father's death. The company began to supply their coffee to Safeway and other chain stores, and in 1931 the firm was sold to Safeway. Dwight Edwards Jr. retired from Safeway in 1956 (Torrance Herald 1959). This can was not collected.

5WL7689 (PBS-KB-14-IF19) is a prehistoric isolate on the eroding northwest edge of a bowl-shaped recess off the south bank of the unnamed tributary of North Pawnee Creek, far downstream from 5WL7688. The IF 5WL7690 is closer to the northeast on the opposite side of the drainage. This artifact is a clear-gray moss agate biface thinning flake measuring about 3.5 cm × 3.1 cm × .9 cm, with a slightly faceted platform and broken distal end. Its dorsal face has some white cortex; both lateral edges lack obvious evidence of use wear. The flake was not collected.

5WL7690 (PBS-KB-14-IF20) is located on the floodplain on the north side of the unnamed tributary of North Pawnee Creek, northeast of IF 5WL7689 and up-stream to the west of site 5WL7681. This is a single isolated shoe polish bottle found near a cattle path. It is a clear—slightly sun-colored—glass bottle measuring 4.2″ tall × 1.9″ base diameter; faint horizontal striations in the glass body suggest manufacture in a turn mold prior to 1925. However, the embossed makers mark on the base Ⓦ is from the T.C. Wheaton Co. and dates no earlier than 1946 (https://sha.org/bottle/pdffiles/WXYZLogoTable.pdf). The bottle has a rusted metal threaded cap 0.9″ in

diameter, and the remnants of the stem and brush/swab are visible inside. The artifact was not collected.

5WL7691 (PBS-KB-14-IF21) is also located on the floodplain on the north side of the unnamed tributary of North Pawnee Creek, just upstream of a sweeping northward bend in the drainage and immediately east of site 5WL7681. This IF is limited to one finishing flake fragment of white chert. The platform surface is broken, and the entire distal half of the flake is missing as well. It measures about 1.1 cm × 1.1 cm × 0.2 cm. This item was not collected.

5WL7692 (PBS-KB-14-IF22) was found south of site 5WL7681on the north gully slope of an unnamed tributary of North Pawnee Creek, at the upstream end of a sharp S-shaped meander. This drainage is the southernmost one in the surveyed parcel, and flows in a northeast direction through the southeast portion of the section. The IF was found on the upper slope, 2 m below the eroding prairie edge. It consists of one production stage biface of white chalcedony, an early stage blank that is only roughly edge-trimmed, with cortex remaining on the central portions of both faces. It measures about 11.25 cm × 8.5 cm × 3.5 cm, and was not collected.

5WL7693 (PBS-KB-14-IF23) is ¼ mile upstream of 5WL7692, located on the actively eroding, upper southeast gully slope of an unnamed tributary of North Pawnee Creek, near the south edge of the surveyed section. Two prehistoric artifacts are found 3–4 m below the prairie edge, with a northwest aspect and 8–10° slopes. The two artifacts are 14.5 m apart in a NE-SW direction, near the state-private land boundary that is marked by a barbed wire fence. Closest to the property fence is a broken projectile point: the base and lower blade of a corner-notched dart point of yellow-brown quartzite. This fragment measures 2.14 cm L × 2.35 cm W × 0.46 cm T with a neck width of 1.40 cm. The corner-notched style is diagnostic of activity in the Late Plains Archaic period ca. 3500–1800 BP. To the northeast is a complete production stage biface of banded maroon and yellow chert, a late stage preform of lanceolate shape with a slightly concave base. It bears a resemblance to Paleoindian specimens, but lacks abraded haft edges and has a rough collateral flaking pattern. It measures 8.37 cm × 3.33 cm × 0.74 cm. Both of these items were collected (Figure 40).

Geary Creek Parcel

5WL7649 (PBS-14-AW-IF1) is a prehistoric isolate found a short distance south of site 5WL1239 on a gentle south-facing slope of a ridge, overlooking a small tributary of Geary Creek in the northernmost portion of the Geary Creek surveyed lands. The IF consists of a sparse scatter of three flakes including one core reduction

flake of brown chalcedony; a small thinning flake of purple-brown Flattop Butte chalcedony, and a large thinning flake of yellow-brown jasper. None of these flakes was collected.

Figure 40. Close-up of collected projectile point fragment (cat. # 5WL7693-1) and preform (cat. # 5WL7693-2).

5WL7650 (PBS-14-AW-IF2) is about 90 m east of 5WL7649 on the same south-facing ridge slope. The IF is limited to one flattened metal basin or tub, approximately 1 ft in height and 24″ in diameter, with a rolled top ring and a twisted wire loop

attached to one side just below the rim. The loop may have been for suspension on a hook, or for anchoring the tub to the ground. The outside surface appears to have been originally a galvanized, blue-gray color. The tub was not collected.

5WL7651 (PBS-14-AW-IF3) is south-southeast of 5WL7650 on the opposite side of a tributary of Geary Creek, just below where the drainage makes a southwesterly bend toward the creek. This Historic period IF is a single tinned can fragment, with slight evidence of a soldered seam, and a folded rim having a width of ¼ inch. Soldered cans generally pre-date 1930. This fragment was not collected.

5WL7652 (PBS-14-AW-IF4) is southeast of 5WL7651 on the same relatively flat plain above Geary Creek. It consists of one rusted metal can lid, 8 inches in diameter. The lid appears to have been punctured by a nail, for a purpose perhaps not involving access to the original contents. Large cans of this size could have held any one of a number of different products such as coffee, lard, foodstuffs, and automotive products such as grease. However, the rim of this lid is too poorly preserved to identify a more specific can type on which it fit. It was not collected.

5WL7653 (PBS-14-AW-IF5) is in an area of gently rolling prairie adjacent to Geary Creek, a short distance upstream from site 5WL7647. This prehistoric IF consists of a single piece of groundstone, made using an unshaped cobble of metamorphic rock, perhaps gneiss. The flattened cobble is somewhat of a lopsided rectangle shape measuring about 10.2 cm × 8.3 cm × 1.5 cm. The faces of the tool are not especially abrasive in texture, suggesting a function other than as a mano, such as a hide-rubbing stone. The tool was not collected.

5WL7654 (PBS-14-AW-IF6) found on the surface on a moderate sloping, east-facing terrace slope just southwest of Geary Creek, between two sharp bends in the creek's course. It consists of two small thinning flakes found on the surface approximately 15 m apart; one is gray moss agate and the other a brick red Morrison silicified sediment. Neither of these pieces of debitage was collected.

5WL7655 (PBS-14-AW-IF7) is downstream to the southwest of 5WL7654, found on a gently sloping, east-facing terrace slope about 30 m above Geary Creek. The IF is limited to one yellow-brown chalcedony flake fragment, possibly from a thinning flake. The flake was not collected.

5WL7656 (PBS-14-AW-IF8) is south of 5WL7653 and west of site 5WL7647, on a moderately sloping, north-northeast-facing terrace slope above Geary Creek. This Historic period IF consists of one thin, round rusted metal disc, 5½ inches in diameter, with a scalloped edge. The shape is suggestive of an individual muffin or

cupcake tin, but it may have had a different function.Two asymmetrically placed, similarly sized holes have been punched toward the center of the artifact, as if it had been nailed to a post or board at one time. It was not collected.

5WL7657 (PBS-14-AW-IF9) is a short distance west-southwest of 5WL7656 on a north-facing terrace slope above Geary Creek. The IF is limited to one small, tan chalcedony thinning flake. Its edges are broken and damaged such that any evidence of use or retouch is obscured. This flake was not collected.

5WL7658 (PBS-14-AW-IF10) is a similarly short distance north-northeast of 5WL7656, just downstream on the north-facing terrace slope near Geary Creek. This Historic period IF contains only two undecorated ceramic fragments, probably from a stoneware serving piece. The paste is a light brown or buff color with a white glaze on both surfaces. Neither shard was collected.

5WL7660 (PBS-14-AW-IF12) is yet another Historic period IF found on the north side of Geary Creek, across the creek from site 5WL7647, near the bottom of a moderate slope. This IF yielded two metal hinges and a pin lock mechanism. There are no maker's marks, logos, or other labeling on any of these artifacts, which were not collected.

5WL7661 (PBS-14-AW-IF13) is about a mile downstream from 5WL7660, and a half mile south of site 5WL7667, on a moderately sloping, northeast-facing terrace slope, west of and about 15 m above Geary Creek. This prehistoric IF consists solely of a unifacially flaked blade fragment of yellow-brown chert or petrified wood. The basal (proximal) end is broken but enough remains to define its shape as lanceolate. This may be a preform for a projectile point, although both lateral edges exhibit hints of light unifacial use wear. This artifact was not collected.

5WL7662 (PBS-14-AW-IF14) is a small scatter of Historic period artifacts on a moderately sloping, northeast-facing terrace slope on the west side of Geary Creek, not far upstream from IF 5WL7661. The artifact scatter includes a crushed can of the soldered hole-in-cap type; three pieces of undecorated porcelain; fragments of amethyst, milk, and clear glass; metal machine and harness parts (Figure 41); and miscellaneous metal fragments. The soldered can is diagnostic of the late 19th-early 20th century. None of these items was collected.

5WL7663 (PBS-14-AW-IF15) is a prehistoric IF north of site 5WL7667 and east of Geary Creek, in an area of gently rolling prairie. Two flaked stone artifacts have been found here about 10 m apart: a discoidal core of tan-yellow Morrison silicified

sediment, and a small thinning flake of black chalcedony or petrified wood. Neither lithic item shows any sign of use nor were they collected.

Figure 41. Metal artifacts found at 5WL7662 include these two pieces. The disc-shaped item may be a component from a seeder or perhaps a gear cover, while the curved artifact at left is the metal portion of a hame from a harness.

5WL7664 (PBS-14-AW-IF16) is a prehistoric IF southeast of site 5WL7667 in an area of gently rolling prairie just above Geary Creek, on the north side of the creek near the apex of a sharp hairpin meander. The isolate is an ovate biface of yellow-brown chert or very fine-grained Morrison silicified sediment. This is a roughly flaked, early production stage biface or blank, albeit of fairly small size, about 7.0 cm × 4.6 cm. It was not collected.

5WL7668 (PBS-14-KA-IF1) is a small scatter of Historic period artifacts located north of 5WL7671 on the northwest bank and within Geary Creek; it is located at an elbow curve in the creek where artifacts are being deposited alluvially because of the abrupt change in the creek's direction. Among the artifacts here are five salt glazed

stoneware shards from the same 7.5 inch diameter vessel (crock) with a gray exterior and brown interior glaze, and one small, crushed aluminum can with a crimped side seam. These items were found 10 ft northwest of the elbow bend in Geary Creek. Also, an aerosol can, a milk glass fragment from a canning jar lid liner with embossed text: "…OYD'S," and a crushed zinc canning jar lid were found within the creek. Finally, a crazed earthenware base fragment of a cup was located within the drainage 20 ft to the west. The embossed canning jar lid liner probably dates to the early 20th century, as it appears a match for "Boyd's" 1869 patent #88439 manufactured through the 1950s (https://www.glassbottlemarks.com/boyds-genuine-porcelain-lined-cap/). None of these items was collected.

5WL7669 (PBS-14-KA-IF2) is 20 to 30 ft south of a meander in Geary Creek on a nearly flat terrace below a gentle, north-facing slope; it is located 10 ft east of a game or cattle trail and across the creek from IF 5WL7671. Two Historic period artifacts are present here, spaced 15 ft apart. These include one hole-in-top can lid fragment, and one double strand barbed wire fragment. The can lid retains the soldered center dot and post-dates 1900. However, a more refined date range cannot be determined on such a small fragment. Neither of these items was collected.

5WL7670 (PBS-14-KA-IF3) was found within the bed of Geary Creek at a looping meander in the creek, almost due south of 5WL7669. It consists of two pieces of flattened metal strapping with rivets, one of which is curved slightly to fit around a circular form or bundle of goods. The curved strapping is 1⅝″ wide, and the shorter, straight piece is 1½″ wide. The curved piece retains a portion of a flat hinge or sliding connector with a ¾″ diameter rivet. These items were not collected.

5WL7671 (PBS-14-KA-IF4), like 5WL7670, is at the bottom of Geary Creek, at a meander between 5WL7668 to the north and 5WL7669 to the southeast. This IF consists of 5–10 molded clear glass fragments from the same vessel, probably a dish or other table ware rather than a bottle. There is no embossing or other markings on the pieces, which were not collected.

5WL7672 (PBS-14-KA-IF5) is a bit under ¼ mi southwest of site 5WL7648 and of Geary Creek, in a gently rolling prairie setting. There are two Historic period artifacts present, including a galvanized metal fragment and a crushed aluminum pull-tab can. Pull-tab openings generally date to the period 1962–1975, but the galvanized metal artifact may be older, not contemporaneous with the can. These items were not collected.

5WL7673 (PBS-14-KA-IF6) is south-southeast of IF 5WL7672, in a similar prairie setting southwest of Geary Creek. This IF consists of one 3″ diameter hole-in-cap can and one metal fragment. The soldered ring on the can top is 1¼″ in diameter. Hole-in-cap cans generally pre-date 1914; no artifacts were collected here.

5WL7674 (PBS-14-KA-IF7) is a Historic period isolate located southwest of and below IF 5WL7675, just east of a tributary of Geary Creek and site 5WL7666. This IF is limited to a single hole-in-top can with a cut-around opening, and neatly machine-soldered side and rim seams. The flattened can appears to be slightly under 4″ in height. Soldered cans of this type generally date to the period 1883–1914. It was not collected.

5WL7675 (PBS-14-KA-IF8) is located directly above 5WL7674 on a gentle slope, 100 m east of the same southwest-flowing intermittent tributary of Geary Creek. It consists of one tinned can fragment with a crimped side seam (i.e., a sanitary can). Crimped seam cans were introduced in 1904 and were the dominant type of can by about 1911 (Horn 2005). This artifact was not collected.

5WL7676 (PBS-14-KA-IF9) is on the northeast bank of Geary Creek, south of site 5WL7667. This Historic period IF consists of a loose cluster of 15 clear molded glass fragments distributed within an area 6 ft in diameter, and a rusted beverage can located 15 ft east of the glass shards. The can is of the modern crimped seam type, with a church-key opening diagnostic of the mid-20th century prior to 1962. None of these items was collected.

5WL7677 (PBS-14-KA-IF10) was found northeast of IF 5WL7678 on a gentle south-facing slope overlooking Geary Creek about ¼ mi to the southwest. This IF is a polished steel hubcap with a distinctive, elongated Ford "V 8" logo of a style dating to ca. 1932–1935 (The Jalopy Journal 2009). The hubcap was not collected.

5WL7678 (PBS-14-KA-IF11) is an isolate on the second river terrace overlooking Geary Creek to the west, and 20 ft west of a north-south trending two-track road. Site 5WL7667 is a short distance to the south and IF 5WL7677 is a bit farther to the northeast of this location. This find is limited to one, 5″ diameter × 2¾″ tall sanitary can with an external friction lid opening and crimped side seam. Such cans post-date 1904, and this specimen was not collected.

5WL7694 (PBS-KB-14-IF24) is located on a rolling plain southwest of Geary Creek and just south of site 5WL7685. It consists of two flakes found 6 m apart in a NE-SW direction at a state-private land boundary fence. Directly at the property

fence is a small thinning flake of yellow-brown silicified sediment, with a bit of red-colored cortex on its dorsal face. This fragment has a broken distal end and measures about 2.1 cm × 2.0 cm × 0.7 cm. To the southwest is a larger thinning flake of red Morrison fm. silicified sediment, probably thermally altered. It measures about 3.5 cm × 3.4 cm × 0.7 cm and is nearly complete. Neither of these pieces of debitage was collected.

Observations on the PBS Data

In the Statement of Objectives chapter, a series of 12 questions was posed as issues to pursue on the PAAC survey in the PBS (see page 33). In the remainder of the report, these and other topics are addressed based both on the inventory results and on results of previous investigations in the region.

Chronology and Cultural Affiliation

Although not a priority on an archaeological survey, PBS crews did record three individual fossil specimens representing isolated paleontological finds, all three of which are located on archaeological sites in three different PBS parcels. Unfortunately, none of the three finds were made in a preserved geological context, so associations with particular bedrock units are questionable. At 5WL7176, a complete vertebra of a marine reptile was found in a loose surface context. Although local bedrock is the Fox Hills formation, it is possible that the specimen eroded from a younger layer. Site 5WL7647 yielded a tested cobble of chert containing an embedded brachiopod fossil. The cobble is part of an extensive veneer of secondary gravels covering the plains of northeast Colorado, greatly limiting the significance of the find. Lastly, at 5WL7681, the cortical wall of a long bone fragment was found amidst a sparse Historic period site on the north side of a drainage. Both the alluvial context of this find and its fragmentary condition likewise limit the interpretive value.

Turning to the archaeological record, temporally diagnostic artifacts—entirely limited to projectile points—have been documented from only seven of the 46 sites and 51 IFs with prehistoric components recorded in the survey area (Figure 42); two other prehistoric resources yielded small biface fragments that might be from an arrow point or arrow point preform. Of those 46 sites, only one (5WL7212) has convincing evidence of the presence of multiple prehistoric components, with projectile point fragments in three different styles (see Figure 26).

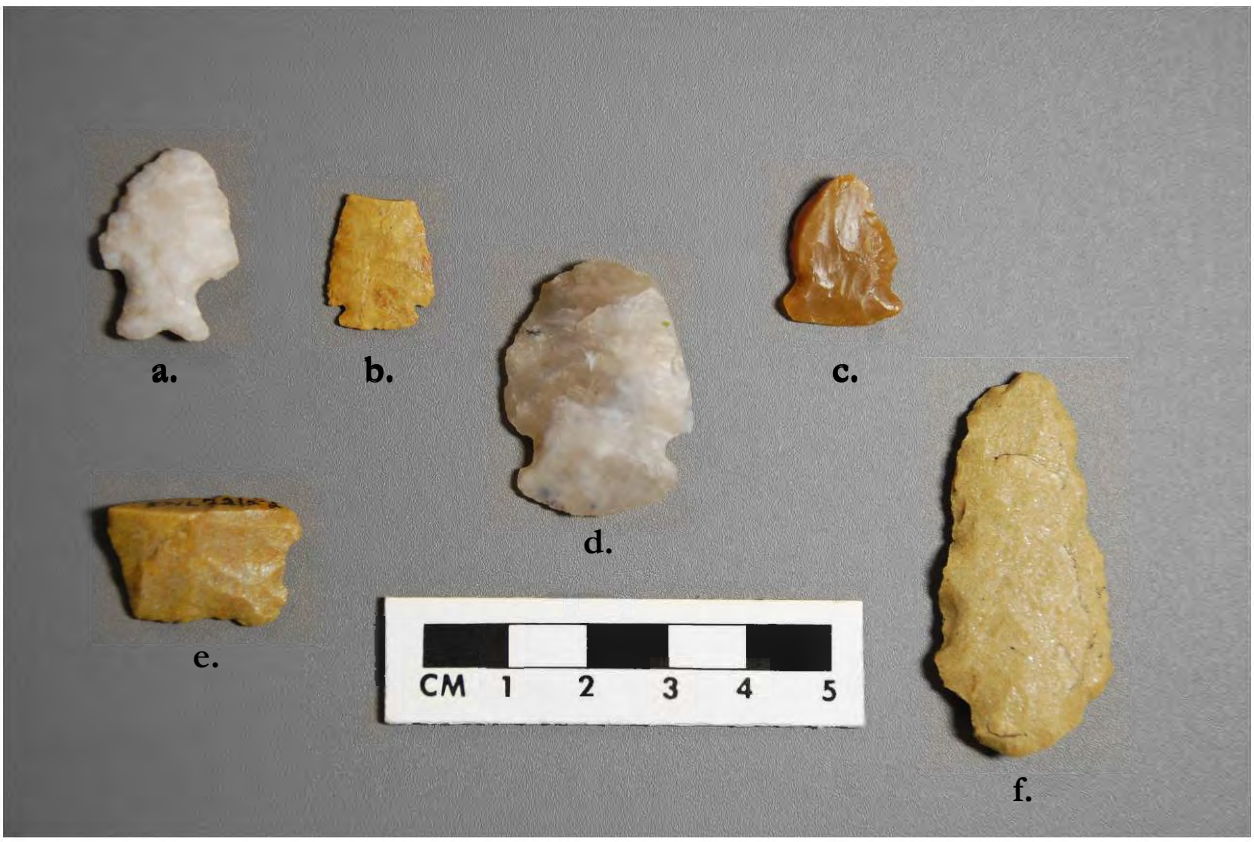

Figure 42. Selected projectile points and point fragments collected during the Pawnee Buttes survey: **a**. 5WL7212–1, **b**. 5WL7178–1, **c**. 5WL7183–2, **d**. 5WL7212–3, **e**. 5WL7212–2, and **f**. 5WL7215–1. See Figures 21 and 40 for photos of other diagnostic points from 5WL7381 and 5WL7693, respectively.

The very small number of diagnostic artifacts encountered obviously limits what one can say about the relative intensity of prehistoric activities in the PBS through time. No Paleoindian style tools have been observed during the survey, which is not especially surprising but a bit disappointing nonetheless. There was some small expectation that the North Pawnee Creek parcel might yield such early evidence given its proximity to the Nelson Cody Complex site, but it was not to be. Barely more visible in the PBS are resources of the Archaic period, with just one site and two IFs yielding such diagnostics. Most impressive is site 5WL7212 in the Wild Horse Creek parcel with its evidence of multiple Archaic and Ceramic period occupations. One of those components may date to the Early Archaic period based on the presence of a spear point with a distinctly convex basal edge (Figure 42d). Middle or Late Archaic and Early Ceramic period projectile points also occur there. The two IFs with Archaic period evidence are 5WL7215 not far west of 5WL7212, and 5WL7693 in the North Pawnee Creek parcel. The diagnostic artifact at 5WL7215 is a stemmed style that

could date to either the Middle or Late Archaic period, while the corner-notched specimen from 5WL7693 is a common style of the Late Archaic period.

A bit more secure evidence was found on the survey for post-Archaic archaeology, with four sites (including the previously recorded 5WL1239) containing small corner-notched arrow points of the Early Ceramic period, and a fifth site with a small side-notched arrow point diagnostic of the Middle Ceramic period. One other site and an IF (5WL7205 and 5WL7213) have small bifaces of arrow point or point preform size that are less certain indicators of Ceramic period activity. Thus, Early Ceramic period diagnostics are most common, followed by equally slim numbers for all other time periods excepting the total lack of Paleoindian period artifacts. The prevalence of Early Ceramic period materials is not at all unusual for survey results in northeastern Colorado (e.g., Gilmore 1999), but the very minimal numbers for the Middle Archaic, Late Archaic, and Middle Ceramic periods is unexpected. One possible explanation is that surface artifact collecting has taken a rising toll on the number of diagnostics, perhaps accelerated by the pace of oil-and-gas exploration and development in recent years.

Given the small sample size, it is ill-advised to read too much into the assignment of cultural affiliations on Archaic components in the PBS. The PBS results may very well not be representative of the intensity of use of the region by different groups. For the Early Archaic period, the sole diagnostic artifact is the side-notched specimen from 5WL7212 noted above. Its convex base represents a style more commonly found in the foothills and higher elevations of the Front Range than on the open plains, where spear point styles more often fit the Hawken and Northern Side-notched type definitions with straight to slightly concave bases. For the Middle Archaic period, the stemmed indented specimen also found at 5WL7212 may be a diminutive example of a Hanna point of the McKean complex, very commonly seen in plains assemblages of this age. The larger stemmed artifact at 5WL7215 is of more questionable affiliation. The very short stem has slightly contracting lateral edges, most often seen in areas west of the plains, identified as "Park points" or the Gatecliff Contracting Stem style that could date to either the Middle or Late Archaic period. Finally, the corner-notched spear point at 5WL7693 represents a very common type on the plains, sometimes called Pelican Lake after a site in Canada, albeit a more local label would be preferred.

Entirely lacking supplemental evidence from ceramic artifacts, the cultural affiliations of post-Archaic groups in the PBS are just as difficult to identify on lithic evidence alone. The projectile points are not as helpful as one might hope, bearing few stylistic attributes that distinguish indigenous plains-dwelling populations from mountain-based groups such as the "Hogback phase." None of the small corner-

notched specimens from the PBS were manufactured with serrated blades as is sometimes seen in mountain assemblages. Thus, the generic and unsatisfying label "Plains Woodland" must suffice for the PBS sites with Early Ceramic period diagnostics. Likewise, the Middle Ceramic groups known to have utilized this part of the plains—Upper Republican and Itskari phase groups—are best distinguished on ceramic and architectural evidence, both lacking in our survey results.

Since no evidence of Historic period tribes was found on the PBS, the chronology of historical archaeology sites in the PBS begins rather abruptly with the initial pioneer settlement of better-watered lands near the Pawnee Buttes in the mid- to late 1880s (see Table 4), documented at 22 sites and 29 IFs. Although historical records indicate that earlier 19th century activities happened in the region, such as the cattle drives on the Texas-Montana trail and John Iliff's ranching operations in the late 1860s, no direct archaeological evidence was found in the project area for that period. Also, the four townships containing the PBS parcels were surveyed between 1869 and 1881, but the oldest survey monument encountered dates to 1917. Apart from a couple of late 19th century homestead claims adjacent to the North Pawnee Creek and Wild Horse Creek parcels, the bulk of PBS settlement occurred in the early 20th century, especially in the 1910s. A handful of more recent historical sites in the project area are mostly post-WW II trash deposits and isolated finds. Mention has also been made of the post-1960 Cold War era missile complexes, one of which was recorded on the Pawnee National Grasslands near Briggsdale with the aid of PAAC volunteers.

Site Types and Features

Based on the surface evidence, no doubt impacted by surface collecting by "arrowhead" hunters, over 80% of the prehistoric sites in the PBS can be categorized into the "open lithic" site type (Table 6). Prehistoric camps are represented at only seven sites, one of which also contains a possible ritual feature (5WL7212; see Figure 27). Fully ninety percent of the lithic scatters (27 sites) are more specifically identified as chipping stations, a.k.a. flaked stone occurrences where debitage dominates overall artifact counts and tools of any kind are either absent or low in number. Two of the other lithic scatters, 5WL7183 and 5WL7381, may be hunting stations based on the presence of one or more projectile points (Figures 19 and 21). Both of these kinds of open lithic sites are characterized by very low tool-to-debitage ratios but differ from lithic sources (where debitage likewise dominates) by their lack of naturally occurring toolstone. Production stage bifaces and unifaces—i.e., blanks and preforms—are found on many of these sites, but neither ground stone tools nor features such as hearths or roasting pits are present.

Table 6. Cultural Resources of the Pawnee Buttes Area, 2012–2014

Site/IF #	Site Type and Age (if known)	NRHP Eligibility	Artifacts Collected
Cultural Resources Recorded in 2012			
5WL7174	isolated artifact: Historic period; open lithic: unknown prehistoric period	not eligible	none
5WL7175	open lithic: unknown prehistoric period	not eligible	none
5WL7176	open camp: unknown prehistoric period; isolated bone, paleontological: Late Cretaceous period	potentially eligible	one fossil bone
5WL7177	open lithic: unknown prehistoric period	not eligible	one uniface tip
5WL7178	open camp: Early Ceramic period	not eligible	one projectile point fragment
5WL7179	depression and trash scatter: Historic period	not eligible	one bottle finish
5WL7180	open lithic: unknown prehistoric period	not eligible	none
5WL7181	open lithic: unknown prehistoric period	not eligible	none
5WL7182	farm equipment: Historic period; open lithic: unknown prehistoric period	not eligible	none
5WL7183	open lithic: Middle Ceramic period	not eligible	one drill fragment, one projectile point fragment
5WL7184	depression and trash scatter: Historic period	not eligible	none
5WL7185	open lithic: unknown prehistoric period	not eligible	none
5WL7186	isolated can: Historic period; open lithic: unknown prehistoric period	not eligible	none
5WL7187	isolated biface: unknown prehistoric period	not eligible	none
5WL7188	isolated flake: unknown prehistoric period	not eligible	none
5WL7189	isolated flake: unknown prehistoric period	not eligible	none
5WL7190	isolated flake: unknown prehistoric period	not eligible	none
5WL7191	isolated flake: unknown prehistoric period	not eligible	none
5WL7192	isolated flake: unknown prehistoric period	not eligible	none
5WL7193	isolated flakes: unknown prehistoric period	not eligible	none
5WL7194	isolated flake: unknown prehistoric period	not eligible	none
5WL7195	isolated flake: unknown prehistoric period	not eligible	none
5WL7196	isolated mano: unknown prehistoric period	not eligible	none
5WL7197	isolated artifacts: unknown prehistoric period	not eligible	two scrapers
5WL7198	isolated flakes: unknown prehistoric period	not eligible	none
5WL7199	isolated flakes: unknown prehistoric period	not eligible	none
5WL7200	isolated vehicle part: Historic period	not eligible	none
5WL7201	open camp: unknown prehistoric period	potentially eligible	none
5WL7202	open lithic: unknown prehistoric period	not eligible	none
5WL7203	open lithic: unknown prehistoric period	not eligible	none
5WL7204	open lithic: unknown prehistoric period	not eligible	none

Site/IF #	Site Type and Age (if known)	NRHP Eligibility	Artifacts Collected
5WL7205	quarry/borrow pits (3): Historic period; open lithic: Ceramic period	not eligible	one arrow point fragment; two lithic raw material samples
5WL7206	open lithic: unknown prehistoric period	potentially eligible	none
5WL7207	open lithic: unknown prehistoric period	potentially eligible	one graver
5WL7208	open lithic: unknown prehistoric period	potentially eligible	one composite knife-scraper
5WL7209	open lithic: unknown prehistoric period	not eligible	none
5WL7210	open camp: unknown prehistoric period	potentially eligible	none
5WL7211	open lithic: unknown prehistoric period	not eligible	none
5WL7212	trash scatter: Historic period; open camp and ritual: Archaic and Ceramic periods	eligible	three projectile points (two are fragments)
5WL7213	isolated arrow point preform: Ceramic period	not eligible	one arrow point preform
5WL7214	isolated artifacts: unknown prehistoric period	not eligible	none
5WL7215	isolated artifacts: Middle to Late Archaic period	not eligible	one stemmed projectile point
5WL7216	isolated artifacts: unknown prehistoric period	not eligible	one bifacial preform
5WL7217	isolated artifacts: unknown prehistoric period	not eligible	none
5WL7218	isolated artifacts: unknown prehistoric period	not eligible	none
Cultural Resources Recorded in 2013			
5WL7374	trash scatter: Historic period; open lithic: unknown prehistoric period	not eligible	one chalcedony flake resembling obsidian
5WL7375	open camp: unknown prehistoric period	not eligible	none
5WL7376	open lithic: unknown prehistoric period	not eligible	none
5WL7377	open lithic: unknown prehistoric period	not eligible	none
5WL7378	open lithic: unknown prehistoric period	not eligible	none
5WL7379	trash scatter: Historic period	not eligible	none
5WL7380	open lithic: unknown prehistoric period	not eligible	none
5WL7381	open lithic: Early Ceramic period	not eligible	one corner-notched arrow point fragment
5WL7382	open lithic: unknown prehistoric period	not eligible	none
5WL7383	open lithic: unknown prehistoric period	not eligible	none
5WL7384	open lithic: unknown prehistoric period	not eligible	none
5WL7385	open lithic: unknown prehistoric period	potentially eligible	none
5WL7386	trash dump & scatter: Historic period	not eligible	none
5WL7387	trash scatter: Historic period; isolated flake: unknown prehistoric period	not eligible	none
5WL7388	fence & land survey cap: Historic period; open lithic/tool kit: unk. prehistoric period	potentially eligible	one flake tool for scraping

Site/IF #	Site Type and Age (if known)	NRHP Eligibility	Artifacts Collected
5WL7389	isolated green glass Coca-Cola bottle fragments: Historic period	not eligible	none
5WL7390	isolated graver and ground stone fragment: unknown prehistoric period	not eligible	none
5WL7391	*resource # retired: overlaps 5WL7376*	——	——
5WL7392	isolated ground stone mano: unknown prehistoric period	not eligible	none
5WL7393	isolated flaked stone debitage (1): unknown prehistoric period	not eligible	none
5WL7394	isolated stone ware shards (3): Historic period	not eligible	none
5WL7395	isolated flaked stone debitage (3): unknown prehistoric period	not eligible	none
5WL7396	isolated license plate, Colorado 1922: Historic period	not eligible	none
5WL7397	isolated bifacial blank fragment: unknown prehistoric period	not eligible	none
5WL7398	isolated glass goblet & bottle caps: Historic period; isolated flaked stone debitage (2): unknown prehistoric period	not eligible	one glass goblet, one bottle cap
5WL7399	isolated flaked stone debitage (7): unknown prehistoric period	not eligible	none
5WL7400	isolated flaked stone debitage (5): unknown prehistoric period	not eligible	none
5WL7401	isolated flaked stone debitage (5): unknown prehistoric period	not eligible	none
5WL7402	isolated drill + flaked stone debitage (3): unknown prehistoric period	not eligible	one chalcedony drill
5WL7403	isolated bifacial preform: unknown prehistoric period	not eligible	none
5WL7404	isolated cairn feature: Historic period	not eligible	none
5WL7405	isolated spokeshave & graver: unknown prehistoric period	not eligible	none
5WL7406	isolated horseshoe: Historic period; isolated flake & core: unknown prehistoric period	not eligible	none
5WL7407	isolated flakes (2): unknown prehistoric period	not eligible	none
5WL7408	isolated flake & core fragment: unknown prehistoric period	not eligible	none
5WL7409	isolated scraper: unknown prehistoric period	not eligible	one chert end scraper
5WL7410	isolated knife fragment: unknown prehistoric period	not eligible	one bifacial (distal portion)
5WL7411	isolated flakes (3): unknown prehistoric period	not eligible	none

Site/IF #	Site Type and Age (if known)	NRHP Eligibility	Artifacts Collected
Cultural Resources Recorded in 2014			
5WL1239	open camp: Early Ceramic period	eligible	none
5WL7647	homestead complex: Historic period; open lithic: unknown prehistoric period; isolated fossil shell: unknown paleontological period	eligible	one chert core with imbedded fossil shell
5WL7648	trash scatter: Historic period; isolated flake: unknown prehistoric period	not eligible	none
5WL7649	isolated flakes (3): unknown prehistoric period	not eligible	none
5WL7650	isolated metal tub: Historic period	not eligible	none
5WL7651	isolated metal can fragment: Historic period	not eligible	none
5WL7652	isolated metal can lid: Historic period	not eligible	none
5WL7653	isolated ground stone: unknown prehistoric period	not eligible	none
5WL7654	isolated flakes (2): unknown prehistoric period	not eligible	none
5WL7655	isolated flake: unknown prehistoric period	not eligible	none
5WL7656	isolated metal disc: Historic period	not eligible	none
5WL7657	isolated flake: unknown prehistoric period	not eligible	none
5WL7658	isolated ceramic shards: Historic period	not eligible	none
5WL7659	*resource # retired: same as 5WL7651*	——	——
5WL7660	isolated metal hinges & pin: Historic period	not eligible	none
5WL7661	isolated bifacial preform: unknown prehistoric period	not eligible	none
5WL7662	isolated glass & metal scrap: Historic period	not eligible	none
5WL7663	isolated core & flake: unknown prehistoric period	not eligible	none
5WL7664	isolated flake: unknown prehistoric period	not eligible	none
5WL7665	open lithic: unknown prehistoric period	potentially eligible	none
5WL7666	homestead complex: Historic period; open lithic: unknown prehistoric period	eligible	none
5WL7667	isolated metal can: Historic period; open lithic: unknown prehistoric period	not eligible	none
5WL7668	isolated stoneware & milk glass shards, cans, & canning jar lid pieces: Historic period	not eligible	none
5WL7669	isolated can fragments & barbed wire piece: Historic period	not eligible	none
5WL7670	isolated metal strapping with rivets & hinge fragment: Historic period	not eligible	none
5WL7671	isolated clear glass bottle shards: Historic period	not eligible	none
5WL7672	isolated galvanized metal scrap & pull-tab can: Historic period	not eligible	none

Site/IF #	Site Type and Age (if known)	NRHP Eligibility	Artifacts Collected
5WL7673	isolated soldered can & metal scrap: Historic period	not eligible	none
5WL7674	isolated soldered can: Historic period	not eligible	none
5WL7675	isolated lapped seam can: Historic period	not eligible	none
5WL7676	isolated clear glass shards & crimped seam can: Historic period	not eligible	none
5WL7677	isolated metal hub cap with V-8 logo: Historic period	not eligible	none
5WL7678	isolated wide & short crimped seam can: Historic period	not eligible	none
5WL7679	trash dump: Historic period	not eligible	none
5WL7680	trash scatter: Historic period; isolated flake: unknown prehistoric period	not eligible	none
5WL7681	trash scatter: Historic period	not eligible	none
5WL7682	collapsed shed & trash scatter: Historic period	not eligible	none
5WL7683	open lithic: unknown prehistoric period	not eligible	none
5WL7684	open lithic: unknown prehistoric period	potentially eligible	none
5WL7685	isolated ointment jar: Historic period; open lithic: unknown prehistoric period	potentially eligible	none
5WL7686	isolated metal water tank & enameled sink: Historic period; isolated flake: unknown prehistoric period	not eligible	none
5WL7687	isolated milled wood scrap: Historic period	not eligible	none
5WL7688	isolated coffee can: Historic period	not eligible	none
5WL7689	isolated flake: unknown prehistoric period	not eligible	none
5WL7690	isolated shoe polish jar: Historic period	not eligible	none
5WL7691	isolated flake: unknown prehistoric period	not eligible	none
5WL7692	isolated bifacial blank: unknown prehistoric period	not eligible	none
5WL7693	isolated projectile point and preform: Late Archaic period	not eligible	one corner-notched dart point fragment & one bifacial preform
5WL7694	isolated flakes (2): unknown prehistoric period	not eligible	none

One other open lithic site, 5WL7388, has a much higher tool-to-debitage ratio (3:5) than do chipping stations, and may represent a more specific 'tool kit' emphasizing scraping tasks other than hide working. However, the total number of artifacts here is quite small, so the short-term activities indicated were not intensive.

It is notable that sites representing the procurement of toolstone, particularly secondary gravel sources, are absent within the PBS parcels. Particularly in the most westerly of the parcels along Geary Creek where secondary toolstone sources have been previously recorded not far away, our expectations were that at least small sources would be encountered. However, the gravel deposits found on the plains above Geary Creek are generally too small to be useful as raw material for flaked stone tool manufacture. Individual nodules of knappable grade toolstone were encountered during the survey, such as at 5WL7205 in the Wild Horse Creek parcel (see Figure 7), but in insufficient quantities to serve as a viable source. Similarly, a handful of tested cobbles were documented during the PBS, such as at 5WL7185 and 5WL7667, but not in the numbers typically seen on substantial secondary source sites.

Site 5WL7212 in the Wild Horse Creek parcel is truly unique among project area cultural resources. Although other hilltop sites are in the PBS sample, none contain the density or diversity of materials observed there. In fact, the number of flaked stone artifacts documented on that single site exceeds the combined total number of artifacts recorded on all other prehistoric sites and IFs in the Wild Horse Creek parcel. In addition, it yielded more diagnostic projectile points than any other site and contains one of the few thermal features observed during the entire survey. Perhaps most significant, however, is the cobble feature the site contains on the highest elevation of the hill (see Figure 27). The large rocks in this feature lack surface oxidation, cracking, or other physical evidence of a hearth or roasting pit feature, and are not part of a more extensive rock scatter on the hill were it a natural occurrence. Clearly, the rocks were placed there intentionally, but for what purpose? There is no indication that their current distribution represents a collapsed cairn, although some small lateral migration in rock position cannot be ruled out. It may be the weathered cap on a hilltop grave, but there is no current requirement to test that possibility. Alternatively, given the landscape position on the highest elevation in the immediate area, the feature may represent some other kind of ritual feature, such as those associated with the vision quest or other rite of significance.

As shown in Figure 43, features of any kind are rather uncommon in the PBS parcels, particularly on prehistoric sites. None of the sites of any type in the survey area are associated with rockshelters, and 36 features other than rockshelters are present on 17 sites and one IF in the study area. A cairn at 5WL7404 is the only feature recorded as an IF (Figure 38). The two most numerous feature types, doubling the number of any other kind, are artifact concentrations and ground depressions at eight features each. The depressions are all on Historic period resources, a few of which may be natural swales rather than cultural features, but test excavations or geophysical work are needed to verify their origin(s). Depressions that are of cultural origin may be collapsed building foundations such as from dugouts or basements.

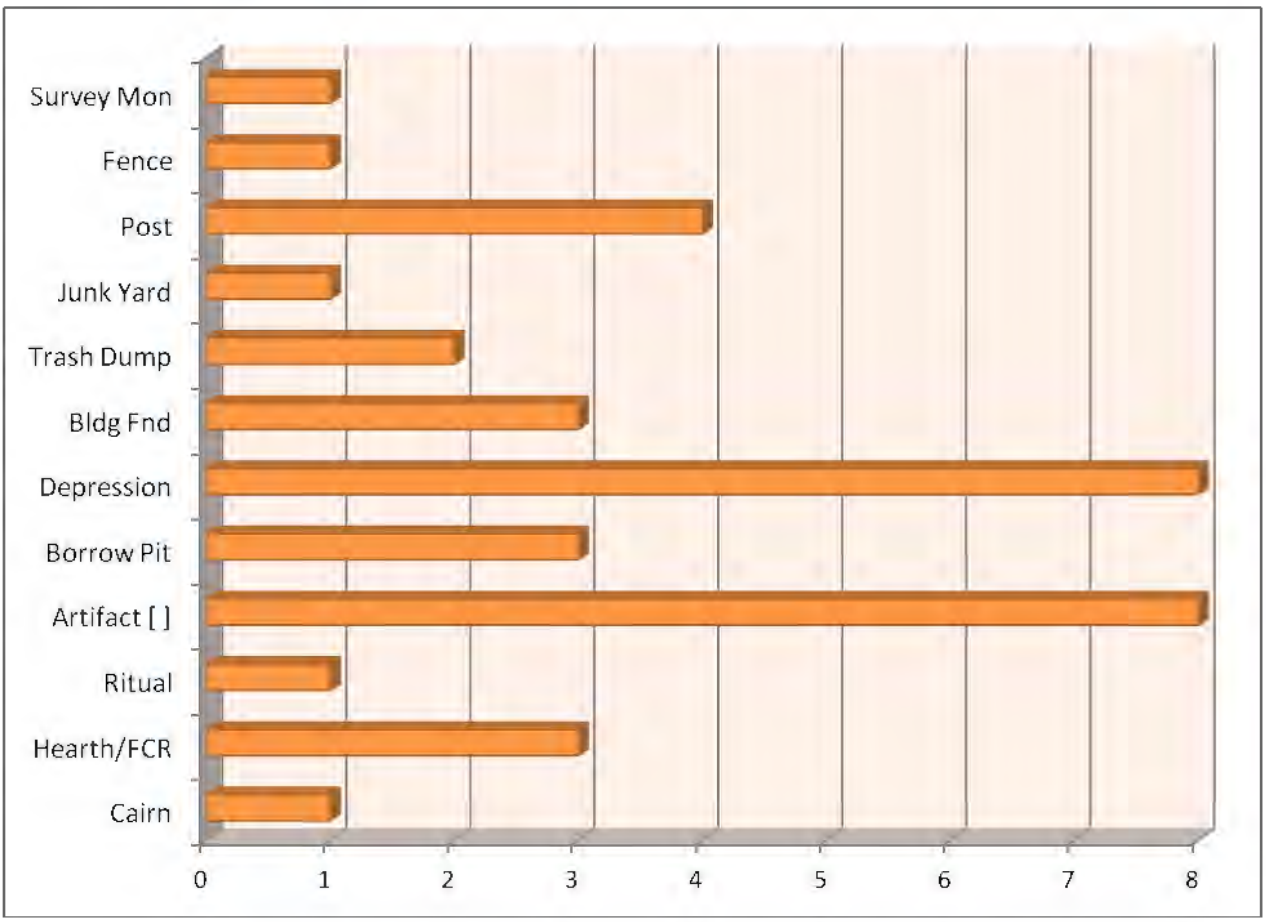

Figure 43. Features recorded in the PBS. Key to symbols and abbreviations: Mon = monument; Bldg Fnd = building foundation; [ ] = concentration; FCR = fire-cracked rock.

Only three other architectural features fit this category: the collapsed shed at 5WL7682 (Figure 30) and two possible building foundations at 5WL7647. The latter site is unusual among the Historic period sites for its number of features, just as 5WL7212 stands out among the prehistoric resources. Apart from the prehistoric component at 5WL7647, which itself includes a notable combination of a fossil shell in a culturally flaked chert core (Figure 32), the historic component is a very extensive homestead complex containing at least two foundation features, three depressions that may also mark architectural remnants, and two trash concentrations.

Settlement Patterns

Given that the PBS parcels were chosen non-randomly, for a specific goal of surveying higher site density areas near and adjacent to drainages, consideration of the resulting settlement patterns is best focused on comparing the inventory results between the four parcels. A related effort authored by Aaron Theis appears in

Appendix II: an overview of predictive modeling efforts, testing the efficacy of the CSU model developed by Sayat Temirbekov and Jason Sibold, along with a more general overview of modeling site presence/absence in northeastern Colorado.

With the final survey sample size of almost 1500 ac, the results from all three seasons of work equate to an overall site density of just under 23 sites/mi^2. Highest densities—combining historic and prehistoric sites—are in the North Pawnee and South Pawnee Creek parcels at 31.7 and 33.3 sites/mi^2, respectively, while significantly lower densities (especially for prehistoric cultural resources) occur on unbroken expanses of short-grass prairie at a distance from any topographic, geologic, or vegetative diversity. In other words, the more featureless the terrain, the sparser the archaeology of any time period. This is evident in all the parcels, but particularly in the North Pawnee Creek and Wild Horse Creek areas where even isolated prehistoric artifacts were rare in low plains settings away from drainages. The lowest overall site density is along Geary Creek at just 10.3 sites/mi^2, albeit IFs are somewhat numerous there.

If Historic period resources are deleted from the computations presented above, a somewhat different picture of site density results for the North Pawnee Creek parcel. Although the South Pawnee Creek parcel continues to have the highest site density even just considering the prehistoric resources, the North Pawnee Creek site density drops to under 20 sites/mi^2 for prehistoric resources alone (the densities for the Geary Creek and Wild Horse Creek parcels are unchanged). Considering that survey in the North Pawnee Creek parcel was heavily focused on lands adjacent to drainages, this lower site density is of interest, although the sample size is rather small at just over 160 acres inventoried in that parcel.

For all four parcels, the uncommon occurrence of isolated projectile points as 'hunting losses' is surprising. Generally speaking, it is expected that modern artifact collectors would focus more effort on sites where flaked stone debitage provides a clue to the possible presence of points and other tools. Isolated points have been routinely encountered on past surveys owing to the more thorough area coverage involved in walking formally defined sweeps. Thus, their near absence in the PBS is a puzzle.

A comparison with the 52 Historic period resources (23 sites, 29 IFs) is of interest as well; the bulk of these resources can be associated with ranching and farming, as previously noted. By far the highest site density for such resources is in the North Pawnee Creek parcel at nearly 28 sites/mi^2, well above the figure of 11.6 sites/mi^2 in the South Pawnee Creek parcel. Both the Geary Creek and Wild Horse Creek parcels have quite low densities of historic sites at 5.7 sites/mi^2, but the Geary

Creek area yielded more historic IFs than all three of the other parcels combined. A possible explanation for the larger number of sites in the North Pawnee Creek parcel is the long-term presence of the Nelson Ranch just beyond the eastern edge of the section. This ranch was one of the first homestead claims in the PBS (see Table 4), and its continuous occupation since the late 1880s in such proximity to the parcel could account for the higher site density. The only earlier homestead claim was made next to the Wild Horse Creek parcel, but in contrast there is no farm or ranch near the spring around which the claim was made.

Material Culture

The archaeological survey at Pawnee Buttes documented under 1,200 artifacts from all prehistoric sites and IFs, which is a rather meager total that reflects relatively small artifact scatters at the vast majority of sites. Not too surprisingly, all of these materials are lithic items, including 1,165 pieces of flaked stone but only 19 ground stone artifacts. Also as expected, flaked stone manufacturing by-products dominate in PBS sites with debitage, cores, tested cobbles, and production-stage bifaces and unifaces (i.e., blanks and preforms) accounting for 94 percent of all flaked stone artifacts (n = 1,095). Table 7 enumerates these data from the project area by artifact class, with selected collections shown in Figures 44 and 45. See Appendix I for tables providing site-by-site artifact inventories.

Ground stone artifacts were mainly documented as single specimens on sites and IFs with just a couple of exceptions, notably at previously recorded site 5WL1239 where eight pieces of ground stone were found. No metates are among the 19 ground stone specimens, and smooth cobble handstones far outnumber abrasive manos, suggesting that hide-rubbing or comparable activities were more prevalent than milling of wild seeds (Adams 2002).

Apart from the paucity of ground stone, there are few other notable trends in the lithic artifact record of the PBS. The flaked stone tools represent very typical forms found on most western plains surveys with just a couple of exceptions among the projectile point styles already noted above. The relative lack of raw toolstone materials in the project area also has been discussed already. However, several sites and IFs in the Wild Horse Creek parcel have flaked stone artifacts made from an unusual welded tuff not observed elsewhere on the survey, and of uncertain origin. This material is dark purple to purple-brown in color with light gray to white or clear quartz inclusions (Figure 46). The assemblage at site 5WL7209 contains the largest number of artifacts made from this material.

Table 7. Tabulation of all prehistoric artifacts observed during the PBS survey.

ARTIFACT CLASS	TOTAL OBSERVED	PERCENTAGE
Debitage	1,047	88.4
Bifacial Blank or Preform	22	1.9
Unifacial Blank or Preform	5	.42
Core	18	1.5
Tested Cobble	3	.25
Core Tool (Borer)	1	.08
Chopper	1	.08
Cobble Handstone	13	1.1
Comal (Cooking Slab)	2	.17
Mano	4	.34
Composite (Multi-Purpose Scraper-Awl)	1	.08
Drill	2	.17
Expedient Flake Tool	33	2.8
Graver	7	.59
Knife	2	.17
Projectile Point	12	1.0
Scraper	8	.68
Spokeshave	3	.25
TOTALS	**1,184**	**99.98**

Figure 44. Sample of collected tools in the PBS. Top row left to right: 5WL7374-1 obsidian-like flake, 5WL7381-1 arrow point, 5WL7388-1 flake tool; bottom row left to right: 5WL7402-1 drill, 5WL7409-1 scraper, and 5WL7410-1 knife.

Figure 45. More collected tools from the PBS. Top row left to right: 5WL7213-1 biface/preform, 5WL7183-1 drill, 5WL7197-2 scraper, 5WL7177-1 uniface; center: 5WL7205-1 arrow point tip; bottom row left to right: 5WL7208-1 flake tool/knife-scraper, 5WL7207-1 graver, 5WL7197-1 scraper, and 5WL7216-1 biface/preform.

Looking at raw material numbers overall, Table 8 and Figure 47 depict the toolstone frequencies present in the PBS. See Appendix I for site- and IF-specific tabulations of these data. Given the probability that secondary gravel sources were frequently utilized in the Pawnee Buttes region, it is no surprise that a diverse mix of materials—jasper, other cherts, chalcedony, agate, silicified sediment, and quartzite—is common in PBS assemblages. Primary source material from the Flattop Butte quarry in Logan County (Greiser 1983; Miller 2010:592), or material visually indistinguishable from the Flattop Butte chert/chalcedony, also is well-represented. A handful of other materials such as petrified wood, siltstone, and the aforementioned welded tuff are also among the PBS lithics, but no clearly non-local materials such as obsidian have been found.

Figure 46. Welded tuff biface recorded at 5WL7212 (scale 1–2 cm).

Table 8. Lithic material type frequencies in the Pawnee Buttes Survey area

Material Type	Total Count	Percentage
Banded Agate/Moss Agate	56	4.7
Chalcedony	86	7.3
Chert	183	15.5
Flattop Butte Chalcedony	122	10.3
Jasper	77	6.5
Petrified Wood	13	1.1
Quartz	20	1.7
Quartzite	327	27.6
Silicified Sediment (Morrison & Other Formations)	243	20.5
Siltstone	4	.34
Welded Tuff	35	3.0
Other Unidentified Volcanic	1	.08
Gneiss/Schist	4	.34
Granite/Granitic	10	.84
Sandstone	3	.25
Totals	**1,184**	**100.05**

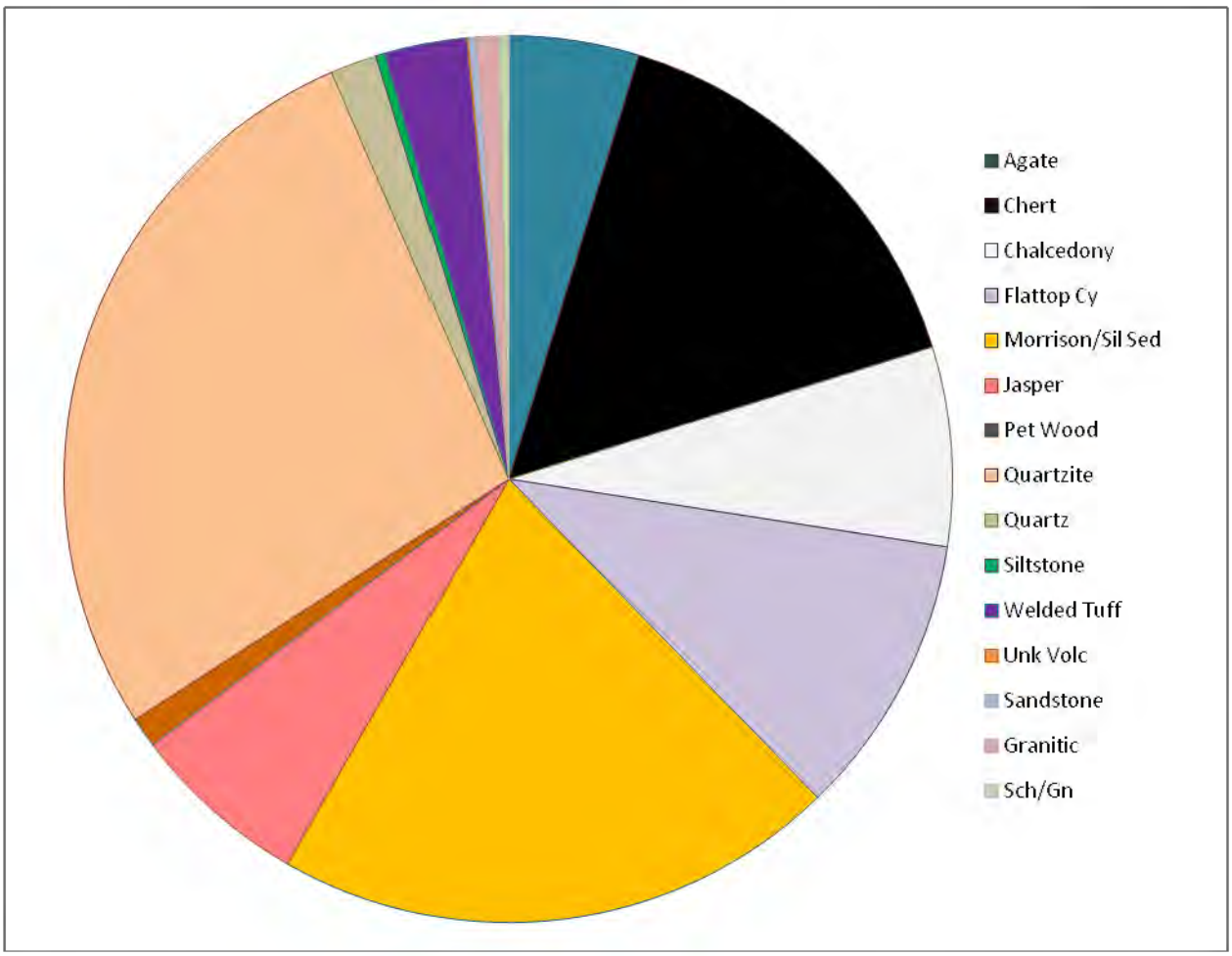

Figure 47. Toolstone frequencies on all sites and IFs in the PBS. Abbreviations: Cy = chalcedony, Sil Sed = silicified sediment, Pet = petrified, Unk Volc = unknown volcanic, and Sch/Gn = schist/gneiss.

Among the large number of Historic period sites and IFs in the PBS, very few unusual or notable artifacts were recorded that deserve special mention. As is typical of such resources, most items encountered are common mass-manufactured materials of glass, metal, and ceramic. While these are invaluable indicators of everyday life on the plains of northeastern Colorado, individually they are no different than any other late 19th or early-mid 20th century assemblage seen on sites all across the state and region. However, it is not uncommon to encounter metal parts from disassembled machinery that can defy easy identification when not *in situ*, such as the metal disk of uncertain function found at 5WL7662 near Geary Creek (see Figure 41).

Also, several artifacts found in trash dumps west of the Nelson Ranch in the North Pawnee Creek parcel are of interest. As is true in many prehistoric contexts, the reuse of artifacts—whether broken or not—is a common practice in situations where

new items may either be unaffordable or unnecessary given the functionality of remnant materials at hand. In lithic terms, this prehistoric tradition is embodied in a group of artifacts described as a "curated assemblage" (e.g., Binford 1979). The Historic period parallel is expressed in the maxim "waste not, want not." The two broken shovel blades reused as hatchets found at 5WL7386 exemplify this widespread practice (see Figure 29). Also, at this and nearby site 5WL7387, a few small ball-like or elongated red rubber(?) objects—some with nipple-shaped projections on one side—occur amidst otherwise standard collections of domestic trash (Figure 48). No clear function for these items has been determined.

Figure 48. Dried rubber(?) artifacts at 5WL7387 have also been found on adjacent site 5WL7386, but their function is unknown. For scale, the pen is 5¼″ long.

Finally, Table 9 provides details on the 30 collected items from the project area. Included are a very diverse array of flaked stone, fossil, and historical materials but projectile points, point blade fragments, and point preforms constitute the largest

fraction of the collection. All these materials are stored by History Colorado-OAHP in Denver.

Table 9. Pawnee Buttes Artifact Catalog, 2012–2014

Catalog #	Artifact Description	Comments & Metrics
5WL7176–1	fossil bone	large marine reptile caudal vertebra
5WL7177–1	uniface tip fragment, yellow quartzite	(2.88) × (2.52) × (0.70) cm; mass = (3.2) g
5WL7178–1	corner-notched arrow point fragment, tip broken; yellow-brown Morrison fm. silicified sediment	Early Ceramic period; (1.64) × 1.28 × 0.27 cm; neck width = 0.83 cm; mass = (0.6) g
5WL7179–1	mold-blown bottle (flask?) finish, aqua glass with a wiped/tooled lip	Historic period ca. AD 1875–1915; (2.40)" H × (1.54)" W × (1.26)" T; 0.54" bore diameter; mass = (37.1) g
5WL7183–1	drill fragment, pinkish-brown chert; expanding base with a broken bit	(2.92) × (2.78) × 0.70 cm; bit width = 0.91 cm; mass = (5.5) g
5WL7183–2	side-notched arrow point fragment, impact-fractured, brown chalcedony	Middle Ceramic period; (1.84) × (1.45) × 0.38 cm; neck width = 1.14 cm; mass = (1.1) g
5WL7197–1	distolateral scraper made on a blade, purple-brown Flattop Butte chalcedony	3.87 × 1.89 × 0.86 cm; mass = 6.4 g; edge angles = 50°–60°
5WL7197–2	distolateral scraper, purple-brown Flattop Butte chalcedony	2.84 × 2.28 × 1.01 cm; mass = 6.5 g; edge angles = 40°–78°
5WL7205–1	arrow point tip fragment, yellow-brown Morrison fm. silicified sediment	Ceramic period; (1.37) × (1.28) × (0.29) cm; mass = (0.5) g
5WL7205–2a	lithic raw material sample, purple moss agate (Flattop Butte-like) with chalky white cortex	White River Group geological context; 4.78 × 3.48 × 2.77 cm; mass = 38.5 g
5WL7205–2b	lithic raw material sample, lustrous light gray chert with chalky white cortex	White River Group geological context; 3.53 × 2.58 × 1.41 cm; mass = 10.7 g
5WL7207–1	graver, yellow-brown jasper	4.13 × 2.47 × 1.06 cm; mass = 10.3 g
5WL7208–1	flake tool: knife-scraper with broken proximal end; Flattop Butte chalcedony	possible butchering tool; (4.54) × 4.18 × 0.73 cm; mass = (8.6) g
5WL7212–1	stemmed arrow point or diminutive Hanna-type dart point, light gray chert	Early Ceramic or Middle Archaic period; 2.29 × (1.65) × 0.50 cm; neck width = 0.82 cm; mass = (1.6) g; broken shoulder tips
5WL7212–2	stemmed projectile point base fragment, yellow-brown Morrison silicified sediment	Archaic period; (1.60) × (2.28) × (0.63) cm; neck width = 2.07 cm; mass = (2.4) g; entire blade missing

Catalog #	Artifact Description	Comments & Metrics
5WL7212–3	large side-notched projectile point reused as a knife, convex base, gray chalcedony	Early Archaic period; 3.08 × (2.31) × 0.68 cm; neck width = 1.59 cm; mass = (5.3) g; broken tip reworked; one blade edge used
5WL7213–1	bifacial arrow point preform, brown petrified wood	Ceramic period; (2.32) × 1.58 × 0.42 cm; mass = (1.7) g; both ends broken
5WL7215–1	Gatecliff Contracting Stem projectile point, tan Morrison fm. silicified sediment	Middle or Late Archaic period; (4.63) × 2.15 × 0.63 cm; stem width = 1.34 cm; mass = (6.9) g; blade tip broken
5WL7216–1	bifacial preform, yellow-brown quartzite	4.96 × 3.18 × 0.76 cm; mass = 12.6 g; triangular form
5WL7374–1	gray chalcedony thinning flake	resembles obsidian; 1.42 × 1.80 × 0.60 cm; mass = 1.1 g
5WL7381–1	corner-notched arrow point, tip and shoulders broken; gray-brown Flattop Butte chalcedony	Early Ceramic period; (2.65) × (1.35) × 0.35 cm; neck width = 0.69 cm; mass = (1.2) g
5WL7388–1	scraping tool made on a thinning flake; purple-brown Flattop Butte chalcedony	3.07 × 3.63 × 0.79 cm; mass = 7.6 g
5WL7398–1	purple glass stemmed goblet with a broken base	Historic period ca. AD 1880–1925; (6)" H × 3" D; 3.85" cup height; mass = (17.33) oz
5WL7398–2	ferrous metal Crown type bottle cap	1.22" D × 0.31" H; mass = 0.105 oz
5WL7402–1	bifacial drill with slightly expanding base and broken tip; gray-brown Flattop Butte chalcedony	(3.62) × 1.41 × 0.56 cm; mass = (3.3) g; edge angles = 55°–60°; light abrasive wear
5WL7409–1	end scraper made on a flake; retouched & utilized distal edge; tan-brown chert	4.03 × 5.42 × 1.38 cm; mass = 29.8 g; edge angles = 40°–50°, worked on ventral side
5WL7410–1	bifacial knife fragment, distal portion; gray-brown-pink moss agate	(3.67) × (3.41) × (0.87) cm; mass = (7.5) g; triangular form
5WL7647–1	green-gray chert core with embedded fossil shell	5.85 × 5.04 × 2.98 cm; mass = 78.9 g
5WL7693–1	corner-notched dart point fragment; yellow-brown quartzite	Late Archaic period; (2.34) × (2.39) × (0.47) cm; neck width = 1.41 cm; mass = (2.9) g
5WL7693–2	bifacial preform; banded maroon and yellow chert	8.37 × 3.33 × 0.74 cm; mass = 24.8 g

*****Metric dimensions are in centimeters, maximum length × width × thickness unless otherwise noted (dimensions for broken items in parentheses); mass in grams.

Evaluations and Recommendations

The Management Information Form (MIF) at the beginning of this report summarizes the significance evaluations for the 53 sites and 77 IFs recorded in the PBS, in terms of their eligibility for the National Register of Historic Places (NRHP). In general, eligibility assessments tended to be conservative ones, favoring conservation of the cultural resources whenever possible. Since there was no known current or short-term planned threat of land disturbing activities in the PBS at the time of the survey—despite the high level of oil and gas-related activity in the general area—there was no perceived need for immediate test excavations to definitively evaluate the significance of sites considered potentially eligible for the NRHP. However, we were unaware of plans for developing new well pads and pipelines, which took place in 2013 in the southern portion of the Wild Horse Creek parcel (Figure 49).

Thirteen of the 53 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 are the primary management recommendations made in addition to avoidance for these 13 sites. Also, further survey with possible test excavations are recommended at both sites 5WL7206 and 5WL7207 on the privately owned lands just east of the Wild Horse Creek parcel property boundary. In both cases, the east section line of the parcel runs quite close to one of the largest natural springs in the area, and evidence on both sites is suggestive of more cultural materials in existence on the private land closer to that spring. Thirty-six 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 77 IFs are inherently insignificant resources that are evaluated not eligible for the NRHP. No further work is recommended for all such insignificant resources.

The remaining four sites in the PBS are evaluated eligible for the NRHP based solely on the surface evidence: 5WL1239, 5WL7212, 5WL7647, and 5WL7666. Site 5WL1239 in the Geary Creek parcel, the only previously recorded resource re-visited by our PAAC crews, exhibits thermal features, time diagnostic projectile points (collected during its original survey in 1987), and more ground stone artifacts than any other site in the PBS. In addition to the standard recommendation for test excavations should future developments threaten its physical integrity, an additional suggestion is for some kind of site protection from the on-going erosion caused by vehicle traffic on a two-track road that passes directly through the site. Given the number of other such jeep trails in the immediate vicinity, perhaps the simplest procedure would be to

close and revegetate the road segment that bisects the site in favor of a re-route on an existing track to the east of the site.

Figure 49. PAAC volunteer David Heath searches the area of 5WL7406 while a new well is being developed beyond him in the Wild Horse Creek parcel, May 2013.

Site 5WL7212 in the Wild Horse Creek parcel is unique among the prehistoric resources of the PBS, not only due to having the largest artifact assemblage in the project area (more than double the total of any other site) but also has an unusual rock feature that may have served a ritual function. Although this site was in reasonably good physical condition at the time of our recording, the site area is vulnerable to both foot and off-road vehicular traffic, being located on the crest of a hill that could be targeted by hikers, hunters, or other visitors. More precise instrument mapping and controlled surface collecting are recommended for this important resource. Also, should a site stewardship program be implemented in the area, it would be prudent to add this resource to the list of sites to be monitored.

In the Geary Creek parcel, site 5WL7647 has a very extensive Historic period component and a smaller prehistoric component that itself may be of some significance. This site has the largest number of features in the PBS, including possible architectural foundations and ground depressions that may also mark architectural ruins. Although the prehistoric component here is far less extensive, it does contain ground stone and a piece of fire-cracked rock that could indicate one or more buried thermal features. Overall, the site has excellent potential for intact buried remains, and test excavations are recommended to more precisely define the extent and condition of buried material.

Also in the Geary Creek parcel, site 5WL7666 contains both Historic period and prehistoric components of some similarity to the archaeological record at 5WL7647, the latter just over ¼ mile northwest of 5WL7666 on the opposite side of the creek. Although unlike 5WL7647, the prehistoric component here lacks significance, but the Historic period materials are extensive and include two ground depressions that may also mark architectural features. The abundance of domestic trash along with the good potential for intact buried remains leads to a conclusion that testing or larger scale excavations here would be quite productive. Both sites 5WL7647 and 5WL7666 can provide important new data on early 20th century homesteading in the Geary Creek area.

On a more general note, our survey results show that illicit excavation is not a significant problem in the PBS area, but that surface "arrowhead" hunting is—and likely has been in the past—a widespread and pervasive activity. Given the diverse areas surveyed totaling nearly 1,500 acres, a disappointing number of diagnostic projectile points were recorded. Such activity is unlikely to decline in a significant way, no matter how intense any educational efforts might be, so no specific additional management recommendations are offered here. On the other hand, surface collecting is an inherently less destructive impact on archaeological sites than digging, thus it is gratifying that such excavation is not in evidence within the PBS parcels. It may well be that those members of the public who might be tempted to dig into archaeological sites favor rockshelter settings, which happen to be entirely absent in our project area.

One of the goals of this project was to evaluate how closely our survey results resemble the archaeological record previously documented on adjacent National Grasslands properties administered by USDA Forest Service. Since OSAC cannot ***require*** surveys on state-owned lands in advance of ground-disturbing activities, but routinely ***recommends*** that such inventories occur, correspondence in survey results would support such recommendations. Indeed the PBS results do provide this evidence. Landforms previously suspected to contain higher archaeological site

densities conform to that expectation in the PBS parcels: terraces along larger streams, gentle terrain near productive springs, and the crests of hills and ridges do tend to hold more sites than other kinds of terrain on the plains. But for prehistoric resources in Weld County there is another consideration, that being the occurrence of knappable toolstones in secondary gravel deposits, which also has a positive impact on site density. Unfortunately, the geological/GIS mapping data currently available are not yet precise enough to define the boundaries or densitites of these surface gravel layers. The development of maps showing where the productive gravels occur would be a big improvement in our ability to model prehistoric site density.

One other clear need relates to the predictive model for tipi ring site occurrence that was evaluated in Appendix II of this report. Clearly, the model as it existed at the start of this survey project radically overestimated the likelihood of tipi ring sites in portions of all of the PBS parcels. Not a single tipi ring site was discovered by our crews, even on lands mapped as "high probability" areas of the PBS. It appears that the criteria used in developing the model were too general in nature—better suited to lithic scatters and short-term camps than to tipi ring sites specifically—and lacked at least one critical kind of data, of obvious utility to most plains archaeologists. That is the availability of natural rock outcrops from which to gather the slabs needed to anchor a tipi cover. The large number of tipi ring features documented in the nearby Keota Stone Circles and West Stoneham National Register districts (Figure 50) are surrounded by extensive sandstone outcrops, not small-scale/localized outcrops such as exists in the South Pawnee Creek parcel. However, as with secondary toolstone occurrences, geological and GIS mapping data are not yet detailed enough to provide accurate locations for extensive outcrop areas not yet surveyed by archaeologists.

Summary and Conclusions

The PBS project has generated some interesting new data on the prehistoric and historic archaeological record of northeastern Colorado, particularly regarding early 20th century farming and ranching. Information on prehistoric use of local landscapes is somewhat sparse, but still shows useful trends in ancient foraging activities. The survey covered just under 1,500 ac (605 ha) in four separate parcels scattered through parts of north central and northeastern Weld County. This work resulted in the recording of 53 sites and 77 IFs.

Figure 50. Tipi ring feature at 5WL354 near Keota, showing a part of the extensive rock outcrop in the background, May 2013.

The most common site types here are prehistoric and Historic period artifact scatters; camps and habitations are present but uncommon, and isolated artifacts of both prehistoric and historical origin are abundant. The prehistoric sites are typified by flaked stone debitage of diverse raw materials, mostly from local secondary gravel sources, with relatively few flaked stone tools that are clearly skewed toward hunting and faunal processing implements. A small number of ground stone tools have been found at only 11 sites and IFs, and procurement activity focused on the diverse materials from gravel sources mostly occurred a short distance west of our four PBS parcels, and from the Flattop Butte source to the east. Both architectural features and ceramic artifacts are entirely absent from the prehistoric resources recorded during the project, as are artifact materials of clearly non-local origin such as obsidian.

Highest site densities are found: 1) near South Pawnee Creek west of New Raymer; 2) on level terraces along all of the larger drainages in the PBS; and 3) on the

crest of hills and ridges. Since the state-owned parcels comprising the survey parcels were never claimed or purchased as homesteads, the Historic period resources mostly reflect farm- and ranch-related trash deposits from adjacent private or federal (formerly private) properties. A couple of architectural sites of the Historic period were recorded in the PBS, however, within the Geary Creek parcel northwest of Briggsdale. The earliest such settlement took place in the late 1880s and 1890s north and west of the Pawnee Buttes, but the bulk of the sites in the PBS sample reflect the Weld County settlement boom of the 1910s and 1920s.

Thirty-six features have been documented at 17 sites and one IF (a cairn) within the PBS, nearly half of which are either artifact concentrations or Historic period ground depressions. Only three thermal features—hearths and fire-cracked rock concentrations—have been recorded at the prehistoric sites, along with a single example of an unburned cobble concentration on a hilltop that may mark some kind of ritual activity, if not a grave. The lack of prehistoric architectural features extends to tipi rings, despite indications from a predictive model of a good probability of such features in parts of the PBS parcels. However, extensive bedrock outcrops that could provide suitable slabs to use for this purpose are lacking in the survey area.

A few project area artifacts are exposed on rodent backdirt, in road berms, or at arroyo cut banks, indicating the presence of potentially significant buried deposits within a meter of the present surface. Much deeper arroyo cuts show that alluvium has accumulated at least 1.5–2.0 m in depth along the larger drainages. As noted above, Historic period sites and features mostly represent farming and ranching activity in the period 1885–1970; the most common features are trash dumps and depressions from possible architectural ruins. Mining evidence is limited to three apparent soil/gravel borrow pits in a parcel west of the Pawnee Buttes.

The prehistoric settlement patterns in the survey area are likely influenced by the proximity of the larger drainages within and adjacent to the PBS. However, the non-random nature of parcel selection precludes quantification of this effect. But other landscape features also were attractions to hunter-gatherer groups throughout the prehistoric era, notably the elevated landforms that provide enhanced viewsheds of the surrounding prairie—an obvious benefit for the semi-nomadic hunting populations in the region. Our evaluation of the predictive model of prehistoric site location developed prior to the PBS identified some straightforward ways to improve the utility of such models, but only if certain critical landscape details become available in digitized format. These include precise mapping of the boundaries of the more extensive rock outcrops that contribute to the significance of the Keota Stone Circles and West Stoneham Archaeological Districts, and similar mapping of dense surface gravel deposits that may contain knappable toolstone materials.

Chronologically, the Early Ceramic period ca. AD 150–1150 is best represented in the PBS, with the caveat that diagnostic projectile points are not common on project area sites so the sample is a small one. A handful of Early Archaic, Middle and/or Late Archaic, and Middle Ceramic period diagnostic are also present in very low numbers, but the Paleoindian period is not represented in the PBS despite the presence of such resources not far outside the four projet parcels. On the opposite end of the time scale, the local Historic period record mostly dates to the 1910–1935 period, but both earlier and more recent activities have been documented. American Indian activities of the pre-reservation era, like the Paleoindian period, are absent from the PBS sample.

Finally, the training provided to our PAAC volunteers in the Pawnee Buttes area has been a good opportunity for them to experience the archaeological record in a different landscape context than they may have encountered previously (Figure 51). Although the density of sites and artifacts was not as high as may be desired, these resources can still be a challenge to document by project participants with more limited experience. Yet our avocational volunteers maintained their enthusiasm and effort regardless of the circumstances—including in often-trying weather conditions. We offer our endless thanks to all 46 of them!

Figure 51. PAAC crew recording isolated find 5WL7692 north of the Pawnee Buttes, in the North Pawnee Creek parcel.

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Appendix I

Project Data Tables

Table I-1. Artifact inventories for all sites and IFs in the Pawnee Buttes Survey area

SITE #	DEB	PP	BF	UN	KN	SC	DR	GR	SP	CH	FT	CT	CO	TC	MN	HS	CM	CP	TOTAL
5WL1239	24	2	2	0	0	0	0	0	0	0	1	0	0	0	0	8	0	0	37
5WL7174	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
5WL7175	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
5WL7176	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	36
5WL7177	45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46
5WL7178	23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	25
5WL7179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7180	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36
5WL7181	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
5WL7182	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5WL7183	91	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	93
5WL7184	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7185	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35
5WL7186	45	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	48
5WL7187	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7188	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7189	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7190	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7191	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7192	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7193	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
5WL7194	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7195	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
5WL7197	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4
5WL7198	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7199	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7201	11	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	14
5WL7202	8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
5WL7203	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5
5WL7204	18	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	20
5WL7205	2	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4
5WL7206	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5WL7207	3	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	5

SITE #	DEB	PP	BF	UN	KN	SC	DR	GR	SP	CH	FT	CT	CO	TC	MN	HS	CM	CP	TOTAL
5WL7208	6	0	1	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	10
5WL7209	13	0	0	0	0	1	0	0	1	0	2	0	1	0	0	0	0	0	18
5WL7210	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	8
5WL7211	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5WL7212	183	3	3	3	0	1	0	2	0	0	1	0	0	0	0	0	0	0	196
5WL7213	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7214	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
5WL7215	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5WL7216	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7217	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3
5WL7218	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7374	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
5WL7375	15	0	0	0	0	1	0	1	0	0	3	0	0	0	0	0	1	0	21
5WL7376	8	0	0	0	0	0	0	1	0	0	5	0	1	0	0	0	0	0	15
5WL7377	16	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	0	0	23
5WL7378	10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	11
5WL7379	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7380	23	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	25
5WL7381	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
5WL7382	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
5WL7383	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
5WL7384	9	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	12
5WL7385	27	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	29
5WL7386	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7387	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7388	5	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1‡	8
5WL7389	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7390	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3
5WL7392	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
5WL7393	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5WL7394	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7395	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5WL7396	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7397	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7398	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7399	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
5WL7400	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5

SITE #	DEB	PP	BF	UN	KN	SC	DR	GR	SP	CH	FT	CT	CO	TC	MN	HS	CM	CP	TOTAL
5WL7401	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
5WL7402	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5
5WL7403	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7404	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7405	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
5WL7406	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
5WL7407	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7408	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
5WL7409	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7410	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7411	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5WL7647	10	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	12
5WL7648	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5WL7649	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5WL7650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7651	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7652	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7653	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5WL7654	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7655	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7656	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7657	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7658	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7660	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7661	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7662	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7663	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
5WL7664	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7665	32	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	34
5WL7666	11	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	14
5WL7667	29	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	30
5WL7668	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7669	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7670	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7671	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7672	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7673	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE #	DEB	PP	BF	UN	KN	SC	DR	GR	SP	CH	FT	CT	CO	TC	MN	HS	CM	CP	TOTAL
5WL7674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7675	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7676	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7677	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7678	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7679	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7680	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7681	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7682	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7683	12	0	0	0	0	0	0	0	0	0	0	1§	2	0	0	0	0	0	15
5WL7684	9	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	11
5WL7685	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
5WL7686	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7687	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7688	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7689	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7690	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7691	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7692	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7693	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7694	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
TOTALS	**1047**	**12**	**22**	**5**	**2**	**8**	**2**	**7**	**3**	**1**	**33**	**1**	**18**	**3**	**4**	**13**	**2**	**1**	**1184**

Historic Items Only
1‡: scraper-awl
1§: borer

Key to abbreviations, Table I-1 (top row): DEB = debitage; PP = projectile point; BF = biface/preform; UN = uniface; KN = knife; SC = scraper; DR = drill; GR = graver; SP = spokeshave; CH = chopper; FT = flake tool; CT = core tool; CO = core; TC = tested cobble; MN = mano; HS = handstone (smooth cobble); CM = comal/cooking slab; CP = composite tool (multi-purpose).

Table I-2. Artifact materials for all prehistoric sites and IFs in the Pawnee Buttes Survey area

SITE #	AG	CT	CY	FC	MS	JS	PW	QE	QZ	ST	WT	IG	SS	GN	SG	Totals
5WL1239	0	10	0	9	3	1	0	4	2	0	0	0	0	8	0	37
5WL7174	0	6	0	3	2	1	0	0	0	0	0	0	0	0	0	12
5WL7175	0	4	0	3	14	0	0	2	0	0	0	0	0	0	0	23
5WL7176	1	4	3	0	15	0	0	12	0	0	0	0	0	0	1	36
5WL7177	0	7	0	8	1	0	1	29	0	0	0	0	0	0	0	46
5WL7178	1	8	8	2	1	3	0	1	0	0	0	0	0	0	1	25
5WL7179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7180	1	7	1	0	1	3	1	22	0	0	0	0	0	0	0	36
5WL7181	0	3	1	2	9	0	0	2	0	0	0	0	0	0	0	17
5WL7182	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	3
5WL7183	2	20	10	2	0	4	0	55	0	0	0	0	0	0	0	93
5WL7184	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5WL7185	0	0	2	0	33	0	0	0	0	0	0	0	0	0	0	35
5WL7186	0	12	5	2	7	0	0	22	0	0	0	0	0	0	0	48
5WL7187	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
5WL7188	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
5WL7189	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5WL7190	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
5WL7191	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5WL7192	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5WL7193	1	2	1	0	0	1	0	0	0	0	0	0	0	0	0	5
5WL7194	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5WL7195	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5WL7196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
5WL7197	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	4
5WL7198	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
5WL7199	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
5WL7200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7201	1	1	1	2	5	0	0	2	0	0	1	0	1	0	0	14
5WL7202	0	0	0	1	1	0	0	4	0	0	3	0	0	0	0	9
5WL7203	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	5
5WL7204	0	8	2	7	0	0	0	1	0	0	2	0	0	0	0	20
5WL7205	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	4
5WL7206	0	1	0	0	0	0	0	3	0	0	2	0	0	0	0	6
5WL7207	0	1	1	1	0	2	0	0	0	0	0	0	0	0	0	5

SITE #	AG	CT	CY	FC	MS	JS	PW	QE	QZ	ST	WT	IG	SS	GN	SG	Totals
5WL7208	0	0	0	4	1	0	0	5	0	0	0	0	0	0	0	10
5WL7209	1	1	0	1	0	0	0	1	0	3	11	0	0	0	0	18
5WL7210	1	0	0	0	2	0	0	3	0	1	1	0	0	0	0	8
5WL7211	1	0	0	2	2	1	0	0	0	0	0	0	0	0	0	6
5WL7212	21	10	6	17	22	33	0	72	13	0	2	0	0	0	0	196
5WL7213	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
5WL7214	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2
5WL7215	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	3
5WL7216	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	2
5WL7217	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
5WL7218	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
5WL7374	0	1	2	2	2	1	0	7	0	0	0	0	0	0	0	15
5WL7375	0	4	4	2	3	2	1	3	0	0	0	0	1	0	0	20
5WL7376	1	2	2	1	0	0	1	8	0	0	0	0	0	0	0	15
5WL7377	1	4	0	3	0	0	3	9	0	0	3	0	0	0	0	23
5WL7378	1	0	1	1	4	3	0	1	0	0	0	0	0	0	0	11
5WL7379	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7380	3	4	0	7	0	0	1	9	0	0	1	0	0	0	0	25
5WL7381	1	1	7	7	13	2	1	2	0	0	0	0	0	0	0	34
5WL7382	0	4	4	2	11	0	1	0	1	0	0	0	0	0	0	23
5WL7383	0	2	3	1	8	0	0	0	0	0	0	0	0	0	0	14
5WL7384	0	0	2	0	4	0	0	2	0	0	4	0	0	0	0	12
5WL7385	0	1	1	0	27	0	0	0	0	0	0	0	0	0	0	29
5WL7386	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7387	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5WL7388	0	0	0	1	5	1	0	1	0	0	0	0	0	0	0	8
5WL7389	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7390	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	3
5WL7392	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5WL7393	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5WL7394	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7395	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	3
5WL7396	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7397	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
5WL7398	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5WL7399	0	4	0	0	1	0	0	0	2	0	0	0	0	0	0	7
5WL7400	0	1	0	0	3	0	0	0	1	0	0	0	0	0	0	5

SITE #	AG	CT	CY	FC	MS	JS	PW	QE	QZ	ST	WT	IG	SS	GN	SG	Totals
5WL7401	0	3	0	1	1	0	0	0	0	0	0	0	0	0	0	5
5WL7402	0	1	0	1	1	2	0	0	0	0	0	0	0	1	0	6
5WL7403	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7404	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7405	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
5WL7406	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
5WL7407	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
5WL7408	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
5WL7409	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7410	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7411	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3
5WL7647	1	3	0	1	3	2	0	1	0	0	0	0	1	0	0	12
5WL7648	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5WL7649	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	3
5WL7650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7651	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7652	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7653	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
5WL7654	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
5WL7655	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7656	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7657	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7658	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7660	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7661	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
5WL7662	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7663	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
5WL7664	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
5WL7665	8	3	0	6	0	2	0	14	1	0	0	0	0	0	0	34
5WL7666	2	3	1	3	4	0	0	1	0	0	0	0	0	0	0	14
5WL7667	0	15	2	2	4	2	0	5	0	0	0	0	0	0	0	30
5WL7668	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7669	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7670	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7671	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7672	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7673	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE #	AG	CT	CY	FC	MS	JS	PW	QE	QZ	ST	WT	IG	SS	GN	SG	Totals
5WL7674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7675	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7676	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7677	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7678	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7679	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7680	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7681	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7682	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7683	2	3	3	2	4	1	0	0	0	0	0	0	0	0	0	15
5WL7684	1	0	2	1	3	2	1	1	0	0	0	0	0	0	0	11
5WL7685	0	9	0	2	4	2	0	2	0	0	0	0	0	0	0	19
5WL7686	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5WL7687	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7688	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7689	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7690	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5WL7691	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7692	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5WL7693	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2
5WL7694	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
TOTALS	**56**	**183**	**86**	**122**	**243**	**77**	**13**	**327**	**20**	**4**	**35**	**1**	**3**	**10**	**4**	**1184**

Key to abbreviations, Table I-2 (top row): AG = agate; CT = chert; CY = chalcedony; FC = Flattop Butte chalcedony (or look-alike); MS = Morrison or other formation silcrete/silicified sediment; JS = jasper; PW = petrified wood; Qe = quartzite; Qz = quartz (macrocrystalline); ST = siltstone; WT = welded tuff; IG = other igneous/volcanic, unidentified; SS = sandstone; GN = granite/ granitic; SG = schist/gneiss.

Table I-3. Features on sites and IFs in the Pawnee Buttes Survey area

SITE #	Cairn	Hearth/ FCR	Ritual	Artifact [ ]	Borrow Pit	Depression	Bldg Fnd	Trash Dump	Junk Yard	Post	Fence	Survey Mon	Total #
5WL1239	0	2	0	0	0	0	0	0	0	0	0	0	2
5WL7179	0	0	0	0	0	1	0	0	0	0	0	0	1
5WL7182	0	0	0	0	0	0	0	0	1	0	0	0	1
5WL7183	0	0	0	1	0	0	0	0	0	0	0	0	1
5WL7184	0	0	0	0	0	1	0	0	0	0	0	0	1
5WL7186	0	0	0	1	0	0	0	0	0	0	0	0	1
5WL7205	0	0	0	0	3	0	0	0	0	0	0	0	3
5WL7212	0	1	1	1	0	0	0	0	0	0	0	0	3
5WL7379	0	0	0	1	0	0	0	0	0	0	0	0	1
5WL7386	0	0	0	0	0	0	0	1	0	0	0	0	1
5WL7388	0	0	0	0	0	0	0	0	0	0	1	1	2
5WL7404	1	0	0	0	0	0	0	0	0	0	0	0	1
5WL7647	0	0	0	2	0	3	2	0	0	1	0	0	8
5WL7666	0	0	0	1	0	2	0	0	0	0	0	0	3
5WL7667	0	0	0	1	0	0	0	0	0	0	0	0	1
5WL7679	0	0	0	0	0	0	0	1	0	0	0	0	1
5WL7682	0	0	0	0	0	0	1	0	0	3	0	0	4
5WL7685	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTALS	**1**	**3**	**1**	**8**	**3**	**8**	**3**	**2**	**1**	**4**	**1**	**1**	**36**

Key to abbreviations, Table I-3 (top row): FCR = fire-cracked rock concentration; [ ] = concentration; Bldg Fnd = building foundation; Mon = monument. Sites and IFs without features have been omitted from this table.

Appendix II

Modeling Prehistoric Settlement in the Pawnee Buttes Region

By Aaron V. A. Theis
Historaeology, Inc.

[under separate cover]

Appendix III

OAHP Site and IF Forms

[under separate cover]

NOTE: These forms and the maps in Appendix IV
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) for further information.

Appendix IV

Project Area Maps with Cultural Resources Plotted

[under separate cover]