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Archaeology IN MONTANA

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Journal of the Montana Archaeological Society

Archaeology IN MONTANA

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Cover Photo: From the article in this issue by Douglas D. Scott and Brenna Moloney, showing a group from Colorado Mesa University metal detecting the "Gap" at Rosebud Battlefield State Park.
Cover Design: Eubank Creative | www.eubankcreative.com

Archaeology IN MONTANA

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EDITOR'S COMMENTS

HAPPY NEW YEAR to all our MAS members! It's been a great year for AIM. I received many positive comments on the new journal cover and the new layout. Several members encouraged MAS to print the journal in color. We asked around to various printers and found that printing in color is quite a bit more expensive. However, we did finally find a printer who seemed more reasonable. Color is preferable because it provides greater contrast for subtle archaeological features. Given an extra financial boost from donors, we submitted the journal for color printing. However, after close to a month with no results, we decided to use our previous printer and go with only selected color graphics. We will continue to work towards a full color edition of AIM in the future.

As I mentioned in our last issue, many professional journals, such as Plains Anthropologist are available to members online via the organizational website. Our MAS web designer, Dan Smith, is currently working to make past volumes of AIM available (as PDFs) on our website for current members. Riley Auge is busy indexing all previous issues (126) of AIM and hopes to complete the indexing process early in 2024. This is a huge milestone for MAS and will allow researchers access to all previous issues of AIM. This handy tool was made possible by the foresight and support of the MAS board, with special thanks to Marv Keller for being such a staunch advocate of launching MAS into the digital future.

We are always looking for manuscripts on a variety of archaeological topics. If you are working on a paper, please consider publishing it in AIM. The quality and the content of the journal are dependent on members like you, so please send your articles to AIM.

Please remember to keep your membership dues current. Our membership costs are outlined on the front cover of the journal and by the president on the next page.

Up next, our spring 2024 AIM issue will feature articles on the Water Skipper rock art site in Golden Valley County and on basic rock art recording methods and more.

INFORMATION FOR AUTHORS

All articles for Archaeology in Montana should be mailed or e-mailed to:

Dr. Sara Scott
521 Redwood Street
Missoula, MT 59802
sascott0012@gmail.com

For Information regarding article layout and format, authors should refer to "Editorial Policy and Style Guide for American Antiquity." This information is available at https://documents.saa.org.

Manuscripts submitted for publication in AIM should be printed on one side of the page and double-spaced with wide margins. The document should be accompanied by a thumb drive or a CD with the manuscript and all graphics included. Graphics should be high quality and show good contrast. Digital photos and graphics should be submitted in jpeg format. All graphics should be submitted as individual separate files and should not be embedded in the manuscript.

Figure and table captions should be provided in a separate WORD document and keyed clearly to the individual figures/tables and their citation in the text.

Please consult 2023 issues of AIM for basic format questions. Submitted articles should follow the article format as shown in these AIM issues.

A NOTE FROM THE MAS PRESIDENT

MARK YOUR CALENDARS FOR THE 2024 MAS MEETING!

The MAS meeting will be held in Helena, May 3-5, 2024.

Although final details are still being worked out, the meeting will fall back to our traditional schedule:

- Board and Committee meetings and education workshop - Friday, May 3
- Fund-raising auction and social - Friday Evening, May 3
- Paper presentations - Saturday - May 4
- Banquet and guest speaker - Saturday evening - May 4
- Field trips are also being planned – Sunday May 5

A formal request for papers will be sent, but its never too early to submit a title and abstract. If you would like to present a paper at the upcoming meeting, submit to marvkeller@yahoo.com.

Also be sure to bring your treasures for inclusion in the live and silent auctions.

Meeting activities will be held at the Best Western Great Northern Hotel. A block of rooms has been set aside for the price of $175 a night, May 2, 3 and 4. Reservations can be made at: https://www.bestwestern.com/en_US/book/hotel-rooms.27075.html?groupId=1D5EW1Mo

OTHER IMPORTANT NEWS!

Make sure your membership is current. It is now more important than ever to keep your MAS membership up to date. Subscription information is listed below.

Past digital issues of Archaeology in Montana will soon be available through a members-only portal on the MAS website. Active MAS members will be able to access these issues at no extra charge. As an added bonus, a searchable index will also be completed early in 2024 and available through this portal, which will allow members to easily locate articles of interest. Instructions on how to use this index will be presented at the 2024 meeting and then later will be published in Archaeology in Montana (AIM).

Hope to see you all in May!
Marv Keller, MAS President

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ABOUT THE AUTHORS

Carl M. Davis was raised in Dillon, Montana and is a retired Regional Archaeologist with the U.S. Forest Service, Northern Region. He is the author of numerous publications about Intermountain and Plains archaeology, including *Six Hundred Generations: An Archaeological History of Montana,* the recipient of the Society for American Archaeology's 2020 Best Popular Book Award.

John W. Fisher, Jr. was a professor in the Department of Sociology & Anthropology at Montana State University from 1990 until his retirement in 2020. His archaeological research interests include the lifeways of hunter-gatherer people in the Great Plains and Rocky Mountains of Montana, zooarchaeology, and the spatial organization/structure of hunter-gatherer archaeological sites. He is fortunate to collaborate on investigations into the lifeways of Later Stone Age people in the Western Cape Province of South Africa.

Shannon M. Gilbert received her M.A. in Anthropology from California State University, Chico. She has worked in cultural resource management for nearly 30 years and currently serves as the Bureau of Land Management Dillon Field Office Archaeologist.

Ann Johnson joined the Montana Archaeological Society when she was about 16 and has been a member for more than 50 years. She left the state for education and then for employment but is now happily living in Kalispell. Her major interests include precontact pottery and the people who made them, the past 3000 years, and the Northern Plains.

Margaret Kennedy worked for more than 46 years in the field of historical and precontact archaeology of the northwestern Plains and eastern slopes of the Rocky Mountains. She and Barney Reeves jointly conducted a seven-year archaeological inventory of the lower Red Deer and South Saskatchewan rivers area on the border between Alberta and Saskatchewan, a project that explored the interrelationships of distinct stone feature sites and significant natural features such as the river forks themselves. She retired from the Department of Archaeology and Anthropology at the University of Saskatchewan in late 2018. Her interests include stone features, quarries and various themes within historical archaeology such as homestead archaeology and early Euro-Canadian settlement, mining towns and industrial installations, amongst others.

C. Milo McLeod grew up in western Washington and on Vancouver Island in British Columbia. He attended the University of New Mexico and received a Bachelor's of University Studies degree with an emphasis on Anthropology and history in 1972. He worked as an archeologist in the American Southwest and Alaska before attending graduate school at the University of Montana. He received an M.A. in Anthropology in 1984 and worked for the USDA Forest Service, Lolo National Forest, as an archeologist for 34 years before retiring in 2008. He continues to participate in archeology and historic preservation projects as a volunteer and founder of the Friends of Upper Rock Creek group.

Brenna Moloney is a heritage specialist with Montana Fish, Wildlife and Parks covering the eastern portion of the state. She has a Masters in Historical Archaeology from Wayne State University and a Master's in Historic Preservation Planning from Eastern Michigan University. She has worked in private CRM and public heritage management since 2010. Her research interests include collections-based methods, the history of American vernacular architecture, and landscape archaeology.

Douglas D. Scott retired in 2006 from the U.S. National Park Service after more than 30 years with the Department of the Interior, He is currently an Adjunct Research Faculty member at Colorado Mesa University. Doug specializes in nineteenth century military sites archeology and forensic archeology. He is particularly noted for his expertise in battlefield archeology and firearms identification. He directed, volunteered on, or advised others on approximately 50 conflict site archaeological investigations over the last 40 years.

Sara A. Scott's career in archaeology spans over four decades including years as a private consultant and as a program manager for various state and federal agencies. Most recently, Sara oversaw the history and archaeology program at Montana State Parks. Sara holds a M.S. in Anthropology from the University of Oregon and a Ph.D. in Anthropology from the University of Montana. Her research interests include precontact stone tool production, rock art, and travel and exchange networks. This work is published in archaeological journals such as Plains Anthropologist, the Journal of California and Great Basin Anthropology, Archaeology in Montana, and the International Journal of Historic Archaeology. Sara is the current editor of Archaeology in Montana and teaches continuing education at the University of Montana on topics such as rock art and precontact trail networks.

James D. Strait is the Tribal and Cultural Resources Officer, as well as the Unmanned Aerial Systems (UAS) Manager for the Montana Department of Environmental Quality. James holds a BS in Anthropology from Iowa State University (1995) and a MA in Archaeology, specializing in the Northern Plains and stone tool analysis from the University of Arkansas (1999). James also worked in the private sector doing Cultural Resource Management thought the Midwest, Southeast, and Southwest. His primary focus in archaeology has been in Montana, Wyoming and the Dakotas. Since 2013 James has been a pioneer in the use of UAS across state agencies, but particularly for archaeological evaluation.

A SEVERE ENGAGEMENT: COLLECTIONS BASED RESEARCH AND NON-DESTRUCTIVE FIELD METHODS AT ROSEBUD BATTLEFIELD, BIG HORN COUNTY, MONTANA

DOUGLAS D. SCOTT
BRENNA MOLONEY

INTRODUCTION

THE FOLLOWING PAPER IS A SUMMARY of an archaeological overview prepared by Douglas D. Scott for Montana Fish, Wildlife and Parks of the June 17, 1876, Battle of the Rosebud, within Rosebud State Park. The park is a National Historic Landmark. The overview integrates several previous private collecting efforts and professional archaeological investigations into a single narrative of archaeological findings and examines their relationship to written sources and Native American oral histories. In addition, this paper reports the findings of two non-destructive archaeological investigations that occurred in 2021 and 2023 and relates them to the previous research. This study combines all relevant archaeological find information into a narrative and also includes an update of spatial knowledge of U.S. Army and Native American movements, engagements, and other notable locations known primarily from historical records. The full archaeological overview is on file with the Montana Fish, Wildlife and Parks heritage program and is available upon request.

The Battle of the Rosebud, on June 17, 1876, was one of the largest engagements ever fought between the U.S. Army and Native American forces. The battle was a victory for the Lakota and Cheyenne warriors who were trying to preserve their way of life as the federal government sought to confine Native people to reservations. The battle is also important for understanding what would happen eight days later at the Battle of the Little Bighorn, where Lakota and Cheyenne warriors annihilated five companies of the Seventh U.S. Cavalry. Native American forces at the Battle of the Rosebud halted General Crook's northward march essentially eliminating the three-pronged battle strategy envisioned by U.S. army commanders. This victory emboldened and empowered the Lakota and Cheyenne to employ the same tactics on the U.S. soldiers who attacked the encampment on the Little Bighorn River on June 25, 1876. Together, these battles represent the pinnacle of Native American power and military prowess at the height of the Great Sioux War.

The battle began on the banks of Rosebud Creek, a tributary of the Yellowstone, in what is now Big Horn County, Montana. The engagement played out across a vast landscape of ravines and rolling hills ranging over fourteen square miles. Discrete as well as dispersed actions occurred across this terrain and no single individual could see the entire field of battle at any one time. The Battle of the Rosebud is one of men, women, and horses flowing across this incredible landscape, fighting at many different locations, and leaving behind physical evidence of their combat actions.

Today the site of the Battle of the Rosebud is a National Historic Landmark, and a portion of the battlefield is a state park managed by Montana Fish, Wildlife and Parks. The

landforms include valley bottoms, rocky bluffs, rolling hills, and high rising ridges with rocky outcrops. These all played a role in the fighting. As historian Paul Hedren (2019:178-184) notes "Landscapes tell stories and are as vital to storytellers as primary documents." The terrain at Rosebud is largely unaltered, with intact integrity and a strong sense of place, valuable for both historic preservation and interpretation. Beyond the landscape, battle participants also left behind a rich legacy of information in the form of oral histories, official U.S. Army after action reports, newspaper accounts, and personal recollections that now are the primary documents that tell the battle story. The physical, archaeological evidence of the battle also represents an important record of the site; however, this has been understudied and under reported.

To address that deficit, in 2021 Dr. Rachel Reckin, heritage specialist with Montana Fish, Wildlife and Parks, contacted Dr. Douglas Scott of Colorado Mesa University and requested that he gather all the diverse sources on relic collecting at the battlefield and place it within the context of professional archaeological investigations in order to create a comprehensive archaeological overview of the Rosebud Battlefield. Later, an additional component was added to the project that sought to locate the U.S. soldiers' mass grave through geophysical testing and a cadaver dog search. This paper summarizes that effort by focusing on the physical and archaeological evidence of the battle in previous collection efforts, surveys, and testing projects and how these studies contribute to understanding the Battle of the Rosebud. The results of the non-destructive investigations conducted in 2021 and 2023, which sought to locate the U.S. soldiers' grave, are also considered.

This study makes clear that all major facets of the battle yielded artifacts in a patterned distribution. The artifacts are tangible physical evidence of the fighting that trace actual troop movements across the battlefield. This information deepens our understanding of this unique landscape and historical event. The historical record contains some biases due to accounts from individuals who could not see the entire engagement. Firearm analysis offers a more distinct account of troops and warrior positions and helps track movements across the battlefield, thus providing new insights into how the battle unfolded. In combination with the geophysical testing and use of cadaver dogs trained to locate archaeological remains, new insights into the U.S. Army's response to the fighting and treatment of causalities can be gained. It is hoped that future research will continue to build on this work and will offer further insight into how this seminal encounter between the Lakota, Cheyenne, and the U.S. Army and their allies unfolded.

BATTLE OF THE ROSEBUD HISTORIC CONTEXT

The Great Sioux War was the last major struggle between European American settlers and Native Americans on the northern Plains. According to Milter's (2013:30-48) analysis of the battle, the encounter is important because it set the scene for what would happen eight days later at the Battle of the Little Bighorn, where Lakota and Cheyenne warriors defeated five companies of the Seventh U.S. Cavalry and besieged the remainder of the unit on June 25 and 26, 1876. Soon after, with increasing pressure from the U.S. Army, the Lakota and Cheyenne were forced to return to the reservations.

The 1876 spring/summer U.S. Army campaign opened with a plan to round up Native American groups. Colonel John Gibbon commanded one prong of a three-pronged movement. His column was the western component

Figure 1. Rosebud Valley and the site of General Crook's camp, where 900 men, horses and mules camped on either side of the creek running through the middle of the photo. Courtesy Jarrod Burks, Ohio Valley Archaeology, Inc. (OVAI).

of the plan, marching his forces out of Fort Ellis near present day Bozeman, Montana. Six companies of the Seventh Infantry and four companies of the Second Cavalry (about 450 men) accompanied Gibbon, who was to march east and make sure the Lakota and their allies did not cross the Yellowstone River. From the east, General Alfred Terry marched west from Fort Abraham Lincoln near present day Bismarck, North Dakota, with roughly 1,000 men, consisting of twelve companies of the Seventh Cavalry and three companies of the Seventeenth Infantry. General George Crook moved north from Fort Fetterman, near Douglas, Wyoming, on May 29, 1876, with about 900 men, ten companies of the Third Cavalry, five companies of the Second Cavalry, and five companies of Infantry, including the Fourth and the Ninth (O'Neill 2015; Milter 2013:30-35; Bourke 1971:285; Mangum 1987:28).

Early on the morning of June 17, 1876, Crook's command prepared for the day's march. The command moved out about six o'clock, following the South Fork of Rosebud Creek northward. Crook ordered a rest at eight o'clock in the morning after reaching the point where the North Fork of Rosebud Creek joins the South Fork. Crook ordered the horses unsaddled and set out to graze as the animals endured a 35-mile march the day before. Pickets were dispatched to the hills above as a precautionary measure (Figure 1).

Unbeknownst to Crook, the Lakota and Cheyenne moved all night long to reach Rosebud Creek. The Cheyenne, led by Young Two Moon, Two Moon, and Spotted Wolf, headed toward Rosebud Creek via Trail Creek. The Lakota, under the guidance of Crazy Horse, headed up

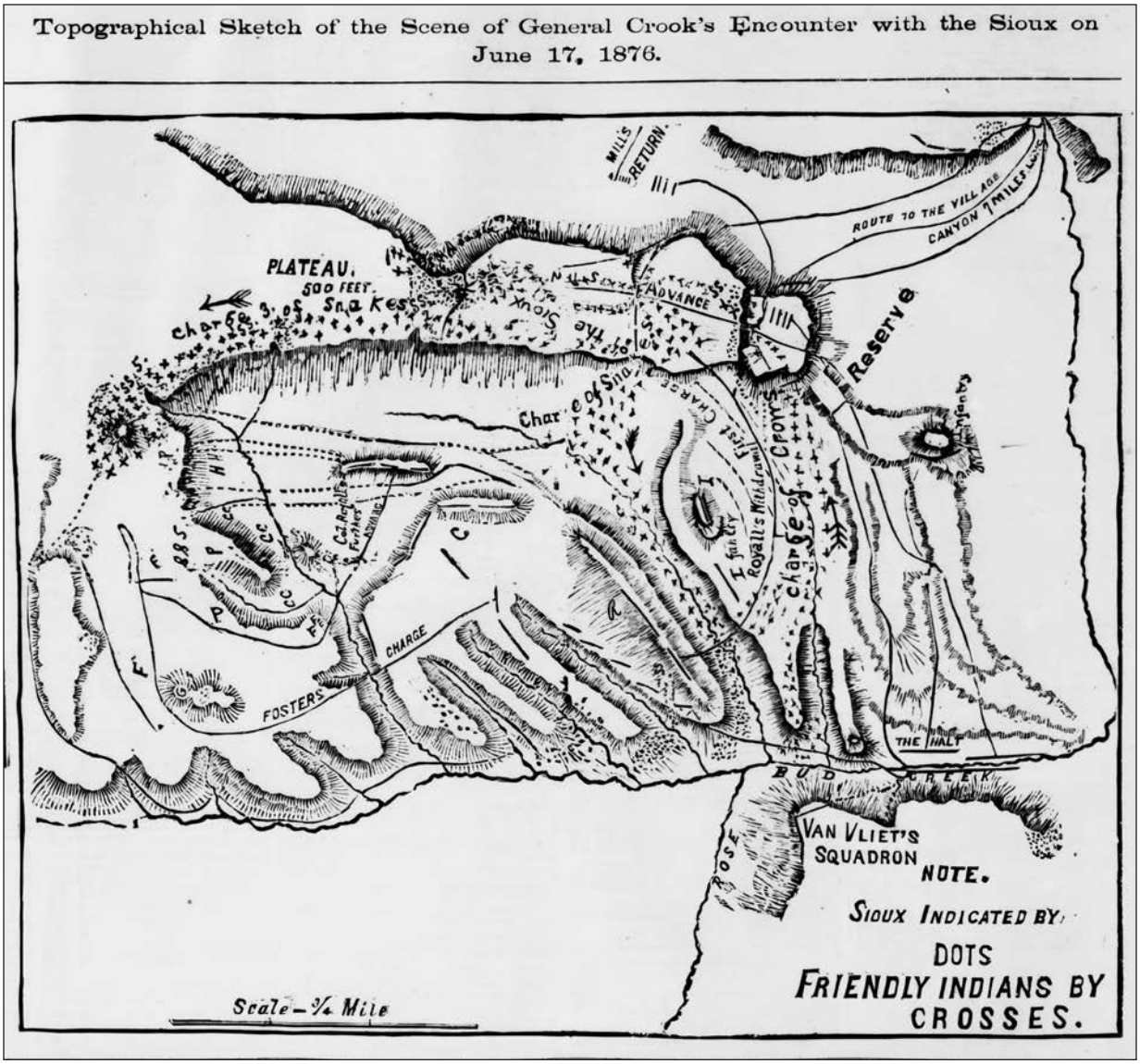

Figure 2. A sketch map of the Rosebud Battlefield published by the New York Herald, July 13, 1876.

the South Fork of Reno Creek and down Corral Creek on their way to meet Crook (Bourke 1971:311; Mangum 1987:49; Vaughn 1994:47).

At approximately 8:30 in the morning, shots were heard by Crook's group in the distance, thought at first to be the scouts shooting buffalo. The shots heard were from the U.S. Army aligned Crow and Shoshone scouts on Corral Creek as they encountered Lakota warriors. The initial firing halted the movement of both groups, but additional Lakota warriors arrived, forcing the Indian scouts back towards the Rosebud. At this point the Shoshone scout, Humpy, dashed into the U.S. Army camp yelling, "Lakota! Lakota!" stirring Crook and his command to action (Figure 2).

Though causalities at the Battle of the Rosebud were lower than those at the Little Big Horn, the battle was not without cost. General Crook lost nine soldiers and one Shoshone scout

who were then buried at an unknown location on the battlefield. Another 50 men were wounded. The Lakota and Cheyenne casualties are not precisely known, but Native American oral histories indicate that at least 13 were killed and an unknown number wounded, some of whom likely died later.

The complete battle story is fully developed in the various works cited here but in the end, the Battle of the Rosebud was a defeat for General Crook and the U.S. Army by Lakota and Cheyenne warriors, although the army declared it a victory for them. The mistakes made during the battle by the Army gave the Lakota and Cheyenne the confidence and the battle experience to defeat Custer a week later (Bourke 1971:311; Buecker 2013; Finerty 1977; King 1880; Lemy 1975; Mangum 1987:54; McDermott 2000; Milter 2013; Montana Preservation Alliance 2007; O'Neill 2015; Vaughn 1966:117-144; 1994:50; Werts and Booras 2011; Wiles 1993).

RESEARCH METHODS AND BACKGROUND INFORMATION

The study of conflict archaeology has grown rapidly in recent years and is now a dynamic area of investigation (Scott and McFeaters 2011). The special focus of the field centers on battlefields and other points of conflict. At such sites, conflict archeologists developed a suite of interdisciplinary techniques and methods to analyze both the material and historical records and address how combat actions, and their aftermath, unfold (Bleed and Scott 2011). In recognition of the important role played in military events, conflict archeologists conduct systematic investigations of military support facilities including camps, bases, arsenals, and other logistical points (Scott and McFeaters 2011).

The components of an archaeological overview and assessment require a context which, in this case, necessitated searching a significant body of published literature, archival materials, and museum holdings. Native American oral history accounts assembled by several authors were also consulted as were the official army records of the battle. Sources for the known historic maps include contemporary newspapers and magazines. Relic collection efforts were documented through archival research, reports, and publications of various battlefield researchers. Contacts were made with surviving artifact collectors as well as living family members regarding the disposition of the collections. Where collections are extant, largely in the possession of current or former landowners, they were physically examined and documented with the families' permission (Figure 3).

Interest in the physical evidence of the battle is not new. It began with the warriors who took war trophies, soldiers who buried the dead, and later with those who collected souvenirs as tangible reminders of their visit to the battleground. Most of these early collection efforts are undocumented and if an item surfaces today in private hands or at a public institution, its association with the battle is often little better than hearsay. Those relics are of interest, but they are not the main concern of this archaeological overview. Private and professional archaeological investigations of the Battle of the Rosebud yielded over two thousand

Figure 3. The Kobold family generously sharing their family Rosebud artifact collection with the CMU team.

artifacts that represent a rich and valid sample of what may still lie in the ground. The objects, their context, and the information they convey can contribute to understanding the particulars of the fight and adds to the historical significance of the battle and its aftermath. Clearly, the remaining archaeological deposits which are substantial, are likely to yield additional significant information about the battle and the individual participants which will in turn, further refine our understanding of the events of June 17, 1876.

The majority of artifacts discovered thus far were recovered by metal detecting (Table 1). The earliest metal detecting was done by Jesse Vaughn (1966, 1994) in the mid-1950s. He along with local rancher and landowner Elmer Kobold, investigated most of the battlefield. He likely intensively swept certain areas, but his field methods are not described in his books. Regardless, he reported he recovered between 600-800 artifacts.

Three other early collectors also used metal detectors, Thain White (1961) and Gordon Pouliot and Fred Werner (1983). White and Pouliot reported they recovered 122 artifacts and Werner reported he recovered 310. Keith Werts and Stevan Booras (2011) metal detected privately owned lands on the east and west sides of Rosebud Battlefield State Park beginning in 1989. They report they recovered 544 artifacts.

Kevin O'Dell (2014) of ACR conducted one of the first professional compliance-related battlefield archaeological investigation in the park as part of a post-fire inventory of a series of fire lines that were constructed during a wildfire in 2013. He also did one block survey using the transect method where the team was spaced less than 20 m apart.

The University of Montana (UM) conducted two seasons of fieldwork in the park in 2011 and 2012 with funding from an American Battlefield Protection grant (Milter 2013). They systematically metal detected 150 acres employing the transect method. The areas metal detected were selected using an approved research design. Crew members walked transects that were spaced approximately three meters apart. The UM team recovered 574 artifacts in total with just 121 being battle-related (Figure 4).

A team from Colorado Mesa University (CMU) conducted a post-burn survey of the 2013 fire affected areas in 2015 (Scott 2016). Approximately 160 acres were metal detected using the transect method with crew members spaced five meters apart (Figures 5, 6). The survey recovered 113 battle-related artifacts.

CMU returned in 2018 (Scott et al. 2018)

Investigation	Number of Artifacts Found
Jesse Vaughn	600 to 800
Thain White and Gordon Pouliot	122
Fred Werner	310
Keith Werts and Stevan Booras	544
ACR, Kevin O'Dell	27
University of Montana Thomas Milter	574 (121 battle-related)
Colorado Mesa University - 2015	113
Colorado Mesa University - 2018	81
Colorado Mesa University – 2021-2022	57
Total known (approximate)	2428 to 2628

Table 1. Reported Metal Detected Finds from Rosebud Battlefield.

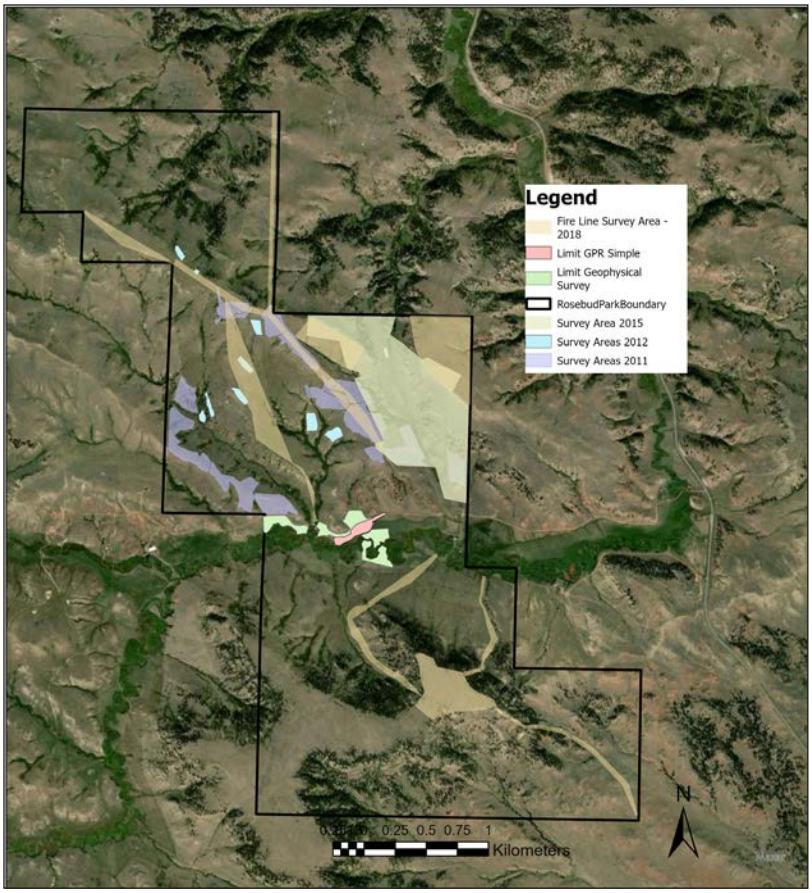

Figure 4. All known archaeological survey areas within Rosebud Battlefield State Park boundary.

Figure 5. A CMU metal detecting line sweeping a portion of the battlefield.

Figure 6. Employing a Trimble GPS unit to record artifacts in the field.

to metal detect a series of proposed fire lines and trail segments. A total of 81 battle-related artifacts were recorded with 80 being reburied on site along with one iron arrowhead which was collected.

CMU returned to the battlefield in 2021 and 2022 as part of an attempt to locate the graves of nine soldiers and to gather data for the archaeological overview (Scott 2024). Opportunistic metal detecting was done in support of that effort. About three acres were metal detected and 57 artifacts were recorded.

Several professional archaeological investigations were completed on portions of the battlefield either for research purposes or in support of park management plans and programs. Documentation and data associated with the

professional archaeological investigations were reviewed. Mapping data associated with these projects were copied and incorporated into a series of layers in a new GIS file that represents all known surveyed areas and artifact locations. Some relic collections included locational information associated with them and where possible, the general find areas usually clusters of materials, are noted on the GIS layers. In one case, Global Positioning System (GPS) coordinates were taken by one collector. Contact was made with one of the principals, but the locational data was not available. Other sources regarding those finds are available and some specific artifact locations were documented and mapped on a GIS layer.

In addition to research and mapping, non-destructive archaeological field methods were employed to collect additional data and confirm accounts of the U.S. Army's camp and the layout of the battlefield.

Dr. Jarrod Burks and Dr. Alex Corkum of Ohio Valley Archaeology Inc. (OVAI) conducted magnetic gradiometer and ground penetrating radar investigations of accessible landforms along Rosebud Creek from September 21 to 25, 2021 in support of an effort to locate the mass grave of the soldiers killed during the battle (Burks et al. 2022). They conducted the magnetic gradiometer and ground penetrating radar surveys using towed instrument arrays.

The survey area was based on an assessment of historical records that suggested the mass grave was somewhere on the north side of Rosebud Creek in the vicinity of the evening camp. The OVAI team was able to magnetically survey 31.7 acres of the valley (Figure 7). The radar instrument was only able to cover 6.43 acres on the north side of the creek due to an

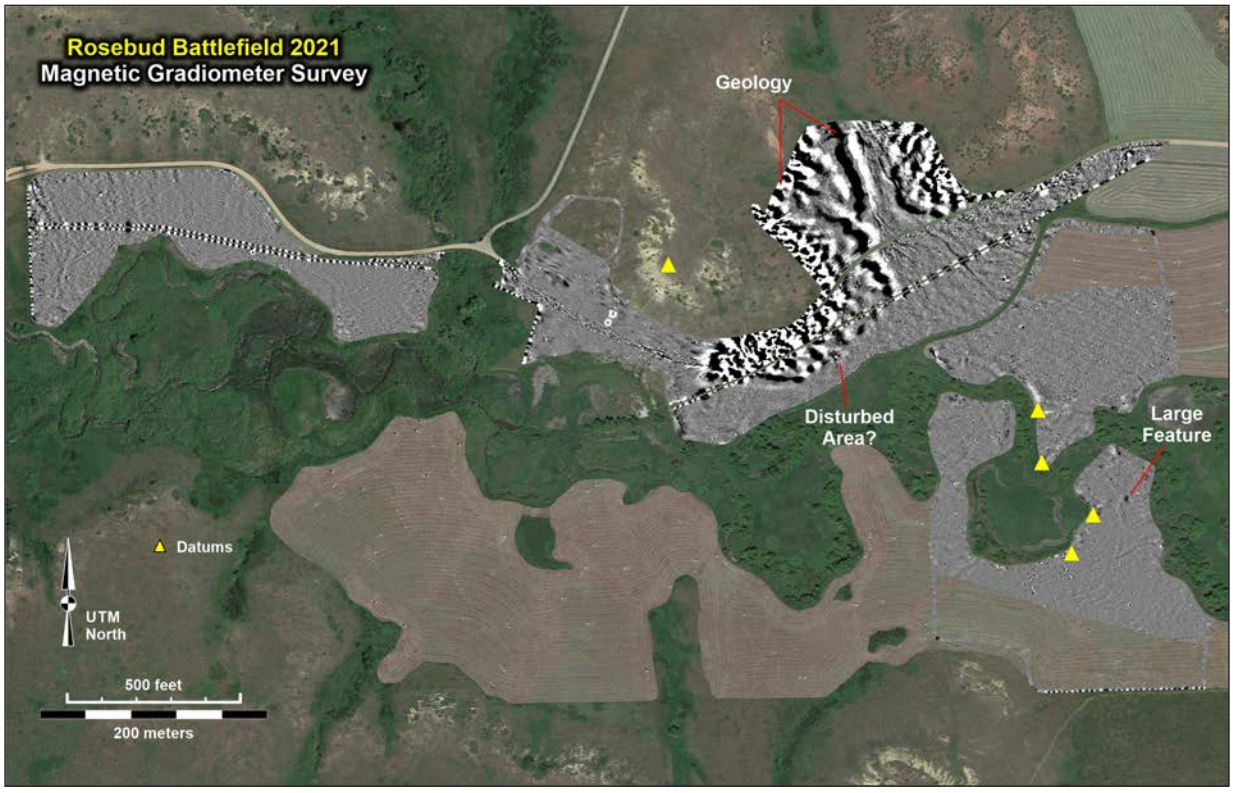

Figure 7. Approximately 30 acres of land in the valley and the Crook's camp area done by Ohio Valley Archaeology Inc. in an attempt to locate the soldiers' burial site.

internal equipment malfunction.

The geophysical survey identified 54 anomalies of potential archaeological interest, as well as dozens of iron object locations. Burks et al. (2022) suggest the anomalies consist of possible pit-type features and clusters of iron. Several anomalies were archaeologically tested and metal detected by the CMU team in 2021.

In 2023, a further search for the grave was done employing Historic Human Remains Detector dogs (HHRD) (Kindt and Merickel 2023). Two dog teams (Melissa Kindt and Hawk and Janie Merickel and Charger) each independently searched about 50 acres along Rosebud Creek (Figure 8). Each dog independently gave Final Trained Reponses (FTR) near the location of the geophysical anomaly 4. That anomaly is located south of Crook's Knob and what is believed to be the site of the field hospital on the evening of June 17, 1876. A 50 X 50 cm test unit was dug at each of the four FTR locations and a fifth was placed in an area of softer soil found using a metal rod grave probe. Each test unit was determined to be associated with a rodent burrow. It appears the dog altered to human scent that is flowing along the rodent tunnels. We are reasonably certain that the soldier's mass grave pit is located in the vicinity of anomaly 4 based on a preponderance of historical documentary evidence, geophysical finds, and the HHRD dog searches. We believe this is adequate confirmation the soldiers' grave is in this area, and current park management needs do not require conducting large scale excavations to confirm the grave pit's precise location.

Figure 8. Historic Human Remains Detector Dog Charger in the process of searching the valley area for the soldiers' grave.

RESULTS AND DISCUSSION: CORRELATION OF THE HISTORICAL AND ARCHAEOLOGICAL RECORDS

The archaeology of the Rosebud Battlefield helps to unravel the particulars of the fight on June 17, 1876. Artifact distributions and patterning, particularly that of identified cartridge cases and bullets, reveal individual and unit movement and their composition. Details absent from the historical record can then be interpreted through the lens of the cultural practices and training received by the opposing forces. Human behavior is patterned and is expressed by individuals who are constrained by the norms and values of the group within which they operate. This behavior is evident in the distribution of the physical evidence of the battle, and in examining it, poignant moments of human struggle are brought back to life.

The following section provides information on the various positions and movements from the Battle of the Rosebud based on archaeological research and surveys, oral histories, collectors finds and ballistics analysis.

The Morning Halt And The Evening Camp

Early on the morning of June 17, 1876, Crook's command prepared for the day's march. The command moved out following the South Fork of Rosebud Creek. The meandering creek is joined by the North Fork and then Rosebud Creek turns east and continues until the Big Bend is reached on the far east side of the battlefield. There Rosebud Creek turns north and flows through the narrows on its way to the Yellowstone River.

It was east of the juncture of the two streams that form Rosebud Creek that Crook ordered a rest halt at about eight o'clock in the morning (see Figure 1). The command's units formed a rough rectangle or an ellipse with elements on both the north and south sides of Rosebud Creek (Hedren 2019). The command's horses and mules were unsaddled and allowed to graze, likely within the ellipse. (Finerty 1977:95).

Crook's headquarters group with the command's surgeons occupied the central area of the ellipse along with the infantry battalion. This halt area is roughly centered on Kollmar Creek where it enters Rosebud Creek. The infantry battalion, commanded by Maj. Alexander Chambers, consisted of Companies D and F of the Fourth Infantry and Companies C, G, and H of the Ninth Infantry. The Shoshone and Crow scouts halted north of Crook and the infantry. Some began roaming to the north to scout the area and hunt for buffalo. East of the infantry and north of the creek was the Second Cavalry's Companies A, B, D, E, and I, commanded by Capt. Henry Noyes.

Anchoring the north side of the creek's halt area on its west side was the pack train with the packers, their mules and the extra horses, and a group of civilian miner volunteers. This location is likely near or just west of the current park boundary.

South of the creek, on the east end was Capt. Anson Mills with Companies A, E, I and M, Second Cavalry. In the middle was the second cavalry squadron, commanded by Capt. Guy V. Henry. It was composed of Companies B, D, F and L of the Third Cavalry. The Third Cavalry squadron composed of Companies C and G, and commanded by Capt. Frederick Van Vliet was deployed on the west. Werts and Booras (2011:46-47) and the Sioux War Atlas (Robertson et al. 1993:13; Milter 2013:40) show Van Vliet in the middle and Henry on the west during the halt, but Hedren's (2019) more recent assessment and analysis of the historic records is now considered the more reliable interpretation.

The command returned to this same general area on the evening of June 17 after the fighting ended. It is assumed the command elements deployed in the similar rough square or ellipse that evening as they had done during the morning halt. Newspaperman John Finerty (1977:95) recounted "We went into camp at about 4 o'clock and were formed in a circle around our horse and pack train, as on the previous night. The hospital was established under the trees down by the sluggish creek."

Archaeological evidence of the camp that night is decidedly meager (Table 2). This is largely due to the fact that little investigation was conducted in the halt and camp area. Elmer Kobold mentioned to Jesse Vaughn that he found an officer's spur and mess knife near the Kobold's house, and that many soldiers' unfired cartridges were found on the south side of the creek. Vaughn was told that about 15 fired soldier cartridge cases were found at the foot of the bluffs or knolls north of the Kobold house. He reported to Thain White that he found a spoon marked to the Seventh Infantry in his yard. The Seventh was not part of Crook's command and a direct association with the battle cannot be reliably determined. Kobold also told Thain White

Gun Type	Minimum number of Guns Identified	Data Source
Ball Carbine	1	Cartridge Cases
Ballard Carbine	1	Cartridge case
Unidentified .50 rimfire	1	Cartridge case
Colt M1851 Navy Revolver	2	Gun Parts
Colt Model 1860 Army Rev.	1	Lead Balls and Bullets
M1872 Colt Open Top Rev.	1	Cartridge Cases and Bullets
M1873 Colt Revolver	1	Cartridge Cases and Bullets
Henry or Win. M1866 Rifle	20	Cartridge Cases and Bullets
Joslyn Carbine	1	Cartridge Cases
Remington M1858 Revolver	1	Bullets
Remington Rolling Block	3	Cartridge Cases and Bullets
Sharps .40-caliber	1	Bullets
Sharps .44 or .45-caliber	1	Cartridge Cases and Bullets
Sharps .50-caliber	19	Cartridge Cases and Bullets
Smith & Wesson Revolver	1	Bullets
Spencer Carbines or Rifles	4	Cartridge Cases
Springfield .58-caliber RF	1	Cartridge Case
Springfield M1866 Rifles	6	Cartridge Cases
Springfield M1868-70 Rifles	13	Cartridge Cases and Bullets
Springfield M1873 Carbines or Rifles	36	Cartridge Cases and Bullets
.69-caliber Musket or Trade Gun	1	Bullets
Spencer Carbines	4	Cartridge Cases
Starr Carbine	1	Cartridge Cases
Winchester M1873 Rifle	1	Cartridge Cases
.54-caliber Pistol or Trade Gun	1	Lead Ball

Table 2. Rosebud Gun types and Minimum Numbers Identified Using Firearm Identification Methods.

that he had found a .50-caliber 450 grain bullet at a beaver dam near his ranch house. An anonymous artifact collection inventory includes two .50-70-caliber cartridge cases identified as being found in the vicinity of the Kobold ranch house.

Early researchers focused on the main battle areas such as Mills' first movement, fighting in and around the Gap, and most significantly the areas around Crook's Hill, Conical Hill, and Royall's Ridge. They apparently ignored the halt and camp area. There are undoubtedly many reasons for this, but one of the more important issues is the valley bottom was in agricultural production or used as hay fields at that time. The landowners would not want planted crops damaged by researchers traipsing across the fields. The ability of metal detectors to reach any depth would also be stymied by thick grass growth as well.

The first documented archaeological investigations conducted in the halt and camp area were those done by CMU when they metal

detected a potential parking lot expansion alternative and conducted opportunistic metal detecting in the area below Crook's Knob (Scott et al. 2018). The potential parking lot area yielded no artifacts in part due to the tall-lush grass that effectively defeated getting the metal detectors close to the ground surface to achieve maximum depth coverage. Opportunistic metal detecting around Crook's Knob was an attempt to locate the field hospital site. Several pieces of iron box strapping were found. It is possible that the box strapping is associated with the battle and the June 17 evening camp, but the box strapping could have other later origins as well. The area east of and below Crook's Knob was metal detected again in 2022 and additional box strap fragments were found and recorded. It seems likely that this area was part of Crook's headquarters camp and possibly part of the evening field hospital site.

The second halt/camp area investigation took place in 2022 to locate the soldier's mass grave. Some metal detecting was done in association with a geophysical survey of the approximately 30 acres of the valley on both sides of the creek (Burks et al. 2022). The geophysical survey used magnetometry and ground penetrating radar to investigate the area. The magnetic survey identified a significant number of anomalies that are likely small features and iron artifacts.

Burks et. al (2022) suggests that low intensity magnetic dipoles may indicate historic iron. The OVAI team identified several low intensity magnetic dipole clusters, one of which was tested in September 2021 during the search for the soldier burials. The limited metal detector testing of cluster or Anomaly 34 identified a horseshoe, a possible gun barrel fragment, and a disassembled Model 1851 Colt Navy revolver that are Rosebud battle related (Figure 9). This

Figure 9. Parts of a Model 1851 Navy type Colt made in 1863 and found in the soldiers' camp. It was likely a warrior weapon that was captured during the battle and disassembled by the soldiers to render it unserviceable.

area may be within the area where the horses and mules were grazing and the area of the Infantry's morning halt. Whether they reoccupied this same area in the evening is not clear from the records. Across the creek from this area opportunistic metal detecting located a cluster of 34 metal detector hits. Sampling of this area yielded fired lead bullets in .44-caliber, .45-caliber, and .50-caliber (Figure 10). Firearm identification methods were applied to the collected sample and we determined that some were fired from a Sharps .50-caliber and a .45-caliber, a .50-caliber Remington, a .45-caliber Springfield, and a .44-caliber Henry or Winchester. Most of the bullets exhibit little or no impact damage suggesting they were at or near their terminal velocity when they struck the ground. This indicates they were fired from guns at some distance from the impact zone.

Figure 10. Examples of Rosebud battle bullet types. Top row, left to right - .45-405 first three with different impact deformation and a 50-450 caliber deformed bullet; bottom row left to right - .50-smooth body Sharps, .58-caliber hollow base Minié ball, .69-caliber hollow base Minié ball, and a .69-caliber spherical or round ball.

Opportunistic metal detecting during the geophysical investigations resulted in another find of interest. It was found south of Crook's Knob and south of the park road and consists of a broken triangular file. The file is consistent with types manufactured in the nineteenth century. The iron tang and about one-third of the file body is present. The tang or haft has been modified. It is sharpened to a point. Similar files have been found in Native American camps and villages and are often associated with metal arrow point production. The origin and use of this file fragment is not known. It could have originated from a Crow or Shoshone scout or used by a soldier for some unidentified purpose. It may also be something that was lost long before the battle when a Native American group camped in the creek bottom (Scott 2024).

Initial Contact and Fighting Between the Army Indian Scouts and the Lakota and Cheyenne

The battle commenced when the Crow and Shoshone scouts encountered the Lakota and Cheyenne on Corral Creek north of the soldier halt area. The Crow and Shoshone accounts of the fighting as well as those of the Lakota and Cheyenne are oral narratives given from their cultural perception of time and space. Fox's (1993) work with oral history accounts of the Battle of the Little Bighorn clearly showed that interpreting Native American perspectives can be a challenge without taking their cultural viewpoint into account. Most accounts are accurate but placing them in space and on a specific terrain feature requires careful parsing of the

information to place it in a modern western cultural context. The Lakota and Cheyenne oral history accounts related to the Rosebud Battle are less specific about where individuals fought and instead recall specific events that are not tied to identifiable geographic locations. Several accounts indicate the warriors fought across the vast landscape moving all the time and engaging Crook's command when and wherever they could (Greene 1994; Marquis 1931), although some accounts can be tied to modern geographic features. It is the archaeological record that is crucial in identifying specific locations where soldiers and warriors fought.

The archaeological data is in concert with the warrior oral accounts of the initial contact between the foes. Wooden Leg (Marquis 1931:199) and Young Two Moon (Powell 1981:956, 959) recalled that Little Hawk's and American Horse's warriors forced the Crow and Shoshone scouts south toward the soldier's halt area. The warriors charged the soldiers and fired on them. The archaeological records based on firearm examination data, show the warriors did fire on the halt area further validating the Lakota and Cheyenne accounts.

The low velocity impact Sharps and Remington fired bullets found south of the creek during the opportunistic metal detecting work would have the longest range with the .44-caliber Henry and with the Winchester having the shortest. The shots likely originated somewhere to the north or east from 1000 to 600 meters (m) away. It seems likely the shots were fired by Lakota and Cheyenne warriors at the retreating Crow and Shoshone scouts during the earliest phase of the battle, or possibly they were fired by the warriors at the soldiers in the halt site. In either case, some of the shots likely came from the bluffs above the halt/camp site and some from the east, perhaps in the vicinity of where Werts and Booras (2011) located warrior positions at the toe of the slope on the eastern side of the Gap. This area is on the Penson-Iekel property. They attributed the positions to actions associated with Mills' First Movement, but this alternative should also be considered and deserves further archaeological investigation.

There is no question that the Indian scouts and Lakota and Cheyenne fought across the battlefield's terrain in a running fight. Initially the scouts were pushed back from the north to the command's halt area. Later the Crow and Shoshone retaliated fighting alongside the soldiers as they pushed the Lakota and Cheyenne warriors off the eastern side of the Gap, from the slopes of Crook's Ridge, on the ridge itself, and to the northwest during the fighting with Royall's command. As the soldiers joined, the fight movements become blurred and to some extent obscure the archaeological evidence of the initial fight between the scouts and the Lakota and Cheyenne.

The deposition of fired cartridge cases and bullets as well as a few dropped and unfired rounds are all that remain to delineate those combat actions. Given that the later fighting crossed much of the same area, it is now difficult to sort out which cartridge cases and bullets belong to the day's early fighting, and which are a part of the greater battle elements.

The Pickets and Initial Army Deployment During the Early Phase of the Attack

General Crook ordered pickets out to the north of the halt area to guard against a surprise attack from the north. The view to the north from the halt area is obscured by a ridgeline composed of a line of low bluffs and small rises broken by Kollmar Creek and the wider small valley of the Gap area as it descends into Rosebud Creek. It was on these bluffs that the pickets were posted. As the Lakota and Cheyenne pushed

the Crow and Shoshone scouts back from their initial contact Crook responded. The warriors swept south toward the creek valley and Crook ordered companies of the Fourth and Ninth Infantries forward or north to form skirmish lines. Mills on the east end was ordered to mount his cavalry detachment and move north. Across the Gap elements of the Second Cavalry formed skirmish lines to face the approaching warrior onslaught.

No archaeological investigations were conducted on the top of the bluffs overlooking Rosebud Creek where the initial pickets and skirmishers were posted. The lower portion of the Gap valley is partially compromised by construction of the visitor parking lot and wayside exhibits, but some archaeological evidence of the Second Cavalry deployment may yet remain there.

In the Gap valley, no archaeological metal detecting was done near the current visitor parking lot and wayside exhibit area. Both UM and CMU metal detected areas on the east side of the lower Gap valley. Two .50-450 grain bullets, two .44 or .45-caliber bullets fired from Sharps, a lead bullet fragment, and a .44-220 grain Henry or Winchester fired bullet were recovered in the lower end of the Gap valley. All of these were likely fired by warriors at the routed scouts or at the soldiers by warriors on the high ground east of the Gap or perhaps from the north by pursuing Lakota and Cheyenne. It is also possible these bullets may relate to Mills' First Movement.

Van Vliet's Movements

One question that archaeological investigations failed to answer is where Van Vliet went and where he engaged the warriors on the southeast side of the battlefield. Hedren (2019:196) suggests Van Vliet moved his squadron up the flanks of the western portion of Van Vliet Ridge to the area known as Eagle Nest Peak. Near there he engaged and drove off some warriors attempting to gain the heights and the rear of the command.

Metal detecting of three possible fire lines and an access point on Van Vliet Ridge in 2018 (Scott et al. 2018) were devoid of any battle-related materials as was the block inventory area on top of the eastern side of the ridge. There is no evidence of Van Vliet's movement nor that of the warriors in any of the areas metal detected. However, the ridge slope was covered in thick tall grasses that prevented the metal detectors from attaining any depth.

The valley area south of the creek and up the ridge slopes, as well as the ridge top's western area should be systematically metal detected to delineate both combatants' locations and movement. This will require that the grass be mowed on the ridge slopes in order to effectively use metal detecting as a method of investigation and to assure maximum depth coverage. Van Vliet's movements and the engagement with the Lakota and Cheyenne warriors' location remain archaeologically undocumented at present.

Henry and Reynolds' Movement to the Big Bend

Capt. Guy V. Henry and 2nd Lt. Bainbridge Reynolds saddled up at their halting place as the warriors began their attack from the north. Maj. Andrew Evans ordered Companies D and F commanded by the two officers to occupy the area of the Big Bend to ensure no attack came from the north along that reach of Rosebud Creek. They advanced eastward along the south side of the creek (Hedren 2019:196-197) to the bend. There Henry observed warriors on the distant high ground, likely to the north or northwest. The area where Henry and Reynolds halted is not known with certainty and was not the subject of investigation by any researcher

based on the known records. It is unlikely any significant archaeological evidence exists relative to this movement. As there was no fighting in the area, the most likely artifacts to be found are horseshoes, horseshoe nails, a lost button, or some other piece of horse tack or personal equipment. At best this will be scattered and ephemeral.

Mills' First Movement

Capt. Anson Mills battalion was positioned on the south side of Rosebud Creek and perhaps the eastern most unit. He asked his men to saddle their horses and mount up. An unknown number of picket pins were reportedly found in this area in the early twentieth century when the ground was first broken by plowing (Hedren 2019:187). A surviving example in the Penson-Iekel collection is a fluted type that is a commercial variety dating to the late nineteenth century or early twentieth century that does not appear to be associated with the battle. Maj. Evans ordered Mills to drive the Lakota and Cheyenne warriors from the hills on the east side of the Gap valley. Company I was detached and sent to Lt. Col. Royall.

The remaining three companies, A, E, and M formed a line of mounted skirmishers and with pistols drawn charged up the Gap valley. Mills had 179 men and officers spread out across this line. Assuming each horse and man occupied a minimum of 0.75 m and again at a minimum the distance between each mounted cavalryman was three meters, then the line was at least 900 m wide and most likely much wider given the undulating terrain the command crossed. The east end of the line likely rode up the flanks of the slope to the bench above the Gap forcing the warriors from their cover behind low hills at the south end of the Gap driving them north along the flat bench.

Forcing the warriors north toward the high ridge above the Gap's east side, Mills' command reached the vicinity of the Buffalo Jump where he ordered his men to dismount (Figure 11). Using the rocky outcrops found above the jump

Figure 11. The Kobold Buffalo Jump site seen from across the valley. The plateau above the jump site was traversed by both Cheyenne and Lakota warriors and Capt. Anson Mills' troops.

on the bench Mills commanded every fourth man to move the four horses he held to cover. The dismounted men now with carbines at the ready moved northerly and pushed the warriors off the benches and high ridge.

Archaeologically, the warrior positions at the start of the fight and in the path of Mills' charge are evident. A portion of the lower hills and flat are on Penson-Iekel lands on the east side of the park. That area was searched by Jerry Iekel and Werts and Booras (2011:118-122). Just east of the park boundary fence Werts and Booras report they found one .45-caliber Colt revolver round about halfway between the creek and the ridge slopes. Also, in this lower area they recovered one .44-caliber Henry cartridge case and one bullet as well as a .50-caliber cartridge case. They surmise that the warriors used these lower slopes and rocky outcrops to fire on Crook's morning halt site.

On the ridge slope, Werts and Booras (2011) found an iron arrowhead and eight .45-caliber Springfield bullets as well as one impact damaged and unidentified bullet. The lower area also yielded a .44-caliber Henry cartridge case, and some fired .45-caliber Springfield bullets. Near the southeast terminus of the ridge, Werts and Booras recovered a .44-caliber Henry bullet, presumptively one fired in a Henry or Winchester firearm. Two .45-caliber Springfield cartridge cases were found on the slope's northeastern side about midway up the slope. They also found 29 .44-caliber Henry cartridge cases on the top or flat area of the ridge as well as an unfired .44-caliber round. It seems clear that Mills' soldiers used their carbines as well as their Colt revolvers during the charge up the hill and onto the bench.

Vaughn (1994:86) reported that he found relics all over the area. Among them were "a number of .45-70 Springfield copper cartridge cases." He found them on the bluff immediately east of the Penson house at the extreme east end of the field where the creek turned north. He believed these to be associated with Company E, Third U.S. Cavalry's movements through the area. He also mentioned that there is a claim that picket pins used by the cavalry were found in the valley southwest of the Penson house. Most of Vaughn's statements regarding his artifact find locations are generalized and of limited value.

Fred Werner's summaries of his metal detecting trips include descriptions of work he did in the area of Mill's movements. He metal detected the eastern side of the Gap at least twice (Werner 1983:54). He recorded finding six .45-70 cartridge cases, one .50-70 cartridge case, and "4 smaller cases -2 of which were Henry cases" in the area above the Kobold Buffalo Jump. Like Vaughn, Werner's descriptions are of limited value in interpreting the fighting events due to his lack of a detailed find map or clarity in the description of where he found battle materials.

Within the park boundary much of this area was burned in the wildfire. As noted, Jim Busse, with ACR, and also with CMU metal detected the burn area. The area encompasses the flat top of the ridge and a bench below it down to the Gap and the Kobold Buffalo Jump site. The ridge narrows and the slopes becomes steeper at its northern terminus.

Scattered artifacts were found on the bench lands in the park including a steel strike-a-light and a brass bead. It is not clear if these are battle-related or were deposited during an early Native American occupation. There is one relatively concentrated artifact area on the northwest slope and ridge top near the ridge terminus. The area contained both Sharps fired rounds and Springfield fired rounds among twelve cartridge cases found representing nine different guns. The Busse collection (O'Dell 2014) adds two additional unfired cartridges and a single fired cartridge case representing a Sharps. Four

other Sharps are represented in the cluster found on the west edge of the ridge (Figure 12). Springfield Model 1866s are also represented. A single isolated .50-70-caliber cartridge case that is consistent with a Model 1866 Gun 1 was found 300 m to the south and on the valley floor. The two Springfield Model 1868 or 1870 .50-70-calber rifles are represented. One Sharps fired cartridge case is consistent with one found on Crook's Ridge above the Gap. It is the only gun that is identified demonstrating movement from one side of the Gap to the other.

The other guns are represented by only a single round. The position of the rounds indicates the warriors holding this area maintained a field of fire to the south and west and perhaps to the northwest. The mixture of gun types, Sharps, two types of Springfields .50-caliber and several .45-70-caliber cartridge cases, as well as gun numbers (8 different firearms) may suggest mixed fighting positions. The .50-70 caliber rounds suggest this was a warrior position (Figure 13). One Springfield Model 1866 is consistent with cartridge cases found about 300 m apart suggesting these were associated with a warrior who moved well south of the ridge top.

Figure 12. Range of cartridge and cartridge cases recovered at the Rosebud Battlefield: left to right, .44-caliber rimfire Henry, top – .44-caliber rimfire cartridge case, bottom - 56-50 Spencer cartridge case, .45-70-caliber cartridge case, .45-70-caliber unfired cartridge, and .50-70-caliber cartridge case.

Figure 13. A .50-70-caliber cartridge made of Bloomfield Gilding metal (copper).

Mills' Second Movement

Mills ordered his horses brought up and then remounted his troops after taking the eastern ridge above the Gap. He continued his movement north charging at warriors holding that ground using available cover. Mills wheeled to the right and across the broken ground driving the warriors north and northwesterly. Some of this area is north of the park boundary and was not professionally investigated. Some interpretations of Mills Second Movement route suggest he crossed the north end of the Gap and rode up a steep drainage onto Crook's Ridge. Hedren's (2019:203-204) discussion of the second movement suggests much of it was north of the park

boundary until Mills moved up Crook's Ridge to clear those flanks on the north. The area was not extensively metal detected by any of the battlefield researchers, and no finds can be definitively identified in the area.

Mills Movement to Find the Native American Encampment

Gen. Crook, as the fighting raged to the northwest of Crook's Hill and to the north, ordered Capt. Mills to withdraw his command and regroup for a sweep down Rosebud Creek to find and attack the Native American camps believed to be to the north (Hedren 2019:222-225). Mills complied with the order and began his march to the Big Bend of Rosebud Creek. After traveling about three km he turned and marched his command about eight km north and down the creek. Here he encountered a large drainage entering the creek from the west. Extensive ground disturbance observed by Mills and his men made it obvious this canyon was used by the Lakota and Cheyenne as an access point to the highlands where the main fighting was on going. It was at this point Mills received orders from Capt. Azor Nickerson to abandon the march and return to aid the much-pressed Crook. Mills turned his command to the west and rode up the well-used canyon to come to Crook's aid (Hedren 2019:289-291). All of this action including a skirmish with some warriors by Capt. Alexander Sutorius occurred outside the park boundaries. No relic collecting or archaeological investigations are known to have occurred along Mills route to find the Native American camp. The camp or camps were far to the north and safely out of range of attack.

Fighting in the Gap

The Gap is especially significant to the Northern Cheyenne. Several Cheyenne warriors and war leaders, including White Shield, White Bird, and Comes in Sight rode back and forth across the Gap enticing the soldiers and their scouts to shoot at them according to the John Stands in Timber account of the battle (Stands in Timber and Liberty 1967:188). At some point during this episode, Comes in Sight's horse was shot unhorsing him. Buffalo Road Woman, his sister, was among other women who accompanied the warriors to the battle. Seeing her brother being shot at, she immediately rode into the Gap, assisted Comes in Sight onto her horse, and escaped to safety. The Cheyenne have since referred to the battle as "Where the Girl Saved Her Brother" (Stands in Timber and Liberty 1967:189).

It is generally implied that Comes in Sight was unhorsed by soldiers firing at him from either or both ridges above the Gap. The archaeological evidence suggests a different scenario. The bullet evidence from the Gap investigations does not indicate the firing was heavy, but the possibility that bullets splintered on impact and are not detectable cannot be ruled out. Nor can the effect of plowing when the Gap area was used as an agricultural field. However, the recovered bullet evidence in the Gap is more consistent with warriors moving through the Gap and then being pushed back by the Army's Crow and Shoshone scouts, perhaps with supporting fire coming from Crook's Ridge and possibly the east ridge top above the buffalo jump. Line of sight and the field of fire is limited from the east ridge, but greater from the west. The few army bullets found in the Gap are on the east side, suggesting the fire came from the west and not the east as those soldiers could not see the warriors in that area.

The presence of a cap and ball revolver ball, .44-caliber Henry type bullets, and .50-450 caliber bullets, and the broken .50-caliber muzzle loading rifle barrel is far more suggestive of warriors and scouts mixing it up in the area than is the idea of intense soldier firing from the ridge

Figure 14. A Colorado Mesa University group metal detecting the Gap area, also known as the area "Where Sister Saved Her Brother."

tops. In fact, this interpretation is far more consistent with the Stands In Timber account (Stands In Timber and Liberty 1967:188-189).

It appears the archaeological evidence is far more in concert with the oral tradition than is the generally accepted account of firing by the soldiers (Figure 14). Perhaps the credit for unhorsing Comes in Sight should go to the soldiers, but the Native American scouts certainly had a role to play in the event that appears to be overlooked.

Late in the morning, Van Vliet was ordered to move his command from the ridge to the Gap area to cover that area when Mills was sent in search of the Lakota and Cheyenne camps. Van Vliet did as ordered, but by the time he arrived fighting in the Gap was essentially over. Any physical evidence left behind from his fighting in the Gap is mingled with that of the earlier engagements and is difficult to sort out archaeologically.

Noyes' and Chambers' Movements to Take Camel Back/Crook's Ridge and Crook's Hill

Noyes' Second Cavalry dismounted battalion moved northwesterly up the valley to clear the west ridgetop that is now known as Crook's Ridge during the initial stages of the battle to drive the warriors from the ridge. Chambers' infantry battalion shortly followed after Noyes up the ridge, fighting as they progressed up and across the ridge as they pushed Lakota and Cheyenne warriors out of their defensive positions behind rocks and swales on the south flanks of Crook's Ridge, across it, and then northward to Packer's Rocks. No specific Lakota or Cheyenne accounts refer specifically to what is now known as Crook's Hill or Crook's Ridge (Figure 15). No doubt some of the individual warrior accounts of heroic actions and fighting back and forth across the terrain refer to the fighting on Crook's Ridge (cf., Greene 1994). This is where

Figure 15. Crook's Hill (as shown here) played a prominent role in the battle. It was occupied by both the Lakota and Cheyenne warriors and Crook and his staff at various times.

the archaeological data becomes important in defining the fighting areas.

Physical evidence of the fighting on the south slopes of Crook's Ridge, across the top, and around Crook's Hill is abundant (Figure 16). Vaughn (1994), White (1961), Werner (1983), Milter (2013), and CMU (Scott 2015; Scott et al. 2018) all metal detected these areas.

The collector information on find locations is fairly general regarding Crook's Hill and Ridge with most noting they found a few, some, or many items, but largely non-specific as to where or the number of items recovered. They do record that cartridge cases were found scattered along the crest of the ridge east of the hill as well as in and around a rock breastwork. Some of the collector finds on and around Crook's Hill include at a minimum 13 .45-70 cartridge cases, two .45-405 grain Springfield bullets, three arrowheads, six Spencer cartridge cases one of which has a **JG** headstamp, four .44-caliber rimfire cartridge cases, 14 .50-70 cartridge cases and two bullets.

Collectors also note that the rocks west of Crook's Hill yielded eight or nine cartridge cases, only one was .45-70-caliber; the rest were .50-70-caliber or .44-caliber rimfire cartridge cases. On Crook's Hill one unfired and two fired .45-70-cartridge cases were recovered as were three .44-caliber rimfire cartridge cases, five .50-70 Benét primed cartridge cases, along with a single .50-caliber impact damaged bullet and a Benét cup primer. At one of the rock breastworks below Crook's Hill one unfired and one fired .45-70-caliber Benét primed cartridge case are reported.

Crook's Ridge was metal detected by both collectors and professional archaeologists. Collectors reported finding 30 unspecified caliber cartridge cases, another 32 .45-70-caliber cartridge cases, and an unspecified number of smaller cartridge cases which are likely to have

Figure 16. Metal detecting on Crook's Ridge with the Kobold buffalo jump site viewed to the southeast from Crook's Ridge. The plateau above the cliff face was fought over by Lakota and Cheyenne warriors and Capt. Anson Mills soldiers.

been .44-caliber Henry or Winchester cases.

Professional investigation of the fire line areas on and around Crook's Hill found evidence of fighting positions and movement of combatants across the ridge. One artifact collected during the survey work was an iron arrowhead found near Crook's Hill (Figure 17). Werts and Booras (2011) reported that three iron projectile points were found on private lands west of the park. Vaughn (1994) also reported a similar find, but the Crook's Hill iron projectile point is the only one found on state park lands.

A rather important bullet was found on Crook's Ridge during the fire line work (Scott et al. 2018). It is .44-caliber 220 grain lead bullet with an **X** scratched into the side (Figure 18). The bullet was fired in a gun with a 6 land and groove rifling configuration that had a right-hand twist. This is consistent with being fired either in a Henry, Winchester Model 1866, or a Winchester Model 1873 rifle. Given its recovery location it is likely the bullet was fired by a warrior at a scout or solider. The **X** scratched into the bullet's side may be a spirit mark made by a warrior to ensure success in battle (Ludwig and Stute 1993:23-24). The bullet was not collected and was reburied in its find location.

On the south slopes of Crook's Ridge, the UM team recorded evidence of warrior positions and soldier and scout movement to the ridge. They found three cartridge cases on the south facing ridge just above the park access road. One of the cartridges (.50-70) they associated with a Lakota or Cheyenne warrior who chased the scouts to the camp. They attribute two .45-70

Figure 17. A metal arrowhead with tip broken found on Crook's Hill. The iron point is typical of a cutler or blacksmith made commercial nineteenth century projectile point.

Figure 18. A .44-caliber 220 grain Winchester fired bullet with an X scratched in the body, a possible spirt mark made by a warrior.

cartridge cases to a Shoshone scout or a member of the Fourth or Ninth Infantry or a Cavalryman associated with Dewees' Second Cavalry. Milter (2013:143-144) notes the two .45-70-caliber cartridge cases firing pin impressions are consistent between cartridge cases indicating they were fired from the same firearm. One was on the terrace above the road and the other was recovered on Crook's Hill indicating a significant distance of movement by this individual. This is direct evidence that this individual took part in securing that crucial landscape feature. North of the .45-70-caliber cartridge case, two .50-70-caliber cartridge cases fired from two individual Model 1866 Springfield's indicate where Lakota or Cheyenne warriors retreated northwest towards Crook/Conical Hill. Milter astutely noted "Once the Army had reached the bottom of the slope it appears that the troops probably were taking considerable fire from Native American forces located on Crook's Hill and its southern slope" (Milter 2013:137). The slope is laced with swales and small ravines as it rises up to become Crook's Ridge. Among the landscape features on the slope six .45-70-caliber cartridge cases and one unfired round were recovered. They represent two individual firearms. The unfired round is a carbine round that used only 55 grains of black powder. This is direct evidence that both the Cavalry and Infantry fought and moved across the area in their effort to reach the ridge top.

A Native American firing position was found in the area as seven different individual weapons were identified from the artifact assemblage recovered in the position. One artifact was a .45-405 bullet likely fired from one of the soldier's assault positions. The other cartridges cases found are attributable to the Lakota and Cheyenne and include a .44-caliber Henry cartridge case that is consistent with three other cartridge cases found on the ridge. This individual fired on the north side of the ridge, perhaps at Mills during his second movement then moved to the northwest across Crook's Hill, then later joined the fight with other warriors firing on the Burt-Burrows position.

Another Native American firing position is on the south slope of Crook's Hill with five individual firearms identified in this area. Two appear to be associated with Lakota and Cheyenne actions. The other three firearms may represent Crow scout movements in the area. One artifact represents a .44-caliber Henry cartridge case fired by a warrior who later participated in the Battle of the Little Bighorn. Based on firearm examination data, this is one of two warrior used firearms that were identified as being used in both battles. One was recovered in the Deep Ravine area at Little Bighorn (Scott 2015). The second is a 56-50-caliber cartridge case fired in a Ball carbine (Figure 19). It was found on knoll south of Crook's Hill and is consistent with a cartridge case (FS8127) from the Battle of the Little Bighorn. These two cartridge cases definitively demonstrate that at least two warriors who fought at Rosebud on June 17 also did battle with the soldiers of the Seventh Cavalry at the Little Bighorn on June 25.

Four .50-70 Sharps rifle or carbine cartridge cases are consistent with a single firearm. One was found near Crook's Hill and may represent a Crow scout who at some point also fought with Royall. The other two artifacts found in the position were fired from a Remington .50-70-caliber rifle and were also likely fired by Crow scouts.

The .45-70 cartridges in this area could represent those fired by Shoshone warriors or the U.S. Army. The .50-70 cartridges are more decidedly associated with Native American use and could indicate the presence of Crow warriors. In this case, the historical record mirrors the archaeological record in assuming these individuals probably started their assault with Royall and then joined the fight for Crook's Hill. The spatial distribution of cartridge cases and bullets does indicate that the fight from Crook's camp on the Rosebud was a quickly executed maneuver, based on the small number of cartridges found. Once the troops and the scouts had reached the toe slope of Crook's Hill they met stiff resistance from Lakota and Cheyenne warriors who eventually retreated once the Army organized its forces in this sector of the field.

Crook's Ridge from its eastern terminus and west about 500 m as well as on the steep slope leading up to the ridge yielded a significant number of artifacts related to the fighting on the slopes as the army pursued the Lakota and Cheyenne up to the ridge and across it. One cluster of seven .45-70 cartridge cases and one isolated cartridge case were located on a lower edge of the slope leading up to the western ridge from the west side of the valley. The cartridge case group is situated above and west of the .50-70 cartridge case group found on the west side in a small bowl. The .45-70 group of seven cartridge cases represent five separate guns. One cartridge case is consistent with another cartridge case that was found about one meter away and another that was 155 m to the south as an isolated round representing a single firearm. A second Springfield fired at least two shots and the others at least one round each. The cluster is about five meters in diameter. The five .45-70

Figure 19. Microscopic image of Rosebud Spencer 414 fired in a Ball carbine compared to a cast of Little Bighorn Spencer 8127 also fired in a Ball carbine. Note the small scar near the top of the firing pin mark in both, which is one individual characteristic that aided in determining the two cases were fired in the same gun.

army Springfields were possibly firing to the north and up slope toward retreating warriors.

The top of Crook's Ridge yielded two unfired and 33 fired .45-70 cartridge cases. One of the unfired cartridges is definitely a cavalry carbine round as cardboard wads were found in the case to reduce the amount of powder that could be loaded. In addition, Jim Busse (who worked with ACR and CMU), recovered two other cartridges and four .45-70 cartridge cases in the same area for a total of four cartridges and 37 fired cartridge cases. The slope just below the top of the ridge and the ridge edge are where a scattering of Springfield army cartridge cases was found. Two groups or clusters are evident in the distribution. One group is on the east-southeast edge of the ridge and is represented by 12 closely spaced cartridge cases and another eight are scatter about nearby. One cartridge case in the cluster and one of the nearby isolates were too oxidized to analyze. The others represent seven guns. In this area, which is about 12.5 m long and angled northeast to southwest, four guns are represented. Each fired multiple shots and the distribution suggests the soldiers wielding the weapons moved within the line up to 12

m. The more scattered rounds or isolated ones are represented by five guns.

The linear arrangement of the 12 .45-70 cartridge cases is strongly suggestive of a skirmish line. The field of fire for the line as well as the more scattered cartridge cases found in this area suggest the soldiers were firing either to the east southeast, toward the Gap or northwesterly across the top of the ridge, or perhaps both.

It is possible this linear group was found earlier by collector Fred Werner. Werner (1983:53-54) reports finding 32 .45-70 cartridge cases on the eastern end of Crook's Ridge. He also found several .50-70 and .44-Henry cartridge cases. Unfortunately, his collections were dispersed and cannot be analyzed in detail. However, his description of find locations does coincide with the southeastern linear group just discussed. If the two are one and the same location, then the soldier line may have extended across the ridge top and filled the gap between the line the fire effect project recorded and the isolated but matching .45-70 cartridge cases also found during field work for the fire project (O'Dell 2014).

Another group or cluster of .45-70 cartridge cases was found near the northern edge of the ridge top. The group is roughly linear with a southeast to northwest alignment. Ten .45-70 cartridge cases were found in the group and the area is about eight meters long, with three additional scattered cartridge cases. The total distance between the isolated rounds and the line is 130 m. A Springfield .45-70 is represented by the northern most find which is on the northern edge of the ridge top and about 200 m from the group of .44-caliber Henrys that likely represent a warrior position as the individual was pushed off the ridge top and to the northwest. The northern .45-70 cartridge case line is about 300 m from the Henry group. The field of fire for this northern line and scattered cartridge cases is along the ridge top to the northwest or to the north.

Six Springfields are represented in the line. One fired three shots on the line, but also shows the most evidence of movement as it is consistent with cartridge cases fired from the same gun on the southeast line. Two other rounds are consistent with being fired in two other guns between the two lines. This duplicates four guns from the southeast line and general area assemblage to the northern line and area indicating the same guns and likely the same soldiers participated in both combat events.

Despite the intensive and repeated metal detecting efforts of Vaughn, White, and Werner the professional archaeological investigations of Crook's Ridge and Crook's Hill clearly demonstrate that significant numbers of artifacts related to the battle are still present in the ground. The cartridge case comparisons also clearly show that individual shooters can be identified and placed in specific fighting positions across the ridge. The data also identifies movements of combatants which adds to the details of the battle story.

Packer's Rocks and the Conical Hill

After reaching Cook's Hill and driving the Native American defenders away, components of the Second and Third Cavalry along with the Fourth and Ninth Infantry of Capt. Andrew Burt and Capt. Thomas Burrows along with a number of scouts and packers made a tactical push to the north. Cartridge case evidence further up the ridge leading to Conical Hill shows possible evidence of warriors retreating through the area. The evidence is in the form of two cartridge cases fired in a Sharps .50-70 and a Springfield .50-70.

At and around Packers Rocks, collectors and professional investigations located 13 soldiers' cartridge cases, seven .44-caliber rimfire cartridge cases, two .44-caliber bullets, perhaps fired by a warrior, one M1872 Colt .44-caliber rimfire cartridge case, 10 Spencer cartridge cases,

one unfired and three fired .50-70 rounds one of which was fired in a Sharps, and one .58-caliber rimfire cartridge case. Around Packer's Rocks, collectors reported they found 28 .45-70 cartridge cases, four .50-70 cartridge cases, and an externally primed .45-70 cartridge case.

Collectors Vaughn (1994), White (1961), and Werner (1983) made repeated visits to the area of Packer's Rocks and Conical Hill in search of physical evidence of the fight. The CMU fire line work in 2018 included one line that passed by Crook's Hill and along an old two track trail leading to the vicinity of Conical Hill likely in the same area as the collectors previously worked (Scott et al. 2018).

At a small rocky ledge 300 m west of Crook's Hill collectors found two soldier cartridge cases (.45-70?), and a .50-70 cartridge case. The professional investigations in the same general area yielded 16 battle-related artifacts suggesting that the area still retains archaeological integrity. The artifacts found on the line include one 56-56 Spencer cartridge case, one .44-40 Winchester cartridge case, nine .45-70 cartridges cases, two .44-Henry cartridge cases, one .44-220 grain bullet, one .50-450 grain bullet, and a horseshoe.

Several hundred meters east of Packer's Rocks is a small rock breastwork where collectors recovered a broken arrowhead as well as six .45-70 cartridge cases, four .50-70 cartridge cases, and a .45-caliber revolver bullet. Along the east side of second breastwork ridge collectors found eight .50-70 cartridge cases below the crest. The finds were scattered along the ridge in an area about 16 m long and eight meters wide.

At Conical Hill collectors reported finding at least eight .50-70 cartridge cases. On the north side of Conical Hill there are reports of finding 58 .44-caliber short rimfire cartridge cases, five .44-caliber externally primed cartridge cases, four .45-70 cartridge cases, one of which was fired in a .50-70-caliber firearm, three .45-405 grain bullets, five Martin primed .50-70 cartridge cases, six externally primed .50-70 cartridge cases, one .50-70-caliber bullet, and five Spencer caliber cartridge cases, one of which was a blank round.

Werner metal detected (1983:62-63) the ridges and hills from Conical Hill toward Andrews' Point. He found five .50-70 cartridge cases, 16 .44-caliber rimfire cartridge cases, three possible Spencer cartridge cases, a .50-caliber bullet, seven .45-70 cartridge cases and one .45-caliber bullet.

Physical evidence of the fighting north of Crook's Hill in the area known as Packer's Rocks and on to Conical Hill is significant. The early metal detecting efforts found numerous cartridge cases and bullets in those areas. Professional archaeological investigations also recovered substantial numbers of artifacts in the Packer's Rock area, although no significant work was done to the north toward or around Conical Hill. Milter (2013:149) observed that the spatial distribution of the artifacts "suggest that many of the soldiers may have started the fight in a traditional military formation but broke into smaller pockets once they had reached the base of Crook's Hill. As the warriors were driven back, again evidence shows that the soldiers, scouts, packers, and miners fought more in smaller pockets as they pushed the Lakota and Cheyenne back towards Conical Hill." His observations are important and are validated by the CMU investigations that artifacts representing the fighting in these areas are still present and the area still maintains archaeological integrity despite the loss of the relic collected evidence (Scott 2016; Scott et al. 2018).

Burt-Burrows Ridge

Captains Burt and Burrows were part of Chambers' infantry command. As Chambers

chased the retreating Lakota and Cheyenne north, he detached Burt and Burrows' companies to provide Crook support at Crook's Hill. As the battle unfolded, specifically with Royall's advance along Kollmar Creek and to the northwest he became hard pressed. Crook took note of the situation and deployed Burt and Burrows' companies along a ridge to the south of Crook's Hill (Hedren 2019:266-267). The companies quickly formed skirmish lines and fired several volleys at advancing warriors who were causing Royall a good deal of trouble.

Collector and professional archaeological metal detecting along the Burt-Burrows Ridge area revealed at least one line of soldiers' cartridge cases as well as a variety of other cartridge cases some of which are not clearly described by the collectors. One UM block survey on the ridge yielded four .50-70-caliber cartridge cases all fired from Sharps firearms and two .44-caliber rimfire cartridge cases fired from a Henry or Model 1866 Winchester. These could be Lakota or Cheyenne fired rounds or could represent a mix of warrior and Crow or Shoshone scout fired rounds.

The CMU fire line survey down the length of the ridge yielded one 56-56 Spencer cartridge case, two .45-70 unfired cartridges, seven fired .45-70 cartridge cases, three .50-70 cartridge cases, four .45-405 grain bullets, two .50-450 grain bullets, and one lead fragment (Scott et al. 2018).

Collector work on another ridge below, likely south of Crook's Hill yielded an impact damaged .45-70 bullet and another on the west side of the ridge line. On the east slope of the ridge discovered artifacts include ten .45-70 cartridge cases, one unfired .45-70 cartridge, four externally primed .45-70 cartridge cases, four .44-caliber revolver cases, seven .44-caliber rimfire cartridge cases, two Spencer caliber cartridge cases, one externally primed .50-70 cartridge case, one bar primed .50-70 cartridge case, and ten Martin primed .50-70 cartridge cases. This suggests the ridge was occupied by the Lakota and Cheyenne, likely early in the fight, and perhaps by Crow and Shoshone scouts as well. Descriptions of the linear cartridge case distribution by the collectors likely reflects the soldiers' deployment in skirmish order along the ridge's military crest.

On a ridge about 250 m east of the Burt-Burrows Ridge, Vaughn recalled finding 13 .50-70 Martin primed cartridge cases, five .45-70 cartridge cases, three externally primed .45-70 cartridge cases, two unfired .45-70 cartridges, one of which was split open revealing cardboard wads indicating it was actually a carbine round, one .44-caliber unidentified rimfire cartridge case, and one .44-caliber rimfire cartridge case.

Like at Packer's Rocks, Crook's Hill, and Crook's Ridge, the number and diversity of the collector and archaeological finds clearly demonstrate that Burt-Burrows Ridge contains significant numbers of buried artifacts related to the battle that remain *in situ*.

Royall's Movements

Lt. Col. William Royall whose command moved quickly along the ridges east of Kollmar Creek initially pushed the Lakota and Cheyenne warriors to the northwest. The story of Royall's advance and retreat is well documented and is only summarized here as it relates to the discovery of physical evidence (Vaughn 1994; Mangum 1987; Hedren 2019). Royall's command consisted of Companies B, D, I, F, and L of the Third Cavalry. The Lakota and Cheyenne withdrew across several ridge lines with Royall's men in pursuit. The warriors took positions on a ridge southwest of Conical Hill. They were joined by other warriors who had been forced there by the fighting at Crook's Hill and at the

Gap. With Crook's command in control of the ridge and with the packers and miners secure position in the rocks north of Crook's Hill, the heavy fighting fell on Royall.

Royall's First Position and Andrews' Point

Royall's first position is a long ridge near the head of a branch of Kollmar Creek. As Royall moved along the ridge, Lt. James Foster with 18 men of Company I moved west to a small ridge in hopes of halting warrior fire coming from that direction. Royall halted his command a bit further north, taking up positions trying to suppress the incoming warrior fire. Lakota and Cheyenne warriors held positions to the north which arced to the west along ridges that afforded good cover. From there they maintained a steady fire on Royall's men.

In order to drive some warriors from the surrounding ridges, Capt. William Andrews and 18 men rode westward along the crest of the ridge to a visible high point now known as Andrews' Point. This is the farthest point north the soldiers reached. Foster was about one-half mile to the south and in trouble. Andrews sent a messenger to Foster ordering him to withdraw and rejoin Royall. Andrews provided covering fire for Foster's withdrawal.

Warriors now concentrated their fire from secure positions behind rocks and swales at Andrews position. It was not long before Andrews realized how untenable his position was and he too withdrew under fire and rejoined Royall. About this time, Royall received an order from Crook to rejoin the main command on Crook's Hill. Royall was under such pressure that he could only detach one company under Capt. Meinhold to join Crook. Company B made their way to the hill under fire from warriors along Kollmar Creek. Royall and the remainder of the command then began a slow retreat back down the ridge to the southeast. Later in the fight Crook ordered the Shoshone and Crow scouts under the command of First Lt. John G. Bourke and Capt. George Randall, respectively, to attack to the west and drive the warriors off the ridge just occupied by Royall. Bourke apparently occupied Andrews' Point from which vantage point he was able to see that Royall was nearly surrounded in his second position. Bourke and his trumpeter were attacked by warriors and barely escaped with their lives; the trumpeter being wounded in both arms on their retreat back to Crook's Hill. There were several other dramatic moments associated with the scouts advance and retreat.

Metal detecting work on Royall's First Position was accomplished entirely by collectors. The reported work is not precise regarding where or how many objects were recovered. However, the reports say that at least 23 .45-70 cartridge cases, one unfired .45-70 cartridge, and one .44-caliber externally primed cartridge case were recovered.

Werts and Booras (2011) were the next to document their finds. They did so in more detail and more accurately than the other early collectors. In the same area where Vaughn found soldier related battle artifacts, they recovered 35 .45-70-caliber cartridge cases, three unfired rounds, two fired .50-70-caliber cartridge cases, and two .50-caliber bullets (Werts and Booras 2011:124). They note the artifacts were found in a line running roughly east to west for about 70 m and about 25 m from the ridge crest – likely the military crest of the ridge. About 300 m west of the ridge, they found 12 fired .45-70-caliber cartridge cases and three unfired rounds. Whether this is the same area found by Vaughn is not clear, but it does indicate a soldier movement in that direction. It may be evidence of some part of Foster's movement.

On the southeast end of the ridge, they found mixed evidence of warrior and solider use

that included cartridge cases, two iron projectile points, and a firearm barrel band. They interpret the origin of the barrel band as belonging to a Springfield .50-caliber carbine. The barrel band may be the middle band from a .45-caliber Springfield Model 1873 rifle (Werts and Booras 2011 123-125). Without detailed measurements it is not possible to confirm what type of firearm it came from.

Somewhere near the first position that John Stands In Timber took Vaughn (1994:130-131) to is a site a site marked by some stacked rocks placed by the Cheyenne to memorialize the location where a young Lakota warrior was killed. Vaughn found a single .45-70 externally primed cartridge case there that was head stamped with **R B**. He believed this to be battle-related, but the headstamp was not used in 1876. It stands for a commercially loaded round and the headstamp means Rifle, Berdan primed. The other cartridge cases found near the site included one .45-70, one .44-caliber, and one .50-70-caliber bar primed case.

In Vaughn's book (1966:137), he recounts his metal detecting efforts around Andrews' Point. Various collectors report many artifacts were found around Andrews' Point, but many are not specifically identified, but those that are include an abundance of .44-caliber Winchester cartridge cases and .50-70 cartridge cases, approximately 50 .44-caliber Winchester and Spencer caliber cartridge cases as well as some bullets. In addition, 12 .45-70 cartridge cases, three .50-70 cartridge cases, one Spencer cartridge case, and another seven .44-caliber rimfire cartridge cases were also found.

Wert and Booras (2011:125-126) found very few solider related items at Andrews' Point, but do record they recovered four fired .45-70-caliber cartridge cases and a fired Colt .45-caliber cartridge case. They did find numerous .44-caliber Henry cartridge cases, Spencers, and .50-70-caliber cartridge cases. They identify three of the Spencer cases as caliber 56-52. One of the cases is illustrated (Wert and Booras 2011:165) and it does not appear to be a 56-52, but rather is a variation of a 56-50 Spencer cartridge case based on the case profile in the image. A positive identification would only be possible by examining the actual specimen.

Fred Werner (1983:63-64) conducted metal detecting on a ridge about a kilometer from Royall's First Position. He found 19 .45-70 cartridge cases, two .44-caliber rimfire cartridge cases, and one .45-caliber bullet. This may be one of the Lakota or Cheyenne positions or possibly the Foster position. The lack of a map denoting his find areas limits the usefulness of his descriptions.

During extensive metal detecting around the Royall's First Position by Werts and Booras (2011) they were able to identify six warrior positions as determined by cartridge case and bullet evidence related to the battle. Two Native American occupied positions were located west of Royall's position. One position was found among a natural rock or boulder formation that provided cover for the warriors. There they found six .44-caliber Henry cartridge cases. The second position was found below the military crest of swale at the western end of the ridge. There they found 15 .44-caliber Henry cartridge cases, two .50-70-caliber cartridge cases, two Spencer fired 56-50 or 56-52-caliber cartridge cases and a .45-caliber Schofield length cartridge case. Werts and Booras believe this position was likely used by warriors to fire on the troops at Andrews' Point.

Another three warrior occupied positions were found north of Royall's First Position. Werts and Booras (2011:129-134) describe the locations as being on a flat-topped ridge line north of the one occupied by Royall and just north of the headwaters of Kollmar Creek. They

believe that the second and third positions were used to fire at Andrews' men and the first position was used to fire at Royall's men in either their first or second positions. The first position yielded one Spencer fired cartridge case, and two .44-caliber Henry cartridge cases. A couple of isolated .45-caliber 405 grain Springfield bullets were found in the general vicinity as was an isolated .45-70-caliber cartridge case. The second warrior position yielded two .50-70-calbier cartridge cases and two .44-caliber Henry cartridge cases. The third position contained only a .50-70-caliber cartridge case. Werts and Booras' battle-related discoveries are definitive evidence of the fighting in this area. They were able to show that the warriors employed the terrain to their advantage as much as possible (Werts and Booras 2011:128-164).

Royall's Second Position

Royall's slow and very deliberate withdrawal from his first position was to a ridge line located about 300 m to the southwest. Two companies formed a position on the west end of the ridge and Capt. Guy Henry deployed Companies D and F in skirmish order about 100 m to the southwest on the ridge. The position is reported to be near a flat-topped sandstone formation. There the command fired at warriors who occupied their old ridgeline position as well as protected locations to the west and south. The soldiers experienced heavy incoming fire with little or no cover available to them. After the withdrawal of the scout advance around Andrews' Point, warrior groups there joined the fighting around Royall's Second Position. Royall found the position untenable and ordered another withdrawal to the southeast.

Vaughn (1994:129) metal detected Royall's Second Position. He noted he recovered 18 .45-70 cartridge cases and three Martin primed .50-70 cartridge cases. Werner also (1983:56) worked on Royall's Second and Third Positions and reported finding nothing. Werts and Booras (2011:134) did not metal detect Royall's Second Position. The area remains largely unknown archaeologically.

Royall's Third Position and Limpy's Rock

Royall withdrew from the second position quickly, but in an orderly fashion. Capt. Guy Henry led the way with Andrews' and Vroom' companies providing covering fire. It was during this movement that the soldiers moving across what is known as the North Slope Route encountered Young Two Moon and Limpy, two famous Cheyenne warriors fighting from a sandstone rock formation now known as Limpy's Rock (Hedren 2019:283-285). A warning from a Lakota warrior alerted them to the presence of the soldiers and all but Limpy retreated. Limpy's own horse was shot, and a dramatic scene unfolded where Young Two Moon rode back to save his comrade. The story is something of a legend in the battle's history.

The area is not known to have been metal detected by any of the earlier researchers. One anonymous collection contains two .44-caliber Henry cartridge cases and one 56-50-caliber Spencer cartridge case as being found at the location. The cartridge cases likely originated with the warriors.

The retreating soldiers did not rush in an unorganized manner but retreated for approximately 50 m and in groups wheeled and fired, then continued in the same maneuver until they reached what became known as Royall's Third Position or Royall's Ridge. The ridge is just over a kilometer long with about one kilometer of it within the park boundary. The soldiers deployed along the ridge forming new skirmish lines.

Vaughn believed Royall's withdrawal from the Second Position to the Third Position

occurred across a saddle between the two ridges. Recorded metal detecting efforts (Werts and Booras 2011:139-150) resulted in finding 17 .45-70 cartridge cases, nine .45-70 fired bullets, three .50-70 cartridge cases, three .50-70 fired bullets, one .44-caliber rimfire cartridge case and one .44-caliber bullet, and one .44-caliber externally primed cartridge case, and two impact damaged bullets.

Werts and Booras (2011:139-150) identified two Lakota and Cheyenne warrior positions that may be associated with the action in this area. One is located in the valley south of Kollmar Creek and the other on a small ridge and rise they dubbed Small Conical Hill. They acknowledge that the two positions could be attributed to separate times of the battle and not exclusively to Royall's movement to the Third Position. The valley position is identified as Limpy's Rocks. There they found three Spencer fired cartridge cases that they identified as 56-52-caliber, as well as seven .44-caliber Henry cartridge cases.

On the ridge to the north of Royall's withdrawal route, collectors describe finding ten cartridge cases and bullets on the flanks of a ravine leading up the slope to the ridge. These included three .45-70-caliber cartridge cases, two .45-caliber 405 grain bullets, and five .50-70-caliber cartridge cases. They believe these artifacts suggest a mixed use of the ridge, first by soldiers and scouts early in the fighting and later by the Lakota and Cheyenne firing at Royall's men.

Vaughn (1994:129-130) was the first to metal detect this ridge and the area dubbed the Small Conical Hill. He and others found ten items, two bullets and eight cartridge cases which are otherwise unidentified. Werts and Booras' (2011:143) also metal detected the hill and surrounding areas. There they recovered one .45-70-caliber cartridge case, one .45-caliber 405 grain bullet, one .50-caliber bullet, one .44-caliber bullet, a .50-70-caliber cartridge case, and a .50-caliber bullet they say was fired in a Sharps rifle.

On Royall's Ridge or Royall's Third Position, Vaughn (1994:130) recorded "large numbers of fired Springfield .45 cases and unfired Springfield cartridges." He specifically stated that he found were 133 .45-70 cartridge cases, two unfired .45-70 cartridges, one externally primed .50-70 cartridge case, one .50-70-caliber fired bullet, one Spencer caliber cartridge case, and one unfired .45-caliber revolver round. He found these in a line of approximately 100 m long on the crest of the ridge. Werts and Booras (2011:144-150) also metal detected the area with Jessie Huffman (a local land owner) and recovered over 160 cartridge cases and two iron arrowheads along the ridge. They note that most of the cartridge cases are .45-70-caliber, and most were found within 50 m of the park boundary fence on the Huffman property. They further describe several cartridge case clusters which they believe represent discrete actions by the soldiers. They provide latitude and longitude information on the locations which was helpful in plotting the general find areas. One area is on the ridge's southwestern side. Here they found in a ten-meter diameter area 15 .45-70-caliber cartridge cases, which they suggest were deposited during an attempt by some soldiers to fire on attacking Lakota and Cheyenne warriors. The second area is located on the northeastern ridge slope where there is a shallow oval-shaped depression. There they found 18 .45-70-caliber cartridge cases and one .50-caliber bullet which they believe represents a trooper holding action near the end of the fight on the ridge.

In their work on areas surrounding the ridge, Werts and Booras (2011:150-164) identified six likely Lakota and Cheyenne warrior fighting positions. For each they provided locational information that was useful in plotting the sites

in GIS. Their "Indian Position 1" is southeast of the small Conical Hill where they found eight .44-caliber Henry cartridge cases and one other that was possibly fired in a Remington or Colt revolver, one 56-50 Spencer cartridge case, a .45-caliber 405 grain Springfield bullet, and two .45-70-caliber cartridge cases.

"Indian Position 2" is across a shallow ravine on the ridge's southwest slope. In this location they found an unfired .50-70 cartridge, two .45-70-caliber cartridge cases, one .44-caliber Winchester centerfire cartridge case, ten .50-70-caliber cartridge cases, five 56-50 Spencer cartridge cases, 25 .44-caliber Henry cartridge cases, two .45-caliber 405 grain Springfield bullets, and one impact damaged bullet.

"Indian Position 3" is in and around a natural rock outcrop that formed a natural breastwork. Here they found three .50-70-caliber cartridge cases, five 56-50 Spencer cartridge cases and one unfired round, 32 .44-caliber Henry cartridge cases, three .45-70-caliber cartridge cases, two .44-caliber bullets, four .50-caliber bullets, and two .45-caliber 405 grain Springfield bullets.

"Indian Position 4" is near the park boundary fence and is separated from Indian Position 3 by a deep ravine. The artifacts recovered include seven .44-caliber Henry cartridge cases, one .45-70-caliber cartridge case that was ruptured and split due to being fired in a larger caliber firearm, one .45-caliber Sharps cartridge, and one .45-caliber Colt revolver bullet.

Stevan Booras identified two other warrior positions (Werts and Booras 2011:164) via metal detecting. His JHRIP2 and JHRIP3 locations are two clusters of artifacts discovered on a ridge south of Royall's Third Position. At Position 2, he recovered three .44-caliber Henry cartridge cases and three .50-70-caliber cartridge cases. About 300 m west/northwest of Position 2 is Position 3 where he found one .44-caliber Henry cartridge case, one 56-50-caliber Spencer cartridge case, and one .45-70-caliber cartridge case that was ruptured and split from being fired in a larger caliber firearm.

The only professional archaeological investigation associated with Royall's Retreat and Third Position was conducted by the UM (Milter 2013:153). This area is the lower end of the ridge and is entirely within the park boundary. A total of seven battle related artifacts were found by the UM field crew in what is believed to be part of the retreat line. The .45-70 cases were found in a roughly semi-circle configuration. Milter suggests this was a firing position for some of the troopers covering Royall's retreat and the retrieval of his horses.

Milter (2013:154-158) reported finding a small cluster of cartridges that he interpreted as at least three Lakota or Cheyenne firing at Royall's retreating troopers based on firing pin impression analysis. All three were firing Henry or Model 1866 Winchesters and all three participated in other parts of the fighting, confirming warrior movement around the field of battle. Two .45-caliber 405 grain bullets recovered in the same area indicate the warriors were under fire as well. He believes at least one bullet was likely fired by Burt and Burrow's forces firing at the Lakota and Cheyenne that were attacking Royall's column while the other was possibly fired by one of Royall's men.

Captain Peter Vroom and Company L was ordered to hold the rear of Royall's line and protect the horses in a small ravine on the west side of an unnamed drainage that enters Rosebud Creek near Kollmar Creek. This is now known as Led Horse Ravine. Vroom's men with the aid of others did protect the horses after the Lakota and Cheyenne attacked the horse holders in an attempt to capture the horses. Vaughn (1994:132) retells a story an early settler told him of hauling a wagon load of horse bones away, some with iron horseshoes still in place.

Vaughn searched the area and found a couple of horse skulls, one of which had been dispatched by a gunshot. From Vaughn' description this is unlikely to be the site of Led Horse Ravine.

Vroom held the attackers off until the retrograde movement began (Hedren 2019:257-260). During the movement of Royall's to the Third Position, Capt. Guy V. Henry was gravely wounded in the face by what was later determined to be a .44-caliber bullet (Hedren 2019:262, 288). He was mounted at the time, but dismounted and lay prostrate on the ground as his troopers were forced down the ridge slope by on-coming Lakota and Cheyenne warriors (Hedren 2019:262-263). Crow and Shoshone scouts saw the situation and counterattacked the Lakota and Cheyenne pushing them back. One scout protected the wounded Henry until some soldiers came to remove him to the protection of their own lines. The Henry story is another element in the battle that has become the stuff of legend. The site of Henry's wounding was marked by the Cheyenne with some stones and later by Elmer Kobold with a concrete marker that still stands to commemorate the event (Hedren 2019:243). The location is not specifically mentioned as being metal detected by any of the published researchers, however, one of the anonymous collections contains two .45-70-caliber cartridge cases, one 56-50 Spencer cartridge case, one .50-70-caliber cartridge case, and one .44-caliber Henry cartridge case attributed to being found at Henry's wounding site.

CONCLUSION

The analytic methods of conflict archaeology require an understanding of how conflict between soldiers and Native Americans was shaped by differences in the way the combatants understood, experienced, and conducted warfare. On the Great Plains, Native American warriors usually fought as individuals or in loosely affiliated war groups. Warriors fought to gain prestige, to capture trophies, and most importantly, to protect their families and their way of life (DeMallie and Parks 2003; Secoy 1992). Generally, their fighting employed a surprise, ambush, and decoy strategy (DeMallie and Parks 2003; Secoy 1992; Smith 1937; Wissler 1941). Tactically, warriors employed the terrain to their benefit, striking quickly in small groups as opportunities presented themselves, and the U. S. Army was constantly frustrated by Native American hit and run tactics (White 1978). There was also little understanding among the frontier army officers and soldiers of the concept of counting coup or striking an enemy, a deeply ingrained cultural practice of many Great Plains tribes (McGinnis 1990). Aside from touching an opponent, one could gain other levels of distinction and honor by capturing a weapon from a live enemy, stealing a horse, or rescuing a fallen warrior from the enemy. Regardless, destruction of an enemy or protection of the family or band was paramount in combat, and inflicting casualties on the enemy by killing or wounding was a natural outcome of such tactics.

In contrast, modern Euro-American military leaders formally conceptualized the range of actions involved in undertaking combat. Military science, the discipline developed to guide military conduct, deployed formal concepts and terms that are applicable to archaeological analysis of battlefields and other military sites. The U.S. Army maintains a regular series of training publications designed to make the conceptual basis of military activities available to new personnel. These publications describe the range of actions involved in preparing for and conducting combat in clearly defined, concrete terms. Since they are intended to guide the planning and execution of military activities, these manuals treat combat at all levels from the specifics of individual and small group actions to the general formation of military

policy. Since they treat both concrete realities and conceptual constructs, these manuals can address observable features and support inferential interpretations of archaeological materials. Military concepts can, therefore, be used to organize diverse and potentially cryptic historical accounts as they provide a pre-established vocabulary and organizational framework for describing and understanding site formation processes and deposition at battlefield archaeological sites.

Relic collecting, the research efforts of Vaughn, White, Werner, Werts and Booras, and the professional archaeological investigation of the Rosebud field of battle yielded thousands of artifacts, several archaeological reports, one monograph, and three books. These documents and the data they present allow for the confirmation of some of the battle's interpretations, while other data require reinterpretation of some sources and events. It is also clear that we have yet to learn everything there is to know. The physical evidence recovered clearly demonstrates that the historical record is correct on most issues, that Native American oral tradition likewise can explain some details better than the army accounts, and that archaeological detective work uncovers artifacts and their patterns of distribution that neither oral tradition nor documentary records can truly address. The physical evidence record is not better than the others; rather it should be viewed as another set of information to be compared, contrasted, and correlated with other information sources. It is a very visible reminder of those past events. These data and the information they convey are a very real part of the interpretation of the Battle of the Rosebud.

Knowledge of the features and areas of significance identified during the archaeological investigations is in turn critical to making informed management decisions when even small- scale construction and/or development activities must be undertaken to provide visitor services such as new trails, enhancement of the viewshed through vegetative manipulation, and other activities. Given the extent of the known fighting locations and the presence of battle-related artifacts across the entire landscape, almost any ground disturbance activity at most locations in the park will technically constitute an undertaking in terms of historic preservation legislation compliance.

At one level, the result of the archaeological studies at the Rosebud shows that individual and unit movement and composition can be revealed in the most chaotic of human endeavors, a pitched battle. Opposing force deployment can be discerned and the flow of the battle followed. Details lost to history can be discovered and interpreted in respect to the cultural conditioning and training received by the opposing forces. Human behavior is patterned. Behavioral patterns are expressed through individual behaviors constrained by the norms, values, sanctions and statuses governing the group within which the individual operates. These various aspects are clear and evident in the distribution and interpretation of the physical evidence of the battle.

War tactics, which represent patterned behavior, include establishment of positions and the deployment and movement of combatants. The residues of tactics in warfare including artifacts, features and their contextual relationships, are shown to be patterned and reflect details of battlefield behavior, and those behaviors are particularly evident in the Rosebud Battle data. Those data show the Lakota and Cheyenne and the Crow and Shoshone fought in small war groups as dictated by their cultural training. The army and the scouts fought a running battle against the Lakota and Cheyenne using well-known and well-developed tactics

and established deployment organization. The army deployed on ridges and side slopes and landscape high points in order to achieve a tactical advantage. The Lakota and Cheyenne warriors used those same and many other features in a different manner. They employed these features to their advantage by using the military crests as a means of cover and concealment. The Native American tactics gave the advantage and the day to the Lakota and Cheyenne. The battle cost relatively few lives on either side, the army remained in control of the field of battle at the end of the day, but the warriors held a strategic victory. Crook withdrew to his Goose Creek camp to resupply resulting in minimizing any threat to the Lakota and Cheyenne for the immediate future. The Rosebud fight emboldened the Lakota and Cheyenne in their fight with Custer eight days later. The historical record, the soldier recollections, the Native American oral histories, and the physical evidence distributed across the field are in concert and provide a rich tapestry to better understand the events of June 17, 1876.

ACKNOWLEDGEMENTS

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Surprising and Unintended Consequences of Managing Cultural Resources

Rehabilitation of Two Historical Homesteads, Granite County, Montana

C. MILO MCLEOD

INTRODUCTION

IN 1979, THE USDA LOLO NATIONAL FOREST purchased 320 acres within the Rock Creek drainage of western Montana for its recreational and wildlife values. The Land and Water Conservation Fund provided money for the purchase. The acreage consisted of two patented 160-acre homestead entry claims (HSE 288 and 560) equaling 320 acres. Each homestead parcel retained its homestead dwelling. The Morgan-Case Homestead also possessed a barn, bunkhouse and a machine shed and foundations from a former woodshed and sauna (Figure 1).

BACKGROUND HOMESTEAD HISTORY

Charles Gerhardt filed a homestead patent for the Hogback homestead in 1914. Gerhardt lived at one of the abandoned mining cabins within his proposed homestead claim while improving his claim; improvements included a log house, barn, and a chicken coop. He cleared the bench north of his building complex and dug irrigation ditches to divert water from Hogback Creek to irrigate his crops, which included mostly root vegetables. He obtained title to the property in 1917. Gerhardt sold the property in 1923 to William Miller who retained the property for six years until 1929 when he sold it to the adjacent landowner, John Meyers (Figure 2).

The Morgan-Case Homestead was originally settled by Agnes "Annie" Morgan. Morgan, an African American woman originally from

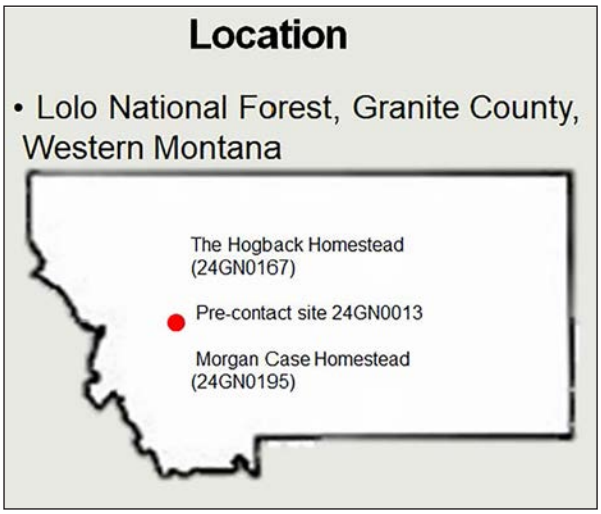


Figure 1. Location map for Hogback and Morgan-Case Homesteads.

Figure 2. Hogback Homestead, 1979.

Figure 3. Morgan-Case Homesteaders, 1890s - 1940s. Annie Morgan (lower left photo) and Jack Case (center of photo above).

Maryland, traveled west after the Civil War. She lived for a time at Fort Meade, South Dakota, where she worked as a servant in the household of a Seventh Calvary lieutenant. She arrived in the mining town of Phillipsburg, Montana, in the late 1880s. In about 1894, she partnered with Joseph Case, a Caucasian Civil War veteran from New Jersey, who she nursed back to health after he suffered a bout of fever. Together they built a cabin and bunkhouse and made a living in Upper Rock Creek farming and renting the bunkhouse in the summer to fisherman from the mining towns of Granite and Phillipsburg (Figure 3). Annie filed her application for a homestead patent in 1911, but the process of proving up was cut short by her death in 1914. After being denied survivor's rights to the parcel, Joseph Case then filed his own application to the same land in 1915. After years of negotiation, Case received title to the homestead in 1919, at 74 years of age. Case sold the homestead in 1924 to John Meyers and his wife Olga. The Meyers farmed and ran a successful cattle operation, which included leasing

grazing rights from adjacent federal land. Meyer supplemented his income by making illegal liquor (Olson 1990). In 1929, they purchased the Hogback homestead from William Miller, thus consolidating the two properties).

The Meyers sold the consolidated property to William Schmidt in 1943. The Schmidt family lived at the homestead and constructed several new buildings including a woodshed/blacksmith shop and sauna. They continued to raise cattle and run a small sawmill operation. In 1951, the Schmidt's sold the property to Frank and Sara Puyear. They continued operating the ranch under the management of an on-site caretaker until 1979 when they sold the property to the Lolo National Forest.

BEGINNING OF FOREST SERVICE MANAGEMENT

After acquiring the property from the Puyears, the Forest Service initially proposed burning the homestead buildings, which they believed to be a liability hazard. Prior to proceeding with their removal, the forest needed to complete the National Historic Preservation Act (NHPA), Section 106 compliance responsibilities. Lolo National Forest seasonal archaeologists documented the homestead remains to determine if they qualified as historically significant properties under NHPA. During fieldwork, archaeologists documented the architectural remains at the two homestead building complexes, Gerhardt's "Hogback Homestead" (24GN0167), and the Morgan-Case Homestead (24GN0195), as well as a historic mining property (24GN0166) roughly a quarter mile east of the Hogback dwelling. While documenting the Hogback dwelling, archaeologists also noted pre-contact lithic material eroding from channels in its access road and from rodent burrows within a cultivated field north of the dwelling. University of Montana Anthropology students working under contract to the Forest Service had recorded the pre-contact site (24GN0013) previously during the Rock Creek Wild and Scenic River Study (Sharrock et al. 1974).

In 1979, compliance with Section 106 of the National Historic Preservation Act was still relatively new to the Forest Service. Rather than undertake formal consultation with the Montana State Historic Preservation Office (SHPO) to resolve the National Register eligibility of the two homesteads, forest managers made the decision to let the buildings "molder." While this decision did not meet the spirit of the legislation, it did result in retaining the buildings on the landscape for the next decade.

REHABILITATION OF HOGBACK HOMESTEAD (24GN0167)

The Hogback homestead was abandoned and badly deteriorated before the Forest Service took possession of it in 1979. Deterioration continued through the 1980s while under federal management. By the end of the 1980s, the doors and windows were either broken and/or removed and many of the rafters and roof joists were salvaged by persons unknown (Figure 4). Because the homestead property was included in a grazing lease, cattle used the building's interior as a loafing shed.

In 1989, a gold miner filed a new mining claim on Hogback Creek, above the homestead building complex. In order to access his claim, he requested authorization from the Missoula Ranger District to improve the existing access road and extend it beyond the homestead dwelling to reach his operation. Because the existing road transected the pre-contact site and came close to the homestead dwelling, road construction could potentially adversely affect both properties. Archaeologists from the Lolo National Forest conducted additional survey, documentation, and test excavation of the homestead and

Figure 4. Hogback Homestead prior to rehabilitation, 1989.

the pre-contact site. The pre-contact artifact assemblage included temporally diagnostic projectile points, knives, scrapers, and lithic material from both terraces above Hogback Creek (Figure 5). They also recorded two culturally modified trees and completed additional documentation for the homestead dwelling (24GN0167) and the mining site (24GN0166). The Forest Archaeologist submitted the documentation and testing results to the Montana SHPO for a determination of eligibility for listing in the National Register of Historic Places. The SHPO concurred that the pre-contact site (24GN0013) and the homestead (24GN00167) were both eligible for listing while the mining site (24GN0166), was not eligible (McLeod 1989).

Later that year the Missoula District committed to rehabilitating the Hogback homestead to preserve and interpret the historic property,

Figure 5. Precontact artifacts recovered during 1990 and 1991 data recovery.

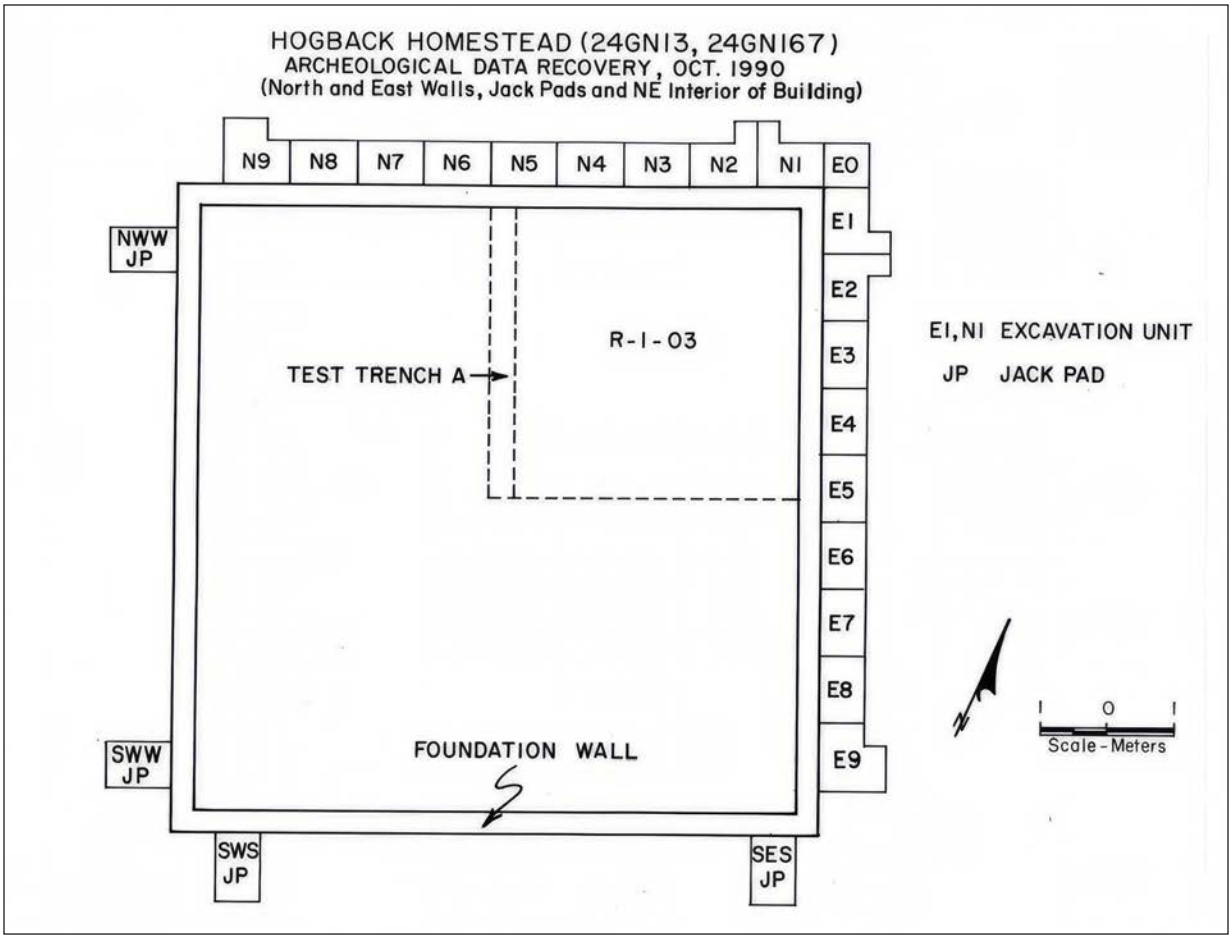


Figure 6. Map of jack pads and foundation excavation at Hogback homestead, 1990.

and for use as a recreation rental under the Forest Service's new recreation (cabin) rental program. The goal of the project was not only to preserve and interpret the historically significant homestead (thus fulfilling the Forest's Section 110 responsibilities), but also to provide an opportunity for Forest Service personnel seeking training in historic preservation and traditional log building construction techniques. Note that at this time, the cabin rental program was new and "experimental," as a part of the Washington Office's Recreation Fee Demonstration Program.

Missoula District personnel began removing trash from the site while photographing and documenting features and saving key architectural elements such as window sash, bead board siding, and porch flooring. Rehabilitation of the building began in October 1990 under the direction of Jim Askins, who was a retired National Park Service Exhibit Specialist.

Askins proposed placing buried concrete jack pads at the four corners of the building, prior to removing and replacing the structure's rotted sill and wall logs. Because excavation would disturb the pre-contact deposit, the forest undertook a data recovery effort. Archaeologists established a grid system for the jack pads and the north and east walls as well as the interior of the structure (Figure 6). The data recovery effort, which extended between 1990 and 1991, yielded extensive pre-contact artifacts including projectile points, knives,

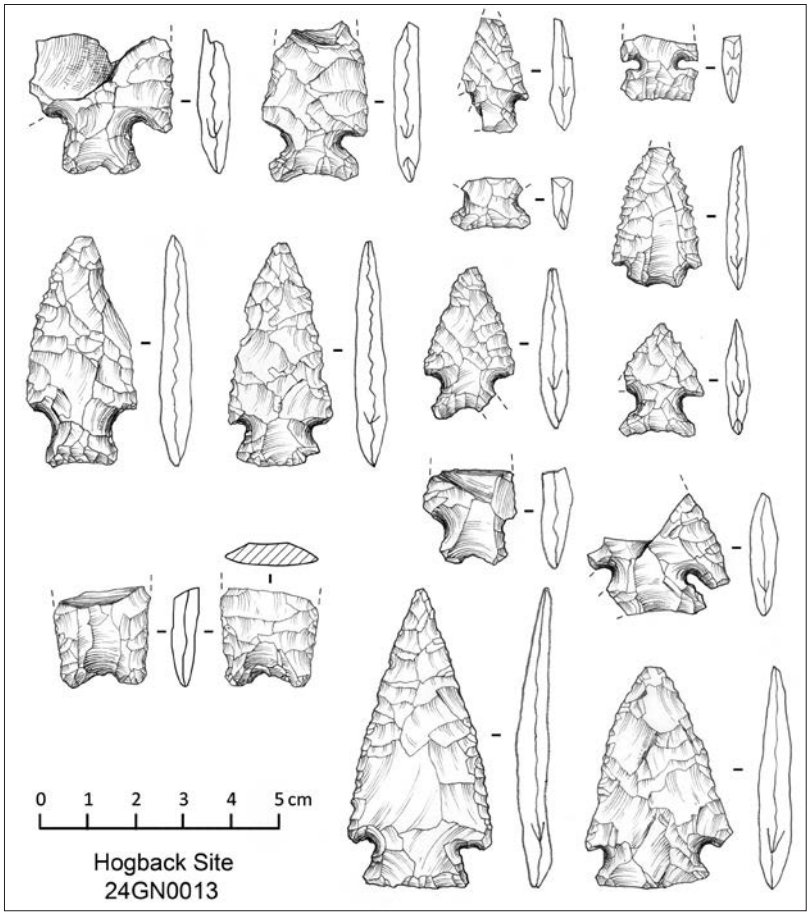


Figure 7. Late Period side and corner—notched projectile points recovered from 1989 test excavations at 24GN0013, Hogback Homestead. Illustration of artifacts by Eric Carlson.

scrapers, and a variety of lithic debitage (Figure 7). Historic artifacts included items typical of an early 20th century homestead, including bottles, cans, nails, cartridge cases, and broken farm implements (Figure 8). The abundance of archeological material recovered during this initial phase of site rehabilitation indicated that any ground-disturbing activity associated with rehabilitating the homestead dwelling would require additional data recovery.

The Forest Archaeologist initiated consultation under section 106 of NHPA with the Montana SHPO and the Salish & Kootenai Cultural Committee and proposed conducting a controlled excavation, using Passport in Time (PIT) volunteers, to mitigate the proposed development areas. With SHPO and Tribal concurrence, the excavation was conducted between July and August 1993. Ten PIT volunteers a week, for three weeks (working under the supervision of professional archaeologists), excavated 33 square meters to a depth of 20 to 30 centimeters. The site yielded an abundance of cultural material including projectile points dating from the Paleoindian period (prior to 10,000 years before present [B.P.]) through the historic period (200 B.P.) as well as knives, scrapers, and ground stone tools (Figure 9). The material types included chert, basalt, quartz, quartzite and obsidian. One blue trade bead was recovered indicating occupation from the proto-historic or early historic period (ca. A.D. 1700 – 1850). Also, the historic

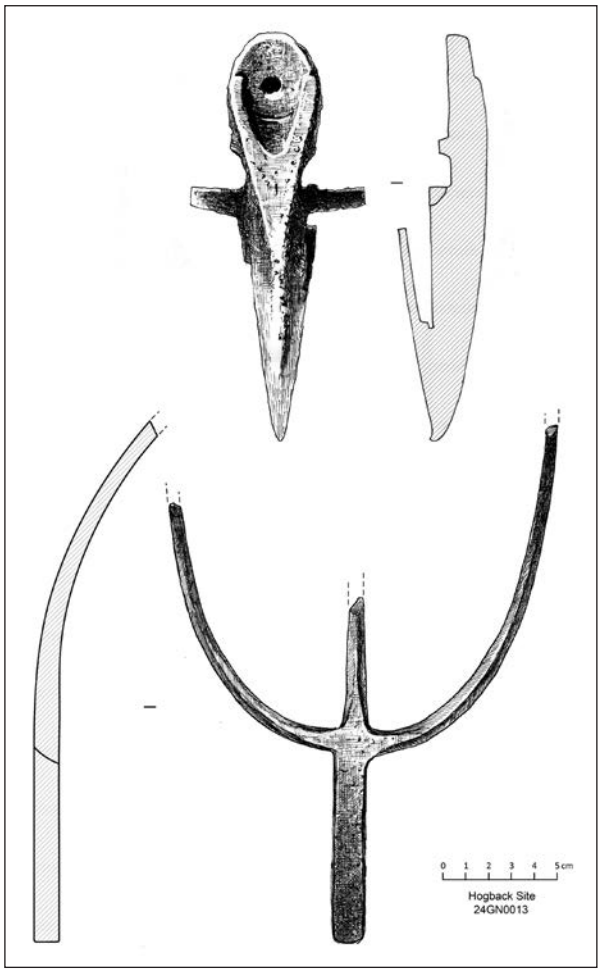


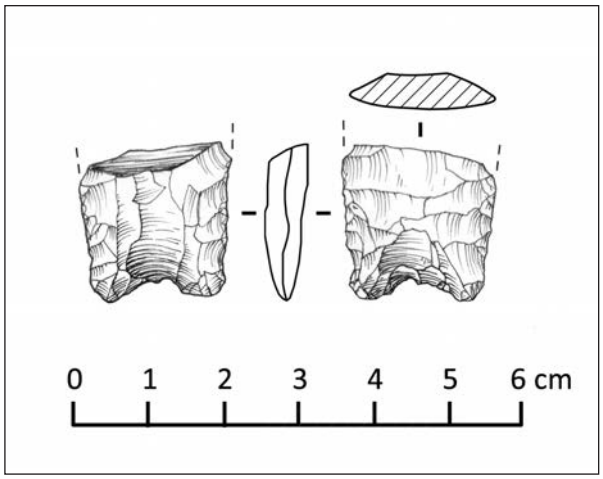
Figure 8. Historic artifacts including glass bottles and broken farm implements recovered during 1990 and 1991 data recovery. Drawing of farm implements by Eric Carlson.

artifact assemblage was consistent with items expected for an early 20th century homestead and included glass, nails, cartridge cases and broken farm implements. Included among the historical artifacts were a few children's toys.

Additional data recovery occurred during the monitoring for road reconstruction and vault toilet installation in 1995. Several stone tools and a quartzite core were recovered in 1995 (Figure 10) as well as an intact fire hearth. The hearth yielded a radiocarbon date of A.D. 1520 (Beta Analytic Inc. 1995). This is consistent with the Late Prehistoric component at the site. In 2014, archaeologists and volunteers excavated seven 1m x 1m units to mitigate the placement of large stones for a parking barrier. The 2014 data recovery project produced four Late Prehistoric period projectile point fragments and two Middle Prehistoric period projectile points, two ground stone artifacts, several small bone fragments, of chert, basalt, obsidian and quartzite debitage.

Artifacts from the pre-contact component at the Hogback site demonstrate that people occupied the area periodically from the late Paleoindian period (pre 10,000 BP) through the Late Prehistoric and Historic periods (A.D. 1700 – 1850). The chert (cryptocrystalline silicates) from the Hogback site was likely acquired from quarries in Granite County including, the Devil's Eyebrow (24GN0501) and Mount Baldy (24GN0062 and 24GN0209) quarries, approximately 25 miles northeast and north respectively. The nearest source for obsidian however, is Bear Gulch, approximately 150 miles southeast of the site in the Centennial Valley of Idaho (Flint and Sappington 1982:19). Obsidian samples from

Figure 9. Paleoindian projectile point (base) and ground stone recovered during 1993 data recovery. Illustration of projectile point base by Eric Carlson (top right).



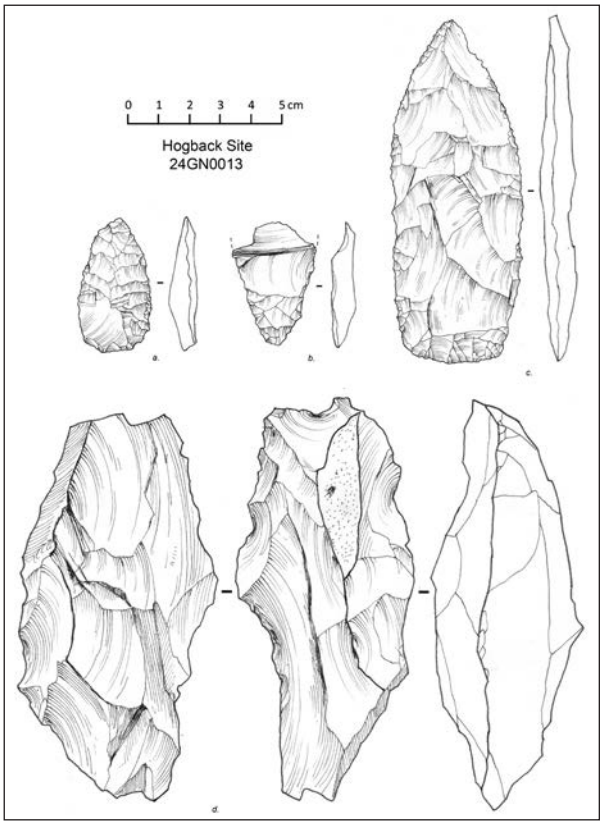


Figure 10. Quartzite core and blade found during 1995 site monitoring. Illustration by Eric Carlson.

the Hogback site (24GN0013) demonstrate that eight came from Bear Gulch, four samples originated from Timber Butte near Boise, Idaho, and two samples came from Teton Pass, Wyoming (Hughes 1992, 1994). Obsidian artifacts occur at other nearby sites in the Flint Creek Valley such as the Graybeal site (24GN0061) and Fred Burr #1 (24GN1095) (Domaine and Comer 2021:94; Flint and Sappington 1982:16). The Black Bear

Coulee Site (24PW0308), is located approximately 20 miles north of the Flint Creek Valley (Beery and Herbel 2020:8). Obsidian from the Black Bear Coulee site appears to exclusively come from Bear Gulch while obsidian from the Fred Burr #1 site includes three samples from Bear Gulch and one from Timber Butte (Domine and Comer 2021:94). Flint and Sappington (1982:22) found that five obsidian samples originated from Timber Butte from sites located in the Flint Creek Valley. No other sites in the valley contain samples from Teton Pass.

The occurrence of multiple sources of obsidian at the Hogback site indicates a long history of intercultural contact or trade with other peoples to the south and east. The Hogback site lies within the traditional homeland of the Salish and Kootenai people. Although Numic speakers from the Great Basin pushed into Southwest Montana regularly during the last 9,000 years, the classic Numic spread of 1,500 to 1,000 years ago was the most recent and is evident in the archeological record (MacDonald 2012:156). Unfortunately, the Hogback site lacks a defined stratigraphy due to the thin soil layers and the displacement of cultural material through natural processes such as frost heaving. Consequently, relative dating techniques based upon projectile point typology provides the only reliable dating technique.

Missoula Ranger District staff, assisted by PIT volunteers completed rehabilitation of the Hogback Homestead in August 1995. A month later the homestead entered the Region One Cabin Rental Program. An interpretive sign located adjacent to the Rock Creek Road, provides information on Native American use of the area and the later homestead era—for renters and the general public. Almost immediately the Hogback Homestead became one of the most popular cabin rentals within the Northern Region of the U.S. Forest Service

THE MORGAN-CASE HOMESTEAD (24GN0195)

In 1999, the public appreciation and support for the Hogback cabin rental, along with financial contributions from Historical Research Associates (HRA) prompted the Missoula District to rehabilitate the Morgan-Case Homestead (Figure 11). Jim Askins (retired National Park Service employee) initially believed the Morgan-Case property unworthy of rehabilitation due to the multiple additions to the building. However, Askins was unaware of the unique history of the homestead relating to Annie Morgan and Joseph Case, the original occupants of the site.

Figure 11. Morgan-Case Homestead prior to rehabilitation 1997, Kirby Matthew in photo.

Major clean up and interior deconstruction began with volunteers from Historical Research Associates and Gray and Pape, Inc. under the direction of Lolo National Forest personnel. The following year Passport in Time volunteers, with Forest Service supervision continued the efforts. In 2001, a new concrete foundation was built and sill and wall logs were replaced. This work was completed by contract, with the assistance of the Region One Historic Preservation Team (HPT) and Missoula District personnel. Passport in Time volunteers installed a new

Figure 12. Passport in Time (PIT) volunteers and Forest Service employees re-roofing Morgan-Case in 2003.

cedar shingle roof in 2003 (Figure 12). The following year the Morgan-Case Homestead was listed in the National Register of Historic Places (Hagen and Caywood 2004).

Reconstruction and rehabilitation efforts continued in 2006 with Missoula District personnel and PIT volunteers, completing a stone retaining wall, a perimeter fence and entrance gate and restoration of the root cellar (Figure 13). Certain projects, such as installing an electrical system and interior drywall installation and taping were contracted to certified and bonded contractors.

In 2007, PIT volunteers installed the interior hardwood floor as well as rebuilt windows and screens. A component of the work included widening the west side doorway so that it met accessibility standards. During the dismantling of the existing door frame, Kirby Matthew, Director for the Region One Historic Preservation Team, discovered a cache of unique historic artifacts purposely hidden behind the door jamb. The artifacts included a hand carved wooden spatula, several bundles of string, a red Silk Soap wrapper, a receipt from a Phillipsburg grocery store with Annie Morgan's name, all contained within a hand-sewn muslin bag (Figure 14). Matthew, a graduate of the National Park Service's Historic Preservation Training Center, with a background in anthropology, immediately recognized the importance of the artifacts.

Shortly after the discovery of the artifact bundle, C. Riley Augé, a doctoral candidate at the University of Montana at the time, specializing in the archaeology of magic, heard of the find and requested to study the collection. Dr. Augé knew of Morgan's reputation as a healer and, after studying the bag and its contents,

Figure 13. Gene Thompson installing an entryway post at Morgan-Case.

Figure 14. Annie Morgan's Hoodoo healing kit found inside the west entrance door jamb at Morgan-Case Homestead, 2007.

concluded that Annie probably drew on African American "hoodoo" healing methods. This method is based on the spiritual traditions that enslaved Africans brought to the Americas during the slave trade. These West and Central African belief systems mixed with Christianity resulted in "hoodoo." The character of the artifacts indicates that Annie practiced root doctoring hoodoo, rather than conjuring hoodoo. Root doctoring hoodoo focused on healing, whereas conjurers' hoodoo-controlled spirits to inflict injury or harm (Augé 2009:3).

Root doctoring hoodoo used plant parts and roots as well as charms and rituals to summon spirits to help heal patients. Traditionally, healers placed these charms in dark places near the entrance to their home to inform the spirits about the powers that the healer possessed. They also served as a warning or barrier to keep unfriendly spirits out (Judy 2017:30).

Annie's root doctoring bag contained the tools needed for her practice. The carved wooden spatula would crush and mix plant material for medicine, while the string helped in binding and mending wounds. The brilliant red and blue soap wrapper, red the color of blood and blue the color of water, was considered an important boundary between the spirit and living worlds. The receipt with Annie's name is important because in hoodoo someone's written name is equal to the person being physically present, and identifies them to the spirits (Judy 2017:30). Additional African magical assemblages similar to Annie's have been found at sites in the South and East, however this is the first to appear in the Pacific Northwest (Augé 2009:3). The discovery of Morgan's root hoodoo bundle, and its interpretation by Augé contributed another important layer of significance to the Morgan-Case Homestead. Since then, Annie Morgan was inducted into the Montana Cowboy Hall of Fame in 2013. She also warranted a chapter in the book *Bold Women in Montana History* by Beth Judy (2017).

Rehabilitating the Morgan-Case Homestead took nine years and required the efforts and funding from a variety of sources both within and outside the Forest Service. Personnel from the Region One HPT, the Missoula District and numerous Passport in Time volunteers completed the project in May 2008. The Morgan-Case Homestead entered the cabin rental program in October 2008 and quickly overshadowed Hogback Homestead as one of the most popular recreation rentals in the Northern Region of the U.S. Forest Service (Figure 15).

Figure 15. The Hogback homestead (top photo) and the Morgan-Case homestead (bottom photo), Lolo National Forest, Granite County, Montana.

CONCLUSION

When the Forest Service purchased the Puyear Ranch in 1979, their intention was to remove all evidence of the homestead improvements and restore the area for its traditional recreational values—fishing and hunting. While the land is indeed used by the public for these pursuits, it is also valued for its cultural sites. The Hogback and Morgan-Case homestead dwellings, both rehabilitated for use as cabin rentals, now act as a type of living history, giving renters a feel for homestead life in the late nineteenth and early twentieth centuries. This use of the two properties also preserves the significant pre-contact site underlying the Hogback Homestead, which contributed significant information regarding the pre-contact occupation of upper Rock Creek. Completely unexpectedly, the Morgan-Case Homestead also yielded evidence of Annie Morgan's cultural tradition of root doctoring hoodoo healing.

In the future when an agency or other land holding entity acquires new properties for whatever reason, be it recreation, wildlife, open space, etc., the presence of valuable cultural resources should not be overlooked or underestimated as surprising finds may eventually be revealed!

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Two Indigenous Drift Wall Hunting Features in Southwest Montana

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INTRODUCTION

FOR MILLENNIA, INDIGENOUS people throughout the Intermountain West and Northwestern Plains built various kinds of wood and stone structures to run down, ambush and entrap big game animals. Hunting features ranged from excavated pits in talus slopes and small rock blinds to more elaborate wood- and stone-constructed surrounding pens, corrals and pitfalls. Converging wings and drift fences made of deadfall timber, felled trees, piled brush and stacked stone were frequently used to funnel game toward these features and awaiting hunters. Hunter-gatherer groups constructed both simple and complex ambush and entrapment structures in alpine, mountain-foothills and valley bottom settings. Using these facilities in individual and communal hunting, Indigenous people procured supplies of meat, hide, horn, and other animal products.

Among the least known and most poorly understood of these constructed hunting features in the Northern Rockies and Plains regions are drift fences—long, continuous temporary or permanent walls or barricades used to control the movement of animals in herding and hunting. Here we describe two stone drift fences at the Blacktail (24BE2572) and Creasey Gulch (24MA2256) sites in southwest Montana (Figure 1). We infer their use by Indigenous groups for big game hunting during the Late Precontact to Historic periods, dating from approximately 1,500 to 150 years before present. Because intact bonebeds either were not originally present or have not survived the passage of time, we are unable to precisely determine which ungulate species-bison (*Bison bison*), mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), bighorn sheep (*Ovis canadensis*), or Rocky Mountain elk (*Cervus canadensis*)--were procured at either site by Indigenous hunters. Thus, we present various lines of evidence to both infer the potential range of prey species and interpret Indigenous hunting strategies involving stacked stone drift fences.

ENVIRONMENTAL SETTING

Part of the Northern Rockies Physiographic Province, southwest Montana is a semi-arid region of scenic mountain ranges, expansive sagebrush-covered foothills, and wide valley bottoms (Fennemen 1931). The region is bounded on the west and north by the Bitterroot Range, the Continental Divide, and the Columbia Plateau; to the south by the Snake River Plain and the Northern Great Basin of eastern Idaho; and to the east by the High Plains of central Montana. Throughout antiquity, the interior Rocky Mountains of southwest Montana served as homelands, hunting territories, and travel routes to the Plains and its vast bison herds for a diversity of Indigenous groups, historically including the Bannock, Blackfeet, Nez Perce,

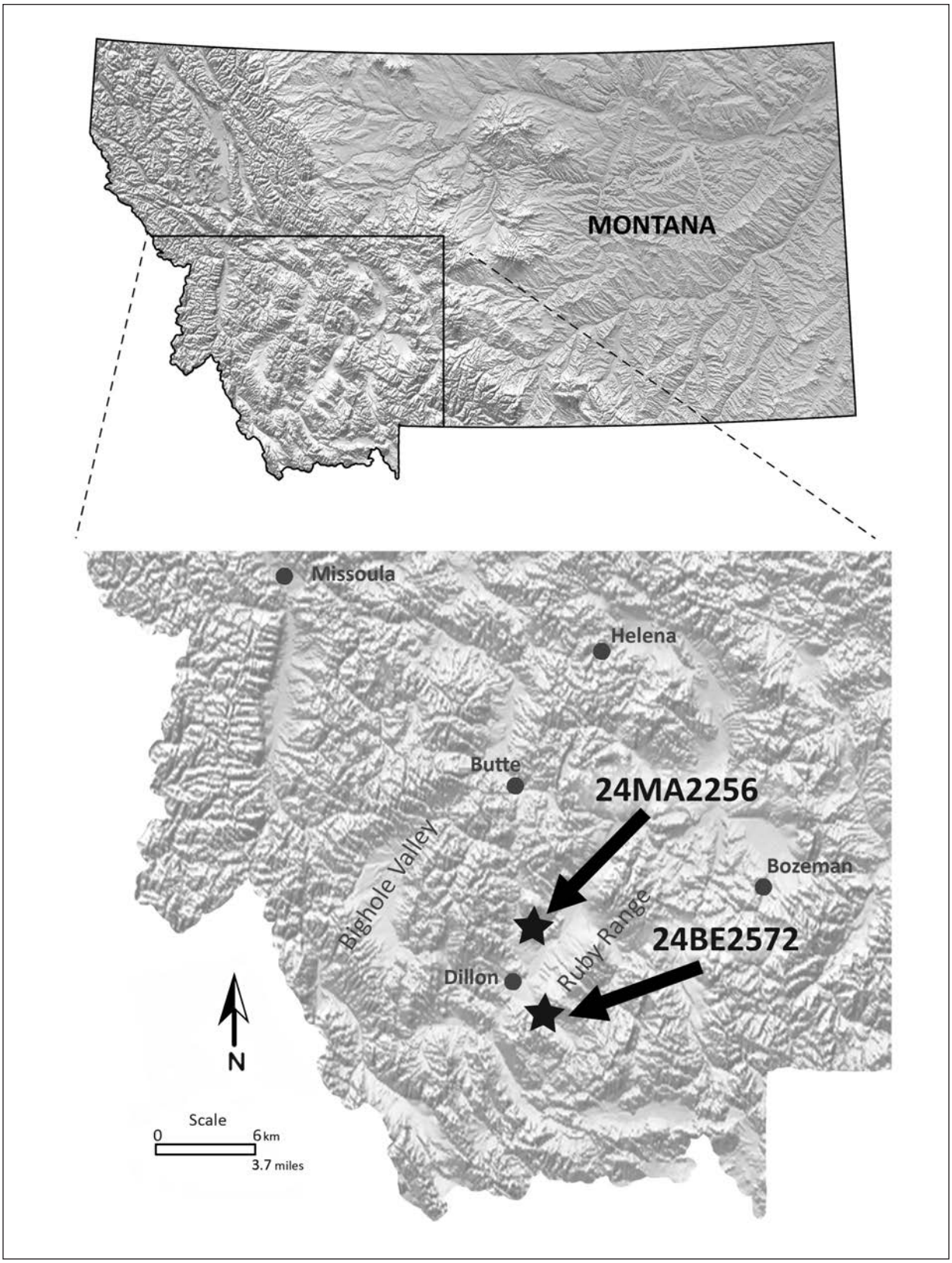

Figure 1. Location of the Blacktail (24BE2572) and Creasey Gulch (24MA2256) archaeological sites in southwest Montana.

Northern (Lemhi) Shoshone, and Salish.

Southwest Montana has a complex geological history (Thomas 2023). Pre-Belt series metamorphic rock and granite gneiss are overlain by Belt sedimentary rock. The region then was dramatically reshaped by plate tectonic movements and volcanic activity, which created southwest Montana's tall mountain ranges and wide basins. The Red Rock, Beaverhead, and other major rivers slowly downcut through the newly-formed valleys, creating wide terraces and extensive floodplains. Quaternary glacial activity carved up mountain ranges, leaving behind glacial till deposits, moraines, and cold alpine lakes. Beginning 11,700 years ago, Holocene erosion and deposition further sculpted and shaped southwest Montana's geologically diverse landscapes.

The Beaverhead, Big Hole, and Jefferson rivers and their many tributary streams like Blacktail Deer Creek issuing from southwest Montana mountain ranges eventually flow into the Missouri River at Three Forks, Montana. Narrow bands of cottonwood (*Populus* sp.), willow (*Salix* sp.), dogwood (*Cornus* sp.), wild rose (*Rosa* sp.) and other riparian vegetation line these water courses on otherwise semi-arid, sagebrush and grass-covered valley floors. Valley bottoms abound with wildlife, including mule deer, white-tailed deer, moose, pronghorn, a variety of small mammals, upland birds and waterfowl. Once prone to running at low water levels during dry summer months, southwest Montana's rivers now enjoy more sustained annual river flows and trout fisheries thanks to small impoundments such as Clark Canyon and Ruby reservoirs.

The conifer-forested Blacktail, Gravelly, Pioneer, Ruby and other mountain ranges rise above the valley floors, with impressive peaks ranging from 2862 to 3232 m above mean seal level (msl). Many ranges hold alpine lakes once seasonally visited by Indigenous peoples in search of game, plants, toolstone, and other upland resources (i.e., Rominger 1979). Between the forested uplands and valley floor are mountain-foothills covered with sagebrush (*Artemisia tridenta*), juniper (*Juniper communis*), and a variety of hardy forbs and grasses. This vast foothills country provides valuable graze and forage for a variety of native wildlife and domestic sheep and cattle herds today.

Southwest Montana has a Continental-type climate, with short, dry, mostly clear summers and long, cold, partly cloudy winters. The Pioneer Mountains bordering the Beaverhead Valley to the west create a minor rain-shadow effect, such that the region recieves about 2.3 cm of annual precipitation in the form of winter snow and spring rains. Average annual temperatures range from about 13° to 83° Farenheit, with spells of both subzero weather and summer temperatures above 90° Fahrenheit.

RECORDING METHODS

The Blacktail and Creasey Gulch archaeological sites are located on private and private/public (Bureau of Land Management, BLM) lands, respectively. Our collective, largely volunteer interest in better documenting these unique Indigenous hunting features in southwest Montana prompted this research rather than a specific agency, university or grant-supported project. Land ownership determined the nature and extent of our field investigations.

Following its intial site recording by one of authors in 2021 (Davis and Loge 2021), we documented the location of the Blacktail drift wall in June of 2022 using a DJI Inspire 1 Pro Unmanned Aerial System (UAS, aka "drone") equipped with a Zenmuse X5 camera flown by author Strait, a Part 107-licensed UAS operator. The UAS enabled us to record this extensive feature on private land more efficiently than with

conventional survey equipment.

The UAS took a series of geo-tagged images utilizing a manual grid pattern at an elevation of 350-feet (106.7 m) above ground surface (AGS) from a nearby launch location. Imagery was captured through a neutral density (ND) filter at 5-second intervals at low flight speeds of 7 to 10 miles per hour in order reduce imagery "artifacts" caused by camera roll (the shift of the drone from its nose to its tail). The UAS also captured video imagery of the larger landscape surrounding the Blacktail site's drift wall. Google Earth also clearly shows the rock wall, but with less resolution.

Agisoft Metashape and Pix4D software were then used to combine the images into a geo-referenced single orthomosaic image. Using the process of photogrammetry, the aforementioned software then produced a digital elevation model (DEM) of the terrain and archaeological feature within spatial accuracy of one-half meter, and an image resolution of 1.9 GSM (ground surface measurement-cm/pixel).

In addition to providing a scaled, aerial view of the rock wall, the DEM displayed as an elevation "heat map," which helped us identify surface features, particularly primitive roads, game and livestock trails, and historic/recent disturbances that were not easily observed on foot in the rough, rocky terrain.

Two of the authors (Fisher, Gilbert) first recorded the Creasey Gulch drift wall site in 2009 and collected a juniper branch for radiocarbon dating (Gilbert 2009). We visited the site in 2022, but without landowner permission we were unwilling to similarly document the Creasey Gulch site with an aerial drone. However, the descending rock wall on BLM lands is visible on aerial photos and Google Earth, from which we were able to document its specific location, length, and configuration, augmenting our own on-the-ground recording of this feature and the entire rock wall complex on both private and BLM property with measuring devices and GPS instruments.

SITE DESCRIPTIONS

The Blacktail archaeological site (24BE2572) in Beaverhead County is located about 66.5 km south of the Creasey Gulch archaeological site (24MA2256) in Madison County (Figure 1) in the general vicinity of Dillon, Montana. Both cultural resource sites are located near the valley floor in mountain-foothills settings, as described in detail below.

BLACKTAIL SITE

The Blacktail site (24BE2572) is located on private land in the dry, rolling foothills at the southeastern end of Ruby Range and on the north side of Blacktail Deer Creek (Figure 2).

Figure 2. Aerial view of the Blacktail drift wall site. The dark dashed line shows the wall's location above the northeast branch of Cabin Creek. The wall terminates in the creek bottom.

Figure 3. View of the northwest portion of the Blacktail drift wall located mid-slope above Cabin Creek. Note that the wall is "tied" together by rock outcrops.

The rock wall is located midslope above the northwest branch of Cabin Creek at 1780 msl. The Cabin Creek drainage is narrow, steep-sided, rocky and nearly treeless. The surrounding terrain is relatively flat, open, and covered with juniper, sagebrush, grasses and forbs.

Beginning at the juncture of the two branches of Cabin Creek, the Blacktail drift wall extends for about 300 m in a southwest to northeast orientation, eventually angling downslope and terminating in the narrow creek bottom (Figure 3). As it wends its way along the sideslope above Cabin Creek, various rock outcrops "tie" the wall together, thus forming a nearly continuous natural and human-built barrier.

The picturesque Blacktail rock wall averages 1 m in height and is between 30-50 cm in width. It is comprised of single and double courses of four to five tabular, gray to reddish-brown colored, lichen-mottled, rocks gathered from the abundant Archean-age quartz-feldspar-biotite geneis outcrops within the Cabin Creek drainage (Figures 4 and 5). The Archean formation's compositional banding has a distinct platy foliation that causes the rock to weather into tabular chunks and boulders that are highly suitable for uniform stacking and building (Steve Lubinski, personal communications, 2023).

There are 1-1.5 m-wide gaps in the wall in several places (Figure 6). These gaps may be explained as follows: the rock wall fell away in places after the rock wall ceased to be used for animal procurement; poles, brush or other perishable materials were once placed there; or the openings were intentional to allow animals to pass through to be ambushed by hunters lying in wait. The taller wall sections provide hiding cover for crouching hunters (Figure 7), but other wall sections seem too low to effectively conceal people.

A stacked rock drift wall or cairn drive lane is not present on the opposite (southeast) side of the creek bottom. Nor is there any surviving evidence of a barricade other than several small, low rock piles located near

Figure 4. Closeup of the Blacktail stacked stone wall with standing person for scale. The rock wall would be difficult to hide behind here, suggesting hunters were positioned elsewhere.

Figure 5. Detail of the four-to-five-courses of granite gneiss rock wall at the Blacktail site. Note that the lowest rocks are embedded in soil and vegetation, and all rocks are lichen-covered.

Figure 6. View of the Blacktail drift wall showing a meter-wide gap in photo center. The absence of a rock wall here suggests that this gap was deliberate, possibly allowing animals to pass through to be ambushed by hunters. The Blacktail Range is in the background.

Figure 7. Southwest section of the Blacktail wall showing its location above Cabin Creek. The person in photo center (indicated by the arrow) provides scale and shows how hunters could easily hide behind the rock wall, rock outcrops and vegetation.

the intersection of the northern and southern branches of Cabin Creek. The DEM "heat map" previously described in the Recording Methods section revealed an historic/modern primitive road emerging from the bottom of the draw just beyond the southwestern terminus of the wall. Otherwise, no other historic features or disturbances other than game and livestock trails stood out during our aerial and on-the-ground inspections.

An intact animal bone bed is not present at the wall's northeastern terminus nor is whole or fragmentary animal bone dispersed throughout the bottom of Cabin Creek. Notably, neither the current ranch owner nor her father ever recalled seeing bison or other animal bones and skulls anywhere in the drainage. A bone bed associated with the kill site possibly eroded away long ago from the steady flow or spring run-off of Cabin Creek or during uncommonly intense summer storms. However, the complete absence of animal remains in the draw bottom suggests that an extensive bone bed was never present here.

A lithic scatter likely associated with an animal kill event is located on a bench just east and directly above the drainage and wall terminus. The observed evidence includes small, variously-colored chert and obsidian flakes and small pieces of animal bone. The bone could reflect game butchering or be the result of carnivore/raptor predation. Burnt bone, fire-cracked rock or related campsite refuse were not readily apparent. The deposit appears to be lightly buried, but subsurface testing has not been done here. The lithic scatter has been impacted by erosion, livestock grazing, fences, and primitive roads. If it is indeed directly associated with the rock wall, then the site may have served as a pre-hunt staging area, an ambush site, or butchering station.

Local collectors of Indigenous artifacts long considered the Blacktail site to be some kind of bison kill site. Burl Stephens, a well-known, now deceased Dillon collector (Davis et al. 2000), recovered 55 Late Plains Side-Notched (LPSN) points from the Blacktail site sometime during the 1960s-1970s (Figure 8). Beyond their general site location, however, the exact provenience of these projectile points within the overall site area is unknown, and they may have been found on the small bench containing the lithic scatter, in the draw bottom, aside the rock wall, at the wall terminus, or all of the above. We presume at least some of the points were collected from within the lithic scatter discussed above where, in fact, one of the authors (Davis) observed the basal fragment of an obsidian LPSN point associated with other lithics during the initial site recording. The Stephen's point collection, now on loan to the Beaverhead County Museum in Dillon, is described below.

The 55 LPSN points collected from the Blacktail site were produced on small flakes and preforms (Figure 8; Table 1). The majority (N=43) are made of obsidian. Six are made of basalt while the remaining six are made of yellow, red and tan chert-chalcedonies. Blade edges vary from straight to asymmetrical, with side-notching ranging from wide, shallow U- to narrow V-shapes. Bases range from straight to slightly concave. None are tri-notched, a technological trait often attributed to Shoshone groups (LPSN points were also made by Shoshonean flintknappers) (Davis et al. 2009). With the exception of two small points (Figure 8, e.g., Specimen 20), none exhibit the low, shallow notching characteristic of Avonlea-style points. The two Avonlea-like points may be a typological coincidence (LPSN points with low notches), isolated (and unrelated) finds, or actual Avonlea arrowpoints that were found and repurposed by later hunters using the Blacktail drift wall site. In any event, the LPSN points range widely in size because of the small size of the flakes used to make them and due to resharpening and

	Length	Width	Thickness	Neck Width	Weight (g)
Range	14.3 - 30.4	9.8 - 17.1	1.7 - 4.9	5.7 – 12.5	0.1 – 1.9
Mean	20.7	12.7	2.9	8.8	0.8
Median	21	12.8	3	8.8	0.8

*Measurements in millimeters on whole specimens only (N = 41).

*Table 1. Metric attributes of the Late Plains Side-notched arrow points collected by Burl Stephens at the Blacktail site.**

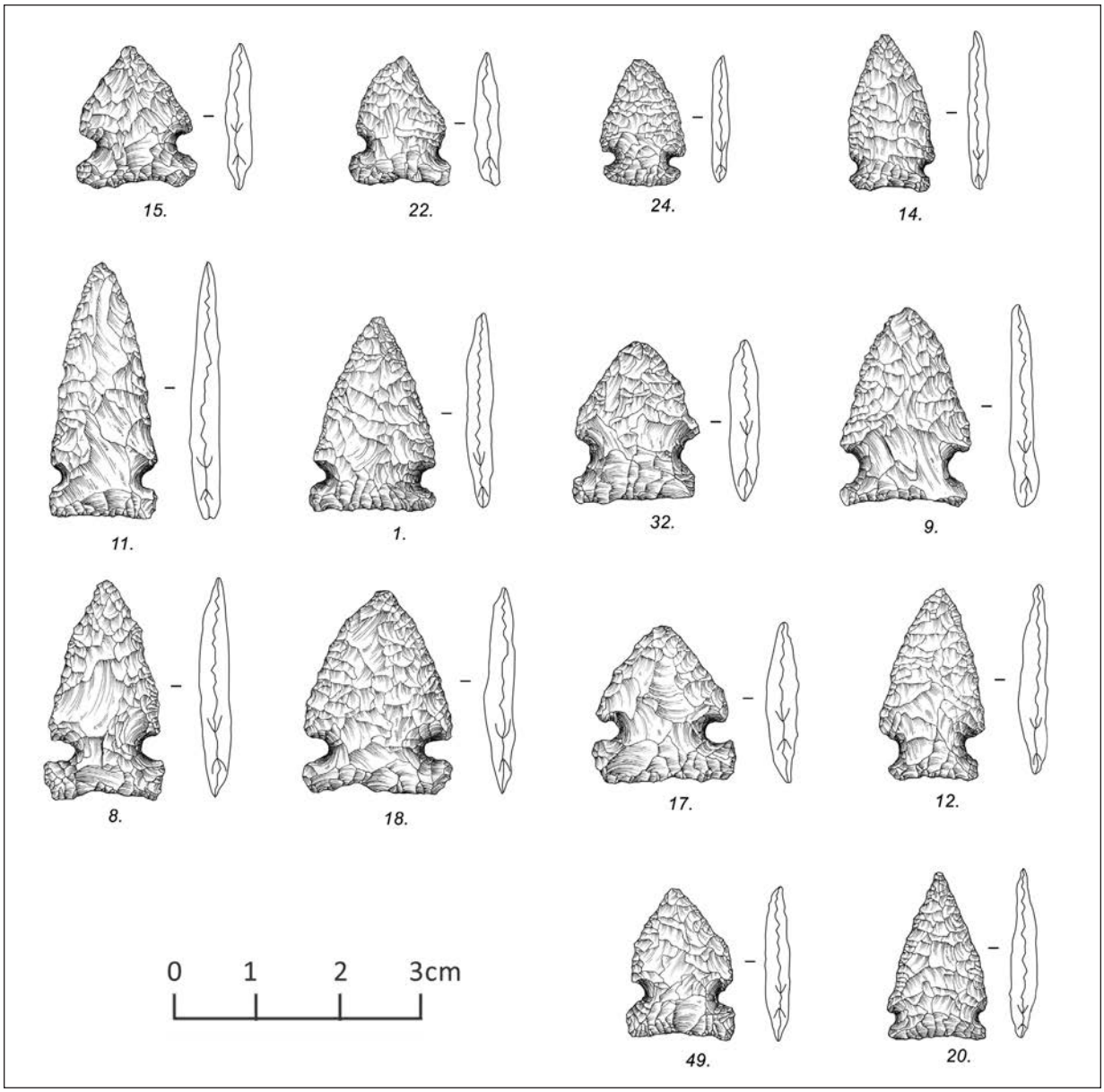

Figure 8. Representative Late Plains Side-notched points recovered by a relic collector from the Blacktail site. Note that some specimens (#15, 17, 22, 32, 49) are resharpened. An Avonlea-like arrowpoint is shown in the lower right (#20).

refurbishment. Their diverse size range is suggestive of conservation of lithic materials by Indigeous knappers and, possibly, their manufacture and use during the winter/early spring seasons when raw lithic material, particularly obsidian, was more difficult to obtain from mountain quarries.

Typologically, the Blacktail site LPSN arrowpoints would easily fit within any number of southwest Montana and Intermountain artifact collections, dating between approximately 1500 years ago to the historic period (e.g., Davis et al. 2005; Davis and Zier 1978; Holmer 1986). We cannot be absolutely certain that the point collection is directly associated with the Blacktail drift wall but if so, then the arrow points indicate a Late Precontact to Historic period time frame for its use by Indigenous groups.

Twelve projectile points randomly chosen for X-ray fluorescence (XRF) analysis were all manufactured from obsidian obtained from Bear Gulch, Idaho (Hughes 2023). The extensive quarry deposit is located in the Centennial Mountains straddling the Montana-Idaho border. The absence of volcanic glass from Obsidian Cliff in Yellowstone National Park and other Idaho and Wyoming sources (see Scheiber and Finley 2011:374, Fig. 1) is somewhat surprising based on XRF data from other local Late Precontact period sites (e.g., Davis et al. 2005). However, our sample size is small. In any case, located some 64 km southeast (as the crow flies) of the Blacktail site, the Bear Gulch obsidian quarries atop the Centennial Mountains were accessible to Indigenous hunter-gatherers during snow-free times of the year.

CREASEY GULCH

The Creasey Gulch site (24MA2256) lies at the base of Block Mountain near "The Notch" on the Big Hole River, some 9.1 km east of the tiny community of Glen, Montana (Gilbert 2009) (Figure 9). Site elevation is 1554 msl. Paleozoic- and Cretaceous-age plunging anticlines and synclines create a stark, complex, erosion-prone topography of long, narrow, north-south ridge systems (Hyndman and Thomas 2020:137). The largely tree-barren ridgetops contain lateral faults that have created protruding, linear, limestone outcrops or low "walls." The intervening gulch bottoms contain dry washes, scattered junipers, and abundant little prickly pear cactus (*Opunta fragilis*).

The Creasey Creek wall is situated on one of these north-south ridge systems. As part of the Kootenai formation, the ridge's eastern

Figure 9. Aerial photo of the L-shaped Creasey Gulch drift wall indicated by a dark dashed line. The short segment descends downslope while the longer segment comprised of at least 9 rock wall features extends along the ridge above Creasey Gulch.

Figure 10. View to southwest of descending wall at Creasey Gulch. The wall terminates several hundred meters above the bottom of Creasey Gulch. There is no evidence of a fence extension here, nor of any other historic or modern-day activity.

aspect is replete with substantial rock outcrops and cliffs, plus sizeable (ca. 2 by 3 m) boulders and smaller cobbles of mudstone, siltstone, limestone and sandstone (Steve Lubinski, personal communications, 2023). Thus, similar to the Blacktail site, stone was readily available on-site for collecting and dry-stacking by Indigenous people. The eastern slope below the ridge facing into Creasey Gulch is relatively short, but is steep, very rocky, and unstable. The ridge's west-facing slope is far more gentle and less rocky, allowing for easier access to the ridge crest for game, livestock and people.

The most prominent feature of the Creasey Gulch site is a continous rock wall descending east from the top of the narrow ridge to near the bottom of Creasey Gulch (Figure 10). Located solely on BLM lands, the wall covers a downslope distance of some 93 m. Built of tabular and angular cobbles, the wall averages one-meter in height and is about .50 m wide (Figure 11). The wall is tied into natural rock outcrops and huge boulders in various places, particularly near the ridge crest and cliffs where they are the most prominent. The descending rock wall is visible from the primitive BLM road extending up Creasey Gulch and could easily be mistaken for a property boundary marker,

Figure 12. Closeup of Creasey Gulch descending rock wall showing the careful stacking of rocks to increase wall height.

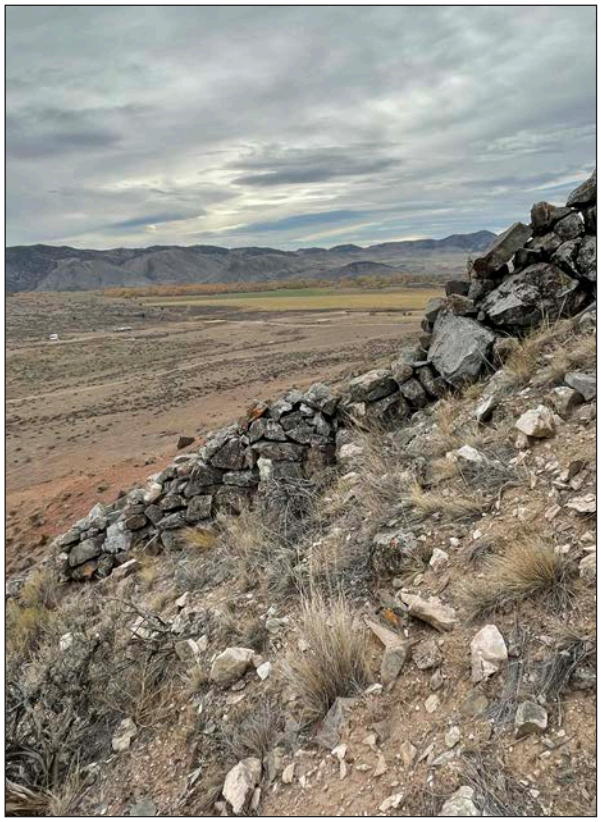

Figure 11. Closeup of the rock wall descending into Creasey Gulch. The wall is comprised of 4-5 tiers of stacked rock obtained from the abundant rock outcrops on the steep slope.

partial fenceline, or some other historic feature—an issue we consider further below.

In contrast to the neatly stacked wall at the Blacktail site, the descending rock wall at Creasey Gulch comprises five to six courses of roughly piled rock ranging from several meters to less than 50 cm in size. Because the wall is built on a steep slope, however, many rocks are intricately stacked and balanced to create level surfaces for additional rock layers (Figure 12). Thus, despite its rather haphazard appearance, the descending wall was built with some thought and care. Two small sections of the descending wall are partly collapsed, creating gaps between 70 cm and 1 m wide. These are not deliberate openings since wall rock is clearly spilling downhill.

The ridge above Creasey Gulch is difficult to access because of its unstable east-facing

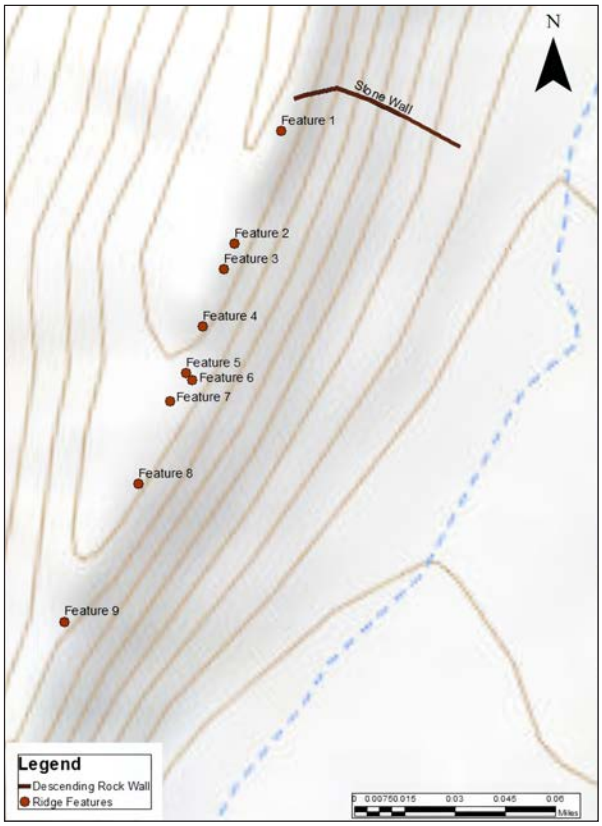

Figure 13. Topographic map showing the nine rock wall features located atop the ridge overlooking Creasey Gulch. The dash line denotes the dry wash in Creasey Gulch.

Figure 14. Feature 1 on the ridge top at Creasey Gulch. This is one of four small-sized walls that appear to have closed off easier access points to the ridge top.

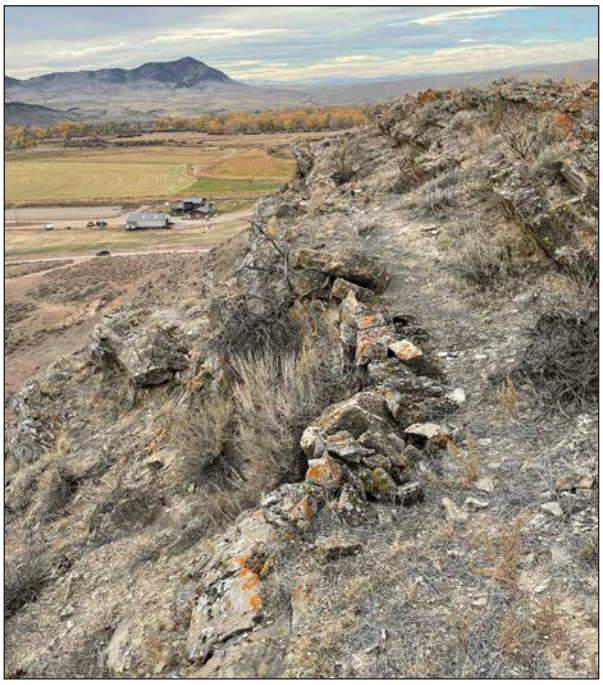

Figure 15. Feature 5 on the ridge top at Creasey Gulch. This is one of five longer wall sections built atop and just below the ridge crest overlooking Creasey Gulch.

slope and substantial, discontinous, vertical rock outcrops or "cliff face." Nonetheless, over a distance of some 283 m, beginning at the ridgeline's nexus with the descending wall southward onto private lands, rocks are stacked in nine different places parallel with and slighly below the ridge crest (Figure 13). These constructed features range from small, low piles, 1 m or less in length (Features 1-3; Figure 14) to more substantial walls, stacked some two to five stones high, that cover distances varying from 6 to 30 m (Features 4-9; Figure 15). Additionally, there are other places where similar features probably existed (as suggested by a few pieces of stacked rock) but they have mostly washed downslope. The stacked rock features appear to have been deliberately built as barriers blocking

Figure 16. Feature 6 showing juniper branch embedded in the rock wall feature at the Creasey Gulch site. The pole may have further braced or helped disguise the rock wall feature.

Figure 17. View north of Feature 9 showing rock wall and possible hunting blind at the Creasey Gulch site, with a person for scale. The feature lies next to a gap in the cliffs and rock wall where animals may have passed through and were ambushed by hunters.

easier access points through the rocky cliffs and onto the ridgetop for game animals.

In several places, juniper branches were placed horizontally across a rock wall feature, apparently to augment, if not to help disguise, the rock barriers. For example, a juniper branch is wedged beneath a large rock in Feature 6 (Figure 16). Another juniper branch near Feature 3 was removed in 2009 for AMS radiocarbon dating, as discussed further below.

Feature 9, the furthest south along the ridge crest, is unique (Figure 17). It is comprised of 1 to 2 courses of stacked rock, and follows the ridgeline north-south for 45 m. The wall averages about

Figure 18. View north of the north/south oriented limestone "walls" atop the ridge above Creasey Gulch. The .5 m tall outcrops would have provided effective hiding and maneuvering cover for hunters watching animals move upslope toward the ridgetop.

70 cm in height. A 3.47 m-wide wall then extends eastward (downhill) from the ridgeline wall, forming an L-shaped configuration. It is composed of one and two layers of rock and stands about 75-cm in height. There is enough space on the north side of the wall to stand or crouch behind. Feature 9 is located immediately next to a gap in the cliff face, suggesting it may have functioned both as a barrier and ambush "pit" for Indigenous archers as game animals sought passage (or escape) to the ridge top. In fact, one of the authors (Davis) fortuitously observed this bighorn sheep behavior precisely at this spot, as described later in this paper.

Besides the rocky cliffs and human-built rock barricades, the ridge crest contains extensive, protruding limestone outcrops that create natural, linear "walls" directly overlooking Creasey Gulch to the east (Figure 18). Ranging from ca. 70 cm to a little over 1 m in height, these limestone outcrops would have served as barriers to animal travel but were equally suited as hiding cover and ambush spots for Indigenous hunters.

Absent chronological control, we cannot be absolutely sure that the various human-constructed rock wall features at Creasey Gulch are coeval in age or function. However, the extant archaeological evidence seems compelling enough for us to propose that the descending rock wall, cliff face, stacked rock features atop the ridge, and the natural rock walls did, in fact, form a natural and human-constructed hunting complex used by Indigenous hunters. It seems likely that the rock walls in this L-shaped configuration were variously modified and repaired by Indigenous groups over time, so that what we see today represents its final episode of use.

Like the Blacktail site, no faunal material is directly associated with the walls nor is it found in the general vicinity within Creasey Gulch. To date, only a single aboriginal artifact—an obsidian biface fragment identified near Feature 3 on

ID	Type	Process	F Modern	Fm Err	Age BP	Age Err	13C
OS-88529	Plant/Wood	Carbon	0.98	0.0032	160	25	-25.42

Table 2. AMS radiocarbon date on the juniper branch embedded in the Creasey Gulch rock wall provided by the NOAA National Ocean Service.

the ridge—has been located at Creasey Gulch. Lithic artifacts were not observed aside the descending, ridgetop and natural rock walls. It is possible that projectile points and other Indigenous artifacts were collected from this easily accessible archaeological site in the past, but so far our inquiries with local ranchers have yielded little information.

The 2 m long juniper (*Juniperus communis*) branch embedded between rocks in Feature 3 yielded an uncalibrated AMS date of 160 ± 25 years before present (NOAA National Ocean Service, OS-88529) (Table 2). Because of the AMS sample's recent radiocarbon age, calibration is problematic. With this caveat in mind, the OxCal v.4.4. online calibration program (Bronk Ramsey 2023) produced dates at the 95.4% probability level varying from A.D. 1665 to A.D. 1907, with the A.D. 1721 to A.D. 1785 age bracket having the highest statistical probability (33.7%) among the calibrated date ranges.

Whatever its precise age, the wood branch appears to reflect use of the Creasey Gulch hunting site during the 18th and 19th centuries when the Shoshone, Salish, Blackfeet and other Indigenous groups occupied or journeyed to southwest Montana. This recent date could also represent a final use episode, with the wall having greater overall antiquity, as previously noted. Less likely given its seemingly careful placement, the juniper branch could simply be a remnant of a decayed juniper tree.

EUROAMERICAN OR INDIGENOUS?

Southwest Montana has been the scene of Euromerican activity since the early 1800s. In this light, and given the proximity of the Blacktail and Creasey Gulch sites to modern ranching operations, we first considered whether the stacked rock walls were historic or modern, and thus are associated with homesteading, ranching, mining or other recent enterprises. We present below various lines of reasoning to support our interpretation that these rock walls were created and used by Indigenous people.

We first consulted Government Land Office (GLO) survey maps and BLM mineral records to identify the rock wall and any associated historic features such as boundary markers, mining claims or homestead entries. At the Blacktail site, GLO surveys in 1870 and 1923 do not show the rock wall or any other human-made features in the legal section containing the rock wall site. However, homestead records do show patents belonging to Ernest Dubie and John O'Malley. The absence of demarcated structures, access roads and fences on the 1923 GLO survey map suggests that Dubie and O'Malley invested minimally in their properties. Thus, an obscure stacked rock wall above a small drainage is unlikely to have caught the attention of GLO surveyors. John A. Conover eventually bought the Dubie and O'Malley places on Blacktail Deer Creek, and located ranch headquarters just northeast of Cabin Creek (Conover and Nye 1997:278).

Similarly, GLO surveys for 1872, 1918 and 1939 do not depict any human-made feature, including a rock wall, in lower Creasey Gulch. Charles and Emily Buhrer (Beehrer) patented Section 33 in 1889 and raised horses and cattle in Creasey Gulch. Aerial imagery from 1953

Figure 19. One of several pieces of smooth wire wrapped around rocks at the Blacktail site. The wire is likely the result of repurposing to support a fence post rather than reflecting a historic or modern origin and function for the rock wall.

shows the descending rock wall but there is no evidence of a fence of any kind extending from it eastward into the bottom of Creasey Gulch. Moreover, GLO survey maps and mineral records do not identify prospect pits, claim markers or other mining evidence in the vicinity of the rock walls in Creasey Gulch.

The Creasey Gulch rock wall lies north of the BLM and private property line, so it clearly did not function as a private/public lands boundary marker. The Blacktail wall lies solely on private ranch property negating this boundary demarcation concern. Neither current landowner had any specific knowledge of the rock wall features. One elderly family member living on a nearby ranch casually suggested that the wall in Creasey Gulch might be a homestead feature or land boundary. The other land owner has always regarded the Blacktail site as some kind of Native American site based on information passed down by her father, other family members, and local artifact collectors.

During our field inspections at both sites, we found very little associated historic cultural material. The exceptions are several isolated pieces of single-strand wire near the rock wall at Creasey Gulch and single strand of metal wire wrapped around a large rock at the Blacktail site. (Figure 19). These few bits of wire suggest to us that the several wall sections were repurposed by homesteaders or ranchers in some minor way, perhaps to support a fence post on rocky ground. Otherwise, there is no evidence, such as deteriorated fence posts, barb wire, or staples to indicate that either wall served as part of a livestock fence. Nor do the walls appear to be mining-related since there is no nearby sign of mining activity within the general vicinity of

either wall. Finally, the relatively low rock walls are quite different from the tall, single, carefully stacked rock monuments typically built by sheepherders in the late 19th and 20th centuries.

The bottom-most rocks in the walls at both sites are embedded in soil and vegetation. Orange, green and grey lichens are also present on the exposed surfaces of many of the boulders and smaller rocks. This evidence indicates that the walls were in place long enough to accumulate soil and allow for lichen colonization and growth, acknowledging that the lichen was possibly present on some of the rocks when they were first collected by Indigenous groups. The rock cobbles also do not exhibit freshly scarred surfaces implying that they had been recently collected and stacked by homesteaders or ranchers.

Effectively "hidden in plain sight," both walls are substantial archaeological features that would not be easily impacted by ranching, mine exploration or other historic or modern activities. Absent historic debris and any obvious modern function, we thus infer that the rock walls are of Indigenous origin and likely date to the Late Precontact or Contact/Historic periods. Future lichenometric study, optically stimulated luminescence (OSL) dating of sediments beneath the rock walls, radiocarbon assays of associated juniper branches or other organic materials embedded among the stone, obsidian hydration dating of associated obsidian tools, and other instrumental dating methods may eventually give more precise chronological ages for both stacked wall hunting features.

CEREMONIAL OR HUNTING?

Some southwest Montana rock alignments clearly do not relate to hunting. Variously called "ceremonial" or "religous" sites by archaeologists, these stone features include isolated cairns, U- and circular-shaped fasting beds, and various geometric alignments. Many of these structures are located atop prominent landscape features--knolls, ridges, and mountain peaks—which provide significant landscape vistas. Such non-hunting stone features are documented in the Block Mountain area and surely exist in the Blacktail Deer Creek Valley as well.

At present, we do not know if the rock walls at Blacktail and Creasey Gulch sites served another cultural purpose beyond the hunting use we propose. At the Blacktail site, the wall is not prominently placed atop the ridge above Cabin Creek and affords a limited view of the surrounding landscape. The linear wall just below the ridge above Creasey Gulch does provide expansive vistas of the the Big Hole River Valley and Pioneer Range to the south and west, but the descending wall does not.

Based on comparisons with a large corpus of documented stone features across the Intermountain West, we believe that the Blacktail and Creasey Gulch rock walls are best interpreted as Indigenous big game hunting features. Given the substantial investment of time and energy in building these stone walls, it is possible that they also served some sort of secondary "ceremonial" or other cultural function, as tentatively suggested for similar rock wall sites in the Great Basin (Thomas and McKee 1974:13). However, such secondary, non-hunting uses are difficult to tease from the extant archaeological record at the Blacktail and Creasey Gulch sites. For this reason, we focus on their primary use as Indigneous communal hunting features.

EXTERNAL COMPARISONS

A wide range of stone- and timber-constructed alignments, blinds, and traps are part of the archaeological record of southwest Montana but few have been systematically investigated. A Montana State Historic Preservation Office (MT SHPO) records search did not identify any linear, stacked stone drift walls in this region

directly attributable to Indigenous hunting practices. It is possible that such aboriginal drift walls in the MT SHPO database are presently misidentified as historic features, including boundary markers, hard fencing, field stone clearing piles, and placer mining tailings (Damon Murdo, MT SHPO, personal communication, 2023).

Some southwest Montana stone cairn "drive lane" alignments identified in the MT SHPO database likely functioned as less obvious drift walls. For example, archaeological site 24BE1207 is located in the foothills east of the Red Rock River near Kidd, Montana. It consists of a linear series of low-lying rock cairns covering some 600 meters above Buck Creek. Quartzite cobble cairns are piled at intervals varying from three to ten meters. Too irregular to be part of a historic fenceline, the low cairns are tentatively interpreted by BLM archaeologists as forming a drive lane or ambush wall for hunting bison, mule deer or pronghorn.

Besides rock cairn alignments, animal traps are documented in the mountain ranges of northwest Wyoming and southwest Montana. These entrapment features comprise drive lanes/drift fences and holding or catch pens made of wood, stone, and earth (Eakin 2005; Frison 2004:143-168). The single known example in southwest Montana is the LaMarche game trap located in the Pioneer Mountains near Melrose (Keyser 1974). The facility was used to entrap and dispatch either bighorn sheep or mule deer, probably by Shoshonean hunters (Davis 2019:201-203; Loendorf and Stone 2006:137-145). So far, however, substantial, stacked rock walls are not yet identified as part of this fairly elaborate type of entrapment architecture.

On the Northwestern and Northern Plains, Indigenous groups built rock cairn drive lanes, pits and blinds, and circling pens out of stone and wood (Brink 2013; Brumley 1983; Frison 2004:121-142; Lubinski 1999; Rennie 2023). These stone cairns typically are not stacked very high and are frequently embedded in soil, leading investigators to suggest that the cairns were variously reinforced with piled brush, animal dung, poles, sagebrush rope, fabricated nets, hides, upright stone and stick decoys ("dead men"), and people. Abundant ethnographic and ethnohistorical evidence indicates that these structures were primarily used to hunt pronghorn by a variety of Plains Indian groups. Again, however, substantial, stacked rock drift fences appear not to be part of this V-wing and circling pen hunting architecture in the Plains and Intermountain regions.

Better analogs for the Blacktail and Creasey Gulch drift walls are found in the Southern Rocky Mountains of north-central Colorado. The Olson game drive feature is a complex system of rock cairns and stacked rock drift walls and blinds atop Rollins Pass and the Continental Divide (LaBelle and Pelton 2013:52, Fig. 5; Whittenburg 2017). The drift walls, totaling some 1307 m in length, range from propped-up rocks (called "leaning slabs"), to low single-tier aligments, to substantial, over 1 m tall rock walls. Significantly, the tallest walls are located near intercept or ambush points within the overall animal drive wall system. The Olson site yielded a variety of chipped and ground stone tools, and bone fragments identified as bighorn sheep. The Olson, Murray and other alpine hunting sites in the Colorado Rockies were built and rebuilt over many centuries, as suggested by their apparent upkeep and maintenance, various projectile point styles, and licheometric and radiocabon dates (e.g., Benedict 1992).

Similar game drive complexes are found across the Great Basin (Delcorte 1985; Hockett et al. 2013; Lubinski 1999; McGuire and Hatoff 1991; Parr 1989; Schneider et al. 2014). Two aboriginal rock alignment sites in central

Nevada compare very closely to the Blacktail and Creasey Gulch rock walls.

The Bob Scott Summit site (26LA601) in Lander County is composed of an eastern and western stone drift wall. The eastern wall extends for about 100 m from a ravine bottom, up a moderately-steep, sage-covered slope, and terminates just below the rocky ridge crest (Thomas and McKee 1974). The west drift wall begins in a ravine bottom opposite the east wall, and terminates about half-way to the ridge top. Both walls range from .50 to 1 m in height. Recovered projectile points suggest the site was used between 3,000 and 1,500 years ago. Absent faunal evidence, investigators conservatively posited that "More than likely, deer were ocassionally hunted, pronghorn were sometimes stampeded by the walls, and perhaps even a few mountain sheep were killed at the site" (Thomas and McKee 1974:15).

The Fort Sage Drift Fence (26WA3030) in Washoe County comprises five separate rock alignments extending across three low, sage- and juniper-covered hills and three drainages (Pendelton and Thomas 1983). The standing rock drift walls range from 20 to 80 cm in height and span a cumulative distance of 1800 m (Pendelton and Thomas 1983:7-9; Fig. 2). Three of the curving walls extend across the canyon plateau and rim, while two other wall wings (Walls II, III) run downslope and terminate on the canyon floor. The investigators documented ten gaps in the walls that they infer functioned as ambush points, although it is unknown if the animals passed through the wall gaps in the course of foraging or if they were hazed there by game drivers and dogs.

Bone beds and other faunal debris were not found directly associated with the drift walls at the Bob Scott Summit and Fort Sage sites. Various lithic scatter loci nearby the Fort Sage rock walls contained projectile points, bifaces, debitage, and other stone tools. The preponderance of collected projectile points pre-date A.D. 1300, suggesting to the investigators that permanent hunting facilities became less important to Indigenous Great Basin hunter-gatherers late in prehistory, possibly due to the increased efficiency of the bow and arrow, depletion of animal herds, or other unknown factors.

The investigators thought it unlikely that mule deer were the main prey at Fort Sage because of their general scarcity in the arid terrain of central Nevada. They therefore tenatatively concluded that pronghorn were the primary target, but they also acknowledged that bighorn sheep were possibly harvested during the winter using the same hunting architecture.

While Nevada is a long way from both Creasey Gulch and the Blacktail Deer Creek Valley, it is important to note that southwest Montana lies adjacent to the Northern Great Basin and Columbia Plateau of eastern Idaho. Shoshonean (Numic) peoples migrating from the Great Basin into the Intermountain region sometime in the distant past no doubt brought with them various communal hunting methods involving hunting architecture (Loendorf and Stone 2006:11-34; see also Madsen and Rhode 1994). Other Indigenous groups who historically inhabited or visited southwest Montana such as the Salish, Blackfeet and Nez Perce also built and used various kinds of constructed hunting features (e.g., Cross 1997). Thus, the ethnic group(s) who constructed and used these two rock drift wall sites in southwest Montana is currently unknown.

ENCOUNTER AND INTERCEPT HUNTING STRATEGIES

We briefly discuss encounter and intercept Indigenous hunting strategies, as originally defined by Binford (1978) and used widely by other archaeologists (e.g., Rasic 2011:154, Table

8.9), since they pertain to our quest to identify the potential range of targeted ungulate species and hunting strategies at the Blacktail and Creasey Gulch sites.

In encounter hunting, prey species are solitary or dispersed across a variety of topographic settings, typically during the summer and fall seasons. Individual hunters or small groups trailed and stalked specific big game animals, with limited advance planning or investment in hunting architecture—blinds, pits and so forth. Kills were made both near and far from base camps. The typically low harvest (a few animals) resulted in little surviving archaeological evidence—a broken stone projectile point, an exhausted butchering knife fragment, or a few flakes, which archaeologists often characterize as "isolated finds."

In contrast, intercept hunting required topographic features (such as arroyos, streambeds, precipices and talus slopes) or constructed containment or entrapment architecture, or both. Both took time and keen knowledge of the land, wind patterns, and animal movements to identify and/or construct. The targeted game animals were frequently aggregated on winter range. Thus, they were more easily hazed by hunters and dogs, often with the help of "game charmers" (shamans, ritual specialists), toward the intended topographic or constructed feature in a planned and coordinated effort. Intercept hunting resulted in larger game mortality (when successful) and thus left a far more visible archeological footprint—wood and stone features, stone tools, and butchering debris. Base camps were frequently located nearby, where men and women butchered and processed the freshly procured game.

Using this simple dichotomy, the Blacktail and Creasey Gulch drift walls best fit the model of an intercept hunting strategy. Specifically, the targeted prey inhabiting the rolling foothills and floodplains of the Blacktail Deer Creek and Big Hole River valleys were ambushed by hunters hiding behind the stone walls. Whether the animals were ambushed during the course of foraging below the stacked rock walls or were gradually hazed there is unknown. In either case, Indigenous archers likely creeped up to the rock walls from beyond the ridge beforehand; hid themselves behind the human-constructed and natural walls (at Creasey Gulch), and then fired arrows into the game animals as they passed by the wall or through the wall gaps, or both.

PREY SPECIES

We have as yet no direct faunal evidence to identify the ungulate species hunted at the Blacktail and Creasey Gulch archaeological sites. Therefore, we must circumstantially infer the targeted game using various strands of ethological, enthnographic and archaeological evidence.

We first argue that bison (*Bison bison*) were probably not the intended prey at either site. Throughout prehistory, bison herds were certainly present in the Blacktail Deer Creek and Big Hole River valleys, as evidenced by a plentitude of bison jumps and campsites containing bison bone (e.g., Davis et al. 2005). In this context, the Blacktail site possibly functioned as an arroyo-type trap, with hunters ambushing hazed bison from behind the stone wall as they stampeded up the draw bottom--an idea long perpetuated by local artifact collectors.

To us, however, the Blacktail site's use in bison hunting is negated by the total absence of a bison bonebed below the rock wall and at its terminus, combined with the similar absence of butchered bone fragments or skulls in the bottom of Cabin Creek or anywhere nearby. In our collective experience, there is usually *some* evidence of a successful mass bison kill event

at even the most disturbed sites. Further, the land owners did not recall ever seeing bison skulls or butchered bone within the drainage bottom or on the alluvial plain at the canyon's mouth--an observation corroborated by our own searches along the bottom of Cabin Creek. Finally, except for a few small cairns, there is no drive lane or drift wall to prevent bison from easily escaping out of the draw to the east, acknowleging that a long-perished, temporary barricade could have been used.

It is equally hard to envison how the L-shaped, ridgetop and downslope configuration of the Creasy Gulch rock walls would function in bison procurement, either as a jump or some sort of impoundment. Bison could have been ambushed as they were herded into or by the descending rock wall in Creasey Gulch, but it is unlikely they would run up the very steep, unstable slope toward the ridgetop wall. Here also is the complete absence of bison bone.

Similarly, jackrabbits (*Lepus californicus*) and cottontail rabbits (*Sylvilagus audubonii*) were communally hunted by Indigenous peoples throughout the Intermountain West (Rood 2018; Steward 1943:267-268). Such hunts typically involved long, woven-fiber nets and snares into which the rabbits were driven by "beaters" and then dispatched with clubs and arrows by men, women and children. There is little ethnographic or archaeological evidence to suggest that rabbits were ever driven into solid or permanent containment structures. We thus conclude that both rock walls functioned in the procurement of animal species other than rabbit or bison.

WILDLIFE HABITAT AND WINTER RANGE

To help us resolve the intended quarry issue, we first consulted BLM/Montana Fish, Wildlife and Parks winter habitat GIS layers for the Blacktail and Creasey Gulch site areas. The maps focus on the current distribution of available wildlife habitat, so they must be used with caution when extrapolating environmental conditions in the past.

Today, the Blacktail Deer Creek Valley qualifies as pronghorn winter range. The rolling foothills of the Ruby Range east of the site also provide mule deer and elk winter habitat, as well as summer range. As currently mapped, Bighorn sheep summer and winter range is not found anywhere near the Blacktail drift wall site, although the present landowner has observed bighorn sheep there.

In contrast, the steep, rocky ridges and open, narrow valleys below McCartney and Block mountains, including Creasey Gulch, are pronghorn and bighorn sheep winter range. Elk and mule deer winter range lies to the north in the foothills and windswept mountains where there is sufficient hiding and thermal cover, although mule deer are now well-adapted to the grass and browse on the now-cultivated Big Hole River floodplain and surrounding foothills during all times of the year.

ANIMAL ETHOLOGY, ETHNOGRAPHY AND ARCHAEOLOGY

Three, and possibly four, game animals are the most likely ungulate (artidactyl) quarry at the Blacktail and Creasey Gulch sites: mule deer, pronghorn, bighorn sheep, and elk. Our effort to identify the specific prey rests on the premise that each rock wall was strategically situated in a landscape setting that enabled hunters to take advantage of the animals' basic adaptations, instincts and behavior. Thus, rock walls were located in an environmental setting that the prey species either: 1) selected preferentially for feeding, resting, birthing, mineral (salt) licking, and other normal activities; or 2) selected preferentially for escape purposes when threatened by a predator. Related to 2) above, each of the species in question has a unique

anti-predator strategy. Specifically, "The pronghorn copes with its enemies through sight and flight. Habitat with low-growing vegetation—less than 24 inches (63.5 cm) in height—and undulating landscapes provide optimal physiographic conditions for such behavior. These habitat characteristics differ markedly from those of other North American wild ungulates. Deer, for example, generally seek dense shrubs and trees to hide from enemies. Wild sheep and goats seek rocky cliffs and steep, precarious terrain for security cover" (Yoakum 2004:409). With these premises in mind, we describe below the preferred habitat, inate biological behaviors (ethology), and anti-predator strategies of the following big game species.

Rocky Mountain mule deer (*Odocoileus hemionus)* are found in nearly every vegetative ecosystem in the Intermountain West, including urban neighborhoods today (Mackie et al. 1998). "Within the numerous and diverse habitats used by mule deer, they generally prefer terrain that is steep, broken, and rough…Their stronghold may be mountain-foothills habitat…along the Rocky Mountains and other mountain ranges" (Mackie et al. 2003:895).

Mule deer typically migrate to higher elevations during the summer months and return to the lowlands during the winter where there is sufficient herbaceous forage, water, and thermal cover. Bucks are solitary or form small bachelor herds while does and fawns congregate into larger nursery or maternal herds for most of the year. During mid-winter through early spring, mule deer sometimes congregate into large groups that can number up to several hundred animals, although such groups generally do not endure (Mackie et al. 2003). Mule deer have small home ranges and they "are very traditional in their patterns of seasonal habitat use" (Schmitt et al. 2017:46).

Mule deer were hunted by Indigenous peoples during all seasons of the year using both encounter and intercept hunting strategies (Frison 2004:169-176). Julian Steward (1943:359) mentions the use of small V-wing drive lanes and small, concealed pit traps to hunt deer by Shoshonean groups, as originally hypothesized for the LaMarche game trap (Keyser 1974). V-wing, timber-constructed hunting features used for mule deer hunting are also documented in the Great Basin of Nevada (Nadel et al. 2020). Indigenous peoples of the Columbia Plateau such as Okanagan used perishable fencing and nets in deer hunting (Teit 1930).

However, because of their generally solitary behavior, encounter hunting along migrations routes or trails in talus pits or other hidden locations was probably more common than intercept hunting using elaborate hunting architecture. It is also not clear if a stone wall having a maximum height of about a meter would pose much of a barrier to mule deer, who evade predators by jumping over rocks and other obstacles using a distinctive, stiff-legged "stotting" leap (Schmitt et al. 2017:46).

In contrast, encounter deer hunting is well documented in the ethnographic literature of the Great Basin and Northwestern Plains. For example, Julian Steward (1938:36) states: "Occurring thus in the low altitudes of mountains and limited to small bands, deer were taken by lone hunters or small groups of men. As the country is less heavily covered with brush than the west coast, snares and ambushes on deer trails was of minor importance. Most hunting was by individual men who stalked and pursued animals, shooting them with poisoned arrows."

American pronghorn (*Antilocapra americana)* Biologists estimate that pronghorn numbered in the many millions prior to the Euromerican settlement of the American West (Buck 1947;

McCabe et al. 2010). By the turn of the 20th Century, their population numbers were catastrophically depleted like many other Western game species from over-hunting and wanton slaughter, disease, and development (i.e., Flores 2022:185-220).

Pronghorns exhibit "many adaptations for living in open grassland. Pronghorn prefer open country with unrestricted directions of travel and lines of sight" (Byers 2003; see also Kitchen 1974:3). They occur most frequently in open terrain, undulating or flat, that does not exceed a ten percent grade (Yoakum 2004:416). They can also be found in foothills, mountain valleys, and plateaus. Pronghorn stay away from cliffs, steep terrain, and dense woody vegetation (Yoakum 2004). They are the fastest land-mammal of North America, with running speed approaching 100 km per hour, and have legendary endurance (Byers 1997:12; Kitchen 1974:19). Pronghorn also are known for their pervasive curiosity and propensity to avoid obstacles like barbwire fences, preferring to go around (or crawl under) rather than jump over them (Byers 1997, 2003).

Primarily browsers, pronghorn feed on sagebrush, grasses, and sedges widely available in plains, mountain-foothills, and basin settings. They seasonally migrate between summer and winter range, and become habituated to the available resources (forage, water, salt licks) within both. Adult males form harems during the autumn mating season and females produce offspring—typically one or two fawns—from late May through June. During the winter, pronghorn congregate into larger herds composed of both sexes. At other times of the year, they break up into small social groups (Kitchen 1974:47).

The ethnographic and ethnohistorical literature indicates that Indigenous groups strongly relied on pronghorn as a food and raw materials source. Pronghorns were stalked; pursued on foot or horse until they were run down and exhausted; driven into natural features (arroyos, snowbanks); or lured into constructed corrals or pounds made of rock, timber, and brush (Frison 2004:128-142). "Pronghorn charmers" (shamans, ritual specialists) often helped to lure pronghorn toward awaiting hunters, and a variety of pre- and post-hunt rituals were associated with pronghorn procurement among a wide range of North American Indigenous groups (e.g., Grinnell 1972:V.1.277-290). As documented by Steward (1938:34-35): "Communal (antelope) drives were among the few economic activities not restricted to family groups. As the animals are wary and fleet of foot, they were taken with considerable difficulty by lone hunters. Large groups of Indians on foot, however, could manage to drive them into a corral. Throughout most of Shoshonean territory, drives were managed by a shaman who received special supernatural power in a vision to charm antelope."

The archaeological evidence for communal pronghorn hunting is plentiful on the Northwestern Plains and in the Great Basin both as actual surround kill sites and occupation sites replete with processed pronghorn bone (Davis et al. 2000; Frison 1971; Hockett and Murphy 2009; Lubinski 1999, 2000; Miller et al. 1999). Pronghorns were hazed using V-wings or along drift fences, sometimes over great distances, into semi- to fully-circular corrals made of brush, sagebrush rope, poles, decoys or "dead men," and people. Once barricaded inside, and taking advantage of pronghorns' proclivity to run in a circle, pronghorn were run to exhaustion and easily dispatched with darts, arrows, and clubs (Brink 2013; Brumley 1983; McCabe et al. 2010: 21-27, Table II; Steward 1943:219-220).

Rocky Mountain bighorn sheep (*Ovis canadensis*) are another artiodactyl species potentially targeted by Indigenous hunters at the Blacktail

and Creasey Gulch sites. Over-hunting, livestock grazing, and diseases transmitted from modern sheep herds decimated bighorn sheep populations in the late 19th and early 20th centuries (George et al. 2008). Their low population numbers today belie both their former abundance and importance in Indigenous diet, material culture, and ideology (Cross 1997).

Bighorn sheep inhabit grassy mountain slopes, alpine meadows, and rocky cliffs in foothills country (Garrott et al. 2021; Geist 1971). Facilitated by a complex digestive system (which allow sheep to rechew food in craggy places safe from predators), Bighorn sheep feed on upland grasses and forbs during the summer and on woody shrubs in lower-elevation winter range and lambing grounds. Open, dry slopes are critical for winter survial because mountain sheep cannot easily walk or feed in deep snow. Places with a high forest or shrub canopy are avoided during all seasons.

Bighorn sheep are social creatures and can comprise herds of up to 100 animals (Krausman and Bower 2003). But they lead separate lives outside of the breeding season in bachelor (ram) groups and nursery/maternal herds composed of ewes and lambs. Loyal to their home territory, sheep seasonally migrate between summer and winter ranges, sometimes occupying intermediate ranges, especially by ewes and maternal herds. Bachelor herds form hierarchies to compete for ewes during the rut.

Signficantly, when bighorn sheep travel, they typically follow single file behind the lead animal, whether it be ram or ewe (Geist 1971:95). Startled sheep will bunch up, then quickly reform into single file and head uphill to difficult to access cliffs or basins. Bighorn sheep are "superb jumpers and climbers in cliffs…" (Geist 1971:4), and they use cliffs and other steep terrain to escape predators. They are rarely far from such secure cover (Krausman and Bower 2003:1101) and "race for rocks when in danger" (Geist 1971:4).

Bighorn sheep hunting is well documented in the archaeological literature of the Intermountain West and Great Basin (Eakin 2005; Fisher et al. 2007; Frison 1978:246-258; McGuire and Hatoff 1991). These sources suggest that encounter hunting was more common during the summer months when sheep were dispersed on their summer range. Intercept hunting occurred at lower elevations during winter months when herd densities were highest, and herds themselves were most vulnerable. Intercept hunting also occurred during the summer months at higher elevations, as evidenced by an abundance of stone-constructed hunting facilities in the mountain plateaus of Colorado and the Great Basin (Labelle and Pelton 2013).

Rocky Mountain elk (*Cervus canadensis*) Elk can occupy diverse habitats but are habituated to coniferous forest and forest edge habitats. In warmer months, they seek higher elevations and return in large herds to lower elevation winter range, including agricultural fields today. Elk graze and browse on a wide variety of seasonally available grasses, sedges, forbs, deciduous shrubs, and young trees. Bulls hold harems during the rut in late September and October, and calves are born in late spring.

Elk are highly vigilant and react quickly to unidentified sights, sounds or smells (Livesay 1979). Herds first move away, then (usually) run uphill from perceived threats, typically bunching together and then following a lead cow toward hiding cover in thick timber. Moreover, their daily movements are less predictable than that of the other species considered here because elk have large home ranges within which they are less disposed to use defined trail systems (Schmitt et al. 2017).

Throughout the Intermountain West,

Indigenous peoples hunted elk using stalking and encounter strategies. Communal hunting is documented ethnographically (Anell 1969:71) and in Indigenous rock art (Keyser 2016:5, Figures 7 and 8). However, in light of their skittish behavior, hazing or herding elk into fairly elaborate entrapment facilities—such as along drift walls—would likely have been less predictable than for bighorn sheep, deer, or pronghorn. Also, the overall paucity of elk bone in Intermountain and Plains archaeological sites suggests that communal elk kills were less common than for other big game species (Frison 2004:171-186).

WHAT'S FOR DINNER?

Considering the environmental settings and animal habitats surrounding the Blacktail and Creasey Gulch sites, the rock walls could have been used to hunt bighorn sheep, elk, mule deer, and pronghorns. Both are constructed in foothills habitat where all four species would naturally travel and forage. Today, as these ungulate species move through landscapes with numerous fences, they seek out fence breaks and use them routinely, only going over or under fences when spooked or threatened (Bob Garrott, personal communications, 2023). Thus, the gaps in the rock walls at both sites could have facilitated intercept hunting for any of these various big game species.

Based on the previously described animal behavior and the archeological record, however, we believe that pronghorn and bighorn sheep, or both, were most likely the intended prey of Indigenous hunters at the Blacktail and Creasey Gulch sites. The rock drift walls played into pronghorns' behavioral inclination to skirt around fences or go through gaps in fences and other barricades as opposed to jumping over them as white-tailed deer and mule deer easily do. However, the preference of pronghorn for open terrain with broad views, especially when threatened by predators, casts some doubt on the Indigenous use of the rock walls other than in casual encounter hunting (i.e., taking advantage of pronghorns foraging near the walls).

The strategic location of both stone drift fences took advantage of the behavioral tendency of bighorn sheep when threatened to bunch up, then follow leaders to higher, rockier ground. Thus, bighorn sheep foraging along the ridge slope, or if they were gently hazed and lured there by hunters and ritual specialists, would have sought escape by ambling to the ridge top and through the wall gaps at Creasey Gulch. In fact, one of the authors (Davis) and a companion observed that behavior during a December afternoon site visit. A bighorn sheep ram ambled across the snowy bottom of Creasey Gulch (in front of our parked pickup), ascended the steep ridge (fully aware of our watchful human presence), passed through a narrow gap just below the ridgeline, and descended to the other side of the ridge, as evidenced by personal observation and the sheep's tracks in the snow. Admittedly ancecdotal evidence, this chance encounter does provide a general idea of how the Creasey Gulch drift wall might have worked for bighorn sheep hunting. As at the Blacktail site, whether the bighorn sheep were ambushed during the course of foraging near the walls, or were gently hazed there by drivers and dogs, is impossible to know.

COMMUNAL HUNTING IN ROCK ART

Rock art across the Intermountain West provides a unique window into communal hunting practices among Indigenous peoples. Pictograph and petroglyph panels distributed from Lake Chelan, Washington, to Writing-on-Stone, Alberta, to Green River, Wyoming, to Tonopah, Nevada document the mass killing of various animal species by a variety of drive and entrapment methods.

The prey--bison, deer, elk, bighorn sheep, pronghorn, rabbits and other species—are typically identified by their anatomical features, although the species of more ambiguously-shaped animals is sometimes inferred by other means (i.e., the presence of a nearby kill site, see Loendorf 2008:127-128). Besides prey animals and entrapment features, rock art panels variously depict hunt bosses, game drivers, ritual specialists or game charmers, armed hunters, dogs, and stick "dead men" or decoys.

On the Columbia Plateau, including Western Montana, drive lanes and barricades were depicted in rock art as vertical lines and "jackleg fence" designs (Keyser 1992:80; Keyser and Whitley 2006:10, Fig. 3) while Northwestern Plains artists illustrated the same with dashes, vertical lines, loops, and horizontal and cross-hatched geometric figures (Keyser and Klassen 2001:78-85; Loendorf 2008:126-131; Sundstrom 2004:28, 34, 56-57). Horizontal, undulating, and zig-zag lines, and gridded nets appear to document drive lanes and hunting structures at Great Basin rock art sites (Quinlan 2007). Natural disconformities on some rock panels may have also indicated some sort of natural or human-built barrier (e.g., Keyser 2016:3).

In all three regions, it is difficult to precisely determine whether the variously depicted drive lanes and containment structures were made of wood, brush, stone, rope, fiber nets, or other materials. In this light, given the difficulty of clearly depicting rock cairns and walls in two-dimensional rock art carvings or paintings, combined with the stylistically conventionalized ways that the other figures in these scenes are drawn, it is eminently possible that some drive lane images were actually meant to show stacked rock wall features like those at the Blacktail and Creasey Gulch sites (Keyser and Klassen 2001:78, Fig. 6.4; Loendorf 2008:127, Fig. 4.11). For example, the branch and "loop-line nets"—large, rounded rectangles with one flat side--drawn in communal hunting scenes could possibly be stylistic conventions for large boulders and rock wall barricades (Figure 20) (e.g., Sundstrom 2004:58, Fig. 5.14). Moreover, rather than being interpreted as animals entangled in fiber nets, the scenes may reflect animals either jumping over substantial stone barricades or even passing through gaps in the walls. In any event, our tentative speculations await more detailed rock art analyses and comparison. What is evident is that rock art provides a visual, firsthand Indigenous view of communal hunting that can add significantly to what we are able to learn from ethnography and field archaeology.

INTERPRETATION AND CONCLUSIONS

The use of stacked rock drift fences by Indigenous groups across the Intermountain West in communal animal hunting presents a variety of interesting interpretive challenges. First, comparatively few, sizeable stacked rock drift fence sites are reported. Some may be misidentified as a historic feature related to homesteading, mining, and other historic or recent enterprises. Stone drift fences often lack associated bone beds and butchering refuse that would identify the targeted game species. Rock walls are also difficult to chronometrically date. Temporally-diagnostic projectile points help, as at the Blacktail site, but such dating relies on the calculated assumption that they are directly associated with rock wall features.

That said, we know that the Blacktail and Creasey Gulch drift wall complexes were built in low-elevation, mountain-foothills settings within big game winter range. Both walls appear to have been built by Indigenous groups after 1,500 years before present, if not appreciably later. Lacking ethnically-identifiable material culture (i.e., Shoshone Intermountain pottery), we do not yet know who built the walls.

Figure 20. 39FA395 in South Dakota showing animals being driven into an L-shaped enclosure similar to Creasey Gulch. The "loop lines nets" in this early hunting style scene may denote more permanent rock wall features. Illustration courtesy of Linea Sundstrom.

However, we might reasonably infer that Shoshone or Salish peoples, who resided in southwest Montana during the Late Precontact and Historic periods, were the local builders, but other tribal groups such as the Blackfeet certainly cannot be ruled out.

We believe that either bighorn sheep or pronghorn, or possibly both, were the intended quarry at the Blacktail site based on ethological, ethnographic, and archaeological evidence. We believe that bighorn sheep were most likely the focus of hunters at Creasey Gulch given the steep slope and ridgeline configuration of the drift walls and ambush points for Indigenous hunters. Based on the behavioral characteristics of mule deer and elk, it is unlikely (though not a given) that either species were hunted using drift fence hunting features. We maintain that bison were not part of the picture.

At both sites, the walls served as drift fences in an intercept hunting strategy. Bighorn sheep and pronghorn overwintering on the open foothills and willowy floodplains of Blacktail Deer Creek and the Big Hole River

either foraged near the walls or were gently hazed and ritually lured there by game drivers, dogs, and charmers. At the Blacktail site, once within narrow Cabin Creek drainage, the animals were ambushed in a firing line of archers hiding behind the drift wall. The hunting strategy was similar at Creasey Gulch, but here bighorn sheep were ambushed by hunters hiding behind the constructed walls, ambush pit(s), and the protruding limestone "walls."

Both rock walls appear to date to the Late Precontact and Historic periods. So, it is possible that horses were used to haze and drive animals toward the hunting complexes. In fact, the ethnographic record shows that horses were used to encircle, drive and run down bison, pronghorn and other game species (Anell 1969). However, given the relative steep topography of the Blacktail and Creasey Gulch sites, the skittish behavior of pronghorns and bighorn sheep, coupled with the absence of horses in rock art depictions showing these game species, it seems to us more likely that animal hazing and driving was done slowly and carefully by pedestrian herders and hunters.

The absence of bone beds and scattered butchering refuse at or near the rock wall features leads to two hypotheses: the extant bone beds have eroded away and disappeared over time; or little to no butchering was ever done at the ambush sites themselves. In effect, pronghorn or bighorn sheep carcasses were lightly butchered and carried away on human shoulders or on poles to nearby camps where full butchering commenced (e.g., Fisher and Goshen 2018). We favor the latter interpretation, since, beyond the relatively easy transportability of bighorn sheep and pronghorn carcasses, keeping the walls free of butchering refuse would have allowed for their repeated use.

We think it most likely that these drift walls were built to take advantage of animals congregated on their winter range. During this season of the year, hunter-gatherer bands were likely spread out in winter camps somewhere in the greater Blacktail Deer Creek and Big Hole River Valley areas. Since the drift walls represent a considerable investment of time and energy, they were probably built during more propitious times of year than winter and early spring. These behaviors reflect advance planning, as well as deep knowledge of the local landscape, wind patterns, and animal behavior.

In summary, hunting architecture remains a relatively little explored archaeological research topic in southwest Montana. Many rock alignment features are clearly attributable to bison hunting. Others were undoubtedly used in encounter and intercept hunting of a variety of big game species still present throughout this region. Without question, more on-the-ground and aerial survey, detailed mapping, chronometric dating and other kinds of analyses are needed to fully document the full range of big game procurement sites in this region.

Ultimately, beyond identifying specific hunting strategies, the study of ancient hunting features will enhance understanding of animal harvest rates, meat consumption and caloric intake, predation effects on ungulate populations by Indigenous hunter-gatherers, and related topics. Repeated and successful individual and communal hunting events no doubt resulted in the periodic depletion of ungulate populations within local hunting territories, and thus was a significant cause of hunter-gatherer mobility in southwest Montana and across the Intermountain West.

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Obituary
Brian (Barney) Olphert Kemmis Reeves (1940-2023)

MARGARET KENNEDY
ANN JOHNSON

Figure 1. Barney Reeves at Bull Springs Coulee.

NORTHWESTERN PLAINS and Rocky Mountain archaeology sadly lost a leading figure with the death of Brian (Barney) O.K. Reeves (Figure 1) on August 3, 2023 from an aggressive form of cancer. He will be greatly missed by not only his family (wife Mary Ann, daughter Anne, son-in-law Jay and two grandsons Lucas and Cody) but also by a host of friends, colleagues, research associates, former students and the good people at Lifeways of Canada, Ltd.

Barney was proud to identify as a third generation southwestern Albertan. He was born in Lethbridge on July 17, 1940 and grew up in Waterton Lakes National Park where, until his passing, he continued to occupy the family home when not at his Calgary residence. Coming home to the beautiful mountains of Waterton brought him joy on every return trip. His strong ties to the southwestern Alberta landscape were facilitated early on

Figure 2. Excavations at Head-Smashed-In Buffalo Jump. Barney is likely the photographer. Date unknown but is likely 1965, 1966 or 1972.

by his maternal grandmother, Ada Kemmis, who took him on field trips to places like Head-Smashed-In Buffalo Jump (HSI) when he just was seven years old to dig for arrowheads. He would later lead groundbreaking archaeological excavations at HSI in 1965, 1966 and 1972 (Figure 2). His remarkable grandmother established many contacts with elder people at Brocket (Piikani Nation Reserve). These marked the beginning for Barney of interactions with Piikani elders that were pivotal in later years as he conducted ethnographic and ethnobotanical studies, research that few other archaeologists were pursuing at the time.

His interest in and exposure to the diverse rocks and mountains around Waterton first led him to enroll in geology at the University of Alberta (B.S. 1961) but along the way he took a course in Classical Archaeology which really grabbed his attention (Knox 2017). After completing that three-year degree in geology, he received a B.A. in Philosophy at the University of Alberta in Calgary (1963) during which time he explored various archaeology and anthropology courses which led him to archaeology as his chosen path. His graduate degrees were both done at the newly established, stand-alone Department of Archaeology at the University of Calgary (U of C, established by Scotty MacNeish). Barney was part of a cohort of graduates from U of C who went on to become founding archaeologists in their field across Canada and the northern U.S. which included his good friend, Les Davis (Figure 3). He completed his M.A. in Archaeology at the University of Calgary in 1966 by excavating and analyzing the Kenney site east of Pincher Creek, Alberta (Reeves 1967) and then he took a sweeping investigation of culture change across the northern Plains with his Ph.D., also at U of C, completed in 1970.

Barney's dissertation (Reeves 1970; 1983a) is symbolic of his approach to archaeology over the 60-plus years of his involvement in the field. The Department was encouraging broad research topics and he went above and beyond the mandate by taking on not only a large chronological time frame in northern Plains archaeology (1000 BC to AD 1000) but also an approach that distinguished Barney as a scholar and researcher – he personally travelled across the huge study area and examined artifact collections first-hand. He was, throughout his career, a consummate researcher, always searching out every possible piece of literature that was out there on whatever he was focused on at the time. This, in addition to being widely read in a number of interest areas, gave him unique and broadened perspectives on any issue. He made personal contact with archaeologists

Figure 3. MacHaffie site (24JF0004) south of Helena, August 1989. Left to right: Les Davis, Barney Reeves, and Steve Aaberg.

across North America, so that he was as current as possible in a variety of research areas and lamented the fact that few students bothered to examine collections and sites first-hand. Even if one did not agree with his interpretations, you would have a tough time arguing that Barney had not done his background research.

However, lenders beware! Libraries and friends who lent him books soon learned that returning them was not his strong point. Borrowed books tended to fall into the black hole of his vast library collection. At one point the University of Calgary cancelled his borrowing privileges due to so many overdue books.

Barney taught archaeology at the University of Calgary from 1966-1970 as a Sessional Instructor before being promoted to the rank of Assistant Professor in 1970, Associate Professor in 1973, Full Professor in 1986 and Professor Emeritus in 1998. During that time, he taught and supervised a large number of students, many of whom were so inspired by him that they took up the profession of archaeology themselves and maintained a career in northern Plains archaeology. He took early retirement from the University of Calgary as Professor Emeritus to devote himself full time to his consulting company, Lifeways of Canada Ltd., Alberta's first and longest operating archaeological consulting firm established in 1972. He remained as Senior Advisor and Consultant with the firm after retiring from it in 2006.

Barney was directly involved in the excavation of many of southwestern Alberta's premier archaeological sites (i.e., Head-Smashed-In). His interest in bison jumps continued through the years (e.g., Reeves 1978a, 1978b, 1983, 1990). It was only fitting that he prepare the draft statement for the nomination of the largest, longest continuously used and best-preserved

known buffalo jump in North America (HIS) as a UNESCO World Heritage site at Alberta Culture's request in the early 1980s. He also launched major inventory projects at both Waterton National Park (e.g., Reeves 1972) as well as Crowsnest Pass in the early 1970s. Working with Parks Canada, he completed inventory and excavation contracts for Banff and Jasper National Parks. Many a practicing, professional archaeologist today completed a thesis or dissertation on aspects of the archaeology encountered through these large, multi-year, grant-funded programs that Barney organized. What we now know of the culture history of the southern Canadian Rocky Mountains is due to Barney Reeves. Rocky Mountain archaeology was once seen as derivative of Plains archaeology or even as a pointless endeavor as it was thought indigenous peoples would not, indeed could not, have lived in the mountains. However, Barney was able to demonstrate the Canadian Rockies held their own cultural integrity and heritage.

Barney was inevitably ahead of the curve in archaeological paradigms of Plains and Rocky Mountain archaeology. For example, he provided cogent arguments why the Plains may not have been abandoned during the Altithermal as was commonly assumed (Reeves 1973). He frequently identified neglected site types that would later become areas of interest for both archaeological study and to governments keen to select sites for public interpretation. His substantial interest in and work on sacred sites marked a fairly new path for archaeologists at the time. He was constantly reworking old assumptions and replacing them with insightful new interpretations.

In 1973, along with Dr. Richard Forbis and other concerned members of the public, Barney was instrumental in helping to develop legislation for the protection and preservation of Alberta's cultural heritage and persuading the Legislative Assembly of Alberta to pass the Alberta Heritage Act, today's Alberta Historical Resources Act.

Under the auspices of Cultural Resource Management through Lifeways of Canada Ltd., Barney supervised and/or managed many historical resource impact assessments and mitigation studies throughout Alberta, including multiyear programs in Alberta's oil sands (Reeves et al 2017; Saxberg and Reeves 2003), major interprovincial pipeline projects, highways, and residential subdivisions, coal mines, power and petrochemical plants, etc. The reports and articles he wrote for many of these projects, backed by prodigious background research mentioned above, became the standards of culture history and chronology for northern Plains and boreal forest archaeology, based on his comprehensive understanding of the archaeological evidence. He was also not afraid to take a firm stand in favor of archaeological and historical resources, even when that put his reputation and livelihood at risk. Examples of this include his publicly stated position that the Oldman River Dam should not have been built in the mid-1990s along with his opposition to a windfarm's construction near the Majorville Medicine Wheel a few years ago. For him, it was the archaeological resource that was paramount.

In the early 1990s, the U.S. National Park Service advertised for an archaeological inventory of Glacier National Park. Barney submitted an excellent proposal and was awarded the project. This work was a natural continuation of the work he accomplished in Waterton Lakes National Park and it added to our understanding of the precontact use of the landscape (Reeves 2003). Following that project, Lifeways moved into Yellowstone National Park for more inventory, testing, and excavation. This culminated in the publication of the Osprey Beach

Figure 4. Barney (second from right) and landowners Jim and Carol Hern (left) discussing the archaeology of the Minor Medicine Wheels locale, lower Red Deer River, Alberta, October 2018.

Figure 5. Barney giving a talk to *the* public at Roy Rivers (aka Bull's Forehead) Medicine Wheel, at the Forks of the Red Deer and South Saskatchewan rivers.

site, a Pelican Lake and Cody Complex campsite (Johnson and Reeves 2013).

The last large field project Barney was involved in was a seven-year field inventory (2013-2019) of the Forks of the Red Deer and South Saskatchewan rivers with Margaret Kennedy. This and the broader area contain the densest array of medicine wheels in western Canada. The focus in their study was not only the medicine wheels themselves which have garnered most attention by previous archaeologists, but the surrounding landscape's multitude of stone features and the interconnections and sight lines amongst these features and the medicine wheels and river forks (e.g., Kennedy et al. 2016; Feathers et al 2022; Reeves and Kennedy 2017a, 2017b). As always, Barney greatly enjoyed giving tours and lectures about the archaeology at the Forks to volunteers, school groups, avocational archaeologists, and landowners (Figures 4 and 5). Numerous other projects spun off of this large and comprehensive study, including a publication on medicine wheels of the Plains and Rocky Mountains (Reeves et al. 2018) as well as a still to be published paper on petroglyph boulders.

In his professional life, Barney developed close ties and trust with traditional members of the Blackfoot Nations in the early 1980s before this practice became recognized as necessary and productive. Traditional studies with these nations were done for several clients including Shell Canada, TransAlta, Parks Canada and the U.S. National Park Service.

Figure 6. Piikani elder Joe Crowshoe honors Barney with the name "*Paahtomahsikimi*" at Head-Smashed-In Buffalo Jump, July 1993.

The latter included three years of ethnological studies in Waterton-Glacier International Peace Park and archaeological inventories on the Blackfeet Reservation and on Piikani and Siksika Nations land (e.g., Reeves 1993a, 1993b, 1997). He worked with Sandy Peacock on ethnobotanical studies with the Piikani (particularly Piikani women elders) and others which formed the basis for Sandy's M.A, thesis. The two wrote *The Mountains are our Pillows*, a report commissioned by the National Park Service to document those values held by Indigenous peoples who consider Glacier National Park and its resources important to their cultural traditions (Reeves and Peacock 2001). The project was very meaningful to Barney.

Barney also engaged in traditional knowledge studies for Shell Canada with the Piikani of the Castle region of Southwestern Alberta for well sites, pipelines, etc. In recognition of this work, Barney was honored by the Piikani Nation in 1993 when they adopted him and bestowed upon him a Piikani name (*Paahtomahsikimi* or Big Inside Lake, referring to Upper Waterton Lake), an honor of which he was very proud (Figure 6). He became especially close with respected Piikani elder Joe Crowshoe and his wife Josephine and with Joe's sister Margaret Plain Eagle. While Margaret was still able to, she and other elders visited several off-reserve traditional locales with Barney and they talked at length about their traditional ways.

Barney not only worked hard as both an academic and consulting archaeologist but also felt driven to contribute community service to other organizations that represented issues of

fundamental importance to him. For example, outside of archaeology and heritage societies in which he held administrative positions, (such as with the Alberta Archaeological Society, the Canadian Archaeological Association, and the Alberta Heritage Foundation amongst others), Barney was also involved for years with the Trail of the Great Bear, an international wildlife tourism initiative inspired by Beth Russell-Towe. He dedicated years to the Nature Conservancy of Canada (NCC) Alberta Region, as a Member of its Board of Directors, and also as Chair of the NCC Alberta Region, Science and Stewardship Committee. One of the many NCC activities that engaged him was a wild plant survey in Crowsnest Pass that he completed with Claire Allum. He was so inspired by this survey that he continued to learn more on his own about local plants and butterflies. Politics and administration also received the benefit of Barney's attention. He was 'mayor' or chair of the Improvement District #4 (Waterton Park) Council for close to 20 years.

Barney was the recipient of some very distinguished awards for his efforts in heritage studies and beyond. These include the following:

1993 Government of Canada, Minister of Environment, Canadian Parks Service, Heritage Service Award

1993 Government of Canada 125th Anniversary of Confederation Medal, (for Native Sacred Site Work)

1993 Piikáni Nation, Honour Dance and Naming, (for Piikani Nation Sacred Site Protection)

2001 Canadian Archaeological Association Smith-Wintemberg Award

2007 Archaeological Society of Alberta Richard G. Forbis Award for Services to Public Archaeology in Alberta

There are many other accomplishments that did not make their way into this tribute, but perhaps the best way to honour him is with the remembrances of former students and friends who recall the kindness, tolerance and empathy that Barney displayed towards them. He also had a unique sense of humour and loved to socialize along with a glass of wine or two. Barney more than once rescued a crew stuck out in some remote area under a tough schedule and miserable weather by arriving with at least one case of wine and liquor. Barney took pleasure in sharing the results of his lifelong love of learning, which ultimately benefitted us all.

Note: This obituary was prepared with the help of many. Specials thanks to Alison Landals and Gerald Oetelaar for the information they provided.

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Organized in 1958, membership in the Montana Archaeological Society (MAS) is open to both amateur and professional archaeologists. MAS was created to stimulate interest in and promote research into the archaeology of Montana and to encourage increased public appreciation and involvement in this fascinating process.

MAS encourages a bond between professionals and non-professionals interested in Montana archaeology and works to focus all efforts into scientific channels. The end goal is to advocate and assist in the conservation and preservation of archaeological sites and materials.

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