THE GRAPEVINE CREEK BUFFALO JUMP COMPLEX: INTERDISCIPLINARY RESEARCH ON THE CROW RESERVATION, MONTANA

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Submitted to the faculty of the University Graduate School
in partial fulfillment of the requirements
For the degree
Doctor of Philosophy
in the Department of Anthropology,
Indiana University
June 2018

Accepted by the Graduate Faculty, Indiana University, in partial fulfillment of the requirements for the degree of Doctor of Philospohy.

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February 14, 2018

Acknowledgements

I could not have completed this dissertation without the assistance of a large group of people and institutions. I often have a hard time saying "I" did anything, as it seems to be "we" in my head! I have attempted to make this list as complete as possible, but I sincerely apologize if someone was left out. Please know that I am grateful to every single person who helped me up the mountain.

First I'd like to thank my parents, Gene, Christine, George, and Oksana, for instilling a drive to achieve and sending me to college, and for so many supportive phone calls through the years. Next I would like to thank the Mussetters and Eddys for taking me in, feeding me, encouraging me, and helping with all the logistics of two field seasons.

My dissertation advisor, Dr. Laura Scheiber, held my hand the whole way. She introduced me to the west, to archaeological fieldwork, and to the Crow Tribe. My other committee members: Dr. Jeanne Sept, for walking me through the development of predictive modeling theory; Dr. Raymond DeMallie, for always being kind, supportive, and thought-provoking; Dr. Chunfeng Hwang, for teaching me everything I know about spatial statistics; Dr. Brian Gilley, for his time and attention; and Dr. Edward Herrmann, for two wonderful field seasons, for countless debates over archaeological method and theory, for pushing me to finish, and for sharing his home and basement office with me back in the good old days.

Dr. Emerson Bull Chief, the Crow THPO, made all of this possible. He pushed me to Grapevine Creek and provided all the funding and support to make the project possible. Without his support, both financial and moral, this project would not have succeeded. Tammie Hugs, Loreen Walks Over Ice, Marie Vogel, John Bird in Ground, Robert Old Coyote, Armand Dust, Marie Bird in Ground, Geraldine Whiteman, Sheldon Big Hair, Son Son Two Leggins, Logan White Clay, Anthony Wegner, John Flood, Seth Grooms, and Janice Rowe all participated in fieldwork or administrative support for the project and I am thankful to count them as friends. Dr. Matthew Rowe helped me conceptualize and execute this project. Dr. Timothy McCleary always kept his office door open to me for advice and sage wisdom.

This project could not have been completed without financial support from the Indiana Univeristy Anthropology Department Skomp Fund, the Crow Tribal Historic Preservation Office, and the National Park Service Tribal Heritage Grant.

Finally, I would like to acknowledge my best friend and partner, Shane Mussetter, who supported me, pushed me, comforted me, and put up with me through the last three years of this journey. I most certainly could not have done it without you.

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This work explores the Grapevine Creek Buffalo Jumping Complex, a Late Prehistoric cultural landscape on the southern border of the Crow Reservation in south-central Montana, USA. The Grapevine Creek drainage is located at a geographic crossroads, being at a major river crossing as well as being the gateway between the Bighorn Basin and the Missouri Plateau. Prehistoric hunters took advantage of this fact to successfully capitalize on game movement through the drainage. Just as game were drawn to the area, so were different groups of people, as evidenced in the archaeological and ethnohistoric records. This concept of intersectionality is explored in my dissertation by drawing on the subdisciplines of ethnohistory, Indigenous archaeology, geoarchaeology, and zooarchaeology. Grapevine Creek plays a prominent role in the oral traditions and oral histories of the Crow Tribe and as such is a physical place where two forms of truth meet: oral traditions and histories and the archaeological record. Utilizing both, function may be ascribed to the large variety of archaeological features identified at Grapevine Creek.

Fieldwork for the project spanned three seasons and was performed by a collaborative crew from several institutions, including Indiana University, University of Arizona, Little Big Horn College, and the Crow Tribal Historic Preservation Office. Standard field methods including pedestrian survey, GPS data collection, and a large subsurface testing regime were used to collect data in the field. The Grapevine Creek buffalo jumping complex is an important addition to our understanding of Prehistoric settlement and subsistence patterns on the high plains. Through the practice of community-based participatory research I explore the challenges and benefits of living

and working with an Indigenous community while conducting original research on the cultural history of the region.

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1. Introduction: Multiple Landscapes, Multiple Disciplines

Grapevine Creek, located on the Crow Reservation in southeastern Montana, is an intersection of cultures, Plains mammals, and geography. Grapevine Creek is an intersection of landscapes: the Plains archaeological landscape (over 50 archaeological sites of every type known on the Plains are represented within the boundaries of the drainage), the Crow cultural landscape, and the Plains Late Prehistoric buffalo jumping landscape. The Grapevine Creek drainage is located at the head of Bighorn Canyon. Grapevine Creek is the first tributary to the Big Horn River north of Bighorn Canyon, entering into the river into the modern Yellowtail Dam After Bay across from the town of Fort Smith. This small fishing town was named after the fort constructed to protect the crossing of the historic Bozeman trail, in use during the late 1860s. The westward-headed Bozeman trail crossed the south-north flowing Bighorn River at Fort Smith and continued into the Grapevine Creek drainage before following the natural topography of a large Chugwater formation uplift and veering north towards Pryor Creek before entering the Yellowstone River valley. Fort Smith and Grapevine Creek represent the first point on the Bighorn River for seventy or so miles that allows for a crossing. This made the crossing significant for both people and for herd animals such as buffalo. Bighorn Canyon cuts through two mountain ranges, passing from the Bighorn Basin to the south into the Bighorn River Valley to the north. With the Pryor mountain range to the west of the canyon's steep walls and the Bighorn Mountains to the east, only a narrow passage allowed for north-south travel along the western rim of the canyon. This Prehistoric trail, marked for tens of miles by over 500 stone cairns, is known today as the Bad Pass Trail. The northern terminus of this trail is currently unknown, but if its route is projected only slightly to the north, it arrives right at the Grapevine Creek drainage and its easily accessible east-west route. Thus, Grapevine Creek is unique, is special, because its geography and geology have made it so.

Its proximity to Bighorn Canyon has made it so. Grapevine Creek, therefore, represents a geographic crossroads, an intersection of east-west and north-south routes.

The Grapevine Creek drainage may be considered an intersection in many different senses. Just as two historic trails, the Bozeman trail and the Bad Pass trail, meet within the boundaries of the drainage, so too do Crow oral history and the archaeological record meet at Grapevine Creek. As I will discuss in greater detail, there is a suite of Crow oral traditions relating to a number of aspects of Grapevine Creek, from the suitability of the area for hunting buffalo to the color of the soils in the drainage, in particular the prominent Chugwater uplift forming the northeastern boundary of the drainage. The substance of these oral traditions have a synchronicity in the archaeological record, which indicates that while people have made use of the drainage since Paleoindian times, there is also a tradition of buffalo jumping, manifest in what I term a buffalo jumping complex, that has been absolutely dated to a time period in which the Crow were known to have occupied the area. Thus, the Grapevine Creek drainage is significant in that it manifests Crow cultural identity in the archaeological record. Beyond just the Crow, the Blackfeet and the Shoshone are represented in the Grapevine Creek archaeological record as well. The term buffalo jumping complex is here used to signify a buffalo jumping landscape, inclusive of all the physical remains of the act of communal buffalo hunting involving driving a herd over a precipice. This includes, but is not limited to stone drive lines along the tops of landforms, buffalo bone beds at the bases of precipices (representing primary butchery areas), associated processing areas, campsites, and stone cairns in geographic proximity that may be associated with the driving of buffalo but are not part of the drive line system. At Grapevine Creek, the portions of the buffalo jump complex that have been identified to date include: several drive line sets, two primary bone beds, a possible secondary processing area, lookout cairns, and domestic campsites.

Peripheral to the buffalo jumping complex at Grapevine Creek but still significant to an understanding of Grapevine Creek as an intersection in the Prehistoric Plains landscape are several fortification sites (including the Grapevine Creek Battle Site, the location of a known historic battle between the Crow and the Blackfeet), a rock art site, surface lithic quarry sites, rock shelters, and burials. Thus, while the Grapevine Creek buffalo jump complex is significant in its own right as an excellent example of Late Prehistoric Plains buffalo jumping culture and as an example of Crow cultural identity manifested in the archaeological record, it also contributes to the overall Grapevine Creek archaeological landscape. This Grapevine Creek archaeological landscape, given the presence of such a wide variety of archaeological site types within the boundaries of the drainage, may be viewed as a microcosm of Plains archaeology in that this large variety of sites occurs together within a relatively constrained geographic area.

The Crow cultural landscape may be said to be centralized around two notions pertaining to the geographic meaning of what it is to be Crow. The first notion is sacred tobacco. The cultivation of sacred tobacco is culturally specific to the Crow and their tobacco society. The very identity of the Crow people may be said to be drawn from their relationship to this plant, as the Biiluge only became the Apsalookee after their journey to discover the growing place of this sacred plant, what we know today as Cloud Peak, the tallest mountain in the Big Horn Range of Wyoming. The second notion of the Crow cultural landscape involves an event from the more recent past, pertaining to a statement made by Chief Sits in the Middle of the Land at the 1851 Fort Laramie Treaty proceedings, where he stated that Crow territory was like the four base poles of a Crow-style tepee, with the four bases falling in the Wind River Range, the headwaters of the Missouri River, the junction of the Judith River and the Missouri River, and the Black Hills (Medicine Crow 1992). These two pieces of specific geographic information that also have strong ties to Crow

cultural identity are the basis of the Crow cultural landscape, of which Grapevine Creek forms just a part.

The Grapevine Creek drainage falls within the boundaries of the present-day Crow Reservation, but this legal boundary is a fairly modern invention that bears small resemblance to the traditional Crow homeland (as described above by Chief Sits in the Middle of the Land). Today's reservation boundaries roughly correspond to the center of the Crow traditional homeland and as such, Grapevine Creek lies directly in the center of the heart of Crow country. Thus, for topographical, archaeological, and cultural reasons, Grapevine Creek may be considered a junction/crossroads/nexus. By its very nature of being such an intersection in three different realms of consideration, Grapevine Creek may also be considered to be a junction of geography, archaeology, and the Crow cultural landscape. As such, the area lends itself to a more integrative, multidisciplinary approach to its study.

Hypothesis Testing

My dissertation concerns fieldwork undertaken over the course of three field seasons (2014-2016). While the nature of this fieldwork was designed to maximize exploration of the multiple significant landscapes intersecting at the Grapevine Creek drainage, it was also couched in a practical consideration of conducting a National Register of Historic Places (NRHP) district nomination for the Grapevine Creek area, pursuant to the Crow Tribe's interest in raising awareness of the cultural significance of the region and providing protection for the area at the same time. When I agreed to assist the tribe with achieving these goals, a secondary objective was added on, namely, providing technical training for cultural monitors employed by the Crow THPO. For that reason, a rotating crew of over twenty tribal monitors assisted with the fieldwork for the

project. As will be discussed in the following chapters, the 2014 field season focused on determining the relevancy of a comprehensive cultural survey of the Grapevine Creek drainage conducted in 1972 by Kent Good and Larry Loendorf. During this time our field crew also conducted NRHP evaluations for several previously recorded sites on the western side of the drainage. In 2015, fieldwork was refocused on the eastern portion of the drainage in an attempt to provide an NRHP evaluation for the previously recorded sites comprising the Grapevine Creek buffalo jump complex. The 2016 field season was funded by a National Park Service Tribal Heritage grant that involved the training of six tribal member students in a formal field school setting.

The bulk of my dissertation is centered on the fieldwork associated with evaluating the buffalo jump complex. While the primary aim and practical focus of this fieldwork was the collection of data to support an NRHP nomination, my work was also driven by several questions. As no previous work in the area turned up buffalo remains or any conclusive evidence indicating that the stone drive lines were used for buffalo jumping, can we confirm the identity of these archaeological sites as a buffalo jump complex? What was the role of Grapevine Creek in Crow society, both in the past and in the present? Why is Grapevine Creek singled out among so many tributaries to the Big Horn River with its own name, Bacheeishdiio? Why does this name refer to successful hunting rather than any other notable features about the landscape (for example, Red Woman's Blood or the wild grapes and chokecherries which grow profusely along the banks of the creek)? Why is Grapevine Creek the subject of such a diverse set of Crow oral traditions?

Assuming that that the sites at Grapevine Creek do represent a buffalo jump complex and that Grapevine Creek is noted for successful hunting, then it follows that one should be able to locate bison bone beds in the colluvial slopes below the previously identified drivelines in

Grapevine Creek. This was the great mystery of Grapevine Creek: fifty years of archaeological study had not noted bison bone below the drive lines, and for this reason I questioned the identification of the drive lines as buffalo jumps on the basis of archaeological evidence alone. If one incorporated the set of Crow oral traditions, which clearly identified the area as a buffalo jumping complex, along with the archaeological evidence of several sets of drivelines (representing one possible component of a buffalo jump complex), then the identity of the archaeological sites would seem clear. However, in the interest of due diligence, I tested my hypotheses with additional fieldwork to locate bone beds in the Grapevine Creek drainage. My research prior to going into the field, the fieldwork itself, and the interpretations based on the results of this research and original fieldwork reflect this multidisciplinary approach to the study of Grapevine Creek. I incorporate many tenets of indigenous archaeology into my practice over the course of my dissertation research.

Outline

The format of my dissertation is as follows. I will first present a theoretical discussion of the interdisciplinary approach I have applied to my research, focusing on an understanding of the subfield of indigenous archaeology and why this theoretical framework was critical to both the fieldwork I practiced and the interpretations and conclusions I have come to through the course of my work (Chapter 2). Then I will discuss the archaeological significance of the Grapevine Creek drainage (Chapter 3). This includes a discussion of more than 50 previously recorded archaeological sites in the area, with a particular focus on the sites composing the Grapevine Creek buffalo jumping complex. I will also discuss previous research within the boundaries of the Grapevine Creek drainage to provide a more thorough understanding of the gaps in this body of

data. This discussion will end with a consideration of the significance of the Grapevine Creek drainage within the larger landscape of Plains archaeology. In my next chapter, I will discuss the Grapevine Creek buffalo jumping complex within the context of the larger landscape of buffalo jumping across the Plains (Chapter 4), discussing both variation through time of communal buffalo hunting practices as defined by the archaeological record, and the landscape of contemporaneous buffalo jumps in the vicinity of the Grapevine Creek drainage. After this chapter I will present the results of the fieldwork conducted in the Grapevine Creek drainage during the 2014, 2015, and 2016 field seasons (Chapter 5). As mentioned previously, this will be focused on the work pertaining to the Grapevine Creek buffalo jumping complex. Finally, I will interpret these archaeological results within the framework of Crow oral traditions surrounding the Grapevine Creek area and buffalo jumping generally (Chapter 6). In this chapter I will first present a synthesis of oral traditions among Plains tribes concerning buffalo jumping and the driving of buffalo and then present a more focused discussion of Crow oral traditions as they relate directly to the buffalo jumping complex at Grapevine Creek. I conclude by exploring the significance of Grapevine Creek (and the Grapevine Creek buffalo jumping complex) in modern Crow society, such as the significance of the drainage and the cultural site today and the impact of my research on the Crow Tribe itself.

2. Applying the Methodology of Indigenous Archaeology to Research on the Crow Reservation

This chapter focuses on the meaning of Indigenous archaeology. In my work I have chosen to combat ethnocentricity and colonialism by exploring the intersection of oral histories and archaeological data at Grapevine Creek. In order to do so, I must first explain what I mean by the term "Indigenous." I then explore the history of Indigenous archaeology in the United States, and then go further into a discussion of the ethical principles required in the practice of Indigenous archaeology. I discuss how the structure of my dissertation project was formed with Indigenous archaeological principles in mind, and I further discuss areas where I did (or did not) live up to my ethical ideals in the carrying out of my research. I include two personal oral histories of my time with the Crow Tribe that I hope will demonstrate both the complexity of practicing archaeology with Indigenous stakeholders as well as its benefits.

Introduction: Defining "Indigenous"

> The values, attitudes, concepts and language embedded in beliefs about spirituality represent, in many cases, the clearest contrast and mark of difference between indigenous peoples and the West. (Smith 1999:74)

The term "indigenous" first entered the Oxford English Dictionary in 1900. The entry notes the first use of the term in 1646 by Sir T. Browne to refer to African slaves transported by Spaniards to the "New World" (as in, they were *not* indigenous to America) (OED 1900). "Indigenous" became associated with the struggles of colonized peoples throughout the world in 1957, with Convention 107 of the International Labor Association (ILO), "The Convention of Indigenous Populations". The ILO was one of the first international organizations to recognize Indigenous issues (Smith 1999:114). "Indigenous" as it will hereafter be defined emerged in the 1970s out of the efforts of the American Indian Movement (AIM) and the Canadian Indian Brotherhood.

Specifically, “it is a term that internationalizes the experiences, the issues, and the struggles of some of the world’s colonized peoples” (7). Today, Indigenous peoples are recognized as living in 72 countries worldwide (Smith and Wobst 2005), the term “peoples” being an important linguistic symbol of the right of self-determination (Smith 1999:115).

An understanding of the concept of indigeneity is closely tied to the interconnected concepts of colonialism and imperialism (colonialism being one form or expression of imperialism (Smith 1999:21)). The term “indigenous” is most effective when used in a language of critique of imperialism and colonialism (24). There is more to being Indigenous than being native to a particular place; there is also a strong sense of being colonized. Thus, a more thorough understanding of all the dimensions of colonization leads of a fuller understanding of the term “indigenous”.

At a very basic level, the humanity (and citizenship) of many Indigenous peoples was denied by Western scholars and countries, even after the Second World War (Smith 1999:69). This was done through specific representations of “native life” as “[…] being devoid of work habits, and of native people being lazy, indolent, with low attention spans [which are] part of a colonial discourse that continues to this day” (53-54). Additionally, Indigenous “[…] forms of knowledge, systems of classification, technologies and codes of social life, which began to be recorded in some detail by the seventeenth century, were regarded as ‘new discoveries’ by Western science. These discoveries were commodified as property belonging to the cultural archive and body of knowledge of the West” (61). Even the ways Indigenous peoples are represented back to the West are radical transformations of Indigenous ways of knowing, such that even the Indigenous concept of space has been colonized (51).

Authenticity is another concept that is closely related to Western ways of understanding what it means to be Indigenous, used as a criterion by Western scholars to determine who is truly Indigenous (Smith 1999:74). Assumptions behind this concept of authenticity focus on how "[…] indigenous cultures cannot change, cannot recreate themselves and still claim to be indigenous. Nor can they be complicated, internally diverse or contradictory" (74). In this sense, authenticity becomes insidious, delegitimizing Indigenous societies after contact with so-called "modern societies" (55) and used in political debates to "fragment and marginalize those who speak for, or in support of, indigenous issues" (72).

The term "indigenous" thus has its roots as an expression of connection to a physical locality, but in the past was co-opted by colonized peoples world-wide as a symbol of self-determination. Thus, "indigenous" also conveys a deep sense of colonization by Western powers. Conversely, the Western understanding of the concept of indigeneity is closely tied to the concept of authenticity, often used as tool for marginalizing supporters of Indigenous issues. The Crow Indians, an Indigenous people of North America, also identify themselves as an American Indian group. I will hereafter use the terms "Indigenous people" and "American Indian group" to refer to peoples who have been colonized by Euroamerican settlers in the United States.

The Ethics of Indigenous Archaeology

> The term 'respect' is consistently used by indigenous peoples to underscore the significance of our relationships and humanity. Through respect the place of everyone and everything in the universe is kept in balance and harmony. Respect is a reciprocal, shared, constantly interchanging principle which is expressed through all aspects of social conduct. (Smith 1999:120)

Moving beyond the definition of "indigenous," I would now like to explore some ethical points discussed in Indigenous archaeology literature, specifically several key assumptions of

Western ideology and traditional archaeological theory and methods; an acknowledgement of colonial practices, past and present; a recognition of Indigenous people as stakeholders in the archaeological process; and finally, fundamental ethical principles espoused by Indigenous archaeology.

Traditional archaeological method and theory, by its nature, is ethnocentric and colonizing. The ways in which archaeologists conceptualize time and space are colonial (i.e., slicing time up into progressive periods, the use of the term "prehistory", the dichotomy between site and non-site or nature and culture), while the traditional way of addressing research questions by assigning importance to certain aspects of the archaeological record over others may be viewed as a very ethnocentric way of assessing the relative importance of Indigenous pasts (Wobst 2005). Wobst states that "[t]he Indigenous past is falsified and violated because parts of their materiality are insensitively disembedded from their place in a spatial continuum and in the Indigenous logic, thus showing the Indigenous past to have been a (poorer and less complete) version of the archaeologist's society" (2005:20). In fact, archaeologists often embrace a very stark distinction between the visible (important) and invisible (unimportant, intangible) archaeological record. What is important to keep in mind is that the concept of "visibility" is not universal, but rather contextual. Because archaeological space is usually devoid of its former occupants, there exists no way for traditional owners who may have been unwilling to leave an imprint on the landscape to describe their culture. This lack of imprint has even been used in the past to dispossess Indigenous peoples from their lands. Finally, the concept of "archaeological cultures" leaves little room for agency or "multivocality." Drawing upon these colonial and ethnocentric notions, one of the goals of Indigenous archaeology is to help archaeologists in realizing that their work often does violence to all societies (Wobst 2005).

Objectivity is perhaps the strongest key assumption of Western philosophers and scientific ideologues (Smith 1999:164). In the context of archaeological and anthropological research, distance (both spatial and temporal) has been used to imply a sense of neutrality and objectivity (56). Certainly in Western scientific thought, space is viewed as static. Divorcing space from reality (i.e., time) has the effect of making it seem well-defined and apolitical (52). In combination with a second assumption, that there is only one true way of making sense of the world or of knowing things (56), it becomes increasingly difficult to accept that "[…] not every social group seeks knowledge of past events that perfectly maps onto Cartesian notions of time and space" (Colwell-Chanthaphonh and Ferguson 2006a:150). Within this static conception of time and space, there is a third assumption regarding progress (Smith 1999:55). The conceptualization of time marching forward or nations growing outward is linked to an assumption that progress is the goal of every human society. Another assumption that is tied to the core concept of objectivity is that "[…] individual researchers have an inherent right to knowledge and truth" (173).

Traditional archaeological method and theory also contains some implicit assumptions that should be questioned. For example, in North American archaeology, land ownership is the most important consideration when working on an archaeological site with human remains (Watkins 2000:89). More implicit still is the focus and attention traditional archaeological method and theory ascribes to artifacts. This focus on materiality hinders the ability to describe past cultures holistically (Watkins 2003:280). Scholars such as Carol Smith and H. Martin Wobst have gone so far as to say that these underlying assumptions make traditional archaeological method and theory inherently incompatible with the principles of Indigenous archaeology (Wobst 2005). To bridge the gap, one must practice archaeology while questioning one's own core assumptions. These questions can aid archaeologists working within contexts involving Indigenous peoples. Is true

objectivity possible? Do archaeologists have a right to control the pasts of others? Is the Western, scientific approach to archaeological theory and method necessarily the 'best' way of interpreting the past? What are the practical ramifications of archaeological research for the Indigenous people with whom archaeologists work, for whom the "artifacts" of archaeology are a living heritage?

Perhaps the biggest step Indigenous archaeology has taken towards questioning these key assumptions has been to problematize the concept of colonization as it relates to Western science, research, and traditional archaeological method and theory. By shifting viewpoints to that of Indigenous peoples or specifically American Indian groups, the depth and persistence of colonial practices becomes more glaring. Research itself is a form of regulating and realizing the underlying code of imperialism and colonialism (Smith 1999:7). Indigenous peoples find that reading and interpretation present problems when (as is often the case) Indigenous voices are not heard in the text (35). American Indians have stated that research carried out on tribal lands is rarely made available to the local population (Watkins 2000:45). This silence or tacit exclusion draws attention to the myriad other ways in which "[…] indigenous languages, knowledges, and cultures have been silenced or misrepresented, ridiculed or condemned in academic and popular discourses" (Smith 1999:20).

Within Western society, archaeologists are recognized as authorities on the past, and thus their interpretations hold the weight of authorized discourse. This recognition often leaves Indigenous and descendent communities feeling powerless over what is said about their ancestors. The power differential between archaeologists and Indigenous peoples leads to assumptions from either party (i.e., that archaeologists are arrogant and insensitive or that Indigenous peoples are antagonistic towards research) (Watkins 2003:275). This power differential has further implications for a fundamental lack of trust between two stakeholders who otherwise have a

common goal of protecting archaeological sites (280). Colwell-Chanthaphonh and Ferguson (2006b) argue that there is a direct correlation between power and trust: "[…] the greater the disparity in power between two coequal groups, the less trust is likely to exist" (128). Thus, Indigenous peoples still feel threatened by the mixture of science, cultural arrogance and political power that so often lies within individual researchers (Smith 1999:99).

We might next consider the position of Indigenous peoples as stakeholders in the interpretation of the past as well as the business of conducting archaeological research. In the past, anthropologists have often disregarded the full humanity of their human subjects by approaching their research as though entire communities of people were passive objects of study. Today, however, "[…] research can no longer be conducted with indigenous communities as if their views did not count or their lives did not matter" (Smith 1999:7). At an even more basic level, Indigenous peoples have long had to contend with defining or defending their very humanity against Western notions of "savagery", some state behind Western civilization on a scale of modern progress (and by association, also somewhere behind a global citizen on a scale of humanity) (26). Although Indigenous communities maintain a collective and critical memory of past injustices, today Indigenous archaeologists (meaning both archaeologists working in Indigenous communities as well as archaeologists who identify themselves as a member of an Indigenous group) must regard these communities as spaces of hope and possibilities (98).

Rather than being seen as passive objects of study, Indigenous communities are socially interested activists in the context of global changes (104). In light of Indigenous communities being hopeful, socially interested activists we may now introduce a concept that proves to be the basis of Indigenous archaeology, bicultural research. Linda Tuhiwai Smith defines bicultural research to be research that "[…] involves both indigenous and non-indigenous researchers

working on a research project and shaping that project together" (178). Thus in the practice of Indigenous archaeology, archaeologists (both Indigenous and non-Indigenous) must include Indigenous communities affected by their project in the research process. In the United States, this task is complicated by the generally negative view American Indians have of archaeologists: "[…] as a rule, American Indians tend to equate archaeologists as pot hunters, grave looters, or, even worse, animals who feast off of the dead (i.e., 'The Vulture Culture')" (Watkins 2000:21). Most Indigenous communities as well as American Indian groups voice the most concern over the perceived threat to the human and funerary remains of their ancestors (89; Smith and Wobst 2005).

Practically, this distaste manifests itself as a reluctance on the part of American Indian groups to provide information regarding cultural and sacred sites to most non-Indians "[…] out of a tacit fear that such information could be used to locate, impact, and possibly destroy the sites" (Watkins 2000:42). To counteract this, it is especially important for Indigenous archaeologists to obtain the views of Indigenous Elders as well as to make decisions regarding their work and ways of reading the land that are informed by Indigenous values and agendas (Smith and Wobst 2005; Wobst 2005). For Indigenous groups, the desire to preserve archaeological sites that attest to tribal history is often more important than any information that can be gained through the destruction of archaeological excavation (Watkins 2003:277). And while many archaeologists have come to understand why Indigenous communities feel they have the right to determine how their direct ancestors are finally treated, this generally only applies to remains from the past 500 years or so. As human remains increase in antiquity, fewer archaeologists are willing to extend the agency of current Indigenous communities (274). Thus, even in light of recent understanding between Indigenous communities and archaeologists, "[…] American Indian and First Nations perspectives

are seen by American Indians and First Nation members to have had limited impact on the practice of archaeology" (281).

Assuming that the practice of Indigenous archaeology leads to a fuller, more relevant understanding of the archaeological record, how do we as archaeologists bridge the gap between cultures, power differentials, and deeply rooted basic assumptions about the groups we must work with (both on the part of archaeologists and Indigenous communities)? I would like to underscore some of the basic ethical principles of importance to the application of Indigenous archaeology. The three most important ethical principles to consider when working with Indigenous communities are respect, honesty and trust: "[Indigenous communities] expect and appreciate honesty. Spelling out the limitations of a project, the things that are not addressed, is most important" (Smith 1999:140; see also Smith and Wobst 2005 and Colwell Chanthaphonh and Ferguson 2006b:118). Bearing in mind that according to the American Anthropological Association's Code of Ethics, the "[…] anthropologist's *paramount* responsibility is to those they study […]" (Watkins 2000:25), the next most important principles to bear in mind revolve around the importance of communication and consultation (30).

Gaining the trust of an Indigenous community may be difficult for an archaeologist. Most American Indian groups hold a fundamental distrust of archaeologists stemming from a perceived threat to their ancestors and human remains (Watkins 2000:3; 11). Communication and consultation can help overcome this sense of distrust. By first being aware of this distrust and then making an effort to educate any communities affected by an archaeological project about "[…] the reasons for the project, the types of information being sought, and the implications and utility of the study to the group studied and to archaeology" (171), the archaeologist gives an Indigenous community the opportunity to have an informed understanding of the work being done. If, at the

beginning of a study, the archaeologists consider aspects of a project such as who benefits from the archaeological research, or how to conduct a project in a way that doesn't do some form of damage to an Indigenous people (Smith and Wobst 2005), they may more clearly and honestly communicate their intentions to affected communities.

A final issue to bear in mind is the importance of the past to Indigenous peoples: "Things that represent the past for anthropologists are vital to indigenous peoples because they are a principal means by which the past continues to exist in the present and to be reproduced in contemporary social life" (Colwell-Chanthaphonh and Ferguson 2006a:149). This importance is articulated in the dialogue between archaeologists and Indigenous communities through a conflict over who controls the past. Indigenous populations have the desire to have a say in the construction of their culture-history, if not complete control over its construction (Watkins 2000:170). Thus Indigenous archaeology has the ability to make a vital connection between Indigenous memory, language, history, semantics, folklore, and excavated materiality (Wobst 2005).

By exploring the effects of applying such fundamental ethical principles, acknowledging the inherent colonial practices associated with archaeology, discussing the assumptions of Western ideology through the lens of traditional archaeological method and theory, and recognizing that Indigenous people are stakeholders in the archaeological process, we have seen how Indigenous archaeology not only can help to bridge the gap between archaeologists and Indigenous groups but also contribute new and innovative interpretations of the archaeological record in ways that perhaps increase the relevance of archaeology in today's society. At this point I will turn to the more practical aspects of conducting archaeology from an Indigenous perspective in the United States. First, I will provide a brief outline of relevant laws for conducting Indigenous archaeology

in the U.S. Finally, I will conclude the chapter by discussing how I have applied the principles of Indigenous archaeology to the Grapevine Creek project on the Crow Reservation.

Laws Governing Indigenous Archaeology in the United States

> Beginning with the passage of the Antiquities Act in 1906, archaeologists (perhaps unintentionally) began to co-opt the American Indian's unwritten history and material culture. The United States government deemed archaeological and historical sites of past cultures in the United States as worthy of protection for the benefit of the public, but it ultimately developed a permit system that centered protection of the past within the scientific community rather than in the hands of those whose ancestors were responsible for its creation. It wasn't until the passage of the Archaeological Resource Protection Act (ARPA) in 1979 that American Indians were given the explicit right to participate in regulating the excavation and removal of archaeological resources on land under the control or ownership of American Indian tribes, organizations, or American Indian individuals. (Watkins 2003:275)

In order to more fully understand the relationship between archaeologists and Native American groups in the United States, I will now explore the set of federal laws which codify a segment of the relations between these two groups. I will not discuss state laws due to the limitations of space and time, as each state has differing legislation regarding the protection of cultural resources (Watkins 2000:37). Through this discussion I want to highlight the legal obligations of archaeologists and the rights of Native American groups from the perspective of the federal government, focusing on the extent or limitations of these laws as a way of emphasizing the usefulness of adopting an Indigenous archaeological perspective when conducting archaeological research.

Federal laws protecting cultural resources date back to the 1906 American Antiquities Act, drafted by President Theodore Roosevelt as part of his vision to preserve the American "wilderness". Under this act the president is granted the authority to declare areas as national

monuments. The first property to be protected under this act was Devils Tower, Wyoming, a natural phenomenon of immense cultural significance to seventeen neighboring Native American groups. President Roosevelt felt that setting aside this land under the ownership of the federal government would help prevent drastic commercialization of natural wonders (such as the commercial development at Niagara Falls, New York). More importantly for Indigenous archaeology, though, the American Antiquities Act placed the responsibility for the stewardship of significant archaeological sites within the United States in the hands of the federal government and archaeologists, in other words, the scientific community (Watkins 2003:275; see also Watkins 2000:43). This act did two very important things. First, it codified into federal law the concept of "wilderness" as an expanse of nature untouched by human hands. This concept of wilderness removed from the national consciousness traditional Native American occupants from the natural environment, leaving the federal government and archaeologists as the only recognized stakeholders protecting what had now become a national heritage: "With the passage of the Antiquities Act, the American Indian's unwritten history and material culture began to be co-opted by the United States" (Watkins 2000:38).

Native American groups were not recognized by federal law as stakeholders concerned with the protection of cultural resources until the passage of the 1979 Archaeological Resources Protection Act (ARPA). This legislation gave federally recognized tribes the explicit right to regulate the excavation of archaeological sites on Indian land, although "[…] it listed skeletal remains as 'cultural resources,' a sore point among many American Indian groups" (Watkins 2000:41). Indian law made more advanced steps around 1990, with the passage of "repatriation legislation" such as the National Museum of the American Indian Act (NMAIA) and the Native American Graves Protection and Repatriation Act (NAGPRA). "Public Law 101-601, the

NAGPRA, affirms the rights of lineal descendants, Indian tribes, and Native Hawaiian organizations to custody of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony" (53; see also 55). Repatriation legislation is so named because it gives federally recognized Indian tribes the right to request the return of these objects from museums and other institutions that may have obtained these objects through a murky history of questionable acquisition practices (see Thomas 2000). Watkins feels this type of legislation may represent a mixed blessing, in effect "codifying choices that were once voluntary – essentially legislating a great number of archaeologists' professional ethics" (2000:xi-xii).

A final important piece of federal legislation regarding Indian law is the Fowler Bill, a set of amendments to the National Historic Preservation Act (NHPA) passed in 1992. The Fowler Bill allowed for the creation of Tribal Historic Preservation Offices as well as the inclusion of "traditional cultural properties" to be listed on the national historic register (Watkins 2000:39). The creation of Tribal Historic Preservation Offices and the assumption of historic preservation functions that were traditionally the responsibility of State Historic Preservation Offices have become "[…] an issue of tribal sovereignty because it removes a state official from the decision-making process managing heritage resources on tribal lands and reinforces the government-to-government relationship between the United States and Indian nations" (Watkins 2003:276). Some reservations, such as the Crow Reservation, have more than one office governing the preservation of cultural resources on Indian land. On that reservation, in addition to a Tribal Historic Preservation Officer appointed by the tribal Chairman and a Cultural Committee formed by members of the Tobacco Society (the traditional society tasked with the preservation of cultural practices), the federal government also employs an archaeologist with jurisdiction over the Reservation through the Bureau of Indian Affairs.

So what does this body of legislation mean for Indigenous archaeology in the United States? Watkins states that Indian sovereignty is a key issue defining the interaction between Native Americans and archaeologists on Indian-owned or controlled land (Watkins 2003:276). This sovereignty comes again from federal law: "Indian tribes are recognized by the United States government as domestic dependent nations that retain sovereign powers, except as divested by the United States […]" (276). What is most important about understanding this federal legislation is the ability of archaeologists to fulfill their legal obligations to Indigenous communities. Bearing this in mind, consultation is defined in federal regulations as "[…] the process of seeking, discussing, and considering the views of other participants, and where feasible, seeking agreement with them regarding matters [of the compliance process]" (King 1998:94).

The general trajectory of these federal laws, from the Antiquities Act of 1906 to the Fowler Bill amendments to the NHPA in 1992, has been towards developing a relationship of mutual, shared stewardship of cultural (archaeological) resources between archaeologists and Native American groups (Watkins 2003:282). This type of shared responsibility may be untenable given current conditions, where federal laws implicitly recognize scientific values as transcending Indigenous cultural values (283). Thus, from the perspective of Native American groups in the United States, the advances made from the passage of newer legislation have been viewed more as lateral moves: "The regulatory 'concessions' made in recent times to North American indigenous groups are those that should have been the right of those groups as sovereign nations all along; they still are limited in their rights to control their own heritage, and still have to rely primarily upon archaeologists to protect their heritage and that of their ancestors" (281).

The body of federal Indian law concerning the protection and stewardship of cultural resources focuses on physical objects and land ownership without addressing issues of value

systems (scientific versus Indigenous) or the sovereignty of Native American groups. Later in this chapter, I will discuss specific methods of applying the ethical principles of Indigenous archaeology to my dissertation research on the Crow Reservation.

Conclusion: Practicing Principles of Indigenous Archaeology on the Crow Reservation

> "American Indians do not have any singular way of dealing with archaeology and archaeologists, but rather have adopted various processes to suit their particular situations." (Watkins 2000:169)

My dissertation research involves the examination of the Grapevine Creek Buffalo Jumping Complex on the southern edge of the Crow Reservation in southern Montana. The Grapevine Creek Buffalo Jumping Complex is a well-known cultural site on the reservation. It was also loosely recorded in the 1960s by archaeologist Stuart Conner, who was shown the sites by tribal historian Joe Medicine Crow. The preliminary research aspects of the study included archival research at a variety of curatorial facilities in Montana and Wyoming as well as work with archaeologists and the Tribal Historic Preservation Office on the Crow Reservation for the purpose of conducting fieldwork and training tribal monitors for capacity building at the THPO. I would like to conclude this chapter by discussing the practical ways in which I have applied the ethical principles of Indigenous archaeology to this research process involving the Crow Tribe. I included the above quotation from Joe Watkins' seminal text on Indigenous archaeology in the United States to emphasize the fact that my situation is unique to myself, built upon both historic dealings of the Crow as a tribe with outsiders as well as my own personal relationships, both with individual members of the tribe as well as archaeologists working in the region. I want to underscore that sometimes I succeeded in practicing these ethical principles and at other times did not live up to them. At times of failure I attempted to reflect on what had happened and how I could improve

processes in the future. At times of success I was grateful to my participants for their willingness and cooperation. What I discuss below might be considered a summary of what I found worked for myself, members of my research team, and Indigenous community members. Throughout this section of the chapter I will insert anecdotes to discuss the success (and failures) of my research to live up to my ethical ideals in order to demonstrate the array of experiences I had conducting fieldwork on the Reservation between 2014 and 2016. In presenting this section in this format I intend to share some of the oral history of Grapevine Creek I created while conducting my dissertation research.

Before I began the research process, there were several practical actions I took in an effort to apply the principles of Indigenous archaeology to my work. First, I considered and articulated answers to critical questions that communities and Indigenous activists often ask, such as: "Whose research is it? Who owns it? Whose interests does it serve? Who will benefit from it? Who has designed its questions and framed its scope? Who will carry it out? Who will write it up? How will its results be disseminated?" (Smith 1999:10). I asked and answered such questions in order to be forthright and transparent regarding my method and methodology. Often when working on projects involving an Indigenous community, the process is more important that the outcome (127-128). Another important consideration I made before heading to the field to conduct research was to clearly articulate the benefits of the research to the Crow Tribe. Many Indigenous groups hold expectations that individual researchers will lay out in detail any likely benefits of their work (118), so considering what precisely the benefits of my dissertation research might be for the Crow helped me when communicating my research agenda to Crow tribal members.

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> It's about 8 a.m. on Wednesday, October 9, 2013. I am sitting in a cheap motel room in Hardin, MT – my first official stay in the reservation border town located

on Interstate 90 halfway between Billings and Sheridan. I've driven through plenty of times, but very little has induced me to think of much beyond its tiny size, the evident poverty, and the rumors I've heard from Crow friends about the rampant racism present in the town. I arrived last night after driving from Helena, MT, where I spent a week visiting the archives at the Montana State Historical Society. I had intended to spend a few weeks there, but I was told by the tribal archaeologist, Tim McCleary, a friend, that the Crow Cultural Committee convened only once a month, on the first Wednesday. My intention had been to obtain approval from the tribe to engage in my research, as well as get some clues as to how to make it the most beneficial to the tribe, so I dropped what I was doing in Helena and came to Hardin.

It is beginning to dawn on me that talking to university outsiders, in particular a group of Crow elders, makes my dissertation feel much more real. It has also occurred to me many times during my drive that it is entirely possible that the committee may tell me that they don't want me doing my research. I can't stop my heart racing and hands shaking this morning. I've prepared a small, typed agenda for my presentation and made copies for the elders. I've also rehearsed my speech a few times when I get a call from Tim.

"Hey Rebecca! How's it going?"

"I'm doing great!" (I'm lying.) "What's up?"

"We-e-ll," (Tim has a way of making this word about three syllables long), "the meeting is going to be at 10 at the tribal administration. Do you know where that is?"

"I don't know exactly where the cultural department is." (I'm hesitant to admit that, like Hardin, I've never done more than drive through Crow Agency). I think Tim sees through this, though, and kindly offers, "Why don't we meet at my office at the college and walk over? If you get here earlier you can hang out in the college library." He gives me directions to the library and I ask, as casually as possible, the question that is weighing me down like a ton of bricks:

"Do you think they will approve my research?"

Tim hesitates before answering, "I think you need to prepare yourself for them to say no. Sonny Joe, the head of the committee, doesn't really like white people coming in here and doing their research and leaving. He thinks there should be some sort of financial recompense to the tribe. You'll be ok though, I'll help you refigure your research so that it's near the reservation but not on it."

I panic.

It's about 9:45 a.m. and I'm in the bathroom of the Little Bighorn College Library. If I thought Hardin was an example of poverty, Crow is worse. Blowing trash and stray dogs met me when I got off the interstate exit, All the buildings I could see look like they're falling down, abandoned, with windows knocked out or boarded up. I later learned that most are not abandoned, but homes occupied by large families and cozy, tidy residences on their interiors. Loose horses are grazing in the town square. The library is an anomaly. It seems like a round, newly built and beautiful building. The interior has a welcoming fire (I pause for a moment at the irony of having open flames in a building full of paper) but am more comfortable in the familiar surroundings of book stacks and students reading or on

computers. Everyone is Crow. I tried to practice my speech a few more times but my panic over the possibility of not getting to continue my research is driving everything else out of my head. In a final desperate act, I have retreated to the bathroom to get on my knees and pray.

With shaking knees, shaking hands, and a stomach that is doing back flips, I leave the library and meet up with Tim. Tim is a rotund cowboy in his fifties, I think. He has very white blond hair and a red face. He is wearing his usual snap shirt and Wranglers. I've known him for four years, meeting up briefly at field schools where he tells Crow oral traditions, shows students interesting archaeological sites, and sometimes invites us to his home, where his wife, Carrie, makes the field school students breakfast and his children, Austin and Katie, show us their newest barnyard chicks and kittens. Tim has been the archaeologist in these parts for longer than anyone knows. Officially, he is a professor at the tribal college. But if anyone wants to know something about archaeology on the reservation or in the area, he is a walking encyclopedia of facts, stories, and opinions. I think of Tim as the only true four-field anthropologist I know, as he is fluent in Crow, has recorded more Crow oral histories and traditions than any other living scholar, and currently contracts his archaeological services to the tribe as a side line on his teaching position. He is also incredibly kind.

"Welp," he opens (this is a contracted version of his three-syllable "well"), "the meeting's over this way. Are you ready?"

I can't remember what I respond, but I spit out rapid fire about the agendas, which I am clutching in my hand, and a prepared speech.

The Crow Tribal Administration building was once the agency hospital. My friend Nancy Old Elk told me later that she hated having meetings in the basement morgues during the time she worked for the Tribe. When we enter the building, mint green tiles line the walls and this prior function is glaringly obvious. The building is humming with activity. I'm too nervous to make eye contact with any of the Crows around me and focus on following Tim like a duck. The meeting is in a small room with a few tables pushed together to make a conference area. The seats at the table are all taken up by wrinkled Crow elders. A younger Crow man I don't recognize is sitting at the foot of the table, wearing a collared button-down shirt, dress slacks, and shiny black shoes. He has a laptop open and is handing a typed meeting agenda around. He stands out, as the rest of the people sitting at the table are wearing faded and worn ranch attire common to southern Montana: worn cowboy boots, long wool-lined coats with bright patterns, sweat-stained cowboy hats. At the head of the table is a very wrinkled Crow man in a very dirty cowboy hat. He wears dark glasses and is missing a few teeth. His hands are gnarled with age and arthritis, but his hair is a warm black with only a few strands of grey. I get the sense that everyone in the room is deferring to him, so I guess that this must be "Sonny Joe," the chair of the cultural committee. Tim takes a seat in a bank of chairs against a wall and I sit next to him. No introductions are made, but it seems like small talk is happening at the table. In Crow. The young Crow man (I later learn that this is the THPO, Emerson Bull Chief) hands Tim an agenda. I peer over Tim's shoulder and see that he has an item regarding photographs at the Smithsonian at the top of the agenda. I am not on the schedule. Tim must have

sensed my panic because he stands and walks over to Emerson and quietly discusses something. Emerson nods and types something on his computer.

We sit around (in my case, awkwardly) for a few minutes before Sonny Joe (I was right in guessing the identity of the man at the head of the table) begins:

"Well we've got a big agenda today, so let's get started. If no one minds I'll go ahead and begin with a prayer." He removes his hat (his hair is oily and remains in the shape his cowboy hat left) and begins speaking a low prayer in Crow. I bow my head and repeat my own prayers.

When he finishes, Emerson speaks up and announces me as an addition to the agenda. Sonny Joe looks at me and I reflexively look away before forcing myself to return eye contact. I feel like an intruder in this meeting, in the building, and in Crow Agency. Tim's agenda item comes up first. He wants permission to look at some photographs at the Smithsonian that were recently identified as images of Crow men and women. Tim wants to bring his knowledge to bear on identifying the individuals in the photographs. After many questions in English (Tim said later that most Crows will never admit that he can speak the language, and that this provides him an advantage when they speak Crow to say things they don't want him to hear) and some discussion in Crow, his request is denied. Another wave of panic runs through me.

A few other agenda items are discussed before we get to me. "And now," says Sonny Joe, in a deep, warm, accented voice, "We have Miss Rebecca Nathan, here to talk about her research." His tone is light, and I suspect he is joking a little. I stand up and hand out my own agenda, trying to do this as quickly as possible so no one can see my hands shake. I begin by introducing myself, and to this day I have no memory of what else I said. What I do remember is that my prepared speech was full of technical and theoretical jargon that seemed utterly incomprehensible to this table of Crow elders. I remember trying to backtrack and say things more simply and straightforward but not finding my words. I tried to emphasize my desire to be of benefit to the tribe in as many ways as possible, but somehow it all felt needlessly complex and academic. Eventually I trail off. The room is stone silent.

Tim stands beside me, and in an act that I will be grateful for the rest of my life, he said "What I think she means to say is…" and went ahead and reiterated my stilted speech clearly, coherently, and briefly. Tim sat down and I followed suit. What followed was a discussion, in Crow, amongst the elders at the table. Perhaps it only took a couple minutes, but for me it was a lifetime. Eventually, Sonny Joe turned to me and said, "Well, I think you're barking up the right tree. We have stories that relate to this land, and I know young Emerson here will tell you about some work he needs done." And with that, I received my approval for dissertation research and was dismissed from the meeting.

***

Another important aspect I considered before beginning my research was that I would be working with individual members of the Crow Tribe, not with the tribe as a singular unit. I always made an attempt to be cognizant of whether I was working only with factions of the Crow Tribe who were known to be sympathetic or supportive of myself (Watkins 2000:xii) or whether I was attempting to communicate my research interests to all factions of the tribe known to be interested in the protection of cultural resources on the reservation should these two groups differ from each other.

***

> My first interaction with members of the Crow Tribe dates to my seasons as an assistant instructor at a field school held at Bighorn Canyon National Recreation Area, located near the Wyoming-Montana border in an area of land sliced out of the boundaries of the reservation. A man named Burdeck Two Leggins, introduced to me as the chair of the Cultural Department of the tribe, would visit the school with a variety of his large family in tow, most often two of his sons, Noel, who was my age, and Jaelyn, a young teenager. It was over the course of many conversations running late into the night at our base camp at the restored Ewing Snell Ranch that the needs of the tribe for aid in protecting their cultural resources were brought to my attention. Burdeck would often talk about his small office, composed of himself and one or two other employees, being tasked with the protection of Crow culture across the entire 2.2 million-acre reservation. It was during these formative years, between 2009 and 2011, that I first began to dream about planning my dissertation research to be of most benefit to the tribe. It wasn't until 2013 that these thoughts crystallized into the plan I presented to the Cultural Committee in 2013. However, when I wrote my dissertation proposal and dreamed my dreams of being helpful, I always envisioned working with Burdeck Two Leggins, whom I had come to look on as a friend, and who had adopted my dissertation advisor, Laura Scheiber, into his family.
>
> Reality was much different, though, as the 2012 tribal election brought a change in tribal administration and a complete change in the staffing of the office. By the time I was prepared to meet with the tribe face-to-face in 2013, the name of Two Leggins was not spoken in the halls of the administration building. When I received my approval to work on the reservation, it was from tribal members appointed into the Darrin Old Coyote administration, like the chair of the Cultural Committee, Sonny Joe Reed, or the newly appointed THPO, Emerson Bull Chief.
>
> When I began to work at the THPO office a year later, I was working directly for Bull Chief. I understood the tension with the previous administration, and when I was in the tribal office, I did not mention my relationship with the Two Leggins. Off work hours, however, I tried to renew my friendship with Burdeck's

son, Noel. While happy to hear from me over the phone, Noel would never commit to meeting with me in person. When I ran into Burdeck and his wife Billie in the streets, they were likewise happy to visit but warned me that the people I was working for were thieves. In Burdeck's own words, they were "evil people." From my own first-hand knowledge and friendships with members of the THPO, I knew that both Two Leggins and Bull Chief were committed to protecting cultural resources on the reservation, but given the political climate at the time I conducted my dissertation research I worked almost exclusively with Bull Chief, Reed, and other tribal members sympathetic to the Old Coyote administration.

During the 2016 field season, however, an opportunity presented itself to introduce the Grapevine Creek project to the Two Leggins. Because this season of work was funded by a federal grant, we were required to advertise the positions being funded by the grant, including several assistant instructors. Two Leggins' second-oldest son, Son Son Two Leggins, applied for the position and was highly qualified. Bull Chief, in an effort at reconciliation, approved the hire, and Son Son worked with us during the second, larger, field season at Grapevine Creek. This field season was an immersive program, where all participants camped near the project area and participated in cooking and maintaining our communal camp. On one night, Son Son's family, including Dr. Scheiber and Burdeck, came to visit for dinner. We fed them a meal and stayed up late visiting and discussing the project. It almost felt like being back at Bighorn Canyon five or six years prior. During the evening I was happy to share information about the research we were undertaking, and our findings, with the tribal elder. We had just opened up two test units at 48CK0262 and were discovering a stratified bison bone bed, perhaps one of the most exciting finds of the season. I recall also feeling very nervous and guarded, as I knew Burdeck's opinion of my employers (who were allowing me to conduct this project). While I wanted to take the opportunity to reestablish our relationship, I had to be clear about my respect and working relationships with Bull Chief and the staff at the THPO. For me, it was a tense evening. However, we both avoided directly discussing the current administration. Burdeck expressed an interest in seeing the dig site and remaining for a few days. I took it as a good sign and invited him to join us at the site the next day. Burdeck returned in the morning with his wife, Billie, and followed us out to the buffalo jumping complex. I explained the archaeological context and landscape we were uncovering, showed them our excavation methodology, and had our Crow students explain their findings. Burdeck and Billie stayed for a few hours and said, before leaving, that the work we were doing was excellent and they hoped we would be back next year to continue the excavations. I was shocked!

What I took home from this was that hosting a field school with a camp allowed me to achieve a level of transparency that would have otherwise been unavailable. We were in the field for six weeks in 2016, and literally had visitors from the community every single night. The project budget allowed for extra food so that anyone who visited was fed and made welcome and I think, more than any of my good intentions, having a space each evening with food and a relaxed atmosphere allowed for two separate, interested parties to acknowledge that each were attempting to do what was best for cultural resources on the reservation.

***

Finally, before beginning research, Linda Tuhiwai Smith suggests that "[…] it is critical that researchers recognize the power dynamic which is embedded in the relationship with their subjects" (Smith 1999:176). In order to apply the principles of Indigenous archaeology to my research, it was important to include Crow tribal members in the research process from the outset (Watkins 2003:278). I began this process early in my research by discussing generally the scope of my project with members of the Tribal Historic Preservation Office, including the THP Officer as well as the head archaeologist employed at this office.

During the course of my research, there were further practical steps I took in order to practice the principles of Indigenous archaeology. First, I acknowledged my privileged place as a non-Indigenous researcher being allowed into the Crow community. And while I received privileged knowledge as a result of this placement, as a scholar of Indigenous archaeology I problematized the insider model by being constantly self-reflexive (Smith 1999:137). I accomplished this while conducting my dissertation research by considering the meaning of consent: "Consent indicates trust and the assumption is that the trust will not only be reciprocated but constantly negotiated – a dynamic relationship rather than a static decision" (136). I attempted to bear in mind that while I had consent to perform my research today, the situation might shift as I learned more and as my presence in the community and personal relationship with Crow tribal members developed. There was a constant fear that consent to continue my research might even be revoked; this was a possibility I accepted just as I fully accepted that the Crow tribe were stakeholders in the research process. I also understood that making the assumption that my own experience concerning archaeology on the Crow Reservation was all that was required to

understand the culture history of the region is presumptuous and arrogant (139), and rather my attitude should be open and accepting of a diversity of truths, perhaps through an incorporation of Crow oral traditions into my research, which I did (Watkins 2003:282). Another way in which I practiced reflexivity while conducting my dissertation research was attempting to recognize when my research questions were shaped by my personal beliefs or assumptions and to focus on the effect these had on me while interacting with people (Smith 1999:173).

In addition to practicing reflexivity, I also bore in mind when conducting research that American Indian groups and archaeologists share a common goal of protecting cultural heritage sites from unnecessary destruction (Watkins 2000:172). In the particular case of my research, I structured my project with the goals of providing real, tangible benefits to the tribe in the form of a National Register of Historic Places Nomination for the Grapevine Creek Archaeological District and capacity building via training of Crow Tribal Cultural Monitors. The project also accommodated a number of Indigenous values by applying a nondestructive method of identifying and surveying archaeological sites, focusing only on archaeological sites threatened by land development, and by involving the Crow community in both testing the model and offering training to tribal members in mapping and surveying techniques (Watkins 2003:277).

The final component of my research involved writing about it in the form of a dissertation. In order to fully integrate the principles of Indigenous archaeology into all of my research process, there were more practical actions I took while writing my dissertation. The first was to maintain a critical assessment of my writing process as well as the sources I utilized. Academic writing is a form which privileges some texts over others in the form of presenting a highly refined body of knowledge. By engaging in this process uncritically, "[…] we too can render indigenous writers invisible or unimportant while reinforcing the validity of other writers" (Smith 1999:36). In

practice, I strove to include all oral histories and traditions as unedited as possible, acknowledging, when it was available, who the speaker of these oral histories and traditions was. Assessing my writing process critically also allowed me to acknowledge the danger of writing, in that I have no control over how people interpret or use my work after I have written it. As Linda Tuhiwai Smith notes, "[…] we reinforce and maintain a style of discourse which is never innocent" (36). Another method of incorporating Indigenous values into my writing process was to include storytelling in my final writing product. Storytelling is a method of discourse which both gives space for diversities of truth but also, by presenting stories and oral traditions in the original form, allows the storyteller to maintain control of the narrative (145). In my chapter on oral traditions, I have included oral traditions in as original form as I could locate, and in all possible cases acknowledging the speaker to whom the oral tradition is attributed to. I refrained from summarizing the stories in order to allow future readers to form their own interpretations of the meaning of these oral traditions. I also concerned myself with ensuring that I respected the intellectual property rights of the Crow Indians, as they are the stewards of their oral traditions (Watkins 2003:282).

Thus, the methodology I employed while conducting my dissertation research included many practical actions I took in order to apply the ethical principles of Indigenous archaeology. Most of these practical actions revolved around a constant, reflexive, critical assessment of my research as I conducted it, asking myself questions about assumptions, purposes, and intentions. Other practical steps included open and honest communication with members of the Crow tribe and making efforts to include tribal members in my research process.

3. Grapevine Creek Background

In this chapter, I will discuss some prior research conducted in the Grapevine Creek area. I will highlight environmental aspects that make this area unique, as well as summarize some of the more interesting archaeological features that make up the Prehistoric and Historic context of the Grapevine Creek buffalo jump complex. These include other nearby buffalo jumps, rock art in Grapevine Creek, the Grapevine Creek Battle site, the Bozeman Trail, other archaeological sites and stone features. These features of the Grapevine Creek landscape serve to provide a context for a later discussion of the Grapevine Creek Buffalo Jumping Complex.

Environment of Grapevine Creek

The Grapevine Creek drainage is located at the base of the Pryor Mountains in the Montana High Plains. These plains consist of short grass prairie broken by mountains and badlands. Precipitation averages about 15-20 inches annually. Generally, winds in the area are persistent. The short grasses are high in protein content and historically supported large game animals year-round (Conner and Conner 1971:12).

The area is described by Payne (1973:6) as a "Foothill Grassland" area:

> Species that define the area are and [*sic*] admixture of plains and mountains species and the predominance of wheatgrasses and fescues. The chief wheat grases [sic] are blue bunch wheatgrass and western wheatgrass. The primary fescues are Idaho fescue and sheep fescue. Another distinguishing feature [of this environmental area] is the shrub and tree covered canyon[s] that descend into this type [*sic*]. Other common species include: Douglas hawthorne, Saskatoon serviceberry, western chokecherry, western snowberry, russet buffaloberry, rose, quaking aspen, Mountain brome, pumpelly brome, thickspike wheat grass, and bluegrass. (Nickels 2003:5)

Buffalo Jumps in the Crow Tradition

The Crow received the buffalo jump from Old Man Coyote, the creator of the world. According to one story,

> As usual, Old Man Coyote was hungry one day and so were the rest of the people and he decided to go look for some meat. Soon he found a herd up on a bench and he decided to trick these buffalo over a nearby cliff hidden by a thick cloud or fog. In his usual bragging style, he challenged the head buffalo to a race. Well, as this story goes, immediately his challenge was accepted and the race was on. Naturally, Old Man Coyote selected the course, was ahead and when they approached the cliff, he disappeared quickly, and the buffalo herd went over the cliff. Old Man Coyote jumped around to the lower end and came around with messed up clothing, if he was wearing clothing, maybe he changed himself into a buffalo, anyhow, he made his nose to bleed and pretended like he was hurt. (Medicine Crow 1962:35)

According to the Crow oral tradition, the technology of hunting buffalo using jumps predated the Crow arrival in south-central Montana and lasted until at least the beginning of the twentieth century (Medicine Crow 1962). According to one tribal historian, Joseph Medicine Crow, use of the buffalo jump increased when the Crow arrived in this area due to the suitability of the landscape for jumps (i.e., the presence of many narrow box canyons). Medicine Crow notes two styles of buffalo jumps used by the Crow on the reservation. The first, or classic style, involves drive lines, usually piles of rocks arranged in wings, or one wing of rock piles used in conjunction with other natural linear features. The second type is intermediate, or semi-classic. This type involves no rock piles but rather is located on a steep-sided point or ridge and the jump itself might happen to be accidental (Medicine Crow 1962:36). There is an important ceremonial aspect to the Crow use of buffalo jumps. Medicine men were used to aid in driving the buffalo over cliffs using bundles or incense (Medicine Crow 1962:38).

Buffalo Jumps in the Immediate Vicinity of Grapevine Creek

In 1978 a large-scale archaeological inventory was carried out by Leslie Davis prior to the construction of the Pryor Cut-Across (between Saint Xavier, Montana and Pryor, Montana). An estimated 142,000 acres of land to the immediate northwest of the Grapevine Creek drainage were intensively surveyed, resulting in the discovery of 95 archaeological sites and 35 isolates (Davis

1978:5). While the majority of these sites (n=83) were identified as "settlement or habitation activity" sites, one was described as a "bison kill, complete with piles of stone converging toward a vertical drop" (Davis 1978:7). The Scott Creek Drive (24BH1784) is located within the Scott Creek drainage approximately 20 kilometers west-northwest from the Grapevine Creek buffalo jump complex. It appears that Davis identified this site's function based on the presence of cairn lines which he interpreted as drive lines. He describes the site as a bison kill site despite a lack of any buffalo bones noted. No artifacts or lithics were collected from the site during the 1978 inventory and no time period was assigned to the site (Davis 1978:104).

The Grapevine Creek Buffalo Jump Complex

In 1961 Medicine Crow presented Crow cultural information about buffalo jumps to the Montana Archaeological Society. His talk was transcribed into a memoir by Carling Malouf and Stuart Conner in 1962. In his talk, Medicine Crow related the specific locations of several buffalo jumps on the Crow Reservation, including the confluence of the Beauvais Creek and Bighorn River, the confluence of Dry Head Creek and Hoodoo Creek, Pryor Creek, Lodge Grass, and a complex of jumps near the mouth of Grapevine Creek. He describes four buffalo jumps, variants on the "classic" style (described in the same talk as having "…wings of piled rocks that converge at the top of a cliff" (Medicine Crow 1962:36). One of these jumps had two separate drive lanes (. Medicine Crow gives the Crow name for this complex as "Place Where Men Pack Meat" or "Where They Get Their Meat." Medicine Crow further notes that terrain with many narrow box canyons is ideal for buffalo jumps and that Crow country was particularly blessed with this type of physiography. The buffalo jump site at the confluence of Dry Head Creek and Hoodoo Creek, which Medicine Crow notes as being used as late as 1911, is less than four miles from the southern

end of the Grapevine Creek drainage and likely located in close proximity to the Bad Pass Trail. This jump is associated with Chief Tip of the Fur, or On Top of His Fur.

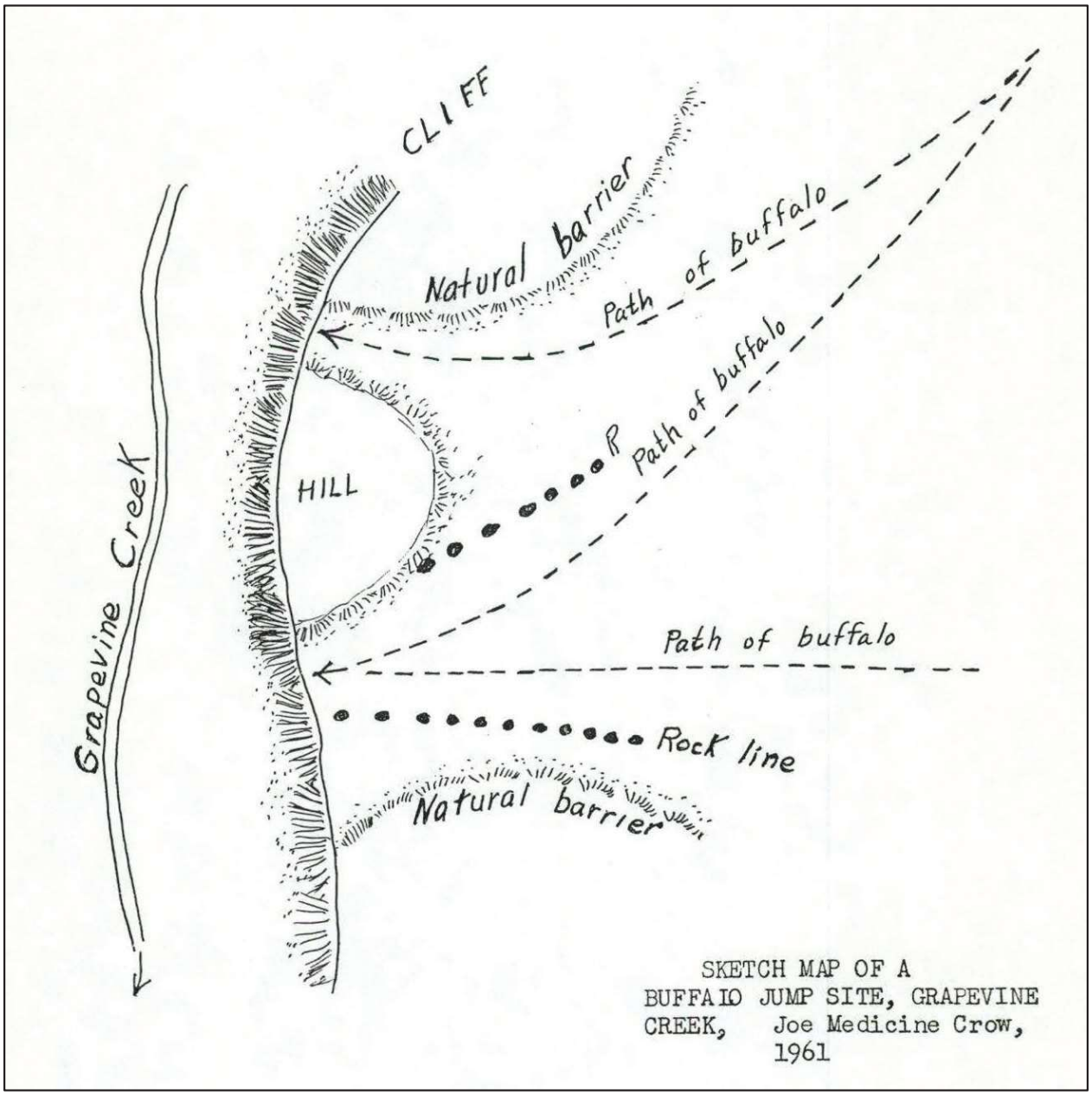

Figure 1: Medicine Crow's drawing of the Grapevine Creek buffalo jump with two drive lines. This site was identified during the course of my research as 24BH0262 (Medicine Crow 1962:39).

Based on the description of the Grapevine Creek buffalo jumps by Medicine Crow in his 1961 lecture, a group of Crow Indians and archaeologists visited the Grapevine Creek buffalo jump

complex in 1964. Stuart Conner drafted a memo describing the event and summarizing the information related to the group by Joe Medicine Crow. 5 separate jumps were identified by the party. 3 jumps, located on the north side of Grapevine Creek, were visited by the party. No bones were located at 24BH261 or 24BH262, but both jumps were noted to have grass covered talus slopes at the base of their respective cliffs. At the cut bank below the cliff of 24BH265, Medicine Crow pulled a bison bone out of the wall. No other faunal remains were noted at any of the five sites. The two sites south of the creek were not visited in 1964. Conner was so impressed by the drive lines and the density of buffalo jumps that he was convinced of this location, known in Crow as "The Place Where the Men Get Their Meat" that he had the following to say about it: "This amazing concentration of buffalo jumps is unique." Conner discussed the complex of 5 sites four years later, stating that, despite only visiting three out of the five sites, "these sites offer an opportunity for the scientific excavation and interpretation of buffalo jumps unparalleled anywhere in the Americas" (Conner 1968:1). Conner describes the buffalo jumps as having traditional rock lines leading up to a cliff, although one of the sites has its drive line running parallel, rather than perpendicular, to the cliff face (presumably Conner is describing 24BH0265). Conner mentions Crow legends that describe using the Grapevine Creek buffalo jumps specifically (1). Finally, Conner mentions that the site forms are on file with the River Basin Survey in Lincoln, Nebraska (1), though these are not currently on file with the Montana State Historic Preservation Office.

Conner returned to the site five years later, in 1969, as part of an investigative team under the Montana Fish and Game Department. The supervisor at that time, Fletcher Newby, wanted to assess the scientific, cultural, and interpretive potential of the four buffalo jumps that were located on state land (Conner 1969:1). Conner noted that one of the sites had been damaged by road improvements since 1964 (24BH0265) and that the investigative team could find no physical

evidence for one of the sites identified in 1964 but not investigated (24BH0263). The team discovered a new rock alignment in the immediate vicinity at this time (24BH0662). Conner and his team looked closely for evidence of buffalo bones at the base of the cliffs of each site but were unable to find evidence of any faunal remains. Conner speculated that the bones of 24BH0262 might have been removed for the manufacture of fertilizer, based on the information of a Crow informant, Martin He-Does-It: "Examination of the talus slope at the foot of the cliff, where the bone deposit should be, revealed no surface indication of bones to whichever of us it was who examined it. This may be the site that Martin He-Does-It told us this summer had once been commercially excavated for the bones to use in the manufacture of fertilizer" (Conner 1969:1). Conner concluded his memo by reiterating how ideal the area is for buffalo habitat. He also provides a copied U.S.G.S. topographic sheet with the locations of these sites drawn on in pencil.

Rock Art at Grapevine Creek

Grapevine Creek empties into the Bighorn River immediately north of Bighorn Canyon. This geologic feature is noted for its towering, sheer rock walls. While not strictly within the drainage itself, Crow Cave lies a mere couple hundred meters away from the drainage boundary. The cave itself is difficult to access, being somewhat below the rim of the canyon wall itself. This cave received its name for the subject of the pictograph panels found within (Figure 2). These panels show anthropomorphic figures with characteristic Crow hairstyles. Additionally, there are panels with what have been interpreted as tobacco plants. Conner and Conner feel that the human figures in Crow Cave represent the work of outsiders to the area:

> Because of internal or body designs and other design elements that do not appear in the figures used in establishing the rectangular body type, the […] Crow Cave drawings are

> not considered as falling within the rectangular body type... [T]he human figures differ sufficiently from other rock drawings of the Montana High Plains as to suggest an essentially alien influence, probably from the Wyoming or Utah areas, although there is some chance that they might be related to Malouf's type 3 forms which presumably occur in the western Montana mountains. (Conner and Conner 1971:28)

The unique design elements of the Crow Cave rock art site support the idea that groups of people travelled great distances through or to Grapevine Creek.

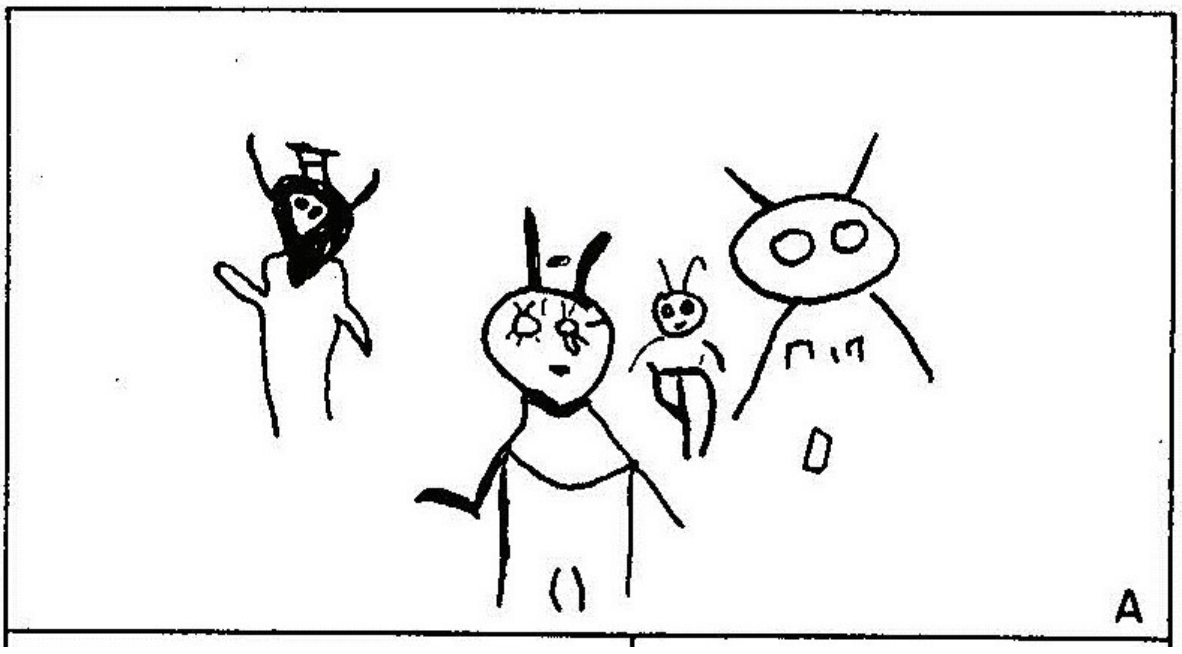

Figure 2: Reproduction of anthropomorphic rock art panel at Crow Cave (from Conner and Conner 1971:63).

The Grapevine Creek Battle

In 1968 Conner described the fortified battle site in a short submission, "Worthy New Sites in Southcentral [*sic*] Montana." He describes the site as consisting of 22 (or more) stone fortifications that are noted in Crow oral history to be the place where a last stand of Blackfeet warriors were routed by Crows. Conner mentions the existence of two living Crow informants who were taken to the site by their grandfathers and told of the battle: "One said when he first saw the site there were human and horse bones about, and bows and arrows and abandoned firearms. The

other, who must have visited the site within 5-10 years, observed none of these artifacts and critically blames the non-Indians of the area for picking the site clean" (Conner 1968:2). The site was photographed prior to the publication of this brief description by Fred Mang, Jr. of the NPS Santa Fe office, although no record of these photos remains. Finally, Conner notes that this site (24BH0266) was *not* the site of an 1834 battle between the Blackfeet and the Crows witnessed by James Beckwourth and described in his autobiography (Conner 1968:2).

This archaeological site was untouched by researchers for thirty years, until 1997 when the Crow Tribe and the National Park Service performed a collaborative research project and metal detection survey of the site (Hoxie 2000). Although the metal detection survey produced no results (34), the historical research into the context of the Grapevine Creek battle was incredibly fruitful. The researchers focused on two versions of the oral tradition of the Grapevine Creek Battle, one referred to as the He Does It version and the other as the Old Coyote version (Hoxie 2000:31). The general course of the story is similar across both narratives but specifics, such as the number of warriors on each side, differ. Conner's information on the battle site in 1968 came from Martin He Does it.

The Crow oral tradition says that the Grapevine Creek Battle was fought between a small war party of Piegan Blackfeet and Crow (Hoxie 2000:1). The battle was part of a rivalry between the Crow and the Blackfeet going back to the eighteenth century or perhaps even earlier (6). While conflicts were ongoing throughout this time in history, engagements escalated with the arrival of the Hudson's Bay Company in the early nineteenth century. The Blackfeet were one of many rivals for hunting ground and living space as Euro-American settlers encroached onto the Northern Plains during the 1800s. In addition to the three bands of the Blackfeet (Piegan, Blood and Siksika) to the north and west, the Crow were enemies with the Lakota to the east and south and the

Assiniboine to the north (5). Despite these hostilities with the Blackfeet, this tribal group and the Crow share many cultural similarities that demonstrate cultural contact and mutual influence (8-9). This may be due to the exchange and enculturation of captives between the two tribal groups but also due to the nature of traditional Plains warfare, which Hoxie thinks is emphasized "[…] by raids of small bodies of warriors for the purpose of attaining status, either through the acquisition of horses or the gaining of other types of coups" (28). Killing enemies or the acquisition of new territory was rarely a focus of Plains warfare, rather the emphasis was more internal, as a means for young men to acquire wealth and status within their own communities (43). By the 1860s, warfare between the Crow and Blackfeet had decreased in intensity, consisting mainly of raids by smaller parties (25). Crow oral traditions suggest that the conflict at Grapevine Creek was a result of just such a small raiding party of Piegan Blackfeet entering traditional Crow hunting territory.

In his research on the Grapevine Creek Battle, Hoxie describes the Grapevine Creek area as being "always intimately associated with the Crow Tribe" (2000:29), first as encompassing a portion of the Mountain Crow traditional hunting range and secondly as eventually being incorporated into the modern-day Crow Reservation, as it continues to be today. Grapevine Creek was an ideal location for the Crow:

> The Grapevine Creek region provided ready access to all the natural resources necessary for the survival of the Crows. Both archaeological and historical records testify to the abundance of buffalo in the region, while the proximity of the Bighorn Mountains provided both prosaic items such as lodgepole and spiritually powerful locations for young Crows seeking guidance. Grapevine Creek itself draws its name from the profusion of vines that grew along its banks, providing another inducement for Crows to frequent the area, particularly in late summer when the fruit was ripe. (Hoxie 2000:32).

The battle itself took place between a small raiding party of Piegans (either 33, according to the He Does It account, or 60, according to the Old Coyote version) (39) and a much larger

Crow hunting party, the exact numbers of which again differ by version. However many Crow there were, there were at least enough to deter the Piegan raiding party. The Piegans were on foot, which meant they were likely on a raid for horses. The Piegan raiding party was spotted by a small group of Crow who were butchering a buffalo (35). The Piegans retreated to a small knoll where they were able to construct 23 stone breastworks (Figure 3). The fact that the Piegan party had time to prepare these stone features indicates that the Crow hunting camp was not in a hurry to attack the retreating Piegans.

Figure 3: Photograph of breastworks at the Grapevine Creek Battle Site, 24BH266. Reproduced from Hoxie 2000:33).

During the battle, the Crow were led by the enigmatic figure of Stump Horn, whose identity in the historic record is unclear. However, Hoxie and his team of researchers feel that Stump Horn

is the same man who is listed on the 1887 census as the father of Bull Bird, also known as William Moore, who died childless sometime after 1910 (2000:30-31). According to the two versions of the story, Stump Horn's young bull elk magic was strong on the day of the battle (38). He charged the breastworks at the crest of the hill without being hit. His attack rallied the Crow to follow after and break through the Piegan defenses. Although Stump Horn does not appear anywhere else in Crow histories, and it does not appear that he was a chief, Crow traditions agree that his intervention caused a Crow victory on that day. Both the He Does It and Old Coyote accounts agree that only two Piegan survivors were left alive, ostensibly to return to their band and tell the story of how badly they were beaten, though one Piegan died of injuries on the return journey (39). There are no Piegan oral traditions that correspond with this story.

The significant features of this archaeological site located in the Grapevine Creek drainage are manifold. First, the figure of Stump Horn ties an archaeological site to a specific historical person that can be traced to the twentieth century. Second, the battle occurred at a pivotal time in this region of the Plains, likely in the early 1860s before the construction of Fort Smith and the opening of the Bozeman trail, and only a few years before the Battle of the Little Bighorn, which took place only a few miles away from Grapevine Creek in 1876 (Hoxie 2000:44). Due to its remote location, the battlefield represents one of the best-preserved Native American intertribal battlefields in existence, in addition to being one of the most historically significant intertribal battle sites on the Northern Plains (47). The battle itself represents a cusp of temporality in that it occurs in "[…] one of the last moments when Indian people fought each other outside the boundaries of U.S. authority" (48). Additionally, the Grapevine Creek Battle site is a place where a decisive Crow victory over their traditional enemies, the Piegan, occurred. In this the site gains ongoing significance to the Crow, who continued to use the Grapevine Creek drainage as a summer

camping location into the twentieth century. The site represents both a form of Indigenous archaeological site curation as well as modern site usage patterns, as young campers were brought to the site and told the story of what happened there (40). This is the source of the two remaining accounts of the battle, Martin He Does It and the Old Coyote version.

Stone Features

In 2005 Alan Three Irons performed a brief survey for the BIA prior to the establishment of a wind monitoring station on the southern end of the Grapevine Creek drainage. He identified a cairn immediately to the west of the proposed monitoring station. No further information regarding this cairn is available, however, the cairn does not correspond with any identified site locations (Three Irons 2005:1).

The Bozeman Trail

One of the major travel corridors through Grapevine Creek is an east-west corridor. This path was first crossed in historic times by Francois-Antoine Larocque in 1805. This marks the beginning of the fur trapping era in this area, with Manuel Lisa establishing a trading post at the mouth of the Bighorn River in 1807 (Davis 1978:21). Most fur trappers could find easier routes to traverse the area to the north or west. Up until the 1830s, fur trapping activity increased, but it wasn't until the early 1860s, when gold was discovered in western Montana, that a large rush of Euro-American emigrants came to settle in that area. In 1863 John Bozeman scouted his trail through the Grapevine Creek drainage in order to make a profit as a guide. However, the Bozeman Trail never experienced the volume of other historic trails due to many factors, including hostility from Sioux tribes (who enter this area around the same time) and the construction of rail lines

(Davis 1978:23). Nearly 2,000 settlers traveled the trail between 1864 and 1865 (Nickels 2003:7). The trail was most often used for military movement, particularly during the occupation of Fort C.F. Smith from 1866-68 at the crossing of the Bighorn River in present day Fort Smith, Montana, immediately north of the mouth of Grapevine Creek (Davis 1978:30). During these two years the fort became a rallying point for the Crows to escape aggression from the Sioux. After this time the trail saw little use.

Perhaps the final important use of the trail was in 1883, when the Crow Agency was moved from its Rosebud location to its current location along the Little Bighorn River (Davis 1978:35). The presence of the Bozeman Trail in the Grapevine Creek drainage reflects the importance of this drainage as an east-west travel corridor. Historical evidence for the use of this area as a travel corridor dates back to as early as 1805, when Francois-Antoine Larocque was guided by Mountain Crows through the area on his way to the Yellowstone River valley near present-day Billings, Montana. It is highly likely that the area was known and used as a travel corridor prior to this time by the area's inhabitants. Despite the fact that the Bozeman Trail was only lightly used, the amount of promotion done by John Bozeman about the trail and the value of moving to western Montana had a huge effect on the volume of overall emigrants who came to this area in the second half of the nineteenth century (Davis 1978:24).

Archaeological Features in the Immediate Vicinity

In 2003 the Bureau of Reclamation undertook a survey and cultural resource inventory for a proposed route for the Yellowtail Afterbay Power Line (Nickels 2003). This survey took place on the eastern banks of the Bighorn River, immediately north of Yellowtail Dam. The surveyors discovered two rock features of presumed historic origins (likely associated with the construction

of Yellowtail Dam in 1967 (Nickels 2003:9) as well as a large lithic scatter just a few hundred meters upstream from the mouth of Grapevine Creek. This site, 24BH2979, consists of an estimated 400 pieces of surface debitage. A 50x50x50 centimeter test unit was placed in the densest portion of the site but revealed no intact subsurface stratigraphy. The function of the site was interpreted as follows: "Locally expedient materials taken from river cobbles, cliff sides and other locations were tested for their fracture dynamics. Good pieces were then taken to be worked elsewhere and finished for tools. The poor quality materials were left behind on the surface" (Nickels 2003:15). The site was determined to be ineligible for the National Register of Historic Places. This site is significant to the Prehistoric use of the Grapevine Creek area; however, due to its close proximity to the Grapevine Creek watershed and its similar nature to the previously identified lithic scatters found within the drainage itself.

Conclusion

In this chapter, I have discussed prior research conducted in the Grapevine Creek area by highlighting environmental aspects that make this area unique, as well as summarizing some of the more interesting archaeological features that make up the Prehistoric and Historic context of the Grapevine Creek buffalo jump complex, including other nearby buffalo jumps, rock art in Grapevine Creek, the Grapevine Creek Battle site, the Bozeman Trail, other archaeological sites and stone features.

While these features of the Grapevine Creek landscape serve to provide a context for a later discussion of the Grapevine Creek Buffalo Jumping Complex, it should also be noted here that many gaps are present in the body of previous research at Grapevine Creek. Most notably, there is a lack of recent archaeological studies in the area. This is most strongly noted at the Grapevine

Creek Buffalo Jumping complex itself, which has no site forms on file at the Montana SHPO, and it appears that little aside from the initial identification of the archaeological features was done. Additionally, no systematic, comprehensive survey of cultural features has taken place within the Grapevine Creek drainage. My dissertation research addresses this sizeable gap.

The interdisciplinary study undertaken at the nearby Grapevine Creek Battlefield is an example of the fruitful research that can be produced when oral traditions, oral histories, the Historic documentary record, and archaeological materials are all brought to bear on the understanding of past events, and I hope that the interdisciplinary study undertaken for my dissertation research will produce similarly fruitful results.

4. History of Buffalo Jumps on the Northwestern Plains

Introduction

Buffalo jumping is a communal hunting activity. Its history can be traced back to the Archaic period on the Plains, and the origins of this practice trace their roots even further back into the Paleoindian period. While bison jumping was a firmly established practice at the end of the altithermal period in Wyoming and Montana, evidence exists that buffalo jumping may have predated the altithermal in other parts of the Plains (Frison and Reher 1970:41). Archaeological sites such as Bonfire Shelter in southwest Texas and Olsen-Chubbuck in southeastern Colorado represent the earliest recorded occurrence of communal bison hunting, around 10,000 years ago (Arthur 1975:71; Dibble and Lorrain 1968, Wheat 1972). The fluorescence of buffalo jumping occurred in an area roughly corresponding to southeastern Montana during the Late Prehistoric Period. The general distribution of archaeological sites understood to represent communal buffalo hunts (whether jumped or impounded) range over an accepted geographic distribution which includes: "[…] east of the Rocky Mountains in Canada and south of the aspen parkland fringe in the prairie provinces of Alberta, Saskatchewan, and Manitoba. South of the Canadian border, drive sites occur in all of the Great Plains states, with the possible exception of Kansas. They are found also in the state of Washington, in southern Idaho, and possibly Utah" (Arthur 1975:72). The center of these activities, both geographically and in terms of density, is eastern Montana (Arthur 1975:72; Malouf and Conner 1962). While buffalo jump sites are found more commonly in the foothills and flanks of the Rocky Mountains (Grapevine Creek being no exception), pound sites are more common farther eastward in the more level plains and prairies (Arthur 1975:72). The Grapevine Creek Buffalo Jumping Complex, dating to the Late Prehistoric time period and found in southeastern Montana, is therefore exemplary of buffalo jumping at its height. Buffalo drives

occur in edge-area environments, the most general and far-reaching being where the Boreal Forests meet the Northern Plains (Kehoe 1973:3). Generally, bison jumps are less common than trapping via pounds, and some scholars, such as Kehoe, argue that their more widespread presence on the Plains is indicative of this method being preferred over jumping (3). Kehoe argues for an industrialized model of bison trapping in the end of the Late Prehistoric Period and the Historic Period, arguing that jumping would be less preferred because it resulted in ruined hides and a less ideal butchering location (on a slope and perhaps far from a secondary processing area) (3). After the introduction of the horse, buffalo pounding and later buffalo surrounds, lacking in any physical structure to aid the hunt, replaced buffalo jumping as the preferred method of communal buffalo hunting. Prior to the acquisition of horses, buffalo jumping and impounding was the primary means by which Plains peoples obtained winter sustenance (Forbis 1960:69). Forbis attributes the intensity of Plains occupation at the time of historic contact to the success of buffalo drives (i.e., jumping and pounding) (69). Communal buffalo hunting as a practice continued up to the extermination of the buffalo on the Plains at the end of the nineteenth century.

As a communal hunting practice, buffalo jumping was inherently concerned with more than just the production of food and other goods manufactured from the body of a buffalo. Groups of people larger than an average community unit were required to converge, live together, and cooperate in an activity that required a large amount of work and effort and had a high risk of failure. Based on the evidence at Kobold, Frison felt that buffalo jumping "[…] required a larger group of people to assemble than would ordinarily associate together unless some unusual food source was available. Buffalo jumping could not have been a spur-of-the-moment activity but had to be conceived and planned ahead of time" (1970:28). A religious element was tied to the success of the jumping through the work of spiritual leaders, who also participated in making a jump

successful. Large communal bison hunts were restricted to the fall of the year, mainly due to animal behavior (Frison 1973:5). Successful communal bison hunting was based on having a critical number of bison in the area to allow for a herd to be successfully driven to a trap site (6). A herd of sufficient size (100 or more) had to be driven to a jump site in order to provide a necessary group force to push buffalo off a cliff. The cliff also had to be of a sufficient height to kill or wound buffalo enough that they were too incapacitated to run off after the fall (6). Given the dangerous nature of corralling a herd of buffalo it is entirely likely that a person could be killed or trampled during a communal hunt (73). Frison also postulates that one of the advantages of a communal bison kill is the provision of surplus bison meat to be processed into storable forms for use during the winter (53).

The buffalo jumping complex itself, as manifested in the archaeological record, consists of many different elements. In some cases these were recorded as separate archaeological sites with separate functions, in other cases (such as Grapevine Creek), the variety of physical remains from buffalo jumping are recorded together as a "complex." In still other cases, only some portions of the complex were ever discovered, but contextual clues from the investigations hinted at a site's function being utilized as part of a buffalo jumping complex. In all cases, the topology of a buffalo jump is as follows: Forbis states that two essential components of a successful buffalo jump are the gathering basin and the cliff (1960:67). An ideal gathering basin would be delimited by natural features that would draw a spooked bison herd towards a chosen precipice. This was often aided by manmade drive lines, often formed of small stone cairns (67). An ideal precipice would be unnoticeable to a herd until they were too far gone to avoid it (67). An additional component of the buffalo jumping complex, according to Forbis, was a campsite at the bottom of a nearby coulee or valley, next to a water source (essential for processing bison) (67). Grapevine Creek meets many

of these requirements for a buffalo jumping complex. These elements manifest themselves in the archaeological record as stone drive lines, buried buffalo bone beds, stone circles, hearth features, processing areas, and other cairns found in proximity to a precipice. Wissler broke butchery of bison into several elements, based on a primary butchery at a kill site and a secondary butchery at a processing area (possibly a camp area). According to Wissler's model, the following remains would be found at a primary butchery area: skulls, mandibles, vertebrae, pelvic and ribs; while the hind limbs, ribs, and thoracic vertebrae would be found at a secondary butchery area (Brink et al. 1985:173-174). In the case of bison, ribs are easily confused with the dorsal spine of the thoracic vertebrae (176).

This chapter focuses on a discussion of a selection of exemplary buffalo jumping sites or complexes. The number of recorded buffalo jumping sites and buffalo kills sites is in the hundreds and a complete summary of these is beyond the scope of this work. Rather, this chapter serves to provide a foundation and scope for the history of buffalo jumping on the Plains as manifested in the archaeological record. The Grapevine Creek Buffalo Jumping Complex will then be discussed as it relates to this history. Sites spanning the history of buffalo jumping, beginning with communal buffalo hunting, the nascent form of buffalo jumping on the Plains, beginning to appear almost 10,000 years B.P., are discussed, through the Archaic period, into the Late Prehistoric period, and terminating in the Historic period 280 years B.P. Sites near Grapevine Creek in southeastern Montana, the geographic locality with the most concentrated occurrence of this site type, are also focused on. In addition to these 15 archaeological sites being exemplary of their respective time periods and geographic areas, they are also exemplary of buffalo jumps in and of themselves, some being the oldest, others being the largest, others having the best stratigraphic

preservation, etc. Several sites have provided archaeologists with complete cultural sequences for Prehistoric Plains cultures, and for this they are notable.

Some General Information Regarding Buffalo

Bison were the preferred game animal of northern Plains tribes during historic times (Dyck 1977:64) and Dyck argues that this cultural preference has its roots in an economic advantage of buffalo as large game animals that, in addition to being the most numerous game animal on the Plains, they also returned maximum yield from minimum individuals (1977:67). Bison remains dominate the assemblages at all Oxbow sites, not just the Harder site (Dyck 1977:68). The original distribution of bison "[…] stretched from Great Slave Lake to northern Mexico, from the Rocky Mountains to about the Mississippi River – all of the Great Plains and a band of forest surrounding it" (Dyck 1977:230). The staple foods of the buffalo are: wheat grass, brome grass, wild rye, wild oats, June grass, blue grass, vanilla grass, reed grass, salt grass, foxtail grass and spear grass. They sometimes also consume horsetail, rushes, sedges, lichens, vetches, pea vine, blueberries, and bear berries (Dyck 1977:231). In the summer bison ranged on the open plains, while their winter range usually was in closer proximity to a sheltered, wooded area (Dyck 1977:233). During the historic period, buffalo jumping and/or pounding was practiced by the Peigan, Blood, Arapaho, Gros Ventre, Kutenai, Hidatsa, and Crow (Forbis 1960:65). The center of communal bison hunting, whether by jumping or pounding, is eastern Montana (Forbis 1960:65). In another mega-narrative, the origin of buffalo jumps is recalled. In this story Old Man Coyote, the trickster-hero, is said to have shown Crow people how to get bison to go over a cliff. In a conversation with two bison bulls he talks them into a race. He designs the course so that it goes into the setting sun and over a cliff. In that way the bulls will be blinded and not see that they will run off a cliff edge. Old Man Coyote

starts out in the race with the two bulls, but feigns a sore leg. The bulls race past him and go over the cliff, which kills them both (Linderman 1996: 91-93). According to one elder who related this narrative, "We don't know if that happened here (at Grapevine), but when we see these (buffalo) jumps, it reminds us of that story" (Personal communication, Marvin Stewart to Timothy McCleary, Ft. Smith, MT. June 2, 2010).

Buffalo themselves are dangerous wild animals (Arthur 1975:34). Their propensity to wallow makes them unique from cattle (Arthur 1975:33). Bulls are significantly larger than cows (Arthur 1975:34). Historic period buffalo averaged in size of 1600 pounds for bulls and 600-700 pounds for cows (Arthur 1975:35; Henry and Thompson 1965:171; Seton 1909:249). Bison have a keen sense of smell and of hearing but poor eyesight (Arthur 1975:35). This results in bison behavior that is indecisive when scent or hearing do not serve. It also allows bison to be approached closely from downwind (Arthur 1975:36; Soper 1941:399). Bison have been observed to avoid drifting snow in the winter season (Arthur 1975:36). Their difficulty in maneuvering in snow made winter an excellent time to hunt buffalo, where they were driven into deep ravines drifted with snow and killed by hunters on snowshoes (Arthur 1975:38; Catlin 1965; Seton 1909:271). McHugh (1958:12) divides the daily activities of buffalo as follows: "(1) *Feeding behavior* which included a short period of walking to select and eat natural forage or hay, and (2) *non-feeding behavior* with much loafing behavior, such as lying and standing, and also ruminating, traveling, watering, licking salt, playing and grooming" (Arthur 1975:39). During the winter, buffalo would make the most of warmer daytime temperatures by becoming active later in the morning and foregoing a time of lounging around noon (Arthur 1975:40). When in the vicinity of a water source, buffalo will drink every day, but are capable of remaining in waterless places for days at a time (Arthur 1975:40; Nelson 1965:35-37). Buffalo do not generally move during the night; they

usually can be found in the same place in the morning as they are at the previous dusk (Arthur 1975:41; Nelson 1965:23). Buffalo herd composition can be broken into bull and cow groups (Arthur 1975:42). Bull groups are smaller than cow groups, and are composed of mostly four-year-olds and older, with some three-year-olds and occasionally a two-year-old bull (Arthur 1975:42). Cow groups (during the non-breeding season), are composed of cows, yearlings, calves, and younger bulls (mostly two-years-old and younger) (Arthur 1975:42). Buffalo cows are the herd leaders (Arthur 1975:44; Roe 1970:106). Buffalo are easily spooked, and in observations of modern-day wild herds, have been known to stampede for a mile or more at the mere sight of humans, the snapping of a twig, or the galloping of a single buffalo (Arthur 1975:45; McHugh 1958:11). The buffalo rut begins in July and continues through mid-August (Arthur 1975:48-49), however anomalies are known to occur. Generally, though, there is an observable inconsistency between rutting season and calving season (Arthur 1975:50). The main calving season lasts about four months, from March to June (Arthur 1975:52). A prime cause for bison to move from one area to another within their range is any change affecting grasses or forage (Arthur 1975:54). Annual movements of a herd were repeated into specific localities year after year (Arthur 1975:55). Buffalo herds practiced seasonal migration from summer to winter ranges; this migration was anywhere from eight to fifteen miles (Arthur 1975:58; Nelson 1965:24-29). Arthur notes that, in the yearly behavioral round of buffalo, individual herds tend to become larger or aggregate during the winter, making the availability of herds larger enough for driving or other communal hunting techniques (1975:60).

9,960 B.P. - Lubbock Lake

Lubbock Lake is an extensive complex of archaeological sites spanning 11,000 years of occupation in northern Texas. This discussion is constrained to Area 6, Stratum 2, a Plainview bison kill and campsite. Lubbock Lake is comparable to the Grapevine Creek Buffalo Jumping Complex in its dates of occupation, particularly in the possibility of Grapevine Creek having a Paleoindian component.

Topology

At this portion of Lubbock Lake, bison remains were stacked into four micro-activity areas (Johnson and Holliday 1980:92). The paleoenvironment of the site was likely a ponded waterway coursing through a marshy meadowland that graded into a mixed grass prairie (100-101). At this locality, the Plainview campsite and bison kill is underlain by a Folsom occupation and overlain by a Firstview occupation (102).

Age

The cultural materials at Lubbock Lake in northern Texas demonstrate a location of bison procurement and processing for the past 11,000 years B.P. (Johnson 2016:129). Later research showed that Lubbock Lake was used from this point through the Historic Period (133), totaling over 10,000 years of human occupation at one archaeological site. Substratum 2B of Area 6, the Plainview component of this Area, dates to between 9960 B.P. and 7890 B.P. (Johnson and Holliday 1980:91).

Evidence of Activity

The earliest occupation levels at Lubbock Lake contain remains from the extinct *Bison antiquus* and diagnostic Paleoindian points (Folsom points) (Johnson 2016:129). One such area, known as Area 6, has a stratum (Stratum 2) that has been dated to the Plainview period and

determined to be a bison kill/butchering locale (Johnson and Holliday 1980:90). This locus of activity at Lubbock Lake represents a small kill of a few individuals around the marshy edges of a pond (92). Two Plainview projectile points were recovered from a single micro-activity area (92). Scrapers and other unifacial cutting tools represent 40% of the lithic butchering kit at the activity area (93). In addition to lithic butchering tools, four bone butchering tools, referred to by the authors as "bone expediency tools," were identified at the campsite (95). "Bone expediency tools" are defined by Johnson and Holliday as being "[…] created from bones of animal carcasses being slaughtered. They were used in the butchering process and then discarded with the rest of the faunal debris after processing was completed" (95). Three of these tools were made from bison ribs and were identified as the same type of bison rib butchering tool that was found in abundance at the Glenrock buffalo jump (Frison 1970:26) and at the Casper bison kill site (Frison 1974:31, Johnson and Holliday 1980:96). The partial remains of six bison were identified at this Plainview campsite at Lubbock Lake (Johnson and Holliday 1980:96). While little evidence of butchery was present on the bones themselves, processing by Plainview people is suggested by the context of the remains (99). Johnson and Holliday tentatively assign a fall seasonality to the Plainview bison kill based on mandibular ages, but caution against certainty because of the presence of fetal remains suggesting a possible spring slaughter (99). The Plainview campsite at Lubbock Lake represents the activities of a small group of people, likely a residential unit (105) as compared to other contemporaneous bison kill sites such as the Plainview site and Bonfire Shelter, which were communal, band-level activities (105). Stacking of elements from different individual bison, as present at this Plainview campsite, is not present at other Plainview sites (105).

Excavation History

Over 100 activity areas have been excavated at Lubbock Lake over a 75-year period (Johnson 2016:134-135).

Additional Useful Information

One of many significant contributions from the Lubbock Lake site includes the first radiocarbon date (ca. 9880 B.P.) on a Folsom site. This date provided a critical chronology for the Paleoindian Period (Johnson 2016:133).

9,650 B.P. - Hudson-Meng

Hudson-Meng is the largest known Paleoindian-age bone bed in the Americas (Todd and Rapson 2016:198). Hudson-Meng, just like Grapevine Creek, is situated at the boundary of two physiographic zones, the High Plains and the Missouri River Short Grass Prairie (Agenbroad 1978:1). The modern climate of western Nebraska was likely similar to that of 9800 years ago, when the site was occupied. The paleoecology of Hudson-Meng indicates that at the time of the Alberta occupation, the site was a moist grassland similar to current conditions, after which it dried into a semi-arid desert which eventually reverted back to its current grassland state (Agenbroad 1978:117; Lewis 1978; Wu and Jones 1978; Young II and Weedon 1978:222).

Topology

The bison bone bed occurs at the site of a large spring, which was likely an attracting feature to the buffalo (Agenbroad 1978:3). Agenbroad hypothesizes that during Alberta times the drop off at Hudson-Meng was at least 12 feet high (32). No associated cache or camp areas were ever discovered in association with Hudson-Meng (49). The Hudson-Meng bone bed was not stratified. Rather, the bison bones were deposited in an almost continuous carpet, one to two bones thick over the entire area exposed during excavations (Agenbroad 2016:173). Additionally, the

bone bed at Hudson-Meng was missing skullcaps (frontals with attached horn cores) (173). The absence of skull caps at Hudson-Meng is a notable anomaly. Agenbroad hypothesizes that the skull caps were considered "low value" and discarded at a primary kill area after begin removed to extract brains (1978:27).

Later research, utilizing many more precise measurements, shows that most of the lithic materials are found almost 20 centimeters above the level of the bone bed (Todd and Rapson 2016:209). Because the bone bed at Hudson-Meng was one unit thick (one to two bones), Agenbroad hypothesized that the remains represented a single event, or multiple events occurring over a short time span, such as a month (Agenbroad 1978:19). The bison remains at Hudson-Meng do not demonstrate evidence of carnivore activity. Evidence indicates a rapid burial (20). Within the bone bed, Agenbroad noted a pattern of deposition to the bison bones which he called "hearth circles": these features he described as bones randomly scattered in circular patterns with the presence of a hearth area serving as the center for each of these patterns (25).

Age

At the time of Agenbroad's excavations in the late 1960s the site was interpreted as a Paleoindian (Alberta Culture) bison kill site with a minimum number of individuals (MNI) estimated to be at least 600 bison (2016:169). Radiocarbon dates support the stylistic interpretation of the projectile points from Hudson-Meng as being Alberta Culture (Agenbroad 1978:72). These dates place the Alberta material at Hudson-Meng in a time interval of 9650 B.P. to 8600 B.P. (115). A single radiocarbon date of 9860 ± 160 B.P. was taken from a sample that was accumulated over four years of hand-picking charcoal flecks from the site (116).

Evidence of Activity

Agenbroad argued that the random scatter of skeletal elements, the low frequency of identifiable individual skeletons, and the association of Alberta Culture associated lithic materials all pointed to the identification of Hudson-Meng as a butchering floor or processing area (2016:174). Agenbroad's final interpretation of the Hudson-Meng site was that of a Paleoindian secondary butchery area (i.e., not the kill location). However, despite extensive survey, Agenbroad was never able to locate a primary butchery area (Todd and Rapson 2016:202-203). Based on a more detailed collection of attribute and spatial data (made possible with the use of technology not available to the first set of researchers), the second set of researchers concluded that Hudson-Meng was the site of a natural death of bison (204). The presence of Alberta Culture lithic material at the bone bed is explained as a separate and more recent event, the stratigraphy and deposition having collapsed such that the artifacts appear to be found at the same level as the bone bed (214). Agenbroad led a survey of the surrounding area in the Hat Creek drainage and discovered an intensive Prehistoric presence, collecting a total of 148 projectile points in styles that spanned the history of human occupation in the area (1978:17). Agenbroad describes the deposition of the bones as reflecting "complete butchery," or a disarticulation of all elements (26). This sort of deposition is in contrast with many other bison kill sites on the Plains, where deposition of bones reflects a breaking up of the bison carcass into what Frison refers to as "butchery units."

Agenbroad felt that, based on an MNI of excavated portions of the site of 400, that 600 bison would be a conservative estimate of the total number of individuals represented in the skeletal remains at Hudson-Meng (1978:27). Dentition indicated that the bison at Hudson-Meng died somewhere between mid-October to mid-November (30-31). There is no evidence of bone grease processing at Hudson-Meng (32). Agenbroad also concluded that six identified articulated

skeletons were cripples, as they did not appear to have been disarticulated or butchered and this seemed a likely explanation for why they would be overlooked by hunters (33). However, in subsequent analysis, Todd and Rapson determined that almost all of the bone bed at Hudson Meng was composed of articulated bison skeletons (Todd and Rapson 2016). What is additionally confusing is that Agenbroad feels the deposition at the archaeological site indicated that one fully articulated skeleton was halfway in a hearth feature, as though the buffalo was dragged entire to a secondary butchering area and then placed one half in the fire (2016:34). In addition to skull caps being missing at the site, sacral units were also absent (35). No bone butchering tools, with the exception of one possible mule deer humerus tool were found at Hudson-Meng (36). Due to the carbonate encrustation of the bones, no butchery marks were observed on any of the bones (36). The assemblage of bones at Hudson-Meng was by no means complete: several elements were either absent or present in very small numbers, such as patellae (only 49 patellae representing 25 animals, out of an MNI of 400, were observed) (37). The bison at Hudson-Meng were an intermediate form between *Bison occidentalis* and *Bison bison* (46). The bison sample from the excavations at Hudson-Meng shows that the majority of the bison were females (73-82%) (56). Calves and juveniles are very abundant at Hudson-Meng, which is in contrast to many other bison kill sites on the Plains (61).

At Hudson-Meng, only 20 projectile points and projectile point fragments were recovered from the site (67). Projectile point material at Hudson-Meng is dominated by Knife River Flint. Also present are quartzites from the Black Hills and metamorphosed shale from the Powder River valley in southeastern Montana/northern Wyoming (73). An additional diagnostic tool from Hudson-Meng is a Cody knife. This is the only occurrence of a Cody knife at an Alberta culture site (80). In addition to projectile points, 22 other formal stone tools were recovered from Hudson-

Meng, a very small number in relation to the estimated number of bison butchered there (at least 600) (85). Debitage recovered from the site numbers over 3,500 flakes and was found in delineated "workshop" or "manufacture areas" (98). Despite the presence of six identified hearth areas, charcoal was absent from all of them, and nearly nonexistent at Hudson-Meng generally. Agenbroad postulated that this was due to the use of buffalo chips as fuel for fires (115). The debitage from Hudson-Meng was mostly what we consider today to be micro-debitage, i.e., having a maximum dimension of less than 5 mm (Huckell 1978:154). This debitage is dominated by bifacial retouch flakes (175). No evidence of dogs was discovered at Hudson-Meng (Agenbroad 1978:51).

Excavation History

The Hudson-Meng site was first excavated over the course of 6 seasons in the late 1960s and early 1970s by Larry Agenbroad (1978:5). During the first three field seasons, no artifacts were found in association with the bone bed. It was not until the 1971 season that an Alberta point was discovered *in situ* with the bone bed (Agenbroad 1978:5, 2016:169). After removing a representative sample of over 100 individuals, a distinctive feature of Agenbroad's excavation was that bison bone was left *in situ* after excavation in hopes that future work might be able to ascertain more detailed information (2016:169). After six seasons, Agenbroad's crew failed to determine the horizontal extent of the bone bed (Agenbroad 1978:9). In an interesting turn of events, a second set of researchers returned to Hudson-Meng from 1991-1996 (Todd and Rapson 2016:197). These researchers would go on to refute most of Agenbroad's conclusions about the function of Hudson-Meng.

Additional Useful Information

Agenbroad uses the assemblage at Hudson-Meng to postulate that the Alberta culture represents a second influx of peoples to North America, different from the Clovis culture, and that this Alberta culture may have an association or descendency into the Cody technological complex (Agenbroad 1978:95). The painstakingly collected charcoal sample from Hudson-Meng, as mentioned above, represents the first radiocarbon date ever collected on Alberta materials (137). In addition to its significance as a bison bone bed dating to Paleoindian times, Hudson-Meng was also the second Alberta period archaeological site ever to be excavated (the first being the Fletcher site; see Forbis 1968; Agenbroad 1978:122).

5,700 B.P. - Head-Smashed-In Buffalo Jump

Head-Smashed-In is one of the largest and most complex buffalo jump systems currently known (Brink et al. 1985:252). This World Heritage Site is part of a cluster of Late Prehistoric bison jumps in the Porcupine Hills of southwestern Alberta, including the Shaver jump, the Pincher Creek jump, the Brocket jump, the Old Woman's jump (56 mi to the north), and the Fort Macleod jump (251; Reeves 1978:153). Head-Smashed-In, located in an area of moderate winters and productive grasslands, is in the best winter cattle range in modern Alberta (Reeves 1978:152) and in Historic times, the southern Porcupine Hills were part of the preferred winter range of the Northern Piegans (152). Similar to Grapevine Creek, Head-Smashed-In is located in a transitional physiographic zone, between the prairie grasslands and the flanks of the Rocky Mountain Foothills (Brink et al. 7). The entire complex is directly adjacent to the Peigan Reserve (Reeves 1978:153).

Topology

The gathering basin associated with Head-Smashed-In is an area covering approximately 22 mi^2 west of the jump itself. Over 500 cairns associated with drive lines, leading from the gathering basin to the precipice, have been located (Reeves 1978:154). These drive line systems are over five miles long, however the closest drivelines are 800 m away from the edge of the precipice. The cairns that would have been nearest to the precipice were either removed in the 1900s as rip-rap for a dam, or they simply silted over through time (Brink et al. 1985:9; Reeves 1978:155).

The precipice at Head-Smashed-In drops an average of 40-45 ft over a lateral distance of 1000 ft (Reeves 1978:153). At this site, archaeological deposits in the processing area were denser in the sloped loess deposits closer to the base of the cliffs forming the precipice and became less dense farther from this base (Brink et al. 1985:25). In the case of Head-Smashed-In, Brink et al. noticed a correlation between the slope of the ground and the presence of cultural materials, in particular that "[…] the more nearly level the ground surface, the greater the potential for heritage resources" (35).

The campsite associated with the kill site at Head-Smashed-In is so large that it covers over half a square kilometer in horizontal extent (Reeves 1978:154). The processing area matched a fall-off model of activity patterning, similar to the pattern noted at the base of the precipice (Brink et al. 1985:72). Several complete and partial stone circles were recorded in the more peripheral areas of the camp, and none were located near the main kill area of Head-Smashed-In, indicating either that they were never present in the core area of the camp or that they were destroyed due to successive post-depositional disturbance events (216).

Age

While Head-Smashed-In was most intensively occupied in the Late Prehistoric period, associated radiocarbon dates of 5700 B.P. in the bone bed (the Mummy Cave Complex) also make it the oldest record of bison jumping on the Plains, while diagnostic sherds identified with the Cluny Complex show that the most recent use of the site was in the early 18th century to the mid-19th century (Brink 2016:14; Brink et al. 1985:76; Reeves 1978:164-166). However, the jump was not in use between 3100 B.C. and 900 B.C. (Reeves 1978:170). This time period represents the McKean complex on the Plains, and leaves the intriguing mystery of why Head-Smashed-In went unused during this period (172). Head-Smashed-In dates primarily to the Avonlea and Old Woman's period, but limited artefactual evidence also shows occupation during the Besant period (Brink et al. 1985:45).

Most of the projectile points excavated (167 in the 1983 field season) dated to the Late Prehistoric Period (Brink et al. 1985:105). Radiocarbon dating of a variety of features in the processing area at Head-Smashed-In suggests an intensity of site use and occupation between 1050 B.P. and 1660 B.P., i.e., during the first half of the Late Prehistoric Period, consistent with Reher and Frison's suggestion that this time period represented a period of optimal bison hunting on the Northwest Plains (237). Relative to a nearby and similarly large buffalo jumping site, Old Woman's Buffalo Jump, Head-Smashed-In has a large Avonlea phase component, which is essentially missing at Old Woman's, while Old Woman's Buffalo Jump has a thorough Besant component, which is relatively scarce at Head-Smashed-In (Reeves 1978:172).

Evidence of Activity

The subsurface vertical extent of the campsite at Head-Smashed-In averages two ft in depth. Common features in the campsite include fire-cracked rock, butchered bone, artifacts,

hearths, and boiling pits (Reeves 1978:154), while no architectural features were discovered in association with the processing area (Brink et al. 1985: 61). The fire-cracked rock at Head-Smashed-In, which is prevalent throughout the processing area, is mostly composed of quartzite cobbles that were brought to the site from over 2 km away. Brink et al. estimated that several thousand kilotons of quartzite cobbles were transported to the site over the several thousand years that the site was in use (69). Generally, at Head-Smashed-In, cultural materials found within features exhibited better preservation than those found outside features (215).

The lithic toolkit at Head-Smashed-In matches the model put forth by Frison and Reher, namely, that communal kill site toolkits "[…] will display a lithic assemblage characterized by an abundance of finished tools and resharpening detritus and low amounts of primary manufacture remains" (Brink et al. 1985:82), with the exception at this site of an abundance of bipolar cores located in the processing area. Also of note is that materials for lithic tools include a number of non-local sources, including porcellanite from southeastern Montana/northeastern Wyoming. Additionally, no large butchering tools were located in the processing area, a condition noted by the investigators as anomalous (96).

Faunal preservation at the kill site at the base of the precipice was good (Brink et al. 1985:50), while faunal remains in the processing area, though completely carpeting the area of cultural activity, were severely weathered due to the shallow deposition, trampling from cattle and other historic incursions, and pot hunting (164-188). One major issue with studying a bison processing area associated with a jump site, as outlined by Brink et al., is that bison processing is by its nature a destructive process and therefore the physical remains are more likely to be destroyed beyond recognition, leading to major interpretive problems (60). That being said, all bison elements are represented at the secondary butchery, or processing area, with the exception

of the sternebrae (171). While ethnographic literature points to bone processing for marrow or grease extraction as a common by-product of bison jumping, there is no clear evidence of this activity taking place at Head-Smashed-In. Other large bison kill sites show a similar lack of evidence, such as Hudson-Meng, Frasca, and Lubbock Lake (190). Faunal material from the Head-Smashed-In site suggest that fall kills were most common in the main kill area (254), while in the eastern portion of the bone beds at the base of Head-Smashed-In, fetal bones were present suggesting that, at least for some of its use, Head-Smashed-In was used in mid-winter (Reeves 1978:161).

Several examples of subsurface canid bones indicate potential scavenging at Head-Smashed-In (e.g. Brink et al. 1985: 46-48). The remains of an extra-large dog (*Canis familiaris*) and a wolf-dog hybrid were found in the Late Prehistoric processing area; the extra-large dog exhibited signs of domestication (202).

Excavation History

Head-Smashed-In has a notable place in the history of Canadian archaeology as the first site excavated in the province of Alberta by a professional archaeologist, Junius Bird, in 1938 (Brink et al. 1985:3). Excavations at Head-Smashed-In were engaged in more completely by Reeves in 1965, 1966, and 1972 (Reeves 1978:155). These investigations were motivated by massive damage to the site from looters (151). Subsequent to Reeves' investigations, Head-Smashed-In was placed on the World Heritage Site list in 1981 (Brink et al. 1985:11).

After this successful nomination, a long-term research agenda in the adjoining processing area at Head-Smashed-In was engaged upon by Jack Brink. Perhaps the most important item in the research agenda of Brink's crew was addressing the relative lack of archaeological data concerning bison processing (as opposed to killing and initial butchering) at buffalo jump sites

(Brink et al. 1983:iii). Brink et al. felt that an investigation of the large processing area at the base of Head-Smashed-In would increase understanding of this area. As a result, in the subsurface excavations of the processing/campsite area at the base of the jump at Head-Smashed-In, several depositional trends were noted. First, the bison bone presented as a "carpet" that was one layer thick, highly fragmented, and located at a varying depth that rarely exceeded 20 cm below ground surface. Second, there was a large amount of highly fragmented, unidentifiable bone. Investigators felt that this was more likely due to differential element survival rather than cultural selection (67). Investigators did not discover any stratified deposits in the bone processing area (90).

Additional Useful Information

Head-Smashed-In is mentioned in the Blackfoot creation story as the general location of where *Napi* created the people and taught them how to jump buffalo (Reeves 1978:151).

One concern I have with the 1983 field season at Head-Smashed-In is that it is field research being done at a World Heritage Site and yet it is largely mitigative in nature, with the development of the interpretive center driving the archaeological investigations. Hence, the research of this field season is largely exploratory in nature, rather than being driven by specific research questions (Brink et al. 1985:62).

4,950 B.P. - The Kobold Site

The Kobold site is a buffalo jumping site located at the head of Rosebud Creek in southern Montana (Frison 1970:1). Its location places it only 15 miles away from the Grapevine Creek buffalo jumping complex, making it the nearest buffalo jump site to this area. As the site is contemporaneous to the Grapevine Creek buffalo jumping complex, it is possible that the two sites were operated by the same group of people during the Late Prehistoric period.

Topology

The site is located in an area of optimum grazing conditions and was likely in such a situation for the entire period of its use (Frison 1970:1). The excavations revealed a primary kill/butchering area. No secondary butchering/processing area was ever located (4). Stone drive lines are present at the Kobold site; 86 visible stone piles extend approximately 1800 feet along the edge of the landform above the drop-off (7). The configuration of the terrain and drive lines at Kobold is similar to the Big Goose Creek site, a nearby Late Prehistoric site (9). In addition to the features associated with the precipice and primary kill area, a number of petroglyphs were found on the surfaces of the soft sandstone composing the bluff around the precipice of the buffalo jump at Kobold (9).

Age

The site was in use from the early post-altithermal period to historic times (Frison 1970:1). The Kobold site was first used as a buffalo jump during McKean times during a period between 3000 to 2500 B.C. (33). The lowest two levels of excavations associated with the bison jump at Kobold date to the Archaic Period based on the presence of 33 corner-notched dart points in the lowest level and 32 similar points in the middle level (11-16). The earliest bison jumping level at Kobold was interpreted by Frison to be a McKean variant (26). The middle bison jumping level at Kobold was dated by obsidian hydration to around 2750 B.C. (28). The middle period of buffalo jumping at the Kobold site dates between 1337 B.C. and 235 A.D. (32). There is a definite lapse in the cultural chronology between the middle and late buffalo jumping periods (Late Prehistoric) at Kobold. For example, no Avonlea artifacts were recovered from the site (32). The latest level of bison jumping spans the Late Prehistoric Period, this designation being based upon the presence of 125 diagnostic projectile points (18). Frison postulates that the drive lines at Kobold date to the

Late Prehistoric Period (9). The last use of the Kobold site was likely by Crow groups during pre-horse times, therefore the total span of buffalo jumping at Kobold is somewhere between 3500 and 4000 years (33).

Evidence of Activity

Prior to the use of the precipice as a buffalo jump, a rock shelter within the cliff was used as a temporary campsite (Frison 1970:5). Cultural deposits at the Kobold site indicate three periods of use as a buffalo jump (6), with each period likely representing multiple jumping events. In all levels bone preservation was so poor as to require chemical hardening during excavation (7). An MNI of 65 bison was established for the excavated area of the lowest buffalo jumping occupation at Kobold (15). The Kobold site bison remains were in a line with what Frison has defined as the "typical" Late Prehistoric bison carcass handling method:

> Mandibles although separated at the symphsis[*sic*], were usually paired but not associated with the skull, suggesting possible detachment for tongue removal. Sections of vertebral columns and proximal ends of ribs indicate removal of axial muscles and subsequent chopping of the ribs for removal to another location. Astragalii, best preserved in Level II, were largely absent as were tibiae, femora, and metatarsals, suggesting detachment and removal of hind quarters. Scapulae were frequent and humerii, radii, and metacarpals less so, which probably indicates removal of most long bones containing significant amounts of marrow to a processing area for grease removal. Conspicuously absent in the kill area were atlas and axis vertebrae perhaps due to poor preservation. At both the Piney Creek (Frison 1967b) and Big Goose Creek (Frison 1967a) sites these were the most common bones in the kill area. Common tools, in the kill areas at Piney Creek and Big Goose Creek, were *Bison* mandible choppers, which are efficient for tasks such as breaking ribs from the vertebral column. (1970:23).

Overall the site exhibits a noticeable lack of debitage, indicating that pre-made tools were brought on site and no tool manufacturing took place at the site itself, apart from repairing and refreshing existing tools (Frison 1970:13). Portions of two steatite pipes were recovered from the most recent bison jumping level at the Kobold site (22).

In the rock shelter portion of the Kobold site, four bison bone knapping tools were recovered (Frison 1970:24). The petroglyphs at Kobold display V-neck figures and shield bearers (26). Frison also postulates that the people who utilized the middle occupation at Kobold engaged in a seasonal round of resource exploitation in the region immediately surrounding the Kobold site (28). Frison notes that the scarcity of projectile points in the middle occupation of Kobold (0.5 points per animal), along with fracture characteristics of long bones indicating a great fall demonstrate conclusively that the Kobold site was used as a buffalo jump rather than as a pound (29). Frison argues that the late summer and fall is the time of the year when the bison are in the best condition to be hunted, both physically and in terms of their behavior, and therefore this is the season of use at the Kobold site (29-30).

Excavation History

The site was first discovered in 1960 and was excavated by George Frison in 1968 (Frison 1970:2-4). In the years between the site's discovery and excavation, it was subject to looting (4).

Additional Useful Information

Frison argues that the presence of the two steatite pipe fragments suggests a potential Shoshone connection to the Kobold site (1970:32).

3,400 B.P. - The Harder Site

The Harder Site is an Archaic Period bison hunter's campsite located in southern Alberta. This site represents the remains of a secondary butchery area and associated campsite that is likely situated near a bison kill site. This site is comparable to the secondary butchering area and associated campsites at Grapevine Creek.

Topology

Dyck assumes that at least one bison kill site (possibly more) associated with the Harder site should be found in the immediately surrounding area (1977:198-199). The Harder site likely represents a campsite associated with a communal hunting site, and while the primary kill/butchery area was never found, a possible pound site was located 200 meters away from the site at the end of the last field season (56). The Harder site is 20 kilometers from the nearest water source. Therefore, Harder is a winter camp as snow is the only possible water source (199). 13 features, ranging in size from smudge pits to dwelling floors, were identified at the Harder site (170). The Harder site is composed of 6 to 8 dwellings and the remains of bison processing (196). One feature, composed of a large amount of comminuted bone and a small amount of small to medium sized coarse-grained stones within a matrix of medium to light brown soil, is interpreted to be a discarded bone pile utilized after bison bone processing had taken place (178-179). Subsurface excavations at the Harder site represent an approximately 10% sample of the total site area (28).

Age

The Harder site has been radiocarbon dated to 3400 B.P. and is identified as Oxbow Complex (Dyck 1977:vi). The Oxbow complex is a bison hunting complex that is pre-ceramic and considered one of the oldest side-notched projectile point traditions on the Plains (5). The Oxbow complex represents the first reoccupation of the Plains after the end of the Altithermal drought some 5000 years ago (5). The two radiocarbon dates placing the date of occupation of the Harder site to around 3400 B.P. push back the previously known age of the Oxbow occupation by 200 years (32).

Evidence of Activity

On the basis of 12 identified features, Dyck concludes that somewhere between 42 and 56 people occupied the site for 21 to 42 days (1977:vi). Dyck interprets coarse stones at the Harder site to be part of the bison processing toolkit, their function being either as hammers and/or anvils or as cooking stones for roasting and boiling (197). The Harder site represents a successful bison hunt (60). Debitage at the site indicates that tools were manufactured on-site (74). Dyck argues that all the projectile point assemblage at the Harder site represents discards, either due to breakage during use or manufacture or specimens that were reworked too many times to acquire any further use from them (90). No large bone tools, as may be considered common at bison kill sites, were found at the Harder site (144).

The main function carried out at the Harder site was the breaking and boiling of bison bones (Dyck 1977:196). Faunal remains at the site consisted of mostly severely pulverized bison bone. Preservation of the faunal remains at the Harder site was good and approximately one-third of the total assemblage was identifiable (33). Of the total butchered faunal assemblage, at least 90% represent the remains of bison (35). The nature of the butchery of the faunal materials indicated secondary butchering or camp processing (42). Extrapolating from the excavated sample, bison remains indicate that somewhere between 93 and 138 individual bison were present at the site (52). The assemblage of bison bones at the Harder site were highly processed. Whole elements were rare and in no cases were there articulated butchering units (217). The bones were generally accumulated into three bone piles (217).

Additional Useful Information

The Harder site is the earliest known archaeological site associated with the Oxbow complex. Oxbow projectile points may be described as follows: "[…] side-notched with notches

straddling the widest part of the blade, and basally thinned with thinning flakes extending on both faces up to or slightly beyond a line joining the distal juncture of the notches. Thinning usually produces a pronounced basal concavity" (Dyck 1977:6). Additional general features of the Oxbow complex are that it is very widespread across the northern Plains, and that copper artifacts are often found at Oxbow sites (7). A noted absence from the Oxbow complex generally is a communal bison hunting site, though bison jump sites are identified for complexes that pre- and post-date the Oxbow complex (10).

2,000 B.P. - Wahkpa Chu'gn

Wahkpa Chu'gn is a bison pounding site in northern Montana, within the city limits of Havre, used from the Late Archaic period to the Late Prehistoric period (Brumley and Stallcop 2016:41). The time period of occupation at Wahkpa Chu'gn is contemporaneous to the time that Grapevine Creek was in use.

Topology

In addition to evidence of winter kills by means of miring in large snow banks, there is also evidence of three separate episodes of bison pound or corral construction. Unique to Wahka Chu'gn is the use of complete bison crania in the construction of post-pits, which researchers have attributed to a ceremonial use (Brumley and Stallcop 2016:48-49).

Age

Wahkpa Chu'gn dates to a time period spanning the Late Archaic period to the Late Prehistoric period (Brumley and Stallcop 2016:41). Overlying the primary Besant occupation at the site are a thin Avonlea concentration of artifacts and a larger Saddle Butte assemblage (47).

Evidence of Activity

Seasonally sensitive bison remains indicate that bison remains at the kill site derive from winter kills, where animals were driven into deep snowdrifts and became mired, in addition to bison evidence supporting bison procurement activities occurring during mid- to late fall. At Wahka Chu'gn, practically the only tools discovered onsite were projectile points, indicating that the area was a primary kill and butchery location (Brumley and Stallcop 2016:46).

Additional Useful Information

Wahkpa Chu'gn is the type site for the Saddle Butte Phase of Old Women's (Brumley and Stallcop 2016:47). A distinctive characteristic of Saddle Butte that differentiates it from Avonlea is the use of mandible choppers, several of which are present at Wahka Chu'gn (48).

1,900 B.P. - The Gull Lake Site

While there are many buffalo pound sites in Saskatchewan, the Gull Lake site in the southwestern corner of the province held the most complete and intact deposits, with over 20 feet of capped cultural deposits (Kehoe 1973:4). The site itself is located about 70 miles north of the Canada-U.S. border and 65 miles east of the border between Saskatchewan and Alberta (6). A prominent landform known as the Missouri Coteau allowed for conditions that led to the erosion of slump blocks along coulee bottoms all in the southern half of Saskatchewan, and these topographic features, along with the rich grasslands and forested parklands in the area, made the region ideal for gathering and impounding buffalo (6). The Gull Lake site contains many similar projectile point styles to those recovered at Grapevine Creek, indicating that the same cultural groups may have been using both sites.

Topology

The slump block forming the Gull Lake site was formed approximately 2000 years ago (Kehoe 1973:9). Present climate, a continental climate with harsh extremes in the summer and winter with low annual precipitation, was likely the same throughout the time period when the Gull Lake site was in use (9). Vegetation, consisting of a mixed grassland with chokecherries and wild roses in gullies and slopes, was also likely similar throughout the period of occupation of the Gull Lake site (9-11).

Age

Briefly, the 52 cultural strata at the Gull Lake site comprise a complete chronology outlining the cultural sequence of the Northern Plains from Avonlea to Prairie to Plains materials (Kehoe 1973:22). The first use of the site was as a small campsite, radiocarbon dated to 1900 B.P. (39). The first proper bison drives began at the Gull Lake site about 200 years later (39). The Gull Lake site was used almost continuously for impounding buffalo from this period to the historic period, encompassing the Avonlea, Prairie, and Plains traditions (39). In the uppermost level, a bison scapula pierced by a .32 caliber bullet attests to the use of the Gull Lake site into the Historic Period (40). The bullet itself was not recovered (42).

Evidence of Activity

Generally, at the Gull Lake site, there is a pattern of whole unburned bison bones lying atop charcoal and heavily butchered bone fragments, which Kehoe felt indicated a pattern of burning the site before reuse (1973:38). Almost 1,000 projectile points were recovered from excavations at the Gull Lake site, about 300 from the Wettlaufer excavations in 1951 and the remainder from Kehoe's work in the early 1960s (47). The projectile points represent three general chronological types: Avonlea, Prairie side-notched, and Plains side-notched (47). Kehoe utilized

the rare, statistically significant population size of the projectile points from the Gull Lake site to create a detailed typology of styles and variants of these three main types, over 20 varieties in all (1973). In subsequent years this detailed classification has been somewhat refuted but the basic chronology and relationships between Avonlea, Prairie side-notched, and Plains side-notched traditions are understood in large part based on Kehoe's work at the Gull Lake site (1973). In total, over 300 projectile points generally typed as Avonlea were recovered at Gull Lake (51). Kehoe describes the general Avonlea style:

> "[…] well executed and shows broad, shallow flake scars, usually parallel to each other, extending from the blade edge to the middle of the point and beyond. Both faces are usually entirely dressed; this in conjunction with the thinness of the primary flake struck for the point, produces a very delicate artifact […] The notches are V- or U-shaped and are never rectangular. They are fairly wide, shallow, small side-notches […] The bases of Avonlea points are preponderantly concave […] (51)

At the Gull Lake site the Avonlea point were made from a variety of materials; notably, however, no Avonlea points were made from obsidian (53). 240 projectile points classified as Prairie side-notched were recovered at the Gull Lake site (56). Kehoe notes that Prairie side-notched points are introduced into the stratigraphy at Gull Lake around A.D. 730 (56). Kehoe describes the Prairie side-notched style as follows: "[…] the poor quality of the flaking and lack of symmetry are distinguishing characteristics […] The bases of Prairie points are usually narrower than the proximal end of the blade" (56). The third variety of projectile point identified at the Gull Lake site, the Plains side-notched point, is the latest chronologically, being introduced to the Northern Plains between 1300 A.D. and 1500 A.D. (60). Kehoe describes the Plains side-notched point thus: "The flaking in the Plains Side-Notched Type is characterized by a well-defined outline with sharp angles at bases and notches. […] The bases of Plains points are at least as wide as the proximal end of the blade; in later periods, bases were often wider than the blade (60-61).

Excavation History

The Gull Lake site was first discovered in 1948, and first excavated in 1951 (Kehoe 1973:11). The Gull Lake site was more heavily excavated by the Saskatchewan provincial government beginning in 1960, after it was discovered that the site was subject to heavy looting (15). The Gull Lake site was excavated in a series of large trenches, where natural and cultural strata were stripped in layers with hand trowels. A total of 52 cultural strata were identified at the Gull Lake site (17). A second set of excavations at Gull Lake site was undertaken in 1963, and since then no further work has been done at the site (20).

Additional Useful Information

The excavations at Gull Lake established the cultural chronology of the Late Prehistoric period for the Northern Plains and as such the site is extremely significant (Kehoe 1973:4).

1,840 B.P. - The Old Woman's Buffalo Jump

The Old Woman's Buffalo Jump is located approximately 50 miles south of Calgary, Alberta, on the south bank of Squaw Coulee (Forbis 1960:57). This buffalo jump site shares many common attributes with the Grapevine Creek buffalo jumping complex, such as time of occupation and a strong connection with the oral traditions of a Plains tribe, the Blackfeet.

Topology

The bone deposit of this buffalo jump is approximately 100 feet wide and extends downhill 200 feet from the base of the cliffs forming the jump (Forbis 1960:57). While not spatially large, Old Woman's Buffalo Jump was intensively used (57).

Age

A radiocarbon date from one of the lower layers at Old Woman's Buffalo Jump places the earliest use of the site around 1840 B.P. (Forbis 1960:66). Excavations at Old Woman's Buffalo

Jump indicated that the site was used intensively and continuously for a period of 1500 years (70). Old Woman's Buffalo Jump was used from Besant times through around A.D. 1600 (82).

Evidence of Activity

Climate, in particular wind, plays an important role in the use of Old Woman's Buffalo Jump. First, the prevailing wind from the southwest provides chinook warmth in the winter and makes the grasslands of southern Alberta ideal winter range for grazing animals (Forbis 1960:67). Second, the fact that winds can predictably be said to come from the southwest allows for the planning of buffalo drive to be run with the wind over cliffs facing east or north (67).

Ninety percent of artifacts from Old Woman's Buffalo Jump are projectile points (over 1000 total) (Forbis 1960:83-84). Materials not directly related to hunting and butchering bison were extremely rare at Old Woman's Buffalo Jump, highlighting the fact that the use of the site was for a specialized function (118). The stratigraphic layers at Old Woman's Buffalo Jump were so compressed that Forbis was unable to determine exactly how many times the jump was used over time; he could only say definitively that it was used many times over (77). The burned layers that interspersed the bone layers in the stratigraphy at Old Woman's Buffalo Jump were thought to be the result of natural causes (77).

Excavation History

Old Woman's Buffalo Jump was excavated over three seasons from 1957 to 1959 (Forbis 1960:59). In addition to the bone bed at the base of the precipice forming the buffalo jump, the archaeological crew located a large campsite associated with the bone bed in the immediate vicinity. A high water table prevented a full excavation of this area (59).

Additional Useful Information

Like Grapevine Creek, Old Woman's Buffalo jump figures highly in Blackfoot oral traditions. It is so named because it is the location of the first Blackfoot marriage ceremony (Forbis 1960:61). Old Woman's Buffalo Jump was noted specifically in a Blackfoot winter count. The year 1842-43 was known as the year when the Bloods camped at Women's Buffalo Jump (61). Also similar to the Crow story of the Grapevine Creek battle, which took place close to the buffalo jump complex, John Cotton relates a story of a battle between a large war party of Crows engaging Bloods camped at the Old Woman's Buffalo Jump. The Crow were ambushed by the Bloods and suffered many casualties (Forbis 1960:61, quoting Dempsey 1957).

One of the most significant contributions of Old Woman's Buffalo Jump to the archaeology of the northern Plains is that it provided a cultural chronology, by projectile point styles, of this area for the past 2000 years or so (Forbis 1960:85). Forbis identified nine distinct types of projectile points at Old Woman's Buffalo Jump. In order of antiquity they are: Besant, Ensor, Washita, Pekisko (what is now referred to as Plains Side-Notched), Paskapoo (what is now referred to as Prairie Side-Notched), Nanton (an Avonlea variant), Lewis, Irvine, and High River (a Pelican Lake variant) (94). In its most recent period of use, the site is attributed to the Blackfeet (70).

1,580 B.P. - The Wardell Buffalo Trap

The Wardell site is a Late Prehistoric period buffalo trap located in western Wyoming in the Green River drainage (Frison 1973:1). The environment of the Upper Green River drainage is a plains environment that is more marginal than usually occupied by *Bison bison* (1). Just like the Grapevine Creek drainage basin, the site is located on a geographically marginal landscape, directly south of the divide between the Green and Snake River drainages, making the area important in terms of past human movement (3).

Topology

The region surrounding the Wardell site is generally arid and the location of the site was likely right on a trail leading to the Green River, the major source of water in the area (Frison 1973:8). The Wardell site, despite being located in an area that could have been utilized as a jump, has been interpreted as a trap (8). The site is located at the confluence of two arroyos, at the base of a steep talus slope which is itself at the base of a perpendicular cliff. Excavations revealed post molds of a corral structure, indicating the site's use as a trap (7-8). The secondary processing area at Wardell, immediately adjacent to the trap and primary butchering area, is over two and a half acres in size (52). Finally, while no structural features were noted, Frison postulates that the area was used as a campsite based on the artifact assemblage (53).

Age

No base notching is present on any of the projectile points, indicating their use earlier in the Late Prehistoric Period (Frison 1973:25). This is confirmed by three radiocarbon dates submitted for the Wardell site, ranging in dates from A.D. 370 (a charred log in the bottom of the kill area excavations) to A.D. 960 (surface fire at the top of the kill area excavations) (74). Frison felt that the earlier date may have been at least a century too early because the juniper log might have been dead for a long time prior to use by the occupants of the Wardell site (74).

Evidence of Activity

Several different constructions episodes were identified, indicating that the site was used multiple times (Frison 1973:8). Excavations of the Wardell bison trap indicated the remains of at least 200 bison and over 400 projectile points that would have tipped arrows rather than darts (12). The high number of recovered projectile points also support the interpretation of Wardell as a trap rather than a jump, as these types of sites (which do not kill buffalo via gravity) require that all

animals be killed by human action of some variety (12). Further, bison remains at the site indicate that most of the buffalo was removed to a nearby processing site while other parts of the buffalo were consumed at the corral itself (12). The most common butchering tool at the Wardell site is a small, thin percussion flake with a fine, pressure-flaked edge (as compared to large percussion-flaked tools with percussion-flaked edges as seen at Glenrock) (15). At Wardell, more butchering was done with heavy chopping tools rather than with these small and delicate cutting tools (15). In excavations, three distinct levels of use were identified (19). Features common to all three occupation levels at Wardell are small and large open fires, not confined to pits (24).

The corral at Wardell was about 30 feet in length and vaguely rectangular in shape with rounded corners (Frison 1973:20). Both a species of juniper known as red cedar as well as cottonwood were used to form the posts of the corral at Wardell (24). The 436 projectile points identified at the Wardell site are all side-notched, although the styles vary widely. No true patterns can be identified between the three occupation levels at Wardell aside from an increasing preference for the use of obsidian in the higher levels (25). Obsidian tools at the Wardell bison trap were sourced to two locations in Yellowstone, despite the fact that there are two closer obsidian sources at Teton Pass and near Wilson, Wyoming (65). Bone preservation at Wardell was generally poor (67). An *Olivella sp.* shell bead and the remains of three to five pottery vessels were recovered from the processing area at the Wardell site (68). A portion of a human femur was found in the middle level of the kill area at the Wardell site (72-73).

The overall toolkit at Wardell represents a specialized function of killing and butchering bison (Frison 1973:34). Intensive marrow recovery at Wardell is demonstrated by large numbers of broken long bones in the primary butchery area (51). A prominent feature of the Wardell site is the presence of bison fetal bones in the secondary processing area and their subsequent lack in the

primary butchering area, indicating that all bison fetuses were removed for processing and were therefore of high value (52). The most prominent features of the processing area at Wardell are basin- and conical-shaped fire pits, the former for heating stones and the latter for roasting meat using heated stones (54). One of the unique finds at the Wardell bison trap was an unopened roasting pit, which was excavated intact (54).

Frison estimated that a group of at least 100 to 125 people were required to make the trap at Wardell operate successfully (1973:79). All occupations at the Wardell buffalo trap indicated repetitive use during the fall season over a series of years (79). The pottery vessels discovered at Wardell represent a unique occurrence of this type of pottery at this time in the Prehistoric record (81). While Fremont and Promontory pottery are contemporaneous with the occupations at the Wardell site, the pottery does not appear to be of the Fremont tradition (81-82). Based on ceramic styles, Frison's conclusion regarding the occupants of the Wardell site were that they may have been a group of Athabascan people who found themselves in the Green River basin during their southward migration (82).

Tooth eruption schedules for the Wardell sample population of buffalo confirm that the trap was used in the fall (Reher 1973:91). The sample population of buffalo from the kill area of the Wardell buffalo trap appeared to be missing a large amount of the expected number of juvenile buffalo for an average population, demonstrating a high juvenile mortality rate (97). The estimated number of buffalo at Wardell, based on this sample population, was 296 buffalo (98).

Excavation History

Although only a fraction of the Wardell archaeological deposit was excavated, it resulted in a sample of over three and a half tons of buffalo bones (Frison 1973:50).

1,540 B.P. - Wanuskewin

The archaeological sites that compose the Wanuskewin Heritage Park, on the Opimihaw Creek (a tributary to the South Saskatchewan River near Saskatoon) represent a complete record of occupation on the Northern Plains going back to 6000 B.P. Two bison kill sites in the park, the Newo Asiniak site and the Opimihaw site, date to the Late Prehistoric period, the same time period as the Grapevine Creek Buffalo Jumping Complex.

Topology

Archaeological sites in the Wanuskewin Heritage Park in Saskatoon include: habitation sites, bison kills, a stone circle site, and a medicine wheel (Walker 2016:113).

Age

Cultural materials excavated at the Newo Asiniak site in 1984 and 1985 indicate two bison kill events radiocarbon dated to 185 B.P. and 1540 B.P (Walker 2016:115).

Evidence of Activity

The Newo Asiniak site, located within the Wanuskewin Heritage Park, is interpreted as a small bison kill site and habitation site. The second bison kill site at the Wanuskewin Heritage Park is the Opimihaw site, the largest site in the heritage park. It is a large bison kill/processing complex.

Excavation History

Test excavations in 1982 revealed 9 occupation levels at the Opimihaw site but no further work has been completed (Walker 2016:119).

Additional Useful Information

"Newo Asiniak" means "four stones" in the Cree language (Walker 2016:115).

1,000 B.P. - First Peoples Buffalo Jump

First Peoples Buffalo Jump is a complex of bison bone beds and associated activity areas located in west-central Montana along the edge of the Missouri River Valley (Fisher Jr. and Roll 2016:88). Like Grapevine Creek, the First Peoples Buffalo Jump exemplifies all the expected archaeological features associated with a buffalo jumping complex, including primary and secondary butchering areas, campsites, and drivelines.

Topology

First Peoples Buffalo Jump is another complex of archaeological remains which includes stratified bison bone beds at the base of a precipice where killing and primary butchery took place, as well as activity areas located away from the cliff where activities such as carcass processing and campsite activities took place (Fisher Jr. and Roll 2016:87).

Age

The First Peoples Buffalo Jump is a stratified site that was used "[…] on multiple occasions during the Late Precontact (Late Prehistoric) Period, with bison killing apparently carried out from fall through winter and into spring" (Fisher Jr. and Roll 2016:87). First Peoples Buffalo Jump has been radiocarbon dated to at least 1000 B.P.; however stratigraphically deeper, undated deposits along with relatively rare occurrences of Avonlea points suggest some usage prior to the 1000 B.P. date (89). Use of First Peoples Buffalo Jump appears to have ended by ca. 1700 A.D. (100).

Evidence of Activity

One of the notable features of the lithic assemblage at First Peoples Buffalo Jump is the high proportion of obsidian artifacts. These artifacts were sourced to Obsidian Cliff at Yellowstone National Park and suggest that the people who used this buffalo jump either traveled frequently to the mountains in the south or had formed exchange relationships with people that lived in that

direction (Fisher Jr. and Roll 2016:93). Additionally, there is a notably low frequency of porcellanite artifacts at First Peoples, indicating a lack of contact with people to the east and southeast (94). Researchers interpret the presence of ceramic artifacts at the site to indicate a long-term occupation of the campsite area near the base of the precipice at First Peoples Buffalo Jump (94). In addition to rare occurrences of Avonlea points, the other diagnostic projectile point style discovered at First Peoples Buffalo Jump is the Old Woman's type (91). First Peoples Buffalo Jump was both a bison kill area and a residential camp site (105).

Excavation History

During the twentieth century, it is estimated that approximately 284 tons of bison bone were removed from the site for fertilizer mining (Fisher Jr. and Roll 2016:101).

650 B.P. The Vore Site

The Vore site is a Late Prehistoric buffalo jump located in the Red Valley of the Black Hills in northeastern Wyoming, initially located by a highway crew in 1970 (Reher and Frison 1980:1). This buffalo jump is listed on the National Register of Historic Places, and the site is open to the public. Reher and Frison postulate that the original occupants of the Vore site might have been either transitional hunter-gatherer-horticultural groups or more fully sedentary groups occupying horticultural villages along the Missouri River (29-30).

Dating back to the Hawkens site, the Black Hills area has been used for trapping buffalo since at least the Altithermal Period (Reher and Frison 1980:30). The Apache, Kiowa, Shoshone, and Crow were all likely or probably inhabitants of the Black Hills region during some portion of the period of use of the Vore site (31-32). The frequency of communal kills at Vore ranged from approximately every 30 years in the 1500s, to almost annually in the 1600s, to less frequent but still only several years apart in the century after that (42). This is a reflection of environmental

conditions in the Black Hills (41). The Vore site, located at a geographic crossroads, was used by many cultural groups in the Late Prehistoric and Historic periods, just like the Grapevine Creek Buffalo Jumping Complex.

Topology

The Vore site is located within the Black Hills, the largest uplift east of the Rocky Mountains, and which are surrounded by shortgrass plains (Reher and Frison 1980:5). The Vore site is located in the extreme northeastern corner of Wyoming, about six miles west of South Dakota and 30 miles south of Montana (6). There are numerous water sources in the immediate vicinity of the Vore site, including several creeks, intermittent streams and small ponds (6). The Red Valley itself represents prime buffalo habitat, with plenty of grassland, water sources, and sheltered and timbered slopes (6). Drive line remnants indicate that buffalo were being driven to the Vore site from the west, from a distance of at least 4 kilometers, however topography suggests that buffalo might be driven from other directions as well (8).

The gypsum sink hole which forms the buffalo jump at the Vore site has very low visibility (Reher and Frison 1980:8). The size and depth of the bone bed is extensive and bone preservation is extensive, with 22 stratified layers of bones identified (1). The dimensions of the sink hole are 31 meters in diameter and 15 meters in depth to the top of the bone deposits (1).

Age

This massive deposit was made over a period of 200-300 years, between A.D. 1500 and 1800 (Reher and Frison 1980:1). The stratigraphy of the projectile points dates the earliest use of the Vore site to no earlier than A.D. 1300 and the lack of Euro-American artifacts places the terminal use of the site before historic contact (29). However, dendrochronology dates the use of the Vore site to between A.D. 1450 and A.D. 1850 (29).

Evidence of Activity

Researchers estimate that the remains of at least 10,000 bison and perhaps as many as 15 to 20 thousand are deposited at the Vore site (Reher and Frison 1980:1). Features at Vore range from small hearths to large circular alignments of buffalo skulls, interpreted to have a ceremonial function (3). One hypothesis posited by Reher and Frison is that the location of the kill site within a steep-sided sink intensified the process of separating the buffalo into transportable butchering units (3-4).

The butchering process utilized by the inhabitants of the Vore site is the same used over the course of 10,000 years and evidenced at the Glenrock and Casper sites, i.e., the skinning of buffalo before the carcasses are broken down into butchering units for transport to a secondary processing area (Reher and Frison 1980:15). Nearly all bone examined from the Vore site was butchered in some fashion (16). Several butchered canid remains were recovered from the Vore site (18-19). Generally, the bone beds at kill sites are missing approximately 30 to 60% of the population killed (60). A seasonality study of mandibles recovered from the Vore site showed that, over time, the buffalo jump was utilized mostly during the fall, with occasional winter use as well (66). Generally speaking, the population of Vore bison were very healthy, living to 14 or 15 years of age and often 3 or 4 years past that (69), indicating an optimum environment for bison populations. Like many other communal kill sites, the population of bison in the bone bed at Vore are distinctly lacking juvenile specimens, an attribute supposed to be caused by a cultural preference to remove juvenile bison (up to two years in age) from a primary processing area before being broken down further (76). Twelve vertebrate species were discovered in the Vore site faunal sample, with bison majorly predominating. Candidae were the next most common species, being a local wolf-dog hybrid population, likely created by incipient domestication (Walker 1980:154).

Based on sexing evidence from bison metapodials from the Vore site, researchers were able to determine that bull herds were being driven along with nursery herds or mixed-sex groups, rather than bulls being driven separately (Peterson, Jr. 1980:176).

Seven charcoal concentrations exposed during excavations at Vore represent surface hearths, all found in the upper one third of the site (Reher and Frison 1980:17-18). Additionally, a circular alignment of skulls was discovered at the Vore site. The feature was partially excavated by sample units and the researchers estimate that 40-50 skulls were used to form the feature (19).

Out of this huge bone bed at Vore, only 68 stone butchering tools and tool fragments were recovered during excavations (Reher and Frison 1980:20). These tools represent a basic and functional butchering toolkit common to many archaeological sites in Wyoming (20). The majority of tools were formed from quartzite flake blanks (20). Aside from stone tools, bone butchering tools, such as choppers and fleshers, were also recovered from the Vore site (24). A total of 217 projectile points were recovered from the excavations at the Vore site (25). Almost all the projectile points from the Vore site are typical Late Prehistoric side-notched points (25). Most of the lithic materials from the Vore site come from regional sources such as the Spanish Diggings quarry, porcellanite, or Knife River flint (52). Based on a multivariate discriminate function analysis of lithic material types, Reher and Frison postulate that the occupants of the Vore site were an aggregation of centralized bands (133).

Excavation History

The site was initially discovered in 1970 prior to the expansion of Interstate 90. Faunal analysis at Vore focused on mandibles. The Vore study was the most intensive examination of mandibles yet attempted in Wyoming (Reher and Frison 1980:3). The 22 stratigraphic layers at the Vore site represent the most complex stratigraphy recorded at a buffalo bone bed (13). Sample

sizes recovered from the various levels ranged from 1% to 10%; however this small fraction of the total population at Vore represents the largest collection at the University of Wyoming (13).

Additional Useful Information

The sample of bison remains recovered from the Vore site represents the largest single site sample ever recovered (Reher and Frison 1980:4).

650 B.P. - The Bootlegger Trail Site

The Bootlegger Trail site was originally discovered in 1964 and 1965 below the high-water mark at Tiber Reservoir along the Marias River (Roll and Deaver 1980:3). The Bootlegger Trail site is significant because it contains both processing areas and a primary kill area, similar to the primary and secondary processing areas identified at Grapevine Creek.

Topology

The site is located on the banks of the Tiber Reservoir in northern Montana between the towns of Shelby and Conrad (Roll and Deaver 1980:4). The location of the site is ideal for trapping bison in that it occurs at a transition between short-grass and mixed-grass prairies, a location where chinook winds occur annually, and that immediately north of the site the Marias River has cut a 45-m deep canyon into the prairie (8-9). During the period of use of the Bootlegger site, the climate was similar to what it is like today (12). The Bootlegger site features over 3 km of driveline features to the south of the site (20). Roll and Deaver postulate that the Galata site (24TL0026), approximately 1.5 km distant, might have been a campsite associated with the use of the Bootlegger bison trap (20). The Bootlegger site itself consists of multiple processing areas and a single kill area (27).

Age

Radiocarbon dates place the use of the Bootlegger site around 1300 A.D. (Roll and Deaver 1980:18). To corroborate this, the presence of side-notched projectile points but a lack of tri-notched points indicate that the Bootlegger Trail site was occupied sometime during the early or middle Late Prehistoric, but not the terminal phase of the Period (48-49). The homogeneity of the artifact sample further suggests that the occupation of the Bootlegger Trail site was brief (49).

Evidence of Activity

The processing areas contained features such as hearths, stone boiling pits, ash-filled pits, and lithic concentrations (Roll and Deaver 1980:27). In the two "flaking stations" located within the processing areas of the Bootlegger Trail site, quartz breccia was significantly the most commonly found lithic material (40). 48 side-notched projectile points were recovered from the kill area at the Bootlegger Trail site, as well as a number of other artifacts associated with killing, butchering, and disarticulating buffalo (44). A greater variety of artifacts were found in the processing areas of the Bootlegger Trail site, including projectile points, knives, endscrapers, bone awls, ceramics, and ornamental items (44). Ceramic evidence indicates that the remains of three vessels were left near a hearth feature in one of the processing areas of the Bootlegger Trail site (48).

Of 20,000 bone fragments from the Bootlegger Trail site, over 90% of these were from bison (Roll and Deaver 1980:56). One notable feature of the suite of butchery marks found on the bison bones at the Bootlegger site is that every brain case was incomplete, indicating that all brains were removed from the kill area without the crania attached (59). In the two levels of the kill area at the Bootlegger site, it appears that the earlier occupants utilized the killed bison more completely than the second occupants, while some articulated and unprocessed sections of bison were found

in the later level of the kill area (59). Using estimates based on the excavated portions of the kill area at the Bootlegger Trail site, Roll and Deaver think that the earlier occupation at Bootlegger Trail contains the remains of 471 adult bison and 64 fetuses, while the later occupation contains at least 866 adults and 375 fetuses (61). In addition to the correlated remains at the processing areas of the Bootlegger Trail site, an estimate of the total minimum number of individual bisons for the site is 1346 adults and 453 fetuses (63). The large number of bison fetus remains at the Bootlegger Trail site indicate that the site was used in the spring (67). Roll and Deaver were unable to distinguish more than one kill event in the bone bed at the Bootlegger site (27). The dental evidence indicates that the bison population killed at the Bootlegger Trail site were very old, indicative of excellent environmental conditions for bison (Roll and Deaver 1980:69; Reher and Frison 1980).

Roll and Deaver postulate that the communal hunting strategy at the Bootlegger Trail site was utilized, as opposed to more efficient individual hunting strategies, because they produced larger absolute yields which in turn allowed for surpluses, feasting, trade, the engagement of kinship ties through food sharing, and greater security throughout the year (1980:94). The three main types of lithic material present at the Bootlegger Trail site are extrusive igneous rocks, quartz of sedimentary origin, and quartz of metamorphic origin (Moe et al. 1980:103). Excepting the obsidian artifacts (likely from the Yellowstone Plateau), all the lithic materials found at the Bootlegger Trail site can be found locally in the vicinity of the Tiber Reservoir area (106). Over 300 bone tools were identified at the Bootlegger Trail site, generally on the basis of wear or polish on the ends of elements (127). The fragments of the three ceramic vessels located in the processing areas of the Bootlegger Trail site exhibit similarities to the Late Saskatchewan Basin Variant from southern Alberta (141).

Excavation History

A sparse concentration of butchered bison bones were investigated in 1974 with four test units and revealed that an intact deposit lay upstream with a Late Prehistoric component (Roll and Deaver 1980:3-5). Subsequent investigations in 1975 revealed that the site contained evidence of multiple uses and a large amount of fetal bison remains (6-7).

450 B.P. - Madison Buffalo Jump

The Madison Buffalo Jump is a large Prehistoric complex located near Bozeman, MT. A prominent, tall landscape feature represents the jump itself, with habitation sites, drive lines, and eagle trapping pits or vision quest sites all found within immediate proximity of the jump itself. The Madison Buffalo Jump falls well within the traditional historic range of the Crow Tribe, and the tribe claims cultural affiliation with the Madison Buffalo Jump, just as they do with the Grapevine Creek Buffalo Jumping Complex.

Topology

At Madison Buffalo Jump, bison bone middens occur on the western slopes of a peninsula-like plateau featuring a 35-foot vertical precipice with a steep talus slope below precipitating downward for 600 feet (Davis and Brownell 2016:59-61). The Madison Buffalo Jump is a complex of archaeological features all presumed to be related to the communal hunting of bison. Aside from the bison bone beds, the complex also includes a series of drive lanes, cairns, stone circles near the bison bone beds and also along a nearby plateau, pictographs, as well as eagle catching pits (62).

Age

The Madison Buffalo Jump was possibly utilized as early as the Paleoindian Period. However, this date is based on a diagnostic projectile point that was photographed as part of a

looter's collection and its provenience at the site is unknown (Davis and Brownell 2016:68). The site contains no diagnostic artifacts from the Archaic Period (69). Based on a preponderance of diagnostic artifacts, what is clear is that the Madison Buffalo Jump experienced its most intense utilization during the Late Prehistoric Period, likely between ca. 450 B.P. to 200 B.P. (69-71).

Evidence of Activity

In addition to diagnostic projectile points, excavations at Madison Buffalo Jump also uncovered 75 sherds of Intermountain Ware ceramics (Davis and Brownell 2016:71). The presence of Intermountain Ware has led to the authors making a cultural association with Mountain Shoshone groups (71-72).

Excavation History

To date the horizontal and vertical extent of the bison remains is still unknown despite the fact that the first excavations occurred there in 1940 (Davis and Brownell 2016:67).

Additional Useful Information

An interesting anomaly, researchers at the Madison Buffalo Jump in southwest Montana propose that the earliest users of the site were Mountain Shoshone hunter-gatherers, despite the fact that Mountain Shoshone have no tradition of bison jumping (Davis and Brownell 2016:59). Obsidian hydration testing showed that many Late Prehistoric lance points dated to around 960 B.P. and were sourced to Obsidian Cliff at Yellowstone National Park. Coincidentally, the same tests were performed on obsidian artifacts from the First Peoples Buffalo Jump indicating the same source and an almost identical time frame, demonstrating that the two buffalo jumps were in simultaneous use during the Late Prehistoric Period (75). Additionally, testing at another nearby bison kill site, the Antonsen bison kill site south-southwest of Madison Buffalo Jump in the

Gallatin Valley, reveals a suite of obsidian artifacts with similar magnitude hydration band thicknesses, indicating a third site in use contemporaneously (78).

280 B.P. - The Glenrock Buffalo Jump

The Glenrock Buffalo Jump is part of a Late Prehistoric Period buffalo jumping complex in central Wyoming (Frison and Reher 1970:1). This site is linked temporally to a constellation of other buffalo jumping sites in the vicinity and it is also connected to a deeper time frame, exhibiting evidence of the same pattern of bison butchery utilized at the Paleoindian Olsen-Chubbuck site to the south. The Glenrock Buffalo Jump exhibits many of the same features as the Grapevine Creek Buffalo Jumping Complex, and also occurs within the same time frame as Grapevine Creek.

Topology

The area surrounding Glenrock Buffalo Jump, with its rolling grasslands and availability of water at Deer Creek, made it ideal for buffalo pasture (Frison and Reher 1970:1-2). Over a mile of stone drive lines are present at the Glenrock Buffalo Jump (2). A second, smaller jump is located about a half mile away from the Glenrock Buffalo Jump, with about 15 stone circles situated between the two jumps (4). These all indicate that Glenrock is part of a larger jumping complex, similar to Grapevine Creek.

The bone deposits at the Glenrock Buffalo Jump were contained in slope wash deposits (Frison and Reher 1970:6). No secondary butchery/processing area was discovered at the Glenrock Buffalo Jump (6). While certain pockets of the bone deposit were well-preserved, other parts were badly decomposed and washed out to at least a mile from the site due to increased arroyo cutting (6-7). The Glenrock Buffalo Jump was likely one jump location among many along the scarp forming the precipice of the jump (43).

Age

While radiocarbon dates place occupation at the site during the Late Prehistoric period, on the cusp of historic contact (210 ± 100 B.P. and 280 ± 100 B.P.) through the historic period, Frison and Reher feel there are indications that the Glenrock Buffalo Jump was in use long before these times (1970:7). The 152 identifiable projectile points found at the Glenrock Buffalo Jump all are diagnostic to the Late Prehistoric Period (38).

Evidence of Activity

Frison and Reher speculate that the Glenrock Buffalo Jump was not used every year, but use alternated between nearby jumps in order to mitigate impacts from the foul odor of rotting bison carcasses produced from successful jumps in previous years (1970:6). In addition to the bone deposits at the base of the jump, evidence of four small fire hearths were discovered during excavations at the Glenrock Buffalo Jump (7). Finally, several stone circles were identified as part of the Glenrock Buffalo Jump. Because these stone circles are not placed in a cluster typical of a campsite and because they "do not have the appearance of typical tipi rings", Frison and Reher postulate that the stone circles are evidence of shamanistic activity related to bison procurement (5).

Bone preservation at the Glenrock Buffalo Jump was good (Frison and Reher 1970:1). There are two levels of bone deposits at the Glenrock Buffalo Jump, the bottom level being by far the thickest and containing the greater amount of buffalo bone (8). Overall, the bone bed at Glenrock Buffalo Jump is composed of disarticulated, butchered bones, indicating that no large body of meat was wasted at the site (9). Based on the butchery data from the bone deposits, Frison and Reher proposed a standard, Late Prehistoric Period butchery process for buffalo:

> […][T]he butchering process consisted first of removing the hide and then loosening the origin or insertion of muscles so they could be stripped out and

> removed to another location nearby for processing. Other processes were involved which included the removal of long bones for later recovery of bone grease, separation of parts of the carcass into various butchering units, opening of the body cavity to gain access to the internal organs, and recovery of brains and other contents of the skull. (10)

This proposed butchering process was based on evidence of butchery marks on the bison remains at the Glenrock Buffalo Jump (10-25).

At the Glenrock Buffalo Jump, a full suite of butchering tools was present at the site (Frison and Reher 1970:9). The tool assemblage at the Glenrock Buffalo Jump is interpreted as a specialized butchery toolkit (25). The toolkit is derived almost entirely from local materials, whether lithic or whether the tools are derived from the animals killed at the site (). Overall the toolkit at the Glenrock Buffalo Jump evidences a focus on function over aesthetics (26). The majority of tools made from bison bones were from rib bones (26). At the Glenrock Buffalo Jump there is a lack of beaming tools and end scrapers, indicating that hide work was done elsewhere (27). The chipped stone tool assemblage at the Glenrock Buffalo Jump is entirely made up of exhausted, and likely discarded tools (34). The 152 projectile points recovered from Glenrock may seem like a large number, but this is significantly smaller when considering other sites from the same time period (42). Frison and Reher attribute this general paucity of projectile points to the lethal nature of the jump at Glenrock (42).

Additional Useful Information

The Glenrock Buffalo Jump is significant in that the buffalo bone deposits produced a Late Prehistoric Period butchering model (Frison and Reher 1970:1), as discussed above. The butchering process at Glenrock Buffalo Jump is similar to the butchering process at the Paleoindian Period Olson-Chubbuck bison kill site in Colorado, indicating some sense of continuity over a vast period of time on the Plains (40).

Conclusion

The preceding summaries of buffalo kill sites across the Plains was intended to demonstrate both the breadth of difference through time and geographic space between such archaeological sites as well as the similarities that can be seen across communal buffalo hunting sites. These similarities are focused on site function – the killing, butchering, and processing of buffalo for food and other goods; this can be seen in the archaeological record through the variety of stone features found in buffalo jumping complexes, in specialized tool kits, and in studying the butchery marks on faunal assemblages.

The Grapevine Creek Buffalo Jumping Complex fits neatly into this spectrum of Prehistory. Grapevine Creek dates to the Late Prehistoric period, a time when the practice of buffalo jumping was reaching its height. Many of the sites discussed in this chapter, such as Head-Smashed-In, Gull Lake, Old Woman's, Wardell, Wanuskewin, First Peoples, Vore, Bootlegger Trail, Madison, and Glenrock would have all been used contemporaneously with Grapevine Creek. Additionally, southeastern Montana represents the center of buffalo jumping activity on the Plains. The foothills of the Rocky Mountains and the Big Horns provided the ideal landscape for jumping buffalo and the density of sites attests to this. Again, Grapevine Creek is located right in the middle of the ideal region for buffalo jumping in a marginal environment between the Bighorn Basin and the Missouri Plateau. Some of the sites mentioned in this chapter are located in close proximity to the Grapevine Creek drainage; particularly the Kobold site found only 15 miles away from Grapevine Creek. While this site predates Grapevine Creek by evidence of use during the Archaic period, both sites would have been utilized during the Late Prehistoric period as well. Another aspect that Grapevine Creek shares with other buffalo jump sites discussed in this chapter is its strong connection with a particular cultural group, the Crow Tribe of Indians. Other sites, such as

Head-Smashed-In and the Old Woman's Buffalo Jump, have similar connections with other Plains tribes. Frison speculated that the Kobold site had a Crow affiliation but this site is not mentioned in any oral traditions of the tribe. Thus, what makes Grapevine Creek unique is its exemplary place, both in time and in geographic space, as an example of buffalo jumping at the height of this industry. Additionally, the oral traditions linking Grapevine Creek to the Crow Tribe make this site unique as the only excavated buffalo jump with such a connection.

In conclusion, no discussion of buffalo jumping sites on the Plains would be complete without some discussion of the mining of surface buffalo bones for fertilizer, a widespread practice at the end of the nineteenth century and the first half of the twentieth century. This topic is particularly relevant to Grapevine Creek, as at least one of the bone beds in the complex (24BH0262) was subject to this destructive practice. The mining of surface bison bones, following the extermination of the bison in the second half of the nineteenth century, was a pervasive commercial enterprise between 1870 and 1896 (Davis 1978:254). A second round of bison bone mining, at archaeological kill sites, occurred in the 1930s, 40s, and 50s in the Northern Plains (254). This occurred at least a dozen times, at a dozen archaeological sites, in Montana, Alberta, and North Dakota (254). Christian R. Hansen, along with Joe Frost, visited 156 bison kills in the state of Montana over the course of 18 years spanning these three decades and was responsible for most commercial bison bone mining efforts in the state (258-259).

5. Fieldwork

Because of its landscape position and its location between distinct physiographic regions, the Grapevine Creek drainage basin was a crossroads for people and animals moving across the landscape. It has been an active cultural landscape for millennia and an important destination throughout much of prehistory. In addition to numerous springs and abundant grasslands in the basin, the natural Big Horn River ford at Fort Smith is likely an important reason that herd animals and people frequented Grapevine Creek, while two Prehistoric/Historic trails cut through the basin connecting Grapevine Creek with other physiographic regions. Diagnostic artifacts and radiocarbon dates recovered from the basin indicate that Grapevine Creek was used by people during the Middle Paleoindian, Early and Late Archaic, and the Late Prehistoric periods.

This chapter discusses three seasons of fieldwork in Grapevine Creek (2014-2016) which comprise the field portion of my dissertation research. While each season's work was conducted through the generous assistance of the Crow Tribal Historic Preservation Office and Indiana University, the size of the field crew, the objectives, and the participants differed each season. The results of this work provide a large amount of archaeological data to shed light on the practice of communal buffalo hunting on the Crow Reservation, and are one pillar of data collection that I use to explore the intersection of truths between oral traditions (discussed in the next chapter) and the archaeological record.

2014 Field Season

Fieldwork at Grapevine Creek began in August 2014, as a collaborative effort between the Crow Tribal Historic Preservation Office and the Indiana University Anthropology Department. I spent two weeks in the field at Grapevine Creek. Our priorities were to evaluate the quality of a comprehensive survey conducted in 1972 by a University of North Dakota crew led by Larry

Loendorf, and to assess previously recorded sites in the area for their merit under the National Register of Historic Places. Given the importance of the Grapevine Creek Battle Site to the area's overall significance, I chose to begin work in the northwest portion of the drainage, closest to the battlefield. While I was able to obtain permission from the tribe to conduct the fieldwork and met with individual tribal land owners, I was unable to obtain access to privately owned parcels of land that interspersed the landscape (due to a holdup at the BIA land records office). Time in the field was also constrained by inclement weather (it rained for one and a half days at the beginning of the field session), wildlife encounters (a black bear became interested in our work recording the Road Ring Site and forced us out of the field on three separate occasions), and general administrative hold ups (we lost an entire day due to the inability to get gas funds for our field vehicles). Additionally, two field days were devoted to training new tribal monitors on how to record archaeological sites and make National Register evaluations. Specifically, I held a field training with assistance from Indiana University faculty, graduate student, and undergraduate students participants from Dr. Laura Scheiber's field school, *Exploring Historical and Social Landscapes in the Greater Yellowstone Region*. This training included pace mapping, feature attribute sketching and recording, National Register significance evaluation, site descriptions, and GPS unit operation. My crew, consisting of a rotating group of 19 tribal monitors and 3 Indiana University participants, had a goal of relocating and evaluating 30 archaeological sites on the reservation side of the Grapevine Creek drainage. In the end, given the numerous delays and hinderances, we were able to successfully re-record and evaluate 5 archaeological sites. We attempted to relocate three additional sites but were unable to do so. Through the process of the informal pedestrian survey we performed in order to relocate archaeological sites, we discovered many isolated artifacts that were not discussed in the 1972 season. The five sites we were able to

relocate, three tipi ring sites, one quarry site, and one lithic material concentration, were so different from the descriptions given in the 1974 report that by the end of the field work I felt I could place little confidence in the 1974 findings and that, were I to use data from Grapevine Creek for my dissertation research, a new comprehensive survey would have to be conducted. The following sections are summaries of the five updated sites in the western portion of the Grapevine Creek Drainage.

24BH0842 Update

This site was first recorded in 1972 by the University of North Dakota Archaeological Survey. It was described by McDonald and Good as a habitation site with scattered lithics. Good and Loendorf further indicate in the 1974 project report that the site contained lithic detritus composed of red and purple chert, agate, and porcelanite, including indigenous chert nodules. One biface, three scrapers, one scraper/chopper, and one core were collected during the 1972 field season.

2014 UPDATE: This site was relocated by a crew of tribal monitors from the Crow THPO in August of 2014. The crew noted few pieces of culturally modified lithic material (8 flakes, 3 of which were modified) and an adundance of raw material (likely what Loendorf noted as "indigenous chert nodules." No formal lithic tools were identified. The site function was noted in 1972 by McDonald and Good as a habitation site. No evidence of habitation was noted by our crew. The site function is updated to possible quarry site with evidence of flint knapping activity observed. The site is located on a low rise. East of the site, 3 protruding canyon walls are visible. White Buffalo Ranch is also within view of the site at the base of the canyon walls. The site is south of North Fork Grapevine Creek.

Figure 4: Example of raw lithic material at 24BH0842. Plan view.

24BH0848 Update

This site was first recorded by Loendorf and Good in 1972. They noted the site type as tipi ring and recorded 7 complete rings and 7 partial rings. The southernmost complete ring contained a central hearth feature. Three formal lithic tools, two scrapers and one obsidian triangular side-notched projectile point were collected at that time.

2014 UPDATE: The site was relocated by a crew of Indiana University field school students working in conjunction with the Crow THPO. Only one partial ring was relocated at this time, along with one flake. Despite the original presence of a temporally diagnostic tool in 1972, the sparse nature of the surface evidence in 2014 makes this site ineligible for the National Register

of Historic Places. The datum used for mapping was a low granitic outcropping along the small drainage leading into North Fork Grapevine Creek. The cropping is approximately 15 centimeters in height. This site is interpreted as a habitation site given the presence of at least one stone circle (one identified in 2014, 14 identified in 1972). 24BH0848 is located at the top of the small box canyon created by North Fork Grapevine Creek. The site itself is located in a small grassy plain surrounded by the canyon rim to the east and pine trees on the other three sides. The site is bounded to the south by a small but established drainage that cuts through bedrock. To the northwest, there is a low ridge of rock outcropping containing possible small shelters.

24BH0852 Update

This site was originally recorded by Westfall in 1972 as an occupation site consisting of scattered lithic debris. The site was recorded as having extremely large dimensions (1/2 mile by 1/4 mile) and being fairly undisturbed despite the lack of many surface artifacts. No surface features were noted at this time. A red porcellanite scraper and a quartzite chopper were collected. No further work was recommended.

2014 UPDATE: This site was relocated by a crew of THPO tribal monitors in the summer of 2014. The site consists of an extensive lithic scatter on terraces on the north and south side of a coulee that bisects the site. The lithic scatter itself is composed primarily of raw material of mostly reddish-orange chert. The crew did a complete close survey of the site including a large grassy area that extends beyond the site and is double the length of the site to the west. We monitored the location of chert outcrops but didn't count all the flakes. Most are not flakes but some are. This still needs to be determined, especially in the southeast corner of the site where the largest cluster is. We marked the location of tools - including a projectile point and several utilized

flakes. The lithic scatter is extensive and extends to the northeast on the east side of the fence on private property. On the northwest side of the site on the north side of the coulee are at least two features, very complete stone circles, 4.5 meters N/S by 5 meters E/W, doorways to the east. More features are possible. The 2014 evaluation confirms the 1972 designation as an occupation site consisting mainly of a very large surface stone quarry. At least two surface stone circles suggest the site's use as a habitation area as well. 24BH852 is located on a primary terrace. The site is surrounded and bisected by low coulees, or dry creek beds.

24BH0871 Update

This site was originally recorded in 1972 as a tipi ring site containing 7 complete rings and 2 partial rings. Only one lithic artifact, a cobble chopper, was noted at the time of recording. When we relocated this site in 2014, we found an additional 17 tipi rings, a lithic material concentration, and a historic trash dump. Additionally, the midsection of a porcellanite biface was located as an isolated artifact in between the access road and the site location. The rings themselves are exemplary of this typical form of Plains domestic architecture. Generally, the rings were well sodded in and appeared undisturbed, despite evidence of the site's use as a dumping ground in recent decades. Based on the quality and quantity of the rings and the variety of lithic materials present at the site, our crew recommended this site for the National Register under Criteria D, a property that is likely to yield important information about the region's prehistory.

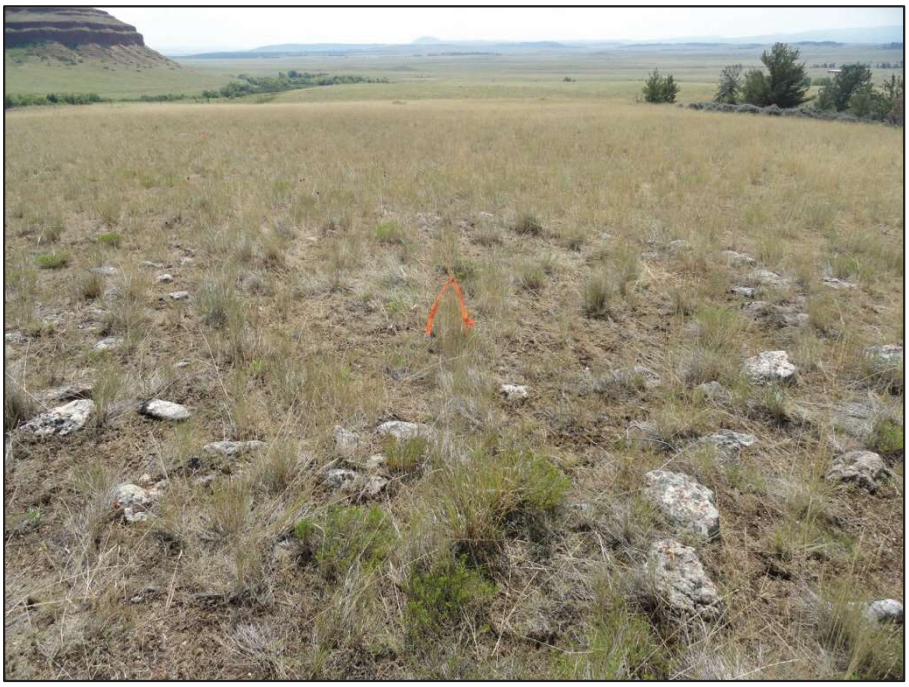

Figure 5: SE Site 24BH0871 Feature 1, a well-defined and well-sodded tipi ring. Note western portion of Grapevine Creek drainage in background and Chugwater uplift in upper left of photo.

24BH0875 Update

This site was first recorded in 1972 as a tipi ring site with 5 complete but well-hidden rings. No lithics were noted on the site report but in the project report Good and Loendorf recommended "more surface collection."

2014 UPDATE: In August 2014 a crew of tribal monitors from the Crow THPO relocated 24BH875. The crew felt positive that, based on the sketch map and physical despcription given in the 1972 report, they had relocated the site. However, this crew was able to identify only one possible tipi ring and no surface lithics. The site is located in a hollow section of land. A canyon is to the south and open land is to the west. Rock piles are located to the north and east. The site is covered with very high grasses with interspersed chokecherry patches, Sediment accumulation appears high. Almost all rocks on the surface are deeply buried. Several rock outcrops are present that are leaving rocks on the surface presently. These do not appear old. This site is determined to

not have significance due to the sparse archaeological features relocated in 2014. Out of five tipi rings that were located (but without collecting attribute information), only one ring was relocated in 2014. This ring consists of only 7 stone and represents an incomplete feature. While no lithics were noted at the time of original site recording, Good and Loendorf recommended more surface collection, indicating that surface lithics were present at that time. However, no lithics were located in 2014.

In conclusion, the five site updates performed during the 2014 field season revealed that the 1972 fieldwork conducted by Good and Loendorf could not be relied upon in the Grapevine Creek drainage. While useful as a starting point, any further research would need to include a re-evaluation of prior studies in the Grapevine Creek area.

2015 Field Season

After realizing the expansive scope of what could be accomplished at Grapevine Creek during the 2014 field season, I chose to focus on a more reasonable body of work that could be handled during a single field season that would also address past landscape use of the Grapevine Creek area. I began by geographically isolating the eastern third of the drainage, separating the entire Grapevine Creek watershed into three major areas (Figure 6). 2015 fieldwork was conducted with a crew composed of 4 tribal monitors from the THPO, myself, and Dr. Edward Herrmann, a faculty member in the Geology Department and a member of my dissertation committee at Indiana University.

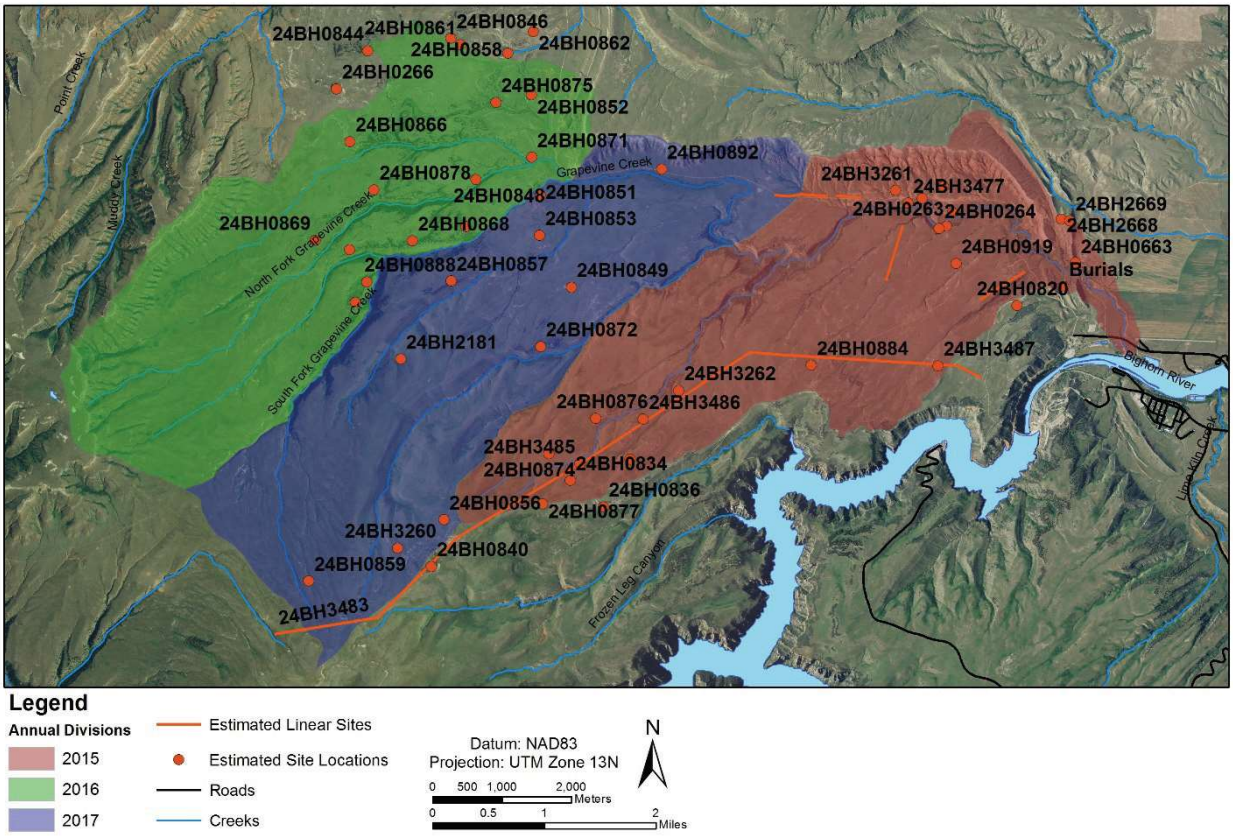

Figure 6: Grapevine Creek drainage divided into three major areas. The 2015 fieldwork focused on the eastern portion of the drainage (in red).

The dividing lines were along unnamed tributaries to Grapevine Creek that roughly divided the drainage evenly. The westernmost third of the drainage includes the Grapevine Creek Battlefield. The eastern portion includes previously identified buffalo jumps and drive lines. The center portion represents the area of the Grapevine Creek drainage where the least amount of previous research has been done. This area is 5,872 acres in size.

Based on a records search at the Montana State Historic Preservation Office (or SHPO), 25 previously identified archaeological sites are located in this easternmost portion of the drainage. The site types, according to this same database, are as follows: 7 buffalo jump sites, 1 burial site,

2 fortification sites, 6 lithic material concentrations, 6 tipi ring sites, 1 drive line, 1 historic trail (likely the Bozeman Trail), and 1 historic power line (Table 1).

Table 1: Previously Identified Archaeological Sites by Type in the 2015 Study Area.

Smithsonian Number	**Site Type**
24BH0262	Buffalo Jump
24BH0263	Buffalo Jump
24BH0264	Buffalo Jump
24BH0265	Buffalo Jump
24BH0919	Buffalo Jump
24BH3262	Buffalo Jump
24BH0261	Buffalo Jump
Burials	Burials
24BH0662	Drive Line
24BH0874	Fortification Site
24BH3485	Fortification Site
24BH3483	Historic Power Line
24BH3489	Historic Road
24BH0663	Lithic Material Concentration
24BH0834	Lithic Material Concentration
24BH0876	Lithic Material Concentration
24BH0877	Lithic Material Concentration
24BH0884	Lithic Material Concentration
24BH2668	Lithic Material Concentration
24BH0873	Tipi Ring
24BH3261	Tipi Ring
24BH3264	Tipi Ring
24BH3477	Tipi Ring
24BH3486	Tipi Ring
24BH3487	Tipi Ring

Previous archaeological work in this area began in 1964 (Conner 1964) and was performed as recently as 2011 (McCleary 2011). Approximately 80% of this area has been previously surveyed, the vast majority of this being performed in 1972 by a University of North Dakota crew led by Kent Good and Lawrence Loendorf (1974). In 2010 a 30-meter corridor survey surrounding

the Lovell-Yellowtail Numbers 1 and 2 Transmission Lines was performed, representing a total of 110 acres within the 2015 study area (the eastern third of Grapevine Creek drainage) (Landt and Alexander 2010). All of the area surveyed in 2010 was previously surveyed by Good and Loendorf.

My initial scope of work included a comprehensive survey of the eastern portion of the drainage in order to first relocate previously identified archaeological sites that were missing GPS data, second identify any previously unnoted archaeological features, and third make a determination of eligibility for the National Register of Historic Places (or NRHP) for all previously recorded archaeological sites. By achieving these goals I hoped to obtain enough data to address several research questions concerning the Grapevine Creek area.

This portion of the Grapevine Creek drainage lies entirely within the boundary of the Crow Reservation, and I found three types of land statuses in the drainage: fee allotment, trust, and tribal. Fee allotment lands are privately owned parcels that are not managed by the Bureau of Indian Affairs (BIA). In the eastern portion of the Grapevine Creek drainage, there are three such land owners (see Figure 7 and Table 2). I approached all three in person requesting permission to access their property using a standard letter form (see Figure 8). Two of the land owners refused to allow me access to their property, and a third agreed and signed my letter.

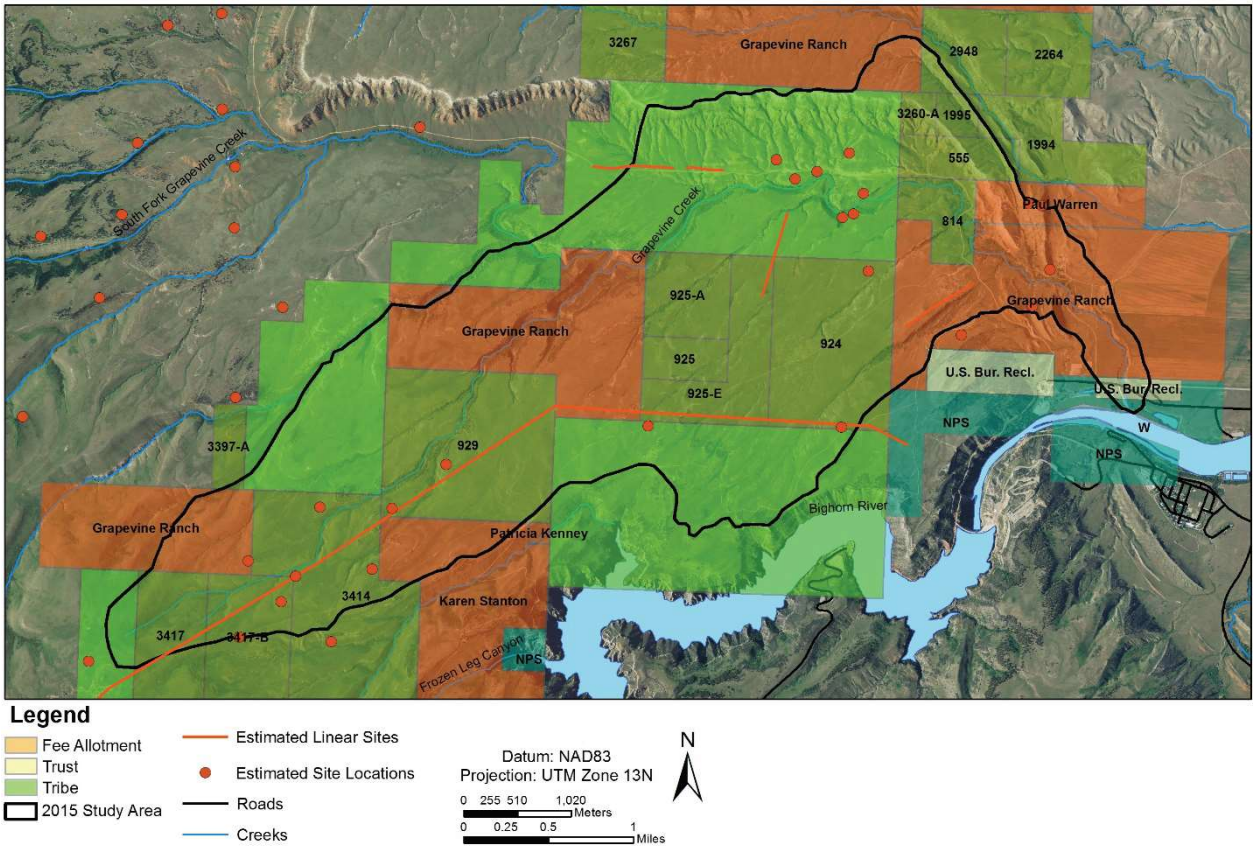

Figure 7: Breakdown of land ownership in the eastern third of Grapevine Creek drainage by land status.

Table 2: Fee Allotment lands in the 2015 Study Area

Land Owner	**Total Acreage**	**Percentage of Total Area (2015 Study)**	**Permission to Access?**
Grapevine Ranch	1335	22.70%	No
Karen Stanton	135	2.30%	Yes
Paul Warren	61	1.00%	No
Total Fee Allotment Area:	1531 acres (26.1% of total study area)		

CROW TRIBE EXECUTIVE BRANCH

Bacheeitche Avenue
P.O. Box 159
Crow Agency (Baaxuwuaashe), Montana 59022
Phone: (406) 638-3709

Date: _____

Name of Property Owner: _____

Address of Property Owner: _____

I, _____, have agreed to grant the Crow Tribal Historic Preservation Office (the "CTHPO") and affiliated researchers permission to access my property at _____ _____ _____ (the "Property") for the purposes of conducting a cultural resources survey during the summer of 2015.

This cultural resources survey will include vehicular access to unpaved areas of my property, a comprehensive pedestrian survey, the recording of identified archaeological sites, and limited subsurface excavations not to exceed one square meter of ground disturbance in any single location, to be backfilled immediately. I hereby permit the CTHPO and affiliated researchers access to the Property for the aforementioned purpose, subject to the following conditions:

1. The CTHPO's right to access the Property will begin June 28, 2015 and terminate on August 1, 2015. Notwithstanding such date, I retain the right to terminate the CTHPO's access at any time prior to that date, for any reason whatsoever, upon notice to the CTHPO. I do not anticipate that I will need to terminate the CTHPO's right of access in the foreseeable future, however I must reserve this right in the event that the CTHPO's access right interferes with my intended use or development of the Property or I feel the CTHPO is not complying with the terms of this letter.
2. I accept no responsibility whatsoever for any losses or damages (personal or property) which the CTHPO and affiliated researchers suffer or incur as a result of using the Property, and the CTHPO agrees to indemnify me against any losses suffered by me or claims made against me by CTHPO employees, agents and others who access the Property pursuant to the rights given to the CTHPO under this letter.
3. The CTHPO agrees to repair any damage caused to the Property as a result of its access.
4. Other: _____ _____ _____

In front of a witness from the CTHPO, I agree with the above terms and conditions.

_____
Property Owner

_____
Crow Tribal Historic Preservation Office Witness

Agreed and accepted this _____, 20___.

Great Apsaalooke Nation: "Teepee Capital of the World"

Figure 8: Permission to access property letter sent to all fee allotment land owners.

The second type of land status is trust lands. These are parcels of land that are owned jointly by many tribal members and managed in trust by the BIA. They are most often leased out through the BIA and the lease fee is distributed among the owners. There are 14 parcels of trust land within the eastern portion of the Grapevine Creek drainage. In order to gain access to these lands, I would have had to sign a business lease with the majority of owners of each parcel of land. In some cases, a small parcel is owned by 18 people. This endeavor presented too much work for the time I had allotted to obtain land permission, so I did not attempt to access any trust lands during the 2015 field season.

The final type of land status is tribal. These parcels of land are owned by the Crow Tribe and are leased out. In the case of the parcels in Grapevine Creek, these are grazing leases. Because these lands are owned by the tribe, I did not require any special permission to access the properties for archaeological investigations. There are four separate plots of tribal lands in the 2015 study area (See Table 3 for a breakdown by acreage and percentage of land types and access levels).

Table 3: Land ownership types and access levels.

Ownership Type	**Acres**	**% of Total Area**	**Access?**
Fee Allotment	1531	26.1%	By permission only
Trust	2358	40.2%	Through lease agreement
NPS	6	0.1%	
Tribe	1953	33.3%	No restrictions
US Bureau of Rec.	21	0.4%	
TOTAL	**5869**	**100%**	

At the beginning of the 2015 field season, I had obtained permission to access 35.6% of the total 2015 study area, covering 10 of 25 previously identified archaeological sites and 2088 total acres (see Figure 9 for a revised 2015 study area by permission to access). These ten sites included 5 buffalo jump or drive line sites, three tipi ring sites, one historic trail (likely the

Bozeman Trail), and one lithic material concentration. Nine of the ten sites were located on a contiguous two-section parcel of tribal lands that could be accessed by the Grapevine Creek Road. In the end I chose to constrain the 2015 fieldwork to Township 6 South Range 30 East Sections 1 and 2 because of access rights, ease of accessibility, and the greatest density of previously identified archaeological sites (including the majority of previously identified buffalo jump sites in the drainage) (see Table 4 for a list of these sites).

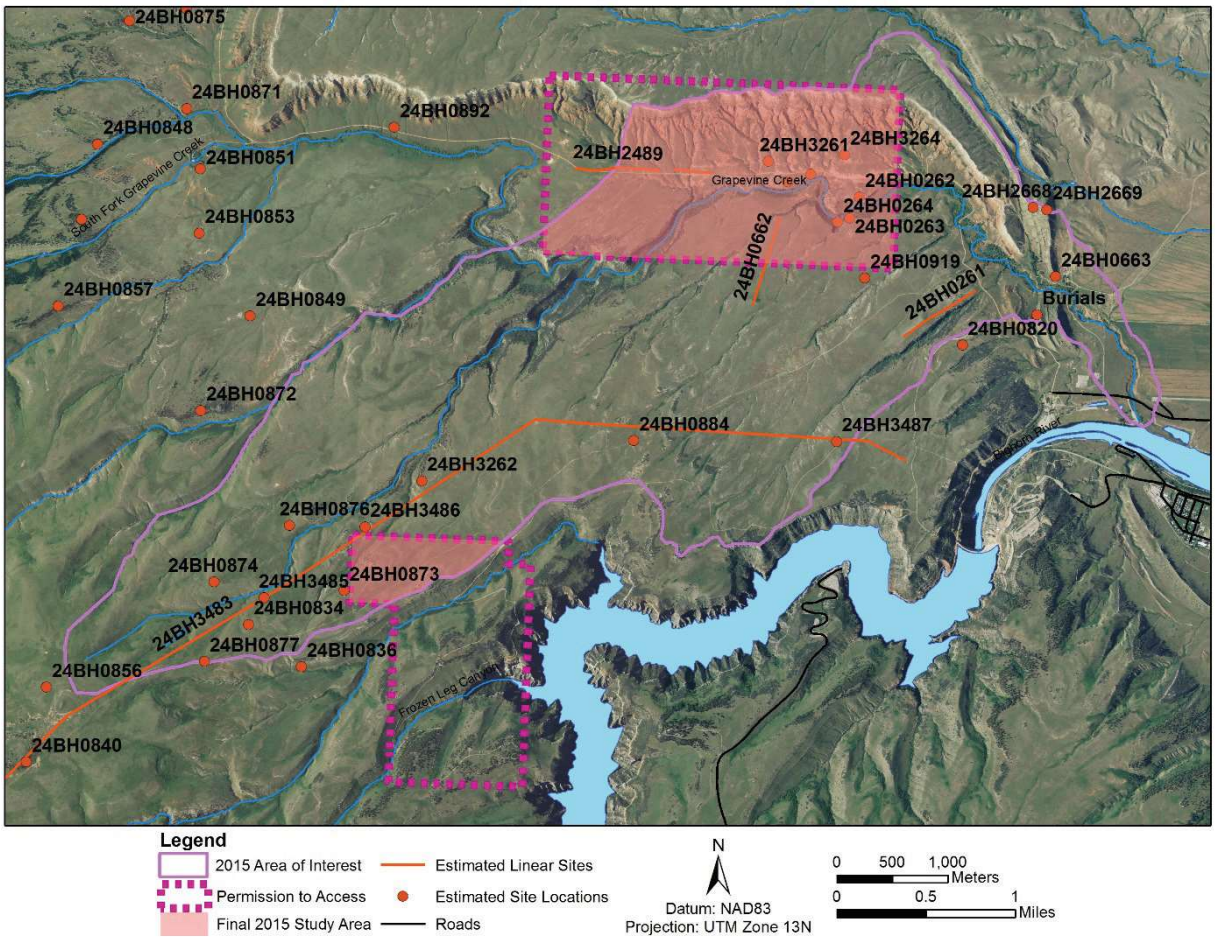

Figure 9: 2015 study area with accessible land parcels highlighted.

Table 4: Previously identified sites in final 2015 study area by site type.

Smithsonian Number	Site Type

24BH0262	Buffalo Jump
24BH0263	Buffalo Jump
24BH0264	Buffalo Jump
24BH0265	Buffalo Jump
24BH0662	Drive Line
24BH3489	Historic Road
24BH3261	Tipi Ring
24BH3264	Tipi Ring
24BH3477	Tipi Ring
24BH3487	Tipi Ring

Initial Survey

My goals for the initial survey of the two sections of tribal land were to relocate sites lacking GPS data, confirm or reevaluate the site type status of each previously recorded site, perform a comprehensive survey of all areas between identified sites, make a determination of eligibility for the NRHP, and in the case of the buffalo jump drive lines, locate any remaining buffalo bone deposits. Due to time constraints (we had a total of 15 days in the field), I selected a non-random sampling strategy in order to relocate sites lacking GPS data. This strategy began with a thorough review of previous research on each of the nine previously identified archaeological sites within the 2015 area of interest.

24BH0262

This site was first identified by an archaeologist in 1964. Stuart Conner submitted an unpublished memo to the Montana Historical Society describing five Grapevine Creek buffalo jumps, which were assigned the Smithsonian trinomials of 24BH0261 to 24BH0265 at that time. No archaeological site form was ever drafted for 24BH0262. Conner describes the site as being on the northwest bank of Grapevine Creek "[…] upstream from the mouth of the dry gulch tributary on which 24BH0261 is located" (Conner 1964:2). He also notes that there are two drive lines

formed of small stone cairns and that below the point where they intersect with the cliff is a grass-covered talus slope. Conner also mentions that the drive lines may extend all the way to 24BH0265, approximately a half mile to the west. The site is marked as being in the southeast quarter of Section 1, Township 6N, Range 30E.

Conner returned to 24BH0262 in 1969 at the request of the District Supervisor of the Montana Fish and Game Department. By 1969 it had been determined that the Grapevine Creek drainage would not be included in the Bighorn Canyon National Recreation Area and the state was interested in getting an inventory of cultural resources on their land. He submitted a second unpublished memo regarding 24BH0262, 24BH0263, 24BH0264, 24BH0265, and a newly identified drive line, 24BH0662. While the specific locational information included in the text of this document confuses the issue, Conner included a copy of a USGS 7.5' topographic map with hand written annotations including site locations. 24BH262 was located at the base of the "v" in the map label "Grapevine Creek" (Conner 1969). I used this annotated map as my estimate for the actual site location of 24BH0262 (see Figure 10).

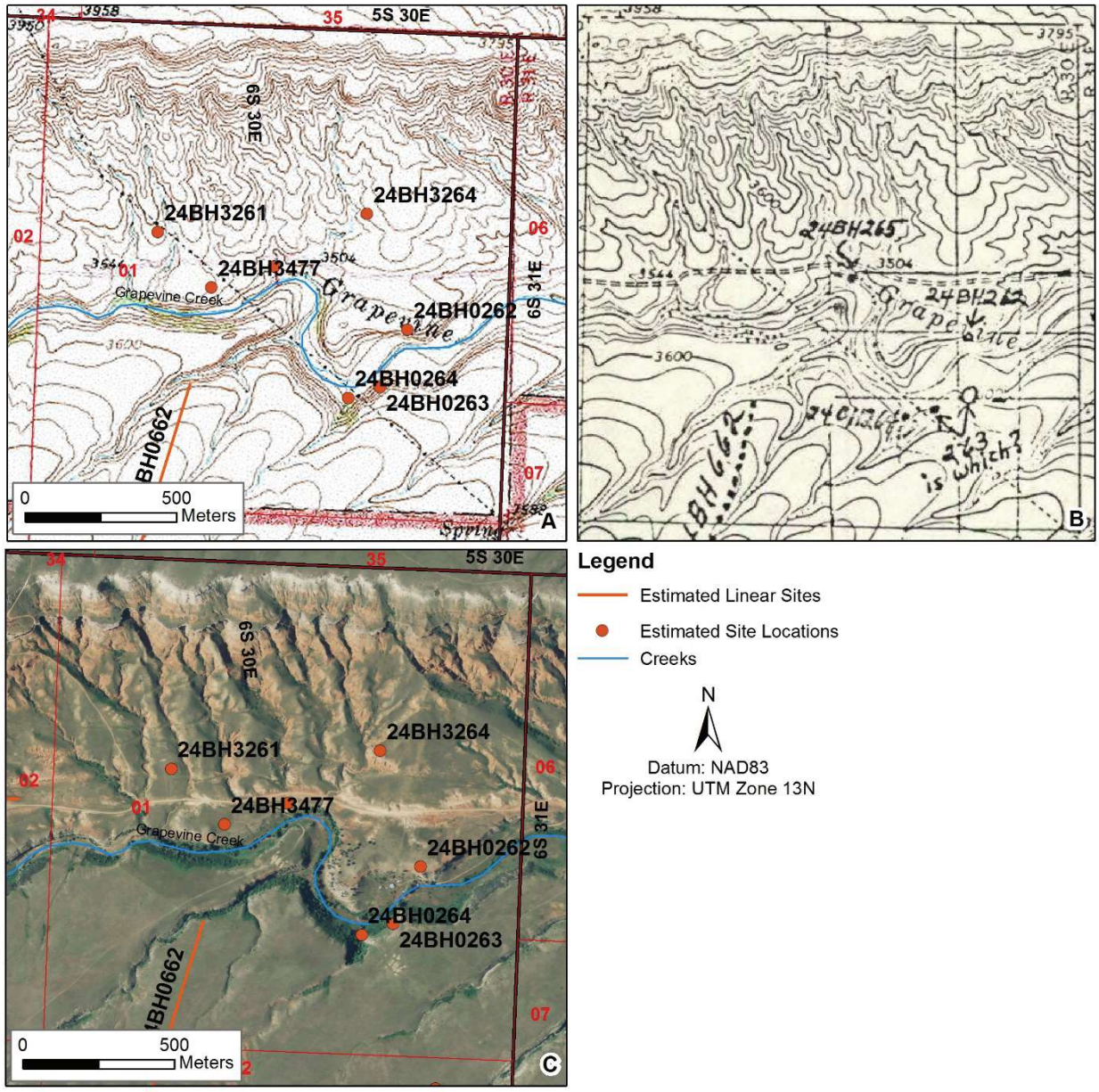

Figure 10: Estimated site locations for 24BH0262, 24BH0263, 24BH0264, and 24BH0265 based on the hand-annotated USGS 7.5' map from Conner 1969: current USGS 7.5' topographic map backdrop with estimated site locations (A); scan of Conner 1969 topographic map (B); 2009 NAIP orthoimagery backdrop with estimated site locations (C).

24BH0263

24BH0263 was first identified at the same time as 24BH0262. Unlike the previously discussed site, however, this site was not physically visited during the 1964 site visit. Joe Medicine Crow (the local Crow informant at the time) pointed out the location of the site as being directly

across the Grapevine Creek drainage from 24BH0262 (Conner 1964:3). In Conner's 1969 memo it seems that he visited the place indicated in 1964 but could not locate a definitive drive line: "[…]a couple of rock piles were seen, if two rocks together count, but never more than two or three possible features in line. Perhaps direct sunlight would help[…]" (3). On the 7.5' topographic map, Conner has two possible locations highlighted as 24BH0263, with a question mark to highlight his uncertainty. I selected one of the two points on this map as a likely location of 24BH0263 and made a mental note to survey the area immediately to the east as well (see Figure 10).

24BH0264

This site was also first identified by Conner in 1964. Like 24BH0263, the site was not physically visited at that time but rather pointed out to Conner by Medicine Crow. He described the location of the site as follows: "On the same side of Grapevine Creek as 263 and about 200 yards upstream is another cliff at the head of an incipient tributary coulee" (Conner 1964:3). Conner notes that this cliff supposedly forms a buffalo jump and that there is only one line of rock piles with the coulee itself forming a barrier on the other side of the drive lane. At this time Conner notes that no one has yet ascertained whether there was a bone deposit at the bottom of the cliff.

In his return trip of 1969, Conner physically visited the site and confirmed the existence of the single rock line and a second potential rock line just to the east of the drainage depression. While he and his colleagues were unable to locate a bone deposit at this time, he noted that "There is a hanging pocket which would have trapped considerable members of animals and where we saw a couple of bovine (?)(Hereford or bison?) [*sic*] leg bones on the surface" (Conner 1969:2). The pocket was inaccessible so they were unable to confirm the species of the bones at that time. The location of 24BH0264 was again noted by hand on a USGS 7.5' map as being due west of the

possible 24BH0263 localities. I chose this location as the likely actual location of the site (see Figure 10).

24BH0265

24BH0265 is the final buffalo jump site identified by Stuart Conner in his 1964 reconnaissance. He notes this site as being further up Grapevine Creek where it meanders to the north. Medicine Crow indicated that he thought the bison were being driven to the east on the north side of the Grapevine Creek drainage and a line of rock piles at 24BH0265 would push the bison to the south, dropping off a 30- to 40-foot cliff. Any bison that missed this drive line could be driven off at 24BH0262, just to the east of 24BH0265. Even as early at 1964, there are indications that 24BH0265 was being impacted or damaged by the Grapevine Creek road: "The cut road may have caused destruction of a couple rock piles. A rock and dirt pile in the line of the aboriginal rock piles does not appear to be related to the buffalo jump or anything prehistoric. It may be the result of road construction or the remnants of a couple of legitimate rock piles heaped together to get them out of the road" (Conner 1964:3). This site was the only buffalo jump site where bone was located at the base of the cliffs in 1964. Medicine Crow was noted to pull a bison bone out of the cut bank beneath the cliff. Finally, Conner notes that there is a 20 or 21-foot diameter stone circle just to the west across a little gully, which was incorporated into the same site number. When Conner returned in 1969 he noted that recent road improvement had eliminated the largest of three extant rock piles forming the drive line at 24BH0265 (Conner 1969:1).

Unlike the previous three buffalo jump sites, 24BH0265 was reinvestigated again more recently. In 2005, as part of an investigation for an access road for a transmission line, the site was relocated and reevaluated. 24BH0265 seems to not have changed much since 1969. Patrick Walker-Kuntz noted the presence of two small rock piles and a single, poorly-defined stone circle.

Walker-Kuntz felt at that time that the site was an "improbable" bison jump (Walker-Kuntz 2005:20). Walker-Kuntz submitted a site update form to the State Historic Preservation Office with GPS coordinates for a site datum. I used this as the likely actual location of 24BH0265 (see Figure 10).

24BH0662

This site was first identified during Conner's 1969 site visit. The location is described as a line of rock piles approximately half a mile long running south-southwest along a tributary canyon to Grapevine Creek that is southwest of the other Grapevine Creek buffalo jump sites. The line runs almost perfectly straight to a high divide in a grassy prairie (Conner 1969:3). The investigators found no evidence of bones or of a second drive line and in the end offered no suggestions as to the function of this set of stone features, save to comment that the rock piles closely resembled those on the buffalo jump drivelines nearby. As with the previous sites, the presumed location of 24BH0662 was indicated by hand on a portion of a USGS 7.5' topographic map. I used this as my estimate for the location of this site (see Figure 11).

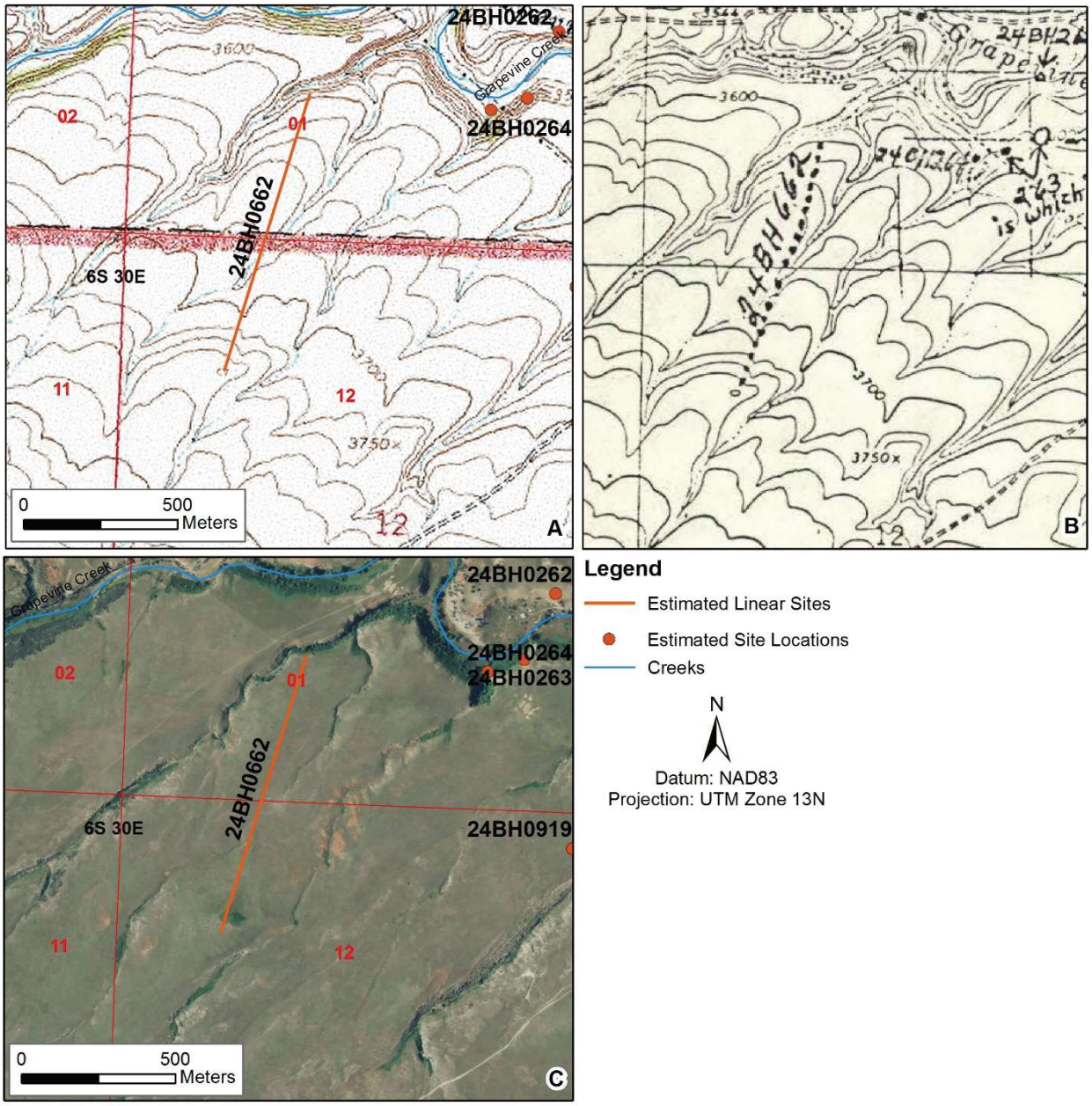

Figure 11: Estimated site location for 24BH0662 based on the hand-annotated USGS 7.5' map from Conner 1969: current USGS 7.5' topographic map backdrop with estimated site location (A); scan of Conner 1969 topographic map (B); 2009 NAIP orthoimagery backdrop with estimated site location (C).

24BH3261

Site 24BH3261 was discovered in 2005 during a cultural resources inventory for the Pacificorps Transmission line, which passes through this portion of the Grapevine Creek drainage (Waker-Kuntz 2005). This segment of the power line was being evaluated in preparation for the

replacement of poles and an evaluation of risks involved in regular power line maintenance. This site consists of four well-defined stone circles north of Grapevine Creek between two seasonal drainages. Walker-Kuntz determined that the site was intact but that, given the site's proximity to the Grapevine Creek road, looting was a definite possibility. No surface artifacts were located and no interpretation of site use or function was given at that time. The investigator noted that the site was likely already impacted by cattle ranching (Walker-Kuntz 2005:16). This site was recorded with a GPS unit in 2005 and these coordinates are what I used for my estimate of actual site location.

24BH3264

This site was located during the same study as 24BH3261, the 2005 cultural resource inventory for the Pacificorps Transmission line. This site is referred to as the "East Fork Hoodoo Ring Site," and is described as being located: "[…] on a low bench above an unnamed tributary (east fork) of Hoodoo Creek" (Walker-Kuntz 2005:17). The site form on file with the SHPO gives a legal description of the site location as the southeast quadrant of the southwest quadrant of the northwest quadrant of Section 1 of Township 6S, Range 30E. The site form also provides a set of GPS coordinates for the site.

Each of these pieces of information are contradictory, however (see Figure 12 for a visual representation of each location). After a careful review of the site paperwork for 24BH3261 and 24BH3264, it appears that the locational information for 24BH3264 was transcribed from the 24BH3261 site form (the GPS coordinates and legal description are still contradictory. Given the fact that the other newly identified sites listed in the Walker-Kuntz report are located within Grapevine Creek and that the legal and verbal descriptions place the site north of Grapevine Creek, I chose to estimate my site location based on the verbal description of the site as though it were

describing Grapevine Creek, rather than Hoodoo Creek, rather than the *verbatim* description given in the site report and the GPS coordinates, none of which agree with the other. The estimated site location in Figure 12 reflects this decision.

This site is described as containing two stone circles and seven flakes of purple chert. No interpretation of site function was offered by the investigators at that time.

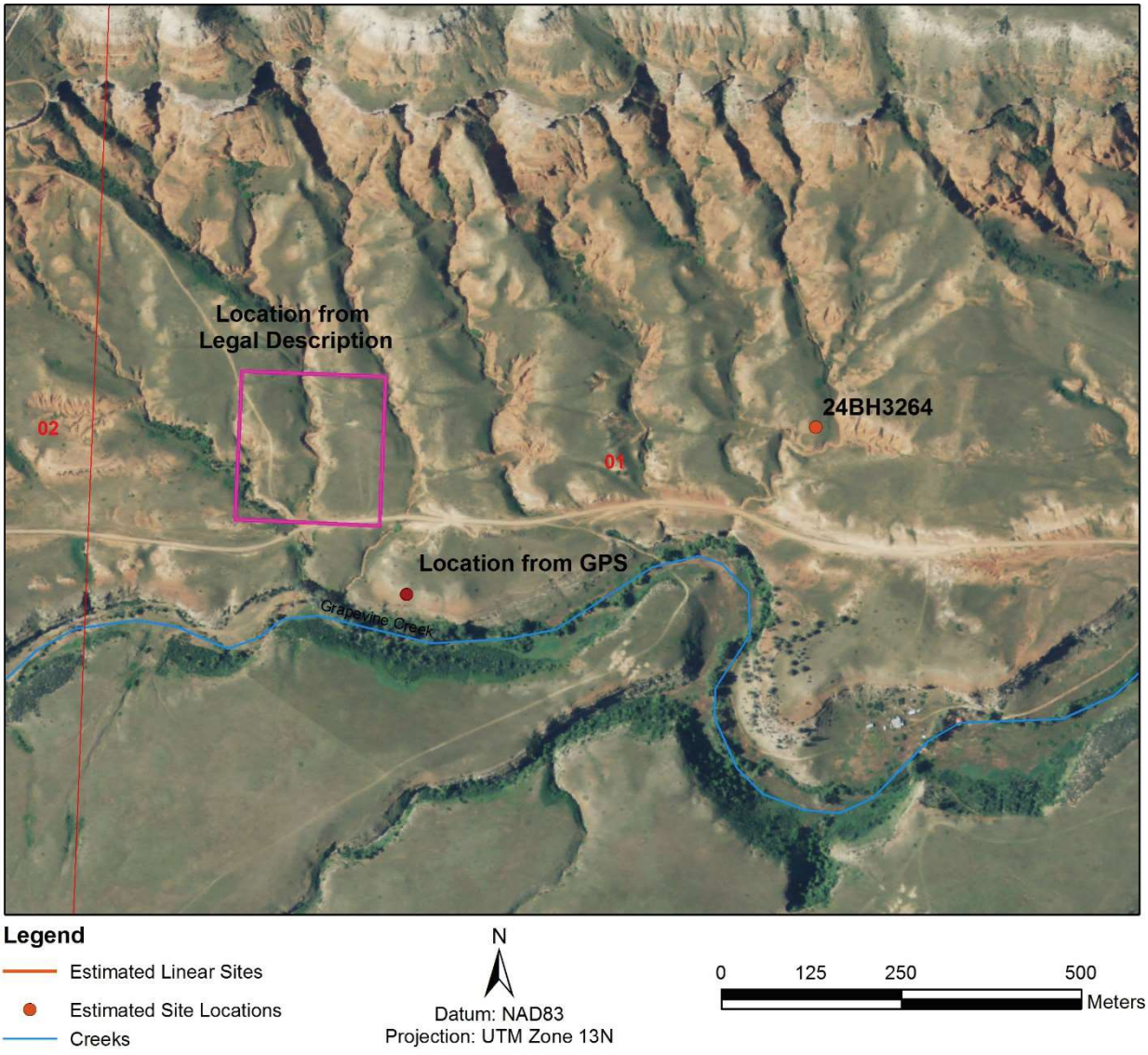

Figure 12: Estimated site location for 24BH3264 along with location as determined by GPS data and legal description from site form on file with SHPO.

24BH3477

This site consists of three stone circles, two cairn lines, and a naturally occurring chert outcrop located immediately west of 24BH0265 (the published site boundaries actually overlap, see Walker-Kuntz 2005 and the 24BH3477 site form on file with the Montana SHPO). The site was recording during a site visit by Pacificorps. The site was brought to the attention of Pacificorps by the Tribal Historic Preservation Officer at the time, Dale Old Horn. No report was published concerning the site, given the informal nature of its discovery, but a site form was filed, containing GPS coordinates, with the Montana SHPO. I used these coordinates for my estimate of site location. Given this site's immediate proximity to 24BH0265, I was also curious whether this site might be considered to be an expansion of our understanding of 24BH0265's boundaries and functions. No interpretation of site function was offered in the 24BH3577 site report but the anonymous authors note that two of the stone circles and one of the stone alignments is quite difficult to discern.

24BH3489

Site 24BH3489 was first discovered in 2010 during a survey and Class III cultural resources inventory for the Lovell-Yellowtail Numbers 1 and 2 transmission lines and access roads (Landt and Alexander 2010). This site consists of four segments of a historic road in immediate proximity to the modern Grapevine Creek Road. This historic road appears on the 1904 GLO plat map and, based on the history of the Bighorn Canyon area was likely in use between 1880 and 1904 and is related to cattle ranching (86). The road manifests itself on the modern landscape as a faint two-track. Landt and Alexander speculated at the time of discovery that the road likely was used only for local access purposes. This site was recorded with a GPS in 2010 and this location is what I am using for my estimate of the actual site location.

Survey Summary

My non-random sampling strategy was based on visiting the estimated site locations for these ten sites and collecting current location data using a Trimble Yuma 2 sub-meter accuracy GPS unit. In some cases the sites were clearly identifiable and were located relatively easily. In other cases the traces of the sites were ephemeral and required a localized survey to determine their precise locations. Due to time constraints, four of the ten sites following sites were not investigated: 24BH3261 (stone circle), 24BH3264 (stone circle), 24BH3487 (stone circle), 24BH3489 (historic road).

Site Investigations

Relocating previously recorded sites within a subsection of the Grapevine Creek drainage allowed us to gain a clearer understanding of landscape use on a larger scale than the individual site. I spent the remainder of our time in the field investigation on portion of these sites, the buffalo jumps and stone alignments (24BH0262, 24BH0263, 24BH0264, and 24BH0662), in greater detail. My study focused on temporality, seasonality, site function, and cultural identity. I will now discuss site investigations individually.

24BH0262

The initial relocation of this site was fairly simple. The site was located in approximately the same location described by Conner in 1964. The major difference in our new understanding of the site location is a delineation of a site boundary beyond a one-dimensional point on a map. The two stone cairn drivelines were marked out with flags to the point where we felt we could not readily perceive man-made alterations to the naturally rocky landscape. Our crew also performed

a closely spaced pedestrian survey to identify surface lithics, opportunistic knapping areas, other stone features (including several cairns not aligned with the drive lines and a stone circle), and potential hearth features. Our crew used a sub-meter accuracy GPS unit to record the locations of each cairn in the drive line features along with the locations of any other stone features and diagnostic lithic artifacts. We identified three "lithic areas" so called because they are a combination of natural chert outcrop and opportunistic knapping locale. The boundaries of these three areas were also recorded with a GPS unit. Our crew also recorded a large-scale elevation model for the surface of the site. We realized that 24BH0262 is the same buffalo jump that Joe Medicine Crow described in a 1961 symposium on buffalo jump sites. He provided a map of the site for the 1962 publication of his talk (Medicine Crow 1962:39). This map indicates a second path for buffalo to run over the cliff that is created by a natural depression in the landscape. We were hoping that this large-scale elevation model would indicate this depression, which was not immediately clear when investigating the surface of the site.

Finally, our crew performed a shoulder-to-shoulder pedestrian survey of the colluvial slope below 24BH0262 as well as along the primary terrace of the Grapevine Creek drainage. We were interested in locating possible bone beds as well as any associated habitation features. This area of Grapevine Creek was occupied during the Historic and Modern periods. When we encountered the site there was an abandoned homestead and associated artifacts below 24BH0262. The landscape within the arroyo formed by Grapevine Creek appeared to have been heavily modified from this occupation. During our survey we suspected that the primary terrace might have been bulldozed or scraped at some point given its extremely level nature and the suggestion made that some of the Grapevine Creek buffalo jump bone beds had been mined for fertilizer at the beginning of the twentieth century.

Our crew found evidence of extremely fragmented and weathered bone eroding from the surface of the colluvial slope at the point below the cliff where the two cairn drive lines lead. We did not find any other evidence of bone below 24BH0262. Within the historic homestead we discovered an antler billet and a quartz flake. Given our time constraints, we did not undertake a subsurface investigation of the colluvial slope below 24BH0262 at this time (see "2016 Field Season" for a discussion of subsurface investigations).

24BH0263

The first and largest question concerning 24BH0263 was its location. In the 1969 Conner publication where he indicated the locations of the sites within the Grapevine Creek buffalo jump complex, he considered two possible locations for the location of 24BH263 (see Figure 10). Our crew surveyed the landscape above the Grapevine Creek arroyo at these points and in the area immediately surrounding them. We utilized a five-meter spacing to conduct this survey, looking for evidence of non-natural stone features. We surveyed to the limits of the natural highlands and to the boundary of the area we had permission to access. We discovered a series of four cairns in a line (total length of 31 meters) leading to the edge of the landform located approximately halfway between the two possible locations of 24BH0263 as indicated by Conner. We also discovered a simply constructed scraper. We discovered no other evidence of any archaeological features in this area. We recorded these stone features and the scraper, along with the site boundary, with a sub-meter accuracy Trimble Yuma 2 GPS unit.

Finally, we performed another tightly-spaced pedestrian survey along the colluvial slope below 24BH0263. Unlike the slope below 24BH0262, however, this slope was covered in dense vegetation that proved difficult to traverse. Our crew completed the survey and then retraced our steps, examining in more detail localized areas that had less dense vegetation or the possibility of

being slumped. We found no evidence of bone below the single cairn line we identified at 24BH0263. Given the limited expression of archaeological features at this site, we chose to conclude our work in this area and focus on the next site, 24BH0264 (see "2016 Field Season" for a further discussion of work at this site).

24BH0264

Our initial goals for this site were to determine the location of its drivelines and also to determine the location of a bone bed, if it existed. Therefore, we began our investigation of this site by performing a closely-spaced pedestrian survey of the landform where Conner indicated the site was located in 1969. We were able to relocate the drive line formed of stone cairns, described by Conner: "[…] the easterly rock line leading back southerly from the cliff […] is fairly difficult to observe without sunshine because of the low skimpy nature of the rock piles which consist of from one to three rocks well settled in the soil" (1969:2). We located 62 such stone piles in a linear alignment measuring a total length of approximately 135 meters. We also examined the dry coulee described by Medicine Crow in 1964 as forming the western drive line of the buffalo jump feature (Conner 1964:3). During our survey we also located surface diagnostic artifacts and a potential hearth feature. Each of these stone features and artifacts were recorded with a Trimble Yuma 2 sub-meter accuracy GPS unit. Just as with 24BH0262, we collected large-scale elevation data for the surface of the site using the same GPS unit. We did this because of Medicine Crow's statement that an ephemeral drainage formed the western barrier of the drive lane. We hoped that producing a three-dimensional model of the surface elevation at the site would aid us in studying the landform morphology at 24BH0264, particularly in relation to the surface landform morphology at 24BH0262, which is located almost directly across the Grapevine Creek arroyo from the 24BH0264 drivelines.

Below the 24BH0264 drive lines, we surveyed a small tributary box canyon just off the Grapevine Creek canyon that is located directly below the line of stone cairns on the surface of 24BH0264. Despite the vegetation being extremely thick and the footing uncertain as the result of multiple landslide events, we were able to identify intact bone elements eroding out of a slumped toe slope. Once we confirmed the likelihood of an intact bone deposit below the 24BH0264 drivelines, we decided to investigate further to determine the extent of the bone bed, whether the bones were the result of multiple events or a single drive, whether the bones were indeed bison, whether we might be able to date the occupation at the site, and whether we might make a determination of cultural affiliation, all of which we felt could be accomplished through the excavation of a single, one-square meter test unit (Unit 15-01).

Unit 15-01 is located on eastern side of horseshoe canyon created by an unnamed ephemeral drainage tributary of Grapevine Creek. The 125-meter by 75-meter canyon contains exposed cliffs rimming the upper portion of the canyon. The unit is approximately 15 meters east of the intermittent drainage which contains a waterfall during seasonal flash flooding events. Beneath the unit, the drainage has removed most of the local sediments, exposing bedrock and large boulders, suggesting that cultural and faunal remains in the path of the drainage have been removed by flash flooding. Unit 15-01 lies approximately three meters above the floor of the drainage, and has been preserved, in part, because boulders have trapped the bone bed and sediments above the drainage. Due to heavy vegetation and a thick canopy in the canyon, we were unable to obtain the requisite satellites to record our GPS location; however, we triangulated our unit location from known points along the rim of the canyon using a compass and 7.5 minute USGS topographic maps.

The location of Unit 15-01 was selected in order to lessen our impact of the potential bone bed. It was placed on the toe slope of landslide deposits exposed within a small box canyon, on the western edge of the surface expression of the bone deposits. The slope on the surface of Unit 15-01 was very steep (38 degrees) downhill and 16 degrees north to south. The excavation was conducted in 10 cm arbitrary levels to 40 cmbs. At this point artifacts and faunal remains were collected and separated by natural strata due to the discovery of a distinct paleosol. A second paleosol was identified as level nine. Unit 15-01 was terminated at a depth of 1 meter due to time constraints and the exploratory nature of the excavation. The excavation produced approximately half a cubic meter of sediments. Despite the small volume, the unit produced over 100 bones and bone fragments from a minimum number of individuals (MNI) equal to four bison (Herrmann et. al 2017). Additionally, two temporally and culturally diagnostic Plains Side-Notched projectile points were excavated from the unit *in situ*, as well as other flakes and possible butchering tools. These points date between 650 BP and the Historic period (Pecks and Ives 2001).

Analysis of the faunal materials from 24BH264 follows standard zooarchaeological methodology (Driver 1992; Gifford and Crader 1977; Grayson 1979; Reitz and Wing 1999) and was led by Dr. Matthew Rowe, University of Arizona. In order to identify species, we relied on a six-year-old *Bison bison* specimen housed at the University of Arizona's School of Anthropology (BARA Lab), and reference material from the Stanley J. Olsen Zooarchaeology Laboratory (Adams and Crabtree 2011; Gilbert 1980). All the recovered bone specimens were sorted into identifiable and non-identifiable materials, all of the fragments were counted, and then examined for burning levels and butchery marks. We determined the total number of fragments and identifiable specimens for each of the arbitrary excavation levels, but calculations of the MNI

aggregated the sample into one analytical unit to avoid over-inflating the numbers in the small faunal assemblage (Marshall and Pilgram 1993).

Results

In the course of 2015 fieldwork, our research team recorded a total of four stone circle sites, three chert surface quarry sites, and a number of lithic concentrations scattered amongst the cultural landscape composed of chert debitage or isolated stone tools. Additionally, we identified and recorded four sets of stone drivelines, and confirmed the presence of two buffalo jumps via the presence of associated bone deposits below the drivelines. At 24BH0262, we identified highly fragmented bone on the surface of the colluvial slope below the drivelines, while at 24BH0264 we identified intact bison skeletal elements (eroding from an intact and preserved bison bone bed) in a difficult to access portion of the Grapevine Creek drainage. This second discovery led us to place a test unit at the edge of the bone bed (Unit 15-01). I will now discuss the results of this fieldwork.

Site 24BH0262

At 24BH0262 we were able to relocate the jump site and the associated cairn lines utilizing hand drawn maps made by Stuart Conner (1964), as discussed above. At this site we documented two drivelines comprised of 93 cairns, a stone circle with hearth feature, several cairns apparently not associated with the drivelines, and three well-defined lithic debitage concentrations (Herrmann et al. 2017). The two drivelines form a typical "V" shape as the two wings narrow to a point at the edge of the cliff facing the Grapevine Creek drainage. The southern driveline is approximately 260 m long and the northern line length is 125 m (Herrmann et al. 2017). The tool assemblage at the site is dominated by locally available tool stone such as the Tensleep Formation, which naturally

outcrops on the site surface. After recording the site and making a large-scale digital elevation model, we realized that 24BH0262 is the same site described and diagrammed by Joseph Medicine Crow at the 1961 Buffalo Jump Symposium (Medicine Crow 1962, 1978). The site is unique to the drainage in the topography on the site allowed for bison to be driven over the cliff edge in two locations, both leading to an 18 meter high cliff. During surface pedestrian survey we recovered a basalt Avonlea projectile point, dating to between A.D. 250 and 1200 on the Northwestern Plains and associated with other buffalo jumping sites in the region (Kehoe 1966; Kehoe and McCorquodale 1961). During the 2015 field season, we constrained our investigations to surface surveys above and below the jump. We identified highly weathered, unidentifiable bone fragments along the colluvial slope below the drive lines during pedestrian survey. These were further investigated during the 2016 field season. This site was highlighted by Crow informant Martin He Does It as an example of commercial mining for bone fertilizer (Conner 1969:1), a common practice in the early twentieth century (Davis and Zeier 1978). Other evidence points to this activity, such as the artificially level terrace above Grapevine Creek, below the colluvial slope where weathered bone was eroding.

Site 24BH0263

We only located fragmentary evidence of buffalo jumping at this site, namely four stone cairns in a line leading to the cliff down into the Grapevine Creek drainage (total length 31 m). Additionally, we identified one stone scraper in close proximity to one cairn. This was not enough evidence to determine the presence of a buffalo jump or whether it might have been located east or west of the cairn line. Power line construction in 2009 might have impacted the preservation of this site (Landt 2008).

Site 24BH0264

Medicine Crow was the first to identify this site to an archaeologist, Stuart Conner, in 1962. Importantly, he described the location as on the south side of Grapevine Creek along a cliff about 200 yards upstream from 24BH0263 "at the head of an incipient tributary coulee" (Conner 1964:3). While investigations at 24BH0263 did not reveal a clearly identifiable buffalo jump site, they did assist in the relocation of 24BH0264, a jumping complex exhibiting many of a jump's characteristic features, such as drive lanes a bone bed, and a potential processing area (identified during the 2016 field season). Conner documented part of the driveline in 1969 but was unable to find any bison bones associated with the site. We relocated this site during pedestrian survey on the eastern side of a small horseshoe canyon on the south side of Grapevine Creek. This small drainage was difficult to access and survey due to the dense vegetation surrounding the talus slope below the drivelines at 24BH0264. This is a marked contrast to the rest of the landscape, which is open grassland. We identified several whole bison skeletal elements emerging from the slopes below the cliff face and 62 cairns oriented south to north forming a driveline 135 m long above and leading to the jump. The ephemeral drainage west of the driveline apparently formed the western wing of the driveline (Herrmann et al. 2017).

Test Excavation Unit 15-01: The bison faunal remains that we first identified at 24BH0264 were revealed by a relatively recent slump. The bone deposit is 21 m in length along the slope and 17 m in length up the slope. Our goal was to determine whether this bone bed was associated with human activity or formed by natural death, and if so, determine the period of use and occupancy of the site. We placed a 1m x 1m test unit on a 38-degree slope in colluvial deposits approximately 20m east of the intermittent drainage (Herrmann et al. 2017). The unit was placed peripheral to the

largest expression of the bone bed in order to minimize our impact to the cultural remains at the site.

The slope beneath the unit shows signs that erosion has removed most of the sediment, leaving behind bedrock and large boulders. This indicates that cultural material and faunal remains have been removed from the area as well. The remaining boulders have trapped some sediment, which is captured in the unit profile of Unit 15-01. This excavated area contains a remnant of the bone bed and some sediments above the floor of the drainage (the unit lies approximately three meters above the floor of the drainage) (Figure 13). Because of the presence of scarps on the talus slope and the A-C horizonation of soils 1 and 2, the depositional events that buried the bison bone bed are most likely the result of two different landslides (Herrmann et al. 2017).

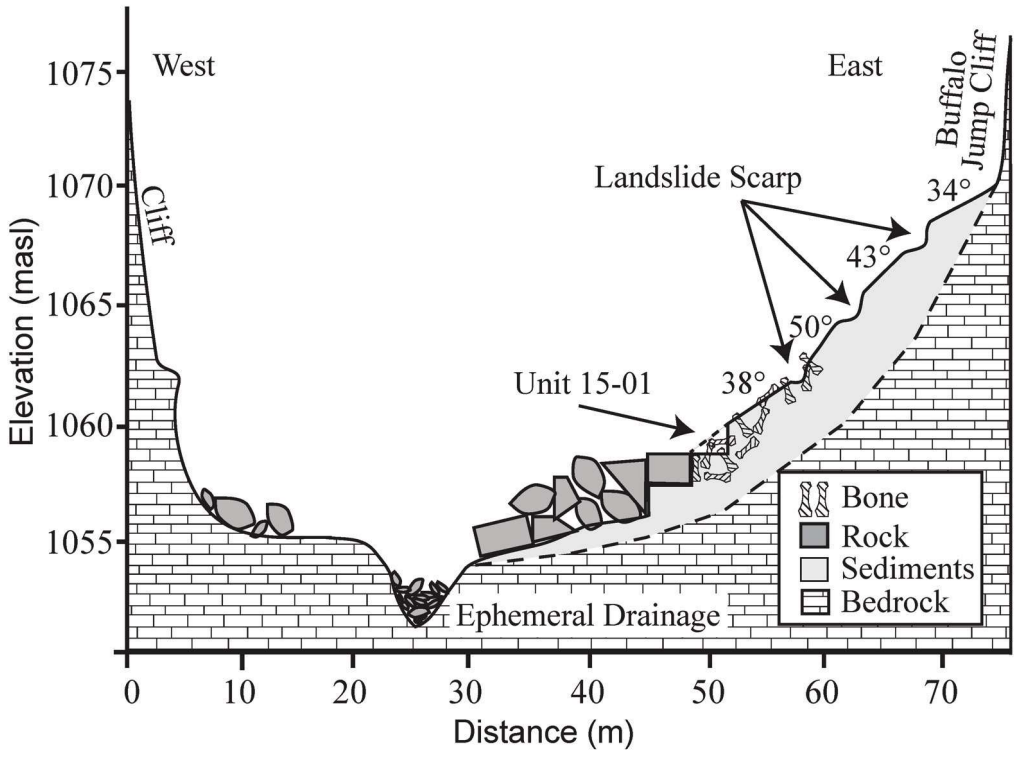

Figure 13: Profile of drainage containing 24BH0264 bone bed (from Herrmann et al. 2017).

Bison bones were present in all three levels of the unit's three-tiered soil profile (Figure 14). The surficial soil and first paleosol encountered were young (Entisols) exhibiting A-C horizonation with weak pedogenesis, while the second paleosol showed somewhat more evidence of pedogenesis (A-B_w horizonation) (Herrmann et al. 2017). Most, but not all of the faunal remains in both paleosols exhibited evidence of burning (calcination and the presence of abundant charcoal flecking). The poorly-sorted sandy loam sediments derive from recent slopewash and older parent material found in the sandy sedimentary units of the bedrock cliffs above the unit (Herrmann et al. 2017). Unit 15-01 also produced two *in situ* Prairie Side-Notched projectile points (38 cmbd and 90 cmbd). This style of projectile point is common in Late Prehistoric Period on the Northwestern Plains (A.D. 700-1300) (Kehoe 1966; Peck and Ives 2001). In addition to the projectile points, we also recovered lithic flakes and possible butchering tools.

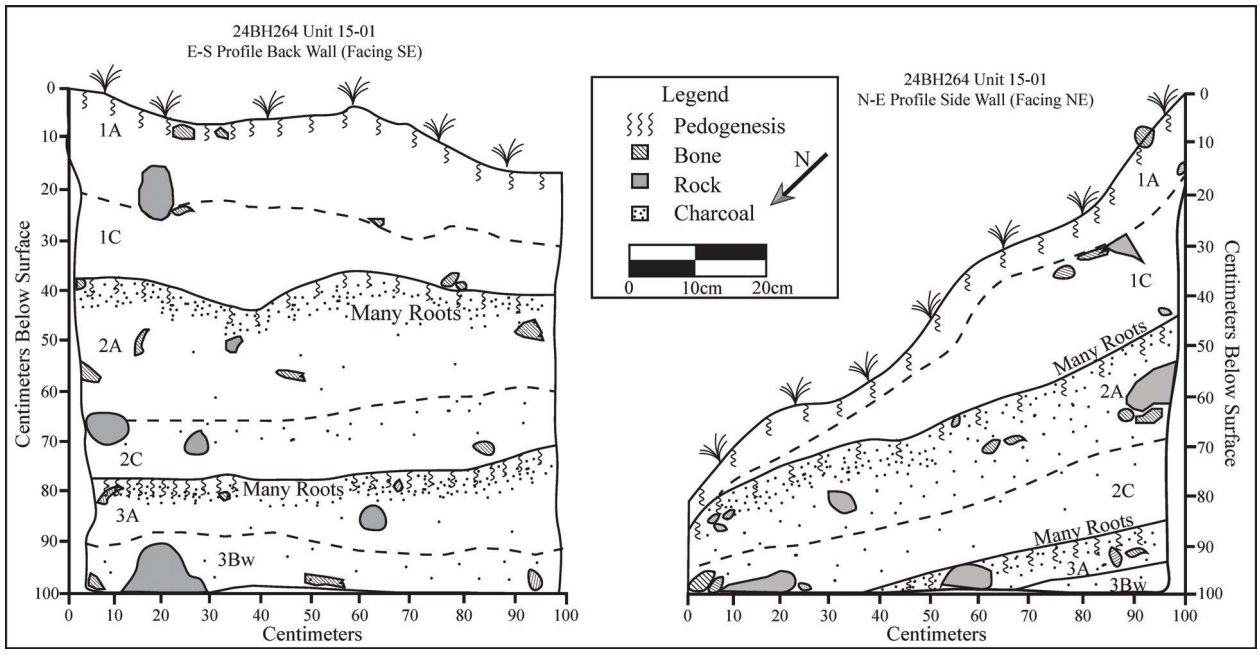

Figure 14: Unit 15-01 profiles (from Herrmann et al. 2017).

Figure 15 is the probability density diagram for the same dates. Bone samples derive from soils 1 and 2 because bone preservation in soil 3 was poor. The charcoal date from soil 3 (1095 ±

15 B.P., UCIAMS 169485; wood charcoal; $\delta^{13}C$ = -25.3‰) may indicate that older bison bones are present in soil 3 beneath the floor of unit 15-01 (Herrmann et al. 2017). The wood charcoal dates are in stratigraphic order; however, the bison bone dates confirm that the 15-01 sediments are disturbed. All four of the radiocarbon dates derived from bison bone are consistent with each other and indicate a period of use for 24BH0264 between cal A.D. 1150-1215.

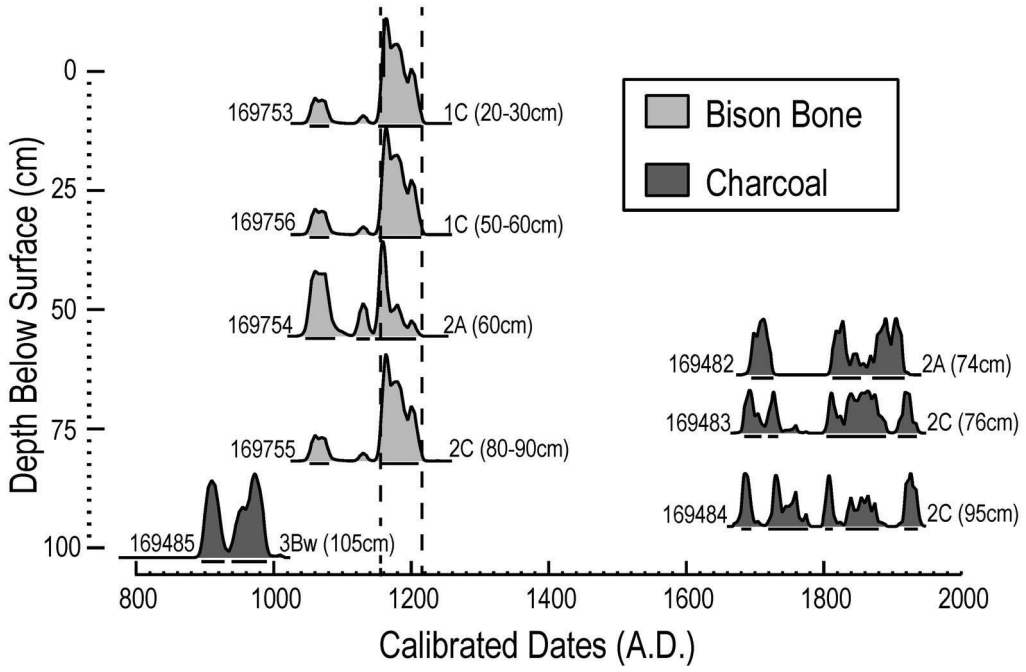

Figure 15: Probability-density diagram for charcoal samples from Unit 15-01 (from Herrmann et al. 2017).

We identified to species and body size class a total of 204 bone elements and bone fragments, for a total of six species and three body sizes classes, though most of these belong to *Bison bison*. Due to the disturbed nature of the stratigraphy in the unit, it is possible that any or all of the non-bison species, particularly *Peromyscus* sp. and *Neotoma* sp. are post-bonebed additions. One bone fragment was identified as *Canis* sp.

Seven hundred and eighty-five (38.6 percent) of the fragments were burned and located primarily within the two paleosols. Only four specimens have direct evidence of butchery or processing. We divided the *Bison bison* assemblage into body regions and found that 63.5 percent of the recovered fragments are from limbs and extremities, while the remaining 36.5 percent come from the axial skeleton and cranium, suggesting that axial and cranial fragments should be more prevalent in our assemblage (Herrmann et al. 2017, Lyman 1984). One possible interpretation of the small number of butchery marks and axial/cranial fragments is that processing occurred at a secondary site, as is common at buffalo jumping complexes. Or, it could simply be due to the small sample size. The elements that led to the discovery of the bone bed were two extremely large femurs (315 mm and 322 mm) and a tibia (414 mm), all found near the surface and recovered *in situ*.

Site 24BH0265

We located two cairns that we believe to be those described at 24BH265 but were unable to relocate features, bones or artifacts that verify the site was used as a buffalo jump. Although Conner (1964) reported that Medicine Crow pulled a bison long bone from a cutbank of Grapevine Creek in 1962, if a jump site was present here Grapevine Creek meandering apparently removed the bonebed from beneath the cliff, while road construction and possible looting destroyed previously identified cairns from the bench above the creek (Conner 1964, 1969; Walker-Kuntz 2005:20).

Site 24BH0662

At this site we identified 62 cairns, forming a south-north driveline that extends for at least 365. We were unable to determine the full extent of the cairn line because it continued south off of tribal property. The other wing of the driveline is formed by an unnamed ephemeral drainage with two to five m high cliffs. This drainage exhibits of evidence of prior flash flooding, leading to a lack of unconsolidated sediments and any evidence of bison faunal remains. As evidenced in our 2016 explorations (see below), however, some faunal remains are present sub-surface. The driveline itself slopes gently down to a 5 m cliff along the side of the drainage. The nature of the topography indicates that bison likely took a less steep path into the drainage itself, which forms a narrow arroyo at that point, and continued for 700 m to the confluence of the drainage with Grapevine Creek itself. The arroyo is so narrow that bison would be forced to run single file down the drainage survive three smaller jumps while hunters would have easy access to the bison from above. It is possible that 24BH0662 represents an example of a combination buffalo jump and bison trap.

2016 Field Season

The same collaborative research team returned to Grapevine Creek to assist with my research in 2016, our largest and most challenging field season to date. In the context of a six-week archaeological field school run through the Crow tribal college, Little Big Horn College, and in collaboration with the Crow Tribal Historic Preservation Office (CTHPO), crews of Crow tribal monitors, Crow field school students, graduate students from Indiana University-Purdue University, Indianapolis (IUPUI), Washington University, Saint Louis, and archaeologists from Indiana University and the University of Arizona surveyed two sections of tribally-owned land in the eastern portion of the Grapevine Creek drainage. This work was designed to build upon the

exploratory research undertaken in the 2015 field season, address questions raised by the results of that research, and fill in the gaps left by the selective sampling strategy we employed to guide our work in the previous year.

This year we began our fieldwork with an intensive pedestrian survey for all cultural resources utilizing 15-m transect spacing. We recorded all cultural features and artifacts identified during the survey with Garmin Rhino 650 handheld GPS units. With the view of recording cultural resources to MT SHPO standards, we further investigated cultural materials upon discovery to determine whether they were isolated features or archaeological sites requiring more intensive recordation. Next, we returned to those cultural resources determined to be potential archaeological sites and conducted more closely-spaced pedestrian survey (1 m or less), flagging out and then mapping and documenting all artifacts and features associated with the site. As we did in 2015, we mapped all archaeological sites, architectural features such as stone circles, and utilized a Trimble Yuma 2 sub-meter accuracy GPS unit to record their location.

After we completed the survey, we initiated a large-scale shovel testing regime to identify potential areas for buried cultural materials utilizing both the survey results and a geomorphology-based archaeological site locational model developed prior to the 2015 field season that was designed to target landscape positions that have experiences alluvial or colluvial deposition (Herrmann et al. *in review*), utilizing a Geographic Information System (GIS) to manipulate and visualize spatial (landscape) attributes. Databases utilized for the predictive model included the Montana SHPO (for archaeological site data, cultural resource inventory reports, and other published literature) and SSURGO soil maps from the Soil Survey Staff (1999; for sediment genesis, soil pedogenic and horizon characteristics which allowed us to pinpoint alluvial and colluvial sediments conducive to burial and preservation). The model targets younger soils, such

as Entisols and Inceptisols) which are more likely to contain newer deposited sediments, as well as soil profiles that included buried paleosols (Herrmann et al. *in review*). Utilizing all this data in combination with a landscape-level Digital Elevation Model, or DEM, we located cliffs and drainages where we felt bison jumps or traps were more likely to occur. We constrained our search to cliff heights between 25 and 5 m in height, as cliffs taller than 25 m might pulverize meat and hides, while less than 5 m might not incapacitate bison enough to make the jump or trap functional. Utilizing this data with previously identified archaeological site distribution in the drainage gave us our targets for a subsurface testing regime. As evidenced by the results, our model was a success.

Our crews dug a total of 44 50 cm x 50 cm square shovel test pits (STPs) to a depth of sterile sediments or a significant deposition of faunal materials. All sediment was screened through ¼" shaker screens. We recorded soil characteristics for each STP including: sediment texture, color, horizonation, inclusions, and artifact presence/absence (Herrmann et al. *in review*). After this regime, we began a second subsurface testing sequence involving several 1m x 1m test units in areas of particularly high potential. In total, we excavated 6 such units during the field season: a 1m x 3m block at a stone circle at a locus identified as Charlotte's Overlook, one test unit at what was potentially the secondary processing area of 24BH0264, and two test units at the base of the colluvial slope below 24BH0262, where STPs indicated a large presence of subsurface artifacts and faunal materials. We began each test unit by excavating in arbitrary five cm levels, up to a depth of 15 cm, at which point we transitioned into following natural stratigraphic horizons. Rebar datums were placed near each unit and each unit was mapped by hand at the bottom of each level. The stone circle at Charlotte's Overlook was excavated in order to obtain chronological data that might tie the occupation of the campsite to the use of the neighboring buffalo jumping complex. Time and resource constraints prevented any further subsurface testing during the field season.

After fieldwork was completed, we utilized artifact, faunal, and geochemical analyses to further study site functionality, activity areas within sites, and the chronology of the Grapevine Creek drainage. This included visiting the curation facility at the Little Big Horn College Library to catalogue and study available lithic assemblages from prior work done at Grapevine Creek, where we recorded temporally and culturally diagnostic stone tools, and compiled an inventory of raw material types following (Taylor 2006, Miller 2010), as well as once again analyzing faunal remains utilizing the same procedures as in the 2015 field season (i.e. Driver 1992; Gifford and Crader 1977; Grayson 1979; Reitz and Wing 1999), once again identifying species using comparative collections curated at the University of Arizona's School of Anthropology (BARA Lab) and the Stanley J. Olsen Zooarchaeology Laboratory (Adams and Crabtree 2012; Gilbert 1980). Geochemical Research Laboratory conducted the obsidian sourcing analysis and University of California Irvine AMS Laboratory performed the radiocarbon age estimates (Herrmann et al. *in review*).

The results of this season's fieldwork show that the Grapevine Creek cultural landscape was utilized over several centuries for intensive bison hunting and processing (ca. A.D. 950-1850). However, the 2016 field season focused on a small portion of the drainage basin, leaving gaps in our understanding of overall landscape use. It is clear that the small portion of the drainage surveyed represents a buffalo jumping complex (as defined by Arthur 1966 and Verbicky-Todd 1984) as it contains all the requisite features: buried bison bone beds, a likely bison processing area, five sets of drivelines (composed of hundreds of stone cairns), domestic campsites (represented by stone circles), quarry sites, lithic scatters, and other isolated cairns whose function is not clear. Figure 16 displays the results of the 2016 pedestrian survey in the Grapevine Creek buffalo jumping complex.

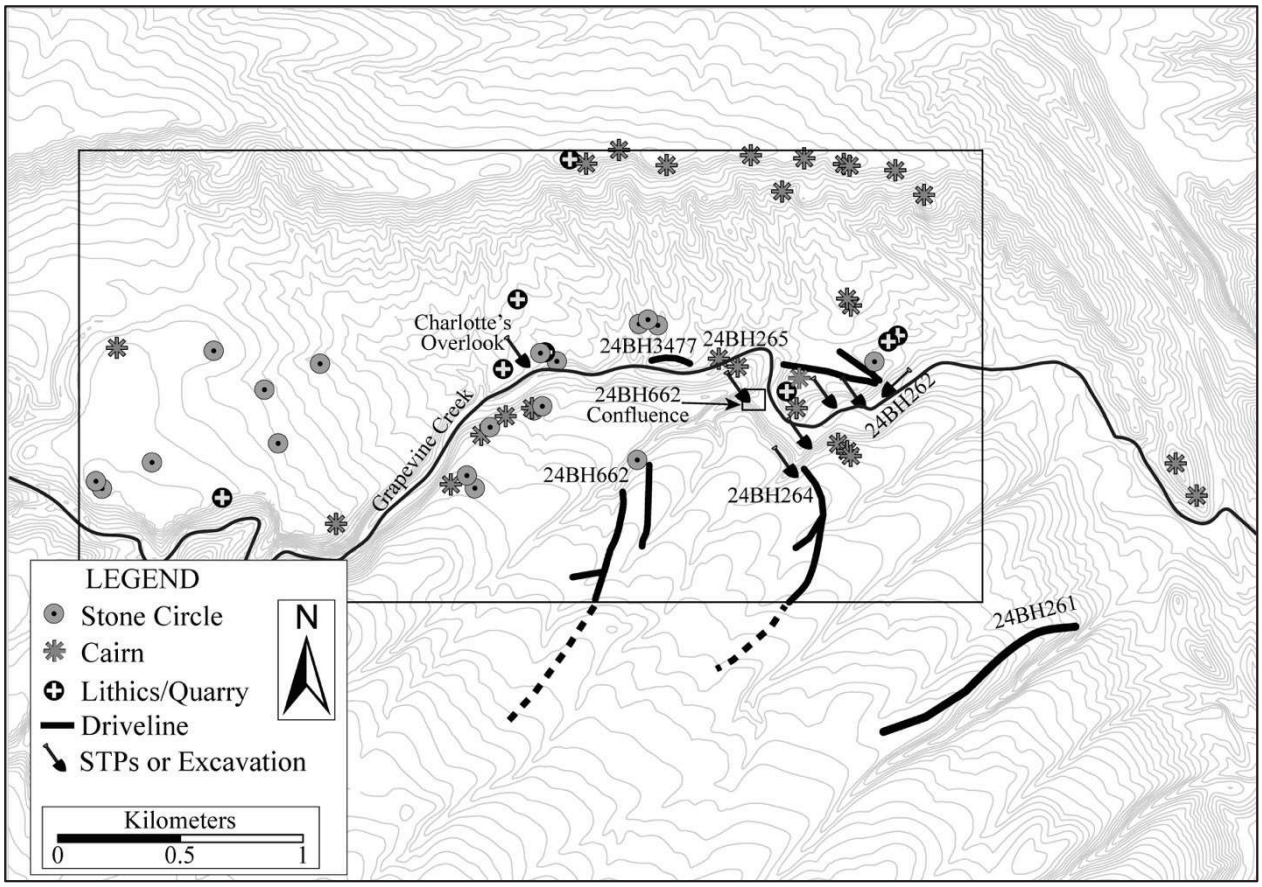

Figure 16: Map of 2016 Field work (from Herrmann et al. in review).

Pedestrian Survey

The pedestrian survey resulted in the identification of 16 stone circles, 11 sites, and seven lithic scatters. In addition, we updated information at five previously recorded archaeological sites. A few of the newly identified stone circles are associated with previously recorded archaeological sites (24BH0262, 24BH0662, and 24BH3477) but most were found west of any known cultural resources and not directly associated with buffalo jump features. These newly recorded stone circles range in size between 4.5 and 5.7 meters in diameter. Four stone circles have smaller circular features (~1.5 m diameter) located in close proximity to the main circle (Herrmann et al.

in review). Despite close interval pedestrian survey, we were unable to determine their function, and time constraints prohibited excavation.

In addition to the stone circles, we recorded ten large, isolated cairns not previously mentioned by other archaeologists, and not associated with buffalo jump driveline features. These cairns were found along the edge of the north rim of the Grapevine Creek drainage basin on a prominent landform. Each cairn was placed such that each location offers a complete and uninterrupted view of the drainage basin. While driveline cairns at Grapevine Creek are typically small and consist of only a few stones, these cairns were large piles and contained hundreds of rocks (Figure 17). Several of these large cairns had flakes and artifacts associated with them. For example, one cairn had two large quartzite choppers, while another had two refit halves of a Shoshone knife (Figure 18). Because of the presence of burials elsewhere in the Grapevine Creek drainage basin, and due to the unusual size, complexity, and location of these cairns, we refrained from data collection beyond a GPS point and photos. 17 other isolated cairns (not associated with drivelines) were also identified on the elevated benches, but these cairns were more in keeping with the small-sized cairns found in the driveline features.

Figure 17: Example of large cairn north of Grapevine Creek drainage.

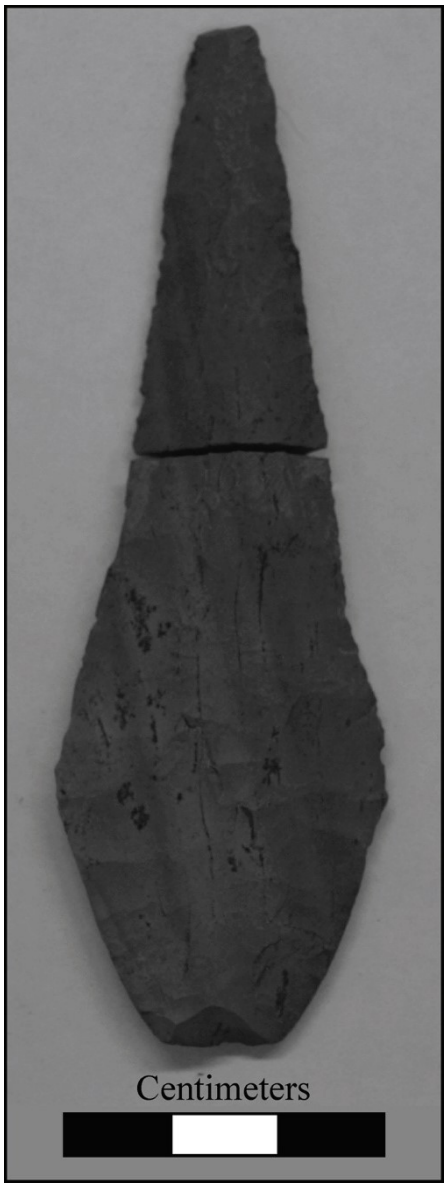

Figure 18: Shoshone knife found adjacent to a large cairn (from Herrmann et al. in review).

The results of the 2016 pedestrian survey have led us to reconsider sites 24BH0263 and 24BH0265 as possible buffalo jump sites. Medicine Crow first identified them as such to Stuart Conner when the sites were first recorded (Conner 1964), however we did not identify enough cultural materials to clearly assign a site function to either location. While both sites were intensively surveyed, we only located four cairns, some chert flakes and one tool, a side scraper above the cliff at 24BH0263 (and no evidence of a bone bed below), and no clearly identifiable

cultural materials at all at 24BH0265. It is possible that construction of the nearby powerline servicing Yellowtail Dam in 2009 might have destroyed some of the drivelines at 24BH0263 (Landt 2008), if they were ever present at the site. Conner noted that during his site visit in the 1960s, Medicine Crow took him to the base of the cliff below the driveline and pulled a long bone (presumably bison) from the Grapevine Creek cutbank (Conner 1964), but we intensively surveyed this area in 2016 (as well as during the 2015 field season) and found no evidence of faunal remains. 24BH0265 is the most well-known of the Grapevine Creek buffalo jumping sites. Prior to fieldwork in Grapevine Creek I have been taken to the area on a number of occasions on a cultural field trip. The location of 24BH0265 is where tribal elders and historians stop and get out to discuss the buffalo jumping complex. Given its proximity to the road, and its high profile, it is entirely possible that modern disturbances may have affected the deposition of cultural materials at this site. Several previous researchers have noted that road construction and probable looting have had a large effect on the cultural features on the benches above the creek (Conner 1964, 1969; Herrmann et al. *in review*; Walker-Kuntz 2005:20). Additionally, the current channel of Grapevine Creek is only a few meters from the base of the cliff at both sites, making it possible that creek meandering has removed much of the bone beds, if they ever did exist (Herrmann et al. *in review*).

At 24BH0662 we expanded upon the work done in 2015 (where we identified a single, long drive line). In 2016 we identified a second driveline forming the other wing of the drive lane as well as an associated stone circle (see Figure 16). The newly identified, western driveline contains over 75 cairns and forms a "Y" about 300 meters away from the cliff, which is approximately 8-meters high at the junction of the two drivelines. Once again, we were unable to fully record this feature as it extended onto private property. However with binoculars we could see that dozens of cairns extended the drivelines to the southwest.

Our newly identified cultural features contribute to our initial assessment of 24BH0662 in 2015 as a possible arroyo bison trap at the confluence of Grapevine Creek and the mouth of the unnamed ephemeral drainage, or arroyo. Hence, we dug two STPs on the alluvial fan at this location. These STPs were positive for faunal materials and cultural materials, containing chert flakes, fire-cracked rock, bison bone, and charcoal at a depth of 23 and 43 cmbs. Charcoal at 43 cmbs provided a radiocarbon age estimate of 175 +/- 15 B.P. (Herrmann et al. *in* review; UCIAMS 182483; cal AD1765; wood charcoal; $\delta^{13}C$ = -24.4‰) (

Table *5*).

Table 5: Radiocarbon Age Estimates from Grapevine Creek (from Herrmann et al. in review*).*

Lab Code	^{14}C Age (rcbp)[1]	# of Ranges[2]	Calibrated Age Ranges (2σ, cal AD)[3]	Location Horizon (Depth)[4]	Material[5]	$^{13}C/^{12}C$ Ratio
UCIAMS 169753	880 ± 15	2	**1152-1215 (87%)**	Unit 15-01 C (20-30)	BB	-18.5‰
UCIAMS 169756	880 ± 15	2	**1152-1215 (87%)**	Unit 15-01 C (50-60)	BB	-18.5‰
UCIAMS 169754	895 ± 15	3	**1147-1207 (45%)** 1046-1091 (45%)	Unit 15-01 2A (60)	BB	-15.1‰
UCIAMS 169482	90 ± 15	4	**1867-1918 (44%)** 1695-1726 (29%) 1813-1854 (27%)	Unit 15-01 2A (74)	C	-23.2‰
UCIAMS 169483	125 ± 15	5	**1804-1891 (57%)** 1682-1713 (17%) 1909-1936 (15%)	Unit 15-01 2C (78)	C	-26.3‰
UCIAMS 169484	140 ± 15	6	**1720-1777 (28%)** 1832-1880 (22%) 1915-1941 (20%) 1675-1699 (16%)	Unit 15-01 2C (95)	C	-27.0‰
UCIAMS 169755	880 ± 15	2	**1152-1215 (87%)**	Unit 15-01 2C (80-90)	BB	-18.6‰
UCIAMS 169485	1095 ± 15	2	**939-990 (61%)** 895-982 (39%)	Unit 15-01 3Bw (105)	C	-25.3‰
UCIAMS 182479	315 ± 15	3	**1514-1600 (78%)** 1617-1643 (21%)	Unit 16-03 (15-20)	C	-24.3‰
UCIAMS 182480	335 ± 15	3	**1538-1604 (50%)** 1486-1532 (30%) 1607-1635 (21%)	Unit 16-03 (15-20)	C	-24.5‰
UCIAMS 182481	125 ± 15	5	**1804-1891 (57%)** 1682-1713 (17%)	264 Processing (30)	C	-26.1‰

UCIAMS 182482	115 ± 15	3	**1808-1892 (61%)** 1686-1731 (28%)	264 Processing (10)	C	-23.1‰
UCIAMS 182483	175 ± 15	4	**1733-1783 (54%)** 1667-1684 (19%) 1929-1949 (18%)	662 Confluence (43)	C	-24.4‰
UCIAMS 182484	605 ± 15	2	**1302-1367 (79%)** 1382-1400 (21%)	262 Floodplain (66)	C	-24.8‰
UCIAMS 182485	155 ± 15	7	**1726-1781 (49%)** 1918-1946 (21%) 1669-1694 (16%)	Unit 16-04 (30)	C	-27.1‰
UCIAMS 182885	130 ± 15	5	**1831-1890 (39%)** 1681-1710 (17%) 1909-1938 (17%)	Unit 16-05 (33)	BB	-18.8‰
UCIAMS 182886	125 ± 15	3	**1804-1891 (57%)** 1682-1713 (17%)	Unit 16-04 (17)	BB	-18.0‰

Notes: [1]Standard ^{14}C age estimates reported in ^{14}C years before present; error reported at ± 1 standard deviation (SD). [2]Total number of calibrated age ranges. [3]Calibrated age ranges (A.D.; 2SD); percent of area under the probability curve for range shown in parentheses; bold indicates highest probability range; ranges <15% probability excluded. Ages calibrated using CALIB 7 (Stuiver and Reimer 1993; Stuiver et al. 2005); calibration based on IntCal13 calibration model (Reimer et al. 2013). [4]Soil horizon from which sample obtained in Unit 15-01; depth below surface in centimeters shown in parentheses. [5]Organic matter type sampled: BB = bison bone, C = wood charcoal.

Finally, during pedestrian survey near the site we termed Charlotte's Overlook, we discovered a small Eden-style projectile point. On the base and hafting area of the point, we discovered evidence of heavy grinding. Additionally, we recovered a second Paleoindian projectile point fragment from the area. This was a broken, probably Scottsbluff-style projectile point with collateral flaking and heavy grinding on the base and the basal third of the lateral margins (Herrmann et al. *in review*). Both projectile points were composed of an unidentifiable, likely exogenous chert coming from outside the Grapevine Creek drainage basin. Finally, a Pelican Lake-style projectile point fragment made from the locally available Bighorn chert indicates that the site also had a Late Archaic usage.

Subsurface Investigations

Our subsurface investigations in the 2016 field season began by continuing the 2015 work at 24BH0264, a Late Prehistoric buffalo jump site. This year we expanded our subsurface

investigations with a shovel testing regime in the alluvial fan formed about 120 meters from the bone bed excavated in 2015, at the confluence of the unnamed drainage and Grapevine Creek. Here we discovered subsurface cultural materials indicating the presence of a possible secondary processing area, such as bison bone exhibiting cut marks, sediments with calcined bone, charcoal, and chert flakes. Two horizons contained charcoal (10 cmbs [centimeters below surface] and 29 cmbs) and two horizons produced bison bone (29 cmbs and 50 cmbs) most of which is either burnt or poorly preserved. The radiocarbon age estimate from charcoal 10 cmbs provided a date of 115 +/- 15 B.P. (UCIAMS 182482; cal AD1840; wood charcoal; $\delta^{13}C$ = -23.1‰), and charcoal from 30 cmbs dated to 125 +/- 15 B.P. (UCIAMS 182481; cal AD1840; wood charcoal; $\delta^{13}C$ = -26.1‰). Although these dates are younger than the dates obtained from bison bone recovered from Unit 15-01, they are identical to two charcoal dates from Unit 15-01 (Figure 19) (Herrmann et al *in review*).

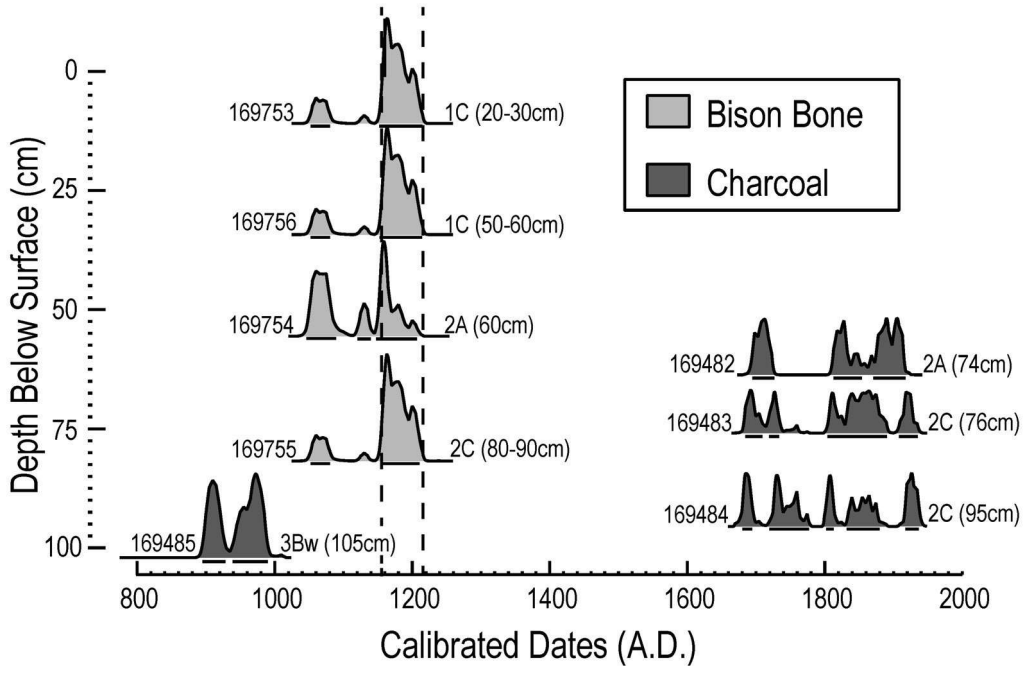

Figure 19: Probability-density diagram for 2016 carbon samples (from Herrmann et al in review*).*

Next, our subsurface investigations turned to 24BH0262, where we identified highly fragmented, calcined bone fragments on the surface of the colluvial slope below the drivelines during the 2015 field season. This site was first identified as one of several possible buffalo jumping sites by Joe Medicine Crow at the 1961 Buffalo Jump Symposium put on by the Montana Historical Society (1962; 1978). During the 2016 field season, we conclusively proved that, whether or not bison bones were ever mined in the past, an intact bone bed still remains in the Grapevine Creek floodplain below the drivelines at 24BH0262. This bed is located approximately 100 meters north of the creek itself. Directly above the bone bed on the tertiary creek terrace, along the benches above the creek, we identified two drivelines, a stone circle, cairns unassociated with the drivelines, and some surface stone quarrying areas during the pedestrian survey (Figure 16). In the 2016 field season we conducted a more intensive surface survey of the site, determining that the two drivelines, which form a "V" with the vertex near the cliff, extended further than our original 2015 survey had indicated. The northern driveline is 125 meters long and composed of 24 stone cairns averaging 3.75 stones per cairn. The southern driveline is much longer, 350 meters long and composed of 106 cairns averaging four stones per cairn (Herrmann et al *in review*). We identified an Avonlea-style projectile point during the 2015 pedestrian survey. Avonlea points are commonly associated with transitional, Late Archaic to Late Prehistoric, bison hunting sites in the Northwestern Plains (A.D. 250-1200; Kehoe 1966; Kehoe and McCorquordale 1961). The site surface contains several outcrops of chert bedrock which would have provided easily accessible low-grade tool material at hand. We were unable to ascertain a function for the cairns on the bench unassociated with the drivelines, however their placement makes them highly visible even from a distance, and their proximity to the drivelines indicates association with the buffalo jumping complex.

Our subsurface investigations at 24BH0262 focused on those few calcined bone fragments identified during the 2015 pedestrian survey. We sank eight STPs along a line perpendicular to the cliff face, beginning at the top of the colluvial slope and going down to the edge of Grapevine Creek. These STPs were placed at 15 meter intervals. After discovering a dense bed of subsurface bone at the break in the slope where the alluvial slope met the floodplain, we placed an additional 11 STPs, again at 15 meter intervals, perpendicular to our first axis. (Figure 20). Out of the 19 total STPs dug at 24BH0262, 15 were positive for either faunal and/or cultural materials. Based on this highly successful testing regime, we chose to expand two of our STPs into 1-meter excavation units (Units 16-04 and 16-05).

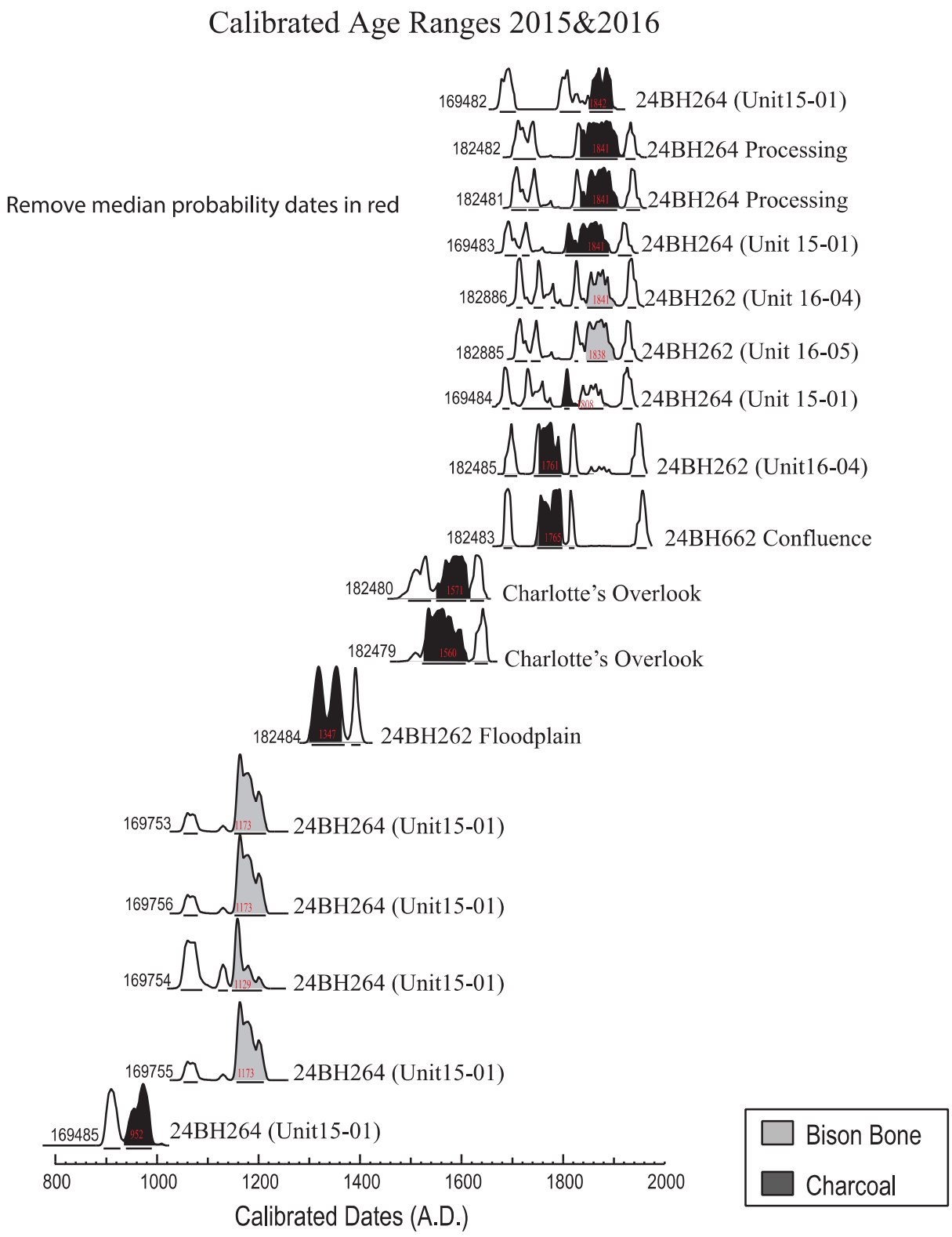

Figure 20: Summary of radiocarbon dates from the 2015 and 2016 field seasons (from Herrmann et al. in review*).*

Our shovel-testing regime provided enough data for us to construct a picture of the depositional history of the Grapevine Creek floodplain, as well as the colluvial slope to a depth of one meter. We were also able to identify the shape and size of the subsurface bone bed. This history shows that below 24BH0262, Grapevine Creek has actively meandered and deposited overbank sediments across the floodplain in recent millennia. The channel meanders and avulsions are recorded in the floodplain architecture by rounded and sorted lag gravels (Herrmann et al. *in review*). In the upper meter of sediments, evidence of channel meandering occurs about thirty meters from the colluvial slope where the densest bone concentration remains, suggesting that the creek has not eroded into the primary bison bone bed (Herrmann et al.). This is likely the result of bedrock control of channel morphology at this locale (Herrmann 2016). The creek meanders away from the cliff face at 24BH0262 approximately 100 meters upstream, or west, of the site, where a bedrock outcrop prevents channel adjustments toward the cliff (Figure 16). At this point the creek meanders towards the middle of the floodplain, where subsurface bone density decreases. At all points north of Grapevine Creek, bison bones are present at subsurface horizons of varying depths (Herrmann et al. *in review* Figure 21). Important to our understanding is that these depths go deeper than the excavations at Units 16-04 and 16-05, indicating that buffalo jumping occurred at 24BH0262 prior to the radiocarbon dates collected during our excavations.

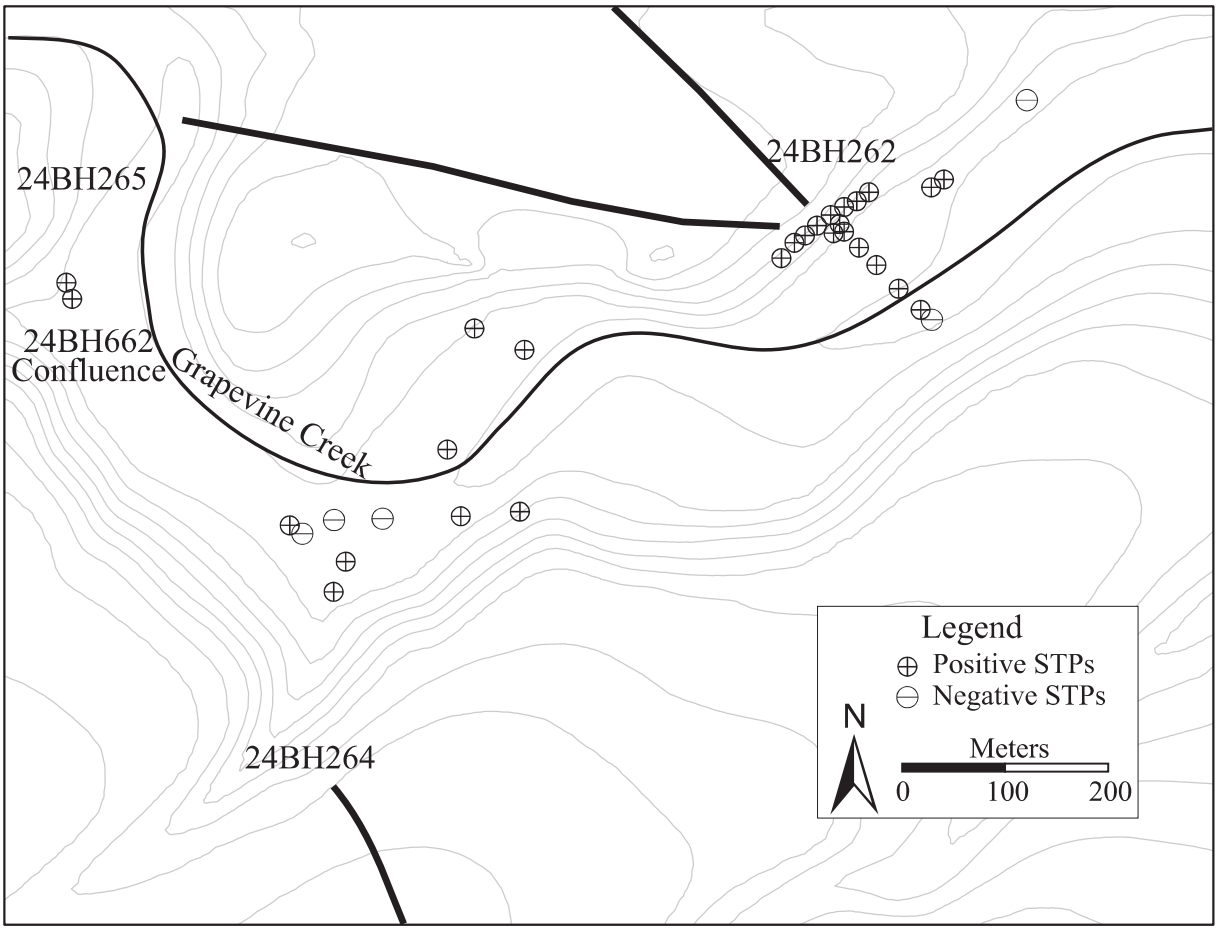

Figure 21: Shovel testing regime during 2016 field season (from Herrmann et al. in review*).*

Units 16-04 and 16-05 at 24BH0262 were selected for excavation as 1 x 1 m test units due to their location directly below the confluence of the drive lines on the bench above, and because those shovel tests contained the heaviest concentrations of subsurface faunal materials. The location of the units was at the intersection of the colluvial slope and floodplain. The cultural material in both units was covered by cliff-derived colluvium. Despite the fact that the units are 15 meters apart, they were relatively homogeneous in that they both contained loamy sand sediments, soil horizonation, bison bone concentrations, and artifacts to our closing depth of 35cmbs (Herrmann et al. *in review*). The units contain a three-tiered soil profile, each exhibiting A-C horizonation with angular rocks and pebbles indicating colluvial parent material (Figure 22).

Soil friability, dark color, and evidence of burning provided clear evidence of paleosol A horizons (Ab and 2Ab) (Herrmann et al.). Pedogenesis between depositional episodes is minimal. Small packages of well-sorted fine sandy layers less than 2mm thick and occasional sorted sand and angular pebble lenses suggests that slopewash was an ongoing process within the units (Herrmann et al.). We did not find evidence of burning within the surficial soil; however, the Ab and 2Ab horizons contained abundant evidence of burning. Charcoal flecking was common throughout the Ab horizon and a large proportion of the bones were either burned or calcined. Burning was more extreme in the 2Ab horizon where most of the bone was calcined and charcoal flecking more abundant (Herrmann et al.).

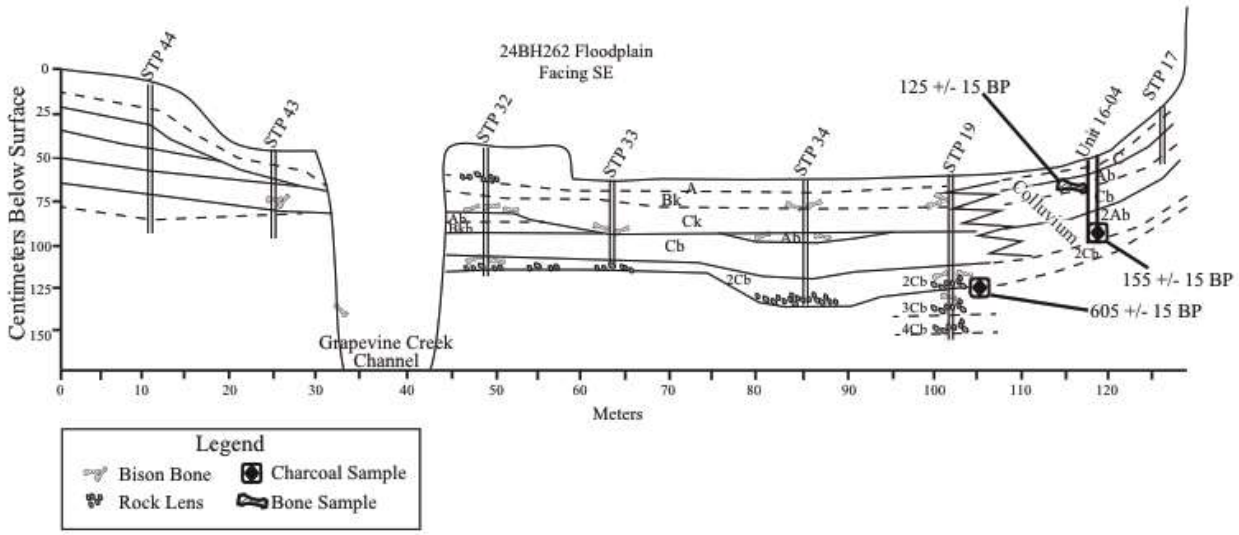

Figure 22: Soil profile below 24BH0262 (from Herrmann et al. in review*).*

Within the excavation units, we first encountered bison bones in the surficial C horizon at a depth of 9 centimeters below the surface. The bones in this horizon were largely recognizable, unarticulated, and unburnt, but were not well preserved. In some cases, the bones fell apart when moved (Herrmann et al. *in review*). We interpret the bones from the C horizon as originating from the lower Ab horizon because most were recovered at the interface of the Ab horizon and bone concentrations were higher in the first paleosol. Some bone might have been deposited from the

talus slope above the unit during colluvial episodes that buried the Ab (Herrmann et al.). Ab horizon bone appeared better preserved than the overlying bone suggesting that the upper horizons were more affected by weathering. The first paleosol (Ab-Cb horizons) contained more rock than the surficial soil indicating that rockfall and colluvium were likely the parent materials (Herrmann et al.). Such geomorphic effects are common in the Grapevine Creek drainage basin and continue; boulders fallen from the cliff at 24BH0262 are present on the surface of the floodplain today. Bone concentrations remained high in the second paleosol (Herrmann et al.; Figure 23).

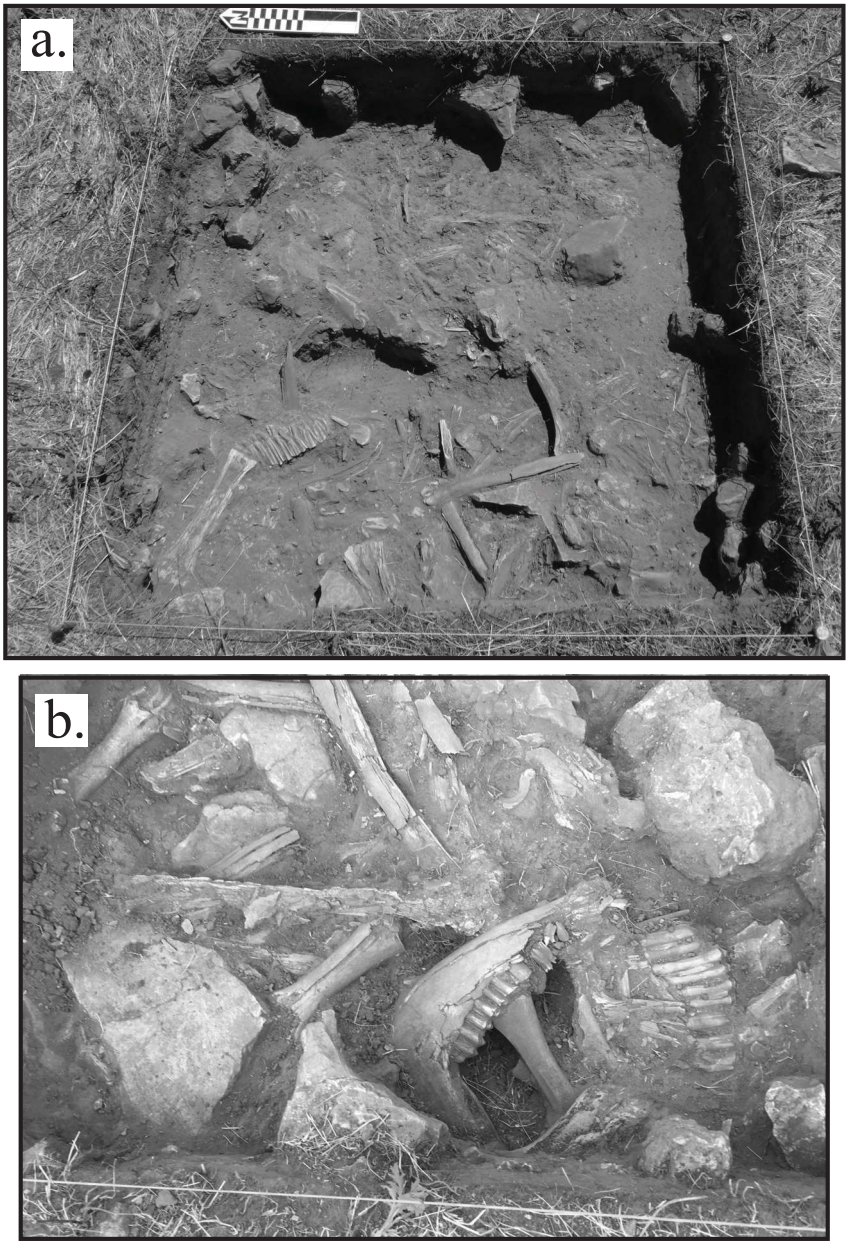

Figure 23: Subsurface investigations below 24BH0262.

Cultural materials from Units 16-04 and 16-05 include lithic flakes composed of basalt, obsidian, and Big Horn chert, and few formal tools. This is consistent with the assemblage one would expect to find in a buffalo jump primary processing area. A single diagnostic tool, a small Late Prehistoric tri-notched projectile point with an impact fracture at its tip, made of obsidian, was found in association with a bison mandible in unit 16-04 at a depth of 28 cmbs (within the

2AB horizon). The projectile point is likely of the Emigrant or Billings Double Spur type as defined by Kehoe (1966). Radiocarbon dates confirm the use of the jump site during the Late Prehistoric period. However, STP data does suggest that bone concentrations continue in depth to deeper, unexcavated horizons, at least to 70 cmbs, indicating that the jump might have been in use prior to the Late Prehistoric period. Due to time constraints, these units were only excavated to a depth of approximately 35 cmbs. Radiocarbon age estimates on bone from units at 24BH262 include 125 +/- 15 B.P. (UCIAMS 182886; cal A.D. 1840; bison bone; $\delta^{13}C$ = -18.0‰), 130 +/- 15 B.P. (UCIAMS 182885; cal A.D. 1840; bison bone; $\delta^{13}C$ = -18.8‰), and 155 +/- 15 B.P. (UCIAMS 182485; cal A.D. 1760; cottonwood charcoal; $\delta^{13}C$ = -27.1‰) (Figure 22). We also obtained a modern date from a leaf of -170 +/- 15 B.P. (UCIAMS 182486; cal A.D. 2010; cottonwood leaf; $\delta^{13}C$ = -26.9‰) (Herrmann et al. *in review*).

At the Charlotte's Overlook site we identified three stone circles and a large lithic scatter lying on a bench above the north side of Grapevine Creek (Figure 16). The site has an excellent viewshed of the drainage basin. In order to better understand the context of this site in relation to the buffalo jumping sites further to the east, we chose to excavate a stone circle that appeared to contain an internal fire hearth feature as well as an east-facing entrance identified by a gap in the circle. Because prevailing winds at Grapevine Creek blow from the west, we were able to search for datable charcoal within the hearth feature and wind-blown charcoal trapped along the western edge of the east side of the circle. We excavated a 3m by 1m block (units 16-01, 16-02, and 16-03) from the center of the stone circle to beyond its eastern boundary, encompassing the hearth feature as well as the eastern entrance (Figure 24). While only charcoal flecking remained in the hearth feature, we were able to recover large charcoal pieces, identified as snowberry and buffaloberry, from where they laid trapped against the stones forming the eastern portion of the

stone circle. These provided age estimates of 315 +/- 15 B.P. (UCIAMS 182479; cal A.D. 1560; snowberry charcoal; $\delta^{13}C$ = -24.3‰), and 335 +/- 15 B.P. (UCIAMS 182480; cal A.D. 1571; buffaloberry charcoal; $\delta^{13}C$ = -24.5‰) (Herrmann et al. *in review*) (Table 5). While these dates are consistent with the Late Prehistoric period usage of the drainage for buffalo jumping, and therefore might allow us to associate the Charlotte's Overlook site with the buffalo jumping complex to the east, the date range represents a period of occupation not yet identified in the drainage. In addition to the charcoal pieces submitted for radiocarbon dating, we also recovered 23 non-diagnostic flakes from the excavation units. Unfortunately, no diagnostic tools were recovered. The units were terminated at bedrock (15-25 cmbs).

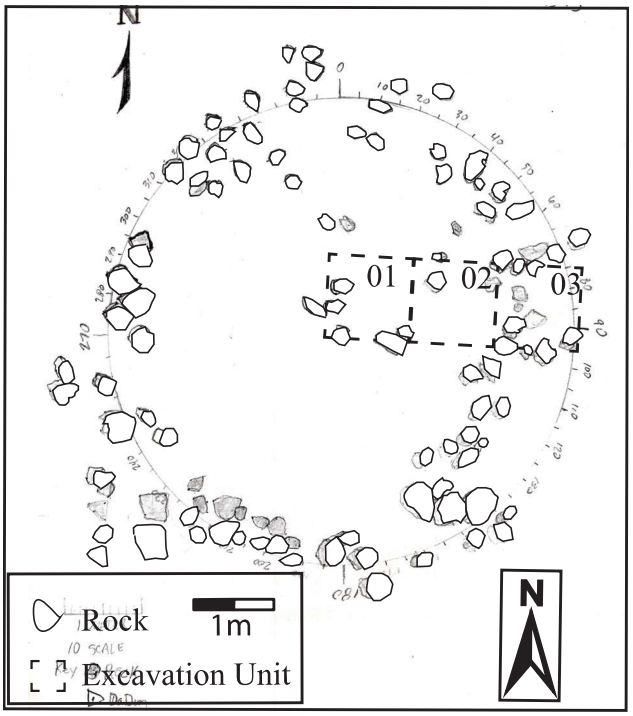

Figure 24: Excavation units at Charlotte's Overlook (from Herrmann et al. in review*).*

Stone Tool Raw Materials and Diagnostic Projectile Points

While a great many lithic raw materials were identified during fieldwork in the Grapevine Creek drainage basin, the most common material used by far was the locally-procured Bighorn Chert. For example, Bighorn Chert, red and black, can be found eroding from surface outcrops on the thin limestone beds towards the top of the Tensleep Formation (Figure 16), rather than the Phosphoria or Amsden Formations, as suggested by Taylor (2006). At the Grapevine Creek drainage basin, the Tensleep Formation occurs between the Phosphoria (above) and the Amsden (below) (Lopez 2000). Tools such as scrapers, projectile points, and bifaces were all identified as being made of Bighorn Chert. The next most common material type present was the regionally available gray porcellanite. Other tool stone types include Moss Agate (a translucent dendritic chert), obsidian, basalt, Niobrara Jasper, silicified sandstone, and chalcedony. While relatively uncommon, we were able to send three flakes and the Late Prehistoric projectile point discovered in unit 16-05 to the Geochemical Research Laboratory in order to source the obsidian. The *in situ* projectile point recovered from Unit 16-04 and flake obtained from surficial context at a large cairn in the northernmost portion of the study area are sourced to Obsidian Cliff, Wyoming. The source of the two flakes recovered at Charlotte's Overlook is Bear Gulch, Idaho (Herrmann et al *in review*).

Diagnostic projectile points recovered from the Grapevine Creek drainage basin over multiple projects indicate that the area was in use during all periods of history, with the exception of the Middle Archaic Period (Table 6). The majority of the diagnostic tools date to the Late Prehistoric Period. Additionally, many of the specific identified projectile point styles (Eden, Scottsbluff, Besant, Avonlea, and Plains and Prairie Side-Notched) have been previously associated with bison hunting sites on the Plains (Kornfeld et al. 2010).

Table 6: Diagnostic Projectile Points from the Grapevine Creek Drainage Basin (from Herrmann et al in review*)*

Type	Location	Age Range (rcbp)
From this research:		
Billings Tri-Notch	Unit 16-04	300-100
Plains Side-Notch	Unit 15-01	600-200
Plains Side-Notch	North of 24BH0262	600-200
Prairie Side-Notch	Unit 15-01	1300-700
Prairie Side-Notch	24BH3477	1300-700
Shoshone Knife	North Rim Cairn	1800-100
Avonlea	24BH262 Bench	1800-800
Besant	North of 24BH0262	1900-1500
Pelican Lake	Charlotte's Overlook	3100-2000
Eden	Charlotte's Overlook	9500-7600
Scottsbluff Knife	North of 24BH0262	9500-7600
From elsewhere in the Grapevine Creek drainage basin[1]:		
Plains Side-Notch	24BH0834	600-200
Plains Side-Notch	24BH0848	600-200
Plains Corner Notch	24BH0844	1800-650
Besant	24BH0844	1900-1500
Besant	24BH0869	1900-1500
Pelican Lake	24BH0884	3100-2000
Yonkee	24BH0881	3200-2500
Yonkee	24BH0881	3200-2500
Fishtail	24BH0840	8200-7500

[1]Good and Loendorf 1974; Good and Loendorf 1977. Age ranges from Kehoe 1966; Taylor 2006.

Discussion and Summary of Fieldwork at Grapevine Creek

Despite the fact that buffalo jumping sites are relatively common in the northern Plains, and eastern Montana particularly (over 300 reported sites) (Hamilton 2007), Grapevine Creek stands out due to its abundance of landscape modification and numerous activity areas within a relatively small area (~5 km^2). Our accumulated radiocarbon age estimates and the available diagnostic tools all indicate that Grapevine Creek was used for communal bison hunting during at least six different time intervals (Table 7). We currently do not know how far back in time bison hunting at Grapevine Creek took place because we have not reached the bottom of bone beds

opened during the 2015 and 2016 field seasons. Therefore, the jumping complex may be older than our oldest age estimate. The presence of diagnostic materials dating to earlier times lends credence to the possibility of early communal hunting episodes. Occupation may reach as far back as the Paleoindian Period, as sites have been located in the surrounding region (Kornfeld et al 2010; Frison et al. 2007; Husted and Edgar 2002). However, none of the Paleoindian projectile points identified at Grapevine Creek were found in association with the bison bone beds and therefore cannot be linked to the use of the bone beds at this time. However, their occurrence on the benches above Grapevine Creek allows us to conjecture about the time depth of bison hunting in the basin.

Table 7: Grapevine Creek Buffalo Jump Complex Age Ranges (from Herrmann et al in review)

GVC Locale	Age Range (cal A.D.)
24BH0264 (Unit 15-01)	940-990
24BH0264 (Unit 15-01)	1150-1215
24BH0262 (Floodplain)	1302-1367
Charlotte's Overlook	1515-1600
24BH0262 & 24BH0662	1730-1780
24BH0262 & 24BH0264	1805-1890

Bone beds 24BH0264 and 24BH0262 exhibit the hallmarks of kill sites where primary butchering would have taken place (*sensu* Brink 1985). For example, excavations revealed many articulated lower leg and foot bones, while relatively few long bones were encountered. Axial and cranial elements were not present in excavations at either bone bed, suggesting that secondary processing might have occurred elsewhere. One Crow oral tradition about a buffalo jump leader named Tip of the Fur may provide a clue as to the lack of bison skulls at these sites. Tip of the Fur was known to have jumped buffalo at Bacheeishdíio (Grapevine Creek drainage) and the adjacent Dryhead drainage. Tip of the Fur would order the severed bison heads to be piled beneath the cliffs

after each jumping episode, resulting in the Crow place name: “Aashúuchoosalaho,” (translated as “Dryhead”) (Medicine Crow 1992).

Consistent with these other locations, a probable processing area located within alluvial fan deposits about 100 meters north of 24BH0264 was also missing bison skulls. This activity area was discovered during our shovel testing regimen on targeted fan deposits. Stratified bison bones and charcoal were present in subsurface deposits, in addition to a long bone displaying evidence of splitting, perhaps in an attempt to extract bone marrow. No further test units were placed to determine the subsurface extent of this activity area. Due to time constraints our investigations here were limited to shovel tests; however, all STPs returned positive results for cultural materials. The locale is a logical place for secondary butchery, as it is near an ample water supply and slightly elevated from the floor of the Grapevine Creek drainage. Deposition from the fan helped to preserve the cultural materials in place. As with the primary butchering areas represented by the other two larger bone beds, stratified charcoal horizons at this secondary processing area may likewise indicate the intentional use of fire to modify the local environment. While naturally occurring wildfires cannot be ruled out as a possible explanation, the ethnographic record provides evidence of the burning of bison remains after the conclusion of butchery tasks in order to minimize foul odors created by successful hunts (Arthur 1962; Brown 1932). Burning utilized carcasses would have made the area easier for people to continue to occupy while simultaneously preparing the jumping landscape for successive hunts. The stench of slowly rotting carcasses might have deterred other bison herds from entering the area. Another ethnographic use of fire was grassland burning in order to attract bison to an area (Forbis 1978). Historically, controlled burns were used to encourage the growth of young nutritious grass shoots, highly attractive to nearby bison herds (Zedeño et al. 2014).

Subsurface burnt horizons, along with burnt and unburnt bison remains, were also present at STPs dug near the base of the 24BH0662 drivelines, at the confluence of a dry arroyo and Grapevine Creek about 500 meters downstream from the cliff. Only a few bone fragments were recovered in this location, as the steep-sided arroyo had been eroded to bedrock near the cliff and along much of its length. The slope of the arroyo decreases near the confluence with the Grapevine Creek drainage thereby resulting in an alluvial fan at the arroyo mouth, which is relatively narrow. The topography of the area makes it an ideal location for the placement of a bison trap due to the naturally-occurring, steep, seven-meter high arroyo walls and the previously mentioned narrow arroyo mouth. As in the case of the secondary processing area at 24BH0264, the deposition of sediments at the fan acted to bury and preserve the few remaining cultural materials.

Because evidence points to the use of 24BH0662 as both a jumping site and a bison trap, it may be the most complicated jump site yet identified at Grapevine Creek. Cultural modification of the landscape at this site includes two drivelines that target a narrow cliff face where bison were funneled over a precipice. The westernmost drive line can act to either assist the other or, by using the natural topography, direct bison to the arroyo for trapping downstream. This western driveline extends a considerable distance (at least 1.2km) and is bifurcated, suggesting a reconstruction episode. The western portion of the bifurcation (oriented east-west) might have been used to keep bison from running into the arroyo when desired (Herrmann et al *in review*). The natural topography might have been used to funnel bison into the arroyo during winter months when the cairns might have been buried in snow. Some Crow oral traditions may shed light on how an arroyo trap could be used. Medicine Crow (1978:250) describes how winter hunts included driving bison into snowy arroyos to trap them. The topography of the arroyo at 24BH0662 would allow hunters to strategically place themselves on top of the arroyo walls in order to effectively slay bison from

a safe distance. Disorientation and confusion would have added to the dispatch of bison in the arroyo, enhanced by three small (1-3 meters high) jumps within the arroyo. Finally, the topography at the jump suggests that a well-sheltered kill area at the confluence of the unnamed arroyo and Grapevine Creek would have eased the process of primary butchery in the winter, as opposed to working on an open plain.

Generally, cultural landscape modification at Grapevine Creek comes in many forms. The large concentration of drivelines suggests that successful hunters operated under a detailed construction and placement plan in order to manipulate the placement of bison herds. People would have to be placed in such a way as to encourage both safe and efficient bison harvests. At Grapevine Creek, drivelines are often strategically parallel to drainages or other topographical features designed to drive bison towards cliffs along the western and southern sides of the Grapevine Creek drainage. All identified drivelines in the drainage follow the same pattern of being designed to drive the bison north or east, presumably in order to keep hunter downwind of keen-nosed bison herds and thereby minimizing the chances of an unsuccessful attempt. According to Joseph Medicine Crow (1962; 1978), drivelines often turned as the drive approached the precipice in order to keep the cliff hidden from the herd. 24BH0264 is an example of this technique. The drivelines at 24BH0262 take advantage of a subtle topographic rise about 40 meters before the cliff edge that likely obstructed the view of bison (Herrmann et al. *in review*).

A second form of landscape modification present at Grapevine Creek are the large, isolated cairns located along the high north rim of the study area (Figure 25). The commanding views from this landform would have allowed for sightlines to the entire Grapevine Creek drainage basin grasslands, herd animals, cliffs, and potential competition (Herrmann et al. *in review*). During the course of our pedestrian survey, we noted that the drainage exhibits an interesting acoustic feature,

whereby we could communicate from the edge of the high northern bluffs with team members working more than a kilometer away on the grasslands of the drainage with a low shout. We therefore assume that, if the cairns were in use at the same time period as the buffalo jumps, they were likely used as lookout or communication stations during bison hunting events. Finally, other smaller, isolated cairns were identified along the south side of the Grapevine Creek drainage, which may be associated with the location of the Bad Pass Trail, whose northern terminus, while currently unknown, likely lies somewhere within the drainage (Loendorf 1980). An early nineteenth century map (Bearss 1970:467) shows the Bad Pass Trail passing through the Grapevine Creek drainage basin just south of Grapevine Creek, as do current National Park Service maps of Bighorn Canyon (Herrmann et al. *in review*).

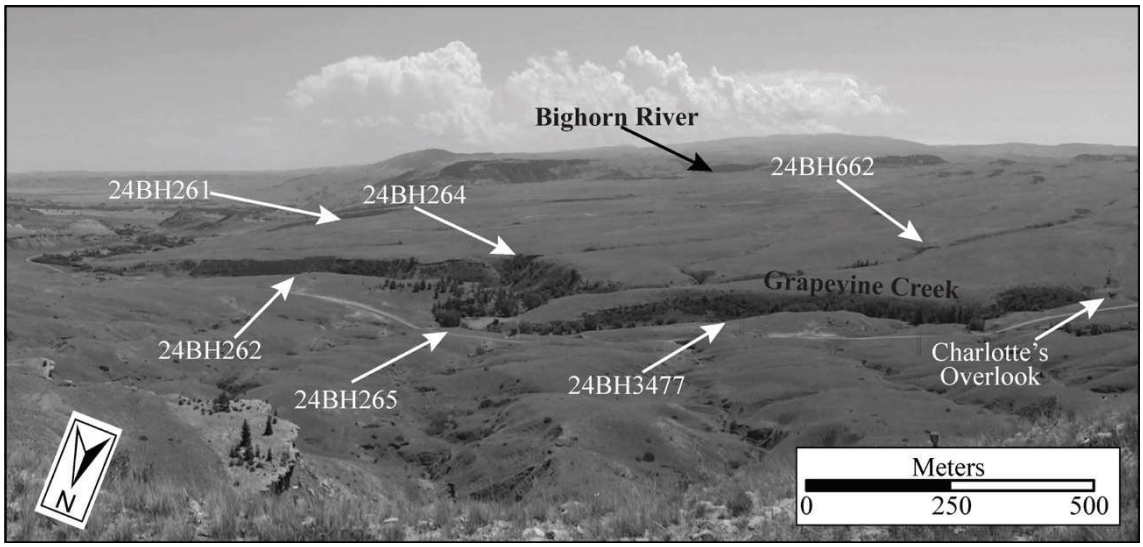

Figure 25: Overview of Grapevine Creek Buffalo Jumping Complex (from Herrmann et al. in review*).*

While the previously discussed field seasons have provided a large amount of data to be studied and interpreted, at the end of three field seasons, more questions remain unanswered regarding the Grapevine Creek drainage. The question of the true location of the Bad Pass trail is just one such question. Also remaining to be researched is the absence of a Middle Archaic record within the drainage: is this the result of sampling bias or is there truly an absence of human

occupants during this time period? Are the large cairns along the northern rim of the Grapevine Creek drainage truly related to the use of the area for bison hunting, or is their function something else entirely? Another question concerns the possible Paleoindian occupation of Grapevine Creek drainage – were the Paleoindians in the drainage using Grapevine Creek to hunt bison, or just passing through? Finally, there remains the difficult question of teasing out cultural affiliations from the Late Prehistoric occupants of Grapevine Creek. Obsidian sourcing test results indicate that whoever these occupants were, they traveled widely and most likely came into contact with other bands and tribes. Using archaeological, ethnohistoric, and ethnographic data, we are able to determine that Grapevine Creek was used by the Crow, Shoshone, Flatheads, and Blackfeet during the Late Prehistoric and Historic Periods (Medicine Crow 1978:250; Hoxie 2000).

6. Crow Oral Traditions

Introduction

Plains Indian life revolved around buffalo. The massive collection of recorded oral traditions and histories from various Plains tribes reflects and underscores this fact. While buffalo jumping was largely abandoned by the Historic period, the practice of communal buffalo hunting

endured to the point of the near-extinction of the buffalo on the Plains. The cultural aspects of communal buffalo hunting during this time period are well-recorded, as well as the relationship between human and buffalo. This chapter focuses on how oral traditions can shed light on the data captured at buffalo jumping sites, particularly how Crow oral traditions can aide in interpreting activities at the Grapevine Creek Buffalo Jumping Complex.

Northern Plains tribes including the Crow, the Blackfoot, Assiniboine, and Sioux were continually at war during early historic times over the possession of buffalo hunting grounds (Arthur 1975:61; DeSmet 1905). George Arthur classifies Plains buffalo hunting techniques into the individual (stalking) and communal (surround). Bison drives, in which he classifies impounding and jumping, are variations of surrounds (Arthur 1975:61). Horses increased hunting mobility and with their introduction, the driving practices of impounding and jumping were abandoned (Arthur 1975:62). In winter, buffalo were slain by floundering them in snowdrifts, where they were pursued and hunted by men on snowshoes (Arthur 1975:64; Denig 1930:535). In the eastern prairies, bison were reportedly surrounded and hunted with the use of fire (Allen 1876:202-203; Arthur 1975:67). In historic times, Crow hunted buffalo on horseback all winter unless the snow became too deep to catch buffalo (Arthur 1975:69; Denig 1961:160). From ethnographic accounts, the Crow were known to drive herds of hundreds of buffalo over cliffs (Arthur 1975:73; Leonard 1959:144). Ethnographic sources indicate that sometimes more than one tribe used the same buffalo jump; for example, a jump near the Tongue River was used by the Crow and the Cheyenne (Arthur 1975:74; Medicine Crow 1962:48). Arthur describes a drive site as consisting of "[…] a gathering basin or grazing area in the locality of the pis'kun where first contact was made with the buffalo. The animals were then gradually lured into a wide V-shaped path or drive lane delineated by drive lines or fences that converged at the edge of a cliff, cutbank

or pound entrance" (1975:75). The notion of fall as the season of buffalo hunting likely originated as a result of the seasonal hunts of agricultural tribes from the eastern Plains and the middle Missouri region (Arthur 1975:97).

Other Plains tribes, more unilaterally dependent on buffalo for sustenance, would hunt in all seasons, not just the fall (Arthur 1975:99). Historical evidence overwhelmingly indicates that buffalo cow hides were preferred over bull hides, and could be taken in all seasons other than the calving season, although robes were best acquired during November, December, and January (Arthur 1975:99). Early historic evidence shows that communal buffalo hunting occurred at all times of the year, not just the fall, which calls into question an assumption made by many archaeologists as to the pressure in the fall season to lay up stores for winter (why lay up stores when you will be continuing to hunt all winter long?) (Arthur 1975:106). Historically, pound sites and associated campsites were always located in areas where bison were expected to winter (Arthur 1975:107). Another assumption made by archaeologists and Plains anthropologists is that Plains tribes separated into smaller groups in the winter in order to better survive the harsh months, when ample ethnohistoric evidence exists to show that in fact many tribes gathered into larger groups at pound sites in order to take advantage of winter communal hunting opportunities (Arthur 1975:110). Arthur argues that this practice of aggregating for winter communal hunting may be projected into the past prior to European contact, as the tribes most noted for these practices in historic times, the Assiniboine and Cree, were the most horse-poor of the Plains tribes and therefore practiced the most antiquated hunting rituals (Arthur 1975:114). Arthur further argues that, as communal bison hunting continued throughout the winter, there was no need for the production and storage of large quantities of dried provisions in the fall (Arthur 1975:121). Arthur

also suggests that, rather than the introduction of the horse, it was the presence of large, aggregated bison herds that allowed for large encampments (Arthur 1975:122).

In this chapter, the focus scales from large to small. First, I will synthesize the relationship between the Crow and buffalo through their oral traditions. Next, I will discuss the practice of Historic communal buffalo jumping on the Plains through a number of oral traditions. Finally, I will discuss several Crow oral traditions that particularly deal with the Grapevine Creek area and how this relates to the practice of archaeology at Grapevine Creek.

The Crow and Their Relationship to Buffalo

A discussion of the role of the buffalo in Crow culture is one that spans the mundane to the sacred, perhaps without a distinction between the two. Not only was the buffalo the primary food source for the Crow, it was also the primary source of raw materials for cultural objects. Many parts of the buffalo were utilized to create objects of material culture. The most utilized part of the buffalo for this function was the hide, which was used for clothing, shelter, stirrups, rattles, and shields (Verbicky-Todd 1984:185). Among all Plains groups, hide dressing was exclusively a woman's job and one of the most important tasks performed by them (Verbicky-Todd 1984:192, Ewers 1945:10-11, Flannery 1953:159, Leonard 1959:155, Mandelbaum 1979:59, McHugh 1972:94-95, Wissler 1910:63). The Cheyenne and Crow made bows by binding pieces of horn and sinew together (Verbicky-Todd 1984:193, McHugh 1972:105).

This reliance upon the buffalo for so many vital things is underscored in the importance of the buffalo in the spirituality of Crow culture. "The religious beliefs of the Plains tribes were deeply rooted in their experience of the natural world, essentially based upon the concept of a controlling supernatural power or series of powers pervading the universe […] The importance of

the buffalo to the survival of the Plains Indians consequently have the buffalo a prominent role in the religious life of the Plains tribes (Verbicky-Todd 1984:197).

An example of the importance of the buffalo to the survival of the Crow is provided in a myth related to the devastation caused by the buffalo disappearing from the earth. Lowie recorded one such myth from the Crow tribe called "The Giants and Their Buffalo":

> The buffalo that had been made disappeared. "Let us look for them," said the people. Ci`rape [the younger brother of Old-Man Coyote, the Crow culture hero] looked for them and found their den right in the rocks. It was hard to find, but he succeeded. Two men made plenty of moccasins and then went after the buffalo, following the tracks. They traveled for three or four days, when they caught up with the hindmost buffalo. Then they saw light shining ahead. "Here is another band coming." They followed the buffalo to another land, where they found a big camp. There were a great many buffalo there, some were even used for riding. This race of people were giants and they mocked the pursuers, saying, "Look at these little people." They asked what these animals were and the giants said they were horses. The giants asked them what they wanted to eat. "Buffalo." The giants had a herald announce that the herd be brought in so the visitors could pick from it. They selected a big fat cow. The giants watched the people eat buffalo and wondered at it for they called the buffalo a "stinking animal." When they killed the buffalo, took the manifolds, and broke the marrow from the bones, the giants held their noses with disgust. They roasted the ribs over the fire and feasted on the ribs, while the giants stood aloof and held their noses. They took the ribs and ate. The giants still held their noses. "How can they eat that stinking stuff?" They sliced the meat over the fire and they took fat to dry. "Where do you live?" "We come from up above, but we want to eat some of your horses, so we followed them in here." "All right, you shall have a large portion of them."
>
> Every creature on the face of the earth except the buffalo were the giants' enemies. Then they heard a voice bidding the giants hide their visitors. All the creatures were attacking the giants, who retreated. Then the little people were asked to hide, because it was not safe for them.
>
> These big giants were killed by the least scratch made on them by little birds. The little people were kept hidden, but it got too hot so they crawled out and saw that the enemies were birds. They took clubs and went out. The giants did not want them to go out, but they killed birds right and left and drove them back. The giants got to be afraid of the pygmies and would not let them stand on the ground, but carried them about and warned one another against doing anything to offend them lest they wipe them out. A little later the Indians said, "Our folks are hungry, we want to take some of your horses." The giants drove in a herd to the hole. The people called Ack·ápkawia were the first in existence. The two men brought the buffalo back

through the tunnel to the other entrance. They got back to the earth, kept track of buffalo, and said they would use knives to prepare them (1918:218-220).

While Plains tribes and buffalo were engaged in a predator-prey relationship, many aspects of Plains culture speak to an underlying respect these groups had for the buffalo. In another Crow myth, a buffalo is impervious to a hunter's attempts to shoot him:

> A young man was hunting deer and buffalo. He saw a bull standing up. He sneaked up in a coulee and when he got close he shot at him. The buffalo raised his tail and looked for him without running away. He shot him again. Again he shot him. The fourth time he shot him. Then the bull got furious. None of the shots hurt him. The Crow got out of his hiding-place and was going to shoot him again. The buffalo saw it and came towards him. The Indian ran to his horse, got on, and fled, pursued by the buffalo. He came to a cliff, got off, and went into a cleft in the rocks. The buffalo came and drove his horse away. Then he got to the cliff and thought the buffalo could not follow, so he ran to a creek, turned, and saw the buffalo. It went to the end of the cliff and came towards him. When he saw the buffalo coming for him, he got to the river, but the bank was too high to jump. There was a tree hanging over. He climbed the tree and sat there. The buffalo came to the tree, looked up and saw him, got back, rolled in the dirt, and came to the tree, which was a big one. He hooked it and knocked off its bark. He hooked off the bark four times. Then he rolled in the dirt again and red paint flew up from where he had wallowed. Now the man was ready for him with his arrows. The buffalo came to the tree, hooked it twice, and at the same time the Crow shot him in the side, but the arrow glanced off as if he had shot at a stone. He did not shoot any more, seeing he could not do anything. The buffalo hooked the tree several more times and rolled in the dirt. Then red paint did not fly any more, but dirt flew. He came towards the tree, walked up, hooked the tree, then went back and came faster toward the tree than before. The man kept crying and begging. The fourth time he rolled in the dust, and white clay flew up. He hooked the tree. Bigger chips flew off now. The Indian kept on begging and crying. He cried till he was hoarse. He wondered how he could get away. The place where the buffalo hooked the tree was getting worn away. All this time the man kept begging for mercy the buffalo was rolling on the ground and lay there. After a while he came under the tree. When he got there he did not hook it, but looked at the man, and went away to his wallow. He looked back and saw the man on the tree, went way off, turned, and looked back. The man saw that the buffalo had painted his eyes white and had a buffalo tail round its neck and its eyes painted white. The roan rolled on the ground, got up and turned into a black horse painted in the same way and with a tail round the neck. This black horse rolled and changed into a bay horse. It had eyes painted white and a buffalo tail round the neck. This bay stood and rolled in the dust and turned into a gray horse, which stood still, then went the other way. When it was far off it turned into a buffalo again. It stood on the hilltop. The Indian climbed down the tree and stealthily went home. (Lowie 1918:269-270).

Another Crow myth relates a bizarre experience with a buffalo:

> An Indian was hunting buffalo. He saw one and sneaked up to it. He came to a washed out trail and crawled up close. A buffalo was lying down. At the noise it stood up and looked at him. He shot the buffalo. It pawed the ground, raised its tail, and came toward the man who lay in the trail which had been washed out. It hooked dirt over the man and tried to make the ground even with him. While digging down the man dug with his knife and made the place still deeper. After the buffalo found he could not hook the man he stuck his head down where the man was and licked him till he wore his shirt off. He kept licking his skin till it was worn off. The man began to cry. When the buffalo had worn his skin off, the blood began to run. The man cried and begged for mercy. After a while the buffalo stood over him and made water, which burnt like fire. He went away. The Indian lay there for a while, peeped out, and saw the buffalo a little way off. It went back again, then he heard somebody singing.
>
> He peeped out and saw a man riding a black horse painted with white clay; his own face was painted with white clay, he wore a buffalo cap with horns and feathers at the back, he held a spear with a buffalo tail tied to it and was singing. While he was looking at him, the horseman started for the rocks close by. The rocks began to shoot at the rider. He went and stick his spear in one rock and turned back. Then the Crow heard cheers and shooting from the rocks. When he came back, he sang another song and came to the rocks. The rocks shot again and smoke came out. He did not stick in his spear, but struck the rocks and turned aside. Then he turned, and sang another song. He wore a black calfskin shirt, fringed at the sleeve, and carried a shield with a buffalo shown in the middle. When he started toward the rocks, the rocks turned into people. He went and stuck one with his spear and went back. He said, “This is the way I am.” When he came back to where he had been he talked to the Crow, told him to look at him, sang another song, and went to the rocks transformed into people. He struck one and turned back. When he came, the rider asked the man if he had seen him. He said he had. He rode round several times and went off. The sore on the Crow’s back did not hurt any more. He did not know how the horseman changed into a buffalo and stood there. While the buffalo was walking away, he kept looking at him. The buffalo went to where a buffalo had died and stood there. While the Crow was looking, the buffalo vanished. The man looked and thought it was the ghost of the dead buffalo he had seen. (Lowie 1918:270-271)

Some buffalo myths were related to human relationships between a human and buffalo, underscoring the close relationship the Plains tribes had in their dependence upon the buffalo. In the following Crow myth, a man marries a buffalo cow:

> Old Man Coyote met one day a man carrying a bow and a quiver of arrows, roaming all over the world. Old Man Coyote said to him, “Come here, and I will show you

something you will like." He took the man to the buffalo cow, stuck fast in the mud, and Old Man Coyote told him to have connection with this buffalo, which the man did. Afterwards, Old Man Coyote took the man to another place where a cow elk was mired, and the man was told to do as he had done with the buffalo cow, which he did, and the Old Man Coyote laughed at him. In the course of several weeks the buffalo cow and elk cow each gave birth to a boy.

Shortly after his meeting with Old Man Coyote, the wandering man returned to his people. One day he was playing a game of ring and arrows. While playing, he was approached by a little boy with a short neck and curly hair, and who had on a buffalo calf robe. The little boy said to him, "Father, if you win anything, give me some." The man looked about him and said, "I will." Shortly afterward another little boy, with lighter hair and longer neck, approached and asked him the same question. When the man had finished playing he called the two boys said, "How is it you call me father?" Each of the boys said, "Don't you remember the time when our mothers were stuck in the mud?" The man said he did. He told each of the boys to go and bring his mother to him, which they did, but in the forms of women.

After looking carefully at each, the man did not care for the elk woman, but lived with the buffalo woman, who said: "I will live with you only under the condition that you do not call me harsh names. You may strike me." The man promised, and lived with her for some time, but one day he was vexed at something she did, and he broke his promise, and pronounced a forbidden word. She quickly transformed herself into a buffalo cow and her child turned into a buffalo calf.

The man tried to catch them. After many days of chasing them he came upon a big herd of buffalo, and as he was sitting on a hill looking at them, a little buffalo calf came silently up to him and said: "Father, my uncles are going to try you by placing all the calves of my age in a circle facing the center, and you are to be in the center, and you are to pick me out of the number. If you fail, my uncles are going to gore you to death; but I will give you a signal when you approach me by twitching my left ear. They also want you to find my mother by picking her out of a circle. I will go and lick some white clay and will act as though I were going to nurse, and will rub the white clay on her left shoulder, so that you may know her when you come to her."

The buffalo had a big dance, and then told the man if he were unable to point out his wife and child they would gore him to death. After forming the circles of cows and calves, the man picked out his wife and child, which angered the buffalo uncles of the child, and they started to gore him to death.

While the man was on his way trying to find his wife and child, he met Old Man Coyote, who instructed him to place a long thin piece of buffalo sinew and a breath feather of the eagle on the top of his head, that it might revolve when dancing.

> When the buffalo went to gore him the feather rose in the air and as his being was in the feather, there was no one in the center of the circle; they gored each other, breaking legs and shoulders; and they did this repeatedly, until at last they abandoned it, saying that his medicine was stronger than theirs, and they let him have his wife and child to take back to his camp. (Simms 1903:289-290).

In another myth, a different type of human relationship is enacted between humans and buffalo, that between parents and child. This is an extract from the Crow tale, "Old Man Coyote and the Infant who was Adopted by the Buffalo":

> Long time ago there lived a chief with his wife and a very beautiful daughter, whom all the young men of the tribe wanted to marry. But the chief would not give his consent.
>
> One day it became known that the daughter was to become a mother. Her parents decided to take her to a place where she could be confined unseen by any one. The mother inquired of the daughter who the father was, and the daughter said, "It is your husband, my father, who is the father of the child." Then the child (a boy) was born, they threw the body into a buffalo wallow. Shortly afterwards, seven buffalo bulls led by an old one, came up to the place to wallow. When the leader heard the baby, he stopped. One of the bulls said, "Why do you stop; we want to go to the north, and it is a long way." The leader replied, "There is a human being in that wallow and I am thinking whether to give him our power and raise him or pass on our way." One of the bulls, a rough one, said, "Let us raise him." The leader agreed, then backed away a short distance and ran up to the baby and tossed it in the air, and when it came down, it sat up. Another bull ran to the baby and tossed it in the air, and when it came down it was standing up. The third bull tossed the baby up, and it lighted on both feet and walked. The fourth tossed the baby up and it again came down landing on its feet and ran. "That is enough," said the leader, so they placed the baby on the neck of one, amidst the thickest of the hair, and covered the body with it and continued on their journey to the north. In course of time, the buffalo taught the boy considerable of the animal ways, such as hunting pastures, water, etc.
>
> Of his own accord, he made a bow and several arrows. The buffalo learned to love the boy devotedly and one day the seven bulls had a council, and the leader said, "Our boy has arrived at a marriageable age, and let us ask him his wishes as to a wife." They asked him, and he said, "I will marry one of my own people." So they prepared him for the journey home to his people, and instructed him in every way. They gave him a stuffed hawk and tied it to his scalp lock near the head and then gave him a long bow and wearing apparel. (Simms 1903:290-291)

Buffalo are so essential to the Crow that they appear in the Crow origin myth. In that myth, Old Man Coyote shows the people how to hunt and process the buffalo, cutting it up and explaining its parts to the first man and woman (Verbicky-Todd 1984:219, Simms 1903:281-282). Buffalo ceremonialism plays an important role in the Sun Dance as well, from a buffalo tongue feast held before the ceremony to the flesh sacrifices of the dancers, where a buffalo skull might be hung from incisions in the backs of the dancers (Verbicky-Todd 1984:231, Dorsey 1905:179, Hultkrantz 1973:16, McHugh 1972:113, Spier 1921:474). Buffalo ceremonialism is also practiced by the Crow in their Medicine Pipe ceremony. A buffalo skull was used in this ceremony where an initiate was adopted by a pipe owner (Verbicky-Todd 1984:233, Lowie 1924:342-344).

Many Plains societies were associated with buffalo. The Crow had a men's society called the Bull Society: "The members painted their faces and bodies with mud in imitation of wallowing buffalo. Two men wore buffalo head masks, and some of the more successful warriors wore buffalo tails from the backs of their belts stiffened with clay and made to stand erect (Verbicky-Todd 1984:237-238, Mails 1973:299-300). Albino buffalo were considered special and received a different treatment. The following excerpt from Lowie (1922b) describes how the Crow handled albino buffalo:

> Three-wolves said that the Crow sometimes encountered a yearling buffalo calf, white either on the back or heart or tail. The man who killed such a calf went home without touching it, gave a present to one of his father's clansmen, and told him he had slain a white calf. The father's clansman would go out, locate the calf, which invariably fell with its face towards the east, and skin it very carefully so as not to cut the hide, which was then turned over very slowly. The meat was not touched at all, for it was said, "If you eat of the meat, your hair will turn gray prematurely." The father's clansman took the hide to camp, singing a song in praise of his clansman's son and praying that this man might have good luck. Then he would take the hide to one of <u>his</u> father's clansmen, saying, "I have brought you this hide for you to offer it to the Sun." The old man would take the skin, tie it to a long pole, carry it through camp with a laudatory chant, and say, "I shall offer this to the Sun; I want everybody in camp to touch this hide." He went from the camp towards sunrise, planted the stick into the ground, and said, "Sun, I have given you a

> blanket." Then he prayed for coups or horses, or that his relatives should live to the next season without illness. He might say, "The people have done a great thing in giving you this, they wish for…" Usually only old people asked for gifts. Four offering songs without words were sung. This offering was made just before sunrise…
>
> One informant said that the killer of an albino buffalo rode home with the skin in front of him, singing praise songs, and presented the hide to the chief, who painted pictures of the sun and the rainbow on the back and tied a plume to the tail. At daybreak he sang a song, telling the Sun of the offering, attached it to a high pole, and placed it on a hill, where it was left to fall; no one would touch it thereafter.
>
> Sitting-elk said that only a medicineman was permitted to skin an albino buffalo. The skin was suspended from an ash or cottonwood pole. (426-427)

Standard Practices of Communal Buffalo Hunting on the Plains according to Oral Traditions

Like other Plains tribes, the Crow lived a nomadic lifestyle, with the buffalo regulating the movements of the tribe throughout the year (Verbicky-Todd 1984:4). Buffalo jumping, along with buffalo impounding and buffalo surrounds, is a form of communal buffalo hunting. Eleanor Verbicky-Todd defines communal buffalo hunting as follows: "The communal buffalo hunt involved a group of people, on either the band or tribal level, working together to secure a large number of buffalo simultaneously and to process the kill for consumption by the community" (1984:10).

Buffalo jumping is one of four forms of communal buffalo hunting practiced by Plains peoples; the other three are buffalo impounding, buffalo surrounds, and horseback hunting (Verbicky-Todd 1984:33). Buffalo jumping and impounding are considered to be the earliest forms of buffalo hunting (Verbicky-Todd 1984:33). While buffalo jumping is considered to be an efficient method of hunting buffalo, it was mostly abandoned in the historic period after the introduction of the horse and its associated greater mobility and flexibility in hunting practices

(Verbicky-Todd 1984:33). While the most conspicuous archaeological remnants of communal buffalo hunting are most often sets of long drive lines composed of sets of low stone cairns, there is no mention of the use of stone cairns in the historic record (Verbicky-Todd 1984:42). Rather, drive lines are described as "[…] lines of stakes or piles of buffalo chips, earth or brush, arranged at regular intervals in lines diverging from […] the edge of the precipice […]" (Verbicky-Todd 1984:41) by most historic writers.

Communal buffalo hunting on the Plains, whether jumping, impounding, surrounding, or hunting on horseback, involves several activities. This section discusses the activities common to Plains tribes that communally hunted buffalo: game charming, gathering the buffalo, and butchering.

Game Charming

Prior to engaging in a buffalo jumping event, the Crow charmed the buffalo into coming towards a jumping complex. They did this with songs and medicine rocks (Verbicky-Todd 1984:11, 22). Crow medicine rocks were shaped like part of an animal's body, usually the head (Verbicky-Todd 1984:22). Game charming was often done by individuals who had received the power through visions. Several Crow individuals had such power, such as Bear Crane's Brother and Big Ox, as related by anthropologist Robert Lowie:

> […] a brother of Bear-cranes, while watering horses, caught site of some buffalo hair and a slice of fat some four inches long on a rosebush on the side of the creek. He brought the hair and the fat home with him, wrapped them up, and tied them to the top of the backrest. When he slept that night, he dreamt of a man singing and shaking a rattle and a great many buffalo came to the singer. When the dreamer looked at the man, the latter said, "Make a rattle like this, putting a buffalo hoof on it, sing and shake the rattle, and buffalo will come to you. The fat you picked up was myself; I am buffalo. Take a buffalo hide, paint it, take this rattle, wrap it up with the hide, and hang it up." He went and carried out these directions.

> At that time the Indians were starving for lack of game. The visionary went and cleaned his lodge. Beside his bed he placed dirt, in which he marked the tracks of big buffalo and of calves. He greased his lips with the fat, also took out the rattle, smudged it with incense of sweetgrass, and began to bellow like a bull. The next time he put the rattle on the same place and bellowed like a cow. The third time he imitated little calves, and the fourth time old buffalo. When the sun had gone down, he gathered together all the men in his tent and asked, "Where do you want the buffalo? "On that big level place on the other side of the hill." He sang the song he had dreamt, shook his rattle and rolled it in the mud as though it were a buffalo wallowing.
>
> He bade all the men go home and go to bed that night. "Tomorrow morning the buffalo will be here." The next morning he heard the bulls bellowing on the other side of the hill. "Get up, the buffalo are here." They got up, saddled horses, mounted and went. The whole plain was covered with buffalo and still more were coming. They were tired and could not run fast. The last time Bear-crane's brother worked his medicine my informant was a little boy of about five.
>
> Big-ox is also credited with having had the power of luring game. Once the people could not find any game. Big-ox bade them get a buffalo skull and put its nose toward the camp. In the night they began to sing. In the morning they saw six head of buffalo and killed them. The following morning they again found several head. When they had had enough, Big-ox bade them turn the skull around, then they did not see any more buffalo. Another man painted buffalo-tracks around the camp, smoked incense and sang, "I want to get buffalo in." He went out and cried, "Young men, get up-hill; I think I have seen some buffalo." Early in the morning some young fellow got up and saw some buffalo going up-hill. He went home to tell the rest and they killed some buffalo. Every morning they repeated this until they had plenty of meat. (1922b:354-359)

Prior to a Crow communal buffalo hunt, a camp crier or "trumpeter" (Leonard 1959:143) would announce when the hunt was to take place, thereby indicating that certain restrictions on individual hunting were in effect until the time of the communal hunt (Verbicky-Todd 1984:27). If an individual were to ignore these proscriptions, the punishment was to be beaten, the offender's arms broken or his lodge cut to pieces (Ewers 1955:164, Larocque 1910:60, Verbicky-Todd 1984:31).

Gathering Buffalo

Plains Indians were very knowledgeable about the use of fire and its effect on both grassland and bison (Arthur 1975:22). Fire was used to control the movement of bison in communal hunts (Arthur 1975:23). Some have accused Plains Indians of carelessly firing the grasslands, but studies now show that these regular fires helped maintain the overall health of the grasslands (Arthur 1975:24). These fires were usually set in the fall or early spring (Arthur 1975:24). Burning grassland has the benefit of reducing the level of dead plant material on the ground. This mulch intercepts precipitation that might otherwise be absorbed into the ground and also retards the growth of spring grasses, thereby delaying the growth and spring fattening of buffalo (Arthur 1975:29-30).

In addition to a tradition of buffalo jumping, the Crow were known to have a tradition of buffalo impounding (Verbicky-Todd 1984:109, Lowie 1922a:211, McHugh 1972:62). Buffalo jumping had an advantage over buffalo impounding in that corrals were not necessary (Verbicky-Todd 1984:109). Verbicky-Todd defines a buffalo jump as a buffalo drive "[…] that employed a precipice high enough to kill or incapacitate most, if not all, of the buffalo driven over its edge" (1984:110). Buffalo jumps occurs in broken country that is dissected by the steep banks of creeks and rivers, often in the foothills of mountains (Verbicky-Todd 1984:110). In North America they are located only on the eastern side of the Continental Divide. According to contributions from the historic record, wind was a significant consideration in the placement and orientation of a buffalo jump (Verbicky-Todd 1984:111). Buffalo have keen senses of smell, therefore it was critical in jump construction to make sure that the scents of a camp or the remains of previous jumping events were masked or be downwind of the direction of the jump (Verbicky-Todd 1984:111). However, some archaeological sites provide puzzling evidence indicating that at times campsites at

successful jumps, such as the Glenrock Buffalo Jump in Wyoming (Frison and Reher 1970), were not placed with any reference to prevailing wind direction. Given the large number of remains found at the site, this apparently did not affect the success of the jump. However, it may be that Glenrock is an anomaly, as most jump sites in the foothills faced east or north, presumably with reference to the prevailing winds (Verbicky-Todd 1984:111, Forbis 1960:243, Malouf and Conner 1962:45).

Buffalo jumps were composed of two essential physical components: a precipice and a grazing area in which a herd was gathered before being driven off the precipice (Verbicky-Todd 1984:111). The Crow specifically would sometimes make use of a natural barrier, such as an escarpment to limit the movements of buffalo being driven towards a precipice (Verbicky-Todd 1984:111-112, Medicine Crow 1978:252). While the use of rock piles in drive line construction is conspicuously absent from the historic record, Medicine Crow mentions their use in Crow buffalo jumping systems (Verbicky-Todd 1984:112, Medicine Crow 1978:251, 252) and Wissler makes similar mention of their use by the Blackfoot (Verbicky-Todd 1984:112, Wissler 1910:34-36). According to Medicine Crow, the Crow also incorporated small piles of burning incense into their drive lines (Verbicky-Todd 1984:112, Medicine Crow 1978:250). The height of the piles used to form the drive lines of buffalo jumps was usually a few feet, with the piles closer to the precipice being taller (Verbicky-Todd 1984:112-113, Medicine Crow 1978:113). The drive lines generally formed a V-shape (Verbicky-Todd 1984:113). Medicine Crow discussed a specific type of buffalo jump used by the Crow which he referred to as a "combination kill," where a jump was composed of multiple sets of drivelines and jump off points, citing as specific examples the Emigrant kill site and several sites in the Grapevine Creek area (Verbicky-Todd 1984:114, Medicine Crow 1978:253). Usually, buffalo jumps occurred near streams or rivers, and groups utilizing the jumps

would establish camps near the base of the buffalo jumps (Verbicky-Todd 1984:114-115, Forbis 1960:67, Wissler 1910:36-37). While there were no rituals specific to buffalo jumping, Medicine Crow mentions one ritual particular to the Crow that was utilized prior to jumping buffalo: According to Medicine Crow, early on the day of the buffalo drive, the Medicine Man would stand at the ridge of the precipice, point a pair of bison hind quarters in the direction of the drive lanes, sing songs to the "Great Spirit" and present the buffalo runners with a pouch of incense. The runners would then embark up the drive lane toward the grazing area, burning incense along the lines as they went. (Verbicky-Todd 1984, Medicine Crow 1978:250)

The procedure of buffalo jumping, after the practice of pre-hunt rituals and ceremonies, would involve several runners meeting the herd to carefully drive them towards the jump. This practice was difficult and required great patience (Verbicky-Todd 1984:116). One of Medicine Crow's informants said that after the buffalo had been driven to a certain distance from the jump site, they formed a line behind the buffalo (Verbicky-Todd 1984:117, Medicine Crow 1978:250). As the buffalo were driven to the start of the drive lanes, a signal was made to the camp for members to muzzle their dogs and remain quiet (Verbicky-Todd 1984:118). According to Medicine Crow, the use of incense in the drive lanes meant that they did not need to be manned heavily. Rather, the rock lines served mainly as markers for the placement of the incense than as a physical barrier (Verbicky-Todd 1984, Medicine Crow 1978:252). As the herd came close to the jump-off, people would be stationed along the drive lines to shout and wave robes at the buffalo in order to frighten them into continuing forward (Verbicky-Todd 1984:119, Barrett 1921:24, Grinnell 1893:229, Medicine Crow 1978:252, Wissler 1910:37). In the historic period, horses were sometimes used by the Crow to drive the buffalo over precipices (Verbicky-Todd 1984:120, Leonard 1959:144). Not every buffalo drive was successful, and the buffalo often broke away

through the drive lines (Verbicky-Todd 1984:120). Sometimes an entire herd was killed on impact after being driven over a precipice. Those that were not killed outright were sufficiently injured to be killed easily by hunters. This meant that the disposal of buffalo was easier at buffalo jumps than at buffalo pounds (Verbicky-Todd 1984:120).

Information on Crow buffalo jumping traditions are provided by Zenas Leonard, a nineteenth century fur trader, and by the ethnographers Robert Lowie and Joe Medicine Crow. Leonard describes a Crow group in northern Wyoming, near to the Grapevine Creek area:

> When they are in a country suitable, these people will destroy the buffalo by driving a herd of some hundreds to the edge of a convenient rocky precipice, when they are forced headlong down the craggy descent. This is more dangerous than the other method [the surround], as the buffalo, unless the Indians are very numerous, will sometimes rush in a solid column through their ranks knocking down the horses and tramping the riders under their feet. (1959:144)

Lowie noted that the Crow preferred to jump buffalo in the fall (1922a:211). Medicine Crow was more detailed, describing five types of jumps used by the Crow: the classic, the intermediate, the natural, the combination kill, and the natural kill (Verbicky-Todd 1984:129-130). The first type, the Classic Jump, has the distinctive V-shaped driveline feature (Medicine Crow 1978:251). Medicine Crow's discussion of the use of incense in the drive lines is unique among ethnographic and historic accounts of buffalo jumping (Verbicky-Todd 1984:129). Medicine Crow's informant, Charles Ten Bears, describes the use of incense by the Crow as follows:

> The night before the drive and jump, a council would be held and the participants were selected, some to drive the herd from the rear and a few to haze near the jumpoff point. Sometimes dogs were used on the drive. A Medicine Man was also asked to officiate in the undertaking. Early in the morning, this Medicine Man would stand on the edge of the upper cliff, facing up the ridge. He would take a pair of bison hind quarters and, pointing the feet along the line of stones, would sing his songs and call upon the Great Spirit to make the operation a success. After this invocation, the Medicine Man would give the two head drivers a pouch of incense. As the two head drivers and their helpers headed up the ridge along the line of stones they would stop and burn incense on the ground, repeating the process four times. When the two groups reached the top, they formed a line and started down

> the ridge. All of the animals along the ridge would be chased downhill, including buffalo, deer, wapiti, bighorn sheep, and even small animals. The mysterious thing about this is that the animals would come to the line where the incense was burned and bolt back into the ridge area. Apparently, there was little or no deployment of hazers along the incense lines except near the cliff. Here the rock piles were higher, larger, and closer together to afford some protection for the hazers. (1978:250)

The Intermediate Jump combined one cairn line with a natural barrier, such as an escarpment. The drive line at 24BH0264 is a good example of this type of jump. The Natural Jump was a hidden cliff or jump that buffalo could be jumped off of without prior planning. The Combination Kill is what we now refer to as a buffalo jump complex, or a series of drive lines and jump-off points, any combination of which could be used depending on conditions on the day of the hunt. Finally, the Natural Kill type of jump was a natural hazard into which buffalo fell accidentally (Verbicky-Todd 1984:130). While buffalo jumping was less labor intensive than buffalo pounding, the use of a high precipice increased the danger of the operation (Verbicky-Todd 1984:132). Buffalo jumping was abandoned as a communal hunting method in the nineteenth century. The last recorded buffalo jump was made by the Blackfeet in approximately 1874 (Verbicky-Todd 1984:132, Ewers 1968:166-167). Leonard noted another method of communal buffalo hunting particular to the Crow that is a variation on pounding:

> They have another method of taking the buffalo, which is in this way: - If they know of a place at the base of some mountain that is surrounded on three sides with inaccessible precipices, and a level valley leading into it, they manage to drive the whole gang of buffalo into this neck and force them up to its termination, when they erect a strong fence across the valley, or outlet, and then butcher their prisoners at leisure. (1959:144)

Butchering Buffalo

According to the ethnographic literature, an initial butchery was done at the kill site, usually by the women and sometimes by men as well (Verbicky-Todd 1984:120). Generally, post-hunt activities included the division of meat among the people, meat processing, and feasting

(Verbicky-Todd 1984:121). Ethnographic accounts of butchering note that a man and a woman could butcher a buffalo together in approximately one hour (Verbicky-Todd 1984:169, Ewers 1955:160). The following body parts of a buffalo were known to have been consumed raw: the liver, kidneys, tongue, eyes, testicles, belly fat, parts of the stomach, gristle from the snout, marrow from the leg bones, the brains, the tissue from the uterine sac of unborn calves, and the nipples of cows (Verbicky-Todd 1984:176, Denig 1930:531, 581, Ewers 1958:73, Grinnell 1893:205, McHugh 1972:85, Mandelbaum 1979:58). Methods of preparing buffalo meat for Plains groups generally included roasting, boiling, stewing, and smoking (Verbicky-Todd 1984:177, McHugh 1972:91).

Conclusion

In this chapter, I have demonstrated how the relationship between the Crow and the buffalo spans a spectrum from the sacred to the mundane, often interweaving both. Additionally, I have discussed the practice of communal buffalo hunting during the Historic period as a way of shedding light on what are the most important aspects of the human practice of this activity. Now, I will conclude the chapter by discussing Crow oral traditions as they relate to Grapevine Creek.

Crow oral traditions combined with interviews of tribal historians (McCleary 2010, 2012; Medicine Crow 1962, 1978, 1992) provided an indigenous perspective on the Grapevine Creek landscape. Because the Grapevine Creek drainage basin was an important landscape for communal hunting and resources, it features prominently in Crow oral traditions that recount the people, flora, and fauna in the region. The spoken histories provide ethnographic accounts of bison hunting and stories relating the origins of the dramatic landscape. Spoken histories often use dramatic or culturally important landscape features to help narrators remember specific people and significant events (Echo-Hawk 2000; Oetelaar 2006), and the Grapevine Creek landscape, people, and events

are referenced in a number of oral traditions, many of which are documented within this chapter (e.g. Medicine Crow 1962, 1978, 1992).

One story describes how the red color in the cliffs of the Chugwater Formation above Grapevine Creek is from the blood of a mythical tyrant named Red Woman. At the conclusion of the narrative, she was camped by the creek gathering food when she was approached by the Divine Twins, Thrown Into The Spring and Thrown Behind The Tipi Curtain. She knew they had come to avenge the murder of their mother. She tried to pacify them by offering them boiled buffalo ribs, but they ignored her pleas. Thrown Behind The Tipi Curtain then shot her with an arrow and as she fled, Thrown Into The Spring slashed at her with a knife. Her blood spilled throughout the drainage staining the cliffs red (McCleary 2012:64; Old Coyote 1995:35).

In clearly historical terms, Crow oral tradition relates that the fifth principal leader or head chief, Running Coyote, received instructions in a dream on how to operate a buffalo jump (Medicine Crow 1978). This undoubtedly meant he was given some type of spiritual power or medicine which he used to cause the bison to go over the cliff (Curtis 1976: 45). In fact, the Crow believe that the organizers of buffalo jumps, commonly called "game charmers" in the literature, often received a form of spiritual assistance. Some were so powerful that any animal that came into the drivelines was forced to go all the way through, even birds flying in the sky (Taylor 1962:41). Minnie Williams, a Crow woman who had participated in buffalo jumps as a child, recalled, "One person lay behind each pile of rocks and sprang up waving a blanket as the stampeding herd came abreast. The tribe was not overly concerned about being trampled because the medicine man gave his protection to the tribe before the run began" (Conner 1960:1).

These and similar oral traditions foster a Crow group identity firmly rooted in the Grapevine Creek landscape. This in turn serves as a form of institutional memory for the Crow

and creates a collective feeling of permanence in the region (Zedeño et al. 2014). The buffalo jumps and surrounds were important to the Crow way of life in the past, and their tangible presence on the landscape of Grapevine Creek offers modern Crows and researchers an opportunity to share in that past. In the collective memory of Crow people today the creation and use of the GVC is tied to mega-narratives from the distant past.

Prior to the introduction of the horse, bison hunting methods varied through time and space to include arroyo traps, various types of natural and built enclosures or surrounds, ambush hunting, and buffalo jumps (Forbis 1978; Kornfeld, et al. 2010; Reeves 1978; Wheat 1978). The buffalo jump is a unique type of bison hunting that was most common on the Northwestern Plains, and is characterized as a location on the landscape where bison were stampeded over a cliff or steep slope (Medicine Crow 1978; Verbicky-Todd 1984). According to Crow oral traditions, successful jumps required that cliff exposures remain hidden from the bison herd by using natural landscape features or abrupt driveline turns to trick the herd over a precipice (Medicine Crow 1962, 1978). This required tribal leaders to carefully orchestrate the placement of drivelines, habitation sites and people in order to have the location of the *coup de grâce* remain hidden from the herd (Carlson and Bement 2013; Zedeño et al. 2014; Kornfeld et al. 2010). Like at the GVC, prearranged cairn or brush lines, fences, or walls took advantage of the natural topography to direct bison herds to a targeted location where people could trap the animals or drive them over a steep drop.

The close proximity of 24BH262, 24BH264, and 24BH662 suggests that this GVC hunting strategy is an example of a buffalo-jumping complex. Jump complexes are often extensive archaeological landscapes that stretch beyond the jump itself, and include clusters of associated sites, such as drive lines in the grasslands above the cliffs, a meat and hide processing area, and campsites nearby (Arthur 1966; Verbicky-Todd 1984). Archaeological research on the Northwest

Plains provides evidence of intensified use of jumping complexes around 2000 years ago (Brink and Dawe 2003; Kornfeld, et al. 2010). Similar to what we found at the GVC jump complex, hunting strategies became more complex and elaborate during the Middle and Late Prehistoric period when large communal hunts were organized using surround traps or multiple drivelines leading to multiple cliff exposures (Butler 1978; Zedeño, et al. 2014).

Driveline preparation, hunting, and processing tasks required the participation of large numbers of people, and by the Late Prehistoric period (ca. A.D. 250-1700) archaeological evidence indicates that communal bison hunting was an important fall event (Frison 1978; Oetelaar 2014). Crow tribal historian Charles Ten-Bear reported that the tribe would move to bison hunting grounds to conduct communal hunts in the fall (Medicine Crow 1978). Preparations for winter were important to Plains groups who relied on bison meat and the fall season provided advantages which other seasons lacked (Carlson and Bement 2013; Frison 1978; Reher 1978). Bison hides and meat are usually in prime condition during the fall and bison herds are more predictable during this period (Frison 1970a, 1970b). For instance, during the spring calving season herds are less likely to be moved in any direction when cows become separated from their calves (Frison 2004).

The Crow also hunted bison during the winter season when environmental manipulation was more difficult. One spoken history recounts the 200-year-old winter bison hunting techniques of Chief One Heart, who would organize fast runners to chase bison onto ice at watering holes where they were safely and effectively dispatched (Medicine Crow 1978). Medicine Crow (1978:250) related another oral history of winter hunts that drove bison into the narrow, snowy arroyos in order to trap bison. The 24BH662 driveline leads to both a five-meter precipice and an arroyo created by an ephemeral drainage. If bison chose to follow a path to the arroyo, the site may be an example of arroyo winter hunting, although it would have been effective during other seasons

as well. The arroyo leads to the Grapevine Creek 500 meters downstream where bison surrounds or traps would be effective in the confined space at the end of the arroyo.

The coordination of bison drives, driveline placement, and tribal participants had to be carefully organized in order for communal hunts to be successful (Frison 1978; Oetelaar 2014). In many cases, this included the arrangement, distribution, and manipulation of habitation sites, processing centers, and the local environments around targeted jumps (Verbicky-Todd 1984). At GVC, organized bison drives took advantage of the local topography. Bison drives were headed either north along topography sloping towards Grapevine Creek or east along benches above Grapevine Creek towards cliffs on the northwestern bank of the creek. Different sets of drivelines are positioned at various locations along the grasslands above jumps. Although each driveline was probably not used during every bison drive, their scattered placement along ridges suggests that some bison might have split from the herd at predictable places along the drive. If so, hunters might have been placed along the drive at these locales in order to harvest part of the herd while the remaining herd continued further north or east. It is also possible that different GVC drivelines were constructed by different groups of Plains hunters or used only when environmental conditions warranted. Regardless, the strategically placed drivelines were positioned to exploit the local topography and the orientation of these drives towards the north or east was organized to take advantage of the prevailing westerly wind direction. This configuration would have left hunters, separate from the runners and/or dogs who were driving the herd, positioned at kill locations downwind from the herd and minimize chances for a failed hunt due to bison catching the scent of participating hunters.

Crow hunters used the fact that bison have an excellent sense of smell to their advantage in another way. Joseph Medicine Crow (1962, 1978) recounted a story told by Ten-Bear of a

medicine man who used incense along drivelines to steer straying members of the herd away from the drivelines and back into the center of the drive. While it is often assumed that hunters were placed along most drivelines in order to startle individual herd members back into the center of the drive like the oral history recounted by Minnie Williams, Ten-Bear's oral history suggests that hunters were not always necessary as sentries. The burnt stratigraphy we exposed in Unit 15-01 might be related to attempts to minimize odors created by successful hunts. Butchered animals would have created foul odors that burning would diminish, making the area easier to bear for people processing meat and hides while also preparing the local environment for successive drives by reducing strong smells that might repel bison (Arthur 1962; Brown 1932). Natural fires cannot be ruled out, but another anthropogenic landscape modification may explain the burnt stratigraphy at 24BH264. Forbis (1978) suggests that Native Americans manipulated environments by using prescribed fires to increase the growth of nutritious grass shoots (Zedeño et al. 2014). After fires, the young grass shoots may draw bison herds to the area.

The use of Crow oral traditions to aide in interpreting the archaeology of Grapevine Creek provides a rich and vital understanding of the events which occurred at the buffalo jumping complex. These traditions bring the landscape alive. The archaeology itself ties these traditions to a specific geographic locality and provides (literally) a tangible aspect to the history of the tribe. In this sense, the Grapevine Creek Buffalo Jumping Complex lies at the intersection of ethnography and archaeology, of history and science.

7. Conclusion

As I have discussed in the preceding chapters, Grapevine Creek represents an intersection of cultures, Plains mammals, and geography. Grapevine Creek is an intersection of landscapes: the Plains archaeological landscape (over 50 archaeological sites of every type known on the Plains are represented within the boundaries of the drainage), the Crow cultural landscape, and the Plains Late Prehistoric buffalo jumping landscape. The Grapevine Creek drainage is located at the head of Bighorn Canyon. Grapevine Creek is the first tributary to the Big Horn River north of Bighorn Canyon, entering into the river into the modern Yellowtail Dam After Bay across from the town of Fort Smith. This small fishing town was named after the fort constructed to protect the crossing of the historic Bozeman trail, in use during the late 1860s. The westward-headed Bozeman trail crossed the south-north flowing Bighorn River at Fort Smith and continued into the Grapevine Creek drainage before following the natural topography of a large Chugwater formation uplift and veering north towards Pryor Creek before entering the Yellowstone River valley. Fort Smith and Grapevine Creek represent the first point on the Bighorn River for seventy or so miles that allows for a crossing. This made the crossing significant for both people and for herd animals such as buffalo. Bighorn Canyon cuts through two mountain ranges, passing from the Bighorn Basin to the south into the Bighorn River Valley to the north. With the Pryor mountain range to the west of the canyon's steep walls and the Bighorn Mountains to the east, only a narrow passage allowed for north-south travel along the western rim of the canyon. This Prehistoric trail, marked for tens of miles by over 500 stone cairns, is known today as the Bad Pass Trail. The northern terminus of this trail is currently unknown, but if its route is projected only slightly to the north, it arrives right at the Grapevine Creek drainage and its easily accessible east-west route. Thus, Grapevine Creek is unique, is special, because its geography and geology have made it so. Its proximity to Bighorn

Canyon has made it so. Grapevine Creek, therefore, represents a geographic crossroads, an intersection of east-west and north-south routes.

The Grapevine Creek drainage may be considered an intersection in many different senses. Just as two historic trails, the Bozeman trail and the Bad Pass trail, meet within the boundaries of the drainage, so too do Crow oral history and the archaeological record meet at Grapevine Creek. As I have discussed in detail, there is a suite of Crow oral traditions relating to a number of aspects of Grapevine Creek, from the suitability of the area for hunting buffalo to the color of the soils in the drainage, in particular the prominent Chugwater uplift forming the northeastern boundary of the drainage. The substance of these oral traditions has a synchronicity in the archaeological record, which indicates that while people have made use of the drainage since Paleoindian times, there is also a tradition of buffalo jumping, manifest in what I termed a buffalo jumping complex, that has been absolutely dated to a time period in which the Crow were known to have occupied the area. Thus, the Grapevine Creek drainage is significant in that it manifests Crow cultural identity in the archaeological record. Beyond just the Crow, the Blackfeet and the Shoshone are represented in the Grapevine Creek archaeological record as well. The term buffalo jumping complex is here used to signify a buffalo jumping landscape, inclusive of all the physical remains of the act of communal buffalo hunting involving driving a herd over a precipice. This includes but is not limited to stone drive lines along the tops of landforms, buffalo bone beds at the bases of precipices (representing primary butchery areas), associated processing areas, campsites, and stone cairns in geographic proximity that may be associated with the driving of buffalo but are not part of the drive line system. At Grapevine Creek, the portions of the buffalo jump complex that have been identified to date include: several drive line sets, two primary bone beds, a possible secondary processing area, lookout cairns, and domestic campsites.

Peripheral to the buffalo jumping complex at Grapevine Creek but still significant to an understanding of Grapevine Creek as an intersection in the Prehistoric Plains landscape are several fortification sites (including the Grapevine Creek Battle Site, the location of a known historic battle between the Crow and the Blackfeet), a rock art site, surface lithic quarry sites, rock shelters, and burials. Thus, while the Grapevine Creek buffalo jump complex is significant in its own right as an excellent example of Late Prehistoric Plains buffalo jumping culture and as an example of Crow cultural identity manifested in the archaeological record, it also contributes to the overall Grapevine Creek archaeological landscape. This Grapevine Creek archaeological landscape, given the presence of such a wide variety of archaeological site types within the boundaries of the drainage, may be viewed as a microcosm of Plains archaeology in that this large variety of sites occurs together within a relatively constrained geographic area.

The Crow cultural landscape may be said to be centralized around two notions pertaining to the geographic meaning of what it is to be Crow. The first notion is sacred tobacco. The cultivation of sacred tobacco is culturally specific to the Crow and their tobacco society. The very identity of the Crow people may be said to be drawn from their relationship to this plant, as the Biiluge only became the Apsalookee after their journey to discover the growing place of this sacred plant, what we know today as Cloud Peak, the tallest mountain in the Big Horn Range of Wyoming. The second notion of the Crow cultural landscape involves an event from the more recent past, pertaining to a statement made by Chief Sits in the Middle of the Land at the 1851 Fort Laramie Treaty proceedings, where he stated that Crow territory was like the four base poles of a Crow-style tepee, with the four bases falling in the Wind River Range, the headwaters of the Missouri River, the junction of the Judith River and the Missouri River, and the Black Hills (Medicine Crow 1992). These two pieces of specific geographic information that also have strong ties to Crow

cultural identity are the basis of the Crow cultural landscape, of which Grapevine Creek forms just a part.

The Grapevine Creek drainage falls within the boundaries of the present-day Crow Reservation, but this legal boundary is a fairly modern invention that bears small resemblance to the traditional Crow homeland (as described above by Chief Sits in the Middle of the Land). Today's reservation boundaries roughly correspond to the center of the Crow traditional homeland and as such, Grapevine Creek lies directly in the center of the heart of Crow country. Thus, for topographical, archaeological, and cultural reasons, Grapevine Creek may be considered a junction/crossroads/nexus. By its very nature of being such an intersection in three different realms of consideration, Grapevine Creek may also be considered to be a junction of geography, archaeology, and the Crow cultural landscape. As such, the area lends itself to a more integrative, multidisciplinary approach to its study.

My dissertation concerns fieldwork undertaken over the course of three field seasons (2014-2016). While the nature of this fieldwork was designed to maximize exploration of the multiple significant landscapes intersecting at the Grapevine Creek drainage, it was also couched in a practical consideration of conducting a National Register of Historic Places (NRHP) district nomination for the Grapevine Creek area, pursuant to the Crow Tribe's interest in raising awareness of the cultural significance of the region and providing protection for the area at the same time. When I agreed to assist the tribe with achieving these goals, a secondary objective was added on, namely, providing technical training for cultural monitors employed by the Crow THPO. For that reason, a rotating crew of over twenty tribal monitors assisted with the fieldwork for the project. As I have discussed in the preceding chapters, the 2014 field season focused on determining the relevancy of a comprehensive cultural survey of the Grapevine Creek drainage

conducted in 1972 by Kent Good and Larry Loendorf. During this time our field crew also conducted NRHP evaluations for several previously recorded sites on the western side of the drainage. In 2015, fieldwork was refocused on the eastern portion of the drainage in an attempt to provide an NRHP evaluation for the previously recorded sites comprising the Grapevine Creek buffalo jump complex. The 2016 field season was funded by a National Park Service Tribal Heritage grant that involved the training of six tribal member students in a formal field school setting.

The bulk of my dissertation is centered on the fieldwork associated with evaluating the buffalo jump complex. While the primary aim and practical focus of this fieldwork was the collection of data to support an NRHP nomination, my work was also driven by several questions. As no previous work in the area turned up buffalo remains or any conclusive evidence indicating that the stone drive lines were used for buffalo jumping, can we confirm the identity of these archaeological sites as a buffalo jump complex? What was the role of Grapevine Creek in Crow society, both in the past and in the present? Why is Grapevine Creek singled out among so many tributaries to the Big Horn River with its own name, Bacheeishdiio? Why does this name refer to successful hunting rather than any other notable features about the landscape (for example, Red Woman's Blood or the wild grapes and chokecherries which grow profusely along the banks of the creek)? Why is Grapevine Creek the subject of such a diverse set of Crow oral traditions?

Assuming that that the sites at Grapevine Creek do represent a buffalo jump complex and that Grapevine Creek is noted for successful hunting, then it follows that one should be able to locate bison bone beds in the colluvial slopes below the previously identified drivelines in Grapevine Creek. This was the great mystery of Grapevine Creek: fifty years of archaeological study had not noted bison bone below the drive lines, and for this reason I questioned the

identification of the drive lines as buffalo jumps on the basis of archaeological evidence alone. If one incorporated the set of Crow oral traditions, which clearly identified the area as a buffalo jumping complex, along with the archaeological evidence of several sets of drivelines (representing one possible component of a buffalo jump complex), then the identity of the archaeological sites would seem clear. However, in the interest of due diligence, I tested my hypotheses with additional fieldwork to locate bone beds in the Grapevine Creek drainage. My research prior to going into the field, the fieldwork itself, and the interpretations based on the results of this research and original fieldwork reflect this multidisciplinary approach to the study of Grapevine Creek. I incorporate many tenets of indigenous archaeology into my practice over the course of my dissertation research.

Epilogue: Post-Grapevine Creek

December 19, 2017 - As noted in the main body of this work, I began dreaming about doing research on the Crow Reservation (with the additional goal of that research being ultimately practical and useful to the Crow Tribe itself) in the summer of 2009, shortly after falling in love with the rugged landscape of Bighorn Canyon and being accepted as a graduate student at Indiana University. At that time, Dr. Brondizio and Dr. Hunt (the department chair and director of graduate studies) gave me a very neatly laid out five-year plan to complete my research, write my dissertation, and defend it in front of a committee by May 2014. Doing the math, something went wrong somewhere.

Or did it? I was unexpectedly offered a chance to fulfill my grandest dreams of being useful to the Tribe in January 2014 when I received a call from Dr. Timothy McCleary, who had been authorized to extend an offer of employment to me from Dr. Emerson Bull Chief (then just Emerson), the Crow Tribal Historic Preservation Officer (THPO). They were looking for someone who could operate GPS units and work with ArcGIS to begin a spatial component of the THPO program (which, in a strange coincidence, was already written into my dissertation proposal as one goal of my research). Again, as I have already noted in the main body of this text, I had originally proposed my dissertation with the intention of working with a man by the name of Burdeck Two Leggins, who had been the THPO under the prior tribal administration. Nonetheless I accepted the opportunity on a temporary basis, with the idea that I would set the systems up, train a tribal member to do the job, and consult from Indiana while I hammered out my dissertation from afar.

It didn't work out that way. The equipment I was supposed to use to set everything up didn't arrive until I was almost done with my short time at the tribe. The tribal member I was supposed to train, Dustin Little Owl, got a job with a local mine. And the funding I anticipated

receiving from the university to pay my rent while I "hammered out my dissertation from afar" never materialized. What did happen was that I formed a strong, respectful friendship with Dr. Bull Chief and the rest of my coworkers at the THPO. One day, when I showed up looking distressed, Dr. Bull Chief asked me what was going on. When I explained the situation he said, "That's easy, just don't leave." And while I did return to Indiana to fulfill a teaching commitment, I came back to Montana as quickly as possible in January of 2015 and haven't left since.

I don't know that there are enough words to describe the impact living in my study area, as a member of my study community, as one of only a few non-Crow employees of the Tribe, has had on my research. I'm sure every anthropologist who has engaged in long-term field studies understands my meaning, however.

I completed the first draft of this dissertation in November 2016. As a body of work I feel it is complete. However, given the events which took place in my final year working on this project, it felt wrong not to provide some context about where things stand now.

I no longer work for the Crow Tribe. I received a layoff letter in early December 2016 from a member of the Chairman's office I didn't know, about a week after the inauguration of a new Tribal Chairman. I was not alone. The entire Cultural Department and THPO office were unilaterally laid off (along with all the other departments of the Tribe's executive branch) following the introduction of a newly elected tribal administration. In the case of the THPO, the position currently is vacant, there are no employees of the office, and the two rooms I worked in for two and a half years lay empty. The new chair of the Cultural Committee, William Big Day, Sr. works alone and unsupported in his department. In the last year, the tribe declared bankruptcy and the federal THPO grant bestowed to the Tribe has been revoked due to a failure to submit necessary reports. I have spoken to Mr. Big Day, either in person or on the phone a handful of

times, offering my services free of charge to help him navigate the THPO records in hard copy or on the computers. The conversations began as mildly confrontational and have since degraded. He has not taken me up on the offer.

During editing of the final draft of my dissertation, it was particularly difficult to work through the fourth chapter, "Applying the Methodology of Indigenous Research on the Crow Reservation." I had to take a hard look at where I did (and did not) live up to my ethical principles. I also had to explore the timeliness of it all – a year ago I was helping, assisting, creating something in concert with the Crow THPO. This year, there is no Crow THPO and I'm just one more white researcher taking something from the Tribe.

One question I brought up in that chapter that I think about often is: "Who owns this research?" My first answer, almost automatic: the Tribe. Like so many things in the United States, archaeology is the property of the land owner, and when working at Grapevine Creek we were very careful to work on tribally owned parcels. The artifacts and faunal remains collected at Grapevine Creek sit on the shelves next to my former desk in the empty THPO office. All the original paperwork associated with the project are in file boxes at the Tribal Administration building.

But there is a nagging, selfish part of my brain that says "What about me?" What about the two and a half years I spent pouring my heart, time, and intellectual efforts into helping Dr. Bull Chief and the rest of the THPO employees into building a professional heritage management program? What about the eight years I've spend working towards a graduate degree? Do those belong to the Tribe? How does one give that back?

Today, my answer is: you don't give it back. You take it with you when you go. I will never forget my time with the Tribe, nor my friends and colleagues at the THPO and in the

community. I still live in Hardin, MT with the family I found there. I don't have any intention of leaving the life I have built in Montana, and I still speak with Dr. Bull Chief, Dr. McCleary, and even Burdick Two Leggins and his sons from time to time. If you've read this far, you know that I made the decision to submit this research as my own to my dissertation committee at Indiana University. In some imperfect way, this research belongs to me, too. I have submitted a copy of this document to Mr. Big Day, the only current member of the Cultural Committee. Unlike Sonny Joe Reid and the rest of the cultural committee members in 2013, I am not asking for his approval. If I own this research, at least in part, then the Tribe does, too, and they now have access to it. The unstated decision of the Tribe at this time is that I am not welcome to work with them or on the reservation, and I respect that decision. I currently work with the U.S. Forest Service in Wyoming. However, I can't help anticipating that a change may someday come in the goals of the tribal administration, and I hope that, should a change come, I am once again in a position to be of service and that this body of work might be of use to the Tribe in some way.

8. Works Cited

Adams, Bradley, and Pam Crabtree
2012 *Comparative Osteology: A Laboratory and Field Guide of Common North American Animals.* Academic Press, Waltham, Massachusetts.

Agenbroad, Larry D.
1978 *The Hudson-Meng Site: An Alberta Bison Kill in the Nebraska High Plains*. The Caxton Printers, Caldwell, Idaho.

2016 The Hudson-Meng Paleoindian Bison Kill: Twenty Years Later and a Post-2005 Update. In *Pisskan: Interpreting First Peoples Bison Kills at Heritage Parks*, edited by Leslie B. Davis and John W. Fisher Jr., pp. 169-191. The University of Utah Press, Salt Lake City.

Allen, Joel A.
1876 The American Bisons, Living and Extinct. *Memoirs of the Geological Survey of Kentucky*, N. S. Shaler, Director, Vol. I, Pt. II, Welch, Bigelo & Co., University Press, Cambridge.

Arthur, George W.
1962 The Emigrant Buffalo Drives of Paradise Valley, Montana. In *Symposium on Buffalo Jumps*, edited by C. I. Malouf and S. W. Conner, pp. 16-27. Montana Archaeological Society, Billings, MT.

1966 *Archaeological Survey of the Upper Yellowstone River Drainage, Montana*. Department of Agricultural Economics and Rural Sociology, Montana Agricultural Experiment Station.

1975 *An Introduction to the Ecology of Early Historic Communal Bison Hunting Among the Northern Plains Indians*. Archaeological Survey of Canada Paper No. 37. National Museums of Canada, Ottawa.

Barrett, S. A.
1921 *Collecting Among the Blackfoot Indians*. Public Museum of the City of Milwaukee, Yearbook.

Brink, Jack
2016 Stepping Back from the Edge of Head-Smashed-In Buffalo Jump. In *Pisskan: Interpreting First Peoples Bison Kills at Heritage Parks*, edited by Leslie B. Davis and John W. Fisher Jr., pp. 13-38. The University of Utah Press, Salt Lake City.

Brink, Jack W. and Bob Dawe
2003 Hot Rocks as Scarce Resources: the Use, Re-use and Abandonment of Heating Stones at Head-Smashed-In Buffalo Jump. *Plains Anthropologist* 48 (186):85-104.

Brink, Jack, Milt Wright, Bob Dawe, and Doug Glaum

1985 *Final Report of the 1983 Season at Head-Smashed-In Buffalo Jump, Alberta*. Archaeological Survey of Alberta Manuscript Series No. 1. Alberta Culture Historical Resources Division, Edmonton.

Brown, Barnum
1932 The Buffalo Drive. *Natural History* 32:75-82.

Brumley, John H. and Emmett A. Stallcop
2016 Wahkpa Chu'gn: Smaller-scale On-site Interpretation of a Northwestern Plains Bison Kill. In *Pisskan: Interpreting First Peoples Bison Kills at Heritage Parks*, edited by Leslie B. Davis and John W. Fisher Jr., pp. 41-55. The University of Utah Press, Salt Lake City.

Butler, B. Robert
1978 Bison Hunting in the Desert West Before 1800: the Paleo-ecological Potential and the Archaeological Reality. *Plains Anthropologist* 23 (82):106-112.

Carlson, Kristen and Leland Bement
2013 Organization of Bison Hunting at the Pleistocene/Holocene Transition on the Plains of North America. Quaternary International 297:93-99.

Catlin, George
1965 *Letters and Notes on the Manners, Customs, and Condition of the North American Indians*. 2 Vols., Reprint of the 1841 edition, Ross and Haines, Inc., Minneapolis.

Conner, Stuart W.
1964 *The Grapevine Creek Buffalo Jumps*. Billings, MT.

1969 *Grapevine Creek Buffalo Jumps, Big Horn County, Montana*. Billings, MT.

Curtis, Edward S.
1976 *The Apsaroke (Crow) and Hidatsa*. The North American Indian, Volume 4. Johnson Reprint Corporation. New York.

Davis, Leslie B.
1978 The 20th-Century Commercial Mining of Northern Plains Bison Kills. *Plains Anthropologist* 23(82):254-286.

1978 Pryor Cut Across Report

Davis, Leslie B. and Joan L. Brownell
2016 Madison Buffalo Jump: A Retrospective. In *Pisskan: Interpreting First Peoples Bison Kills at Heritage Parks*, edited by Leslie B. Davis and John W. Fisher Jr., pp. 59-84. The University of Utah Press, Salt Lake City.

Davis, Leslie B., and Charles D. Zeier

1978 Multi-phase Late Period Bison Procurement at the Antonsen Site, Southwestern Montana. *Plains Anthropologist* 23:222-235.

Denig, Edwin Thompson
1930 *Indian Tribes of the Upper Missouri*, edited by J. N. B. Hewitt. Forty-sixth Annual Report of the Bureau of American Ethnology: 375-625.

1961 *Five Indian Tribes of the Upper Missouri*. John C. Ewers (ed.), University of Oklahoma Press, Norman.

DeSmet, Pierre-Jean
1905 *Life, Letters and Travels of Father Pierre-Jean DeSmet, S.J. 1801-1873*. Four Volumes, Francis P. Harper, New York City.

Dibble, David S. and Dessamae Lorrain
1968 Bonfire Shelter: A Stratified Bison Kill Site, Val Verde County, Texas. *Miscellaneous Papers*, No. 1, Texas Memorial Museum, University of Texas, Austin.

Dorsey, George A.
1905 *The Cheyenne*. Field Columbian Museum Publications 99 and 103, Anthropological Series 9(1-2). Reprinted by Rio Grande Press, Glorieta, NM, 1971.

Driver, Jonathan C.
1992 Identification, Classification and Zooarchaeology. *Circaea* 9:35-47.

Dyck, Ian G.
1977 *The Harder Site: A Middle Period Bison Hunter's Campsite in the Northern Great Plains*. Archaeological Survey of Canada Paper No. 67. National Museums of Canada, Ottawa.

Echo-Hawk, Roger C.
2000 Ancient History in the New World: Integrating Oral Traditions and the Archaeological Record in Deep Time. *American Antiquity* 65:267-290.

Ewers, John C.
1945 *Blackfeet Crafts*. U.S. Department of the Interior, Bureau of Indian Affairs, Dept. of Education.

1955 *The Horse in Blackfoot Indian Culture*. Bureau of American Ethnology Bulletin 159. Smithsonian Institution, Washington, D.C.

1958 *The Blackfeet: Raiders of the Northwestern Plains*. University of Oklahoma Press, Norman.

1968 *Indian Life on the Upper Missouri*. University of Oklahoma Press, Norman.

Fisher Jr., John W. and Tom E. Roll

2016 First Peoples Buffalo Jump Archaeology: Research Results and Public Interpretation. In *Pisskan: Interpreting First Peoples Bison Kills at Heritage Parks*, edited by Leslie B. Davis and John W. Fisher Jr., pp. 87-108. The University of Utah Press, Salt Lake City.

Flannery, Regina
1953 *The Gros Ventres of Montana: Part I, Social Life*. The Catholic University of America Anthropological Series 15.

Forbis, Richard G.
1960 *The Old Woman's Buffalo Jump, Alberta*. National Museum of Canada, Bulletin No. 180, Contributions to Anthropology, 1960, Part I, pp. 57-123. Canada Department of Northern Affairs and National Resources, Ottawa.

1968 Fletcher: A Paleo-Indian Site in Alberta. *American Antiquity* 33(1):1-10.

1978 Some Facets of Communal Hunting. *Plains Anthropologist* 23(82):3-8.

Frison, George C.
1967a *Archaeological Evidence of the Crow Indians in Northern Wyoming: A Study of a Late Prehistoric Period Buffalo Economy*. Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.

1967b *The Piney Creek Sites, Wyoming*. University of Wyoming Publications Vol. 33, No. 1. University of Wyoming, Laramie.

1970a The Glenrock Buffalo Jump, 48CO304: Late Prehistoric Period Buffalo Procurement and Butchering. *Plains Anthropologist* 15(50):1-45.

1970b The Kobold Site, 24BH406: a Post-althithermal Record of Buffalo-jumping for the Northwestern Plains. *Plains Anthropologist* 15(47):1-35.

1973 *The Wardell Buffalo Trap 48 SU 301: Communal Procurement in the Upper Green River Basin, Wyoming*. Anthropological Papers of the Museum of Anthropology, University of Michigan No. 48. The University of Michigan, Ann Arbor.

2004 *Survival by Hunting: Prehistoric Human Predators and Animal Prey*. University of California Press, Berkeley.

Frison, George C. and Charles A. Reher
1970 The Glenrock Buffalo Jump, 48CO304: Late Prehistoric Period Buffalo Procurement and Butchering. *Plains Anthropologist* 15(50):1-45.

Gifford, Diane P., and Diana C. Crader
1977 A Computer Coding System for Archaeological Faunal Remains. *American Antiquity* 42:225-238.

Gilbert, B. Miles
1990 *Mammalian Osteology*. Missouri Archaeology Society, Columbia.

Good, Kent N. and Lawrence L. Loendorf
1974 *The Results of the Archaeological Survey in the Grapevine Creek Area, Bighorn Canyon National Recreation Area, 1972 Field Season*. University of North Dakota, Grand Forks, ND. Submitted to U.S. Department of the Interior, National Park Service, Contract No. 4970P20444. Copies available from Montana State Historic Preservation Office, Helena MT.

Grayson, Donald K.
1979 On the Quantification of Vertebrate Archaeofaunas. *Advances in Archaeological Method and Theory* 2:199-237.

Grinnell, George Bird
1893 *Blackfoot Lodge Tales*. David Nutt, London.

Henry, Alexander and David Thompson
1965 *New Light on the Early History of the Greater Northwest: The Manuscript Journals of Alexander Henry and David Thompson, 1799-1814*, edited by Elliott Coues, 2 Vols., Reprinted by Ross and Haines, Inc., Minneapolis.

Herrmann, Edward, Rebecca Nathan, Matthew J. Rowe, and Timothy P. McCleary
2017 Bacheeishdíio (Place Where Men Pack Meat). *American Antiquity* 82(1):151-167.

Herrmann, Edward, Matthew J. Rowe, and Rebecca Nathan
In Review The Archaeology of the Grapevine Creek Drainage, Montana: Report from the 2012-2016 Field Seasons. *Plains Anthropology*

Hoxie 2000 *The Grapevine Creek Battle.*

Huckell, Bruce
1978 Hudson-Meng Chipped Stone. In *The Hudson-Meng Site: An Alberta Bison Kill in the Nebraska High Plains*, pp. 153-191. The Caxton Printers, Caldwell, Idaho.

Hultkrantz, Åke
1973 *Prairie and Plains Indians*. Institute of Religious Iconography, State University Groningen, Iconography of Religions 10, edited by Th. P. van Barren, L. Leertouwer, and H. Bruning.

Johnson, Eileen
2016 Lubbock Lake Landmark: A Joint Venture in Preservation, Research, and Public Interpretation. In *Pisskan: Interpreting First Peoples Bison Kills at Heritage Parks*, edited by Leslie B. Davis and John W. Fisher Jr., pp. 129-166. The University of Utah Press, Salt Lake City.

Johnson, Eileen and Vance T. Holliday

1980 A Plainview Kill/Butchering Locale on the Llano Estacado – The Lubbock Lake Site. *Plains Anthropologist* 25(88):89-111.

Kehoe, Thomas F.
1966 The Small Side-notched Point System of the Northern Plains. *American Antiquity* 31:827-841.

Kehoe, Thomas F.
1973 *The Gull Lake Site: A Prehistoric Bison Drive in Southwestern Saskatchewan*. Publications in Anthropology and History No. 1. Milwaukee Public Museum, New Berlin, Wisconsin.

Kehoe, Thomas F., and Bruce A. McCorquodale
1961 The Avonlea Point: Horizon Marker for the Northwestern Plains. *Plains Anthropologist* 6:179-188.

Kornfeld, Marcel, George C. Frison, Mary Lou Larson and Bruce A. Bradley
2010 *Prehistoric Hunter-gatherers of the High Plains and Rockies*. Left Coast Press.

Landt, Matthew
2008 *Class III Cultural Resource Inventory for the Yellowtail-Yellowtail PACE OPGW Installation Project, Bighorn County, Montana*. Alpine Archaeological Consultants, Inc., Montrose, CO. Submitted to Western Area Power Administration Rocky Mountain Region, Loveland, CO, MTAO Project Number YT-08-103. Copies available from Montana State Historic Preservation Office, Helena, MT.

Landt, Matthew J. and S. Rheagan Alexander
2010 *Class III Cultural Resource Inventory for the Lovell-Yellowtail Numbers 1 and 2 Transmission Lines and Access Roads, Carbon and Big Horn Counties, Montana and Big Horn County, Wyoming*. Alpine Archaeological Consultants, Inc., Montrose, CO. Submitted to Western Area Power Administration Rocky Mountain Region, Loveland CO, Contract No. DE-AM65-05WJ67492. Copies available from Wyoming Cultural Records Office (Report No. 53054).

Larocque, Francois
1910 *Journal of Larocque from the Assiniboine to the Yellowstone, 1805*, edited by L. J. Burpee. Publication No. 3, Canadian Archives.

Lewis, Rhoda Owen
1978 Use of Opal Phytoliths in Paleo-Environmental Reconstruction at the Hudson-Meng Site. In *The Hudson-Meng Site: An Alberta Bison Kill in the Nebraska High Plains*, pp. 211-215. The Caxton Printers, Caldwell, Idaho.

Linderman, Frank B.
1996 *Old Man Coyote*. Bison Books. University of Nebraska Press. Lincoln.

Leonard, Zenas
1959 *Adventures of Zenas Leonard, Fur Trader*, edited by John C. Ewers. University of Oklahoma, Norman.

Lowie, Robert H.
1918 Myths and Traditions of the Crow Indians. *Anthropological Papers of the American Museum of Natural History* 21(3):203-269.

1922a The Material Culture of the Crow Indians. *Anthropological Papers of the American Museum of Natural History* 25(1).

1922b The Religion of the Crow Indians. *Anthropological Papers of the American Museum of Natural History* 25(2):309-444.

1924 Minor Crow Ceremonies. *Anthropological Papers of the American Museum of Natural History* 21(5).

Lyman, R. Lee
1984 Bone Density and Differential Survivorship of Fossil Classes. *Journal of Anthropological Archaeology.* 3:259-299.

McCleary, Timothy P.
2010 The Apsaalooke, edited by C. A. Little Big Horn College, Montana, pp. 1-55.

2011 *Crow Indian Reservation Cultural Resource Survey Results, Bighorn County, Montana*. Cultural Resource Office, Little Big Horn College, Crow Agency, MT. Submitted to Bureau of Indian Affairs, Billings Area Office, Project No. CTHPO11-0243. Copies available from Montana State Historic Preservation Office, Helena, MT.

2012 *The Stars We Know: Crow Indian Astronomy and Lifeways*. Waveland Press, Long Grove, IL.

McHugh, Tom
1958 Social Behavior of the American Buffalo (*Bison bison bison*). *Zoologica* 43(1):1-40.

1972 *The Time of the Buffalo*. Alfred A. Knopf, New York.

Mails, Thomas E.
1973 *Dog Soldiers, Bear Men and Buffalo Women*. Prentice-Hall, Englewood Cliffs, N.J.

Malouf, Carling and Stuart Conner (editors)
1962 *Symposium on Buffalo Jumps*. Montana Archaeological Society, Memoir 1, Billings.

Mandelbaum, David S.
1979 *The Plains Cree*. Canadian Plains Research Center, University of Regina, Canadian Plains Study 9.

Marshall, Fiona, and Tom Pilgram
1993 NISP vs. MNI in Quantification of Body-Part Representation. *American Antiquity* 58:261-269.

Medicine Crow, Joseph
1962 The Crow Indian Buffalo Jump Legends. In *Symposium on Buffalo Jumps*, Memoir No. 1, edited by Carling Malouf and Stuart Conner, pp. 35-39. Montana Archaeological Society.

1978 Notes on Crow Indian Buffalo Jump traditions. *Plains Anthropologist* 23:249-253.

1992 *From the Heart of the Crow Country: The Crow Indians' Own Stories*. Orion Books, New York, NY.

Moe, Jeanne, John W. Fisher, Jr., Steve Bolton, and Dennis Schoepp
1980 Artifact Descriptions. In *The Bootlegger Trail Site, A Late Prehistoric Spring Bison Kill*, pp. 101-148. Interagency Archaeological Series Publication No. 1. U.S. Department of the Interior Heritage Conservation and Recreation Service, Washington, D.C.

Nelson, Kendall L.
1965 Status and Habits of the American Buffalo (*Bison bison*) in the Henry Mountain Area of Utah. *Publication No. 65-2, Utah State Department of Fish and Game*, Salt Lake City.

Oetelaar, Gerald A.
2006 Movement and Native American Landscapes: A Comparative Approach. *Plains Anthropologist* 51(199):355-374.

2014 Better Homes and Pastures: Human Agency and the Construction of Place in Communal Bison Hunting on the Northern Plains. *Plains Anthropologist* 59(229):9-37.

Old Coyote, Lloyd G. M. and Helene Smith
1995 *Flag and Emblem of the Apsaalooka Nation*. Macdonald/Sward Publishing Co. Greensburg, Pennsylvania.

Peck, Trevor R., and John W. Ives
2001 Late Side-Notched Projectile Points in the Northern Plains. *Plains Anthropologist* 46:163-193.

Peterson, Jr., Robert R.
1980 Continuing Research in Bison Morphology and Herd Composition Using Chronological Variation in Metapodials. *Plains Anthropologist* 25(88):170-190.

Reeves, Brian O.K.
1978 Head-Smashed-In: 5500 Years of Bison Jumping in the Alberta Plains. *Plains Anthropologist* 23(82):151-174.

Reher, Charles A.
1973 The Wardell *Bison bison* Sample: Population Dynamics and Archaeological Interpretation. In *The Wardell Buffalo Trap 48 SU 301: Communal Procurement in the Upper Green River Basin, Wyoming*, pp. 89-105. The University of Michigan, Ann Arbor.

1978 Buffalo Population and Other Deterministic Factors in a Model of Adaptive Process on the Shortgrass Plains. *Plains Anthropologist* 23(82):23-39.

Reher, Charles A. and George C. Frison
1980 The Vore Site, 48CK302, A Stratified Buffalo Jump in the Wyoming Black Hills. *Plains Anthropologist* 25(88):1-153.

Reitz, Elizabeth J., and Elizabeth S. Wing
1999 *Zooarchaeology. Cambridge Manuals in Archaeology*. University of Cambridge Press, Cambridge.

Roe, Frank Gilbert
1970 *The North American Buffalo: A Critical Study of the Species*, 2nd ed. University of Toronto Press, Toronto.

Roll, Tom E. and Ken Deaver
1980 *The Bootlegger Trail Site, A Late Prehistoric Spring Bison Kill*. Interagency Archaeological Series Publication No. 1. U.S. Department of the Interior Heritage Conservation and Recreation Service, Washington, D.C.

Seton, Ernest Thompson
1909 *Life-Histories of Northern Animals: An Account of the Mammals of Manitoba*. Charles Scribner's Sons, New York.

Simms, S. C.
1903 Traditions of the Crows. *Field Columbian Museum Publication* 85, Vol. 2(6).

Soper, Dewey J.
1941 History, Range and Home Life of the Northern Bison. *Ecological Monographs* 2(4):349-412.

Spier, Leslie
1921 The Sun Dance of the Plains Indians. *Anthropological Papers of the American Museum of Natural History* 16(7).

Taylor, Dee C.
1962 Panel Discussions on Buffalo Jumps. *Montana Archaeological Association*. Memoir 1: 40-60.

Todd, Lawrence C. and David J. Rapson

2016 Research and Public Visitation at Hudson-Meng, 1991-1996: Integrating Observations and Interpretation. In *Pisskan: Interpreting First Peoples Bison Kills at Heritage Parks*, edited by Leslie B. Davis and John W. Fisher Jr., pp. 195-223. The University of Utah Press, Salt Lake City.

Verbicky-Todd, Eleanor
1984 *Communal Hunting Among the Plains Indians: An Ethnographic and Historic Review*. Archaeological Survey of Alberta Occasional Paper No. 24. Alberta Culture Historical Resources Division, Edmonton.

Walker, Danny N.
1980 The Vore Site Local Fauna. *Plains Anthropologist* 25(88):154-169.

Walker, Ernest G.
2016 Archaeological Research and Interpretive Development at Wanuskewin Heritage Park. In *Pisskan: Interpreting First Peoples Bison Kills at Heritage Parks*, edited by Leslie B. Davis and John W. Fisher Jr., pp. 111-126. The University of Utah Press, Salt Lake City.

Walker-Kuntz, Patrick
2005 *Pacificorps Transmission Line Cultural Resource Inventory on the Crow Reservation, Montana*. Field Research Services, Billings, MT. Submitted to EPG, Inc., Phoenix, AZ. Copies available from Montana State Historic Preservation Office, Helena, MT.

Wheat, Joe Ben
1978 Olsen-Chubbuck and Jurgens Sites: Four Aspects of Paleo-indian Bison Economy. *Plains Anthropologist* 23(82):84-89.

Wissler, Clark
1910 Material Culture of the Blackfoot Indians. *Anthropological Papers of the American Museum of Natural History* 5(1).

Wu, Shi-Kuei and Charles A. Jones
1978 Molluscs from the Hudson-Meng Site. In *The Hudson-Meng Site: An Alberta Bison Kill in the Nebraska High Plains*, pp. 193-210. The Caxton Printers, Caldwell, Idaho.

Young II, Lawrence W. and Ronald R. Weedon
1978 Vegetation and Flora of the Hudson-Meng Bison Kill. In *The Hudson-Meng Site: An Alberta Bison Kill in the Nebraska High Plains*, pp. 217-225. The Caxton Printers, Caldwell, Idaho.

Zedeño, Maria Nieves, Jesse A. M. Ballenger and John R. Murray
2014 Landscape Engineering and Organizational Complexity among Late Prehistoric Bison Hunters of the Northwestern Plains. *Current Anthropology* 55:23-58.

Rebecca Ann Nathan

EDUCATION

Indiana University Bloomington, IN
Ph.D. in Archaeology, June 2018
Minors: Socio-cultural Anthropology and Statistics
Master's Degree in Archaeology, May 2013
Carnegie Mellon University Pittsburgh, PA
Bachelor of Science in Anthropology and History, May 2006
Double Major: European Studies
Palomar College San Marcos, CA
GIS Certificate of Proficiency, December 2008

FIELD SCHOOL

Exploring Historical and Social Landscapes of the Greater Yellowstone Ecosystem Archaeological Field School, Northwest College and Indiana University Cody, WY
May 2008, May-August 2009

WORK EXPERIENCE

USFS, Black Hills National Forest, Bearlodge Ranger District Sundance, WY
DISTRICT ARCHAEOLOGIST, June 2017 –March 2018
Supervisor: Michael Engelhart, North Zone Archaeologist
Supervised a seasonal field crew in the office and served as a crew chief in the field.

- Provided technical skills training in field methods and report-writing skills.
- Lined out field crews with tasks and instructions on a daily basis.

Supervised and ensured accuracy of the district data in the NRM Heritage module.
Served as Principal Investigator and author on large Class III inventory projects and reports.

Principal Investigator:

- Hemler Dam and Ditch Federal Ditch Bill Project (Class III, 2017)
- Herman Vegetation Management Area (Class III, 2017)
- Phantom and Tombstone Timber Sales (Class III, 2018)
- *FRTA Road Easement Project (Class III, est. completion 2018)*
- *Wonder Vegetation Management Area (Class I and III, est. completion 2018)*

Reports Authored:

- *A Class III Cultural Resource Inventory of the Phantom and Tombstone Timber Sales in Crook County, WY,* 2018
- *A Class III Cultural Cultural Resource Inventory of the Proposed Hemler Ditch Bill Easement Project in Crook County, WY*, 2017
- *A Class III Cultural Resource Survey for the Herman Vegetation Management Project in Crook County, WY*, 2017 (co-authored)

- *Appendix D to the Class III Notch #1 Vegetation Management Report: Additional Finds within Notch 1 Prior to Implementation*, 2017 (co-authored)

Provided heritage management analysis to other departments within the Ranger District to assist with their duties.

- Understood compliance protocols related to: Fire, Timber, Fuels, Hydrology, Recreation, Biology, Range.
- Responded appropriately and in a timely fashion to concerns from other departments that arose on a daily basis.

Proofed all maps, spatial data, and other cartographic products produced in the Heritage Department utilizing the following software products and GPS hardware: ArcGIS, Trimble Pathfinder, TerraSync, Adobe Illustrator, Adobe Acrobat, Trimble Geo7 Series, Garmin units.

Maintained current certification as a Type 2 Hand Crew Wildland Fire Fighter at the Arduous fitness level.

Maintained an active government driver's license for Lt/Med duty vehicles and Trailer Towing.

Completed the following federal training courses:

- IS-200.b – ICS for Single Resources and Initial Action Incident
- N9042 – Resource Advisor

Indiana University Anthropology Department Bloomington, IN
COURSE INSTRUCTOR, August 2014 – December 2014
Course: ANTH P-399 GIS in Archaeology
Supervisor: Dr. Catherine Tucker, Anthropology Department Chair
Developed and taught a curriculum in GIS applications with minimal oversight.
Drafted teaching materials and in-class labs for GIS education for a 15-week upper level university course.
Took class on a field day to learn how to use a variety of GPS units while recording an artificial archaeological "site."
Brought class to Lilly Library to look at 15th and 16th century maps in a unit on cartography.
Graded all assignments and exams.
Held bi-weekly office hours for the purpose of answering student's questions and providing one-on-one guidance, when necessary, through lessons.

Crow Tribal Historic Preservation Office Crow Agency, MT
ARCHAEOLOGIST/GIS MANAGER, May 2014 – December 2016
Supervisor: Dr. Emerson Bull Chief, Crow Tribal Historic Preservation Officer
Constructed and managed a reservation-wide archaeological geodatabase.
Composed maps for monitoring and survey project reports utilizing the following software products and GPS hardware: ArcGIS, Trimble Pathfinder, TerraSync, Adobe Illustrator, Adobe Acrobat, Trimble Yuma series, Garmin Rino series.
Maintained a spatial database for archaeological and cultural resources on the reservation.
Successfully applied for grant funding for heritage management projects proposed by the THPO (over $50,000 in grant monies in 2015).

Directed the Grapevine Creek Archaeological Field School and THPO Para-Archaeologist training.

- Drafted grant applications in support of the project.
- Did all preliminary planning work including: obtaining legal permits from government agencies and individual land owners to conduct work, drafting interagency agreements with the NPS to utilize park resources for the tribal field school, prepared and maintained a project budget/finances, priced and purchased all field school supplies (including work supplies, camp supplies, and food), prepared all educational materials, such as lessons, readings, notebooks, hired all field school staff including research collaborators and assistants.
- Supervised field school students and crew on a daily basis, both in the field and in a field camp setting.
- Planned, supervised, and provided on the ground training for daily work goals for a 13-person crew.

Served as crew chief for tribal monitors conducting archaeological survey and cultural monitoring; crews ranged in size from 2 to 20+ in size.

Served as Principal Investigator for the 2015 NPS Tribal Heritage Grant Project: Grapevine Creek Archaeological Field School.

Regularly attending tribal consultation meetings as a representative of the Crow THPO in several states.

Studied Crow language at Little Bighorn College, Crow Agency, MT.

Completed the following federal training courses:

- An Introduction to ARPA.

Capstone Publishing Bloomington, IN

CONTENT CONSULTANT, December 2013 – March 2014

Supervisor: Erika Shores, Senior Editor – Nonfiction

Consulted on content and fact-checked articles appearing in the research database "PebbleGo Next: State and American Indian Studies (grades 3-6)," on the history of tribes in the Arctic, Plateau, Northwest Coast, Great Basin, Southwest, and Great Plains regions.

USFS, Salmon-Challis National Forest, Supervisor's Office Salmon, ID

ARCHAEOLOGICAL TECHNICIAN, June 2013 – September 2013

Supervisor: Dr. Timothy Canaday, Forest Archaeologist

Performed back-country Section 110 compliance work and cultural resource survey in the Frank Church/River of No Return Wilderness.

Authored and updated archaeological site forms for the Idaho State Historic Preservation Office.

Operated Trimble GeoXT units in the field to record spatial data while updating ID site forms.

Sketch and pace mapping for individual Prehistoric and Historic sites.

Generated map images using ArcGIS software for individual site forms and compiled GIS data for a seasonal site report.

Certified as a Firefighter Type 2 at the Arduous fitness level.

Received a US Gov't Motor Vehicle Operator's ID Card, qualified to drive the following types of vehicles: Sedans/Pickups, Trucks, 4-Wheel Drive.

Completed the following federal training courses:

- S130 – Firefighter training;
- S190 – Introduction to Wildland Fire Behavior;
- L180 – Human Factors in the Wildland Fire Service;
- ICS-100 – Introduction to Incident Command System;
- IS-00700.a – National Incident Management System (NIMS): An Introduction.

American Indian Studies Research Institute Bloomington, IN

GRADUATE FELLOW, August 2012 – May 2013

RESEARCH ASSISTANT, October 2013 – May 2014

Supervisor: Dr. Raymond DeMallie, Director

The Fellowship was awarded for scholastic achievement. I was asked to continue at the Institute as a Research Assistant when the Fellowship ended.

Prepared maps for publication for other members of the Research Institute.

Digitized Dakota village information from a 17th century map and presented research results at a national conference.

Instructed undergraduate assistant in Plains Indian digital toponym project.

- Taught student how to use ArcGIS and conduct spatial data searches on the internet.
- Instructed student in geodatabase construction and management.
- Oversaw the collection of toponyms from five Plains Indian language databases.

Indiana University Anthropology Department Bloomington, IN

ASSISTANT INSTRUCTOR, January 2012 – May 2012; January 2013 – May 2013

Course: ANTH E-319 American Indian Religions

Supervisor: Dr. Raymond DeMallie, Chancellor's Professor of Anthropology

This was a one-semester teaching appointment through the Anthropology Department. Dr. DeMallie requested that I return the following year to assist him again.

Attended all lectures.

Held office hours bi-weekly to meet with students, discuss course content, and provide editing services and advice on writing assignments.

Graded all assignments and exams for a 70-student lecture.

Center for Advanced Spatial Technology at the University of Arkansas Fayetteville, AR

DIGITAL INSTITUTE FOR ARCHAEOLOGY FELLOW, August 2011 – December 2011

Supervisor: Dr. Jesse Casana, Associate Professor

Participated in courses focused on archaeological applications of spatial technology.

Presented a department-wide colloquium (50 faculty members and graduate students in attendance) discussing research and dissertation goals.

Conducted fieldwork with CAST crews using geophysical equipment (including RTK GPS units, ground-penetrating radar, and magnetometer) at historic sites in Bella Vista, AR and Buda, TX.

Exploring Historical and Social Landscapes of the Greater Yellowstone Ecosystem Archaeological Field School, Indiana University Cody, WY
ASSISTANT INSTRUCTOR, 2010 – 2012 Field Seasons
Supervisor: Dr. Laura Scheiber, Director
Managed all spatial data collection in the field utilizing survey-grade RTK equipment, Trimble GeoXT series, Garmin Rino series.
Post-processed and managed all spatial data post-field season utilizing Pathfinder Office, GNSS Solutions, ArcGIS, Adobe Illustrator.
Assisted with instruction in field methods for pedestrian survey, feature and artifact recording, excavation, mapping.
Assisted with the management of back country field camps including keeping inventories and stock of supplies, managing food and back country camp kitchens, maintaining camp safety in bear country.
Assisted with post-field season data management including analysis of collected artifacts, water screening and soil matrix sampling, drafting site and feature maps for publication, preparation of WY site forms, and construction and management of project-wide geodatabase.

Glenn A. Black Laboratory of Archaeology, Indiana University Bloomington, IN
GIS TECHNICIAN, October 2009 – December 2010
Supervisor: Dr. William Monaghan, Director
Developed a geodatabase for the Angel Mounds Archaeological Site (12VG0001).
Created digital 3D spatial models of mound features at Angel using ArcScene software.
Assisted with the spatial component of the Red River Basin archaeological predictive model utilizing statistical analyses in R and ArcGIS software programs.
Presented results of work at professional conferences such as the Indiana Archaeological Council (IAC) – 3/2010, and Midwest Archaeological Conference (MAC) – 10/2010.
Managed the digitization of state records for archaeological site locations within the state of Indiana.
Managed the oversize-map digitization and indexing project for the lab. Prior to this work there was no way to access or utilize the historic, oversized map collection at the lab.

William R. Adams Zooarchaeological Laboratory, Indiana University Bloomington, IN
GEODATABASE MANAGER, August 2009 – May 2011
Supervisor: Dr. Laura Scheiber, Director
Constructed and managed an archaeological geodatabase for field research conducted in association with the lab's field program.
Prepared WY site forms for submission to SHPO.
Assisted with the creation of graphics and maps for conference posters for lab-affiliated researchers, including faculty members, graduate students, and undergraduates.
Utilized spatial data platforms such as GNSS Solutions and ArcGIS.

San Diego Archaeological Center Escondido, CA
COLLECTIONS AND GIS TECHNICIAN, February 2007 – May 2009
Supervisor: Cindy Stankowski, Director

Developed and managed a county-wide archaeological geodatabase utilizing ArcGIS.
Developed maps and GIS macro programs to assist staff members and researchers.
Curated and rehabilitated archaeological collections: inventoried collections of 100,000+ objects, created digital catalogues, rehoused items in archival quality materials, and prepared collections for storage and use by researchers.
Taught Project Archaeology lessons to field trip students (grades K -12, group sizes 10 – 60 students).
Assisted in the preparation of collections for exhbits: prepared and catalogued items for transport, assisted with the selection of items for display, designed display cases and interpretive materials.
Assisted with management of digital and physical collections databases: during my tenure at SDAC we moved our digital database platform from one software program to another. I helped keep track of the migration.
Instructed and supervised collections management and GIS interns: taught interns curation methods and protocols, taught the artifact material classes as well as basic archaeological theory; taught basic GIS skills and geodatabase management.

SUCCESSFULLY FUNDED GRANTS

Tribal Heritage Grant Crow Agency, MT
Funding Agency: National Park Service
Dates of Tenure: August 2015 – December 2016
The goal of this grant was to put on an archaeological field school through the Crow THPO. Our objectives were to perform a National Register of Historic Places (NRHP) District evaluation of the Grapevine Creek area while building capacity at the THPO through intensive training of tribal monitors.

College of Arts and Humanities Institute Travel Grant Bloomington, IN
Funding Agency: Indiana University
Dates of Tenure: April 2014
I received funding to aid in travel expenses to present my research at the Society for American Archaeology Annual Meeting in Austin, TX.

David C. Skomp Fund for Archaeological Research Helena, MT and Crow Agency, MT
Funding Agency: Indiana University Anthropology Department
Dates of Tenure: October 2013, August 2014
This grant funded two seasons of fieldwork in pursuit of my doctoral degree in archaeology. I performed archival research at the Montana Historical Society in Helena and archaeological field survey in collaboration with the Crow THPO.

INTERNSHIPS

San Diego Archaeological Center Escondido, CA
Supervisor: Cindy Stankowski, Director
GIS INTERN, January 2008 – May 2008

Created a list of all site data missing from Center database since the last GIS intern.
Created a new shapefile of all archaeological sites within San Diego county curated by SDAC.
Particiapted in linking SDAC artifact data with spatial site data on GIS.

EXHIBIT AND EDUCATIONAL PROGRAMMING INTERN, August 2006 – February 2007

Researched new information and designed an original exhibit using an old interpretive display for a public library on the Historic period in the neighborhood of City Heights.
Researched and designed an original exhibit on trade routes for the Allied Gardens public library.
Assisted in teaching Project Archaeology lessons to field trip students (grades K -12, group sizes 10 – 60 students).

PUBLICATIONS

Nathan R. 2012. Uniting the Tribes: The Rise and Fall of Pan-Indian Community on the Crow Reservation: A Review. *Montana: The Magazine of Western History.*

PAPERS

Rebecca Nathan and Edward Herrmann: *Where Men Get Their Meat: Rediscovering the Grapevine Creek Buffalo Jump Complex, Crow Reservation, Montana*. Presented at the 73rd Annual Plains Anthropological Conference, October 2015.

Rebecca Nathan: *Collaborative Fieldwork on the Crow Reservation, Montana*. Presented at the 9th Annual Indiana University Anthropology Graduate Student Association Symposium, February 2015.

Rebecca Nathan: *Approaching a Crow Landscape Through the Ethnohistoric Record: The First Steps Towards an Archaeological Predictive Model for the Crow Reservation in South-Central Montana*. Presented at the 8th Annual Indiana University Anthropology Graduate Student Association Symposium, February 2014.

Rebecca Nathan: *Theoretical Intersections on the Crow Reservation: An Indigenous Archaeological Approach to Archaeological Predictive Modeling*. Presented at the 7th Annual Indiana University Anthropology Graduate Student Association Symposium, February 2013.

Rebecca Nathan: *Mapping Multiple Landscapes in the Northern Bighorn Basin: An Ethnoarchaeological Study*. Presented at the 77th Society for American Archaeology Annual Meeting, April 2012.

Rebecca Nathan and Katherine Burnett: *Landscape Modeling in the Northern Bighorn Basin: An Exploratory Study*. Presented at the 69th Annual Plains Anthropological Conference, October 2011.

Rebecca Nathan and Anthony Krus: *Angel Mounds GIS: Visualizing Old Data in New Ways*. Presented at the 56th Annual Midwest Archaeological Conference, October 2010 and at the 76th Annual Society for American Archaeology Annual Meeting, April 2011.

Rebecca Nathan and Katherine Burnett: *3D Spatial Modeling at a Historic Stage Stop in Central Wyoming*. Presented at the 68th Annual Plains Anthropological Conference, October 2010.

Anthony Krus and Rebecca Nathan: *Recent Research on Angel Mound's (12-Vg-1) Landscape*, Presented at the Indiana Archaeology Council's 2010 Spring Workshop, March 2010.

POSTERS

Rebecca Nathan: *Connecting Historical Cartography to the Archaeological Record: An Examination of the 1697 Franquelin/Delisle Map of the Upper Mississippi River Basin and Its Potential Impact on Minnesota Archaeology*. Presented at the 79th Annual Society for American Archaeology Annual Meeting, April 2014.

Laura Scheiber, Rebecca Nathan, and Katherine Burnett: *Investigating Historic Tipi Rings in the Bighorn Basin, Wyoming*. Presented at the 68th Annual Plains Anthropological Conference, October 2010.

Matthew Rowe, Laura Scheiber, Judson Byrd Finley, Rebecca Nathan, and Katherine Burnett: *Not Just Another Nail: The archaeology of archaeology, metal detecting, modern mapping, and site formation and transformation*. Presented at the 68th Annual Plains Anthropological Conference, October 2010.

Laura Scheiber, Judson Byrd Finley, Matthew J. Rowe, Maureen P. Boyle, Dawn M. Ruteki, Rebecca A. Nathan, Aaron E. Erickson, Katherine L. Burnett, and Jacqueline E. Burnett: *"They Were Rather Surprised at Our Approach and Retreated to the Heights": Investigation of Mountain Shoshone Campsites and Landscapes in the Absaroka Mountains of Northwestern Wyoming*. Presented at the 67th Annual Plains Anthropological Conference, October 2009.

Laura Scheiber, Kelly M. Branam, Judson Byrd Finley, Rebecca A. Nathan, Dawn M. Ruteki, Aaron Erickson, Chris Finley, and Alda Good Luck: *"Crow Rediscover a Piece of Their Homeland": America's Best Idea at Bighorn Canyon*. Presented at the 67th Annual Plains Anthropological Conference, October 2009.

VOLUNTEER EXPERIENCE

Mother Hubbard's Cupboard Bloomington, IN
August 2012 – October 2013
Supervisor: Stephanie Solomon, Director of Education and Outreach

This organization is a food bank that also maintains three community gardens. The produce from the gardens is taken directly to the food bank and served to clients. I volunteered my time as a gardener and later used GPS equipment to record the gardens themselves and prepare maps for grants, publications, and internal use at the organization.

Bighorn Canyon National Recreation Area Lovell, WY
Summer 2008 – Summer 2011
Supervisor: Chris Finley, Park Archaeologist
Volunteered over 1000 hours assisting in cultural resources management within park boundaries by recording stone circles and cairn sites, helping to create an interpretive roadside display at the Two Eagles site, and by participating in excavations at stone circle sites.

Indiana University Anthropology Graduate Student Association (AGSA) Bloomington, IN
GRADUATE AND PROFESSIONAL STUDENT ORGANIZATION (GPSO) REPRESENTATIVE, Fall 2010 – Spring 2011
Attended GPSO General Assembly meetings while representing AGSA.
Reported GPSO initiatives at AGSA officer meetings and to the Anthropology graduate student email listserv.
Supervised AGSA participation in the "Greening Cream and Crimson" initiative.
Ran an Anthropology Department t-shirt and hoodie fundraising effort. Profits tripled the AGSA budget for the year.

Carnegie Mellon Activities Board Pittsburgh, PA
SPECIAL EVENTS COMMITTEE CHAIR, Fall 2004 – Spring 2005
Organized and put on events for 1000+ people: planned and coordinated activities, reserved rooms, contracted vendors and performers, negotiated contracts, settled disputes.
Coordinated between several academic organizations and non-affiliated companies during event planning.

Carnegie Mellon Student Senate Pittsburgh, PA – Spring 2003 – Spring 2004
CAMPUS LIFE COMMITTEE CHAIR, Spring 2004
Authored a new Senate Poster Policy that was successfully voted on in legislature.
JOINT FUNDING COMMITTEE MEMBER, Spring 2004
Budgeted over one million dollars to 40+ campus organizations over a two month period.
Met with organization members to discuss budget revisions and changes.