THESIS

THE PROTOHISTORIC PERIOD IN NORTHCENTRAL COLORADO: ANALYSIS OF THE LYKINS VALLEY SITE (5LR263)

Submitted by

Cody Collins Newton

Department of Anthropology

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Colorado State University

Fort Collins, Colorado

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

COLORADO STATE UNIVERSITY

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WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR SUPERVISION BY CODY NEWTON ENTITLED THE PROTOHISTORIC PERIOD IN NORTHCENTRAL COLORADO: ANALYSIS OF THE LYKINS VALLEY SITE (5LR263) BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS.

Committee on Graduate Work

Lawrence C. Todd

Jared P. Orsi

Charles A. Reher

Advisor - Jason M. LaBelle

Department Head/Director

Abstract of Thesis

**The Protohistoric Period in Northcentral Colorado:
Analysis of the Lykins Valley Site (5LR263)**

The Lykins Valley Site (5LR263) is a Protohistoric-aged site that contains both items of European manufacture and items such as stone tools associated with pre-contact indigenous technology. The site is a small group campsite occupied in a single event or multiple annual events possibly by a Cheyenne or Comanche group. Temporal analysis of the site indicates that the site was occupied shortly after A.D. 1800. This analysis of the Lykins Valley site is used as a stepping-off point to address larger questions about native acceptance of European technologies, the degree to which the western-central Great Plains were actually impacted by European intrusion and site types of the Protohistoric Period. This study finds that the region including Lykins Valley was not greatly affected by direct European contact until after the beginning of the 1800's, coinciding with the fur trade era. The Protohistoric occupation of 5LR263 exemplifies a native group that was fully equestrian, had somewhat integrated European technology into their culture via trade good acquisition, but was still reliant on pre-contact technology.

Cody Collins Newton
Anthropology Department
Colorado State University
Fort Collins, CO 80523
Spring 2008

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> One West of the popular imagination is a place of spacious landscapes and few people. It is beyond the fringe of settlement on the frontier of national, and even international, expansion. It is natural wilderness, defined as a place where people are not, more often than as a place where people are. This imagined West ignores the well-established presence of native peoples and the diverse groups of nonnatives who have arrived in the region. It neglects the human heritages that have shaped the West both from within and from without. New peoples from across the Atlantic contributed to the mixture of cultures on the continent. Well before these developments, native cultures met and mixed in the West.
>
> --- Milner II 1994: 9

Chapter 1. Introduction

The Great Plains is an area of vast expanses and few people that has become a symbol of American culture. The pioneering expansion and frontier settlement of the region is a formative part of the American spirit (Turner 1920). The region is responsible for many iconographic images that the world associates with America (Wood 1998). The classic image of the mounted Native American warrior in full regalia has become the de facto symbol of "the free and noble Indian" for millions of people around the world. What is less known is that this image is from a time when native groups were undergoing incredible cultural change as a result of European presence in the New World. Archaeologists and historians have used culture contact studies to analyze the impacts of European colonization on indigenous groups. This contact is better documented in the eastern portion of the continent and the specifics and resultant native responses are less understood in the Plains region. Contact period studies should be of great interest to the archaeologist as this time period bridges the gap between history and prehistory (Lightfoot 1995).

On the Plains, the time between initial contact and the European settlement is known as the Protohistoric Period because historic records do not adequately describe the Native American experience. The Protohistoric Period is bounded on one side by the initial Spanish *entrada* onto the Great Plains by Francisco Vásquez de Coronado and Hernando de Soto in 1541 and on the other by the beginnings of Euroamerican settlement in 1860 (Clark 1999: 309). The Protohistoric Period can be described as the time when written histories were being recorded but any documentation of indigenous history is largely a byproduct of contact with Europeans and generally has a Eurocentric bias. The result of this is that, although there are written accounts, the native narrative is largely unknown. This is especially true of the central and western Plains region, which was not the focus of European settlement and trading systems until later than the Northern and Southern Plains.

Towards the end of the Protohistoric Period (i.e., beginning in the late 18th century), the Plains underwent an incredible amount of change, resulting in the relocation of Native inhabitants through warfare, economic dependence and in some cases ecological subjugation to open up the area for Euroamerican agriculture and other types of extractive activities (Calloway 2003; Hämäläinen 2003; West 1998). Before the arrival of Europeans, Native American groups had inhabited the Great Plains (Figure 1.1) since at least 11,000 B.C. (Bamforth 1988; Gunnerson 1987; Frison 1991, Wedel 1998, 1986) with varying degrees of intensity, according to environmental variability. This "land of sun and wind and grass" (Wedel 1961a: 20), was occupied by groups who mainly practiced a hunter-gatherer subsistence

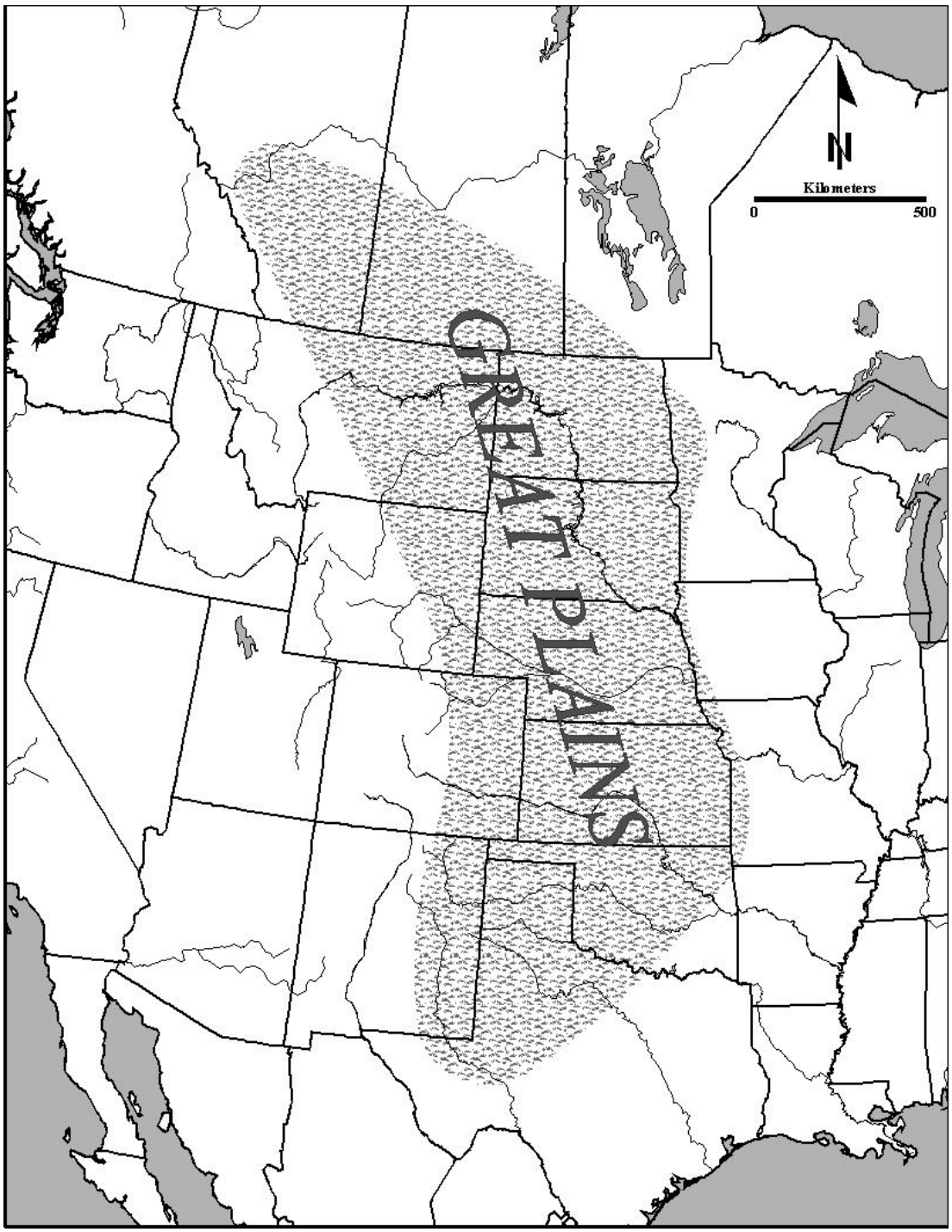

Figure 1.1. The Great Plains of North America.

adaptation, although in the last 1500 years horticultural subsistence was practiced along the eastern edges and in major river valleys, such as the Missouri River valley.

When the Coronado expedition ventured out onto the Plains, the Spaniards

encountered a band of natives that they called *Querechos* (Lavender 1992: 81) who were living a nomadic bison hunting lifestyle and employing dogs as beasts of burden. This is the first documented direct contact between a Great Plains native group and a European group. This encounter is a definitive episode that delineates a change in the cultural trajectory for both parties involved and hastens in the Protohistoric Period on the western Plains. The manner and apparent ease that Plains indigenous groups adapted to the new and reintroduced but previously unknown technologies (i.e., metal items and the horse, respectively) brought to the New World has and continues to pique the interest of scientist and laymen (Wood 1998: 1-2).

Wissler (1914) argues that the introduction of European technology to Plains groups resulted in the complete adoption of many new technologies (especially the horse) in a relatively short time, as a result of a preadaptive lifeway. Others, such as Rogers counter that it was not such a straightforward trajectory. Instead, he states that the "open acceptance of European trade goods is not a given fact of Indian behavior; instead Indian perspectives and modes of sociocultural operation must be considered meaningful factors in understanding the processes of trade and culture contact" (Rogers 1993: 75). It is more likely that both preadaptive and sociocultural factors were responsible for why Plains groups became so adept at using the technologies afforded them by contact.

The stereotype about indigenous groups having limited agency and only reactive roles in interactions with European groups and their policies has largely been refuted. Native groups did not always readily adopt European technologies when available and often were able to manipulate the economic system to their benefit (Bamforth

2003, 1993; Rogers 1993). These were economies that were usually based on the extraction and/or consumption of natural resources, such as animal furs and items such as pemmican (Binnema 2001). How and to what degree native groups on the Plains adopted and adapted to European technologies are fundamental questions that do not have straightforward answers, but can be addressed by looking at the evidence in the archaeological record. A simple correlation of trade items with acculturation is not adequate to explain Protohistoric sites.

This thesis is based on the study of a particular site, which was occupied during the Protohistoric Period. The Lykins Valley Site (5LR263) is located on the western periphery of the Great Plains in the Platte River drainage basin. This site provides an excellent opportunity to help understand what was happening during the later part of the Protohistoric Period. Clark (1999: 334) refers to the Protohistoric Period in the Platte River drainage basin as "a data gap." Clark then outlines the specific types of data that would help researchers fill this gap. These include data from sites with the capacity for absolute dates, buried/excavated sites and dateable sites with either a single Protohistoric component or clearly separate multiple components. 5LR263 demonstrates these criteria, making the site ideal as a focus of study.

A site such as 5LR263, which contains trade items that might indicate dependence on European technology and trade, requires a comprehensive analysis to effectively gauge the amount of European dependence. Analysis of the total site assemblage will provide a clearer understanding of the mode or modes of subsistence and degree to which European technologies were incorporated into the native lifeways. The occurrence of trade items at site is often used too deterministically in assessing native

autonomy. Artifact collectors, when encountering a site with trade items, often refer to that site as a "trading site." Trade items (even by their very nomenclature) and their perceived importance to indigenous groups can mask other important aspects of a site, as well as larger cultural issues and concerns.

Purpose of Thesis

Although the site was originally reported in 1979 (Ohr et al. 1979), the assemblage was reanalyzed to help answer questions about the Protohistoric Period. During the interim since the original work, there have been advances in analytical techniques and an ever-increasing body of comparative published work. Developing new questions and taking advantage of the expanded reference record and new analytical techniques justifies a reanalysis of the site assemblage. Also, the site is a noteworthy combination of chronological placement and regional location.

In this site analysis, multiple lines of evidence will be used to create a more robust picture of how the Protohistoric component of 5LR263 fits into the overall time period. Published historic accounts from the period are researched to address some of these questions. The original report provides data that can be used in combination with the reanalysis of the extant faunal, lithic and trade good assemblage. New data in the form of radiometric dating and lithic sourcing are added to the database as well. The composite of these allows for a more complete understanding of the site's use.

This analysis indicates that the site is more recent (~ A.D. 1800 versus ~ A.D. 1760) than was postulated by the original investigators (Ohr et al. 1979), but this is a case where making a site younger by no means makes it less interesting, as this places the site occupation during the period in the Protohistoric Period when Native cultural

change as a response to European influence was increasing dynamically. A look at the written history of the region from the Protohistoric Period indicates that there is a dearth of knowledge about this temporal period. Also adding to the unknown is that the site is located in a hinterland that was disputed by the sovereign governments beginning in the 17th century. To paraphrase Binnema (2001), the site was located in a "common and contested ground."

Research Questions

Research was undertaken to address research questions that when answered would give a better indication of the site's temporal and functional context. This research begins with the analysis of the extant assemblage using traditional assemblage analysis methods. This is done to answer the question of (*1) What can the assemblage analysis tell about the Lykins Valley Site in terms of temporal placement, native affiliation and trade influences?* Lithic, faunal, trade good and radiometric data, along with historical records and regional data are examined to address this question. In answering this question, a baseline can be established with which to address larger issues concerning the lifeways of native groups during the Protohistoric Period.

Further evidence about the site is provided by answering question two, which asks: *(2) What does the temporal placement and site use of 5LR263 say about the degree of dependence on European technology by site occupants?* Examining a qualitative comparison between site types of the Protohistoric Period and 5LR263 can be used to determine the site activities. Site activities or use along with the temporal placement of the site and assemblage composition are important factors in the

determination of European technological impacts. The degree of dependence on post-contact goods can be used to gauge the impacts of European intrusion into the Plains.

Question three asks, *(3) Based on site type, date of occupation and degree of dependence on European technology, what can 5LR263 tell about European impact on the western Plains at the beginning of the 19th century*? The cumulative data are analyzed to address the larger issue of how much were the occupants of 5LR263 and native groups in general actually impacted by Europeans. The impacts of trade and disease far outpaced the actual direct contact in this region. It is felt that European impact beyond trade good introduction was not as profound on groups of the western Plains as those to the east and the westerns Plains groups were able to maintain a largely pre-contact lifestyle that selectively incorporated trade items. These groups may have sought out areas such as Lykins Valley to take advantage of its isolation and resource abundance.

Terminology

Culture contact is a term often used to describe the process by which two distinct cultures meet and the resulting conflict as one between the "contemporary" and the "traditional" (Rogers 1993: 45). Although this view of the innovators versus the complacent receivers is not consistent with the actual dynamics of the situation and Native agency in many cases, the term is still a useful moniker. Further reduction of this term gives us *direct* and *indirect* contact, which refers to the human physicality of the contact scenario. In many cases indirect contact through traded items or even disease vectors occurred earlier and was much more profound than the actual direct contact. Indirect contact as a term has an oxymoronic slant that belittles the effects it

had on cultures. Preferably this term could be further divided into terms such as "materials contact" for trade good distribution and "epidemic contact" for disease impacts.

In this work, indirect contact will be presented in these conceptual terms. At 5LR263, materials contact is the primary form of contact. The impacts of epidemic contact, though noted, are difficult to ascertain from the assemblage analysis and are therefore only included in the discussion of larger issues concerning the post-contact period. The description of artifacts that are of non-indigenous origins will be referred to as items of European manufacture, unless the items are known to have been manufactured in the New World. Every effort will be made to distinguish between European and Euroamerican, but in general instances the term European will be used and taken to cover all persons of European ancestry.

As outlined in this chapter, the research questions addressed in this thesis are about contextualizing 5LR263 and its Protohistoric component through the reanalysis of the extant assemblage. Central to this thesis is the extent of culture contact on the western Great Plains and its documentation archaeologically. Although post-contact archaeology has a long research history on the Great Plains, the next chapter illustrates there is a lack of both data and, until relatively recently, explicit culture contact theory orienting research in the region.

Chapter 2. Background

Captain William Clark wrote in his journal on October 22, 1804 that the Corps of Discovery had:

> [P]assed 2 old Villages at the mouth of a large Creek L. S. [Hunting Creek] and Small Island at the head of which is a bad place, an old village on the S. S. [Double Ditch] and the upper of the 6 villages the Mandans occupied about 25 years ago this village was entirely cut off by the Sioux & one of the others nearly, the Small Pox destroyed great Numbers [Lewis et al. 2002].

This journal entry chronicles the aftermath of introduced disease and warfare in the Mandan villages and documents the abandonment of the Double Ditch Village in the face of these pressures. Double Ditch Village is thought to have been occupied by the Mandan from ~A.D. 1500 to 1781, and was one of nine Mandan villages occupied around the confluence of the Heart and Missouri Rivers that were occupied at the time of the French trader La Vérendrye's visit in 1738, but had been abandoned in the face of epidemic disease and warfare with the Sioux (DeVoto 1953: 57). The Mandan at the time of the Lewis and Clark Expedition had withdrawn upstream to locations around the confluence of the Knife and Missouri Rivers out of the way of the Sioux migration.

The demographic changes that the Mandan underwent between the European visits serve to illustrate the changing conditions of the post-contact Plains. The situation that Lewis and Clark encountered was far different than what is described by La Vérendrye sixty-six years before. Besides being mentioned in the early historic accounts of the region, the village sites along the Middle Missouri became the focus of early archaeological work. The Plains Village sites, especially the more recently

occupied ones, were very visible archaeologically and therefore were some of the first to be excavated in the area. Double Ditch Village was tested by George Will and Herbert Spinden in 1905, making it was one of the earliest archaeological excavations in the Plains (Krause 1998: 52-54). As late as the 1920's, most scholars believed that the human occupation of the Plains was insubstantial before the introduction of the horse in the 18th century (Wedel 1961b).

An era of large-scale, systematic data recovery in Plains archaeology was ushered in with the Missouri Basin Project. The Missouri Basin Project (MBP) was the largest of the Smithsonian River Basin Surveys, which was aimed at survey and salvage archaeology of land to be inundated by water due to federal dam construction in the Missouri drainage basin (Mitchell 2006: 383). Beginning in the late 1940's, these projects recorded and excavated sites, including many Protohistoric age village sites in the Middle Missouri region. Prior to this time, there were few professional archaeologists working in the Plains and had been few systematic surveys in the region (Wedel 1977).

The archaeology of the MBP resulted in a large accumulation of knowledge, but has been criticized for fostering a tradition of implicit, culture-historical research that has lacked explicit theoretical development (Mitchell 2006: 383). As it applies to Protohistoric studies, the early study of sites of this age has probably resulted in a bias towards post-contact Plains Village sites and a simplistic view of culture contact in the Great Plains, but by the middle of the 20th century Plains archaeologists recognized that the dynamics of contact may have been far more complex than they originally thought.

Beginning in the 1980's, partly inspired by the 500th anniversary of Columbus's first voyage to the Americas, there was a large increase in the anthropological, archaeological and historical investigation of the effects of European colonization on indigenous groups (Bamforth 1994: 95). Yet, despite the tradition of study and recent renewed interest into the Protohistoric Period, there lacks a definitive orienting research throughout the Plains and much of Protohistoric study is tightly focused on a particular site or event. This could be a product of when the majority of the prominent Protohistoric sites were excavated (e.g., the Middle Missouri village sites) and the understanding of the post-contact plains was thought to be more comprehensive than we now know it to be. Also, the large prominent sites such as the village sites were conspicuous and intriguing and would have been excavated for that reason. Outside of the Plains Village region, Protohistoric studies have received more limited treatment and this issue is particularly germane in the South Platte River Basin.

A comprehensive summary of the Protohistoric period and known sites in the region, *Colorado Prehistory: A Context for the Platte River Basin* outlines what is known about this temporal period. Researching the Office of Archaeology and Historic Preservation (OAHP) and site reports Bonnie Clark (1999: 310-311) identified over 130 sites in the South Platte River drainage basin containing Protohistoric components and specifically describes 26 of these sites in her discussion of the regional Protohistoric Period, indicating that these sites have been more fully reported or have more integrity compared to the rest of the sample. Clark (1999: 310) indicates that the majority of these sites are open campsites or open lithic scatters and

are primarily identified by diagnostic artifacts, specific types of features and ethnographic analogy or ethnohistory.

In *Colorado History: A Context for Historical Archaeology*, there is a discussion of the Protohistoric Period based on the known tribes in the state of Colorado (Baker et al. 2007). The authors (Baker et al. 2007: 100) conclude that in the case of archaeological sites of Plains groups such as the Apache, Arapaho, Comanche or Cheyenne "[i]t has not been possible to learn how many such sites have been recorded within Colorado because of an obvious lack of focus on them. In addition, it is perhaps difficult to identify them for what they are." The difficulties of relating the archaeological record to a specific tribal group or even a tight enough temporal frame when trade goods generally lacked diachronic change and calibrating radiocarbon dates from the Protohistoric Period results in a much too coarse dating bracket are major drawbacks in the archaeological study of post-contact groups.

The sites recorded in the region, to some degree, reflect areas where archaeological survey has taken place, but also indicate that certain areas may have been more attractive to Protohistoric groups as the high concentration of sites along the foothills and into the mountains suggests. The above discussion emphasizes the importance of a site such as 5LR263 in understanding the post-contact dynamics of the Plains so a discussion of this site in particular begins with the site background material important to the site context and understanding how the site relates to the "bigger picture."

Site Background

5LR263 is located in northern Larimer County in northcentral Colorado (Figure 2.1). The Great Plains end abruptly about six kilometers east of the site against a high hogback. These plains are part of the Colorado Piedmont region of the Great Plains, an area formed by deeply eroded Tertiary deposits, which covers much of eastern Colorado (Trimble 1980). Five kilometers north of the site is the beginning of a west to east trending upland scarp, which separates the Colorado Piedmont from the High Plains and the Ogallala formation capped preserved remnant that borders the piedmont on the north and east (Trimble 1980). Immediately west of the site the eastern slopes of Laramie Mountains begin. This transitional ecotone supports high diversity and a few kilometers in either direction from the site results in dramatic changes in the environmental setting. There are 70 species of edible plants and 32 species of mammals and birds that are known to have been found within the ecotonal setting (see Ohr et al. 1979: Table 1).

The landform from which the site takes its name is a north to south running valley cutting through the distinctive red Lykins formation sandstone. Boxelder Creek, the small permanent stream that flows through Lykins Valley, originates in the Laramie Mountains and flows east through a deep canyon before emerging from the canyon mouth less than two kilometers north of the site. Boxelder Creek flows south through 5LR263 then east through the hogbacks onto the Plains to the east and continues south before emptying into the Cache la Poudre River. The valley borders are formed by the rising slopes of the Laramie Range to the west and the hogback formation to the east. Immediately east of the site location is a large isolated landform known as

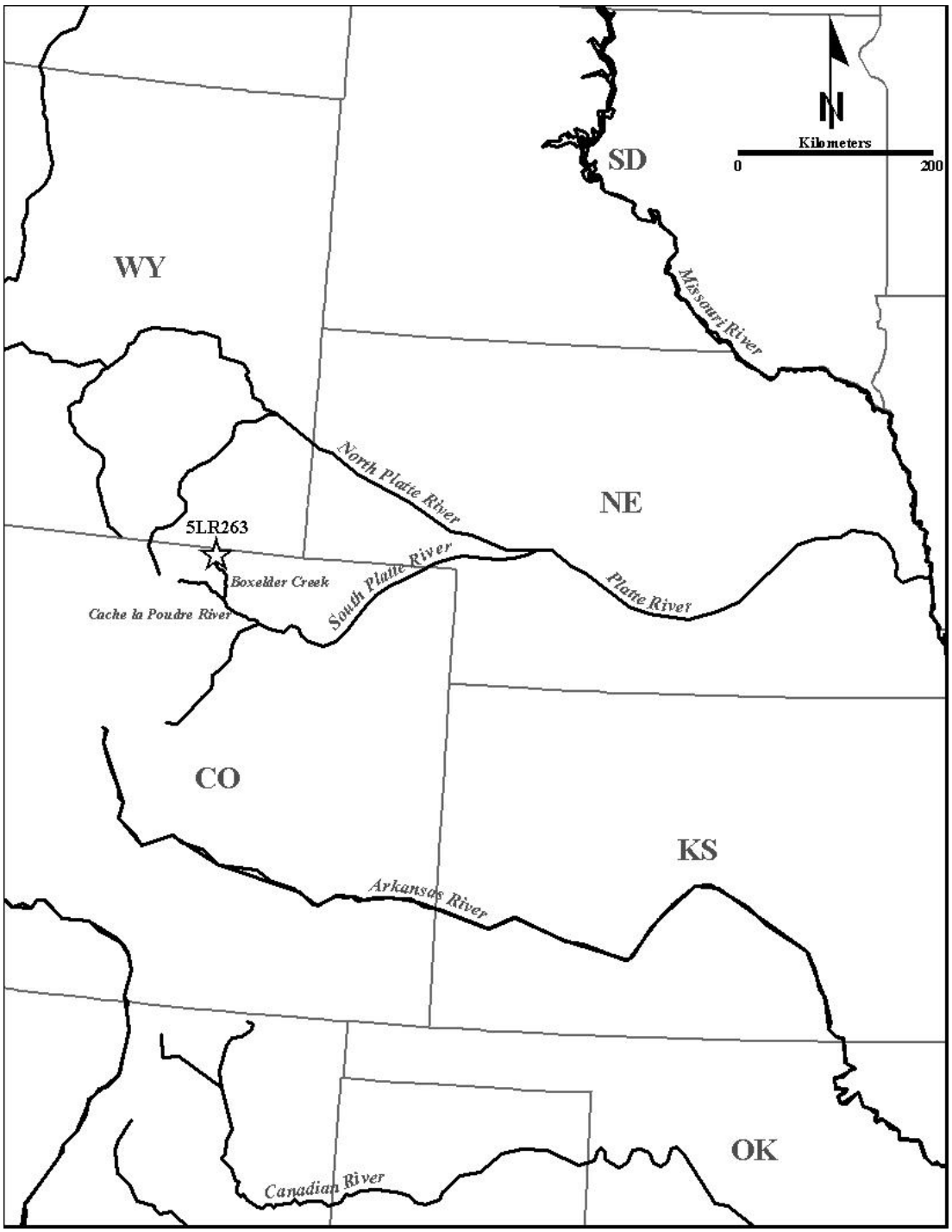

Figure 2.1. Location of 5LR263.

Table Mountain. The hogback formation and Table Mountain itself are composed of mainly of Morrison formation and Dakota formation sandstones. The western slope

of the valley is composed of Lyons sandstone overlain by Ingleside formation sandstone (Courtright and Braddock 1989).

The site is situated in Lykins Valley at an elevation of 1886 meters. This location would have provided good shelter, forage and animal resources for the site occupants (Figure 2.2). The Plains-foothills ecotone would have prevented the site occupants from experiencing the weather extremes common in the mountains and Plains (Travis 1988: 171). A local rancher stated that immediately north of the site an area, known as the "Big Hole," was used historically to winter cattle due to its sheltered nature and forage capability. Wedel (1963: 9) provides reasoning for seasonally locating campsites in the foothills:

> In winter…mounted hunters found the uplands unsuitable for continuous residence…large summer camps customarily broke into smaller units...which sought the relative safety of broken marginal terrain and timbered valley...[h]ere the Indians found protection against inclement weather, fuel, water, forage for their horses.

The location of mounted Plains groups in a transitional ecotone, especially in the winter, was necessitated by the shelter and resources that these regions offered.

History of Work at 5LR263

In 1972, the Department of Anthropology at Colorado State University was contracted by the U. S. National Park Service to survey drainages in the Boxelder Creek watershed (Morris et al. 1979: 1). These drainages include Boxelder Creek, Sand Creek, Rawhide Creek, Coal Creek and Indian Creek. The survey was to precede the proposed Boxelder Creek Watershed Program, which was designed to mitigate the effects of flood events on downstream farms and communities. The project included the construction of flood control structures to retard future flood

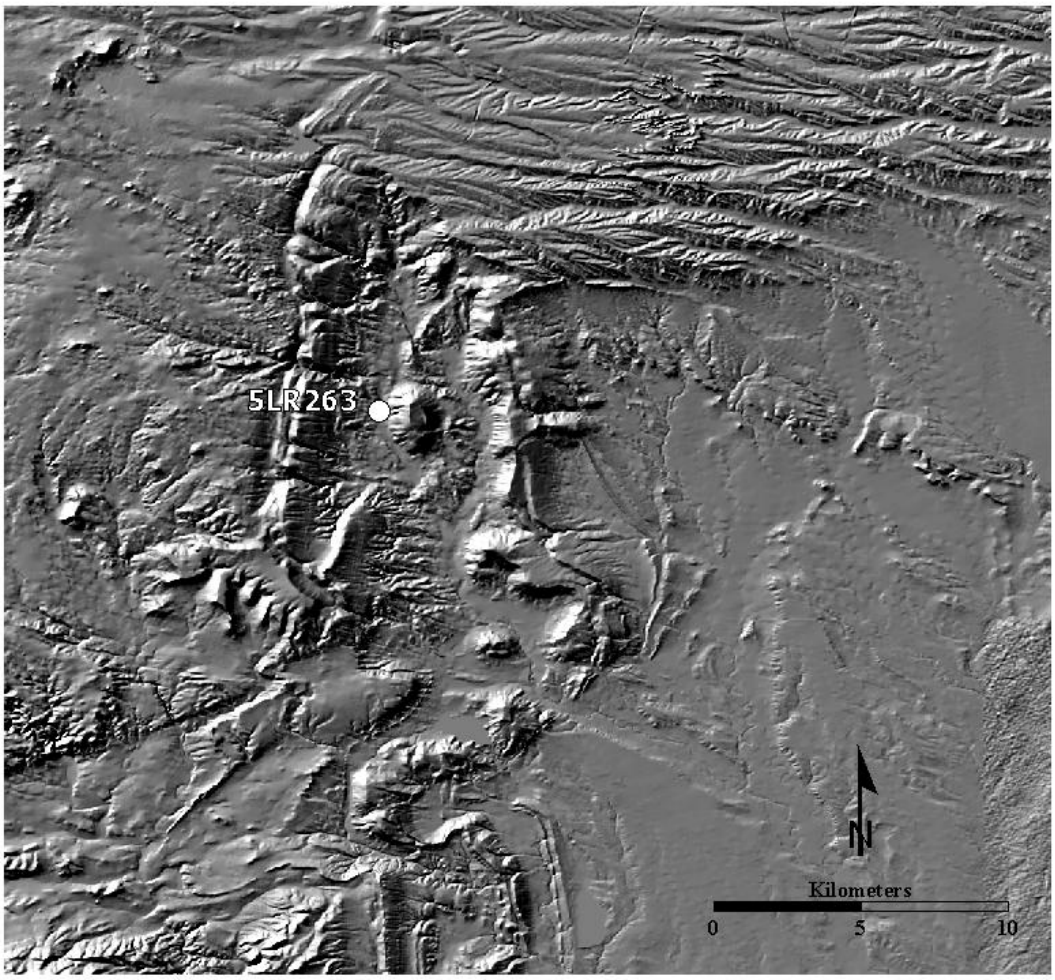

Figure 2.2. Digital Elevation Model (DEM) showing sheltered location of 5LR263.

events. The initial surface survey was undertaken in 1972-73, which resulted in the discovery of 25 archaeological sites, one of these being 5LR263.

5LR263 is located on and in the alluvial deposits of the first terrace above the current channel of Boxelder Creek (Figure 2.3). The site was discerned by the presence of exposed thermal features and surface artifacts. The presence of buried cultural deposits indicated that the site had particular promise to the original investigators (Morris et al. 1979: 2). Under a new contract negotiated in 1974, further

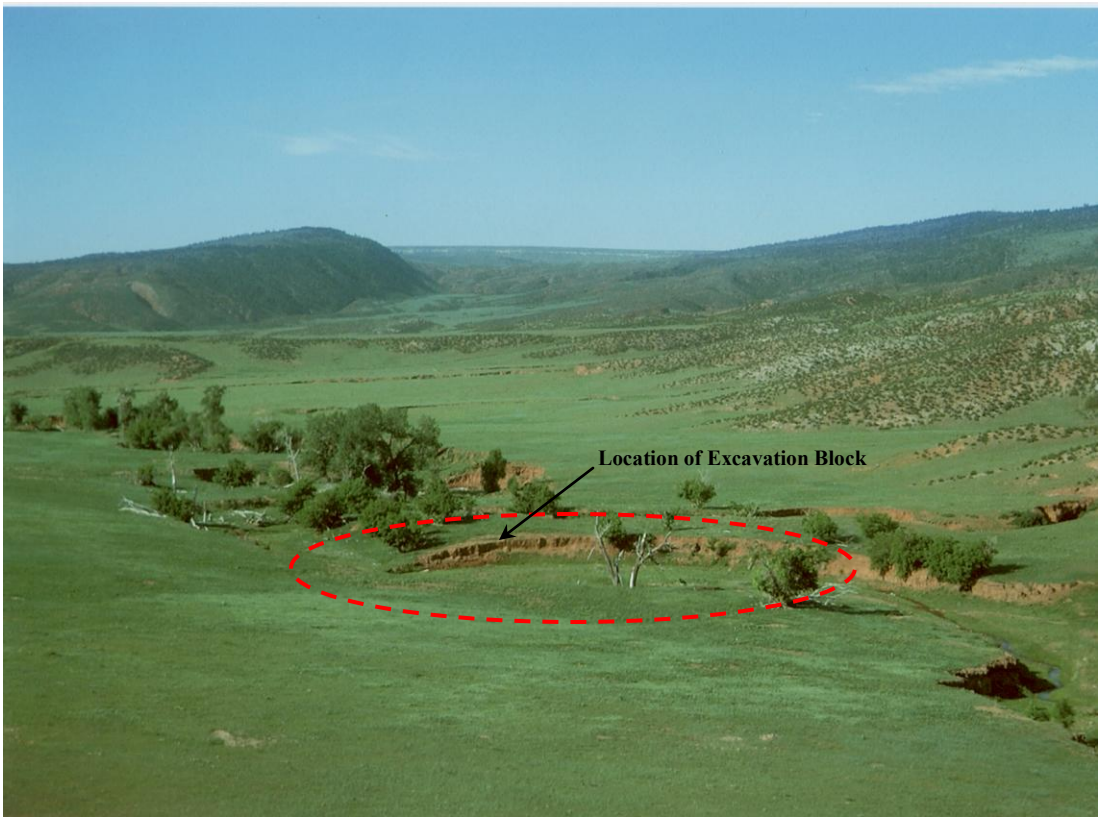

Figure 2.3. Site overview looking southwest, site is located within red outline (photo by Dr. Elizabeth Morris).

fieldwork was undertaken in the spring of that year, including resurvey and test excavations at 5LR263. The investigators were confronted with a site that had undergone intensive erosion since the original survey (Ohr et al. 1979: 1). Additional thermal features were exposed and a vertical exposure indicated indigenous occupations to a depth of at least two meters and charcoal lenses to a depth of over five meters. The horizontal extent of the site was determined to be roughly 60,000 m^2, being bisected by Boxelder Creek. The surface survey in 1974 also revealed artifacts such as glass beads and a clay pipe fragments, indicating that the site had a "Historic post-contact Indian occupation" (Ohr et al. 1979: 1).

Test excavations at 5LR263 were undertaken in May and June of 1974, along what was designated as the "south bank" horizontal subdivision of the site. This area

was chosen for excavation because it contained exposed thermal features and was where all of the post-contact artifacts were found (Ohr et al. 1979: 17). An excavation block composed of three units, each with a maximum dimension of 4 meters (labeled as Grid 1, Grid 2, and Grid 3) was laid out on the terrace using the cutbank edge as the north border (Figure 2.4). The excavation block covered roughly 47.6 m^2 and was dug in geological units based on soil color, grain size and cultural content (Ohr et al. 1979: 17). These geologic units varied from five to ten centimeters in thickness. The *in situ* artifacts were mapped in place to the nearest centimeter from a datum established in the southeast corner of the grid. Unfortunately this information is currently misplaced (or perhaps lost) and cannot be used in this analysis; this problem will be discussed more below. All excavated material was dry screened using a $1/16^{th}$ in (1.587 mm) size screen.

The three units were excavated to a maximum of four natural levels or a depth of roughly 25 centimeters (Ohr et al. 1979: 20). The excavation recovered a small but robust assemblage of trade goods along with a larger number of other artifacts (Ohr et al. 1979: 54). The trade items were found on the surface and the top two excavated levels of the site. The excavations also produced lithic and faunal artifacts including *in situ* horse bone and obsidian flakes. Carbon samples from hearth features in Levels 1 and 2 produced dates of 250$\pm$85 (UGa-816) and 210$\pm$95 (UGa-813) radiocarbon years before present (r.c.y.b.p.), respectively. The site also contained cultural components that predated the Protohistoric occupation. Hearth features in the exposed west bank and north bank of the site were dated to 1370$\pm$175 (UGa-812) and 1675$\pm$85 (UGa-818) r.c.y.b.p. respectively.

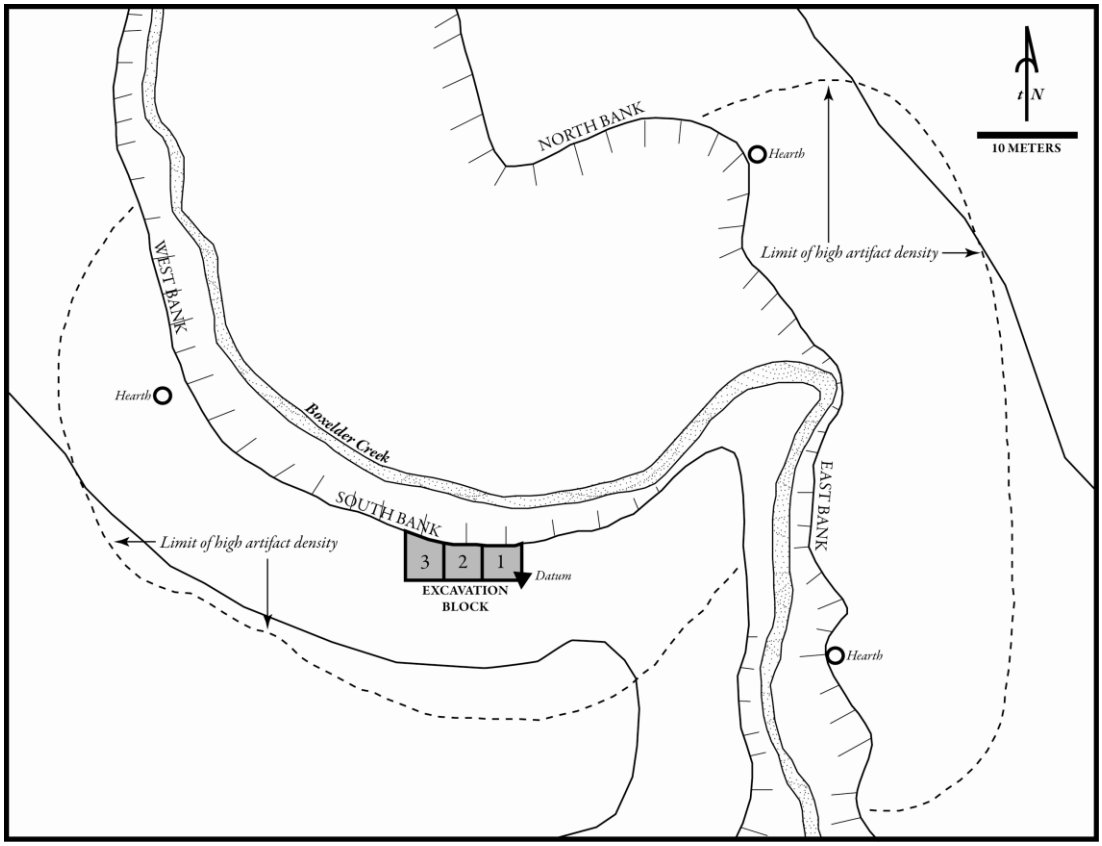

Figure 2.4 Plan map of 5LR263 (adapted from Ohr et al. 1979: Figure 5).

Based on the stratigraphy and artifact assemblage, the initial researchers hypothesized that Levels 1 and 2 represented historic Plains Apache occupations (Ohr et al. 1979: 52). The excavation grids also contained lithic reduction and butchering activity areas. The researchers felt that the mixture of trade goods and items of indigenous manufacture from the surface and levels 1 and 2 were evidence of a pre and post-contact reoccupation at 5LR263.

Unfortunately, the excavation at the site was terminated prematurely due to loss of access to the land because the landowner unexpectedly decided that the work taking place was detrimental to his ranching activities (Morris et al. 1979: 5-6). This meant that the investigative goals of the site were not completely realized and the excavations were not carried out to the full extent that they were initially planned. No

further work was allowed in the area until the summer of 2006, when once again archaeologists from Colorado State University (including the author) performed fieldwork at the site as part of a Larimer County open space development project.

Initially, an area including the Lykins Valley Site was to be destroyed by construction of one of the flood retardation structures (designated B-5). In an effort to protect the site from destruction and because of its importance to the cultural knowledge of the region as a Protohistoric aged locality, 5LR263 was deemed eligible for the National Register of Historic Places (Ohr et al. 1979: 3). However, flood control construction activities impacted all but the core site area as delineated in the 1979 report (Ohr et al. 1979: 18). The portion of the site that was spared from destruction includes the location of the excavation block and fortunately does provide an area where future archaeological investigations can be undertaken.

Fieldwork conducted at the site in June of 2006 focused on mapping, surface collection and metal detection, which was aimed at developing an understanding of the present condition of the remaining site (LaBelle et al. 2006; see Appendix E for complete report of 2006 fieldwork). The 1974 excavation block was relocated and mapping of the cutbank indicated that 70% of the original block has been lost to erosion. The surface of the site is much more heavily vegetated than in 1974, with the terrace basically overgrown with rabbit brush and grasses that severely limit surface visibility.

The completion of the dam and relocation of the active Boxelder Creek channel to the west, although beneficial in protecting the remaining site portions, is probably a factor in the increased vegetation in the area. However, surface collection and metal

detection resulted in the recovery of 87 artifacts, the majority being bone and flakes. The metal detection immediately south of the excavation block located a kettle lug fragment in a subsurface context. The results of the 2006 fieldwork indicate that despite heavy erosion in portions of the site there is still evidence of intact cultural deposits, which merit further investigation.

Assemblage Analysis Approach

The analysis of the Protohistoric component at the Lykins Valley Site is based on the total assemblage that was recovered from the surface and Levels 1, 2 and 3. The original analysis indicated that these levels represented a pre and post-contact reoccupation by Apachean groups (Ohr et al. 1979: 46). However, the artifacts from these stratigraphic units will be collapsed into a single Protohistoric component and analyzed as a one distinct assemblage.

The use of an assemblage approach in this analysis is a decision based on many factors, some of which were voiced in the initial site report:

> Although the radiocarbon date of AD 1740 [from the level 2 hearth] is 40 years more recent than the date supplied by the Level 1 hearth, taking into account the nearness of the stratigraphic units, the similarities of cultural materials, the problems dating recent sites with the Carbon-14 method, and the standard deviations of the samples, the apparent discrepancy does not pose a problem [Ohr et al. 1979: 46].

This is also the case for the bone collagen dates obtained from artifacts in 2006 as will be discussed in Chapter 6. A lack of ceramics in the proposed pre-contact Apachean levels is also evidence that both levels may represent a single occupation.

The occurrence of European items in both of the subsurface levels indicates stratigraphic mixing and calls into question the sanctity of the level separation. Clay pipe fragments recovered from the surface and Level 1 refit, kettle lug fragments

recovered from Levels 1 and 2 refit and glass beads of the same type were recovered from the surface and Level 1. Further evidence that provides support for a single Protohistoric component is found in the weathering patterns of the faunal assemblage.

The faunal analysis involved a determination of weathering stage for each applicable specimen (there were fragments too small to make a determination in the assemblage). The weathering stages are described in Appendix A in Code #18 and are modified from Behrensmeyer's (1978) weathering stages. The weathering stage profile of the cortical bone specimens indicates that by level and overall the frequencies of each type are consistent (Figure 2.5). The majority of the faunal specimens are in stage three and four weathering, which, according to Behrensmeyer (1978), would mean that they were exposed for between 4 and 15 years post mortem. This may indicate that the entire assemblage was exposed for the same amount of time prior to burial and the rate of deposition over the site area was consistent. This similarity could point to a single depositional event resulting in the faunal assemblage.

The distribution of the faunal assemblage is significantly different from a normal distribution (K-S single sample $D=0.201$, $P<0.001$) indicating that there is patterning in the assemblage. Much of this patterning is due to the differences in weathering between the animal body size classes as there is a significant difference in the bison sample compared to the deer/pronghorn in the assemblage (K-S two-sample $D=0.178$, $P=0.019$). The weathering profile of the faunal assemblage for the bison and deer/pronghorn cortical bone components of the assemblage indicates that the bison specimens show increased later stage weathering (Figure 2.6). This pattern is

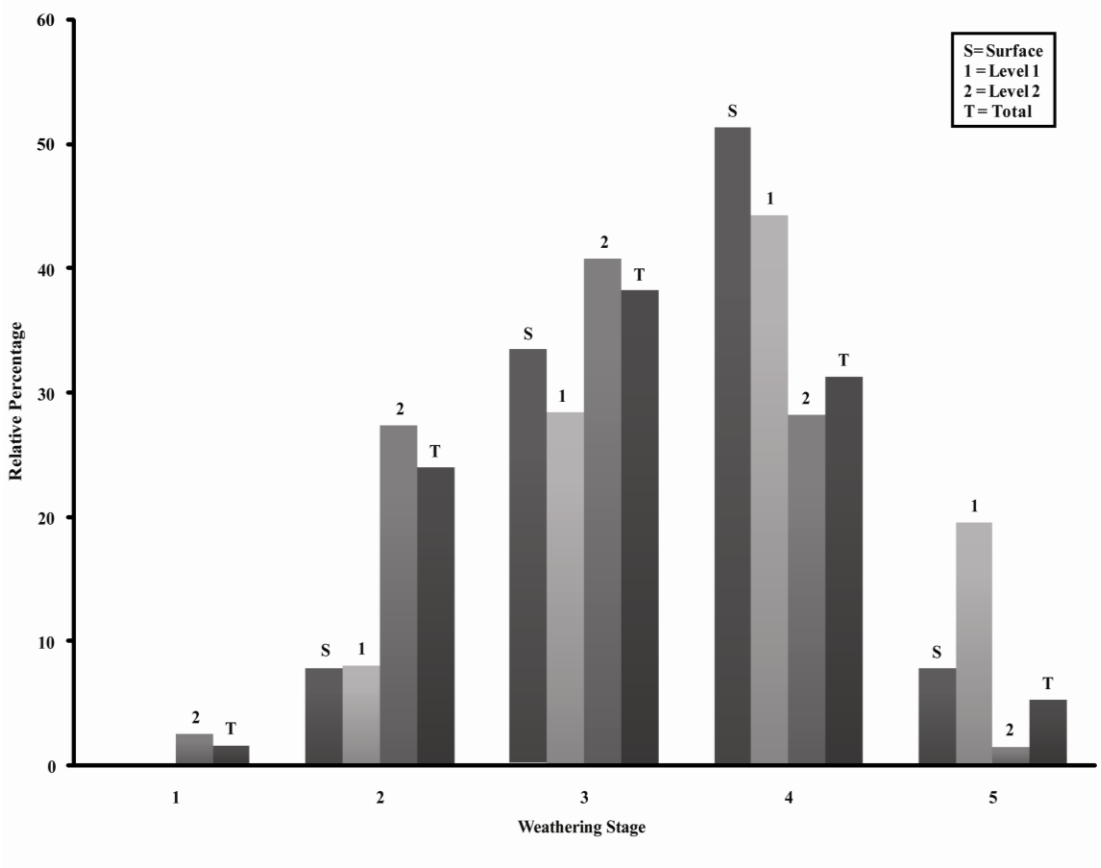

Figure 2.5. Weathering profile of faunal assemblage.

very similar to a profile of two different size class bone assemblages from East Africa (Bower et al. 1985).

In this case, the authors suggest that the differences are due to the larger bones needing more deposition before burial, thus being exposed to aerial weathering longer (Bower et al. 1985). This patterning in the total faunal assemblage from 5LR263 is suggestive that assemblage was deposited more or less simultaneously due to the consistent later stage weathering exhibited by the larger (bison) specimens. This interpretation for the 5LR263 assemblage is substantiated by significant correlations between mass and amount of weathering (N=1240, r_s=0.109, p<0.001), as well as species and amount of weathering (N=1240, r_s=0.150, p<0.001). There is not a

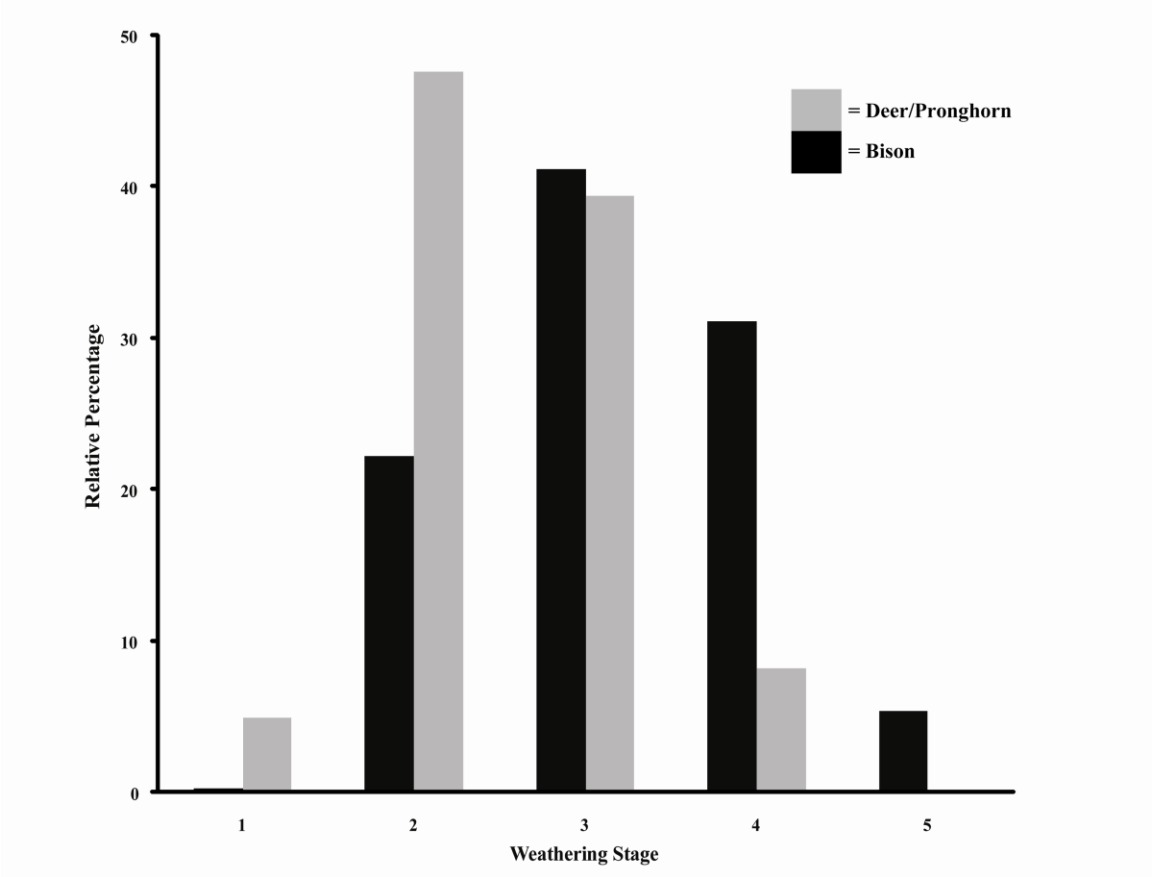

Figure 2.6. Weathering profiles for bison and deer/pronghorn components.

significant correlation, however, between excavation level and amount of weathering (N=1240, r_s=-0.024, p=0.391).

The site maps indicate that artifact concentrations between Levels 1 and 2 have very little spatial overlap, more representative of a single occupation on a sloped surface. It is hard to accept a reoccupation of such a small area by pre and post-contact groups. If there are multiple occupational events at the site, they are too tightly spaced (yearly or within a handful of years) to encompass the amount of time necessary for a group to evolve from a pre-contact pedestrian subsistence to a post-contact equestrian lifestyle, including trade good incorporation. Either there would have to be visual evidence still at the site in the form of still visible features and other

debris for a reoccupying group to map onto that exact spot so precisely, or it would have to be the same group reusing this space. It is my contention that the assemblage may well represent a single occupation that overwintered at the site, as further data from the faunal assemblage discussed in the next chapter demonstrates.

Chapter 3. Faunal Analysis

Analysis of the faunal assemblage from 5LR263 can provide important information about both the site occupants and their occupational characteristics. At 5LR263 in particular, characteristics of the faunal assemblage are used to determine the degree to which the site occupants had incorporated trade goods into their subsistence. The use of trade items such as metal knives and axes would leave a different butchering signature on the faunal assemblage than that from the use of stone tools. Butchering patterns, type and intensity can be a good indication of post-contact assimilation and European impacts on existing Native groups. The faunal assemblage from 5LR263 is especially important because, along with the lithic assemblage, it indicates that certain parts of the post-contact subsistence organization of the site occupants were largely unchanged from pre-contact times.

It is my contention, based on the faunal analysis, that 5LR263 was a small campsite where animal resources were being introduced as relatively complete units periodically throughout the occupation. If animals were being partially processed elsewhere and portions brought back to the site location then there may be evidence of butchering units (Wheat 1972: 18), likely represented by the appendicular skeletal elements. Also, the skeletal elements from the site can be quantified according to their food utility and compared against the different transport strategies defined by Binford (1978: 19-23). This can be used as an indication of the transport of carcasses back to the site by horse, rather than pedestrian means.

Advances in the study of faunal remains from the archaeological record (e.g. Binford 1978; Todd 1987, 1983) have led to an increased awareness that analysis of faunal assemblages is a very important part of any site analysis. An important part of zooarchaeological analysis is discerning the biotic and abiotic processes that have affected site formation and to what degree these processes alter the archaeological record. This analysis will focus on the faunal assemblage in terms of the cultural processes that may have been a factor in its formation.

The faunal assemblage is quantified using a coding format originally developed by Todd (1983) and later refined and modified by other researchers (Hill 2001; Rapson 1990). The coding format used for this analysis is a further modification of the system developed by the above authors (see Appendix A for format and data set). The basic analytical units of MNI (Minimum Number of Individuals) and MAU (Minimum Animal Units) are important to this study, along with the amount of carnivore and human modification that is present on the specimens and the derivation of species and the elemental frequencies of each.

Faunal Analytical Methodology

All specimens from the first three excavated levels of the site, along with surface bone found within the excavation block, were separated from the rest of the assemblage. All other specimens recovered from the lower levels and other surface or slump finds were excluded due to lack of definitive association with the Protohistoric aged deposits. It was determined that a <0.1 gram weight cutoff be applied due to the large amount of small "crumbs" that had accrued in bags of bones, most of which it was felt were due to the storage and deterioration of the specimens

subsequent to their recovery from the site. Each specimen that made the cutoff was then coded for 22 variables, including comments. The assemblage was subjected to an initial coding run through where all the ratio level data (i.e., the mass) was taken, along with any other variables that could be discerned without the use of comparative skeletal specimens.

Specimens that could be further identified with comparative specimens were reanalyzed via direct comparisons with modern and prehistoric bone specimens. This was especially important in species determination and in the intra-elemental differentiation within species in order to determine MNI. After each specimen was identified through comparison, it was binned according to species and element. The final step, once all these specimens had been binned, was an element-by-element analysis for refits and overlaps necessary to develop MNI counts, as well as, skeletal articulation.

Results of Analysis

The analysis of the Protohistoric faunal assemblage at 5LR263 indicates that the site occupants were using at least three different big game animal species as food resources (Table 3.1). Bison (*Bison bison*), Mule Deer (*Odocoileus hemionus*) and Pronghorn (*Antilocapra americana*) skeletal elements represent the main prey species procured for consumption by the occupants of the site. Horse (*Equus caballus*) remains were identified as well but they are excluded from any discussion of food resources given the small number of specimens (n=2) in the assemblage and their predominate use by post-contact native groups as beasts of burden.

Table 3.1. Species represented in faunal assemblage

Scientific Name	Common Name	NISP	NOST [1]	%NISP	MNI
Bison bison	Bison	281	415	69.7	3
Odocoileus/Antilocapra	Deer/Pronghorn	39	70	9.7	1
Odocoileus hemionus	Mule Deer	31	31	7.7	3
Antilocapra americana	Pronghorn	5	5	1.2	1
Equus caballus	Horse	2	2	0.5	1
Mammalia	Unknown mammal	41	997	10.2	1
Rodentia	Unknown rodent	4	7	1.0	1
Aves	Unknown bird	0	6	0.0	1
	TOTAL	**403**	**1533**	**100.0**	

[1] *Number of total specimens refers to both identified and unidentified (from Byerly and Meltzer 2005)*

Morphologically the skeletons of Mule Deer (*Odocoileus hemionus*) and White-Tailed Deer (*Odocoileus virginianus)* are very similar, especially in the post-cranial elements. This makes distinguishing between archaeological specimens of the two species difficult based on comparatives alone. In the case of the 5LR263 assemblage, the determination was based on historical accounts of the ranges of the two deer species in Colorado. According to Hunter (1948), before 1900 white-tailed deer were only present along the Platte and Arkansas River bottoms in extreme northeastern and southeastern Colorado, respectively. Kufeld and Bowden (1995: 3-5), after an examination of early historic accounts from eastern Colorado maintain that the deer mentioned are probably mule deer given the vegetative conditions along the major drainages, and the Platte River historically did not have enough vegetative cover to provide adequate habitat for white-tailed deer. They also conclude that deer "were relatively scarce or only locally abundant on the Plains of eastern Colorado during the early to mid-1800s" (Kufeld and Bowden 1995: 4). Hunting by early settlers and reduced forage are cited as reasons for the low numbers of animals. These factors may not have affected the deer population at and around Lykins Valley during the occupation of 5LR263, but the historic evidence strongly suggests that there were no

white-tailed deer in the Boxelder drainage prior to 1900 and no white-tailed deer have been observed in the site vicinity at any time during fieldwork and other visits in 2006 and 2007. Mule deer, on the other hand, were observed frequently in the area, which is a much more suitable habitat for this species.

Of the 1533 individual specimens analyzed from 5LR263, 403 (26.3 %) were identifiable to species or genus. Bison dominate the assemblage with 69.7% of the identifiable specimens, followed by mule deer (7.7%). As a conglomerate, the identifiable non-bison mammalian species (20.1%) trail far behind the bison. The greater size of the bison specimens in comparison to the other species, meant size could be used as a distinguishing characteristic in separating out the bison component. Where there was overlap in size, such as in the mule deer and pronghorn, only more complete specimens that retained distinctive landmarks were able to be speciated and most of the smaller more fragmented specimens had to be designated as deer/pronghorn, which is a size class category still useful in this analysis. There is also size overlap between the bison and the horse, but the two species have distinct differences in their skeletal element morphology making speciation possible.

Minimum Number of Individuals (MNI)

The Minimum Number of Individuals (MNI) for each species is calculated based on the number of individual animals necessary to account for a particular skeletal element with ontogenetic age differences taken into account following Klein and Cruz-Uribe (1984). The MNI on Table 3.1 is the largest figure calculated for each species in the assemblage. The MNI of three for bison is based on recovered mandibles from two juvenile animals and post-cranial elements from a mature animal.

The MNI for the mule deer is based on tibiae, with size and side overlap being the criteria. The horse and pronghorn in the faunal assemblage both have MNI values of one.

Minimum Animal Units (MAU)

Looking at the assemblage broken down by element (Table 3.2) indicates that the overall Minimum Number of Elements (MNE) and Minimum Animal Units (MAU), based on Binford (1984: 50-51), are low for all species. The largest Percent MAU (%MAU) for bison and mule deer components of the assemblage can be found in the cranial elements. The next largest %MAU values for both species are the mandible and various long bone elements. According to the %MAU measure, the bison and mule deer assemblage appears to be dominated by the cranial and mandibular elements. In my interpretation, this indicates transport of carcasses with the skulls attached, rather than an assemblage dominated by elements of the skull due to selective transport of these elements. Overall, the MAU values are low (≤ 2.00) throughout the assemblage and the preponderance of skull elements that the %MAU values indicate is misleading. The pronghorn and horse in the assemblage are based on very small NISP values and lack informative power. The even overall elemental representation evident in Table 3.2 is an indication of the low numbers of animals that were brought to the site.

In order to assess if density mediated attrition (Lyman 1994: 235-258) has affected the faunal assemblage, Kreutzer's (1992 and 1996) volume densities were compared against the %MAU of the bison and mule deer. For this analysis, the density measurements were averaged for each element and the os coxae was treated

Table 3.2. Species breakdown by element

Scientific Name	Common Name	Skeletal Element - CODE	NISP	MNE	MAU	%MAU
Bison bison	Bison	Cranium - CR	12	2	2.00	100.0
		Mandible - MR	12	3	1.50	75.0
		Maxillary molar - MMX	1	1	0.17	8.3
		Maxillary premolar - PMX	1	1	0.17	8.3
		Incisor - IC	6	1	0.17	8.3
		Cervical vertebra - CE	1	1	0.20	10.0
		Thoracic vertebra - TH	2	2	0.14	7.1
		Lumbar vertebra - LM	4	2	0.40	20.0
		Rib - RB	125	3	0.11	5.4
		Scapula - SC	4	1	0.50	25.0
		Humerus - HM	18	1	0.50	25.0
		Radius - RD	6	1	0.50	25.0
		Ulna - UL	3	2	1.00	50.0
		Metacarpal - MC	3	1	0.50	25.0
		Intermediate carpal - CPI	1	1	0.50	25.0
		Radial carpal - CPR	1	1	0.50	25.0
		Fused 2nd & 3rd carpal - CPS	1	1	0.50	25.0
		4th carpal - CPF	1	1	0.50	25.0
		Femur - FM	16	2	1.00	50.0
		Patella - PT	1	1	0.50	25.0
		Tibia - TA	24	3	1.50	75.0
		Lateral malleolus - LTM	2	2	1.00	50.0
		Metatarsal - MT	2	1	0.50	25.0
		Os coxae - IM	3	1	1.00	50.0
		1st phalanx - PHF	2	2	0.25	12.5
		2nd phalanx - PHS	1	1	0.13	6.3
		3rd phalanx - PHT	6	4	0.50	25.0
		Proximal sesamoid - SEP	1	1	0.06	3.1
		Distal sesamoid - SED	1	1	0.13	6.3
Odocoileus/ Antilocapra	Deer/Pronghorn	Molar - MUN	1	1	0.08	16.7
		Lumbar vertebra - LM	1	1	0.20	40.0
		Rib - RB	17	2	0.07	14.3
		Carpal - CP	1	1	0.10	20.0
		Tibia - TA	2	1	0.50	100.0
		Fused central & 4th tarsal - TRC	3	1	0.50	100.0
		Metatarsal - MT	2	1	0.50	100.0
		1st phalanx - PHF	1	1	0.13	25.0
Odocoileus hemionus	Mule deer	Cranium - CR	5	2	2.00	100.0
		Mandible - MR	5	3	1.50	75.0
		Antler - ANT	3	3	1.50	75.0
		Incisor - IC	1	1	0.17	8.3
		Costal cartilage - CS	3	2	0.07	3.6
		Humerus - HM	2	1	0.50	25.0
		Radius - RD	1	1	0.50	25.0
		Metacarpal - MC	1	1	0.50	25.0
		Tibia - TA	7	3	1.50	75.0
		Calcaneus - CL	1	1	0.50	25.0
		Metatarsal - MT	1	1	0.50	25.0
		Metapodial - MP	1	1	0.25	12.5
Antilocapra americana	Pronghorn	Humerus - HM	1	1	0.50	100.0
		Tibia - TA	1	1	0.50	100.0
		Calcaneus - CL	1	1	0.50	100.0
		1st phalanx - PHF	2	2	0.25	50.0
Equus caballus	Horse	Scapula - SC	1	1	0.50	100.0
		Metapodial - MP	1	1	0.50	100.0

as a single element (i.e., the densities for the ischium, illium, acetabulum and pubis were all averaged for the value used in this comparison). The bison show that there

was no significant correlation ($N = 22$, $r_s = 0.341$, $p = 0.121$) between the two sets of values. This is also the case with the mule deer ($N = 8$, $r_s = -0.591$, $p = 0.123$). This suggests that density mediated attrition is not a factor in bone survival and representation in the assemblage. One factor for a lack of attrition may be the age of the site.

Skeletal Portion

Recording skeletal units or portions was used initially at the Olsen-Chubbuck site in order to examine butchering practices because it was postulated by the researchers that articulated skeletal elements represented portions cut off during processing (Wheat 1972: 18). At 5LR263, analysis of the curated assemblage did not provide the opportunity to gather this type of data from *in situ* faunal remains. An analysis of the assemblage broken down by skeletal unit or portion was done on a more general level in order to determine the completeness of the prey animals that were being brought back to the site. The horse, bison, mule deer and pronghorn components of the assemblage were broken down into the following categories: *Axial* – which includes the os coxae, vertebral column and ribs; *Appendicular* – which was a catch-all for unidentified long bone specimens and the phalanges and sesamoids; *Forelimb* – which includes the bones of the forelimbs from distal scapula on down; *Hindlimb* – which includes the bones of the hindlimbs from the proximal femur on down and *Cranial* – which includes the cranium and mandibles.

The frequencies of the skeletal units are shown in Figure 3.1. As the graph indicates, the species most represented at the site (bison and mule deer) have elements found in each of the different units. Another representation of this is given in Figure 3.2. The NISP of the bison (n=388) is increased over that given in Table 3.1 (n = 281) because of the inclusion of unidentified long bone fragments in the Appendicular category. This is also the case for the combined deer and pronghorn category, where the NISP is increased from 70 to 100. The occurrence of all types of elements in the bison and mule deer provide evidence that entire animals were being brought to the site to be processed.

The bison and the total combined mule deer and pronghorn skeletal portion frequencies are compared with a complete generalized ungulate skeleton (Figure 3.3). The complete skeleton frequencies are based on a Cranial portion of 33 separate named portions including the mandibles and teeth minus horn or antler. The Axial portion frequency is derived from bison skeletal counts of vertebrae, sacrum and caudal vertebrae and uses twenty-eight ribs, but does not include the costal cartilage or sternabrae. Finally, the Appendicular portion includes the phalanges and sesamoids.

The frequency profile of the combined deer/pronghorn and bison is very similar to that of the complete skeleton. This indicates that the skeletal elements from 5LR263 in a relative sense are highly representative of complete carcasses. Complete carcass transport would have been possible using horses, which the site occupants would

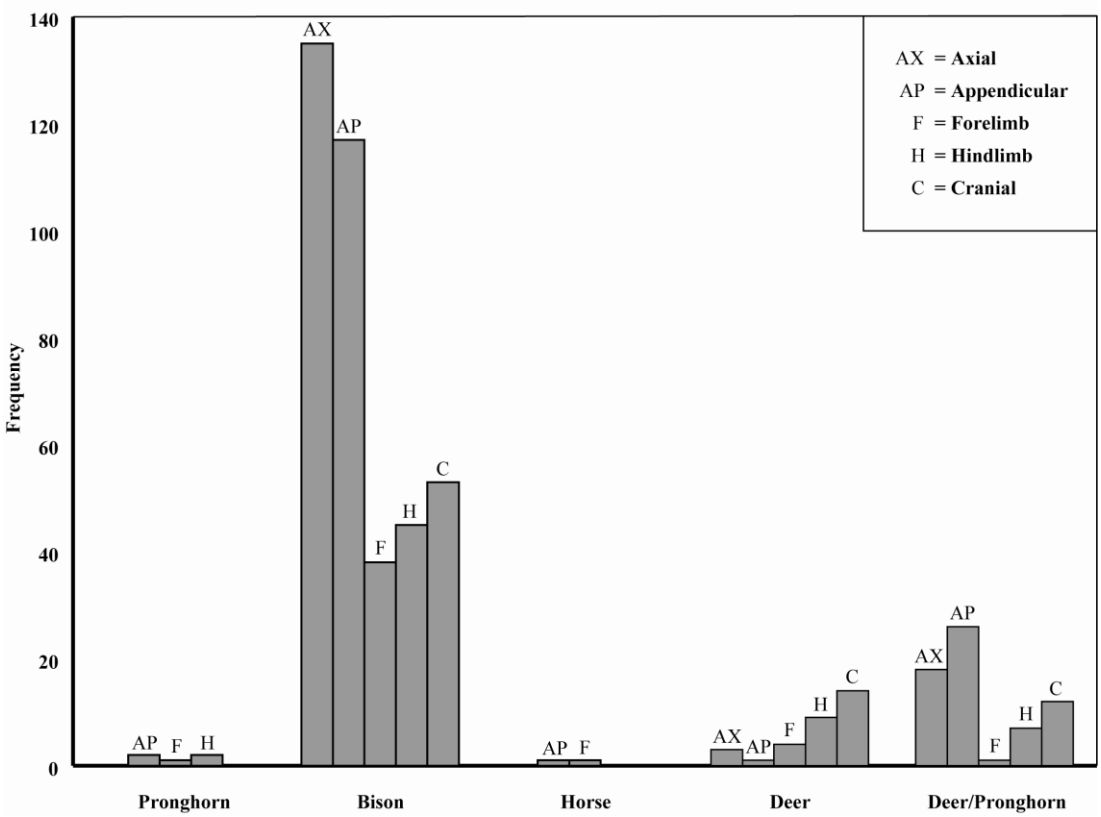

Figure 3.1. Assemblage breakdown by skeletal portion.

have had access to, according to the horse remains and will be discussed in more detail below.

When examining the skeletal portion frequencies (Table 3.3) using G scores, which is a contingency table statistic that is similar to chi-square but more robust (Meltzer et al. 2006: 163), there is a significant difference in their distribution by portion ($G = 64.150$, $df = 20$, $p < 0.001$). Freeman-Tukey deviates, which identify cell values that are significantly larger or smaller than what would be expected by the null hypothesis, indicate that bison portion frequency does not differ significantly, but the deer are under-represented in the Axial and Appendicular cells and over-

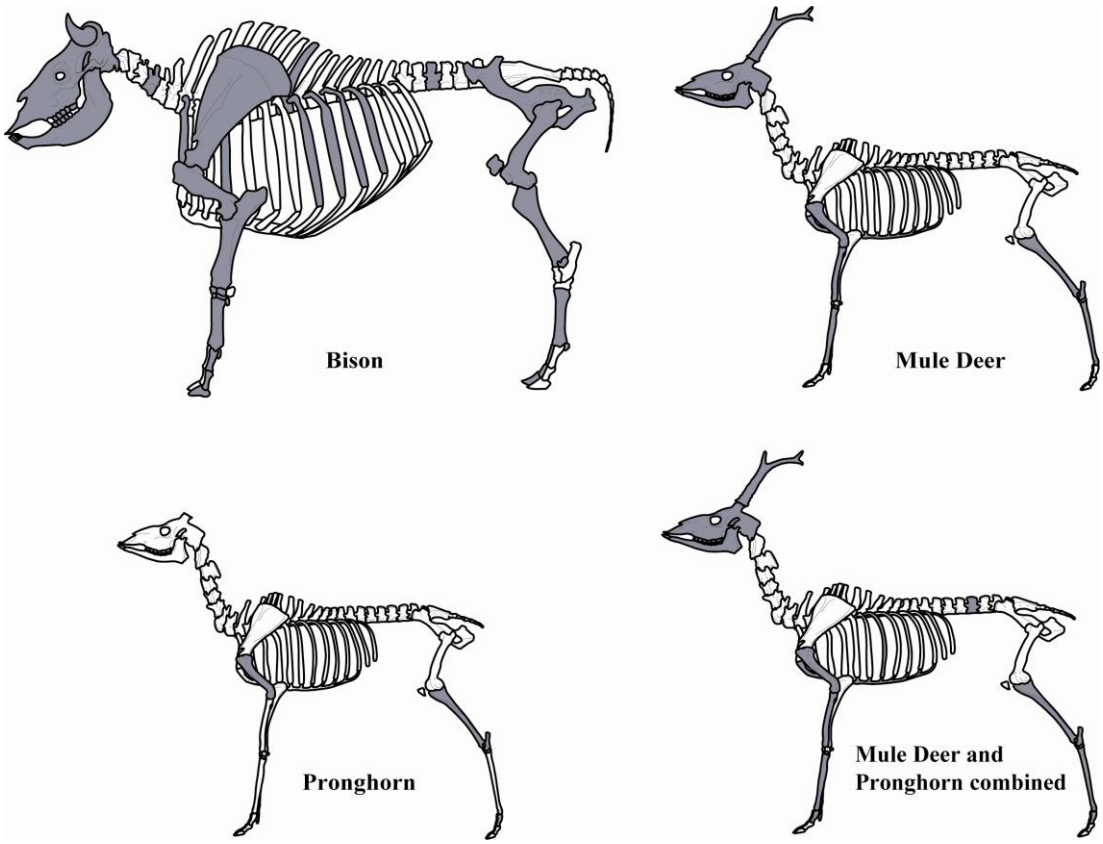

Figure 3. 2. Elements represented in gray, skeletal drawings by Yvinec and Coutureau (2005).

represented in the Hindlimb and Cranial cells. Pronghorn is under-represented in the Axial cell. The bison data support the complete carcass hypothesis. The deviance in the mule deer component could be due to the mule deer specimens that are not identified as such in the Deer/Pronghorn category.

However, a G score analysis of the data from Figure 3.3 was performed and indicates that there is a significant difference ($G = 18.917$, $df = 8$, $p = 0.015$) in the distribution of the combined mule deer and pronghorn components (Table 3.3). Freeman-Tukey deviate analysis shows that the cells of the combined mule deer and

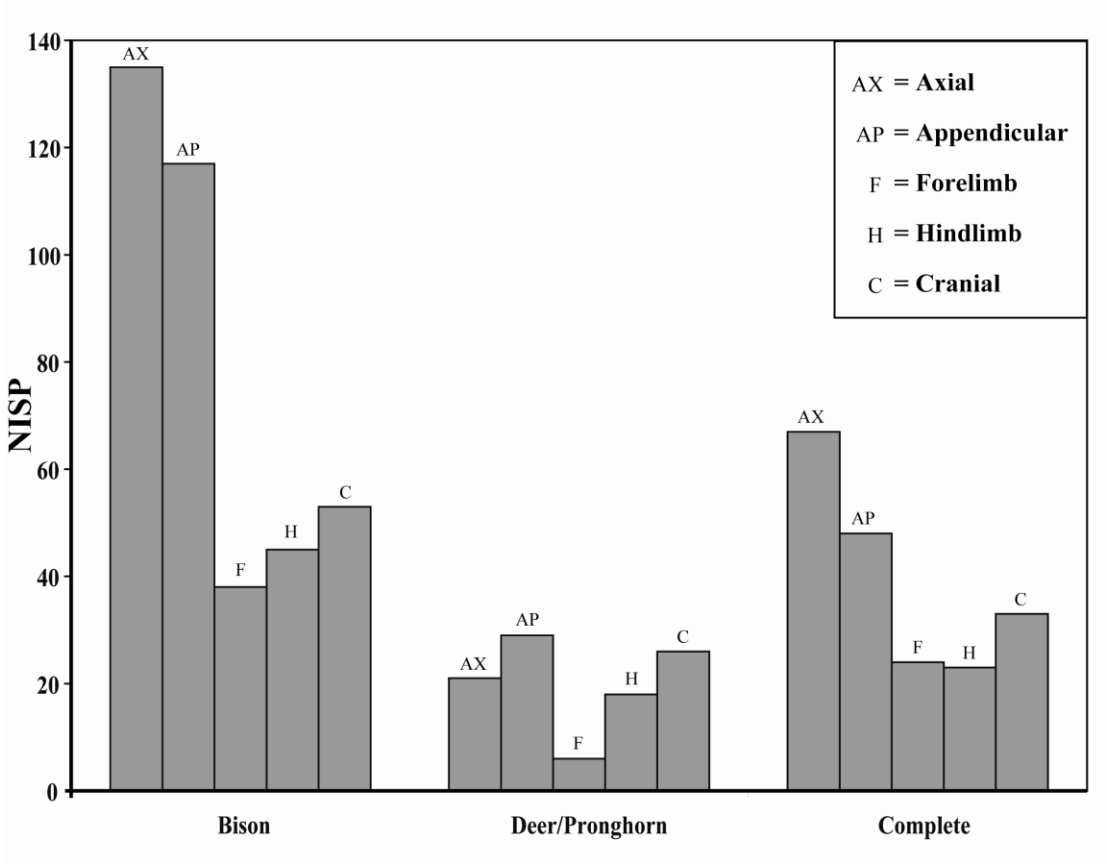

Figure 3. 3. Skeletal portion frequencies compared to a complete skeleton.

pronghorn show the same deviation pattern as the deer component alone, the only difference being that the Appendicular cell of the combined does not deviate significantly. The complete skeleton shows no deviation between the cells just the same as the bison does in both cases. This analysis indicates for the most part that the skeletal elements of the prey species at the site represent remains of relatively complete carcasses.

Transport Strategy

Since ethnographic data indicate the hunter-gatherers often transport skeletal elements as complete bones rather than portions of bones (O'Connell et al. 1990), the

Table 3.3. Complete Protohistoric faunal assemblage by skeletal unit

Observed Values - Total assemblage

	Axial	Appendicular	Forelimb	Hindlimb	Cranial	Unidentified	*Total*
Bison	135	117	38	45	53	27	*415*
Deer/Pronghorn	18	26	1	7	12	6	*70*
Deer	3	1	4	9	14	0	*31*
Antelope	0	2	1	2	0	0	*5*
Horse	0	1	1	0	0	0	*2*
Total	*156*	*147*	*45*	*63*	*79*	*33*	*523*

Freeman-Tukey Deviates - Total assemblage

	Axial	Appendicular	Forelimb	Hindlimb	Cranial	Unidentified
Bison	1.01	0.06	0.42	-0.69	-1.24	0.20
Deer/Pronghorn	-0.59	1.37	**-2.59**	-0.42	0.49	0.77
Deer	**-2.43**	**-3.57**	0.82	**2.17**	**3.17**	**-1.97**
Antelope	**-1.64**	0.57	0.76	1.30	-1.01	-0.50
Horse	-0.84	0.61	1.11	-0.40	-0.49	-0.23

Significance at the p=.05 level (+/- 1.600303) is shown in bold.

Observed Values - Figure 3.3 data

	Axial	Appendicular	Forelimb	Hindlimb	Cranial	*Total*
Bison	135	117	38	45	53	*388*
Deer/Pronghorn	21	29	6	18	26	*100*
Complete	67	48	24	23	33	*195*
Total	*223*	*194*	*68*	*86*	*112*	*683*

Freeman-Tukey Deviates - Figure 3.3 data

	Axial	Appendicular	Forelimb	Hindlimb	Cranial
Bison	0.75	0.66	-0.06	-0.52	-1.36
Deer/Pronghorn	**-2.20**	0.16	-1.29	**1.44**	**2.14**
Complete	0.44	-0.99	1.03	-0.27	0.22

Significance at the p=.05 level (+/- 1.431355) is shown in bold.

Standardized Food Utility Index (SFUI) developed by Metcalfe and Jones (1988) can be used as a measure of economic utility. Following Faith and Gordon (2007), the SFUI was used to consider transport strategies at 5LR263. A SFUI value was obtained for the elements in the bison and combined mule deer/pronghorn components of the faunal assemblage (Table 3.4). As indicated in Table 3.4, the majority of the assemblage is composed of elements with a utility of less than 50. The tibiae in the deer and pronghorn component represent an exception where an element with a large SFUI is highly represented, which is a possible indication of

Table 3.4. Prey species assemblage with Standardized Food Utility Index (SFUI) data

Common Name	Skeletal Element - CODE	NISP	MNE	MAU	%MAU	SFUI
Mule deer and pronghorn combined	Tibia - TA	10	5	2.50	100.0	53.5[a]
	Cranium - CR	5	2	2.00	80.0	9.1
	Mandible - MR	5	3	1.50	60.0	31.1
	Antler - ANT	3	3	1.50	60.0	1
	Humerus - HM	3	2	1.00	40.0	40.8[a]
	Calcaneus - CL	2	2	1.00	40.0	27.7
	Metatarsal - MT	3	2	1.00	40.0	17.5[a]
	Radius - RD	1	1	0.50	20.0	23[a]
	Metacarpal - MC	1	1	0.50	20.0	8.1[a]
	Fused central & 4th tarsal - TRC	3	1	0.50	20.0	27.7
	First phalanx - PHF	3	3	0.38	15.2	8.6
	Lumbar vertebra - LM	1	1	0.20	8.0	33.2
	Carpal - CP	1	1	0.10	4.0	12.7
	Rib - RB	17	2	0.07	2.8	51.6
Bison	Cranium - CR	12	2	2.00	100.0	9.1
	Mandible - MR	12	3	1.50	75.0	31.1
	Tibia - TA	24	3	1.50	75.0	53.5[a]
	Femur - FM	16	2	1.00	50.0	100[a]
	Os coxae - IM	3	1	1.00	50.0	49.3
	Scapula - SC	4	1	0.50	25.0	44.7
	Humerus - HM	18	1	0.50	25.0	40.8[a]
	Radius - RD	6	1	0.50	25.0	23[a]
	Metacarpal - MC	3	1	0.50	25.0	8.1[a]
	Intermediate carpal - CPI	1	1	0.50	25.0	12.7
	Radial carpal - CPR	1	1	0.50	25.0	12.7
	Fused 2nd & 3rd carpal - CPS	1	1	0.50	25.0	12.7
	4th carpal - CPF	1	1	0.50	25.0	12.7
	Metatarsal - MT	2	1	0.50	25.0	17.5[a]
	3rd phalanx - PHT	6	4	0.50	25.0	8.6
	Lumbar vertebra - LM	4	2	0.40	20.0	33.2
	1st phalanx - PHF	2	2	0.25	12.5	8.6
	Cervical vertebra - CE	1	1	0.20	10.0	37.1
	Throracic vertebra - TH	2	2	0.14	7.1	47.3
	2nd phalanx - PHS	1	1	0.13	6.3	8.6
	Rib - RB	125	3	0.11	5.4	51.6

[a] *Number is average of proximal and distal values from Metcalfe and Jones (1988: Table 2).*

differential transport. However, the low overall MNE of the entire component means there is a more uniform representation than the %MAU would indicate.

These data were then plotted against the %MAU with generalized transport strategies of *unbiased, bulk*, *unconstrained* and *gourmet* (Binford 1978). An *unbiased* transport strategy is where skeletal elements are transported in direct proportion to their economic utility; a *bulk* transport strategy is where the quantity of all but the lowest utility elements is maximized; the *unconstrained* transport strategy being where all elements all transported; and the *gourmet* transport strategy is where

the quality of elements transported is maximized based on utility (Faith and Gordon 2007: 872-873). The resulting plot (Figure 3.4) shows that the elements found at 5LR263 do not tightly adhere to any of the idealized transport strategies. This indicates that the species were not differentially transported and visually the strategy would appear to be most similar to the specialized bulk or gourmet strategies.

Faith and Gordon (2007) present a convincing argument that the Shannon evenness index can be used to quantitatively assess the different transport strategies. The index is expressed as the evenness (E) = $-\Sigma p_i \ln p_i / \ln S$, where p_i is the MAU for each element divided by the total MAU and S is the number of types of elements. When this calculation is performed on the bison component of the assemblage, the value (E = 0.915) is slightly closer to the bulk transport value (E = 0.980) than the unbiased transport value (E = 0.842) (values from Faith and Gordon 2007: 875). The combined mule deer/pronghorn value E = 0.883 is closest to the unbiased strategy. In both cases the evenness measurement indicates a transport strategy that would support use of the horse for carcass transport.

Bone Breakage

Characteristics of the faunal assemblage can speak to how prey was processed. Green bone break and impact cones can generally be used as indicators of human modification, especially when this type of modification is found in conjunction with other artifacts (Marshall 1988). The Protohistoric assemblage has 1317 specimens (85.9%) that exhibit green bone break; these specimens being broken before the bones had dried. Fragments less than five centimeters with green bone breakage compose 50.5% of the total assemblage. This indicates a high degree of

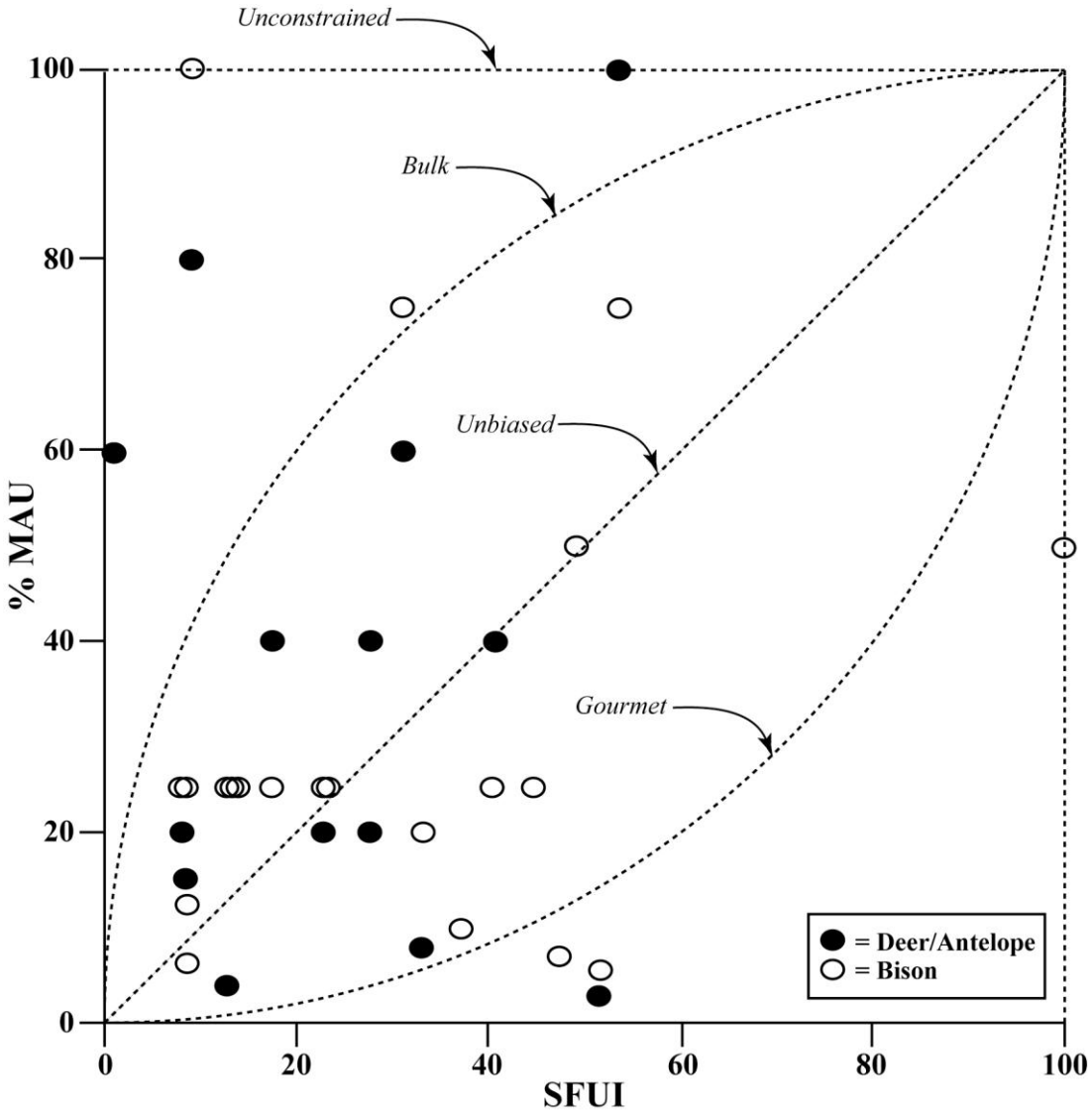

Figure 3.4. 5LR263 bison and mule deer/pronghorn with generalized transport strategies.

fragmentation, possibly during processing. There were 68 impact cones recorded (Figure 3.5), 70.6% on bison bone and 92.6% were found on ribs and long bones (Figure 3.6). The assemblage contained 124 impact flakes that are "pieces with a platform of cortical bone, a bulb of percussion and parts of the surface of the interior marrow cavity" (Bunn 1988: 83), strong evidence that intensive processing was taking place on-site.

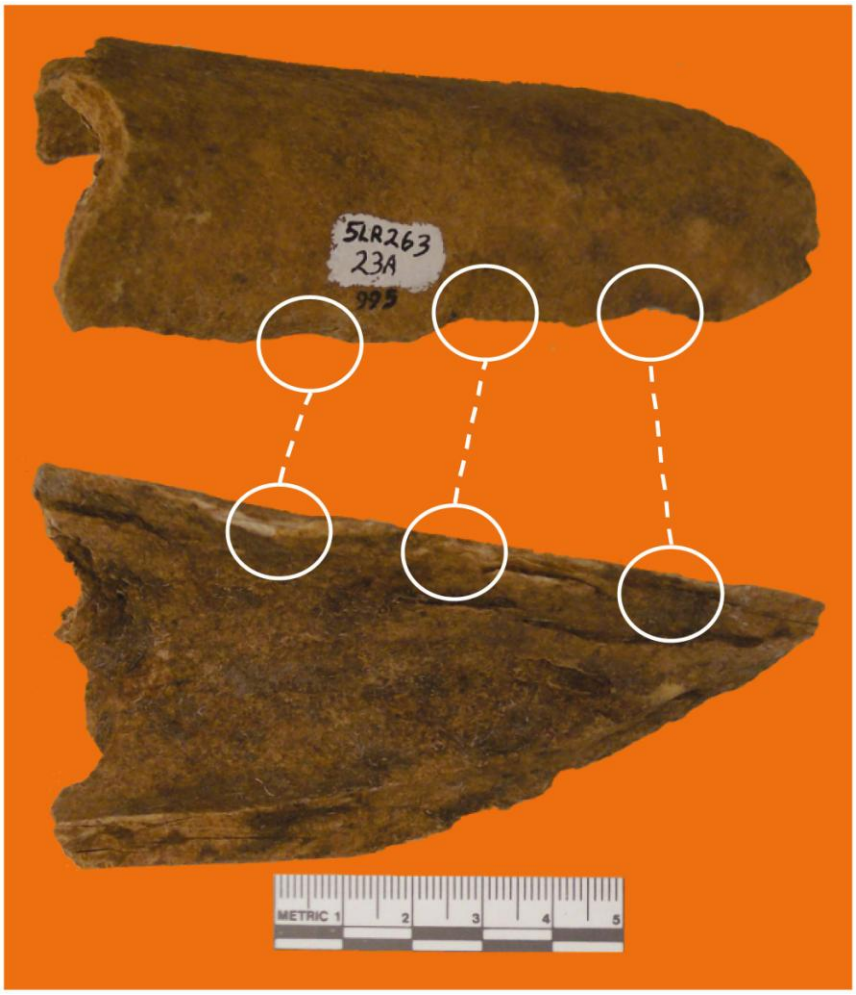

Figure 3.5. Bison right humerus fragment showing multiple impact cones.

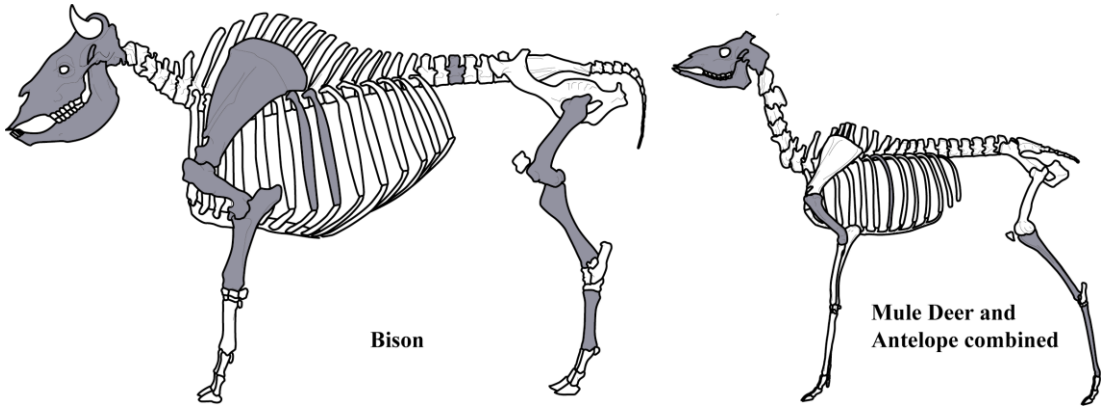

Figure 3.6. Elements with impact cones in gray, skeletal drawings by Yvinec and Coutureau (2005).

Thermal Modification

Thermal modification of the specimens was noted in the form of carbonized or calcined bone. A total of 270 specimens had this type of modification, 17.6% of the assemblage. Two hundred thirteen of these (85.6%) are unidentified fragments. This most likely resulted from the heating or burning bone, which affects its durability and changes fracture type (Outram 2001: 403). The number of burned specimens identified as bison (n = 17) is slightly less that that of deer or pronghorn combined (n = 20) and these similar values could be indicative of similar treatment of the carcasses despite size and species. An overall lack of thermal modification in the form of carbonized or calcined bone, especially on the larger specimens could point to a cooking process where the meat was not removed from the bones.

Seasonality

The bison and mule deer components of the assemblage provide evidence of the seasonality of the site occupation (Figure 3.7). There are two bison mandibles from juvenile animals that, based on M1 eruption, are both from animals that were less than six months old at the time of death. Comparison with modern specimens housed at the Laboratory for Human Paleoecology at Colorado State University indicates that these animals were four to five months old at the time of their demise.

Using late April to early May as a generally accepted calving period, this places the time of death in August or September. The mule deer frontal has the small pedicle of an immature animal less than three years of age. The disintegrating ring of bone on the pedicle indicates that the animal was getting close to shedding its antler. Mule deer generally shed their antlers in January, so this places the time of death

Figure 3.7. Mule deer frontal (top) and bison mandible (bottom) used for seasonality.

slightly before that. Using bison and mule deer evidence as rough bookends shows that the site was at least occupied from late summer into the winter.

Horse and Camp Size Considerations

The size of the deer and two juvenile bison represented in the faunal assemblage are well within the load range that a horse is capable of transporting. Using an estimate of ~86-95 kg as the live weight for each of the two bison calves and a live weight range of ~50 – 73 kg for the mule deer and pronghorn gives a composite weight range where even the whole undressed carcasses could have been transported by a horse. This conclusion is based on the Ewers's estimated load range of 90 – 136 kg for a typical horse (Ewers 1955: 306-308).

The two bison calves (~90 kg each), at least one mature bison (~500 kg), three mule deer (~60 kg each) and one pronghorn (~60 kg) would have conservatively

provided ~552 kg of meat (MTWT). This value for usable meat was calculated using the equation (modified from White [1953]): $MTWT = \Sigma MNI_s(0.60)(LW_s)$, where MNI_s is the minimum number of individuals by species, 0.60 is the percentage of live weight representing meat and LW_s is the live weight by species. This value, as a rough baseline estimate of the amount of meat that was available for consumption at 5LR263, is used to calculate some hypothetical occupation lengths (Table 3.5). The amount of usable meat, based on the MNI, may not have supported the caloric needs of a large group through the winter, but could very well have been consumed by a small group when introduced into the site individually throughout the occupation.

The occurrence of horse bone at 5LR263 has been used as evidence that the horses were employed by the site occupants. Why these two particular specimens (i.e., a distal scapula and distal metapodial) of horse bone were deposited at the site is puzzling. However, the occurrence of discrete horse elements has some precedents in the archaeological record. At the River Bend Site, a Shoshoni campsite along the North Platte River in central Wyoming a single horse cranium was recovered *in situ*, but no other *equus* elements were found (Buff 1983: 15). The Biesterfeldt Site, a fortified village attributed to the Cheyenne in North Dakota, contained a storage pit with articulated horse bones (Wood 1971: 22). These instances indicate that horses may have received unusual treatment compared to other animals that Protohistoric groups introduced into their camp locations.

Both specimens from 5LR263 have green bone breakage and the scapula exhibits an impact cone as well. That these specimens represent an animal or animals processed and consumed for food is possible, but the lack of more elements

Table 3.5 Hypothetical meat consumption scenarios for 5LR263

Group Size	Kilogram(s) per person	Total Kilograms	Occupation Length (Days)
5	1.0	552	110.4
10	1.0	552	55.2
15	1.0	552	36.8
20	1.0	552	27.6
5	3.7	552	30
5	1.6	552	70
5	1.0	552	110
5	0.7	552	150
10	1.8	552	30
10	0.8	552	70
10	0.5	552	110
10	0.4	552	150

representative of a complete carcass is problematic. These two particular elements could represent an instance of opportunistic scavenging of an animal that perished during the winter where size considerations meant that there was selective transport of the appendicular portions.

Summary

The faunal analysis indicates that the occupants at 5LR263 were processing and utilizing animals to fully extract the available nutrients. The carcasses were being brought into the site as relatively whole packages and this was enabled by the use of horses for transport. The processing intensity of the animal remains based on the amount of breakage was high indicating that the animals were completely used up as resources. The seasonality of the site occupation based on the faunal evidence is at least throughout the winter.

Overall, the evidence supports a scenario where a small group wintered at 5LR263 and was at least partially sustained by meat and other foodstuffs from at least seven animals that were brought into the site as relatively whole carcasses and intensively processed. It is also probable that these carcasses were introduced singly

as the food requirements of the groups necessitated. The prey species represented in the faunal assemblage indicates that the economy of the Native group at the site was largely unchanged compared to pre-contact times. The use of the horse may have eased some of the previous pedestrian logistical constraints, but overall the signature of the processing and utilization of the animals is reminiscent of prehistoric use.

A lack of evidence for metal tools used in butchering indicates that more traditional indigenous technologies were used. The lithic assemblage from the Protohistoric component of 5LR263 as a whole indicates that this technology was still utilized by the site occupants. Therefore, it is important that this aspect of the site assemblage be analyzed in order to determine the importance of lithic technology to the Native group at 5LR263. The following chapter details the lithic analysis of the 5LR263 site assemblage.

Chapter 4. Lithic Analysis

The analysis of the lithic assemblage is important because it is an avenue by which hierarchical organizational relationships can be recognized. The question of what is the relationship between the stone tools and the introduced trade items, whether the lack of one precipitates the use of the other, or if there is truly a preference of one over the other. Access to the trade items and types available was certainly a factor, but a preference and one-way relationship between available trade items and their use is not always demonstrated archaeologically (cf. Rogers and Wilson 1993).

Beyond a means to understand the correlation between post-contact technologies and pre-contact subsistence, analysis of the lithic materials from 5LR263 can provide information about the basic subsistence of the site occupants. The numbers and types of stone tools used and/or discarded at the site can be indicative of this subsistence. Lithic assemblage characteristics such as material type, reduction strategy, debitage frequencies are important factors in determining how the indigenous technology was possibly synthesized with introduced trade items.

An important and rare aspect of 5LR263 is the occurrence of lithic materials in co-association with the items of European manufacture. Understanding the relationship between the indigenous and European technologies employed at the site is important for determining site function and the degree of dependence on post-contact trade items. Therefore, it is important to analyze this portion of the

assemblage to understand how it was used in conjunction with the introduced European technology.

Unfortunately, the examination of the extant collection was undertaken sans any provenience data from the 1974 excavations, as these records were unable to be located. Thus the analysis is carried out on two levels: (1) using the complete site assemblage; and (2) using the sample that could be definitively assigned to the Protohistoric component of the site. A number of lithics could be definitively assigned to the Protohistoric component based on artifact container labels that designated an excavation level and horizontal grid location. Surface artifacts were excluded because Ohr et al. (1979: 24) makes clear that "this material represents a mixing of cultural deposits since collection was made on the surface and along slump deposits near Boxelder Creek."

Using the complete assemblage increases the sample size allowing for better pattern or trend recognition. Based on the report of the frequencies of artifacts recovered by level (Ohr et al. 1979: 54), the preponderance of the lithic artifacts was recovered from the Protohistoric components. Therefore, the total assemblage, including artifacts of unknown provenience, should contain artifacts primarily from the Protohistoric occupation (Table 4.1). The majority of the total assemblage probably derives from the Protohistoric component. However, the known Protohistoric component sample is statistically different than the complete assemblage in both material type frequency ($\chi^2 = 39.51$, $df = 9$, $p < 0.005$) and size grade frequency ($\chi^2 = 98.17$, $df = 5$, $p < 0.005$). So the complete sample is used in the analysis of continuous variables because it provides a more representative picture of

Table 4.1. Debitage frequencies from Ohr et al. (1979)

Designation[1]	Level	Utilized Flakes	Primary Flakes	Retouch Flakes	*Total*	*Percentage*
Unknown	Surface	10	59	34	*103*	*10.50*
Protohistoric	1	2	30	362	*394*	*40.16*
	2	7	213	257	*477*	*48.63*
	3	0	4	3	*7*	*0.71*
	Total	*19*	*306*	*656*	*981*	*100.00*
	Percentage	*1.94*	*31.19*	*66.86*	*100.00*	

[1]*Designation added, not in Ohr et al. (1979).*

the occupation. The complete debitage assemblage (minus formal tools) is composed of 864 artifacts and the known Protohistoric debitage sample is composed of 613 artifacts.

Lithic Analytical Methodology

The descriptive nomenclature in this analysis follows the terms as defined and used by Andrefsky (2005). Each specimen in the resultant assemblage was coded for 14 variables (see Appendix B for coding format and complete data set). Each specimen was coded as a lithic type based on morphological characteristics observed through macroscopic analysis. These categories included debitage types and tool types (see Appendix C) and were based on the presence of certain criteria (e.g., platform presence on flakes) in order to determine type. For this analysis, retouch flakes are categorized as flakes less than one centimeter in maximum dimension. The retouch flakes were curated in aggregate containers and were not weighed.

The material types are coded based on macroscopic inspection of each artifact using characteristics such as color, texture, inclusions and comparative knowledge. Based on this, the assemblage was broken down into the raw material categories which are described as follows: *Red Quartzite* – a local material found in the site area that grades from coarse to medium; *Chert* – cherts of unknown type including the local mauve chert; *Quartzite* –presumable local quartzites from either the Morrison or

Dakota formation; *White Chert* –glossy white to light brown, occasionally semi-opaque material that is probably local (based on cortex and flake size); *Dendritic Chert* – chert with dendrites ranging in color from caramel to dark red or maroon and is similar to that seen by the author in mountain uplifts and could be coming from the Laramie Range west of the site; *Gray Chalcedony* – a gray to milky white semi-opaque chalcedony, this is local and found in small (<10 cm maximum dimension) nodules in the site area; *Obsidian* – this black volcanic glass is the only definitively non-local material in the assemblage; *Unknown, Chert or Chalcedony* – these categories are for retouch flakes that were assigned to the assemblage based on cataloging data that did not include definitive material type (See Figure 4.1 for examples of local raw materials).

The source analysis was limited to a local versus non-local distinction based on distance from the site to possible source areas. This demarcation between local and non-local sources was set at 10 kilometers based on the low end of Kelly's (1995: 133) estimate that a "20- to 30-kilometer round trip appears to be the maximum distance hunter-gatherers will walk comfortably in a day in a variety of habitats." This conservative determination ignores the increased foraging radius, which would have been possible by equestrian means. The local source areas are known to include primary sources (Beausoleil 1994; Coffin 1951; Self 1952) and secondary sources, both of which can be found within 10 kilometers of the site. The Dakota and Morrison formations can be found within 2 km of the site (Courtright and Braddock 1989).

Figure 4.1. Local materials clockwise from top left – white chert, gray chalcedony, Morrison quartzite, mauve chert, dendritic chert and red quartzite.

Other information was coded for the assemblage and used in the analysis. Portion was coded for each specimen as proximal/distal or lateral. On flakes, the proximal end was the platform, but for bifacial tools, the base of the specimen was classified as proximal. If these attributes were not part of the specimen (such as in the case of shatter), it was coded as a complete piece. The maximum dimension was recorded for all specimens using a size grade method of one-centimeter increments set in a concentric pattern. Each artifact was placed in the center of this "bull's eye" to determine the size grade in which it fell. The mass of each specimen was measured if greater than 0.1 grams.

Debitage

Table 4.2 gives some basic attributes of the debitage analyzed from the Protohistoric component of 5LR263. The vast majority of the assemblage is complete debitage, and retouch flakes dominate the debitage assemblage. The preponderance of retouch flakes indicates that tool use and resharpening were major activities at the site. The grid-by-grid breakdown indicates that Grids 1 and 2 contain 81.57% of the debitage, which indicates that flintknapping occurred primarily in this area of the excavation block.

Despite statistical differences in material and size, the complete assemblage and the Protohistoric sample show a similar frequency profile based on mass (Figure 4.2). Both indicate that the majority of the lithics are small (<1 gm) pieces. The lithic artifacts that were weighed in the analysis (excluding retouch flakes) and have known provenience are plotted using a box plot in Figure 4.3. This gives the position of the median, upper and lower quartiles, and maximum and minimum values minus outliers (Valiela 2001: 195). This plot and the histograms both indicate that, regardless of material type, the debitage assemblage is composed largely of small flakes. The box plot of the entire assemblage reiterates this characteristic for all debitage from the site (Figure 4.4). The local materials, other than the Morrison Quartzite, have similar mass characteristics. The larger size and greater range characteristics of the Morrison Quartzite could reflect a larger nodule size than the rest of the raw materials, or possibly procurement from primary sources. What is apparent by the two plots is that the materials were generally reduced and used in a

Table 4.2. Frequency breakdown on lithic debitage

	PORTION							
Material	**Complete**	**Proximal**	**Distal**	**Lateral**	**Midsection**	**Broken/Unknown**	*Total*	*Percent*
Red Quartzite	33	4	3	3	3	6	*52*	*8.48*
Chert	430	0	0	0	0	1	*431*	*70.31*
Quartzite	1	0	0	0	0	0	*1*	*0.16*
White Chert	12	8	2	1	1	6	*30*	*4.89*
Dendritic Chert	3	0	0	0	0	0	*3*	*0.49*
Gray Chalcedony	25	7	3	1	0	4	*40*	*6.53*
Obsidian	1	1	1	0	0	0	*3*	*0.49*
Unknown	12	0	0	0	0	0	*12*	*1.96*
Chert or Chalcedony	41	0	0	0	0	0	*41*	*6.69*
Total	*558*	*20*	*9*	*5*	*4*	*17*	*613*	*100.00*
Percent	*91.03*	*3.26*	*1.47*	*0.82*	*0.65*	*2.77*	*100.00*	

	HORIZONTAL				
Material	**Grid 1**	**Grid 2**	**Grid 3**	**General**	**Unknown**
Red Quartzite	3	0	48	0	1
Chert	127	241	62	0	1
Quartzite	1	0	0	0	0
White Chert	24	6	0	0	0
Dendritic Chert	2	0	1	0	0
Gray Chalcedony	39	1	0	0	0
Obsidian	2	1	0	0	0
Unknown	0	12	0	0	0
Chert or Chalcedony	41	0	0	0	0
Total	*239*	*261*	*111*	*0*	*2*
Percent	*38.99*	*42.58*	*18.11*	*0.00*	*0.33*

	DEBITAGE TYPE				
Material	**Flake**	**Shatter**	**Edge Modified**	**Retouch**	**Potlid**
Red Quartzite	21	4	0	27	0
Chert	10	2	1	418	0
Quartzite	0	1	0	0	0
White Chert	26	4	0	0	0
Dendritic Chert	3	0	0	0	0
Gray Chalcedony	37	2	0	0	1
Obsidian	3	0	0	0	0
Unknown	0	0	0	12	0
Chert or Chalcedony	0	0	0	41	0
Total	*100*	*13*	*1*	*498*	*1*
Percent	*16.31*	*2.12*	*0.16*	*81.24*	*0.16*

similar manner, which is understandable seeing as how the majority of the debitage is composed of local materials and, most likely, secondary sources.

A G score analysis of the assemblage variables by frequency indicates that some aspects of the sample do not vary between material types (Table 4.3). A contingency analysis of platform types indicates that the distribution is not statistically significantly different ($G = 14.807$, $df = 24$, $p = 0.926$) between the material types.

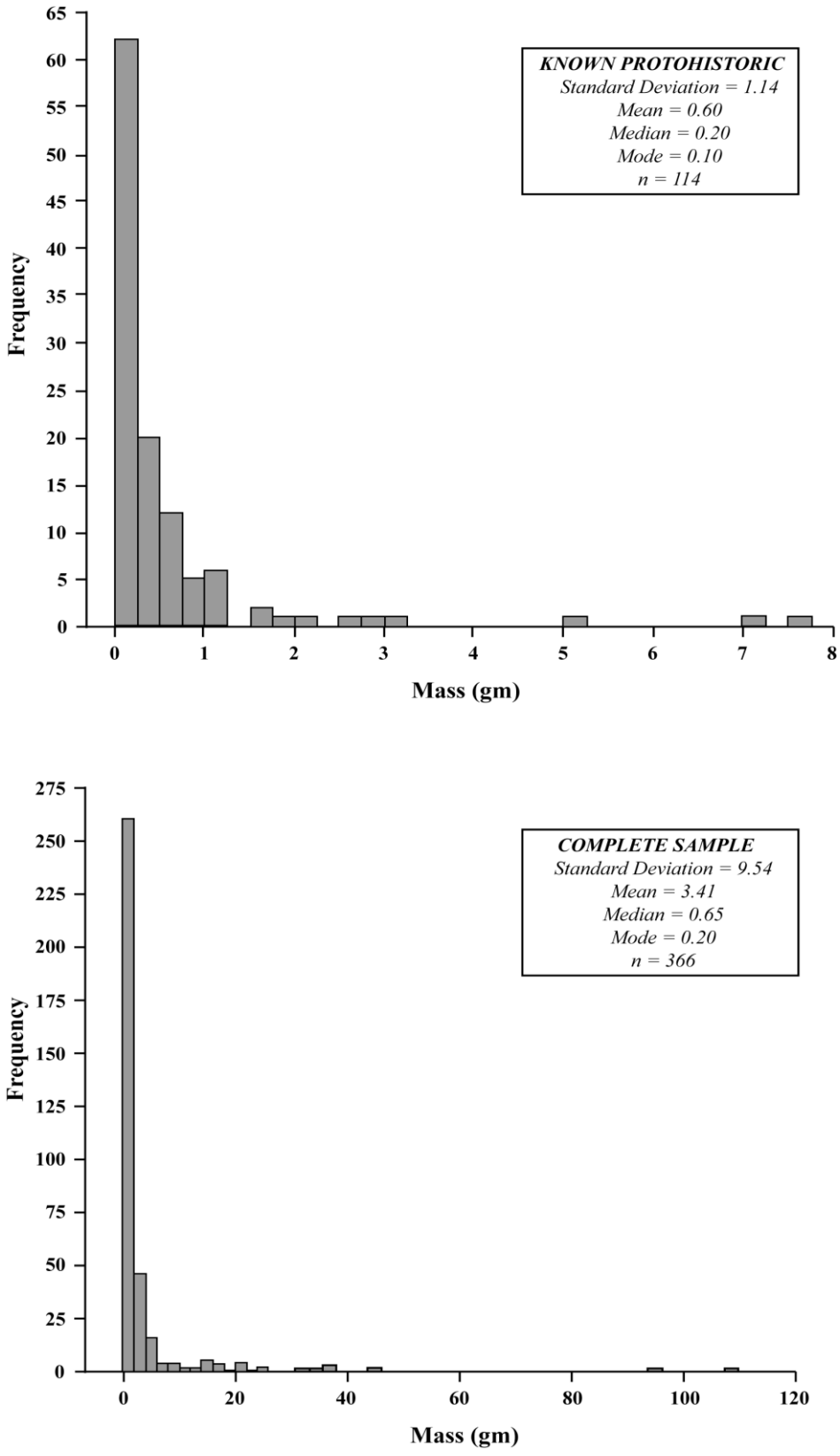

Figure 4.2. Mass distribution of the Protohistoric and complete site assemblages.

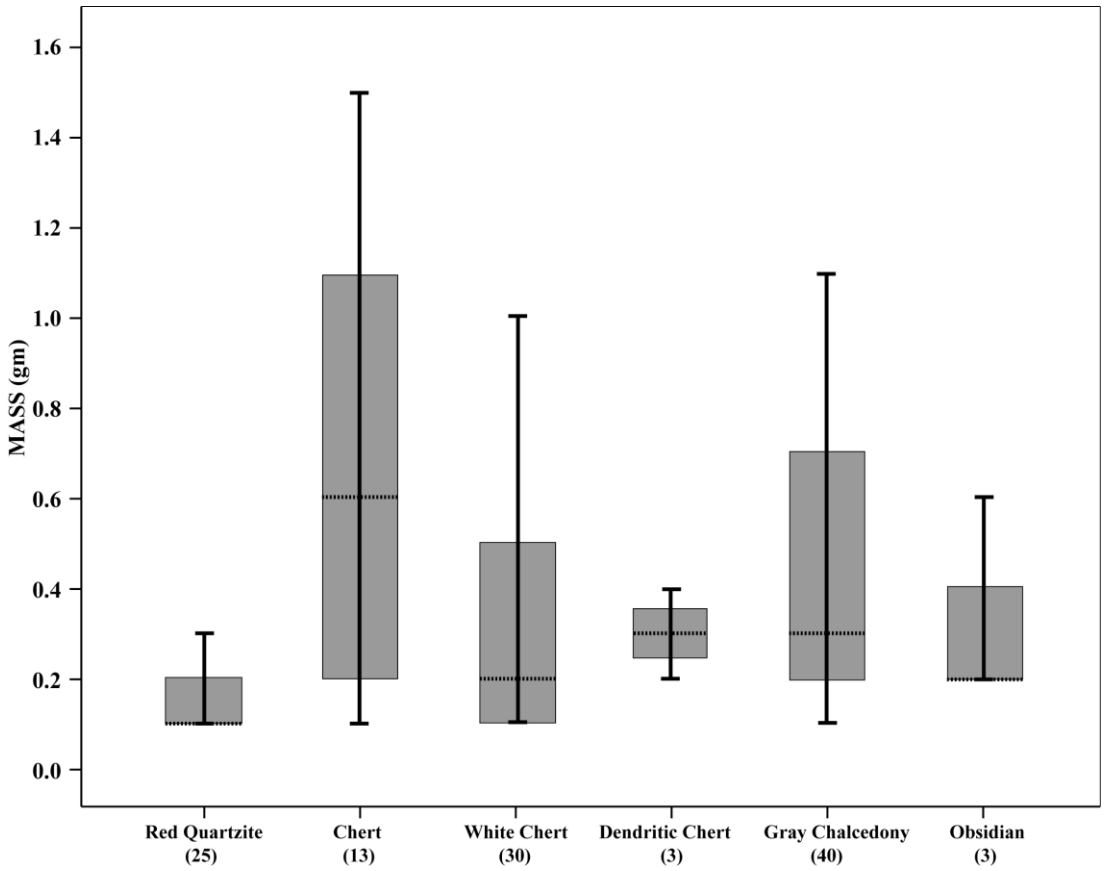

Figure 4.3. Box plot of debitage from Protohistoric component.

This is also the case with the dorsal flake scar count ($G = 34.182$, $df = 24$, $p = 0.081$) between material types. The Freeman-Tukey deviate analysis indicates that the platform cells contain values within the expected range. The platform distribution is indicative of a complete reduction sequence being represented at the site, which is reasonable in light of the proximity to secondary cobble deposits. This evidence, combined with the small overall artifact size of the assemblage, suggests small nodule reduction took place. The deviate analysis of the flake scar counts for the red quartzite indicates that it is over represented in the one flake scar cell and underrepresented in the greater than three flake scar cell. This particular material has more flakes of primary reduction stages than later reduction.

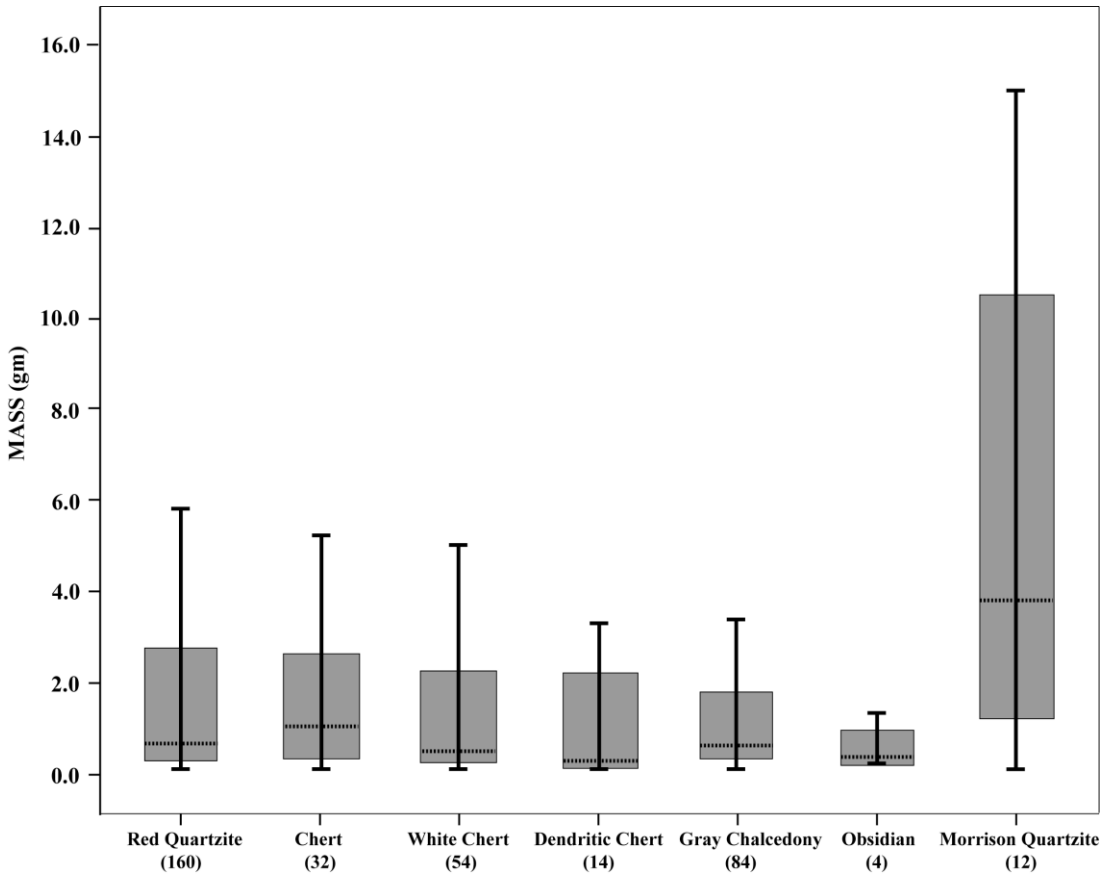

Figure 4.4. Box plot of debitage from complete 5LR263 assemblage.

The size grade frequencies between the known Protohistoric and the complete assemblage are both positively skewed distributions and reflect what the mass variable analysis indicated (Figure 4.5). These size grade frequencies, unlike the mass histograms and bar charts, do include the retouch flake portion of the sample as these were size graded but not weighed. The retouch flakes account for the entire size grade one artifacts (n=498) in both charts. Although mass analysis has been shown to be problematic in determining tool type production or lithic reduction technology (Andrefsky 2007), Figure 4.6 indicates that, in a general sense, the 5LR263 debitage compares favorably to full reduction sequences. This is based on similar percentage

Table 4.3 Platform type and flake scar count

Observed Values - Platform type

	Cortex	Flat	Complex	Abraded	*Total*
Red Quartzite	1	5	0	2	*8*
Chert	3	4	0	3	*10*
Quartzite	0	0	0	0	*0*
White Chert	2	9	0	5	*16*
Dendritic Chert	0	2	1	0	*3*
Gray Chalcedony	4	15	1	9	*29*
Obsidian	0	1	1	0	*2*
Unknown	0	0	0	0	*0*
Chert and Chalcedony	0	0	0	0	*0*
Total	*10*	*36*	*3*	*19*	*68*

Freeman-Tukey Deviates - Platform type

	Cortex	Flat	Complex	Abraded
Red Quartzite	0.03	0.45	-0.55	-0.01
Chert	1.11	-0.47	-0.66	0.24
Quartzite	0.00	0.00	0.00	0.00
White Chert	-0.08	0.26	-0.96	0.34
Dendritic Chert	-0.66	0.43	1.18	-1.09
Gray Chalcedony	-0.01	-0.03	-0.06	0.38
Obsidian	-0.48	0.13	1.25	-0.80
Unknown	0.00	0.00	0.00	0.00
Chert and Chalcedony	0.00	0.00	0.00	0.00

Significance at the p=.05 level (+/- 1.600303) is shown in bold.

Observed Values - Number of dorsal flake scars

	Cortex	1	2	>3	*Total*
Red Quartzite	2	9	8	3	*22*
Chert	0	0	3	7	*10*
Quartzite	0	0	0	0	*0*
White Chert	0	7	7	13	*27*
Dendritic Chert	0	0	2	1	*3*
Gray Chalcedony	2	3	8	24	*37*
Obsidian	0	0	0	3	*3*
Unknown	0	0	0	0	*0*
Chert and Chalcedony	0	0	0	0	*0*
Total	*4*	*19*	*28*	*51*	*102*

Freeman-Tukey Deviates - Number of dorsal flake scars

	Cortex	1	2	>3
Red Quartzite	1.04	**1.99**	0.81	**-2.98**
Chert	-0.60	**-1.91**	0.27	0.89
Quartzite	0.00	0.00	0.00	0.00
White Chert	-1.29	0.88	-0.06	-0.07
Dendritic Chert	-0.21	-0.80	1.07	-0.23
Gray Chalcedony	0.54	**-1.61**	-0.62	1.24
Obsidian	-0.21	-0.80	-1.07	1.09
Unknown	0.00	0.00	0.00	0.00
Chert and Chalcedony	0.00	0.00	0.00	0.00

Significance at the p=.05 level (+/- 1.600303) is shown in bold.

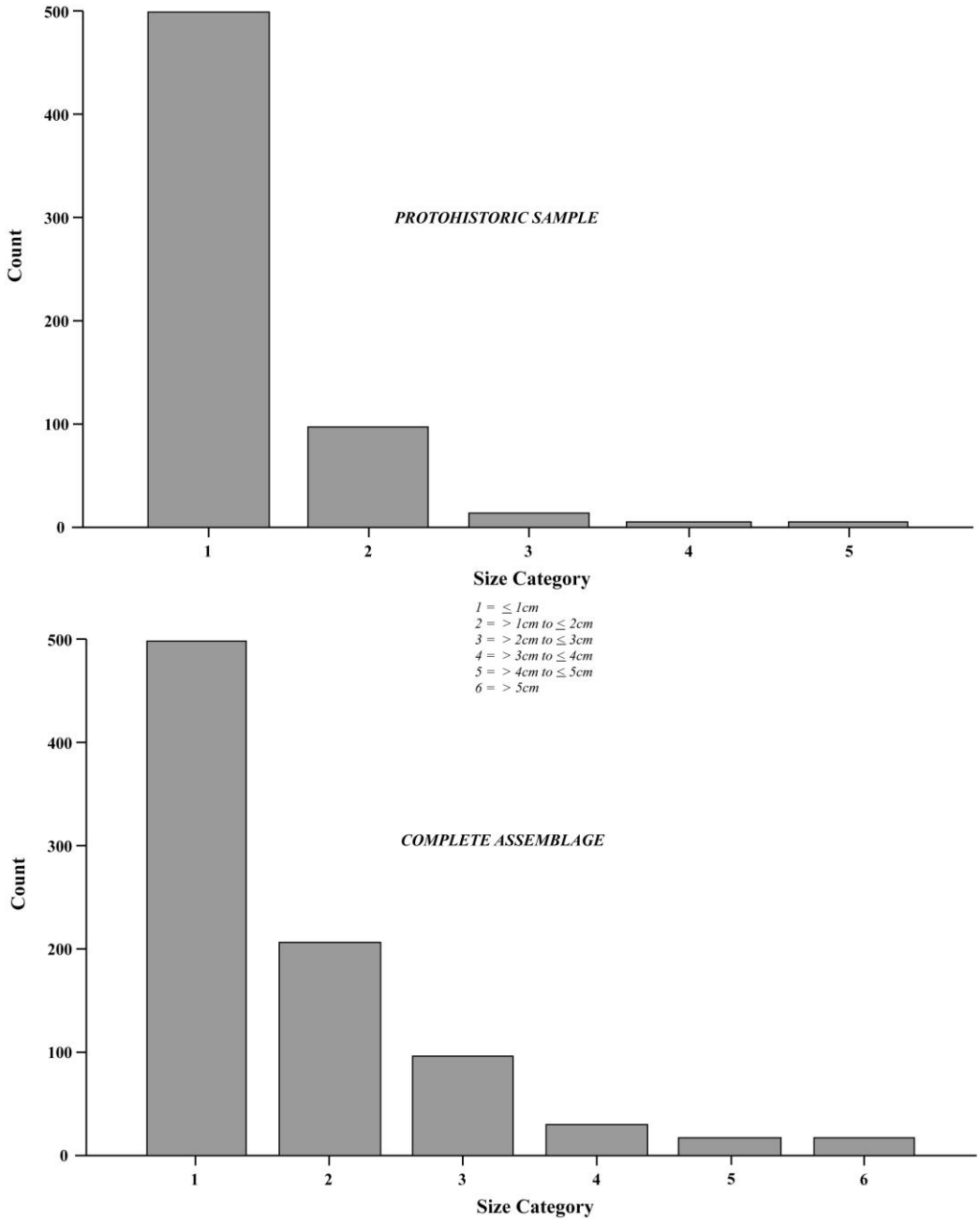

Figure 4.5. Size grade breakdown of Protohistoric and complete site assemblages.

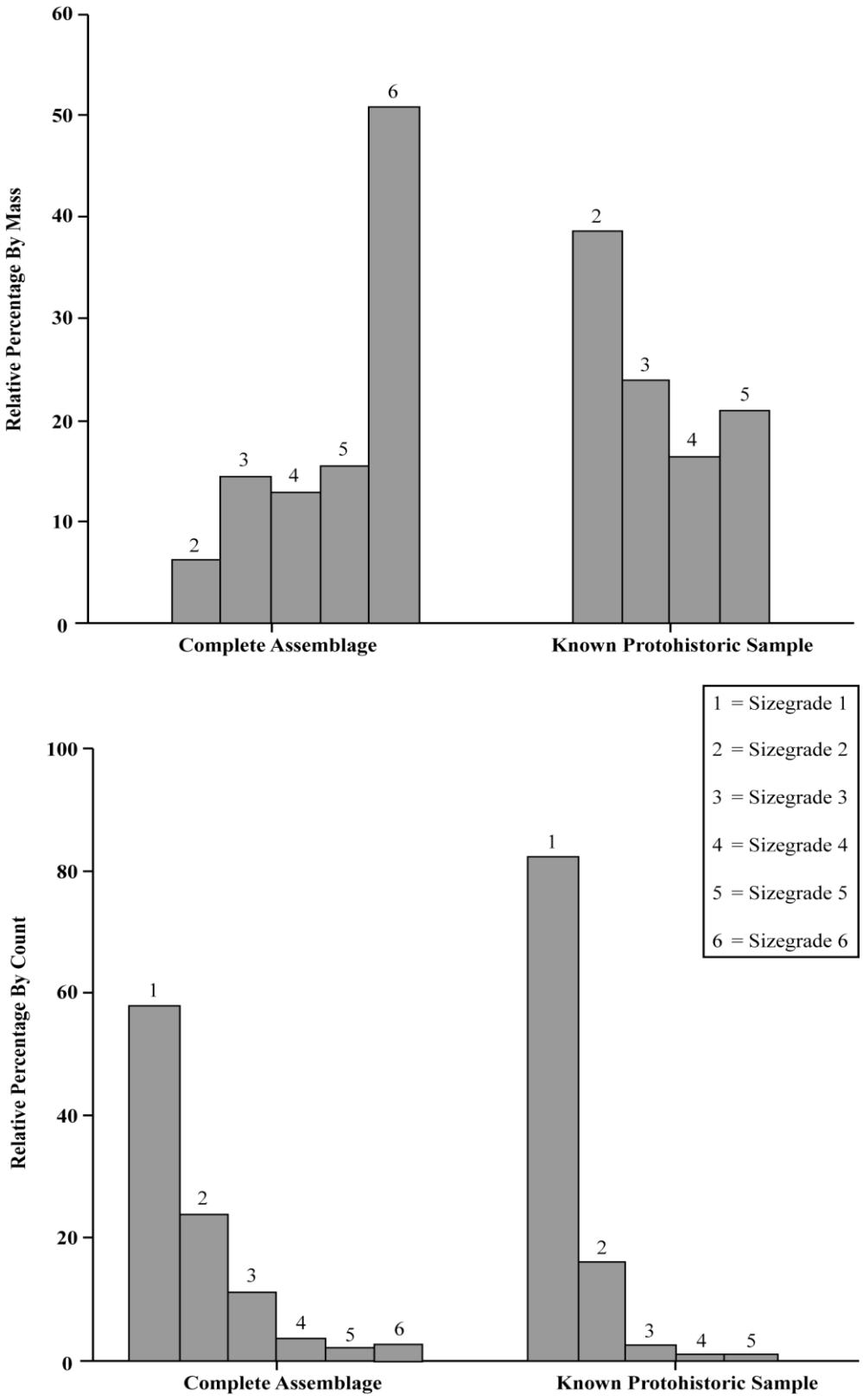

Figure 4.6. Mass analysis of debitage assemblage.

profiles in both the relative percentages of mass and count. Comparison with the data presented by Andrefsky (2007: 393-394) shows that the assemblage is representative of a full reduction sequence and is most similar to flake production profiles.

Returning to the Protohistoric sample, a G score analysis of size grade and cortex percentage (Table 4.4) indicates statistically significant differences. Both in size grade ($G = 426.605$, $df = 32$, $p < 0.0001$) and percentage of cortex ($G = 82.255$, $df = 24$, $p < 0.0001$), these variables differ significantly across material type. This difference, along with any deviance, is mainly due to the large amount of retouch flakes in the sample and is confined mostly to one material type (chert). When these are removed, differences between the material types are not significant either for size grade ($G = 23.427$, $df = 24$, $p = 0.495$), or cortex percentage ($G = 22.929$, $df = 24$, $p = 0.524$) (Table 4.5). The large frequency of retouch flakes in the sample significantly biases the statistical analysis.

That the complete reduction of small, locally available nodules was the dominant pattern is obscured when the retouch flakes are included in the analysis. The retouch flakes in the assemblage are probably the byproducts of two activities: the reduction of stone into tools and resharpening events. Both late stage tool manufacture (e.g. pressure flaking for shaping, etc.) and the resharpening of existing tools produce flakes that would be coded as retouch flakes, based on the methodology employed here. That these flakes derive from multiple technological activities increased the incidence of this type of flake in the assemblage. If the site were occupied for many months, as it is postulated, then tools would have been manufactured and retouched

Table 4.4. Lithic size grade and cortex percentage

Observed Values - Size grades

	≤ 1 cm	>1 to ≤ 2 cm	> 2 to ≤ 3 cm	> 3 to ≤ 4 cm	> 4 to ≤ 5 cm	*Total*
Red Quartzite	27	24	0	0	1	*52*
Chert	418	8	3	1	1	*431*
Quartzite	0	1	0	0	0	*1*
White Chert	0	26	2	2	0	*30*
Dendritic Chert	0	3	0	0	0	*3*
Gray Chalcedony	0	32	8	0	0	*40*
Obsidian	0	3	0	0	0	*3*
Unknown	12	0	0	0	0	*12*
Chert and Chalcedony	41	0	0	0	0	*41*
Total	*498*	*97*	*13*	*3*	*2*	*613*

Freeman-Tukey Deviates - Size grades

	≤ 1 cm	>1 to ≤ 2 cm	> 2 to ≤ 3 cm	> 3 to ≤ 4 cm	> 4 to ≤ 5 cm
Red Quartzite	**-2.55**	**4.08**	-1.33	-0.42	1.12
Chert	**3.48**	**-10.72**	**-2.40**	-0.66	-0.16
Quartzite	-1.06	1.14	-0.04	-0.01	-0.01
White Chert	**-8.92**	**5.82**	1.26	**1.89**	-0.18
Dendritic Chert	**-2.28**	**2.03**	-0.12	-0.03	-0.02
Gray Chalcedony	**-10.44**	**6.27**	**3.73**	-0.34	-0.23
Obsidian	**-2.28**	**2.03**	-0.12	-0.03	-0.02
Unknown	0.75	**-1.93**	-0.42	-0.11	-0.08
Chert and Chalcedony	1.30	**-4.19**	-1.12	-0.34	-0.24

Significance at the p=.05 level (+/- 1.652786) is shown in bold.

Observed Values - Percentage of dorsal cortex

	0 %	1 - 49 %	50 - 99 %	100 %	*Total*
Red Quartzite	48	1	1	2	*52*
Chert	424	7	0	0	*431*
Quartzite	0	1	0	0	*1*
White Chert	22	7	1	0	*30*
Dendritic Chert	2	1	0	0	*3*
Gray Chalcedony	28	8	2	2	*40*
Obsidian	3	0	0	0	*3*
Unknown	12	0	0	0	*12*
Chert and Chalcedony	41	0	0	0	*41*
Total	*580*	*25*	*4*	*4*	*613*

Freeman-Tukey Deviates - Percentage of dorsal cortex

	0 %	1 - 49 %	50 - 99 %	100 %
Red Quartzite	-0.14	-0.67	0.88	**1.61**
Chert	0.81	**-2.97**	**-2.50**	**-2.50**
Quartzite	-1.19	1.34	-0.01	-0.01
White Chert	-1.22	**3.05**	1.08	-0.34
Dendritic Chert	-0.37	1.19	-0.04	-0.04
Gray Chalcedony	**-1.67**	**3.09**	**1.72**	**1.72**
Obsidian	0.22	-0.22	-0.04	-0.04
Unknown	0.26	-0.72	-0.15	-0.15
Chert and Chalcedony	0.39	**-1.77**	-0.44	-0.44

Significance at the p=.05 level (+/- 1.600303) is shown in bold.

Table 4.5. Lithic size grade and cortex percentage without retouch flakes included in sample

Observed Values - Size grades

	>1 to ≤ 2 cm	> 2 to ≤ 3 cm	> 3 to ≤ 4 cm	> 4 to ≤ 5 cm	*Total*
Red Quartzite	24	0	0	1	*25*
Chert	8	3	1	1	*13*
Quartzite	1	0	0	0	*1*
White Chert	26	2	2	0	*30*
Dendritic Chert	3	0	0	0	*3*
Gray Chalcedony	32	8	0	0	*40*
Obsidian	3	0	0	0	*3*
Unknown	0	0	0	0	*0*
Chert and Chalcedony	0	0	0	0	*0*
Total	*97*	*13*	*3*	*2*	*115*

Freeman-Tukey Deviates - Size grades

	>1 to ≤ 2 cm	> 2 to ≤ 3 cm	> 3 to ≤ 4 cm	> 4 to ≤ 5 cm
Red Quartzite	0.66	**-2.51**	-0.90	0.76
Chert	-0.87	1.11	0.88	1.03
Quartzite	0.32	-0.21	-0.05	-0.03
White Chert	0.18	-0.67	1.11	-0.76
Dendritic Chert	0.40	-0.54	-0.15	-0.10
Gray Chalcedony	-0.26	1.46	-1.27	-0.94
Obsidian	0.40	-0.54	-0.15	-0.10
Unknown	0.00	0.00	0.00	0.00
Chert and Chalcedony	0.00	0.00	0.00	0.00

Significance at the p=.05 level (+/- 1.600303) is shown in bold.

Observed Values - Percentage of dorsal cortex

	0 %	1 - 49 %	50 - 99 %	100 %	*Total*
Red Quartzite	21	1	1	2	*25*
Chert	6	7	0	0	*13*
Quartzite	0	1	0	0	*1*
White Chert	22	7	1	0	*30*
Dendritic Chert	2	1	0	0	*3*
Gray Chalcedony	28	8	2	2	*40*
Obsidian	3	0	0	0	*3*
Unknown	0	0	0	0	*0*
Chert and Chalcedony	0	0	0	0	*0*
Total	*82*	*25*	*4*	*4*	*115*

Freeman-Tukey Deviates - Percentage of dorsal cortex

	0 %	1 - 49 %	50 - 99 %	100 %
Red Quartzite	0.25	-1.57	0.58	1.31
Chert	-1.45	**2.52**	-0.50	-0.50
Quartzite	-1.05	1.15	-0.05	-0.05
White Chert	-0.38	1.13	0.45	-0.96
Dendritic Chert	-0.12	0.75	-0.13	-0.13
Gray Chalcedony	-0.71	0.85	0.95	0.95
Obsidian	0.47	-0.67	-0.13	-0.13
Unknown	0.00	0.00	0.00	0.00
Chert and Chalcedony	0.00	0.00	0.00	0.00

Significance at the p=.05 level (+/- 1.600303) is shown in bold.

for a long enough period of time to account for the proportionately large accumulation compared to other debitage types.

The debitage data indicates that the site occupants were primarily using locally available materials. The fact that there are abundant secondary sources in proximity to the site would have provided ample opportunities to acquire raw materials. Along with a lack of evidence for more formal tool reduction, this use of available materials could point to a small foraging radius and this supports a possible winter camp scenario where mobility would have generally decreased due to weather. A more expedient strategy of raw material acquisition and tool manufacture/use speaks to a group that was "hunkered down" for the winter and is in line with the faunal evidence that indicates highly processed animal remains.

Obsidian

Obsidian has long been recognized as an important lithic resource. It has been used throughout the Late Pleistocene and Holocene occupation of the New World. Obsidian sources are generally found along the western periphery of the Great Plains, though this material was has been recovered in sites long distances from its source areas. Large amounts of obsidian sourced to the Rocky Mountains has been found in Hopewell sites east of the Mississippi River (Hughes 2006), indicating the prized status and scale at which obsidian moved through trade. To determine the source of the obsidian from 5LR263, the three pieces from the Protohistoric component were analyzed by the Archaeological X-Ray Fluorescence Spectrometry Laboratory at the University of California using a Spectrace (Thermo) *QuanX* EDXRF spectrometer.

All three pieces were sourced to the Jemez Mountains in northcentral New Mexico, specifically the El Rechuelos Rhyolite (Shackley to LaBelle, April 17, 2006). This material would have been collected at Polvadera Peak (Baugh and Nelson 1987: 317-318). The Jemez Mountain sources are common in late period contexts throughout the Southwest and east of the Rocky Mountains (Shackley 2005). Baugh and Nelson (1987) source obsidian from Protohistoric sites in the southern Plains in Oklahoma and Texas and demonstrate that obsidian from New Mexico source areas was common.

In the 18th and 19th centuries, Plains groups such as the Comanche had trading networks with groups in the Santa Fe area (Hämäläinen 1998). The New Mexico obsidian source is located close to Santa Fe, which is considered the locus from which the horse spread north on to the Plains (Haines 1938b). The sourcing of the obsidian to the Santa Fe area indicates a southern Plains influence at the site and possible occupation by a group that frequented that area or had trade relations there. There was one piece of obsidian from the site that was sourced to Obsidian Cliff in Wyoming, but that particular artifact was found in a slump deposit, so it cannot be definitively attributed to the Protohistoric occupation.

Tools

The 5LR263 includes a small sample of tools, which could be definitively provenienced to the Protohistoric occupation of the site. As with the debitage, there are tools in the assemblage that lacked provenience making assignment to the Protohistoric component impossible. It is probable that some or all of these tools were from the Protohistoric levels given the preponderance of lithics that were

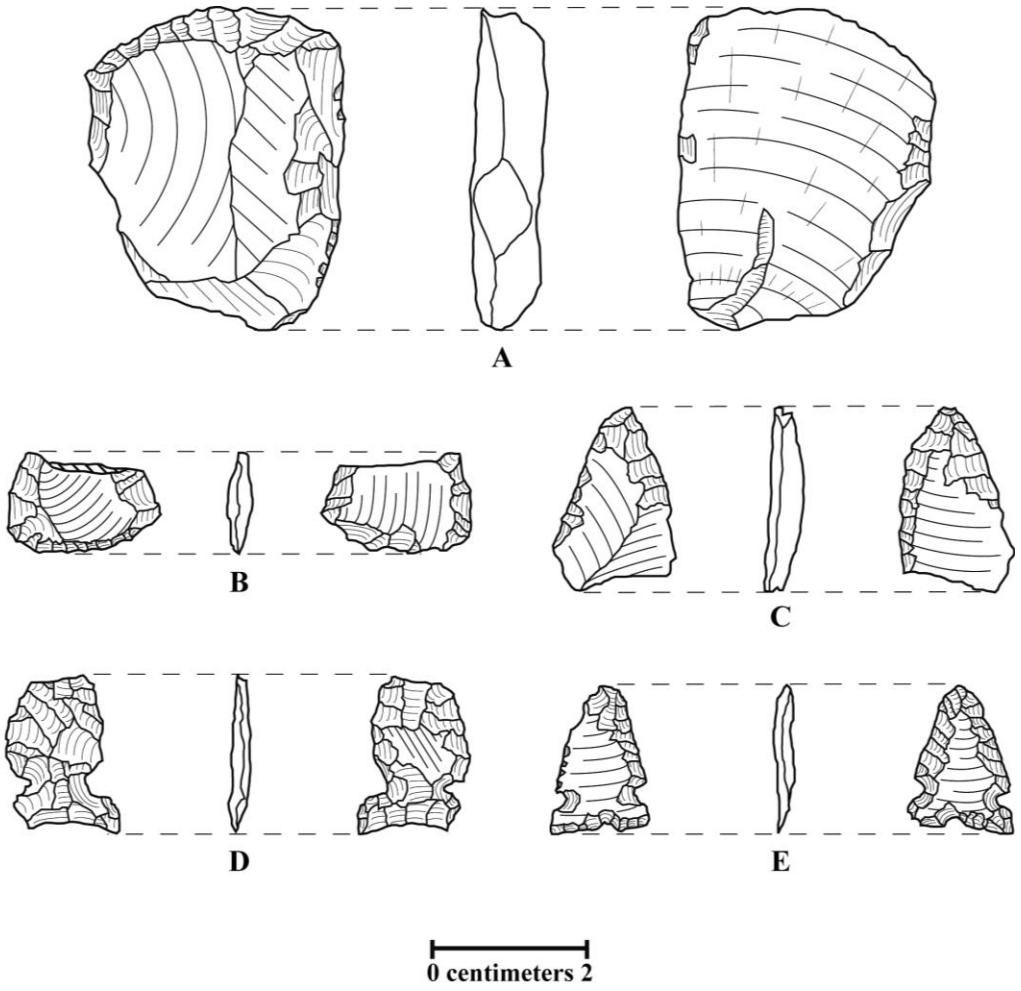

Figure 4.7. Stone tools

recovered from these units. Also, one projectile point described and pictured in the report (Ohr et al. 1979: 33) is missing from the site assemblage. Typologically it is identical to one that will be described below (Figure 4.7, E). Figure 4.7 shows the stone tools that could be definitively assigned to the Protohistoric component of the site. This sample includes one endscraper, two preforms and two projectile points (See Appendix C for measurements, material types, etc.).

Endscrapers

The endscraper (Figure 4.7, A) is one of five recovered from the site. Three of the endscrapers are much larger (maximum length M = 5.37, maximum width M = 4.20, maximum thickness M = 1.53) than the specimen pictured. The total sample is not statistically different ($t = 0.248$, $df = 4$, $p = 0.816$) than the Group I endscrapers (n = 27) from the Little Deer Site (43CU10) in Oklahoma (Hofman 1978). The sizes of the endscrapers from 43CU10 are noted as being unusually large and Hofman (1978: 28-30) indicates they compare favorably to French contact sites occupied by the Wichita post A.D. 1700. The occurrence of large endscrapers in post-contact sites is attributed to surplus hide preparation for trade with Europeans (Odell 1999: 419). The large sizes of the 5LR263 sample are characteristic of a post-contact setting with possible increased hide preparation for trade, but the small site size militates against any large-scale operation.

Preforms

The arrowpoint preforms (Figure 4.7, B, and C) indicate projectile point manufacturing occurred at the site. The two preforms pictured are made on flakes of locally available chalcedony. Making arrowpoints from flake preforms was a common manufacturing technique and preforms of this type have been found throughout the Plains in both prehistoric and historic contexts (cf. Blakeslee and Hawley 2006; Irwin and Irwin 1959). The specimen on the left is at a later stage of manufacture than the one on the right. The ability to produce projectile points on flakes and the local availability of lithic material would have made manufacturing arrowpoints a relatively low-cost endeavor.

Arrowpoints

The two arrowpoint specimens (Figure 4.7, D, and E) have different morphological characteristics. The specimen on the left is classified as a Middle Ceramic Period point in the original report (Ohr et al. 1979: 25). It also resembles Plains Apachean point types, specifically of the Dismal River Aspect (Gunnerson 1960). This point was recovered from within the excavation grid on the surface, as was another, larger biface, possibly a knife, or a Late Archaic corner-notched dart point (not pictured).

The tri-notched arrowpoint (Figure 4.7, E) was recovered from a subsurface context along with another point of the same typology (missing from collection). Typed as NBa2 by Strong (1935: 88-90), he indicates that points of this type were recovered from Plains Village sites, Dismal River surface sites, and at the Signal Butte Site in Nebraska. In a more recent typology, it is called the "Emigrant Basal-notched variety" by Kehoe (1966: 832-834) and based on points found from sites in the northern Plains. Frison (1991: 122-123) says that tri-notched points were found in association with glass trade beads in the uppermost level at the Medicine Lodge Creek Site and points of this type were found at the River Bend Site, a Protohistoric Shoshonean Camp in central Wyoming, in association with metal fragments and horse bone (Buff 1983: 16).

Points of this type were also found in cultural contexts believed to represent Protohistoric Crow at Pictograph Cave (Mulloy 1958) and the Hagen Site (Mulloy 1942) in Montana. The Piney Creek Site and the Big Goose Creek Site have points of this type and are temporally classified as Late Prehistoric/Protohistoric Crow

occupations (Frison 1967; Frison et al 1978). The Vore Site, a buffalo jump in use from A.D. 1500 to A.D. 1800, also has points of this type and provides evidence that the use of side-notching increased through time (Reher and Frison 1980). The Glenrock Buffalo Jump, which has two uncalibrated radiocarbon dates of 210 $\pm$100 (essentially identical to one of the dates from 5LR263) and 280 $\pm$ 100, contains similar examples (Frison 1970). The Protohistoric Eden-Farson site in Green River Basin of Wyoming contains tri-notched point attributed to the Shoshone (Frison 1971). Not confined to the northern Plains, tri-notched or basal-notched points occur in Eastern Kansas (Cumming 1958) and have also been attributed to Upper Republican complex in the central Plains (Wedel 1961a). The Narrows survey project of the South Platte turned up at least two points, one at 5WL81 (Morris et al. 1975: 54).

The preceding indicates that this type of point had a widespread distribution throughout the Great Plains and is generally attributed to Late Prehistoric/Protohistoric occupations. The use of bow and arrow technology into the post-gun era is not unexpected. Early trade muskets were of poor quality and Native Americans were generally unable to obtain enough gunpowder and lead to use them for hunting. Even with adequate supplies, the bow and arrow was a much better weapon for horseback hunting than the musket, which Native Americans used rarely before 1860 (Ray 1974). Bow and arrows were even used at the Fetterman Massacre in 1866, long after the introduction of the gun.

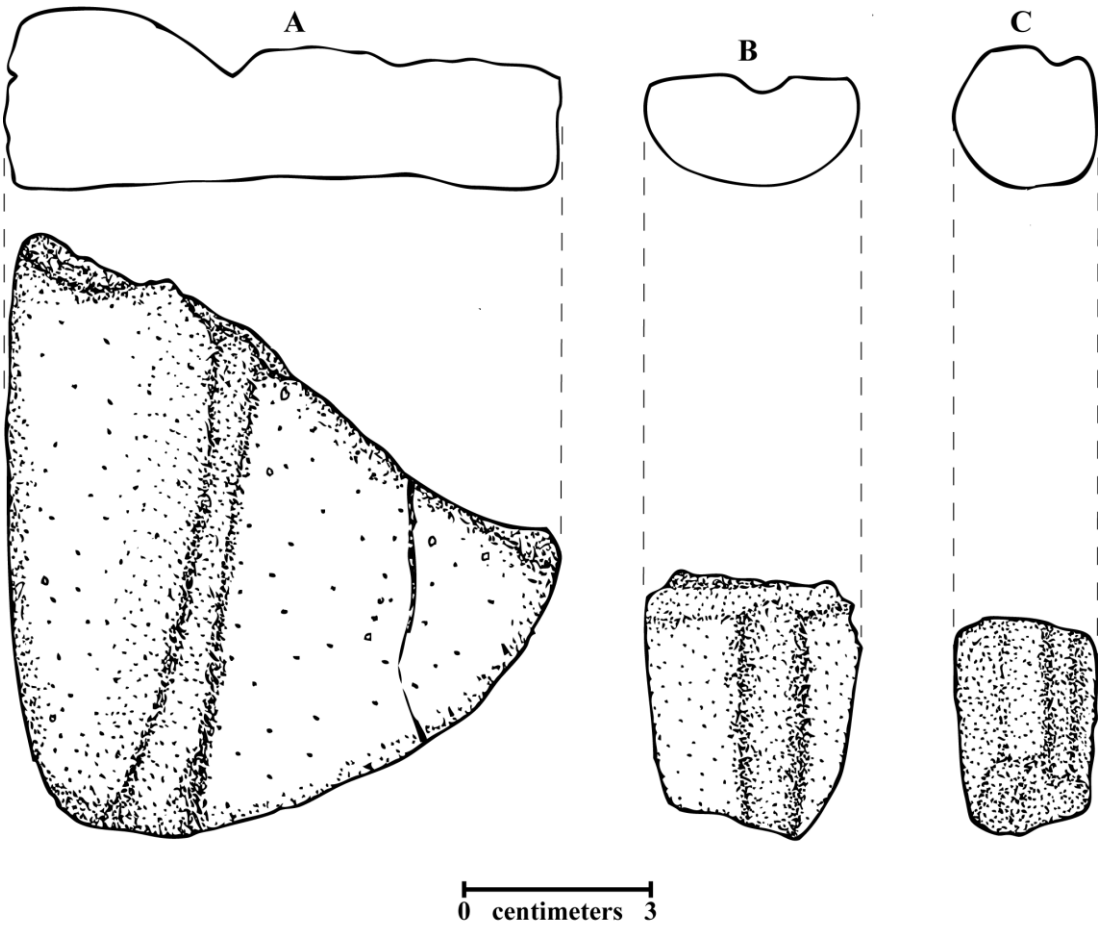

Figure 4.8. Ground stone from the Protohistoric component of 5LR263.

Ground stone

The Protohistoric stone tool assemblage at 5LR263 also includes three ground stone fragments (Figure 4.8). This ground stone can all be classified as grooved abraders based on the presence of a groove that was probably used to sharpen, dull or shape tools depending on the material and shape of the groove (Adams 2002: 82-87). These tools are included in the set of ground stone tools that are used for shaping, but fall in between handstones and netherstones in their use (Adams 2002: 89-91). Grooved abraders can be divided into classes based on groove shape, either V-shaped

or U- shaped in cross-section. V-shaped abraders are generally thought to have been used to put points on tools, such as awls or needles, or dull the edges of lithic tools. U-shaped grooves are thought to have been used to shape wooden rods such as arrow shafts and are often referred to as "shaft smoothers". The largest ground stone specimen from 5LR263 (Figure 4.8, A) has a V-shaped groove, while the other two specimens have U-shaped grooves.

Grooved abraders are found throughout the Plains and some sites contain large amounts of these tools. The Spain Site in the Middle Missouri region of South Dakota has 71 "grooved shaft smoothers" that range from 17 to 75 mm in length, 18 to 42 mm in width and 8 to 30 mm in thickness, and have both U-shaped and V-shaped grooves (Smith and Grange 1958: 108). This site is dated to the Extended Coalescent Variant (~ A.D. 1550 – 1675) by Lehmer (1971: 120). The specimens from 5LR263 fit into the size range of these specimens, although they are not complete. Roper (2006) indicates that certain central Plains village groups probably manufactured these items for trade in later periods.

The use of grooved abraders as shaft smoothers is ethnographically documented in the Plains with examples from the Crow, Sioux, Omaha, Pawnee, and Cheyenne (Flenniken and Ozbun 1988: 37). The Sioux are documented to have used two paired stones to form a hole through which an arrowshaft could be pulled and twisted (Hasserick 1964: 197). A specimen from 5LR263 (Figure 4.8, B) may represent a portion of one half of a paired specimen. The smallest specimen (Figure 4.8, C) has multiple ground surfaces and a fairly circular cross section. The groove of this specimen is slight and may represent its use for an activity other than shaft abrasion.

Comparison of abrader groove width against known ethnographic arrow shaft widths provides a means to determine if in fact these abraders were used for shaft smoothing activities. Thomas (1978) measured ethnographic and archaeological complete compound arrows from roughly two dozen tribes throughout North American (located in the collections of the American Museum of Natural History) and provides arrow shaft diameter values that can be compared to the groove width of the 5LR263 specimens. Thomas (1978: 467) measured maximum mainshaft diameter and took a foreshaft diameter measurement two centimeters from the distal end.

The summary data (Table 4.6), when compared to the U-shaped groove width (6.93 mm and 8.85 mm) of the two specimens, indicate the grooves are within the range of values presented by Thomas. When addressing the two measurements provided, it is difficult to assess which measurement is more representative of a non-compound arrow shaft, more common on the Plains. Although there is a positive correlation between the two measurements ($N = 118$, $r = 0.543$, $p < 0.001$), the two measurements as separate samples have statistically significant differences ($t = 9.196$, $df = 235.86$, $p < 0.001$). However, when the two measurements are combined into one sample to average out these differences, the values from the 5LR263 specimens both fall within one sigma of the mean values from the Thomas sample.

The three specimens could have been used for a variety of tasks much like sandpaper is used today. The occurrence of these tools, in association with projectile points suggests that at least one (Figure 4.8, B) was a shaft smoother, because abraders have been recovered as part of flintknapping kits (Cobb and Pope 1998).

Table 4.6. Foreshaft and mainshaft diameter summary data from Thomas (1978)

Dimension	n	*M*	Median	Mode(s)	*s*	s^2	Minimum	Maximum	Range
Mainshaft	*118*	*9.10*	*9.00*	*7.50, 9.00, 10.30*	*1.63*	*2.66*	*6.20*	*18.30*	*12.10*
Foreshaft	*132*	*7.30*	*7.00*	*7.00*	*1.45*	*2.11*	*4.40*	*18.10*	*13.70*
Combined	*250*	*8.15*	*7.70*	*7.00*	*1.78*	*3.18*	*4.40*	*18.30*	*13.90*

Comparative data indicates that grooved abrading stones have been around since Paleoindian times (LaBelle 2005: 208-211). The occurrence of these items in large numbers does not take place until the Late Prehistoric Period and certainly coincides with the manufacturing of arrows. The grooved abraders at 5LR263 are indicative of this later florescence in the use of abrading tools and indicate arrow manufacturing, or at least discard of arrow making tools, at the site.

Summary

The lithic assemblage characteristics from 5LR263 suggest that the site was a small camp where limited tool production took place and existing tools brought to the site were used and maintained. Compared to the amount and type of debitage in the assemblage, there is a small amount of tools. The use of local lithic sources, probably secondary cobble deposits, resulted in a smaller initial nodule size and smaller overall flake size. Lithic procurement was probably embedded in other daily subsistence activities. These factors, along with acquisition of trade items, may indicate that site occupants were less reliant on lithic technology than a pre-contact group would have been. The lack of formal tools and clear reductive strategies indicates a more informal use of the indigenous technology, although the presence of tools such as arrowpoints and endscrapers indicate it was still important to their economy. The presence of ground stone and endscrapers indicates varied activities were taking place at the site, a characteristic of a longer term occupation.

Although the amount and material types of the debitage may also indicate that tools other than arrowpoints could have been manufactured at the site, a lack of these tools and other evidence of formal tool production, such as bifaces, indicates that, if manufactured, these tools were removed from the site. The classes of tools missing from the site, such as bifacial knives and drills, point to a lack of discard at the site or possible use of metal tools. There is mention of a metal artifact in the report that was described as a possible knife fragment (Ohr et al. 1979: 30), which was not found in the extant collection. This may indicate that metal knives were used at the site; however, a lack of cutmarks on the faunal remains is contrary to the use of knives.

From the lithic assemblage to the items of European manufacture, the assemblage analysis involved an examination of these important goods. The basis for post-contact determination, at least in a materials contact sense, these items at 5LR263 incongruently mixed with stone tools and highly processed bones, is at the heart of the site analysis and the reason why this site is rare and deserving of more research. In the following chapter, the items of European manufacture are analyzed to provide data for this thesis.

Chapter 5. Items of European Manufacture

The 5LR263 assemblage includes a small, but robust sample of items of European manufacture. The items of European manufacture include a single gunflint, 458 glass beads, *dentalium* (not necessarily manufactured, but a traded exotic item nonetheless), brass kettle parts, a tinkler, a clay pipe and metal fragments. Although not technically an item of European manufacture, the horse remains are included in this discussion because Europeans reintroduced these animals to the New World. These items provide evidence of material contact with European culture and the incorporation of the new technologies into native systems.

The items of European manufacture provide the basis for the Protohistoric age of occupation at the site. Taken on their own, the faunal and lithic assemblage really differ little from what could be expected from a pre-contact site, so the non-indigenous items are important to determining certain aspects of the site. This portion of the site assemblage is analyzed with a focus on temporal aspects and country of manufacture. This data is important for further arguments concerning the Native group occupation at the site in the Protohistoric Period.

Gunflint

It was initially thought that the single gunflint recovered from 5LR263 was of French origin (Ohr et al. 1979: 27). The reanalysis of this artifact indicates that, based on certain diagnostic characteristics, it is of English origin (Figure 5.1). Typologically the gunflint is a *flake* gunflint rather than a *spall* gunflint. This distinction is based on the manufacture technique. Spall gunflints are made on wedge

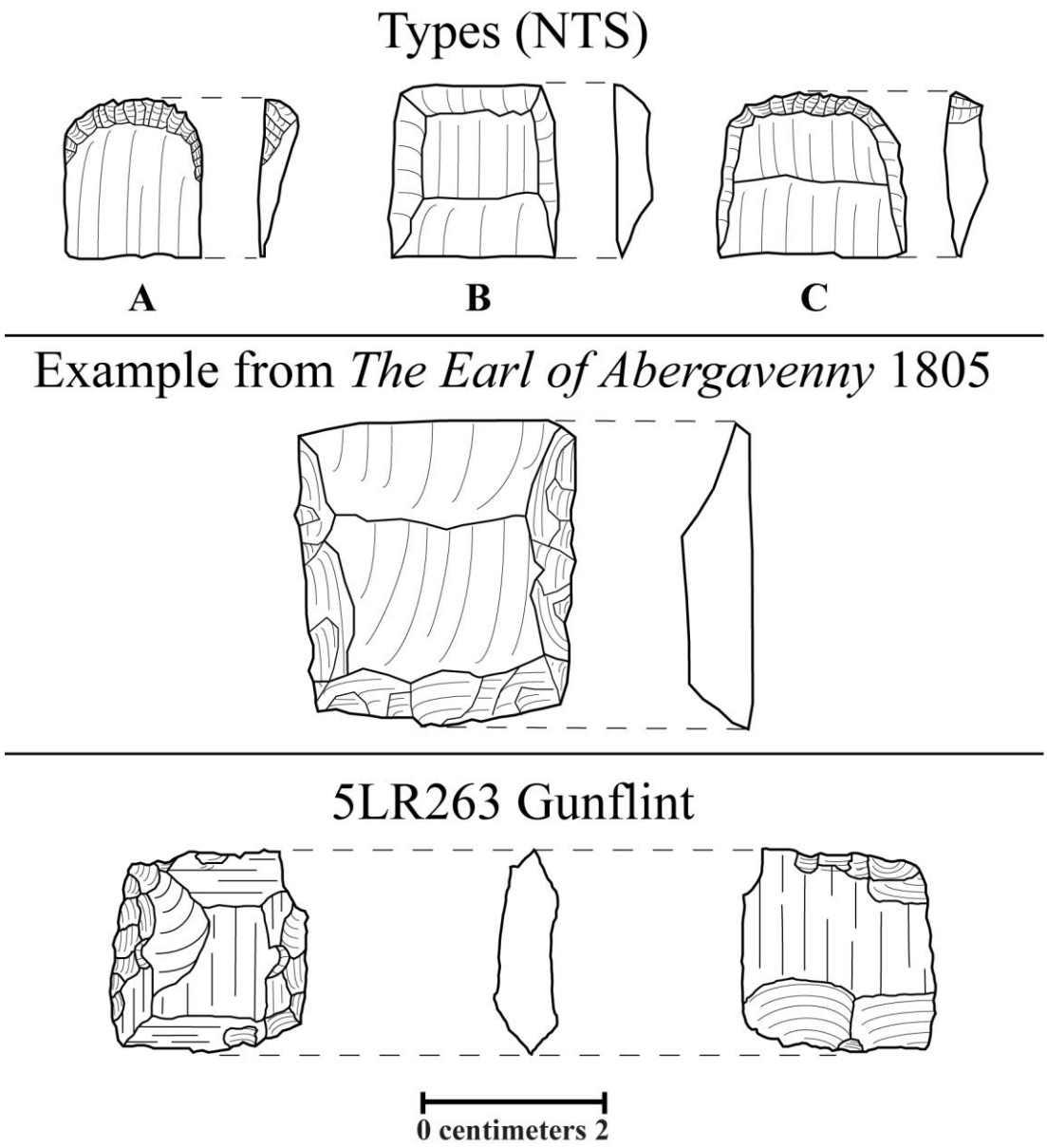

Figure 5.1. 5LR263 gunflint with comparative example and general types: (A) spall, (B) English, (C) French (types from Noël Hume 1969: 221).

shaped pieces of flint that were individually knocked off of pieces with suitable striking platforms in a more haphazard manner versus flake gunflints, which are made from blades precisely struck from prepared cores (Hamilton and Emery 1988: 10-12). The dimensions of this gunflint fall within the range of 20 to 28mm and suggest that it was manufactured for a trade musket (Hamilton and Emery 1988: 21). The gunflint

from 5LR263 is manufactured from a dark gray chert that, based on visual comparison with local sources and known regional sources, is a non-local material. Compared to French flakes, which according to Hamilton and Emery (1988: 13), were made from a glossy translucent yellowish flint, English gunflints were made from a flint without gloss and dark gray to solid black in color. The most compelling evidence for the origin of the 5LR263 gunflint comes from the presence of diagnostic impact cones on the piece.

In order to break the long flint blades into pieces of the correct size for use as gunflints, the blade was placed upon a chisel edge and then struck with a chisel edged hammer to detach the flint producing a sloping end on the flint and a projecting end (Witthoft 1966: 36). The striking of the flint in this manner left the flint end with a partial positive bulb of percussion known as a "demicone." The British developed a technique for manufacturing flake gunflints after 1780, which not only helps type the gunflint but also provides a *terminus post quem* for the Protohistoric occupation of 5LR263. The gunflint from 5LR263 has these demicones (like the example from the *Earl of Abergavenny,* an English ship that sunk in 1805). The demicone, according to Witthoft (1966: 36), "not the outline or the kind of retouch, characterizes the British gunflint." Fort Michilimackinac, abandoned by the British in 1781, contains no English flake gunflints, because they had yet to appear in North America evidence of the *terminus post quem* on gunflints of this type (Hamilton and Emery 1988: 244). The presence of several nearly identical specimens from a sample of gunflints that were manufactured in 1893 in Brandon, England (Witthoft 1966: 34-35) give a general dating bracket of 1780-1893 for the 5LR263 gunflint.

Kettle

The kettle fragments recovered from the site were possibly acquired through trade with the British or French, or intermediaries. There are nine fragments of cast brass, some with brass rivets and sheet brass still attached, that form portions of at least two kettle lugs (or bail ears) and probably represents a single vessel (Figure 5.2). Eight of these pieces were recovered in the 1974 excavation block (Ohr et al. 1979) and one was found 7 meters west of the excavation block and 20 cm below the present ground surface during the 2006 fieldwork.

The kettle lugs are classified as Type A Variety 2 according to the classification system used by Brain (1979: 164-165) for kettles from the Trudeau Site (occupied from A.D. 1731 to 1764) in central Louisiana. Based upon a complete kettle of this type recovered from the Little Rock Falls of the Granite River on the Minnesota/Ontario border, these kettles had a 30.5 cm opening and held about 11.4 liters (Wheeler et al. 1975: 63-64). The Gilbert Site, in northeastern Texas (occupied from A.D. 1740 to 1770), yielded a single kettle lug of this type, although the rivets on the lug are described as being made from copper rather than brass (Jelks 1966 105-107). There is a fragment of the same type of lug in the collections of the Koochiching Museums in International Falls, Minnesota (Birk 2004: 80).

The presence of kettles of this type at the Trudeau and Gilbert sites suggests that they are of French origin, given that contact and trade with Europeans during their occupation would have been with the French. Based on this evidence, as well as a kettle of this type in an 18th century French painting, Hansen (1997: 4) says that this type of kettle is definitely French. However, based on assumed association with a

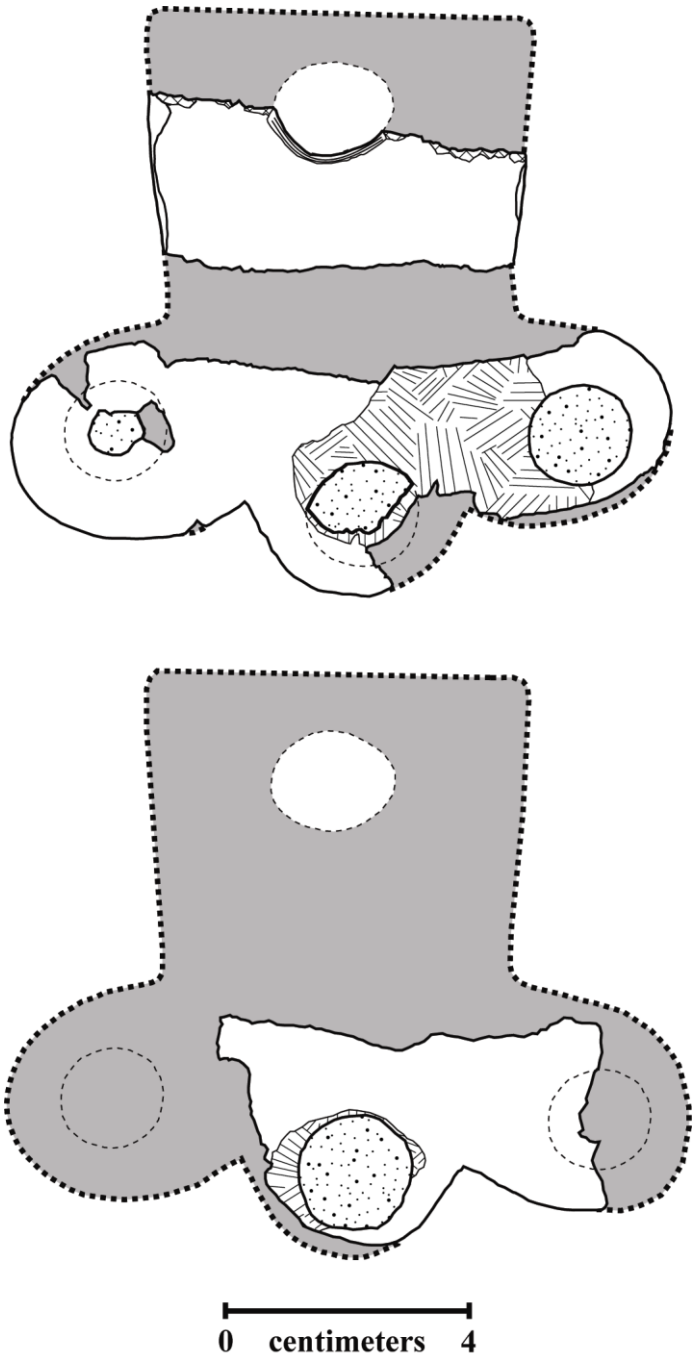

Figure 5.2. Kettle ear fragments from 5LR263, gray areas are missing portions, spotted circles are rivets and hatched areas are attached sheet brass from bowl portion.

pewter spoon stamped with a touchmark of an English manufacturer that was in operation between A.D. 1744 to 1767, Wheeler et al. (1975: 63-64) suggest that the kettle from Little Rock Falls is of British origin dating to the late 18th century. Brain

(1979: 173) acknowledges this and indicates that kettles of this type may have had a multinational origin. The preponderance of evidence, including a complete specimen from Normandy believed to date from the late 19th or early 20th century, indicates that the kettles probably were manufactured in France. At Fort Michilimackinac, occupied by both the French and British between 1715 and 1781, French-made kettles were commonly used by both nations (Stone 1974: 175). This was a product of the spatial and temporal overlap that occurred in the Great Lakes region during the 18th century between the English and the French. This being the case, one can easily see that items manufactured by one nation could easily end up in the hands of the other. The temporal range for the kettle in the New World is conservatively placed between A.D. 1731 and 1900.

Clay Pipe

Nineteen clay pipe fragments were found during the 1974 excavations. Most of these refit together to form a single incomplete specimen (Figure 5.3). The pipe is made from white clay that Pfeiffer (1982) types as "white ball clay." Ball clay is kaolinitic sedimentary clay found in southwest England that is light cream to white when fired (Echlin 2002). The bowl of the pipe is decorated with flutes or scallops that begin roughly halfway down the bowl and constrict into raised lines as the bowl diameter decreases into the stem. The raised lines terminate on the stem at a pair of raised lines that encircle the stem. Following the paired raised lines is a circle of raised dots followed by a final raised line encircling the stem. There are diagonal hash marks along the bowl seams (which align with the long axis of the pipe). The pipe also has a flat-ended spur.

Figure 5.3. Clay pipe from 5LR263.

The pipe's stylistic elements and overall shape are nearly identical to pipes Pfeiffer (1982: 252-253) analyzed from the Fort Union Trading Post National Monument. Fort Union, located at the confluence of the Missouri and Yellowstone Rivers in North Dakota, operated as a trading fort from 1829 until 1867 (Robertson 1999: 230-236). These pipes, that Pfeiffer calls "CP Half Rib," have the same decorative flutes, diagonal hash marks and spur. Unlike the 5LR263 pipe, Pfeiffer describes a double set of paired lines on the stem and the letters "CP" on the right side of the stem and there is no mention of raised dots. In its present condition the pipe from 5LR263 only shows three definite lines on the stem, but the missing fourth line and "CP" mark would have been located in positions on the pipe that are missing and/or worn. Comparison with measurements (Pfeiffer 1982: 252) given on the Fort Unions sample indicates that the 5LR263 pipe has the same morphometric dimensions ($\pm$ 3mm because of estimates due to missing portions).

The CP Half Rib type is also found at other locations (Table 5.1) according to Pfeiffer 1982: 251-252). Pipes of this type are reported from Fort Michilimackinac in Michigan (Peterson 1963: #15 as figured). Like-a-Fishhook Village, a fortified location on the Missouri River in North Dakota occupied by the Hidatsa, Mandan and Arikara, has an example of this type of pipe (Smith 1972: 78). The pictured example has the same diagonal hatching along the bowl seams as the 5LR263 pipe. Closer to the site location, pipes of this type are reported from Fort Laramie, located on the North Platte River in Wyoming (which was the location of various trading forts or posts that operated from 1834 to 1849) and Bent's Old Fort, located on the Arkansas River in Colorado (Wilson 1971; Moore 1973, respectively). The examples from Bent's Old Fort are described as having three rings, but the fluting goes three quarters of the way up the bowl, which has six four pointed stars below the rim and height of only 31.4 mm (Moore 1973: 78).

The temporal range of the Plains sites where CP Half Rib pipes are found has non-overlapping ranges with the Fort Michilimackinac occupation (Figure 5.4). Fort Michilimackinac was occupied earlier than the other sites on the Plains. The occupation ranges of the Plains forts show consistency due to their function as trading establishments during the fur trade era (~1824 to 1840). Like-a-Fishhook Village was a Native American habitation site that was occupied later than the other Plains forts. The maximum temporal range for the Plains sites is 1829 to the late 1880's with a mean age of occupation of 1850. Pipes of the CP Half Rib type were commonly introduced as a trade item during the fur trade but could have been introduced into the region much earlier, given their occurrence at Fort

Table 5.1. Temporal data on sites where CP Half Rib pipes are found

Site	Location	Dates Occupied (A.D.) Begin	End	*M* [1]	Reference
Fort Michilimackinac	Michigan	*1715*	*1781*	*1748*	Peterson (1963)
Fort Union	North Dakota	*1829*	*1867*	*1848*	Pfeiffer (1982)
Bent's Old Fort	Colorado	*1833*	*1849*	*1841*	Moore (1968)
Fort Laramie	Wyoming	*1834*	*1849*	*1842*	Wilson (1971)
Like-a-Fishhook Village	North Dakota	*1845*	*1888* [2]	*1867*	Smith (1972)

[1] *Mean averaged to nearest whole year*

[2] *This value used to calculate mean as end of occupation date is given as "late 1880's"*

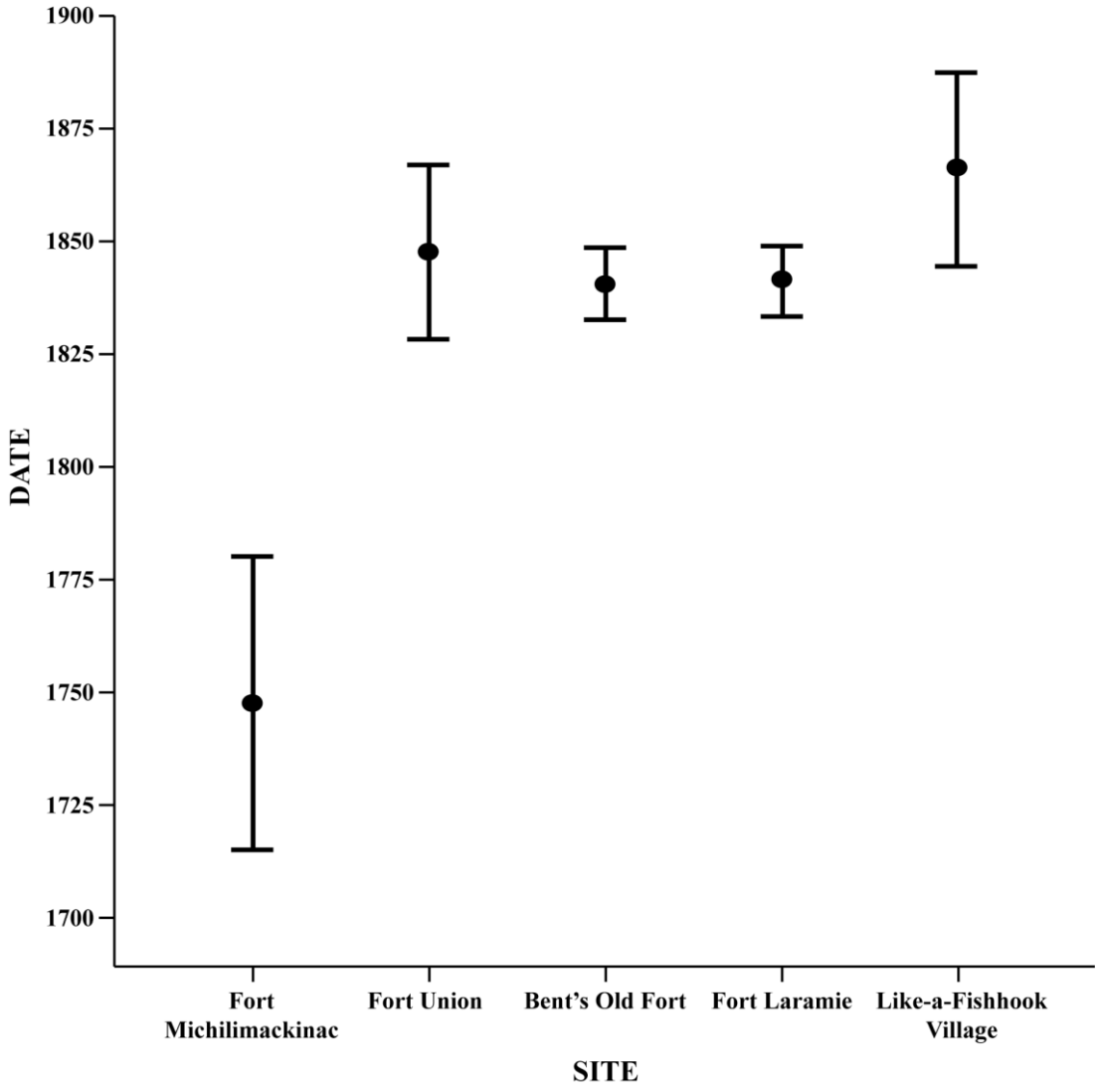

Figure 5.4. High, low, mean plot of occupation dates of sites with CP Half Rib pipe examples.

Michilimackinac. The above information gives a conservative dating range of 1714-1888.

The CP Half Rib is identical in most aspects to the pipe from 5LR263, but there are some inconsistencies in style. The 5LR263 pipe differs from pipes classified as this type from other locations as well. How complete the examples described by the researchers is unknown. What is known is that the pipe from 5LR263 has missing and/or worn portions that may account for some, but not all of these differences (e.g. the presence of decorative stars would be evident in its present condition). There does appear to be some variation within this style of pipe, but there is a general consistency in the dates of the western sites where this style is described.

The refit pieces of the pipe indicate that the stem had been broken, but it was still long enough that the pipe was used afterward. The discard of the pipe at the site may have been due to a break that rendered the pipe unusable, but its present fragmented state as a product of pre or post discard processes is difficult to determine. It is reasonable to assume that an item such as this would have been highly curated and its loss was disconcerting to the owner. Replacement of the pipe with another would not have been an easy endeavor, especially in the winter. But the loss of this pipe could be seen as evidence that there was a lengthy occupation at the site as this would have increased the likelihood that even highly prized and cared for items are broken and discarded. The trade beads found at the site are evidence of this for the same reasons, as they are a prized and curated item unlikely to be carelessly lost or discarded.

Tinkler

The single metal tinkler cone (Figure 5.5) was found at the site. Tinklers were decorative items used for adornment in a plethora of ways. Tinklers were a common trade item throughout the Protohistoric and Historic period on the Plains. Tinklers have been found in many post-contact sites and have little diagnostic value as they have undergone little diachronic change throughout the post-contact period (Birk and Richner 2004: 60). The example from the site does appear to be non-native in manufacture based on the clean trimmed end of the cone, which is in contrast with a native-made tinkler where the corners of the metal project out and are not trimmed.

Beads

The assemblage also includes 458 glass beads, a single dentalia shell and a black stone tubular bead (Figure 5.6). Dentalia (*Dentalia pretiosum)* shells are found on the Northwest Coast, were prized as decorative items used both in hair and clothing adornment by Plains groups. These groups acquired dentalia through both intertribal trade and/or contact with Europeans traders who often handled them as a commodity (Smith 1972: 106). It is not clear whether the black tubular bead is of native manufacture, but the symmetrical, polished appearance of this bead, along with the minute wall thickness suggests some kind of mechanical manufacturing technique.

The glass beads can be classified using the system developed by Kidd and Kidd (1970). 5LR263 contains type IIa and IIIf, which are drawn beads and the type WIc, which was made by the wound manufacture technique (Table 5.2). The total IIa type beads, if assembled onto a square of cloth in an attached position, would only fill an area of 13.21 cm^2, indicating that these beads may represent the loss or discard of a

Figure 5.5. Metal tinkler from 5LR263.

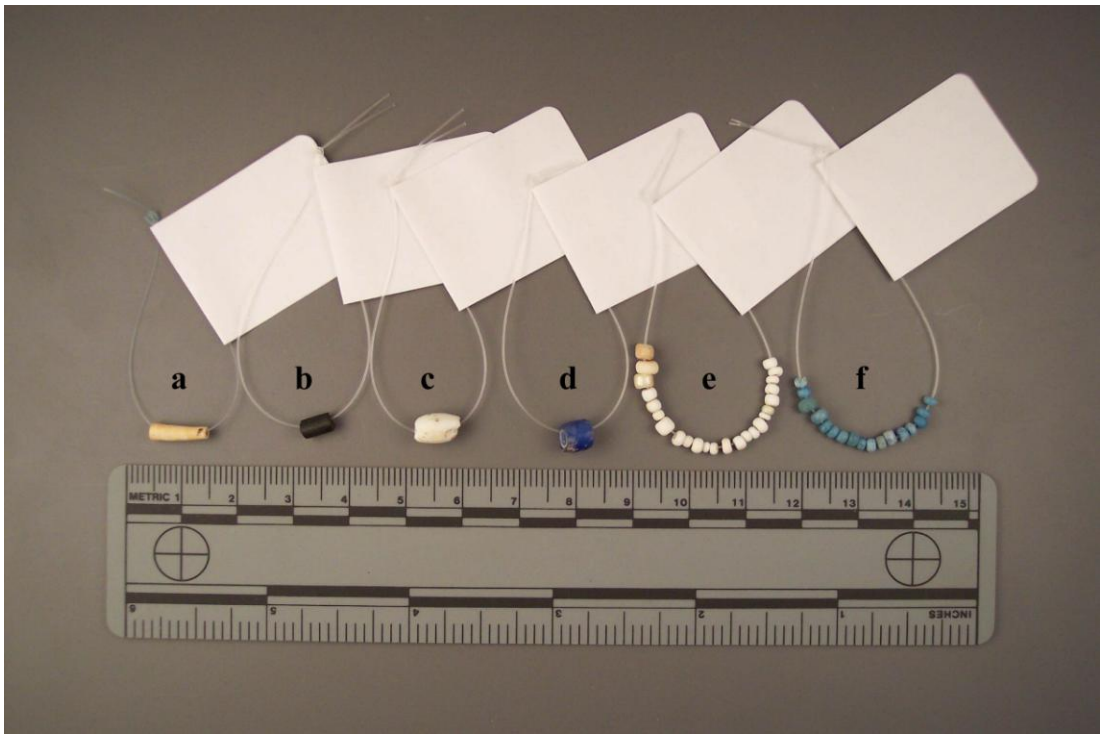

Figure 5.6. 5LR263 bead types: (a) dentalia, (b) tubular black stone, (c) type WIc, (d) type IIIf, (e) type IIa white and (f) type IIa blue.

Table 5.2. Glass bead frequencies

Complete	Incomplete	Total
431	27	458
Type	**Color**	**Number**
IIa	*White*	*239*
	Blue	*211*
	Black	*4*
WIc	*White*	*2*
	Green	*1*
IIIf	*Blue*	*1*

single decorated item and *not* a trading stock's worth quantity of beads. Summary data will be presented on the glass beads based on information provided by Chris von Wedell (personal communication 2007), who at the time of writing is working on a much more detailed analysis. However, any conclusions or comparisons in this work are made by the author.

Glass beads from the Protohistoric and Historic periods are found throughout the Great Plains and their trade to and use by native groups was widespread. An overall chronology of beads from the region has not been definitively established due to a lack of standardization of terms from well-dated sites and limited analysis of beads from other sites (Scheiber 1994: 39-40). In her analysis of the Pitchfork Rockshelter (48PA42) from northwestern Wyoming, Scheiber (1994) uses characteristics of the bead assemblage (N = 1034) to date Native American burials at the site to ca. 1810. The beads are dated to approximately A.D. 1800-1840 based on characteristics including the limited assortment of colors and a wide range of variation in the measurements of outer diameter, inner diameter and length. These same characteristics can be used to describe the glass bead assemblage from 5LR263.

The dimensional data for the IIa beads (Table 5.3) provided by Chris von Wedell (personal communication 2007) indicate that the 5LR263 beads cannot be statistically

Table 5.3. 5LR263 IIa bead measurement statistics and date estimates using regression formula from Reher and Scheiber (1993)

Dimension	n	*M*	Median	Mode	*s*	s^2	Minimum	Maximum	Range
Outer Diameter	*409*	*2.68*	*2.61*	*2.55*	*0.39*	*0.16*	*1.64*	*4.07*	*2.43*
Inner Diameter	*406*	*1.01*	*1.00*	*0.92*	*0.19*	*0.04*	*0.30*	*1.72*	*1.42*
Length	*406*	*1.92*	*1.90*	*1.83*	*0.38*	*1.42*	*1.04*	*3.13*	*2.09*

			Date		
Color	Diameter	*s*	*M* [1]	Youngest	Oldest
All	*2.6767*	*0.3924*	*1836*	*1812*	*1860*
White	*2.6815*	*0.4015*	*1836*	*1811*	*1861*
Blue	*2.6707*	*0.3881*	*1837*	*1812*	*1861*

[1] *Mean averaged to nearest whole year*

differentiated from the Pitchfork beads based on comparison of the outer diameter ($t = 0.078$, $df = 8$, $p = 0.940$), inner diameter ($t = 0.271$, $df = 8$, $p = 0.793$) and length ($t = 0.522$, $df = 8$, $p = 0.616$). The Pitchfork Rockshelter assemblage is composed of white (67%), blue (21%), red with white centers (8%) and black (4%) beads (Scheiber 1994: 37). These colors are found in the 5LR263 bead assemblage with the exception of the red with white center beads. However, a bead of this type was found less than 1.5 km from 5LR263 along Boxelder Creek during archaeological survey in the summer of 2007. The overall lack of variety of colors is indicative of an earlier (pre fur trade) rather than more

recent (historic post-1860) site because the variety of colors available through European contact increased through time (Davis 1973: 34). Davis (1973: 32) also indicates that red colored beads are more commonly found in sites that post-date 1800 in the northern Plains.

Table 5.3 also includes a dating analysis performed by von Wedell on the IIa beads. Reher and Scheiber (1993) used 11 bead assemblages from dated sites in Wyoming to develop a regression formula for estimating dates based on outer

diameter, as follows: Estimated Date = -62.5(Mean Outer Diameter) + 2003.75. The estimated date from the assemblage based on this analysis is 1836, within the approximate date range that the characteristics described by Scheiber (1994) indicate. The Pitchfork beads date to 1810 using the regression analysis, an indication that the beads from that assemblage are larger. IIa type beads, especially undecorated specimens, show a general trend of getting smaller through time (Davis 1973: 34).

Beads from dated contexts can provide comparisons with which to estimate the age of 5LR263 assemblage. Date ranges from 25 sites from the northern Plains (Davis 1973), 57 sites mainly from Eastern North America (Brain 1979) and some southern Plains data (Harris and Harris 1967) provide comparative ranges against which the matching bead types from the 5LR263 assemblage can be compared (Table 5.4). The date ranges from the Eastern North America sites have consistently earlier date ranges than the Northern Plains sites, but there is considerable overlap between the two. This pattern is clearly evident when a high, low, mean plot of this data is presented (Figure 5.7). It is not surprising, given the manner in which Europeans colonized North America by moving generally from east to west and establishing settlements in the eastern portion of the continent earlier than in the west.
The earlier date ranges from Eastern North America do leave open the possibility that these beads could have been present at 5LR263 much earlier than the Northern Plains data suggests.

The date ranges for beads from 5LR263 provided by the Northern Plains sites does provide a date range that is compatible with the chronological evidence derived from the other items of European manufacture in the assemblage. Chris von Wedell

Table 5.4. Temporal data from North American sites where bead types from 5LR263 are found

			Northern Plains			Eastern North America [4]			Southern Plains
			Temporal Range (A.D.) [2]			Temporal Range (A.D.)			
Type	**Size** [1]	**Color**	**Begin**	**End**	***M*** [3]	**Begin**	**End**	***M***	**Earliest Date** [5]
IIa	Small	White	*1650*	*1895*	*1815*	*1600*	*1836*	*1739*	*1700-1740*
		Blue	*1650*	*1895*	*1815*	*1600*	*1836*	*1737*	*1700-1740*
		Black	*1650*	*1895*	*1813*	*1600*	*1890*	*1745*	*1700-1740*
	Medium	White	*1777*	*1857*	*1826*	*1600*	*1836*	*1739*	
		Blue	*1777*	*1857*	*1824*	*1600*	*1836*	*1737*	
		Black	*1777*	*1832*	*1822*	*1600*	*1890*	*1745*	
IIIf	Medium	Blue	*1777*	*1815*	*1796*				*1780-1820*
WIc	Medium	White				*1680*	*1831*	*1741*	

[1]size classes from Kidd and Kidd (1980: 66): Small = 2 to 4mm, Medium = 4 to 6 mm
[2]temporal range values from Davis (1973: 19-29), but subsituted a date range of 1834-1849 for Fort Laramie as this was when it was strictly a trading establishment and 1895 was used as a cut-off date for Sitting Crow Mounds to replace 1890's date in order to calculate mean
[3]Mean determined from the average date of occupation from each site where the bead type is present and rounded to the nearest whole year
[4]temporal range and mean values from Brain (1979: 97-116)
[5]values from Harris and Harris (1967)

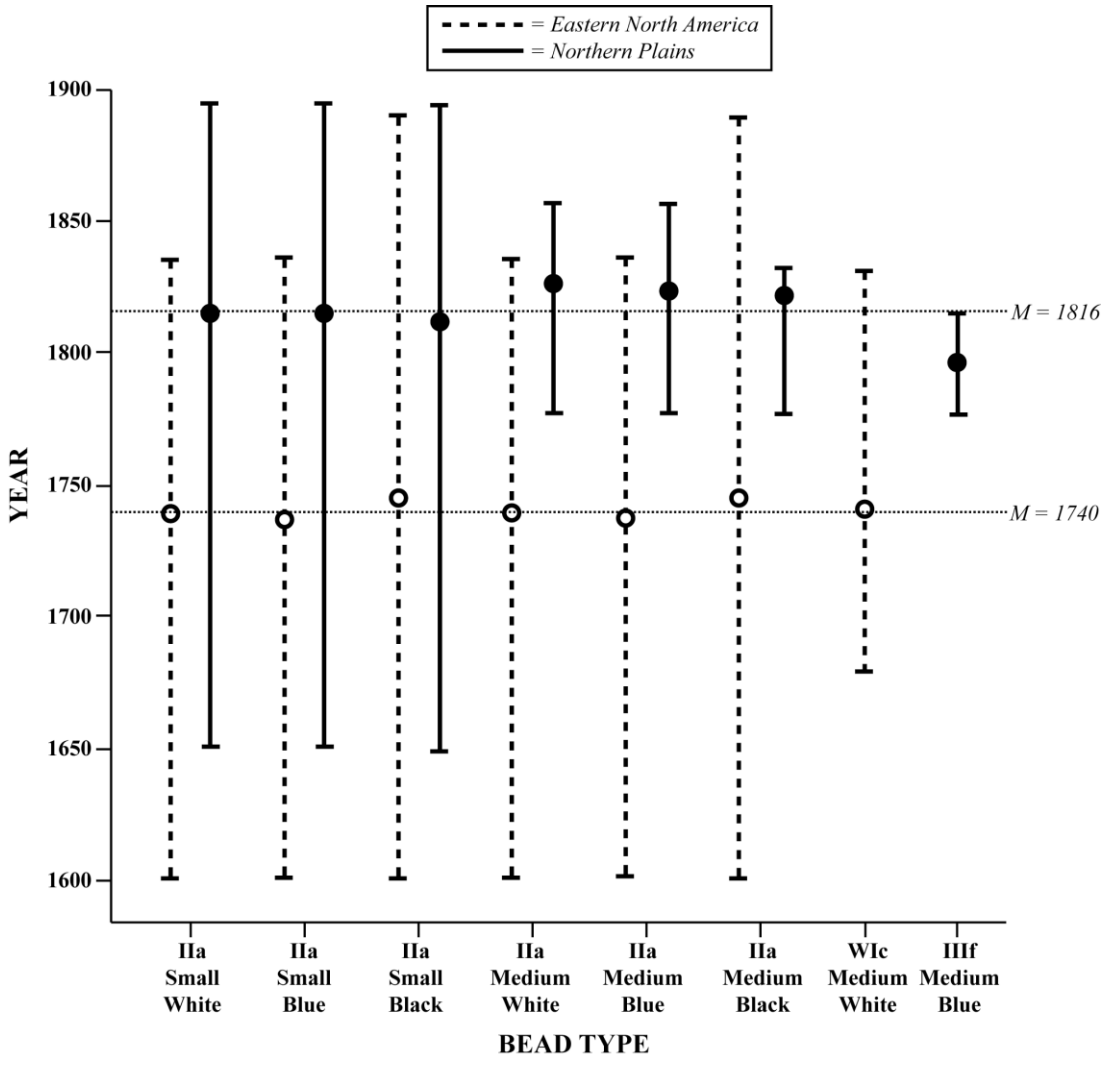

Figure 5.7. High, low, mean plot of date ranges from Table 5.4.

(personal communication 2007) has provided date ranges from ten sites where IIIf type beads were found (Table 5.5). This type as known as "Hudson's Bay Blue Facetted" has been found in colonial contact sites in North America and other continents as well. These sites provide date ranges that indicate a maximum range of 1650-1910 (Figure 5.8), but the North American sites provide a core range of 1700-1865. The two sites closest to 5LR263, Hill and Fort Union, narrow the date range even further to 1777-1865, in agreement with the date ranges presented above.

The glass beads from 5LR263 provide good evidence as to when the Protohistoric occupation took place. The combined temporal data on the beads both from known dated sites, statistical analysis, and assemblage characteristics indicate the beads can be comfortably placed within a core date range of 1800-1840. A conservative dating bracket, however, would be 1600-1895.

Horse

Although not an item of European manufacture in the technical sense, domesticated horses were reintroduced by Europeans through the course of their colonization of the New World. The presence of horse bone in conjunction with the rest of the Protohistoric assemblage at 5LR263 indicates that the site occupants were no longer pedestrian groups. More than any trade good, adoption of the horse by native groups was responsible for the dynamic changes that took place during the post-contact period. Some groups (e.g., the Comanche) completely reorganized their culture around this animal and used it to attain greater intertribal status (Hämäläinen 2003).

Table 5.5. Temporal data on sites where IIIf beads are found

Site	Location	Dates Occupied (A.D.) Begin	End	*M* [1]	Reference
Hill	Nebraska	*1777*	*1815*	*1796*	Davis (1973)
Fort Union	North Dakota	*1829*	*1867*	*1848*	DeVore (1992)
New Montpelier Estate	Jamaica	*1770*	*1910*	*1840*	Karklins and Barka (1989)
Galways Plantation	Montserrat	*1790*	*1850*	*1820*	Karklins and Barka (1989)
St. Augustine	Florida	*1700*	*1821*	*1761*	Karklins and Barka (1989)
First Hermitage	Tennessee	*1804*	*1856*	*1830*	Karklins and Barka (1989)
Kaskaskia Indian Village	Illinois	*1719*	*1833*	*1776*	Karklins and Barka (1989)
Fort Vancouver	Washington	*1829*	*1860*	*1845*	Karklins and Barka (1989)
Elmina	Ghana	*1637*	*1872*	*1755*	Karklins and Barka (1989)
Amsterdam Sites	Netherlands	*1650*	*1800*	*1725*	Karklins and Barka (1989)

[1] *Mean averaged to nearest whole year*

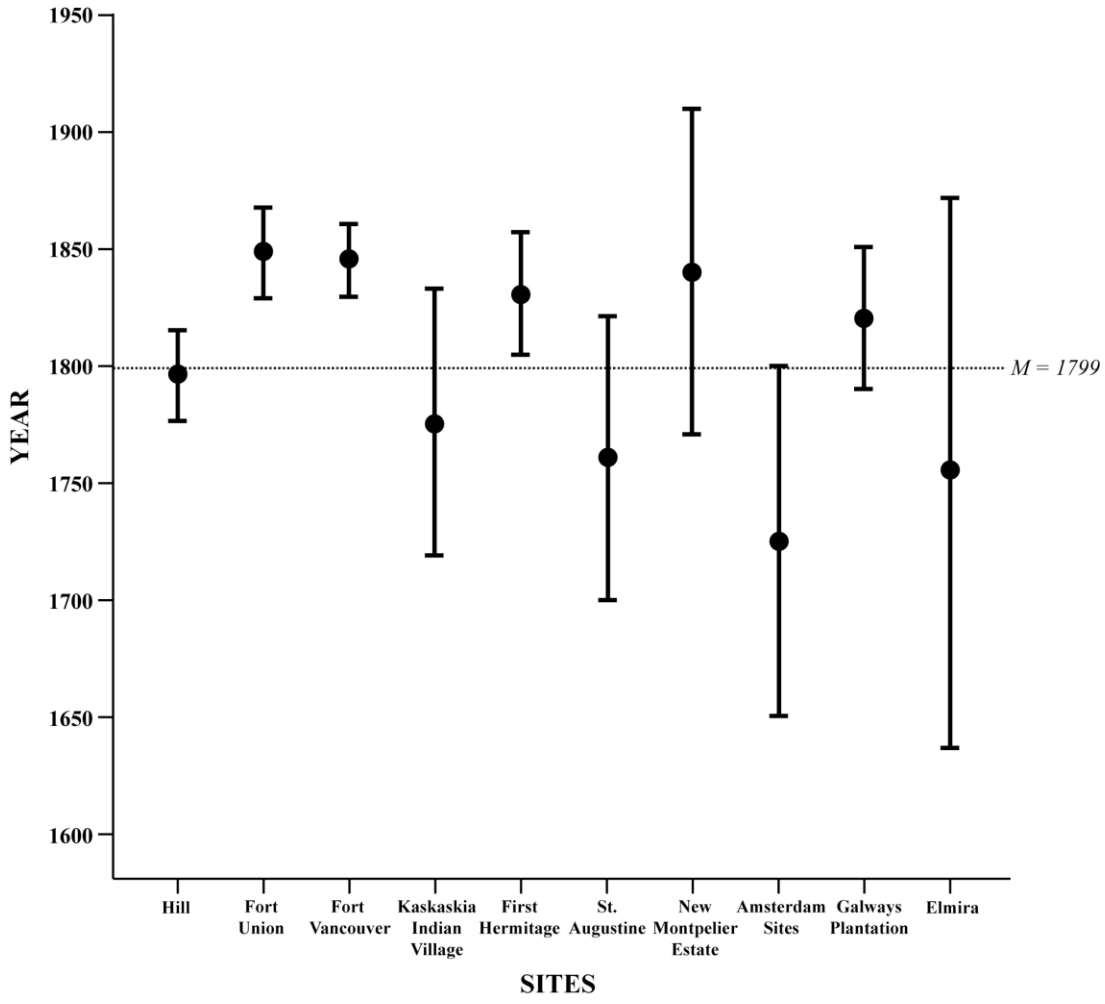

Figure 5.8. High, low, mean plot of date ranges from Table 5.5.

The horse, a New World species, took a somewhat circuitous route in order to reappear on the doorstep of Native American groups in the Plains. The horse, as we know it today, evolved on the North American continent and eventually migrated to Asia and beyond. Subsequently the New World horse (*Equus occidentalis)* went extinct during the terminal Pleistocene (Roberts 1998: 81). It was on the central Asian steppes where the horse (*Equus caballus)* was first domesticated over four millennia ago (Roberts 1998: 178). From that point, the horse, as a domesticate, spread throughout Eurasia where it came to be an integral part of the European colonial expansion machine, especially for the Spanish.

The Spanish expeditions (1540-1542) of DeSoto and Coronado are generally credited with bringing the first horses onto the Plains (Wissler 1914: 1). The Coronado expedition, in particular, was the first to come in contact with tribes on the Plains in 1541. About this same time, the DeSoto expedition brought horses across the Mississippi into areas of what is now Texas and Oklahoma. Wissler (1914) theorized that these expeditions afforded the first horse acquisition opportunities for native groups in the form of animals that were lost or had strayed from the Spanish herds. This "stray theory" of horse acquisition has been refuted by later studies (Haines 1938a; Roe 1955), which present convincing evidence showing that the initial Spanish expeditions neither had enough female animals nor lost enough animals to establish a viable breeding population for Native Americans to use. The records from the DeSoto expedition also indicate that native groups who came in contact with these initial expeditions often killed horses because they associated horses with the hated Spanish (Haines 1938a: 114). Evidence from an archaeological

site (48SW8319) in Wyoming supports the notion that the indigenous groups did not initially appreciate or recognize the potential of the horse (Eckles et al. 1994). At this site, a horse skeleton dating to the mid-17th century, exhibits axe and cut marks that cannot be explained by butchering but indicate a hacking and violent mutilation of the carcass. Haines (1938b: 429) posits the more likely theory that horses were acquired from the Spanish settlements in the southwest around the beginning of the 17th century.

The likelihood that horses were initially captured and/or stolen from the stock raising centers around Santa Fe established by the Spaniards is much more logical than the stray model of horse acquisition. The use of native labor at the missionaries and ranches of the Spanish provided Native Americans with the opportunity to learn how to raise and manage horses (Haines 1938b: 429-431). This knowledge eventually allowed native groups to raid Spanish herds. Events such as the Pueblo Revolt of 1680 provided further opportunities for the transfer of horses from Spanish to native groups (Haines 1938b). The horse then spread north into the Plains from native group to group by trade or theft, with the northern Plains being the last to acquire the animals around the mid-18th century. The horse eventually became a symbol of wealth, as well as a powerful weapon in the competition for land and resources.

It has been argued that the lifeways of the pedestrian hunters were pre-adapted for the horse because they used dogs prior to contact (Osborn 1983: 565) and the subsequent acquisition of the horse simply intensified the existing nomadic adaptation to the Plains. The horse was simply a "big dog" providing much improved

transportation and hunting capabilities. This view has some credence, as native groups named the animal using terms such as "medicine dog," but is also somewhat contradicted by the evidence that the horse gave rise to pronounced changes in virtually every aspect of native lifeways. The domestication of the horse changed the technology, subsistence, mobility, settlement patterns, warfare, as well as the wealth and social status structuring of Plains groups (Osborn 1983: 565), and certainly did more than simply replace dogs.

Studies of other aspects of the material culture, particularly in the realm of tools, demonstrate that aboriginal groups did not always preferentially choose trade items over indigenous items (Bamforth 1993). This evidence serves to demonstrate that native groups were selective in their acceptance of European items and supports the case that the horse was of particular importance to native groups. The profound affect that the acquisition of horses had on existing cultures demonstrates that it was a catalyst for change.

Hunting methods and logistics were changed with horses. New hunting techniques were developed where the speed and mobility of mounted hunters negated the use of topographic traps such as jumps or pounds (Frison 1991). With the exception of jumps (Reher and Frison 1980), the other methods for killing buffalo, with the exception of the pounds used in the northern Plains, were mostly abandoned when the horse hunting technique was developed. Location and procurement became a more encounter-based less logistical strategy because of the ability of horses to run down bison. The use of topography, critical when herding animals into traps or other enclosures, was not needed other than to decrease pursuit time. Equestrian hunters

were able to procure animals over a much larger area than by pedestrian means, increasing the effective density of the prey species (particularly bison) that was being hunted (Osborn 1983). Horses provided the hunter with longer encounter times with hunted animals, which translated into a larger killing window. A mounted hunter could pursue animals rather than having to drive or ambush them as before. As pack animals, horses allowed for larger amounts of meat to be procured and moved over greater distances.

There seems to be some correlation between the introduction of the horse and the increase in certain activities such as hide processing for trade and hunting. At post-horse sites, such as Little Deer in Oklahoma (Hofman 1978) and Biesterfeldt in North Dakota (Wood 1971), extremely large endscrapers are used to speculate that the increased hunting success brought about by the horse gave rise to an increase in hide processing for trade. The large endscrapers at 5LR263 are evidence that the site occupants may have been involved in this trade, though not necessarily at the site itself.

Caring for individual or herds of large ungulates, such as the horse, requires finding habitation sites in areas with suitable forage and shelter. Historic accounts indicate that the horse herds of Plains tribes could be quite numerous. One account from 1833 of Prince Maximilian's expedition up the Missouri River indicates that the Crow were in possession of between 9,000 and 10,000 horses (Thomas and Ronnefeldt 1976: 36). The forage requirements of a herd this size would be immense and would limit camp location to a few specific places on the landscape and require full-time allocation of individuals from the group for the care and maintenance of the

herd. Osborn (1983: 586) calculated that a horse weighing 409 kilograms would require 7.8 kilograms of solid food and 23.1 kilograms of water a day. A historic account of Native American villages indicates some of the hardships of keeping horses fed throughout the winter. General George Custer wrote of his winter campaign of 1868-69 that:

> [W]e invariably discovered them [villages] located upon that point of the stream promising the greatest supply of cottonwood bark [which was fed to the horses as winter forage], while the stream in the vicinity of the village was completely shorn of its supply of timber [Cutright 1969: 86-87].

Riparian areas, such as the Boxelder drainage, would have been especially attractive as they provide abundant forage and dependable water sources.

Historic and ethnographic accounts of village sites indicate that they were placed along riparian zones because of the amounts of forage and water that horses required (Osborn 1983). Groups such as the Blackfeet specifically chose a river valley for winter camp and remained there barring all but total resource exhaustion (Ewers 1958). Camp considerations such as these would be different from pre-horse considerations.

Summary

How or why these items of European manufacture came to be lost and/or discarded at 5LR263 are questions that are certainly beyond the scope of archaeological inquiry, but the result of which allows us to analyze the site occupants in greater detail. The items of European manufacture recovered at 5LR263 provide evidence of time of occupation and origin of manufacture. The claypipe and gunflint are from English sources, whereas the kettle was likely manufactured by the French. These items indicate that the Native group at 5LR263 acquired them through trade or

direct procurement to the north and east. Also, the gunflint indicates that the site was not occupied until after A.D. 1780. Further evidence from the bead assemblage also places the occupation around the beginning of the 19th century.

The French and English trade items are compatible with the postulated age of occupation at 5LR263. These nations traded and explored west into the Great Plains in the 18th century as they expanded out from the Great Lakes region. The occurrence of this particular suite of trade items at 5LR263 indicates that the site occupants had access to items that would have been highly valued. Overall, the items of European manufacture indicate access to highly valued items and trading influences from trade to the north and east with the French and/or English.

The presence of at least one and probably two horses (based on $\delta^{13}C$ difference between the two elements) at the site are strong evidence that horses were a part of the post-contact occupation at 5LR263. The camp location and faunal assemblage characteristics of the site indicate that the site was occupied by a group that had adopted an equestrian lifeway. The postulated age of occupation at the site is after the generally accepted date of horse acquisition in the area of the early to mid-18th century, so this is not entirely unexpected. The precise acquisition date of horses in the area is lost to history, but absolute dating of materials from the site can help to delineate the occupation date of the site. The next chapter describes the radiometric analysis of material from 5LR263 and provides support to the postulated beginning of the 19th century occupation.

Chapter 6. Radiometric Analysis

Radiocarbon dating of materials and features from the Protohistoric component of 5LR263 provide additional absolute data that can be used to place the site in a temporal context (Table 6.1). Thermal features uncovered in the 1974 excavation block (Ohr et al. 1974) provided two dates (UGa – 816, UGa – 813) from excavation Levels 1 and 2. Additional bone collagen samples (Beta – 220556, Beta – 220557, Beta – 220558) were dated in 2006 to obtain more radiometric data and to ensure (in the case of the horse) that all aspects of the assemblage were contemporaneous. As with the original charcoal dates, the bone dates were also stratigraphically inverted.

Table 6.2 gives the calibrated date ranges and pooled dates with the greatest probability. The five dates are statistically contemporaneous (χ^2=3.347, p<0.05). As the calibrated values (using Calib Radiocarbon Calibration Program v. 5.0.1 with IntCal04.14c data set [Reimer et al 2004]) indicate the date ranges primarily fall in the 18th and 19th century and becomes the most likely time of occupation when the *terminus post quem* of 1780 is applied based on the gunflint.

The date ranges for the trade items combined with the absolute dates indicate that the site was occupied in the first half of the 19th century (Figure 6.1). The bars represent the conservative date ranges and the dots represent the mean occupation date where each type of artifact was found. The radiocarbon date range on the plot represents the pooled and calibrated date range with the greatest probability. Although some of the date ranges are based on sites located a great distance away

Table 6.1. Radiocarbon dates from Protohistoric occupation at 5LR263

Sample	Level	Depth (cm)	Description	Material	Reference	$^{13}C/^{12}C$	$^{15}N/^{14}N$	RCYBP
UGa - 816	1	0 - 5	thermal feature	charcoal	Ohr et al. 1979			250 ± 85
Beta - 220556	1		*Equus caballus* metapodial	bone collagen		-11.9		170 ± 40
UGa - 813	2	5 - 10	thermal feature	charcoal	Ohr et al. 1979			210 ± 95
Beta - 220557	2		*Equus caballus* scapula	bone collagen		-16.9	7.1	150 ± 40
Beta - 220558	2		*Bison bison* mandible	bone collagen		-8.7		240 ± 40

Table 6.2. Calibrated two-sigma ranges for 5LR263 Protohistoric dates

		Calibrated 2σ Age Ranges (A.D.)		
Sample	RCYBP	Start	End	Probability (%)
UGa - 816	250 ± 85	***1455***[1]	***1706***	***61.27***
		1719	1825	24.22
		1832	1884	6.19
		1913	1953*	8.32
Beta - 220556	170 ± 40	1655	1707	19.43
		1719	***1826***	***48.84***
		1832	1886	13.54
		1912	1953*	18.19
UGa - 813	210 ± 95	1493	1602	17.02
		1615	***1953****	***82.98***
Beta - 220557	150 ± 40	***1666***	***1784***	***48.11***
		1795	1892	33.92
		1908	1953*	17.97
Beta - 220558	240 ± 40	1520	1592	15.25
		1619	***1685***	***42.84***
		1732	1807	33.32
		1928	1952*	8.59
Level 1 pooled	185 ± 36	1648	1697	22.04
		1724	***1815***	***52.70***
		1834	1878	6.58
		1916	1952*	18.68
Level 2 pooled	196 ± 27	1650	1685	24.91
		1731	***1808***	***57.15***
		1927	1952*	17.94
All pooled	192 ± 22	1659	1683	22.37
		1734	***1806***	***58.26***
		1929	1952*	19.37

* *date that impinges on end of calibration data set*
[1] *bold italicized values indicate date range with greatest probability*

from 5LR263, they still can have relevance to the site because the combination of specific artifact types found at the site indicates an occupation, which pre-dates the Fur Trade Era. The application of the *terminus post quem* date of 1780 negates most of the dates from locations beyond the Plains region and narrows the range even further. A mean of the average occupation date from locations that post-date the *terminus post quem* is 1815. All in all, the ranges provided by the trade items along

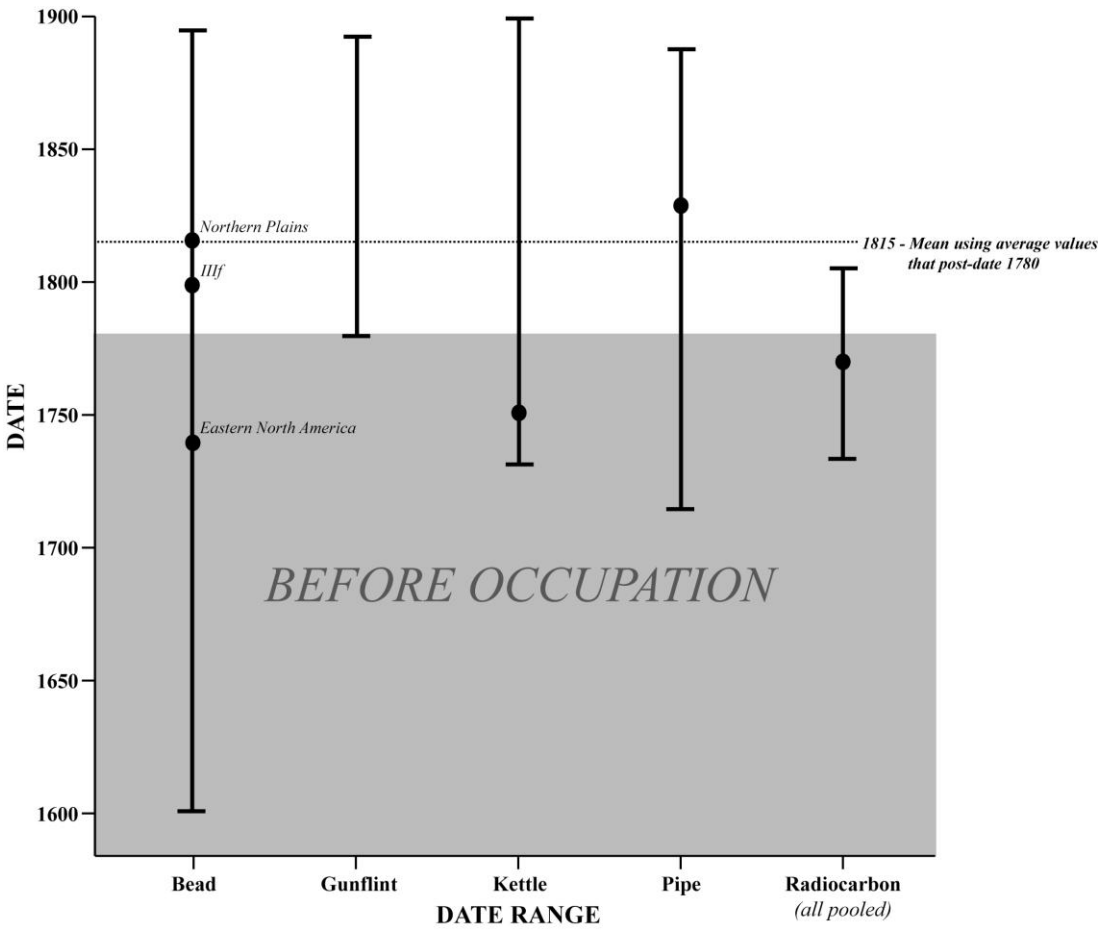

Figure 6.1. Combined date ranges from comparative and absolute data.

with the radiometric data presents a cogent picture of a site occupation that occurred in the beginning of the 19th century, probably within the first two decades.

The Protohistoric Period of the early 19th century was a time when European contact began to transition from materials contact to the direct physical contact that began in earnest with the fur trade era. Because it is believed that 5LR263 was occupied during this time it is important to establish a tight date of occupation versus a more general range. The site appears to represent a single occupation so trying to determine when this took place is critical to the arguments about degree of European

contact and Native group affiliation. These aspects would be drastically different if, say, the site was occupied in 1750 or 1850. The dynamics of the Protohistoric Period necessitate that a fine-grained determination of occupation be attempted. All of the available data both absolute and relative is brought together to winnow down the more general date ranges to a precise date of occupation.

The postulated occupation, as being a single event or not more than a couple closely spaced events, is based primarily on the spatial characteristics of the artifact distribution from the excavated Protohistoric levels from 5LR263. The following chapter outlines the spatial data that is available from the excavations. The data that was used for this analysis is strictly from the site report (Ohr et al. 1979), but it clearly demonstrates some patterning that supports the single or closely temporally spaced occupation hypothesis of this analysis.

Chapter 7. Report Data Spatial Analysis

The spatial patterning of the artifacts as mapped in the excavation block of 5LR263 provides evidence of a distinct occupation during the Protohistoric Period. Given the inability to use the actual raw data from the excavations, the presented level maps from the site report (Ohr et al. 1979) are analyzed for existent spatial patterning. The analysis demonstrates that the patterning of the point plotted artifacts from the Protohistoric levels are distinctly concentrated in a manner suggestive both visually and statistically of an occupation that took place during a discrete place in time.

The existing planview maps from levels 1 through 3 were collapsed into a single map. This was done by superimposing a 50 cm square grid on the level maps using north/south and east/west lines numbered starting with 1 at the southwest corner of the excavation block. The position of each plotted artifact was then recorded to the nearest tenth (5 cm) in both northing and easting within the larger 2500 cm^2 grid squares. The resultant position placed each mapped artifact within a 25 cm^2 block (Figure 7.1).

It is important to note that by collapsing the levels into a single Protohistoric component the resultant map may be representative of a palimpsest rather than a discrete occupational event. In addressing site formation processes, LaMotta and Schiffer (1999: 20) note that there is not necessarily a direct relationship between an object found and the activity that produced it, and that the archeological record may be a palimpsest of deposits related to different phases of occupation. However, the

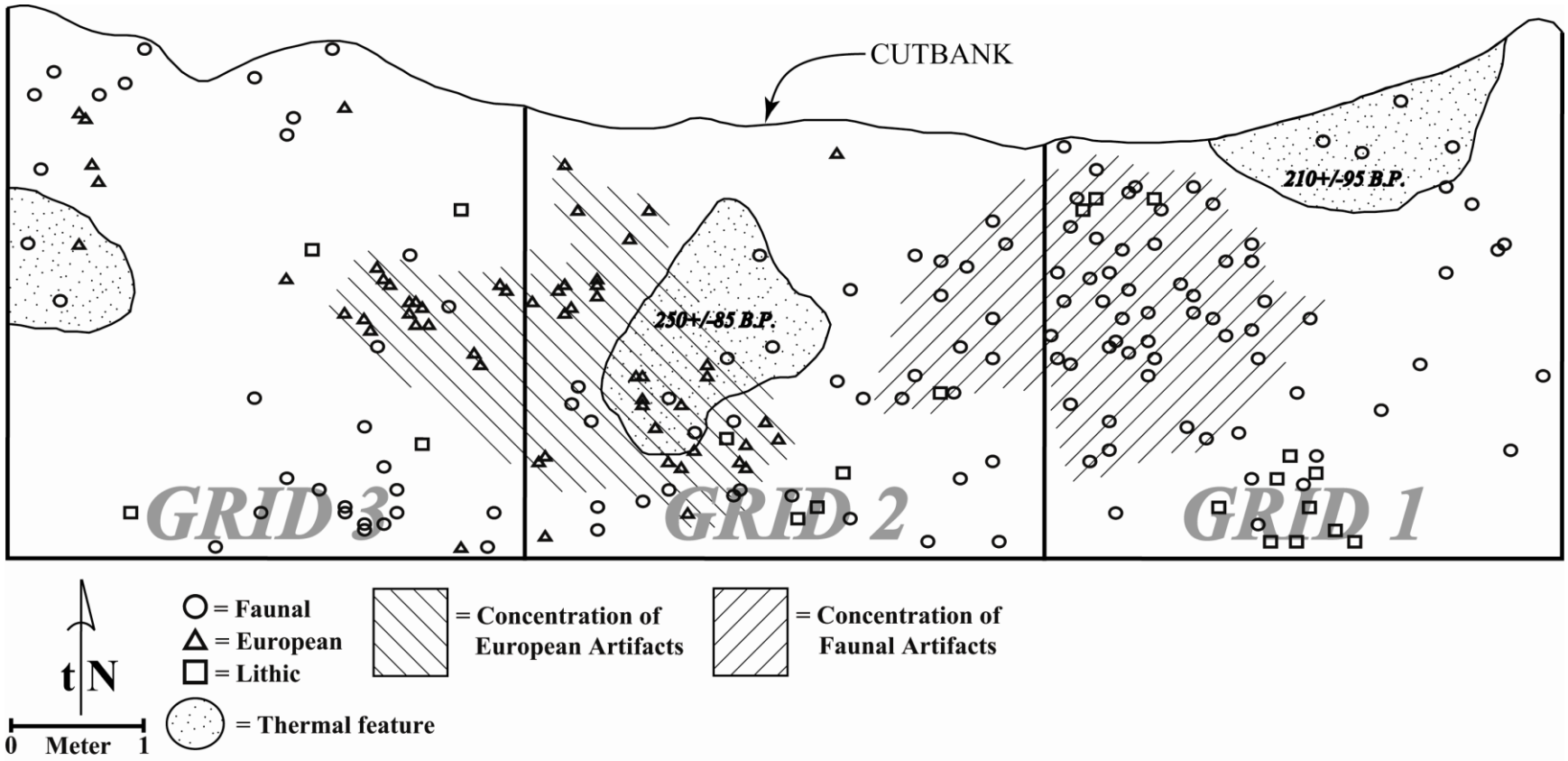

Figure 7.1. Map of plotted artifacts in 5LR263 excavation block.

postulated use of this area as contemporaneous or very closely spaced in time is the rationale used for a blanket analysis. The spatial patterning of the artifacts, as demonstrated below, indicates that the space was used in a very similar manner, even if it represents multiple occupations.

Figure 7.1 shows that the mapped artifacts within the excavation block are patterned around the thermal features. The trade goods (designated European on Figure 7.1) and faunal artifacts are in separate concentrations. The thermal features contain few artifacts, an indication that they were being used as centers of activity around which artifacts were discarded or lost. A lack of habitation features suggests that this was an outside hearth area and very similar to Binford's (1978: 345-355) outside hearth model. If this is in fact an outside hearth, the northern portion of this area was lost to erosion, and the remaining areas could represent both a drop zone in Grid 1 around the central hearth feature and a forward toss zone, given the prevailing north to northwest winds in the site area.

Drop zones around the hearths are generally composed of smaller items, such as lithic debitage and bone flakes whose size is not bothersome to further work. Larger items such as bone are instead tossed away (Carr 1991: 230). The large amounts of retouch flakes and other debitage recovered from the excavation suggest that tool manufacture/maintenance was occurring here. The presence of impact cones in the assemblage from the excavation block shows that bone processing was taking place in this area. The size of the trade goods around the hearth indicates a bias in disposal or loss of artifacts as well.

Glass beads and the single tinkler comprise fifty (87.7 %) of the fifty-seven total plotted European goods. These are items that were probably lost rather than actively discarded and are concentrated mainly on the north and northwestern sides of the hearths, a good indication that this direction was preferable for situating oneself to take advantage of the prevailing wind and escape campfire smoke. The kettle fragments recovered in the excavation block may represent an item that was discarded as it became unusable because of breakage. The kettle fragments recovered both within and outside of the excavation block are small and from a portion of the kettle (i.e., the lugs) that are made of cast brass versus the bowl portion of the container which is made of sheet brass. The lack of sheet brass fragments from the kettle could represent the recycling of this material for other items or tools (e.g., projectile points or decorative items) that were removed from the site area. The map indicates that this small area was used for multiple activities, which is more indicative of a campsite location than any other type of site.

When analyzed statistically, the data available from the original report (Ohr et al. 1979) provide quantitative support for the intuitive interpretation of the map (Table 7.1). The faunal sample that is mapped on Figure 7.1 is different statistically from the total faunal assemblage, based on expected frequencies ($\chi^2 = 43.02$, $df = 4$, $p < 0.005$). This is probably due to a bias towards larger-sized specimens in both *in situ* recovery and mapping preference. A G-score analysis indicates that the report sample is not significantly different in the distribution between skeletal portions ($G = 30.488$, $df = 20$, $p = 0.062$), but there is a significant difference in the distribution of skeletal portions by grid ($G = 30.591$, $df = 8$, $p < 0.001$).

Table 7.1. Artifacts from report

Observed Values - Report sample

	Axial	Appendicular	Forelimb	Hindlimb	Cranial	Unidentified	*Total*
Bison	25	28	11	11	15	0	*90*
Deer/Pronghorn	7	8	4	1	3	0	*23*
Deer	4	1	2	5	12	0	*24*
Pronghorn	0	2	1	1	0	0	*4*
Horse	0	1	1	0	0	0	*2*
Total	*36*	*40*	*19*	*18*	*30*	*0*	*143*

Freeman-Tukey Deviates - Report sample

	Axial	Appendicular	Forelimb	Hindlimb	Cranial	Unidentified
Bison	0.53	0.59	-0.21	-0.02	-0.87	0.00
Deer/Pronghorn	0.56	0.66	0.60	-1.13	-0.77	0.00
Deer	-0.78	**-2.86**	-0.56	1.07	**2.47**	0.00
Pronghorn	-1.24	0.81	0.65	0.68	-1.09	0.00
Horse	-0.74	0.61	0.98	-0.42	-0.64	0.00

Significance at the p=.05 level (+/- 1.600303) is shown in bold.

Observed Values - Skeletal units

	Axial	Appendicular	Forelimb	Hindlimb	Cranial	*Total*
Grid 1	15	18	4	7	23	*67*
Grid 2	8	7	8	7	6	*36*
Grid 3	10	14	5	2	0	*31*
Total	*33*	*39*	*17*	*16*	*29*	*134*

Freeman-Tukey Deviates - Skeletal units

	Axial	Appendicular	Forelimb	Hindlimb	Cranial
Grid 1	-0.31	-0.29	**-1.68**	-0.27	**2.01**
Grid 2	-0.21	-1.08	**1.44**	1.21	-0.58
Grid 3	0.86	**1.52**	0.60	-0.83	**-4.28**

Significance at the p=.05 level (+/- 1.431355) is shown in bold.

Observed Values - Artifact type

	Grid 1	Grid 2	Grid 3	*Total*
Faunal	67	36	31	*134*
Lithic	13	5	4	*22*
European	0	31	26	*57*
Total	*80*	*72*	*60*	*212*

Freeman-Tukey Deviates - Artifact type

	Grid 1	Grid 2	Grid 3
Faunal	**2.23**	**-1.40**	-1.27
Lithic	**1.50**	-0.87	-0.85
European	**-8.33**	**2.37**	**2.20**

Significance at the p=.05 level (+/- 1.306642) is shown in bold.

Freeman-Tukey deviate analysis shows that forelimb and appendicular portions are over-represented in Grids 2 and 3. This may indicate that these higher utility skeletal portions were processed and/or consumed around the central hearth, resulting in larger numbers of discarded high utility elements in this area. The overrepresentation of cranial elements in Grid 1 suggests that this lower utility carcass portion was less intensively processed and/or consumed in the areas around the hearths and more readily discarded in the forward toss zone.

The statistical analysis of the map shows that significant differences exist in the frequencies of artifact types by grid ($G = 66.876$, $df = 4$, $p < 0.001$). Deviate analysis shows that bone and lithics are over-represented in Grid 1 whereas European items are over-represented in Grids 2 and 3. Under-representation of bone in Grid 2 and European items in Grid 1 further substantiate the visual pattern evident on the map and indicate that a discard area may be present in Grid 1 south of the hearths for bone and larger debitage. The European items found in proximity to the hearth in Grids 2 and 3 were lost rather than actively discarded. Hearths, the center of outside activity at a camp, would be a probable locus for the deposition of cultural remains.

Beyond the delineation of activity areas that indicate a single occupation, the spatial analysis is important to the overall site analysis because it indicates a typical pre-contact hearth centered activity area. The butchered faunal remains and lithic debitage show that despite trade good acquisition traditional indigenous technologies and subsistence were part of the site activities. These aspects of the assemblage when analyzed spatially with the trade goods provide strong evidence of a post-contact occupation by a Native group that was probably not involved in a market economy or

anything associated with direct European contact. The stark evidence that the patterning of the plotted artifacts provides is strong testimony to a lack of direct European contact with the Native group at 5LR263.

Even more evidence of the lack of direct physical contact with the occupants of 5LR263 by Europeans is provided by the historical data. The written historical record of Europeans in the Great Plains indicates that Native Groups, especially those on the western plains were probably not contacted until well into the 19th century. The next chapter describes the historical data via the written historical record that pertains to 5LR263 and the degree of European contact the Native groups probably felt at the beginning of the 1800's.

Chapter 8. Historical Data

Historical accounts from the Plains region document European activities before and after the postulated Protohistoric occupation at 5LR263. Information from secondary sources is presented in order to help place the occupation of the site in larger temporal context. A look at the well-known documented expeditions into the Great Plains during the Protohistoric period provides general trends in how space was viewed by Europeans and later Euroamericans. Based on known accounts, Lykins Valley was located in what was regarded as a territorial hinterland that was not breached by Euroamericans until after the turn of the 19th century.

Spanish Exploration

The Spanish were the first to enter the Great Plains, when Francisco Vásquez de Coronado led a large expedition into what is now central Kansas (Schroeder 1962). The Spanish were seeking a kingdom called Quivira that was described to them as a place of great wealth, but were unimpressed by what they actually found. The chronicler of the expedition, Pedro de Castañeda, described the region they saw as "nothing but cattle [bison] and sky" (Weber 1992: 49). They made it as far as a Wichita Village on the Arkansas River (a far cry from the wealthy city the Spanish were envisioning) before turning back in frustration. The exact route that the Coronado expedition took is unclear and the subject of some disagreement (cf. Wagstaff 1966) but the generally accepted route (Lavender 1992: 6-7) is presented in Figure 8.1.

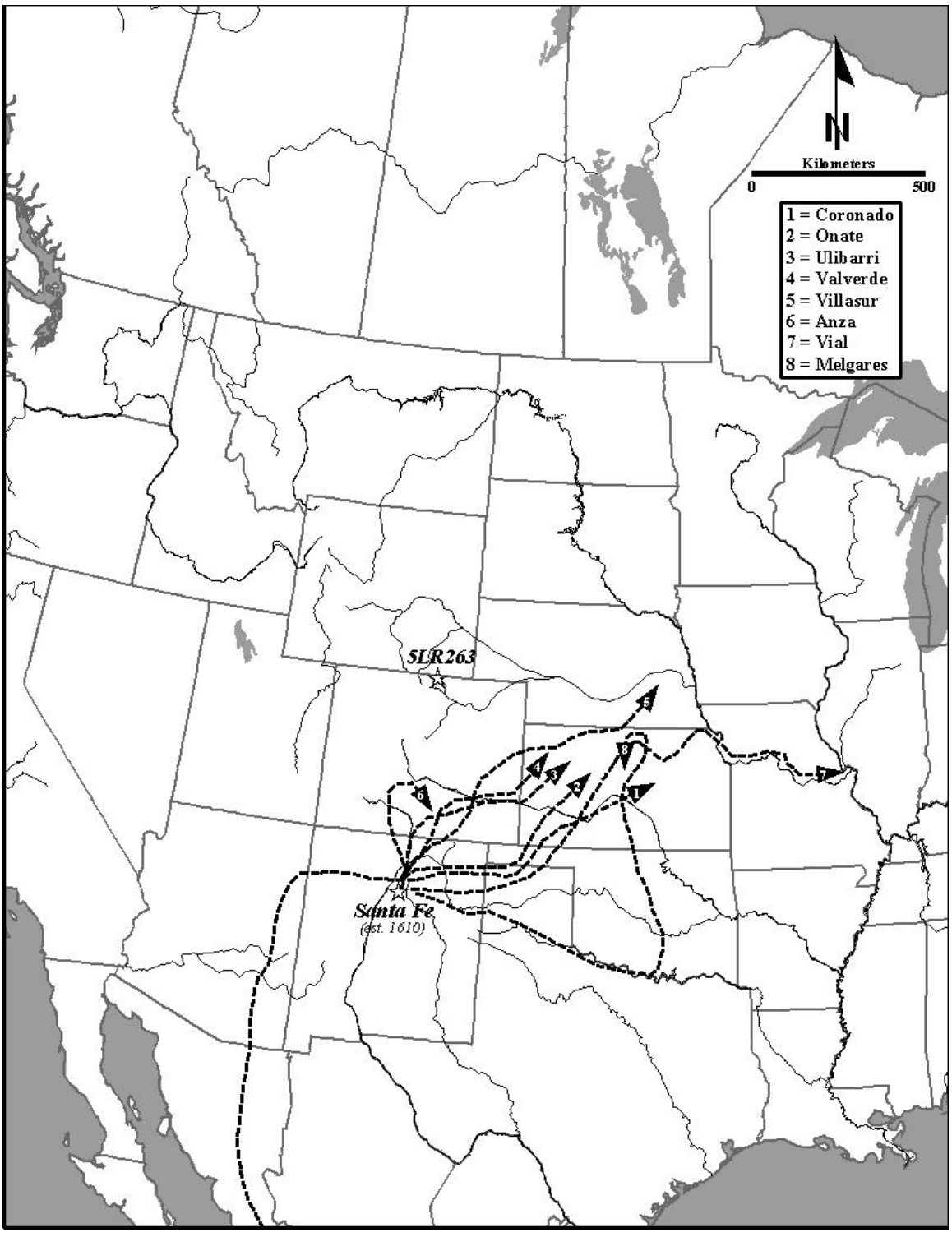

Figure 8.1. Documented Spanish *entradas* in the Plains region 1540 to 1806.

Figure 8.1 also presents the hypothesized routes of other documented Spanish *entradas* into the Plains. Juan de Oñate in 1601, led an expedition to the Quivira (Wichita) villages, where exhaustion of his men and animals forced him to turn back. He mistakenly believed that he was close to the Atlantic Ocean at that point, greatly underestimating the width of the continent. This was a common misconception of many early explorers who believed that the distance between the Pacific and Atlantic Oceans was much smaller than it actually is (Weber 1992: 82).

Native responses to Spanish rule in the Santa Fe area often gave cause to later expeditions north into the central Plains region. "El Cuartelejo" is the name generally applied to the Apachean pueblo located in present day Scott County, Kansas, north of the Arkansas River (Scheiber 2006: 144). El Cuartelejo, as a concept, represents the Apachean homeland visited by the Spanish, which was centered in the area of the Scott County Pueblo. This area provided refuge for native groups that fled from the Santa Fe area in response to the hardships brought on by Spanish rule. A party under the leadership of Juan de Archuleta (not on map) was dispatched to El Cuartelejo to return a group of natives to Taos pueblo during the 17th century (Thomas 1935: 53). During his visit, Archuleta found that the group had acquired French trade goods from the neighboring Wichitas. Evidence of French trade items and reports given in Santa Fe of white men on the eastern Plains (Weber 1992: 168) during the 17th century galvanized the perception that the French were encroaching on Spanish territory Keeping New Mexico out of French hands was an argument advanced to justify the reconquest of the region following the Pueblo Revolt of 1680 (Weber 1992: 168).

The perceived French threat, native group attacks and returning renegade pueblo groups provided impetus for the Spanish expeditions launched in the 18th century. In 1706, Juan de Ulibarri went to El Cuartelejo to return a band of Picuríes to New Mexico (Thomas 1935: 16-26). Ute and Comanche attacks on friendly Apache groups caused then New Mexico governor Antonio Valverde y Cosío to lead a military campaign against these groups in 1719 (Thomas 1935 26-33). When Valverde arrived on the Arkansas River in present day southeastern Colorado, friendly Apaches told him that the French had established two towns among the Pawnee and were arming this group for action against the Spanish (Weber 1992: 168).

Pedro de Villasur led an expedition in 1720 in response to the reports that Valverde had received. He made it to the confluence of the Platte and Loup Rivers in eastern Nebraska where his group was attacked and almost totally decimated by a group of Pawnees, Otos and possibly Frenchmen (Weber 1992: 171). The final documented expedition was a large military expedition led by Juan Bautista de Anza in 1779, which attacked and destroyed a Comanche camp and killed chief Cuerno Verde in the San Luis Valley of Colorado (Weber 1992: 231). Later, as governor of New Mexico, Anza was able to win an enduring peace with the Comanche in 1786, which ended the hostilities that had plagued the Spanish since the middle of the 1700's (Webber 1992: 230-231).

Between 1786 and 1788, Pedro Vial blazed trails from San Antonio to Santa Fe and Santa Fe to Natchitoches (Webber 1992: 295). A Frenchman in Spanish employ, Vial's most important trip is the route he pioneered in 1792 between Santa Fe and St.

Louis that was closely followed by the route of the Santa Fe Trail in the 1820's. Vial's travels documented the extent of the Southern Plains and demonstrated the geographic proximity of the Louisiana Territory and New Mexico (Webber 1992: 295). In 1800, the Spanish agreed to give France the Louisiana Territory, which the Spanish believed would provide a buffer between their New World assets and American encroachment from the east. The French promptly sold the territory to the United States in 1803 and the age of Euroamerican exploration into the Louisiana Territory began.

The Spanish launched several expeditions to intercept the exploring expeditions sent west by Thomas Jefferson. The 1806 Freeman-Custis expedition was turned back from its travel up the Red River by a detachment of Spanish from Natchitoches led by Francisco Viana (Webber 1992: 294). Facundo Melgares led a large party tasked with locating the Euromerican interlopers in 1806 (Cook 1973: 477-483). Melgares travelled east from Santa Fe and down the Red River in an unsuccessful effort to locate the Hunter-Dunbar expedition before turning north and sweeping north to a Pawnee Village on the Republican River before turning back. Unbeknownst to Melgares, he was less than 250 km from the Missouri River and, had he kept trailing north, could have possibly intercepted Lewis and Clark (Cook 1973: 478-479). He also came close to the expedition of Zebulon Pike who followed the trail left by his large force south to the Arkansas River (Webber 1992: 294).

The map of the probable Spanish routes indicates that 5LR263 was not approached by these expeditions. Coupled with the agenda that the Spanish were

pursuing when they ventured north from Santa Fe, it is easy to see why Spanish influence in the form of trade or occupation would have been minimal during this time. Most of the Spanish intrusion into the Plains was either proactive or reactive response to the threat of encroachment by French and later Euroamerican groups. The Spanish were never able to establish any significant trade relations with Native groups beyond the Southern Plains and never established any permanent settlements or trading posts in the Central or Northern Plains. The era of Spanish occupation in the New World ended in 1821 when the Adams-Onís Treaty and the Mexican Revolution effectively ended Spanish rule in Mexico and North America.

French Exploration

The documented French exploration into the Great Plains region was for different reasons and resulted in different impacts on the native groups in the area. As mentioned above, the French were involved in active trade with Plains groups starting in the 17th century, but well documented French exploration of the western Plains does not occur until the 18th century. As the French agenda was mostly economic, they traded all manner of items with native groups, including guns, which Spanish trade policy forbade. Through trade and assimilation with native groups, the French generally were able to maintain good relations with the indigenous groups they encountered (Binnema 2001: 107-108).

Etienne de Véniard, sieur de Bourgmont was a remarkable Frenchman who was an early explorer of the Central Plains (Norall 1988). Somewhat controversial in his day, Bourgmont was commissioned by the French government to establish relations with Plains Apache groups to bolster trading and establish French claims to the

region. In 1724, Bourgmont led an expedition from Fort d' Orléans west up the Missouri River to a Kansa Village before turning southwest and traveling into the Central Plains (Figure 8.2). When he left the Kansa Village Bourgmont's party included over 1000 people and 300 dogs which eventually made it to a Padouca, or Plains Apache, village in what is today central Kansas and made a successful bid to establish peaceful relations with the Padoucas (Norall 1988: 57-80).

The Mallet expedition, which began in 1739, started in French Illinois and eventually made it all the way to Santa Fe before returning to French territory (Blakeslee 1995). This expedition was the first documented direct French contact with Santa Fe and was an important achievement at the time, as all officially sanctioned expeditions sent looking for a route to the New Mexico trading center had failed (Figure 8.2). The French governor looked upon the possibility of trade with New Mexico optimistically at the time, but the French never established trade with Santa Fe. It was not until after the Mexican Revolution of 1821 that regular trade was established with the opening of the Santa Fe Trail (Blakeslee 1995: xiv).

The Vérendrye brothers, in 1742-3, explored into northeastern Wyoming and probably made it as far as the Bighorn Mountains (Smith 1980: 1-3). The brothers were looking for new sources of furs as well as the fabled "Sea of the West," which was thought would provide a passage to the Indies (Tennant 2007: 113-115). Again, this demonstrates the misconceptions regarding the breadth of the continent that guided early explorers.

Though French exploration took a different vector than the Spanish, neither impacted the area around 5LR263. French trade, on the other hand, had a marked

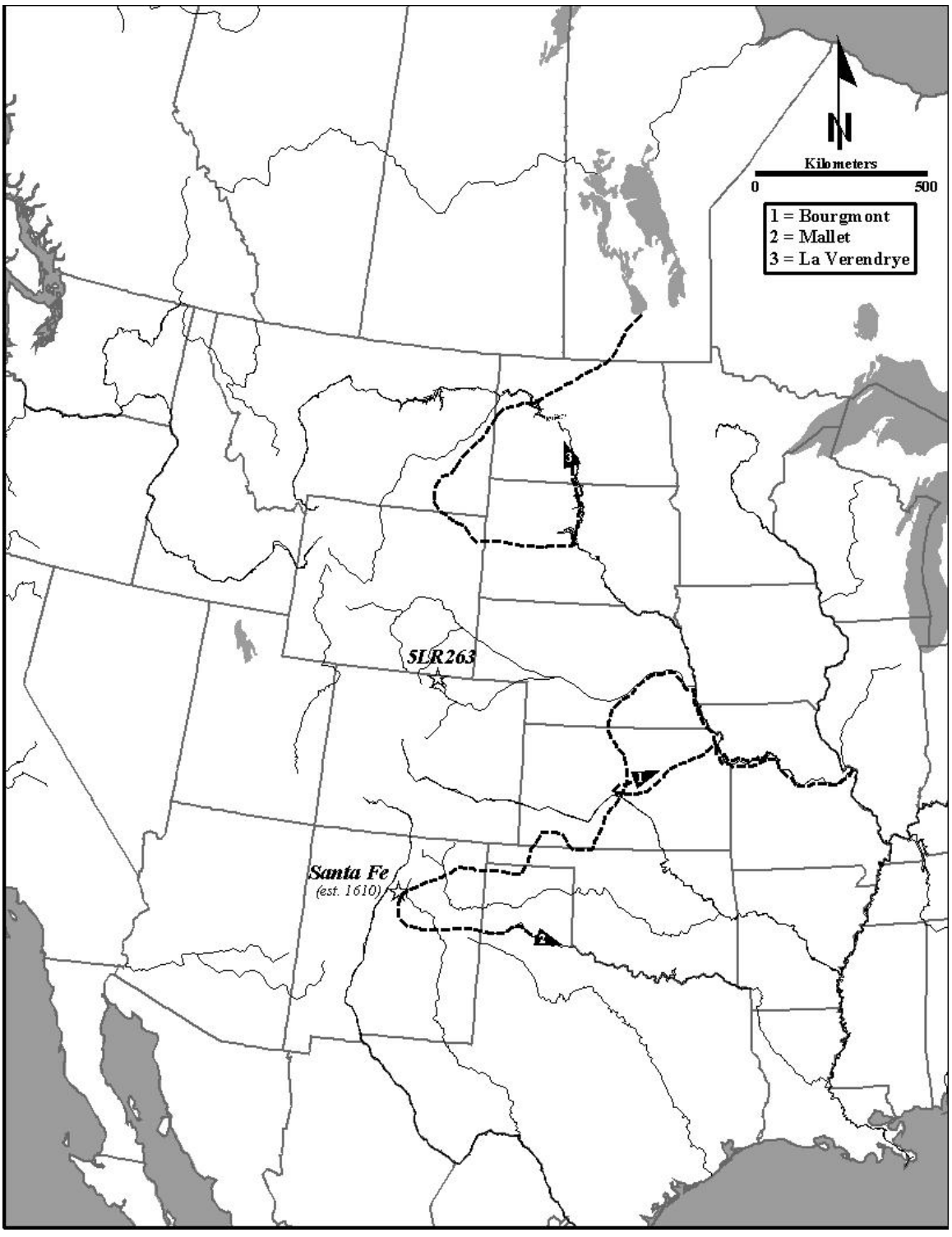

Figure 8.2. Documented French exploration onto the Plains in the 18th century.

impact on native groups on the Plains through materials contact. The introduction of trade goods, especially guns, by French traders was impacting groups and realigning the cultural and geographic boundaries of native groups. English and/or French trade, coupled with the inadvertent introduction of the horse from Spanish sources, was probably responsible for the 5LR263 assemblage. Materials contact took place before and after the documented expeditions of the 17th and 18th century. The expanding horse and gun frontiers are postulated to have reached the location of 5LR263 by about 1750 (Secoy 1953: 105). It is possible that an undocumented European group was in the vicinity of 5LR263 before the 19th century but the overall pattern of the documented Spanish and French expeditions suggests otherwise.

Euroamerican Exploration

The Louisiana Purchase of 1803, which transferred possession of the Louisiana Territory to America, ushered in the era of Euroamerican exploration. The acquisition of this land by America combined with the expulsion of the Spanish from New Mexico in 1821 opened the Great Plains to the uncontested trade and settlement that marks the middle part of the 19th century. Prior to this, the vast expanse had yet to be defined and quantified. Figure 8.3 shows the major expeditions that came the closest to 5LR263, beginning with Zebulon Pike in 1806.

Under the guise of locating the source of the Arkansas River, Pike was possibly on a military mission ordered by General James Wilkinson to gather information about the Spanish in New Mexico (Flores 2005: 22). His party was eventually captured and taken to Santa Fe by the Spanish, who were aggressively searching for American encroachment onto the Plains, which was still disputed territory. The route

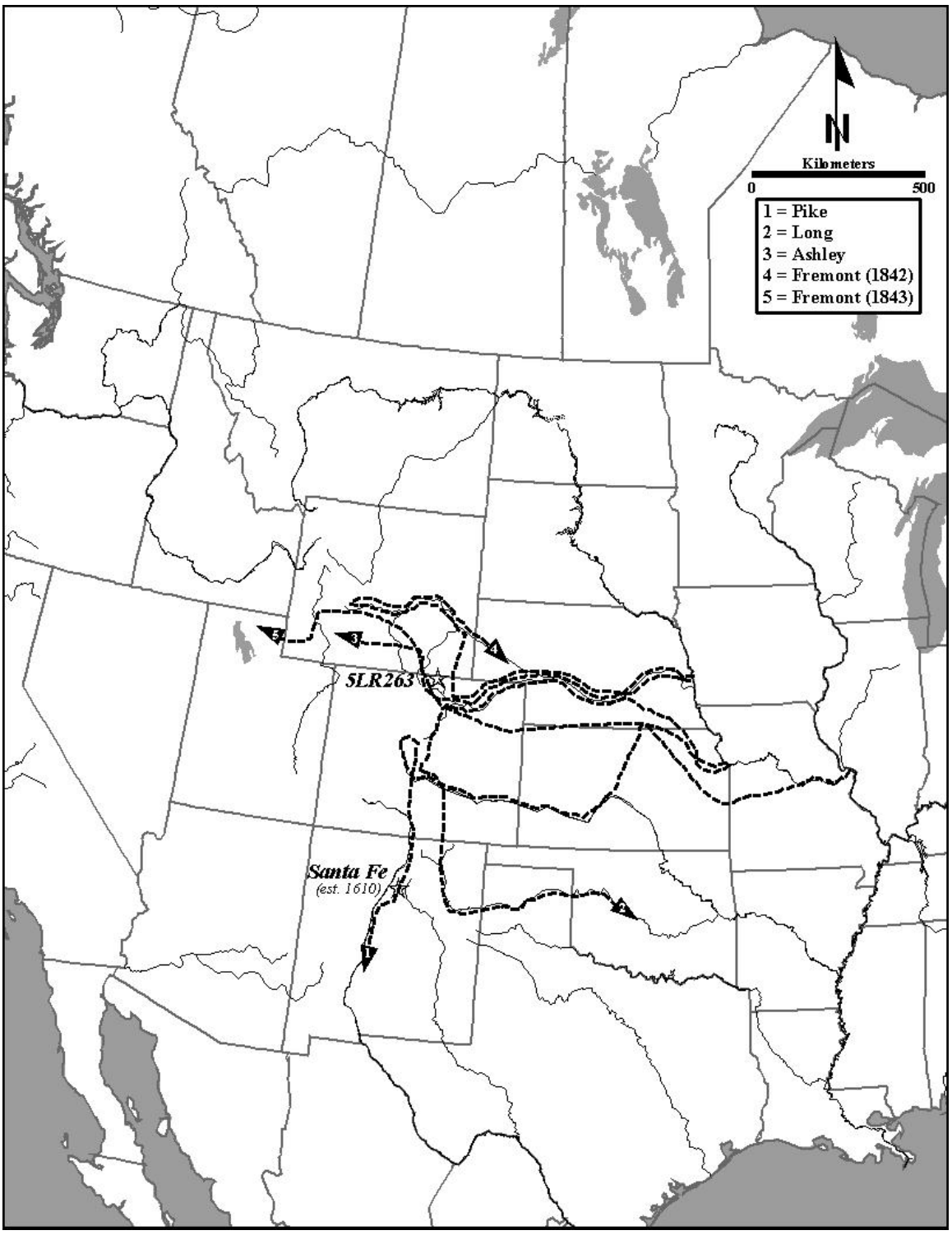

Figure 8.3. Documented Euroamerican exploration onto the Plains in the 19th century.

of Pike up the Arkansas put him closer to 5LR263 than any previous European exploration.

Major Steven Long led a party to the Rockies in 1820. This expedition was much more scientifically oriented and better staffed for scientific discovery than any previous expedition (Goodman and Lawson 1995: xii). This expedition traveled up the Platte, then up the South Platte, passing the mouth of the Cache la Poudre on July 3rd, 1820 and traveled south along the Front Range to the Arkansas River before turning east. Records from the Long expedition provide a great deal of information about the country through which they passed, as the expedition included a botanist, a geologist, a naturalist, a zoologist and an artist. Included in this data is information about the native groups in the area that will be discussed in detail below.

William Ashley was an entrepreneur, who was on his way to the rich beaver trapping grounds located along Continental Divide in the area of the Green River, when winter forced him to make camp on the Cache la Poudre River for three weeks in 1824 (Carter 1965: 84). He eventually continued his journey up the Poudre and over the Laramie Plains to the Green River. His purpose in reaching trapping grounds indicates that there was not much attention paid to his stay on the Poudre.

John C. Frémont led two expeditions to gather military and scientific information, which came in proximity to 5LR263. In 1842, Frémont reached the Laramie Mountains where he turned north to cross onto the Laramie Plains. In 1843 he came up the Poudre along the same route as Ashley, but may have taken the North Fork of the Poudre on his way to the Laramie Plains (Burris 2006: 38). The 1843 expedition by Frémont resulted in the first map (Frémont 1845) to show Boxelder Creek as a

tributary of the Cache la Poudre River (Figure 8.4). Frémont's route would have taken him past the mouth of Boxelder Creek, but the fact it is called out on his map indicates it was a known drainage that must have been viewed as significant in the region by that time.

The Euroamerican exploration of the Plains has a much different dynamic than that of the earlier French or Spanish expeditions. The acquisition of the Louisiana Territory opened the area for scientific and military exploration by Americans who were committed to making the area part of their young country. During this time, Lykins Valley can no longer be considered part of a hinterland as in three documented instances the area is entered by expeditions. Furthermore, by 1843, Boxelder Creek is known well enough to accurately appear on a map of the region.

Exploration Summary

Table 8.1 summarizes the Protohistoric Period expeditions and their proximity to 5LR263. The mean closest distance for the Spanish *entradas* was 442 km and for the French expeditions this value was 510 km. After the turn of the 19th century, the mean closest distance for the Euroamerican expeditions is 69 km, indicating the increased encroachment into the area following the Louisiana Purchase. These data demonstrates the increasing European expansion into the area through time and suggests that it had become a known part of the American continent by the middle of the 19th century.

Trading Establishments

The Mexican Revolution of 1821 and the resultant expulsion of the Spanish from New Mexico paved the way for uncontested trade in the Plains and mountains of

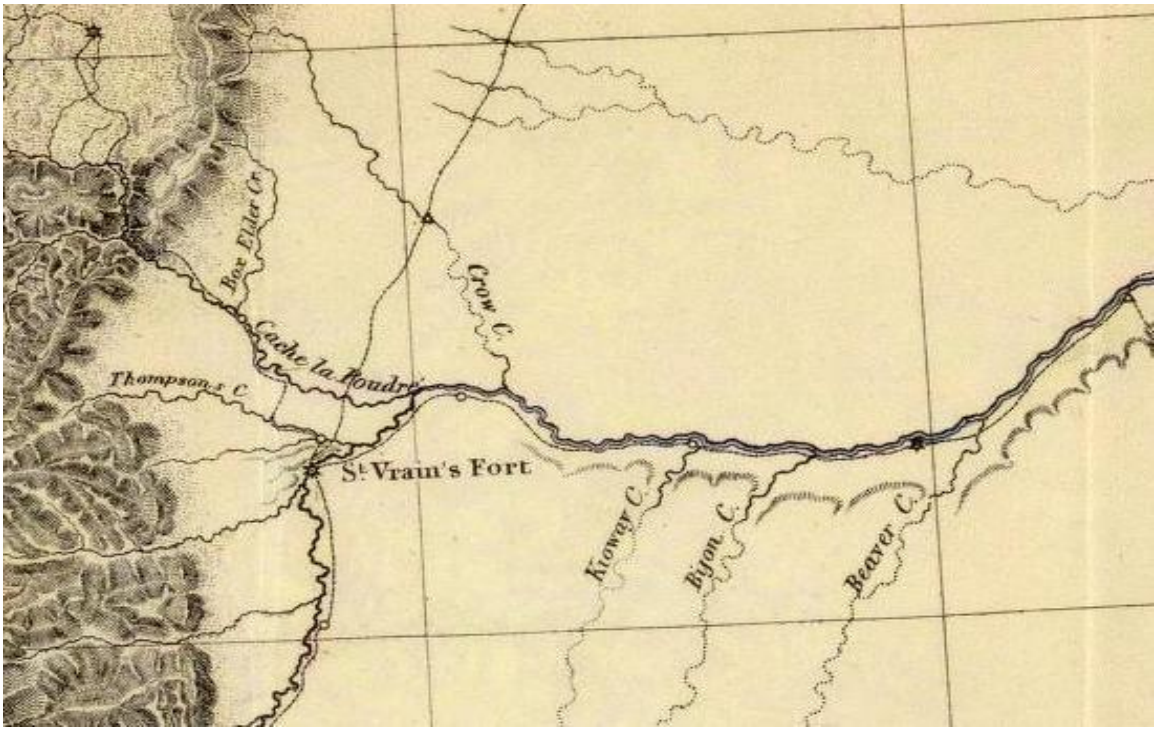

Figure 8.4. Portion of Frémont's map showing Boxelder Creek (Frémont 1845).

western North America. The fur trade era (1824 – 1840) was a time of increased trade, based mainly on beaver pelts, requiring an infrastructure of trading establishments to facilitate this exchange. Numerous trading establishments popped up all over the west to provide points of contact between the trappers and traders. This resulted in a huge influx of trade items and a greatly increased availability through the numerous trading loci. The Rocky Mountains were prime trapping grounds and many of these trade centers were located in this area to accommodate trade. The fur trade in the western Plains began around 1830 and resulted in the construction of numerous competing trade forts or posts along the Front Range and on the Western Slope (Figure 8.5).

Table 8.2 gives the occupation ranges (from Robertson 1999, Eddy 1982) and distance from 5LR263 for each of the forts shown in Figure 8.5. This data indicates

Table 8.1. Exploration into the Plains region

Nation	Explorers	Expedition began	Nearest to 5LR263 (km)
Spain	Melgares	1806	569[a]
	Coronado	1540	559[a]
	Vial	1792	558[a]
	Oñate	1601	503[a]
	Ulibarri	1706	378[a]
	Valverde	1719	350[a]
	Villasur	1720	308[a]
	Anza	1779	312[a]
France	Bourgmont	1724	606[e]
	Mallet	1739	510[a]
	Verendrye	1742	415[b]
United States	Pike	1806	185[a]
	Long	1820	75[c]
	Ashley	1824	27[d]
	Fremont	1842	45[e]
		1843	13[f]

[a] *this value based on generally accepted route ± 80 km*

[b] *whether the brothers actually made it to the Bighorn Mtns. versus the Black Hills is disputed*

[c] *closest point of the South Platte to 5LR263*

[d] *based on journal of camping on and subsequent journey up Cache la Poudre onto Laramie Plains*

[e] *this value based on generally accepted route ± 20 km*

[f] *based on journey up north fork of Cache la Poudre onto Laramie Plains*

that beginning in 1829 with the establishment of Fort Uncompahgre, 21 trading forts or posts were in operation at various times until 1860 (Bent's New Fort). Four of these posts were located along a 25 km stretch of the South Platte River roughly 90 km from 5LR263 and were in operation from 1835 to 1845. These forts would have provided a substantial amount of trade items for native groups in the area during this time.

The mean length that these establishments were in operation is 7 years and many were open less than three (excluding those that lack discrete opening and closing dates). It is difficult to perceive how much trade was available when the various posts

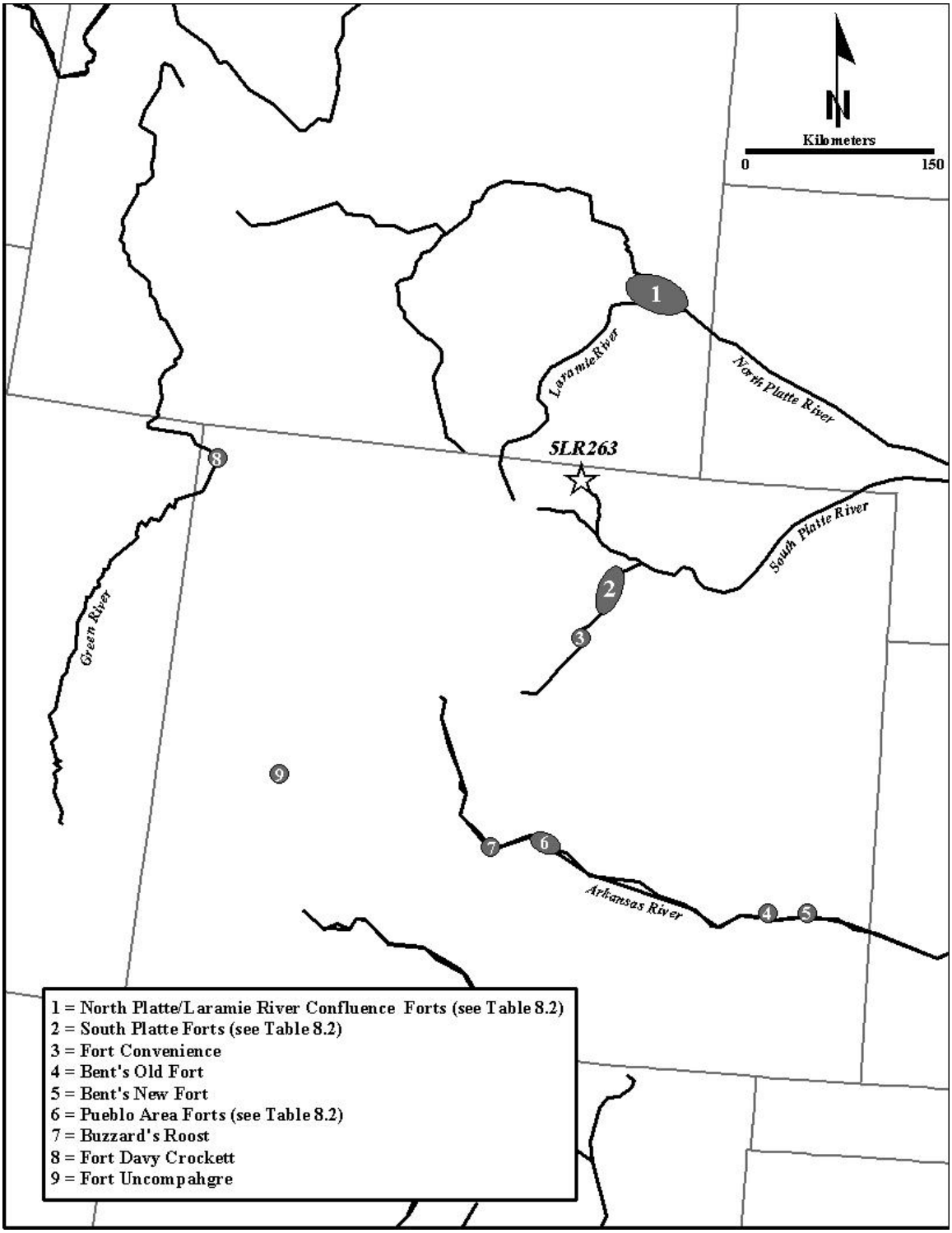

Figure 8.5. Trading establishments in proximity to 5LR263.

Table 8.2. Trading establishments

Area Description	Number[2]	Trading Establishments	Years Occupied	Distance to 5LR263
North Platte/Laramie River Confluence	1	Fort William	1834 - 1849	160[1]
	1	Fort Platte	1841 - 1845	160[1]
	1	Fort Adams	1841 - 1842	160[1]
	1	Lock, Randolf & Co.'s North Platte Post	1841 - 1842	160[1]
	1	Bissonette's North Platte Post	1843 - 1849	160[1]
	1	Fort Bernard	1845 - 1846	160[1]
	1	Moncravie House	1856 - 1858	160[1]
	1	Drip's North Platte Post	1857 - 1860	160[1]
South Platte River in Colorado	2	Fort Vasquez	1835 - 1842	90[1]
	2	Fort Jackson	1837 - 1838	90[1]
	2	Fort Lupton	1837 - 1841	90[1]
	2	Fort St. Vrain	1837 - 1845	90[1]
	3	Fort Convenience	1830's	127
Arkansas River in Colorado	4	Bent's Old Fort	1834 - 1849	378
	5	Bent's New Fort	1853 - 1860	391
	7	Buzzard's Roost	1840's	302
Arkansas River at modern city of Pueblo	6	Fort William	1831 - 1834	292[1]
	6	Fort Cass	1832 - 1834	292[1]
	6	Fort Pueblo	1842 - 1854	292[1]
Western slope of Colorado	8	Fort Davy Crockett	1837 - 1840	293
	9	Fort Uncompahgre	1828 - 1844	338

[1] *value based on distance to center of fort/post concentration*
[2] *as numbered on Figure 8.5*

were open simply by looking at the dates, but by graphing the number of open trading establishments per year (excluding the forts on the Western Slope) a pattern is evident (Figure 8.6). Beginning in 1831 there is a steady increase in the number of open trading establishments that peaks in 1842 and declines rather sharply the next eight years. The year 1842 coincides with the end of the Fur Trade Era.

Further dividing these forts into groups based on drainage system indicates different trade centers were more active at different times (Figure 8.7). There were never more than four trading establishments in operation at the same time on any of the rivers. The Arkansas had more posts/forts open initially but a decline in numbers there coincided with an increase in the South Platte forts. While the number of forts in operation on the South Platte decreased to zero by 1845, the Arkansas and North

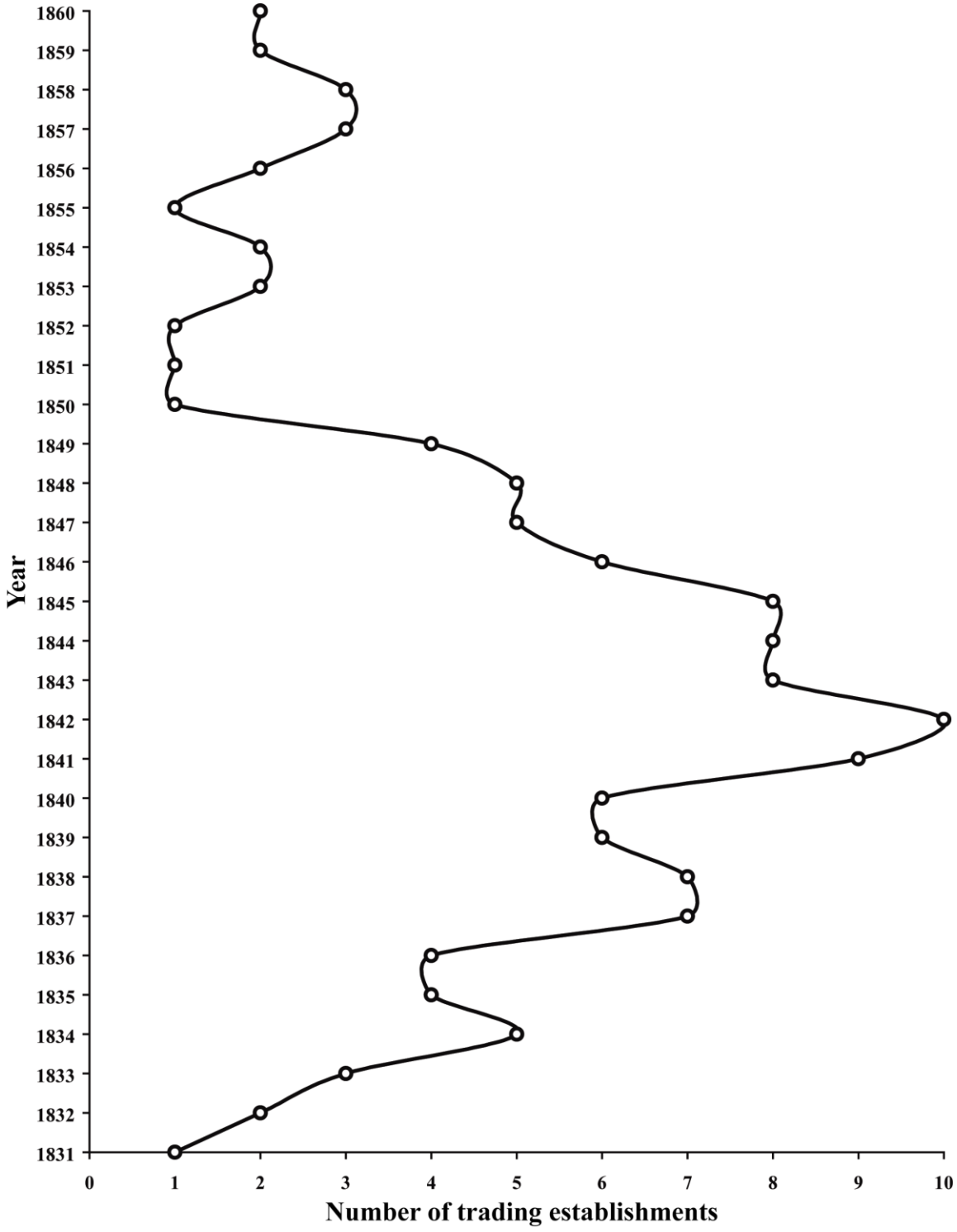

Figure 8.6. Number of trading establishments in operation by year.

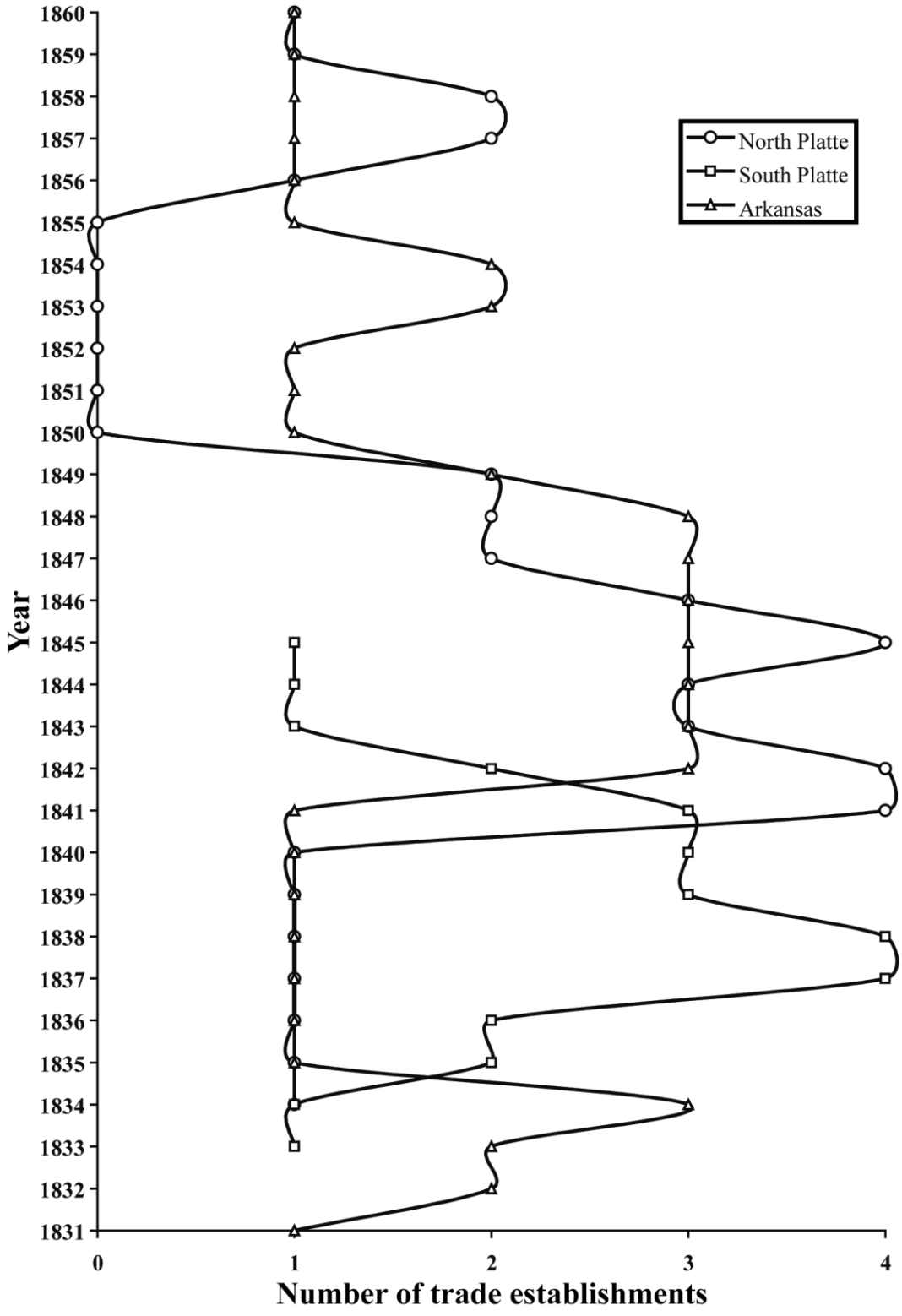

Figure 8.7. Number of trading establishments in operation by year examined by drainage.

Platte both had multiple forts/posts in operation at that time. From 1849 to 1856, only the Arkansas had operating trade establishments. This is probably a reflection of good relations established with native groups, who were active in trading even after the fur trade collapsed. This is the case for William Bent, who maintained close ties with the Cheyenne because he married a woman from that tribe (Jablow 1950:66).

The ebb and flow of open forts during this time, especially on the South and North Platte, could be reflective of different things. It could represent the reduction of furs as areas became "trapped out," making these trading locations less viable economically. It could also represent a lack of native group trade involvement in these areas or bad relations between the traders and these groups. The latter scenario could imply that native groups, who did not like the European presence in their territory, occupied areas such as the South Platte. It is known that the Fort Laramie area became an important center for native/Euroamerican interaction during the last half of the 19th century, but the South Platte region was not located along a major avenue of commerce and settlement like the North Platte and Arkansas.

The establishment of the numerous trading posts/forts marks a time when European presence and trade was significant in the area. There was an influx of trade goods and trading opportunities that was unknown in previous times. If 5LR263 was occupied during this time it is expected that the trade good assemblage would reflect the variety of items available, especially beads (as the site has a relatively large sample compared to most "bead sites"), as the varied inventories from Fort Jackson (Peterson 1974: 138-150) indicate. The trade assemblage does not indicate that a

variety of items were available. These items, if acquired from an established trading post that contained a full complement of trade goods, would conceivably have more homogeneity of origin of manufacture. At the time of fur trade one would expect that trading companies could have obtained their goods from American manufacturers, which is not the case at 5LR263 where the artifacts are from French and English manufacturers. Also, based on a lack of items and faunal remains associated with trapping, there is no evidence that the location was part of the fur trade. The lithic assemblage indicates that there was still a reliance on stone tool technology for subsistence activities, more so than one would expect for a site occupied during an era when trade goods and European technology was readily available "just downstream."

Native Groups

The native group or groups that occupied 5LR263 could be of a variety of cultural affiliations (Table 8.3). Native American groups shifted territories as a result of disease depopulation, the encroachment of Europeans and tribal warfare. This is evident by the number of tribes that historic accounts place in proximity to 5RL263 during the first half of the 19th century. Records from the Long expedition provide most of this evidence through contact with groups along the South Platte and secondhand accounts accumulated along the way. The accounts from the expedition, compiled by expedition member Edwin James, indicate that at the time St. Vrain Creek was known as Potera's Creek, being named after a Frenchman who became disoriented there and was rescued by a band of Kiowa who frequented that

Table 8.3. Known native groups in 5LR263 vicinity

Date (A.D)	Groups within 150 km of 5LR263	Reference
1300-1400	Upper Republican groups	Scheiber (2006)
1400-1500	Plains Apache groups	Scheiber (2006)
1500-1600	Plains Apache groups	Scheiber (2006)
1600-1700	Plains Apache groups	Bamforth (1988); Scheiber (2006)
	Ute	Bamforth (1988); Burris (2006)
	Shoshoni	Bamforth (1988)
	Comanche	Burris (2006)
1700-1800	Ute	Bamforth (1988)
	Comanche	Bamforth (1988); Burris (2006)
	Shoshoni	Bamforth (1988)
	Kiowa	Burris (2006)
1800-1860	Ute	Burris (2006)
	Comanche	Benson (1988)
	Kiowa	Benson (1988)
	Kiowa-Apache	Benson (1988); Burris (2006)
	Arapahoe	Bamforth (1988); Burris (2006); Watrous (1911)
	Cheyenne	Bamforth (1988); Benson (1988); Burris (2006)
	Pawnee	Watrous (1911)
	Sioux	Burris (2006)
	Cherokee	Watrous (1911)

part of the country (Benson 1988: 198). The accounts describe a location on the South Platte at the mouth of Cherry Creek near present day Denver where a mixed group of Kiowa, Kiowa-Apache and Arapaho had a rendezvous for trade with the Cheyenne (Benson 1988: 202). The Arapaho, by historic accounts, used the Poudre Valley as a hunting ground and often camped on Boxelder Creek (Watrous 1911: 15). The Pawnee, Sioux and Cherokee were not documented in the area until the middle part of the 19th century, shortly after the occupation at 5LR263. The Ute were a mountain group that occupied the Western Slope region of Colorado which had adversarial and limited relations with Native groups east of the Front Range by the 19th century.

The movement of these groups was widespread and the dispersal and coalescence of different tribal groups on the Plains during this period often resulted in camps being composed of natives from many different tribes (as indicated above). Groups

were known to travel great distances from their generally recognized home territories. The Comanche, for example, visited the Green River Rendezvous in southwestern Wyoming during the early 19th century (Keyser et al. 2004: 136). An Arapaho group traveled to the Saskatchewan River to trade at the Chesterfield House in 1801 in the company of their kin the Gros Ventres (Binnema 2001: 171). It was learned by the trader that it took this group of Arapahos or Tattooed Indians, a forty-four day journey from their home territory on the eastern borders of the mountain far to the south (Binnema 2001: 171). These two examples show how far ranging and dynamic group movements were at the time. The increase of documented native groups in the vicinity of Lykins Valley through time is indicative of increased mobility due to pressures felt by native groups in the region during the Protohistoric Period.

There is other evidence as to the possible tribal affiliation of the occupants of 5LR263, or at least the people using the Boxelder Valley. This is in the form of a rock art image located up Boxelder Creek at the mouth of the canyon less than 2 km from the site. The rock art site (5LR293) contains incised panels that depict a horse mounted warrior, another figure of a horse, and a human figure that appears to be strung between two posts in some sort of a torture scene (Figure 8.8). The riding tack on the horse in the largest figure has characteristics that may indicate a tribal affiliation.

Based on comparison with historic saddle types, the high pommel and cantle of the saddle is reminiscent of a Spanish-type saddle. The pommel and cantle are similar to a saddle depicted on a figure from the southern Bighorn Mountains of Wyoming that is conservatively dated by Keyser et al. (2005: 28) as having been

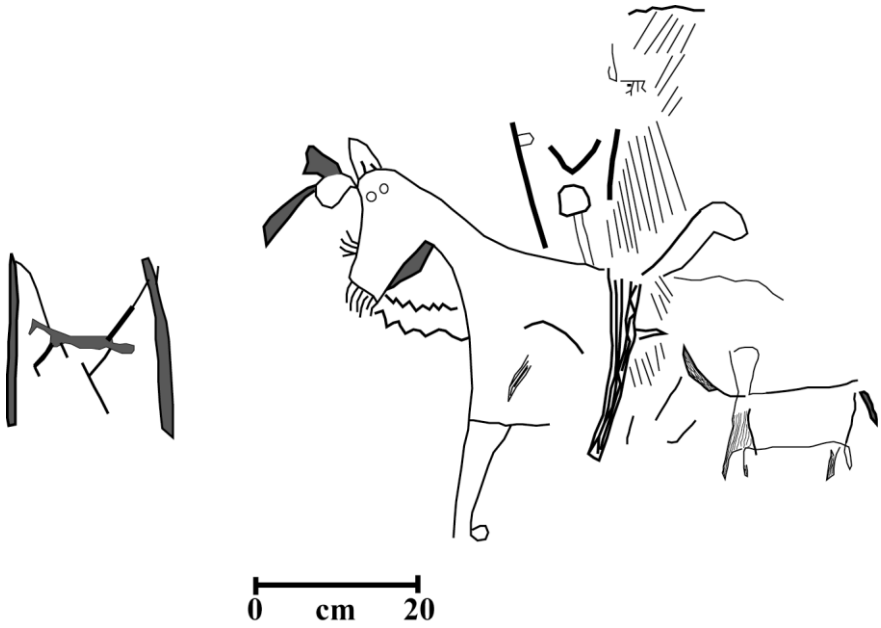

Figure 8.8. Rock art from 5LR293 reproduced from Morris et al. (1979: 89). Figures are not to scale in relation to one another.

produced between A.D. 1650 and 1800. The figure in Wyoming also depicts hide armament on the horse. For a short period after the introduction of the horse to the Plains, certain native groups covered their horses with thick overlapping layers of heavy hide. This appears in several early rock art images of horse-mounted warriors (Keyser and Klassen 2001: 235). A lack of armor in the image from 5LR293 compared to other images with evident amour (cf. Mitchell 2004) may indicate a more recent date for the rock art from Boxelder Creek.

The image at 5LR293 contains a group of closely incised lines that hang down below the chin of the horse, resembling a beard. In his analysis of this image, Steward (1992) references Keyser (1987) and surmises that these lines represent a scalp trophy in a Great Plains culture style associated with Cheyenne, Arapahos and

Sioux wartime horse decoration. Steward (1992: 3) then indicates that, based on the defined forelock, rounded ears and zig-zag reins, the image shares many similarities with a Southern Cheyenne ledger book example found in Keyser (1987). His report (Steward 1992: 3) shows this image, which is similar to the 5LR293 image in terms of these characteristics.

There is another possibility, however, for the beard-like lines under the chin of the horse. The shortness of the lines may indicate that they represent a Spanish chain bit rather than a scalp adornment. Keyser and Mitchell (2001) include the image from 5LR293 in the sample that they use to analyze Plains Biographic decorated bridles found in rock art images. They do not say whether or not the lines on the image represent a chain bit, but the article includes images of both scalp adornment and chain bits. The lines on the 5LR293 image more closely resemble the latter. The Spanish chain bit is a type of ring bit to which bit chains and other noisemaking devices were attached and first appeared in the 17th century (Keyser and Mitchell 2001: 200). The Spanish chain bit was first noted on the Northwestern Plains by the Verendrye expedition in 1739 (Smith 1980: 100). On the southern Plains, chain bits were considered by the Spanish to be standard trade items for the Comanche by 1750 (Kenner 1969). Ledger drawings by the Cheyenne, Crow and Sioux depict these bits in a precise manner and this suggests they were a high prestige item (Keyser and Mitchell 2001: 201).

The zig-zag reins on the 5LR293 image are diagnostic because they show possible affiliation with the Comanche. In their analysis of a horse and rider image with zig-zag reins from the Tolar Site in southwestern Wyoming, Loendorf and Olsen (2003)

indicate that the image is similar to Comanche drawings. The authors compare the image from the Tolar Site to Comanche drawings from Oklahoma and conclude that a Comanche artist probably made the Tolar Site image sometime after 1720. Keyser et al. (2004) suggest this image may date to post-1840 based on the realism of the image making it comparable to Comanche ledger drawings from the second half of the 19th century.

Native Group Summary

The rock art from 5LR293 cannot by definitely associated with the occupation at 5LR263, but it does provide ancillary evidence as to the possible tribal affiliation of the Lykins Valley Site occupants. The panel by all accounts dates to the same period, known in rock art studies as the Biographic Tradition (early 1700's to late 1800's), defined by Keyser and Klassen (2001) and can be attributed to a tribe known by historic accounts to have been in the area. The saddle and bit characteristics suggest a Southern Plains influence similar to known Comanche and Cheyenne drawings, indicating that one of these native groups probably produced the image.

The other image (Figure 8.8, left) is strong evidence that there was conflict occurring at the time it was made. Stewart (1992: 5) interprets the upside down figure as a dead person. The figure holds, in his downward hanging hand, what appears to be a stick or pole of some sort. The length of this line roughly matches the length of a rifle or musket when compared with the length of the human figure, although the line lacks any detail. This line could represent a rifle or musket, in the dead figure's hand an indication that the artist was witness to post-contact gun warfare. Furthermore, the figure holding the gun may very well be European (as

Europeans were associated with the introduction of this item) and demonstrate the Native attitude towards European interlopers in the region.

The Boxelder Creek drainage has concentrated evidence of post-contact Native group occupations. Furthermore, post-contact artifacts, such as glass trade beads and metal arrow points, have been recovered from multiple sites along the drainages and on the plains in the vicinity of Lykins Valley. The recovery of artifacts dating from this time attests to a Native presence in the area throughout the Protohistoric Period. Coupled with a lack of definitive European presence in the area until the Fur Trade Era, this indicates that the area was important economically and strategically for Native groups who may have wanted to avoid direct European contact.

The importance of the Lykins Valley and proximity to post-contact Native groups is demonstrated not only by the types of artifacts recovered but by the types of sites where these artifacts were found. An analysis of site types from the Protohistoric Period is a useful exercise in that it helps to discern the differences that may be evident in post-contact sites versus prehistoric ones. It is also useful to understand that many sites from the Protohistoric may not be easy to differentiate from earlier sites and that sans trade goods in the assemblage it may be very difficult to differentiate these sites from prehistoric occupations. In the following chapter a taxonomic and functional analysis of site types from the Protohistoric Period is undertaken to help understand the above issues.

Chapter 9. Site Comparative Analysis

The analysis of sites based on assemblage characteristics is a basic way to differentiate site functions. The differentiation of sites by function is important to understand the organization of human groups on the landscape and conversely how the landscape influenced the organization of human subsistence. The evolution of group use and organization based on resource distribution changes through time. Therefore a comparative site analysis that acknowledges factors germane to a particular time period can be a more useful exercise than a more general site typology. The Protohistoric Period and the culture contact it subsumes enable a site comparative analysis that is exclusive of earlier prehistoric site types. As applied to 5LR263, this analysis allows the placement of the site in the Protohistoric Period contextually as it relates to the spectrum of site type that the period presents.

A qualitative comparative analysis of Protohistoric Period site types is used to help contextualize 5LR263. In this analysis, general site types from the Protohistoric Period are characterized based on the presence/absence of artifacts and features. The site types are then compared to 5LR263. This is done (1) to comparatively determine the site type of 5LR263 and (2) to better understand the site types of the Protohistoric Period and how they appear in the archaeological record. The analysis is based on the general characteristics of the site assemblage and features that could be expected for each type of site. These characteristics are presented as nominal level variables based on presence or absence in the assemblage or in the case of features occurrence at the site.

Often the presence of trade items is the defining characteristic used to distinguish between Late Prehistoric and Protohistoric occupations. Absolute dating is the method that will be used in this analysis to distinguish between the Late Prehistoric and Protohistoric periods. The delineation between the two periods is an arbitrary date that native groups living at the time would not have recognized, as many groups were living a prehistoric lifestyle long after the initial Spanish *entrada*. But through the knowledge of hindsight, it did usher in a time of incredible cultural change in the Great Plains region so this date provides a useful temporal boundary for archaeological study.

The period after contact gave rise to different considerations by native groups when carrying out subsistence activities and interacting with each other. The introduction and trade of European items introduced added new types of artifacts and site types previously unknown to the archaeological record. Prehistorically, trade was basically carried out through an open system involving down-the-line exchange requiring only limited formal alliances between groups (Renfrew 1975). This exchange system accounts for the apparent fall-off in materials that is a common pattern as the distance from the source is increased. This type of trade system may not adequately describe the more formal and structured trade system that evolved during the Protohistoric Period.

It was originally thought that native groups developed an immediate and strong dependence on European technology rendering them helpless without adequate supplies of trade goods (Rich 1967). More recent studies of trade good introduction challenged this view and show that Native Americans were active and savvy

participants in this trade (Ray 1974). Both Native and European traders were able at times to manipulate the trade to accommodate their needs.

European trade centers were static points on the landscape and Native Americans were required to travel to participate in exchange. This was an imposition of established European methods and decreased the fluidity of trade compared to pre-contact times. Permanent trade centers and the availability of trade items often forced native groups to make logistical compromises in order to trade. Native groups may have been forced to make longer journeys to trade because permanent trading establishments resulted in less "meet in the middle" type trade (the Arapaho trading on the Saskatchewan River is an extreme example of this).

This provided opportunity for native groups to gain wealth and prestige as middlemen by providing European trade items to fringe groups who lacked direct access to trading posts or forts. As trading middlemen, groups like the Comanche, were able to gain a powerful hold on the southern Plains. They controlled and dictated trade in the late 18th and early 19th century (Hämäläinen 1998). The Comanche had a large trade center located along the Arkansas and the Bent brothers were aware of this fact. This was part of the reason they place their trading fort in the same general area.

The rigidity of the trade center location and capitalistic agenda of the traders made the trading interaction a highly structured event. In the Protohistoric Period, trade centers were an important type of site and differ significantly in the archaeological record from pre-contact trade locations. Conversely, non-trade sites,

where different subsistence activities took place might not have produced a different archaeological signature than pre-contact examples.

Baker (2007), based on extensive study of the Eastern Ute bands in western Colorado, has developed a comprehensive culture history model for the post-contact native groups. He divides the Protohistoric Period as defined above (A.D. 1540 – 1860) into two divisions: the *Early Contact Phase* (A.D. 1540-1820) and the *Middle Contact Phase* (A.D. 1820-1860). The division used by Baker clearly corresponds with florescence of the fur trade in the region, a demarcation that separated materials contact with much more impactful direct contact and European market economies. These phases, although based on native groups inhabiting the mountains, are useful for contact studies elsewhere. Given that there are Protohistoric-aged archaeological sites attributed to the Ute in the Rocky Mountains just west and south of Lykins Valley (Butler 2005: 33), these data can be relevant. The occupants of the 5LR263 were most likely not Ute but could very well have come in contact with them. Baker (2007: 64-67) lists expected archeological hallmarks of sites from these phases.

The Early Contact Phase can be characterized by several archaeological hallmarks according to Baker (2007: 41). As shown in Table 9.1, several of these hallmarks are particularly significant to 5LR263 and the extant assemblage from the Protohistoric component. Baker presents the characteristics between the two phases as a continuum of change based on the increasing influences of European contact. The numbers of trade goods and increasing reliance on these goods are important concepts that define this period and are especially applicable to 5LR263.

Table 9.1. Protohistoric Ute site hallmarks from Baker (2007)

Phase	Dates	Suggested Archaeological Hallmarks
Early Contact	1540 to 1820	*-First appearance and increasing presence of horses and equipage late in phase* *-Bulk of households not equestrian?* *-Largely traditional subsistence strategies and technologies with selected integration of trade items* *-Lithic technology still comprehensive* *-Metal cutting and chopping tools introduced* *-Trade beads increasingly present* *-Site plans, settlement patterns and house styles still largely traditional* *-Trade goods mostly Spanish-derived* *-Tepee encampments developing with start of seasonal band consolidations late in phase* *-Few if any guns* *-Bow and arrow still used/lithic points* *-Traditional ceramics still used*
Middle Contact	ca. 1820 to 1860	*-Largely equestrian profile develops* *-Large numbers of horses and equipment* *-Large disparity between mounted and uncounted households and bands* *-Wide variety of trade goods/trade goods now American* *-Firearms introduced* *-Seed beads and "little China" prosser buttons* *-Plains Indian trails common* *-Heavy mortality rates* *-New subsistence strategies* *-Traditional technologies begin to be lost* *-Annual bison hunting/raiding onto Plains* *-Some lithic technology still used* *-Metal artifacts increasingly common* *-Metal projectile points begin to replace lithics?* *-Ceramics largely disappear from inventory* *-Metal cooking vessels appear* *-Brush architecture still used* *-Tepees used* *-Native wealth and affluence most evident at this time* *-Pronounced evidence of economic stratification among households--greater variety among sites?*

Included in the hallmarks presented by Baker (2007: 41) are characteristics that are similar to the 5LR263 Protohistoric component. The presence of horse remains at the site is a hallmark of the temporal period. This is also the case for guns as indicated by the gunflint at the site. These artifacts suggest that the site was framed by Baker's two phases. Which phase best characterizes the site is unclear because of the low numbers of trade goods at 5LR263.

Other site characteristics provide evidence and indicate that the site falls into the Early Contact Phase. The most telling of these characteristics is the lithic assemblage, which indicates that this technology was still vital to the site occupants. The recovery of stone projectile points from the site indicates the use of bow and

arrow technology. The faunal remains and bone breakage/butchering intensity may attest to a traditional subsistence pattern as well. The trade beads, although a relatively large proportion of the trade assemblage from 5LR263 and a large number compared to other sites in the area with bead, lack variability and show characteristics of beads introduced early in the period.

The brass kettle and the seed beads at the site would seemingly indicate a Middle Contact Phase site, but these items are documented from other sites in the 18th century so their presence at 5LR263 before 1820 is not unreasonable. The presence of these items, the lack of native ceramics, the *terminus post quem* of the gunflint and English or French origins of the gunflint, kettle, and pipe definitely push the site occupation to the later stages of the Early Contact Phase. Also, Baker (2007: 41) indicates that horses would have appeared late in this phase, which reinforces the late Early Contact Phase placement of 5LR263.

Based on the comparison with the archaeological hallmarks provided by Baker, the temporal placement of 5LR263 compliments the occupation dates indicated by the trade good and radiometric analyses. Comparison with different site types of the Protohistoric period provides a typology for 5LR263 based on its specific assemblage and feature characteristics.

Description of Characteristics

A nominal scale comparison using presence/absence of the general assemblage and feature characteristics of sites dating from the Protohistoric Period, provide a baseline data for this analysis (Table 9.2). The site characteristics used are based on the descriptive aspects of an archaeological site that could be found during the

Table 9.2. Idealized Protohistoric site type characteristics

Site Type	Faunal			Lithics					Trade Goods			Features			
	Domesticates	Prey Species	Other	Projectiles	Animal Processing	Plant Processing	Tool Maintenance	Tool Manufacture	Decorative	Tools	Cooking/ Consumption	Cooking/ Heating	Habitation Permanent	Habitation Temporary	Other
Large Group Camp	X	X	X	X	X	X	X	X	X	X	X	X		X	
Small Group Camp	X	X	X	X	X	X	X	X	X	X	X	X		X	
Lithic Procurement							X	X				X		X	
Kill		X		X	X		X	X		X	X	X		X	
Trading Camp	X	X		X	X	X			X	X	X	X		X	
Trading Fort/Post	X	X							X	X	X	X	X		
Ceremonial				X					X						X
5LR263	X	X		X	X	X	X	X	X	X	X	X			

Site Type	Location				Size			Water			
	Lithic Source Area	Subsistence Resource Area	Known Trading Locus	Religiously Significant Area	Small	Medium	Large	River/ Stream Confluence	Permanent Water	Not Necessary	
Large Group Camp		X	X			X	X	X	X		
Small Group Camp		X			X	X			X		
Lithic Procurement	X					X	X			X	
Kill		X				X	X			X	
Trading Camp		X	X		X	X	X	X	X		
Trading Fort/Post			X			X	X	X			
Ceremonial			X	X	X	X	X			X	
5LR263	X	X			X				X		

X = characteristic expected at site of this type

Protohistoric Period. This information is based on a corpus of data from excavated sites, historic accounts, my own knowledge of characteristics and gut level feelings. More quantitative characteristics like site size and proximity to water are used in an ordinal sense based on known examples. The size grades are subjective and it could be argued that these categories are neither all encompassing nor indicative of sites that have been described as "small, medium or large" in the past, but in a comparative sense they are appropriate for this analysis.

The faunal characteristics are divided based on domesticate, prey species, or other. "Domesticate" here means horse or dog, the two animals that were domesticated by Plains groups (Hämäläinen 2003, Wilson 1924). "Prey species" includes all animals that Native Americans procured for food. "Other" is a catchall for the animals (such birds and beavers) that may have been procured for non-consumptive purposes (e.g. furs, bead manufacture, feathers, etc.) and tools that were manufactured of bone.

The lithic assemblage characteristics are based on the occurrence of lithic materials generally associated with each of the activities. The "Projectile" category includes arrow, dart and lance points, although in the Protohistoric Period, this category usually means arrowpoints. "Animal Processing" includes lithic tools associated with skinning, butchering, hide processing and bone processing and would include such tools as scrapers and knives. The "Plant Processing" category encompasses lithics that were used to modify plants for consumption or crafts. This category includes stone axes and tools, such as gravers and ground stone, which are acknowledged, were not always used on plant material. "Tool maintenance" is

evidenced in the archaeological record as retouch flakes and reshaping flakes. Tool manufacture encompasses the many different types of debitage that are associated with lithic reduction.

Like the lithic assemblage characteristics, the trade good assemblage is divided into categories based on perceived use of the items. "Decorative" items include beads, tinklers and other artifacts that were used to adorn garments, tack, or other accoutrements. "Tools" are the guns, axes, knives; metal objects that were generally applied to subsistence activities. This category also includes clay pipes, as they were tools used to smoke tobacco. The "Cooking/Consumption" category includes the metal kettles and cooking vessels that were introduced through trade.

Site feature categories are Cooking/Heating, Habitation Permanent, Habitation Temporary and Other. "Cooking/Heating" features are thermal features generally called hearths that may have served for cooking and/or heating. "Habitation Permanent" is used for substantial features such as forts or buildings generally ascribed to European origin. "Habitation Temporary" means the moveable or less substantial dwellings of the native groups such as tepees and wickiups. The "Other" category includes features that were not used for habitation such as ceremonial structures and burials.

The site location categories are straightforward and indicative of the main site activity. Lithic procurement site will be in lithic source areas and camps are generally located in areas where subsistence resources are accessible. Religiously significant areas characterized by cultural significant topography that held symbolic and ritual importance to native groups.

Site size is based on the horizontal distribution of the features and artifacts that make up a core activity area for the group occupants. Small sites are those that are generally occupied by less than five family groups as evidenced by habitation structures. Using dimensions from a contemporaneous three lodge concentration at the Eden-Farson Site (48SW304), a Protohistoric Shoshonean campsite in Wyoming (Frison 1971: 260) and extrapolating that area for five lodges for the small campsite category gives an area of 1533 m^2. Similarly, using spatial data from the Killdeer Canyon Site (5LR289) (Long 2006: 15), a Protohistoric stone circle site within 11 km of 5LR263, produces an area of 1280 m^2 based on the area of three defined stone circles (figured in Long 2006) extrapolated to include five. These two sites indicate that a value of ~1500 m^2 is applicable for the top end of the small site size used in this comparison.

The medium size site range is the intermediate range that is exclusive of the small and large site sites. Large sites are categorized by areas of where ten or greater family groups cohabitated. Using the Eden-Farson and Killdeer Canyon data gives areas ranging from 3066 to 2560 m^2, so 3000 m^2 for the bottom end of the large size category. Thusly, the ranges are 0 to $\leq$1500 m^2 for small sites, >1500 m^2 to <3000 m^2 for the medium sizes and $\geq$ 3000 m^2 for large sites. It is acknowledged that the dispersal of habitation features could be much greater within each of the family group sizes used to delineate the sizes, but as a qualitative measure these categories are adequate. The variability in size of each site type in this study is acknowledged by including more than one size category for each type.

The proximity to water for each of the sites is categorized based on the need for human or animal consumption, or predicted upon accessibility due to topographic location as in the case of the trading locations. The need for water is basic for both human and animal, and this need was exacerbated with the acquisition of horses which do not consume snow or ice to obtain water. Other considerations, however, could result in sites located away from permanent water so this was taken into account with the categorization.

The above characteristics are general considerations that can be used as a trait list to get at the site function. Hopefully, all are fairly intuitive and when taken as a qualitative whole provide the full gamut of variables that could be expected at sites in the Protohistoric Period. Given this, the different site types are qualified based on expected general aspects that the site should present in the archaeological record.

Large Group Campsite

A large group or congregation of smaller groups typifies the large group campsite during the Protohistoric Period and would have resulted in a substantial number of people camping in one location at one time. This aggregation would result in a site with a varied faunal assemblage including domesticated animals such as at Biesterfeldt (Wood 1971: 44). The lithic assemblage would be varied due to the multiple tasks carried out during daily subsistence activities. Trade goods, if present, would reflect variability. Cooking/heating features and habitation features, usually stone circles, would be present at sites of this type. The location considerations are based on access to resources necessary to support a large group and, if the congregation was based on exchange, a known trading location was preferred as well.

The two generally coincide as areas chosen for trade had to accommodate the subsistence needs of the group as well. The site size is generally medium to large based on the substantial group numbers occupying the area. Location would be based on water availability and if trading was the purpose of the aggregation then waterway confluences were used in much the same manner as how trading forts/posts were positioned. As noted above, the location of a previous Comanche trading center on the Arkansas River in the Big Timber area was a factor used to determine the location of Bent's Old Fort (Hämäläinen 1998).

Small Group Campsite

The small group campsite is going to be basically the same as a large group campsite, the main difference being site size. The site size distinction versus a large group camp is also based on the fact that small sites were generally occupied for a shorter period of time. This site category would include occupations for fur or hide procurement. The traits indicate that a small group camp should have a varied lithic and faunal assemblage based on the numerous activities that would have taken place. Trade items would be varied much in much the same manner as the large group campsite perhaps in smaller numbers. There generally are cooking/heating features present with fewer occurrences of habitation features. Access to food and water resources usually dictated camp location and sites are generally found where some portion of the subsistence base could be procured. Size would range from small to medium based on factors such as topography, length of occupation. Access to water would be important and after horse adoption this would have had to take the form of a watercourse, spring or body of water.

Lithic Procurement Site

Lithic procurement sites characterized for this analysis are source locations for raw material. Therefore these sites are basically delineated based on the lithic assemblage. There are no faunal remains generally found at sites of this type. The lithic assemblage is characterized by early stage reduction and tool manufacture and maintenance. Features may include temporary habitation features and thermal features associated with cooking or heat-treating of raw materials. The location is dictated by proximity of lithic sources and this means that source areas are where sites of this type are found. Size is generally medium to large for sites of this type due to the diffuse nature of lithic outcrops and large amounts of lithic debitage generated. Major procurement areas such as Spanish Diggings in Wyoming, which cover many hectares, were used in Protohistoric times (cf. Reher and Frison 1980). Smaller source areas were undoubtedly used, but evidence and specific sourcing of materials mainly dictates that known distinctive materials are most recognized and provide evidence of procurement location. An finally water is not a consideration given that the site must be located where raw material can be acquisitioned which is often exclusive of permanent water.

Kill Site

Kill sites in the Protohistoric Period share characteristics that are often based on site preservation, which can be a product of the number of animals killed. Classic examples, such as Glenrock (Frison 1970) and Vore (Reher and Frison 1980), for example, contain the remains of hundreds of animals. A northern Plains Indian term for buffalo jump is “pishkun” meaning “deep blood kettle” (Reher and Frison 1980:

136). Historic accounts indicate that large numbers of animals were killed in single events as well (Binnema 2001). There were obviously small kills (single or a few animals) but the amount that have been excavated or recorded is scant. Mounted hunting in non-trapping situations usually spread out the carcasses and the remains of individual animals were isolated and much more exposed to deterioration. This is unlike a kill event directed at procurement of a large number of animals, which usually took place in a sheltered topographic feature that helped preserve the evidence. The faunal assemblage is homogenous with the particular prey species (usually bison) dominating the numbers. The lithic assemblage would include the projectiles used to dispatch the animals, butchering/processing tools, and often maintenance and manufacturing evidence of tool rejuvenation and/or replacement.

The killing, butchering and processing of animal carcasses was a time consuming event and features involved with the processing and consumption of animals generally are present. Depending on the size and/or success of the hunting episodes these efforts may take days or weeks (Frison 1973: 53) resulting in temporary habitation structures being present. Sites are located in the prey species habitat where the animals are found. Based on factors discussed above, the sites generally range from medium to large given the preservation bias. Plains prey species were not always close to water although they did need to come and water occasionally. Kill sites therefore do not necessarily need to be located close to water, although many generally are because the watering habits of game provided a predictable behavior to exploit for animal procurement.

Trading Camp

Trading camps are site types that probably occurred throughout the occupation of the Plains region. Materials from exotic locales have been found in sites on the Plains and materials from the Plains have been found in exotic locales. The formal group interaction that facilitated materials exchange in the Protohistoric Period on the Plains generally occurred in two ways: (1) aggregation at a known location by different groups to trade or (2) journey to an established European trading post/fort (discussed below). The aggregation of groups at a known location accessible to both for trading resulted in trading camp site type. The historic accounts give examples of rather large aggregations such as the Green River Rendezvous or the Comanche trade center on the Arkansas River. Archaeologically this site is much the same as a large group camp, the possible differences being in the amount and diversity of European goods and possibly evidence of differing cultural contingents present. Unlike a large group camp; however, a trading camp could be quite small just a few individuals meeting to trade. Location at a known trading locus or subsistence resource and location at a permanent water source, usually along a major river or watercourse confluence, round out the characteristics for this site type.

Trading Fort/Post

Trading forts or posts are manifestation of the post-18th century Protohistoric Period. The development of the fur trade in the first part of the 19th century instigated the construction of these sites by European traders. This site type differs from a trading camp in its permanence and fixed location. Trading fort/posts were built at a location that was visited by groups or individuals for trading purposes. The

archaeological assemblage at these sites should reflect their largely European occupants in the presence of domesticated animals in the faunal portion and lack of indigenous lithic technology. A full suite of trade items can be found in sites of this type, along with distinctive permanent architectural features. These sites are located at known trading loci, and range in size from medium, exemplified by the single low one-story building described for Fort Davy Crockett in 1839 (Eddy 1982: 42-43), to large exemplified by Bent's Old Fort, which was a large enclosed adobe structure (Moore 1973: 14). The location (see Figure 8.1) is on a major river usually at its confluence with another stream.

Ceremonial Site

The characteristics of ceremonial sites during the Protohistoric Period are much harder to ascertain. Tangible attributes of ceremonial or religious sites may include physical features, such as caves or cultural features such as rock art or rock alignments (Sundstrom 2003: 259). There was and continues to be religious significance ascribed to much of the natural world by Native Americans. The importance of certain topographic features is well noted based on historic and ethnohistoric accounts; places such as Bear Butte and Inyan Kara Mountain are recognized as holding special religious status (Sundstrom 2003). In the archaeological record, there are few definitive sites of this type although ceremonial activity is often the given purpose for enigmatic features. This site type will include intentional human burials as they undoubtedly held a ceremonial or religious significance.

For the purposes of this analysis certain features were ascertained as general characteristics of ceremonial sites. The presence of projectile points may occur at a site of this type as ceremonial offerings. Hudson (1993: 272) references historic accounts that indicate, especially after the introduction of metal projectile points, stone points took on a religious significance and were used in ceremonies. The trade goods are usually of a decorative nature given as offerings or placed in the interment as burial offerings. Glass trade beads were found in association with the central cairn at the Medicine Wheel in northern Wyoming (Grey 1963). Probably the most defining characteristic of ceremonial sites is the features. Stone features such as cairns and rock lines, especially in concert with one another like the Medicine Wheel mark ceremonial locations. Rock art can have religious significance as well.

These sites are located at places on the landscape that hold special significance to the native groups, but in the Protohistoric groups movements, coalescence and dispersals brought many people into new territory and they had to adapt to a new cultural topography. Native groups were highly adaptable and incorporated the new features. The significance of the Black Hills to the Lakota is an example as this group was a relative latecomer to the Great Plains but was able to become religiously tied to this uplift. Known trading locus is included as a possible site location because the aggregation of groups at these places provided an opportunity for religious celebration, if not at the locus itself, close by at satellite locations. Site size for ceremonial sites encompasses all three size classes given sites could be based on an individual person performing religious activities (e.g., a vision quest site or an eagle trap) to large numbers of people coming together. Water is not a real consideration as

these sites could be located anywhere on the landscape, as the ceremonial landscape does not necessarily correlate with the subsistence landscape.

5LR263

Finally the assemblage and site location characteristics of 5LR263 are listed. The characteristics of 5LR263 indicate that it contains a robust assemblage of faunal, lithic and European artifacts. It lacks any type of habitation features, containing only thermal features. It is located in an area of both lithic and subsistence resources. The site is ranked small in size and is located on a small permanent water source.

Site Correlations

Based on the expected presence or absence of characteristics, the seven site types and 5LR263 were compared to see if there were any significant correlations. The statistical analysis revealed that there are eight significant correlations (Table 9.3). Most of the correlations are not surprising and could be arrived at in a strictly intuitive sense, but the statistics analysis provides quantitative reinforcement of the intuitive assumptions.

The correlation between small group camp and 5LR263 is the strongest and indicates along with other supporting data that the site was a small group camp. The correlations indicate a significant positive relationship between the assemblage characteristics of 5LR263 and this site type. The correlation between large group camp and small group camp is expected as the large group camp was characterized as generally larger in size and more variable in the location and water categories. The large group camp correlated with a trading camp as well due to the habitation focus of the two sites and presence of trade item at both regardless of trading or not. The

Table 9.3. Significant correlations between site types

		Correlation	
Type Comparison	***N***	r_s	***p***
Small Group Camp - 5LR263	*25*	*0.665*	*<0.001*
Large Group Camp - Small Group Camp	*25*	*0.618*	*0.001*
Large Group Camp - Trading Camp	*25*	*0.618*	*0.001*
Lithic Procurement - Kill	*25*	*0.487*	*0.013*
Small Group Camp - Trading Camp	*25*	*0.449*	*0.025*
Trading Fort/Post - Trading Camp	*25*	*0.435*	*0.030*
Large Group Camp - Kill	*25*	*0.397*	*0.049*
Large Group Camp - Ceremonial	*25*	*-0.418*	*0.038*

All correlations significant at the α=0.05 level (two-tailed).

correlation between lithic procurement and kills is based on similarities in the lithic assemblage, size and not being tied to water. The correlation between the small group camp and trading camp is based on the same considerations as with the large group camp and trading camp correlation. The trading fort/post site type singularly significantly correlated with the trading camp. This is based on the identical activity focus at both site types. The correlation is not as strong as might be expected but the differences in feature type and more focused trade occurring at forts/posts could account for this.

An interesting correlation was between the large group camp and kill site types. This correlation was based on similar lithic assemblage, feature types and size; this reflects the camping aspect of kills that would have taken place to complete animal capture and processing activities. Finally, there is a significant negative correlation between large group camp and ceremonial sites. This is reflective of the different specialized nature of a ceremonial site signature versus the more generalized and rich signature of the large group camp.

The significant correlations are generally intuitive in nature indicating relationships that should be expected. The importance of correlating sites lies in the

demonstrating that these site types do overlap and seemingly disparate types can look similar in the archeological record if broken down to baseline qualitative assessments. It is important that all assemblage aspects be analyzed in order to assess site function. For example, if 5LR263 were analyzed based upon strictly the lithic assemblage one might categorize the site as being strictly for lithic procurement. The point being that one portion of an assemblage may dominate proportionately but this does not mean that this represents the dominate activity taking place at the site.

The site types of the Protohistoric Period, especially as they pertain to the central and western Plains region are a broad spectrum of types that range from ephemeral to concrete. Given the geographic setting of the Lykins Valley is suitable for camping, it is not surprising that 5LR263 correlates highly with the small group campsite. The size of Boxelder Creek and out of the way location of the Lykins Valley may be the reasons that other site types are not found in the region. The trade forts on the South Platte are located on the larger river in a much more accessible location based on traditional routes of movement by human groups in the area.

The analysis of sites based on assemblage and setting characteristics indicates that the Protohistoric Period contained site types that could be radically different from pre-contact times. This site comparative study concludes the analysis of 5LR263 by determining how this site fits into the spectrum of sites from post-contact occupations. The following discussion uses this analysis as part of an elucidation of the larger context of the Protohistoric Period on the western Plains based on the information provided by the analyses presented in this thesis. The reanalysis of the

5LR263 assemblage caged in a larger scale look at the Protohistoric Period provides important fodder for the archaeology and historical study of this time and place.

Chapter 10. Discussion and Conclusions

The preceding analyses of the 5LR263 assemblage and the Protohistoric Period in general provide evidence that the western Plains may only have been impacted to a slight degree previous to the Fur Trade Era. The characteristics of the 5LR263 assemblage indicate that the site was occupied by a group that had materials contact with European groups, but maintained a traditional subsistence. A discussion of various aspects of the site assemblage demonstrates this and argues for a distinct temporal placement of the site occupation and underlies the importance of 5LR263 in understanding early 19th century Native culture in the area.

The faunal analysis of the Protohistoric component from 5LR263 indicates that at least seven animals were brought to the site from late summer or fall into mid-winter. In general, these animals weighed less than 100 kg and could have been transported whole by a horse. The use of the horse is also suggested by the transport analysis, which indicates a bulk or unconstrained strategy. Once at camp, the carcasses were intensively processed as indicated by the bone fragmentation and presence of impact flakes and cones. I believe animals were introduced individually into the camp and were completely "used up" before more meat was procured. This is logical in a winter camp scenario where snow and inclement weather would have made hunting difficult if not impossible at times and evinced a "bird in the hand" type of resource use. It is also possible that part of the food stores were obtained during fall kill events (especially the juvenile bison), and used in the same manner until absolutely exhausted. An overall lack of carnivore modification might result from the site

occupants exhausting all available bone nutrients and/or staying in proximity to the scrap bones and limiting carnivore access. The lack of fur-bearing animal remains, such as beaver, and the low overall site MNI indicates that this occupation was not involved in the fur or hide trade, although off-site fur processing is possible.

The lithic assemblage has characteristics that may indicate an over wintering camp scenario as well. The assemblage is dominated by local material and tool maintenance debitage. The proximity of raw material sources allowed tool manufacturing activity to take place, but a low amount of formal tools suggests that the site occupants used the tools they already had. Although local material dominates the debitage portion of the assemblage none of the formal tools can definitively be categorized as local. The only definite exotic material from the site was the obsidian, which was sourced to the Jemez Mountains in the Santa Fe region in northern New Mexico. The obsidian whether acquired by trade or direct procurement shows a link to the Southwest. Ground stone in the assemblage speaks to varied camp activities and the grooved abraders indicate possible weapon manufacturing. The arrowpoints and flake preforms indicate that bow and arrow technology was important. The typology of the projectiles is expected for the Protohistoric Period.

The gunflint, kettle and pipe, all of English or French origin, indicate influences from the east and north. The typology of the gunflint shows that these items were acquired some time after 1780 and most likely before 1830. French and English trade influence was strong on the Plains during this time according to historic accounts. The horse bone found in the assemblage indicates that these were equestrian people, which by the turn of the 19th century is not unexpected in the region. The trade good

assemblage indicates that the site occupants possessed European technology but still depended on lithic technology for subsistence activities.

The data gleaned from the report (Ohr et al. 1979) provided useful spatial data that suggest a hearth centered activity area. The occurrence of different types of artifacts in different portions of the excavation statistically shows discard verses drop zones. These zones conform to the prevailing wind direction. The lack of habitation features indicates this was an outside activity area. The report data indicate that a probable hearth was present in the excavation block and, when the Protohistoric levels are collapsed together, a complete picture of this activity locus appears. The excavation area appears to represent one occupation or closely spaced occupations, consecutive years or within a couple of years, given that these occupations would have had to use the space in the exact same manner and without visual evidence from the previous occupation.

The absolute dating of materials from the site provided five dates. These dates are statistically contemporaneous and when pooled and calibrated show that the most probable range of dates (at the two sigma range) occurs from the 18th into the early 19th century. This supports the postulated early 19th century occupation for the Protohistoric components of the site. It is also important that the dated horse bone was contemporaneous with the rest of this assemblage, thus supporting the interpretation that the site occupants used and possibly ate horses. The faunal assemblage and apparent transport strategy further support the availability of horses to the occupants of the site.

The historic accounts of European intrusion into the 5LR263 region are scanty at best. The documented accounts from the 16th through 18th centuries provide no evidence of Europeans remotely close to Lykins Valley. However, in the 19th century the area became a focus for exploration by Americans. There is still no direct account of the site itself and it does not appear on a map until 1845. The fur trade era saw an influx of European trappers and traders, along with trade goods, but this is after the postulated occupation of the site. This is not to say that an undocumented expedition did not come to the area before the 1820's, but the general pattern of the documented explorations indicates otherwise.

The establishment of trade in the region began in the 1830's as a response to the burgeoning fur trade. There was a large influx of trade goods associated with this occurrence. Given the relative paucity of trade goods at 5LR263, this indicates that the occupation of the site occurred before the fur trade began in earnest. The site occupants at Lykins Valley were not involved with the fur or hide trade and the lack of success of trade forts on the South Platte may even indicate limited interaction with groups during the fur trade.

Native group affiliation for the site is hard to determine. There are many native groups that were documented in the area throughout the late 18th and 19th century. Given the evidence from nearby rock art, the Boxelder Valley may have been used by Comanche or Cheyenne groups during this time, although French and British trade goods could also be suggestive of a more northern oriented trading group such as the Arapaho. This evidence is strictly circumstantial but shows that one of these groups might have been at 5LR263. The Southern Plains influenced rock art and obsidian

sources is somewhat incongruous with the east to northeast trade good influence, but given the wide ranging group dynamics of the time, a group like the Comanche or Cheyenne would have had numerous contacts or direct interaction.

The site comparative analysis indicates that 5LR263 is highly correlated with the small group camp. This correlation indicates that the site is probably a small group camp or an isolated portion of a large group camp. The former interpretation is preferred because the original survey of the site area failed to locate any other activity areas that could have been contemporaneous with the one that was excavated.

The Protohistoric Period (A.D. 1540-1860) in the Plains region is under documented in both the archaeological and historic record. The reanalysis of the 5LR263 Protohistoric component provides new information on this under-explored temporal period. The impact of materials contact with Europeans was felt on the Plains long before actual physical contact for many groups. Native groups were able to adopt and incorporate European trade items into their culture as acquired.

The numbers and types of trade items varied with proximity and contact to trading centers and/or European traders. In the early 19th century, the group or groups that occupied 5LR263 were still reliant on traditional technologies. This was probably a product of the site's location. The site was in an area that was disputed by European sovereignties that sought to control its economic base. Competing Spanish, French and English groups were probably more concerned with the groups in their immediate contact sphere rather than groups in the hinterlands.

It is difficult to determine whether the occupants of Lykins Valley acquired trade goods in a manner favorable to them or if they were relegated to bottom rung

acquisition, although horses and guns suggest power. However, the occurrence of French or English trade items at the site, along with a possible Southern Plains influence, based on the nearby rock art and obsidian at the site, indicates far-ranging contacts. A Comanche or Cheyenne occupation could account for the varied influences since the groups are known to have been powerful and successful traders around the turn of the 19th century.

That the site is in a well-sheltered place, and knowledge of that place would require an understanding of local topography, indicates that the site occupants were a local group. The riparian zone of Boxelder Creek would have provided adequate water and forage for horses. The faunal assemblage indicates that animals were brought to the site throughout the late summer/early fall into winter. They might have used Lykins Valley for an over-wintering camp. This also indicates that winter supplies of food were not procured beforehand as was the general pattern for pre-contact subsistence on the Plains. This change in strategy might be a product of native group upheaval where traditional lifeways were usurped by warfare, group movements and the loss of cultural capital and people by disease (Sutton 2004: 26). Or, residents of 5LR263 might have counted on access to big game throughout the winter based on an intimate knowledge of their surroundings.

As the above discussion demonstrates the analysis and research have led to an interpretation and scenario of likely activities at the site and in the region. But how does this interpretation and discussion apply to the research questions posited at the beginning of this thesis? Directing this discussion to the research questions provides

the following determinations about 5LR263 and the Protohistoric Period in northcentral Colorado.

The purpose of this thesis was to address three research questions through the analysis of the 5LR263 and its context in the Protohistoric Period. The first question was: *(1) What can the assemblage analysis tell about the Lykins Valley Site in terms of temporal placement, native affiliation and trade influences?* In addressing this question, evidence based on the analysis of the lithic, faunal and trade good components of the assemblage, along with the historic records from the Protohistoric Period was used. The summation of the evidence indicates that the site probably dates to the very beginnings of the 19th century around the time of the Louisiana Purchase but before the establishment of the fur trade in the region.

The trade items and lithic sourcing of the obsidian indicate that goods came from both the south and northeast. This is an indication of varied trade contacts of the group. The trade good assemblage contains many items that would have been highly valued and could be seen as indicators of prosperity. This evidence, combined with the rock art at 5LR293, indicates the group at 5LR263 many have been part of a powerful tribe, such as the Comanche or Cheyenne.

The next research question that this thesis addressed is *(2) What does the temporal placement and site use of 5LR263 say about the degree of dependence on European technology by site occupants?* Beyond materials contact, the evidence indicates that Europeans had minimal impact into the western Plains until the beginning of the fur trade era. There are a number of sites on the western and northern Plains that date to the Protohistoric Period but are classified as Late

Prehistoric for various reasons but mainly for a lack of trade goods. If the dates are correct there were native groups that either did not have or were very fastidious (did not discard) with their trade items even after well over 100 years of materials contact with Europeans (this is based on the Spanish accounts of French trading on the Plains beginning in the 17th century). The Vore Site which was used for ~300 years (A.D. 1500-1800) but no trade goods were recovered from the excavations; however, bison bones in the upper levels do have cutmarks made by metal knives (Charles Reher, personal communication 2007). I feel this is evidence that there were post-contact groups living pre-contact lifeways by their own choosing.

Where does the Lykins Valley Site fit into this scenario? The site does have trade goods and some that would have probably been coveted, but there also was lithic technology being employed. It is almost as if the site occupants were very selective about what European items they wanted and used. The presence of highly valued trade items leaves open the possibility of Europeans at 5LR263 but the lithics at the site indicates that the occupation would have had to of been a mixed European and Native group, with the Native component of the group dominate archaeologically.

The site location is in a sheltered game rich area that was in the hinterlands of a disputed territory where Spanish and French vied for control in a manner that based on historic accounts left this place untouched and unknown. Lykins Valley was occupied during a time when large portions of the western Plains were still unseen by Europeans and by a people that could be selective in trade item incorporation into the existing culture. If the group at Lykins Valley was either Comanche or Cheyenne this

was during a time when these groups were probably at their apogee as far as controlling trade and equestrian might.

The third and final research question that was addressed by this thesis is *(3) Based on site type, date of occupation and degree of dependence on European technology, what can 5LR263 tell about European impact on the western Plains at the beginning of the 19th century?* The analysis of the Protohistoric component from 5LR263 can contribute to our understanding of post-contact change in the Great Plains of North America. The artifact analysis indicates that the occupation at the site occurred around the beginnings of the 19th century. The historical data show that the region was undocumented by Europeans at this time. Along with the site assemblage characteristics, this information indicates that the occupation of the site was by a people not in direct contact with European groups. They were still involved in a largely pre-contact subsistence pattern and had only selectively integrated European technology into their culture. It is not unlikely that pressure from European colonization, albeit indirectly at this point, influenced their choice of Lykins Valley as a place to camp. It was a sheltered and discrete location and was in the hinterlands of the Plains. The small size and assemblage characteristics of the site suggest small group occupation. This could be a product of the dispersal and depopulation that resulted from epidemiological contact, which far outpaced physical contact.

The 5LR263 Protohistoric occupation, based on this analysis, was unique not only in the period of occupation but the manner in which European contact had influenced their traditional culture. The group or groups at 5LR263 had acquired high-end trade items yet still relied heavily on indigenous technologies for subsistence. The lack of

traditional pottery at the site coupled with the presence of brass kettle parts indicates that they took advantage of the superior metal technology but they continued to use lithic technology, specifically the bow and arrow. The overall geographical setting and size of the site indicate an intimate knowledge of the area and that site occupants made a conscientious effort to avoid direct European contact.

Although the analysis of the site as a single small group camp is justified based on the initial survey of the area, there is evidence that other occupations from the same time period have occurred in proximity to 5LR263. Apart from the petroglyphs that depict scenes from the Plains Biographic Period at 5LR293, trade beads have been found at four other locations (5LR261, 5LR11724, 5LR11726, 5LR11819) on Boxelder and Sand Creek, all within five kilometers of 5LR263 and two other sites (5LR289, 5LR256) within 20 km have evidence of post-contact occupations (Table 10.1). Future study of these locations, coupled with the data from 5LR263, will provide more information about the use of Lykins Valley and the Big Hole during the Protohistoric period and help to answer questions about the under-explored post-contact period on the Plains.

Does the occurrence of European trade goods at so many locations in a relatively small region indicate that Lykins Valley was an especially important place to people during post-contact times or that in other areas evidence of post-contact occupations has been removed or destroyed? The answer is some of both in my mind as location of campsites in alluvial settings to take advantage of riparian vegetation was necessitated by post-horse considerations and these are the same locations that generally are subject to the heaviest development both in historic and modern times.

Table 10.1. Protohistoric sites

Site Number	Site Type	Protohistoric Evidence
5LR263	*Small Campsite*	*Glass trade beads* *Clay tobacco pipe* *Brass kettle fragments* *Gunflint* *Tinkler* *Metal fragments* *Horse bone* *Radiocarbon dates*
5LR261	*Small Campsite*	*Glass trade bead*
5LR11724	*Campsite*[1]	*Glass trade beads*
5LR11726	*Campsite*[1]	*Glass trade beads*
5LR293	*Rock art/Ceremonial*	*Horse depictions*
5LR11819	*Campsite*[1]	*Glass trade beads*
5LR289	*Stone circle/Campsite*	*Radiocarbon dates*
5LR256	*Campsite*	*Metal arrowpoint*

[1]*Probable site type, exact extent unknown.*

Alluvial settings also tend to lack depositional stability due to flooding and erosional events that either end up deeply burying artifacts or wash them away. Heavy vegetation in riparian zones can make surface survey difficult due to lack of visibility. As this applies to Lykins Valley and the Big Hole, the area was isolated and not developed; also at the time that 5LR263 was found heavy grazing provided good visibility. Another factor is survey in the area in the summer of 2007 was explicitly looking for post-contact sites based on the findings at 5LR263, 5LR293 and 5LR261, as well as earlier archaeological accounts of trade goods being found as sites in this area.

It is especially important to understand how these sites relate to one another and to the Protohistoric Period in general. Further investigation of the area using 5LR263 as a take-off point to research the other sites in the area is important. Gathering data to determine if these sites were contemporaneous are essential as well as developing

ideas about group identity. Comparison of a site such as 5LR289, which lacks trade goods but was occupied in the Protohistoric Period, with the other sites that have trade goods could relay important information about group access and/or acceptance of Europeans technologies. This area may provide data to help firm up a chronology for the Protohistoric Period, which at this point is very difficult given the diachronic artifact use and the complexity of ^{14}C calibration curve after A.D. 1600.

Obtaining a larger data set from this little known time period is important. The study of culture contact is relevant not only to archaeological inquiry but to modern issues of culture conflict. The scenario of culture contact is one that has been played out around the world for untold millennia and continues to occur as expanding global interests impact groups of people that are living inclusively. Lessons from the past concerning cultural contact can be applied to the modern issues and help to mitigate the negative impacts subjugated groups continue to absorb. It is important that lessons from the past be elucidated through the archaeological study of contact so that the future of culture contact is brighter than the past.

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Appendix A. Faunal Assemblage Data

1 - NUMBER
number assigned during CCN analysis

2 - ACCESSION NUMBER
accession number from Laboratory of Public Archaeology (LOPA)

3 - CATALOG NUMBER
original catalog number
999 = Unknown/None

4 - HORIZONTAL PROVENIENCE
1 = Grid 1
2 = Grid 2
3 = Grid 3
4 = Surface Within Grid
99 = Unknown

5 - VERTICAL PROVENIENCE
1 = Level 1
2 = Level 2
3 = Surface
99 = Unknown

6 - SPECIES
1 = *Antilocapra Americana*
2 = Bird
3 = *Bison bison*
4 = Canid
5 = *Equus caballus*
6 = *Odocoileus hemionus*
7 = Deer/Pronghorn sized (medium)
9 = Rodent
999 = Unidentified

7 - ELEMENT

Cranium/Teeth

1 = Cranium
2 = Mandible
3 = Hyoid
4 = Antler
5 = Horn Sheath
6 = Maxillary Molar
7 = Mandibular Molar
8 = Maxillary Premolar
9 = Mandibular Premolar
10 = Incisor
11 = Deciduous Molar
12 = Unidentified Molar
13 = Unidentified Premolar
14 = Tooth Fragment
15 = Unidentified Tooth

Axial Skeleton

101 = Atlas Vertebra
102 = Axis Vertebra
103 = Cervical Vertebra
104 = Thoracic Vertebra
105 = Lumbar Vertebra
106 = Sacral Vertebra
107 = Caudal Vertebra
108 = Sacrum
109 = Costal Cartilage
110 = Sternal Element
111 = Manubrium
112 = Xiphoid Cartilage
113 = Rib
114 = Unidentified Vertebra

Fore Limb

201 = Scapula
202 = Humerus

203 = Radius
204 = Ulna
205 = Radius-Ulna
206 = Metacarpal
207 = 5th Metacarpal
208 = Ulnar Carpal
209 = Intermediate Carpal
210 = Radial Carpal
211 = Fused 2&3 Carpal
212 = 4th Carpal
213 = Accessory Carpal
214 = Unidentified Carpal

Hind Limb
301 = Pelvis
302 = Femur
303 = Patella
304 = Tibia
305 = Lateral Malleolus
306 = Calcaneus
307 = Astragalus
308 = Fused Central&4th Tarsal
309 = Fused 2&3 Tarsal
310 = 1st Tarsal
311 = 2nd Metatarsal
312 = Metatarsal
313 = Unidentified Tarsal
314 = Ox Coxae

Misc. Appendicular Skeleton
401 = 1st Phalanx
402 = 2nd Phalanx
403 = 3rd Phalanx
404 = Phalanx
405 = Metapodial
406 = Proximal Sesamoid
407 = Distal Sesamoid
408 = Sesamoid
409 = Accessory Phalanx

Fragments
501 = Long Bone
502 = Cancellous Bone
503 = Flat Bone/Axial Bone
999 = Unidentified Bone

8 - PORTION

Long Bones and General
1 = Complete
2 = Proximal End
3 = Proximal >1/2 Shaft
4 = Proximal <1/2 Shaft
5 = Diaphysis + Proximal Epiphysis
6 = Distal End
7 = Distal <1/2 Shaft
8 = Distal >1/2 Shaft
9 = Proximal Epiphysis
10 = Condyle
11 = Impact Flake
12 = Impact Cone
13 = Distal Epiphysis
14 = Diaphysis
15 = Distal Diaphysis
16 = Proximal Diaphysis
17 = Distal End + Distal Epiphysis
18 = Long Bone Shaft
19 = Flake <1/2 Shaft/Fragment
20 = Epiphysis
21 = Blade, Scapula/Rib
22 = Head
999 = Unknown

Cranium
101 = Parietal
102 = Frontal
103 = Zygomatic
104 = Lacrimal

105 = Incisive
106 = Braincase (Frontal + Occipital)
107 = Temporal
108 = Other Combination
109 = Palatine
110 = Tooth Row
111 = Maxilla
112 = Horn Core
113 = Petrous Portion
114 = Skull Roof (Frontal + Horn Core)
115 = Nasal
116 = Occipital
117 = Tooth Enamel
118 = Jugal Process
119 = Antler Tine

Vertebrae
701 = Centrum
702 = Centrum + Neural Arch
703 = Centrum + Dorsal Spine
704 = Atlas, Centrum + Wings
705 = Neural Arch + Spine
706 = Dorsal Spinous Process
707 = Transverse Spinous Process
708 = Articular Process
709 = Anterior Epiphysis
710 = Posterior Epiphysis

Mandible
201 = Horizontal Ramus
202 = Dentary Ramus
203 = Ascending Ramus
204 = Tooth Enamel
205 = Angle
206 = Coronoid Process
207 = Dentary Ramus + Ascending Ramus
208 = Symphysis
209 = Tooth Row
210 = Distal Border

211 = Condylar Process

Scapula
301 = Cranial Border
302 = Glenoid
303 = Glenoid + Spine
304 = Caudal Border
305 = Glenoid + Blade Fragment

Ulna
401 = Trochlear Notch
402 = Olecranonal Portion

Hyoid
501 = Angle
502 = Body

Os Coxae
601 = Ilium
602 = Ischium
603 = Pubis
604 = Acetabulum
605 = Ilium (Caudal)
606 = Ischium (Caudal)
607 = Acetabulum + Ischium
608 = Acetabulum + Ilium
609 = Acetabulum + Pubis
610 = Ilium (Cranial)
611 = Ischium (Cranial)
612 = Pubic Symphysis
613 = Ventral Pubic Tubercle

9 - SEGMENT
1= Complete
2 = Proximal
3 = Distal
4 = Lateral
5 = Medial
6 = Cranial

7 = Caudal
8 = Dorsal
9 = Ventral
10 = Tooth Enamel
11 = Split Rib Blade
12 = Spine
13 = Head
14 = Posterolateral
15 = Posteromedial
16 = Anterolateral
17 = Anteromedial
18 = Fore
19 = Hind
20 = #1-14 Vertebra/Rib/Tooth
21 = Fragment
22 = Interior
23 = Exterior
24 = Tooth Row
25 = Buccal
26 = Lingual
27 = Axial
29 = Abaxial
999 = Unknown

10 - LANDMARK

Humerus

1 = Lateral Tuberosity
2 = Head
3 = Tres Tuberosity
4 = Coronoid Fossa
5 = Medial Epicondyle
6 = Medial Condyle
7 = Medial Tuberosity
8 = Proximal Shaft
9 = Proximal Olecranon Fossa
10 = Lateral Epicondyle
11 = Lateral Condyle
12 = Foramen
13 = Complete

14 = Radial Fossa
15 = Teres Major Tubercle
999 = Unknown/None

Radius
101 = Lateral Glenoid Cavity
102 = Proximal Posterior Shaft
103 = Posterolateral Nutrient Foramen
104 = Mid-Posterior Shaft
105 = Distal Posterior Shaft
106 = Radial Carpal Facet
107 = Medial Glenoid Cavity
108 = Radial Tuberosity
109 = Mid-Anterior Shaft
110 = Distal Anterior Shaft
111 = Medial Carpal Facet

Ulna
201 = Proximal Epiphysis
202 = Anconeal Process
203 = Mid-Shaft
204 = Olecranon Process
205 = Articular Facet
206 = Styloid Process

Femur
301 = Head
302 = Lesser Trochanter
303 = Linea Aspera
304 = Supracondyloid Fossa
305 = Medial Condyle
306 = Greater Trochanter
307 = Anterior Shaft
308 = Anterior Medal Foramen
309 = Proximal Trochlea
310 = Lateral Condyle
311 = Trochlea

Tibia

401 = Tibial Tuberosity
402 = Lateral Condyle
403 = Posterolateral Foramen
404 = Distal Posterior Shaft
405 = Medial Groove
406 = Fibular Facet
407 = Medial Condyle
408 = Anterior Crest
409 = Proximal Posterior Shaft
410 = Distal Anterior Shaft
411 = Lateral Groove
412 = Anterior Nutrient Foramen
413 = Muscular Tines

Mandible
501 = Coronoid Process
502 = Mandibular Foramen
503 = Lower Border
504 = Symphysis
505 = M1 Tooth/Alveolus
506 = M2 Tooth/Alveolus
507 = P2 Tooth/Alveolus
508 = Anterior Condyle
509 = Angle
510 = Diastema
511 = Incisors/Canines
512 = M3 Tooth/Alveolus
513 = P3 Tooth/Alveolus
514 = P1 Tooth/Alveolus
515 = P4 Tooth/Alveolus

11 - SIDE
1 = Left
2 = Right
3 = Axial
4 = Abaxial
5 = Not Applicable
999 = Unknown

12 - FUSION

0 = Unfused
1 = Partially Fused
2 = Fused Line Visible
3 = Complete Fusion
4 = Broken Indeterminate
5 = Not Applicable

13 - SEX

1 = Male
2 = Female
999 = Unknown

14 - BURNING

0 = None
1 = Carbonized
2 = Calcined
3 = Carbonized + Calcined

15 - BREAKAGE

0 = Complete
1 = Green
2 = Dry
3 = Recent
4 = Indeterminate
5 = Green + Dry
6 = Green + Recent
7 = Dry + Recent
8 = Green + Dry + Recent

16 - ROOT ETCHING

0 = 0%
1 = 5%
2 = 10%
3 = 20%
4 = 30%
5 = 40%
6 = 50%
7 = >50%

999 = No Surface Present

17 – COMPACT WEATHERING

1 = Unweathered, articular surfaces intact with no surface cracking
2 = Articular surfaces intact with some surfaces cracking
3 = Articular surfaces exhibit some deterioration
but >50% of articular surface intact
4 = Intact articular surface restricted to a few small islands
<50% of articular surface intact
5 = No articular surface area remains intact
6 = Bone severely deteriorated, large areas of fibrous bone exposed
7 = Fragment, not applicable
99 = Cortical

18 – CORTICAL WEATHERING

1 = Unweathered
2 = Limited surface weathering, some longitudinal cracking
3 = Light surface flaking, deeper cracking
4 = Patches of fibrous bone with moderate flaking and cracking
5 = Deep cracking and extensive surface flaking
7 = Fragment, not applicable
99 = Compact

19 - MASS

= Weight of specimen in grams

20 - CULTURAL MODIFICATION

1 = Indeterminate
2 = Sawed
3 = Chopmarks Metal
4 = Cutmarks Stone
5 = Cutmarks Metal
6 = Pot Polish
7 = Impact Cone
8 = Impact Flake
9 = Chopmarks Stone
10 = Cutmark
11 = Recent (excavation)
12 = 7+3

13 = 7+6
99 = None

21 - CARNIVORE MODIFICATION

1 = Indeterminate
2 = Crenilation
3 = Crushing/Pitting
4 = Gnaw Marks
5 = 3+4
6 = Polished
99 = None

22 - COMMENTS

additional or miscellaneous information not covered in the artifact coding

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	37	999	2	2	6	202	14	14	12	2	4	99	0	1	5	99	1	8.2	7	99	refit w/ #1358
2	37	999	2	2	3	113	21	6	99	5	4	99	0	1	5	99	2	3.8	10	99	
3	37	999	2	2	3	113	21	21	99	99	4	99	0	4	0	99	1	8.8	99	99	heavy polish
4	37	999	2	2	7	113	21	11	99	99	4	99	1	1	1	99	1	1	7	99	
5	37	999	2	2	3	503	21	21	99	99	4	99	0	1	2	99	1	1.7	99	99	
6	37	999	2	2	99	99	19	1	99	99	4	99	0	1	0	99	1	0.3	99	99	
7	37	999	2	2	99	99	19	1	99	99	4	99	3	1	0	99	1	0.1	99	99	
8	37	999	2	2	3	105	707	6	99	1	4	99	0	1	1	99	2	2.1	99	99	3rd lumbar
9	37	999	2	2	3	501	19	1	99	99	4	99	0	5	0	99	2	0.5	99	99	
10	37	999	2	2	99	502	19	1	99	99	4	99	0	1	0	99	1	0.3	99	99	
11	37	999	2	2	99	503	19	1	99	99	4	99	0	6	3	99	3	0.4	99	99	
12	37	999	2	2	7	501	14	1	99	99	4	99	0	5	3	99	2	0.1	99	99	
13	37	999	2	2	99	501	19	1	99	99	4	99	0	1	2	99	1	0.3	99	99	
14	37	999	2	2	99	99	19	1	99	99	4	99	0	6	7	99	7	0.2	99	99	
15	37	999	2	2	99	503	14	21	99	99	4	99	0	1	0	99	1	0.1	99	99	
16	37	999	2	2	99	501	14	21	99	99	4	99	0	5	0	99	4	0.2	99	99	
17	37	999	2	2	99	114	19	1	99	99	4	99	0	4	1	99	2	0.4	99	99	
18	37	999	2	2	99	501	14	21	99	99	4	99	0	2	7	99	4	0.3	99	99	
19	37	999	2	2	99	99	19	1	99	99	4	99	0	4	0	99	2	0.1	99	99	
20	37	999	2	2	99	501	14	21	99	99	4	99	0	5	0	99	2	0.1	99	99	
21	37	999	2	2	99	99	19	1	99	99	4	99	0	4	0	99	2	0.1	99	99	
22	37	999	2	2	99	99	19	1	99	99	4	99	0	4	0	99	5	0.1	99	99	
23	37	999	2	2	99	99	19	1	99	99	4	99	0	4	1	99	4	0.2	99	99	
24	37	999	2	2	99	14	117	1	99	99	5	99	0	4	0	99	7	0.1	99	99	
25	37	999	2	2	7	113	21	11	99	99	4	99	0	1	0	99	1	0.1	99	99	
26	37	999	2	2	3	2	202	1	99	1	4	99	0	1	0	99	2	1.2	99	99	refit w/ #227, 1412
27	37	999	2	2	99	99	19	1	99	99	4	99	0	2	0	99	3	0.2	99	99	
28	37	999	2	2	99	503	11	1	99	99	4	99	0	1	5	99	2	0.2	99	99	
29	37	999	2	2	7	501	14	21	99	99	4	99	0	1	4	99	2	0.2	99	99	
30	37	999	2	2	99	99	11	1	99	99	4	99	0	1	1	99	2	0.1	99	99	
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36	37	999	2	2	99	99	19	1	99	99	4	99	0	5	0	99	4	0.2	99	99	
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43	37	999	2	2	99	99	19	1	99	99	4	99	0	1	0	99	2	0.1	99	99	
44	37	999	2	2	3	113	21	7	99	99	4	99	1	1	2	99	7	0.7	99	99	#9? 8-14
45	37	999	2	2	99	503	19	1	99	99	4	99	0	1	0	99	2	0.4	99	99	
46	37	999	2	2	7	501	19	1	99	99	4	99	0	1	1	99	2	0.2	99	99	

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91	37	999	2	2	7	304	19	1	99	99	4	99	0	1	3	99	3	1.4	99	99	
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94	37	999	2	2	99	503	19	1	99	99	4	99	0	6	5	99	2	0.7	99	99	
95	37	999	2	2	3	113	19	1	99	99	4	99	0	1	5	99	3	0.6	99	99	
96	37	999	2	2	3	113	21	1	99	99	4	99	0	6	5	99	3	2.3	99	99	#11?, 8-14
97	37	999	2	2	99	99	19	1	99	99	4	99	0	5	2	99	3	0.1	99	99	
98	37	999	2	2	99	99	19	1	99	99	4	99	2	1	0	99	7	0.3	99	99	
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131	37	999	2	2	3	206	14	21	99	99	4	99	0	1	4	99	4	7.7	99	99	
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134	37	999	2	2	99	501	11	1	99	99	4	99	0	1	1	99	2	0.2	99	99	
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137	37	999	2	2	99	503	19	1	99	99	4	99	0	1	2	99	2	0.3	99	99	
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147	37	999	2	2	3	304	14	14	99	1	4	99	0	1	1	99	2	5.3	7	99	
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198	37	999	2	2	99	14	117	1	99	99	4	99	0	1	0	99	7	0.3	99	99	
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200	37	999	2	2	3	304	14	21	403	2	4	99	0	1	5	99	2	10.4	99	99	
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207	37	999	2	2	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
208	37	999	2	2	99	99	19	1	99	99	4	99	0	1	2	99	3	0.1	99	99	
209	37	999	2	2	99	99	19	1	99	99	4	99	1	1	0	99	7	0.1	99	99	
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219	37	999	2	2	3	113	21	21	99	99	4	99	0	6	5	99	3	1.8	99	99	
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227	37	999	2	2	3	2	202	1	99	1	4	99	0	1	0	99	2	0.9	99	99	refit w/ #26, 1412
228	37	999	2	2	99	99	19	1	99	99	4	99	0	6	3	99	3	0.3	99	99	
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236	37	999	2	2	99	503	19	1	99	99	4	99	0	6	4	99	3	0.7	99	99	
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239	37	999	2	2	9	503	19	1	99	99	4	99	0	2	0	99	1	0.1	99	99	prob. occipital
240	37	999	2	2	99	99	19	1	99	99	4	99	0	1	3	99	3	0.7	99	99	
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293	37	999	2	2	3	501	19	1	99	99	4	99	0	1	2	99	2	1.3	7	99	
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325	37	999	2	2	3	99	19	1	99	99	4	99	0	6	3	99	4	1.3	99	99	
326	37	999	2	2	99	503	19	1	99	99	4	99	0	5	0	99	2	0.2	99	99	
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328	37	999	2	2	3	501	19	1	99	99	4	99	2	1	0	99	7	0.5	99	99	
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367	37	999	2	2	3	14	117	1	99	99	5	99	0	2	3	99	7	0.3	99	99	
368	37	999	2	2	3	10	1	1	99	99	5	99	0	2	3	99	7	0.7	99	99	

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370	37	999	2	2	3	8	1	1	513	2	5	99	0	0	2	99	3	3.5	99	99	extremely worn
371	37	999	2	2	9	204	1	1	13	2	3	99	0	0	1	99	2	0.1	99	99	
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448	57	999	1	2	7	308	19	1	99	99	4	99	1	5	0	99	2	0.8	99	99	prob refit w/ #516
449	57	999	1	2	7	308	20	1	99	99	4	99	1	1	0	99	2	0.4	99	99	prob refit w/ #516
450	57	999	1	2	99	99	19	1	99	99	4	99	0	6	3	99	2	0.6	99	99	
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470	57	999	1	2	3	113	21	15	99	99	4	99	0	1	5	99	3	2.2	99	99	
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536	57	999	1	2	99	14	117	1	99	99	5	99	0	7	0	99	7	0.1	99	99	
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739	92	999	3	1	99	502	19	1	99	99	4	99	0	4	0	99	4	0.1	99	99	
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885	36	999	1	2	99	99	19	1	99	99	4	99	0	6	3	99	2	0.6	99	99	
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892	36	999	1	2	99	99	19	1	99	99	4	99	1	1	3	99	3	0.5	99	99	
893	36	999	1	2	99	99	11	1	99	99	4	99	0	1	0	99	4	0.5	99	99	
894	36	999	1	2	3	113	21	6	99	99	4	99	0	1	5	99	4	0.3	99	99	
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898	96	161	3	2	3	201	304	21	99	99	4	99	0	1	2	99	2	13.4	99	99	
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905	90	121	3	2	3	113	21	11	99	99	4	99	0	1	3	99	3	1.5	99	99	
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910	33	143	99	2	5	201	8	1	99	2	3	99	0	1	4	3	2	161.6	7	99	
911	33	90	99	2	3	304	7	1	99	2	3	99	0	1	5	4	3	87.5	7	99	articulate w/ 1395
912	33	O3	99	2	3	302	13	4	310	1	4	99	0	4	4	6	99	55.2	99	5	
913	7	P,B2,H1	99	2	3	2	1	1	99	1	5	99	0	6	4	99	3	117.7	10	99	refit w/ 1520
914	13	999	1	1	99	99	19	1	99	99	4	99	0	1	2	99	3	0.3	99	99	
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926	13	999	1	1	99	99	19	1	99	99	4	99	0	4	2	99	5	0.7	99	6	heavy polish
927	13	999	1	1	99	99	19	1	99	99	4	99	0	6	2	99	4	0.3	99	99	
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943	30	999	2	3	3	501	19	1	99	99	4	99	0	6	0	99	5	1.3	99	99	
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990	91	122	99	9	6	312	4	1	99	2	3	99	0	6	7	4	4	22.9	7	99	
991	18	E3	99	99	3	304	16	14	403	1	4	99	0	1	5	99	3	42.3	7	99	
992	18	E1	99	99	3	304	16	17	408	2	4	99	0	6	5	99	3	28.4	11	99	
993	18	E2	99	1	3	403	1	1	13	99	3	99	0	0	7	3	99	14.4	99	99	
994	31	23A	99	99	3	203	14	15	99	2	4	99	0	1	7	99	2	20.9	99	99	
995	31	23A	99	99	3	202	14	6	99	1	4	99	0	1	7	99	2	57.1	7	99	impact cones
996	31	23A	99	99	3	113	21	21	99	99	4	99	0	1	5	99	3	1	7	99	
997	31	96	99	99	3	304	7	1	99	1	3	99	0	1	4	4	3	111.5	99	99	
998	77	F2	99	99	6	1	111	24	99	2	4	99	0	5	2	99	2	17.8	99	99	
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1001	77	F1	99	99	6	4	1	1	99	99	5	1	0	0	4	99	5	14.6	99	99	
1002	78	I0	99	99	3	113	21	1	99	99	4	99	0	1	7	99	5	25.6	99	99	
1003	78	I4	99	99	3	501	19	1	99	99	4	99	0	1	3	99	2	2.9	99	99	
1004	50	Y	99	99	3	1	103	21	99	2	4	99	0	6	5	99	3	4	99	99	
1005	50	Y3	99	99	3	501	19	1	99	99	4	99	0	6	2	99	3	2.2	99	99	
1006	50	Y2	99	99	99	99	19	1	99	99	4	99	0	1	3	99	3	3.6	99	99	
1007	50	Y3	99	99	6	304	14	21	99	99	4	99	0	1	7	99	3	3.8	7	99	
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1011	72	U2	99	99	99	502	19	1	99	99	4	99	0	1	5	99	3	0.3	10	99	
1012	72	U	99	99	3	202	14	15	99	2	4	99	0	1	4	99	4	15.9	7	99	

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1014	19	A4	99	99	3	203	14	5	99	2	4	99	0	1	3	99	3	6.1	7	99	
1015	19	A1	99	99	3	206	7	1	99	2	3	99	0	1	6	4	3	121.2	99	99	
1016	86	L4	99	99	6	304	7	1	99	1	3	99	0	6	6	4	3	30.5	99	99	
1017	86	L1	99	99	3	202	14	14	99	2	4	99	0	1	7	99	3	11.3	7	99	
1018	70	T1	99	99	6	304	7	14	99	1	3	99	0	7	5	4	4	13.4	99	3	
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1021	70	T3	99	99	6	2	209	3	99	1	4	99	0	1	4	99	3	18.2	99	99	M1-M3
1022	94	167	99	99	99	99	19	1	99	99	4	99	0	1	2	99	4	1.2	99	99	
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1025	94	163	99	99	3	403	1	1	99	99	3	99	0	1	3	4	4	14.8	99	99	
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1027	103	154	99	99	3	113	4	1	99	2	3	99	0	1	6	5	3	16.6	99	3	
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1032	54	R4	99	99	3	202	16	4	99	2	4	99	0	1	4	99	3	8.6	99	99	
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1044	123	11	99	99	3	407	1	1	99	99	3	99	0	0	7	4	99	2.5	99	99	articulate w/ 1045
1045	123	9	99	99	3	403	1	1	99	99	3	99	0	0	5	5	99	28.6	99	99	articulate w/ 1044
1046	28	180	99	99	3	304	7	1	99	1	3	99	0	1	4	4	3	118.9	7	99	
1047	29	Q1	99	99	3	113	21	7	99	99	4	99	0	1	5	99	4	9.9	7	99	
1048	29	Q3	99	99	3	501	19	1	99	99	4	99	0	6	7	99	5	8.2	99	99	
1049	29	Q4	99	99	3	113	21	1	99	99	4	99	0	6	7	99	5	20.7	99	99	
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1051	11	K1	99	99	6	4	119	1	99	99	5	1	0	7	7	99	5	15.2	99	99	
1052	27	A0	99	99	3	113	21	1	99	99	4	99	0	6	6	99	4	72.9	99	99	
1053	27	85	99	99	3	113	21	1	99	99	4	99	0	6	5	99	4	32.5	99	99	
1054	42	W	99	99	3	304	14	17	408	1	4	99	0	1	6	99	4	85.8	99	99	
1055	42	W2	99	99	3	304	14	7	413	1	4	99	0	1	6	99	3	10.6	99	99	
1056	42	W3	99	99	6	304	19	1	99	99	4	99	0	1	7	99	3	1.6	99	99	
1057	42	W1	99	99	6	109	21	1	99	99	4	99	0	4	0	99	5	2.6	99	99	
1058	48	X1	99	99	3	304	9	4	402	1	4	99	0	8	7	99	4	16.5	99	99	

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1059	48	X	99	99	3	113	21	7	99	99	4	99	0	1	7	99	3	4.1	99	99	
1060	48	X3	99	99	99	503	21	21	99	99	4	99	0	1	3	99	2	1.8	99	99	
1061	48	X	99	99	99	503	21	21	99	99	4	99	0	1	5	99	4	1.3	99	99	
1062	48	X2	99	99	99	113	21	21	99	99	4	99	0	1	6	99	4	2.3	99	99	
1063	51	Z1	99	99	3	501	19	1	99	99	4	99	0	1	2	99	2	4.6	99	99	
1064	51	Z3	99	99	3	501	11	1	99	99	4	99	0	1	3	99	2	4.4	99	99	
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1066	51	Z	99	99	3	304	14	15	99	1	4	99	0	1	4	99	2	11.1	99	99	
1067	5	G2	99	99	6	1	111	24	99	2	4	99	0	8	3	99	2	17	99	99	
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1069	112	99	99	99	3	302	14	14	99	1	4	99	0	1	5	99	2	10.6	99	99	refit w/ 1068
1070	112	99	99	99	99	503	19	1	99	99	4	99	0	6	3	99	2	0.4	99	99	
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1103	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
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1149	112	99	99	99	99	14	117	1	99	99	5	99	0	7	5	99	7	0.1	99	99	
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1159	112	99	99	99	3	14	117	1	99	99	5	99	0	7	6	99	7	1.7	99	99	
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1190	112	99	99	99	99	99	19	1	99	99	4	99	2	6	3	99	3	1.4	99	99	refit w/ 1158
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1220	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1221	112	99	99	99	99	99	19	1	99	99	4	99	0	1	4	99	3	1.1	99	99	
1222	112	99	99	99	99	99	19	1	99	99	4	99	2	1	5	99	7	0.7	99	99	
1223	112	99	99	99	99	99	19	1	99	99	4	99	3	1	0	99	7	0.1	99	99	
1224	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1225	112	99	99	99	99	99	19	1	99	99	4	99	2	1	2	99	7	0.1	99	99	
1226	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1227	112	99	99	99	99	99	19	1	99	99	4	99	2	1	1	99	7	0.1	99	99	
1228	112	99	99	99	3	113	21	21	99	99	4	99	0	1	3	99	3	1.4	99	3	
1229	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	3	0.2	99	99	
1230	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	3	0.2	99	99	
1231	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	3	0.3	99	99	
1232	112	99	99	99	99	99	11	1	99	99	4	99	0	1	7	99	2	0.1	99	99	
1233	112	99	99	99	99	99	19	1	99	99	4	99	0	1	5	99	3	0.2	99	99	
1234	112	99	99	99	99	99	11	1	99	99	4	99	0	1	6	99	3	1	99	99	
1235	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1236	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1237	112	99	99	99	99	14	117	1	99	99	5	99	0	7	4	99	7	0.1	99	99	
1238	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1239	112	99	99	99	99	502	19	1	99	99	4	99	1	4	0	99	7	0.1	99	99	
1240	112	99	99	99	99	14	99	1	99	99	4	99	0	6	7	99	3	0.1	99	99	
1241	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.2	99	99	
1242	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1243	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1244	112	99	99	99	3	501	11	1	99	99	4	99	1	6	5	99	2	0.6	99	99	
1245	112	99	99	99	99	99	19	1	99	99	4	99	1	1	5	99	2	0.2	99	99	
1246	112	99	99	99	7	304	14	6	99	2	4	99	0	1	6	99	2	1.5	99	99	
1247	112	99	99	99	99	99	19	1	99	99	4	99	2	1	1	99	3	0.1	99	99	
1248	112	99	99	99	99	99	19	1	99	99	4	99	3	1	0	99	7	0.3	99	99	
1249	112	99	99	99	99	99	19	1	99	99	4	99	2	1	2	99	7	0.1	99	99	
1250	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	3	0.1	99	99	
1251	112	99	99	99	99	99	19	1	99	99	4	99	1	1	0	99	7	0.2	99	99	
1252	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1253	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1254	112	99	99	99	99	99	19	1	99	99	4	99	1	1	3	99	2	0.1	99	99	
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1256	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1257	112	99	99	99	3	99	19	1	99	99	4	99	0	1	2	99	2	0.4	99	99	
1258	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.3	99	99	
1259	112	99	99	99	99	99	19	1	99	99	4	99	0	1	3	99	2	0.5	99	99	
1260	112	99	99	99	99	503	19	1	99	99	4	99	0	6	6	99	2	0.1	99	99	
1261	112	99	99	99	99	99	19	1	99	99	4	99	3	1	0	99	7	0.1	99	99	
1262	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1263	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.2	99	99	
1264	112	99	99	99	99	99	11	1	99	99	4	99	0	1	4	99	2	0.2	99	99	
1265	112	99	99	99	99	99	19	1	99	99	4	99	1	1	0	99	7	0.2	99	99	
1266	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
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1268	112	99	99	99	99	99	11	1	99	99	4	99	0	1	7	99	3	0.3	99	99	
1269	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1270	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1271	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1272	112	99	99	99	99	99	19	1	99	99	4	99	0	1	1	99	2	0.1	99	99	
1273	112	99	99	99	99	99	11	1	99	99	4	99	0	1	5	99	2	0.3	99	99	
1274	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1275	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1276	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1277	112	99	99	99	99	99	19	1	99	99	4	99	0	1	2	99	2	0.1	99	99	
1278	112	99	99	99	99	14	117	1	99	99	5	99	0	7	3	99	7	0.3	99	99	
1279	112	99	99	99	99	99	19	1	99	99	4	99	2	1	0	99	7	0.1	99	99	
1280	112	99	99	99	99	99	19	1	99	99	4	99	0	1	4	99	2	0.2	99	99	
1281	112	99	99	99	3	501	19	1	99	99	4	99	0	1	3	99	3	1.8	99	99	
1282	112	99	99	99	99	99	11	1	99	99	4	99	0	1	3	99	2	0.1	7	99	
1283	112	99	99	99	7	501	19	1	99	99	4	99	3	1	2	99	2	0.6	99	99	
1284	122	52	99	99	3	302	14	14	99	1	4	99	0	1	7	99	3	8.5	99	99	
1285	122	51	99	99	3	103	707	1	99	2	4	99	0	6	7	99	3	18.5	99	99	
1286	122	50	99	99	3	204	401	1	99	1	3	99	0	6	7	4	3	23.7	99	99	
1287	124	16	99	99	3	99	19	1	99	99	4	99	0	6	7	99	3	4	99	99	
1288	124	17	99	99	3	113	21	21	99	99	4	99	0	1	3	99	4	1	99	99	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1289	124	14	99	99	7	312	14	7	99	99	4	99	0	6	7	99	4	5.8	99	99	
1290	124	12	99	99	99	99	19	1	99	99	4	99	0	6	0	99	2	1.8	99	99	
1291	124	13	99	99	3	314	604	21	99	2	4	99	0	6	7	99	2	5.7	11	99	
1292	125	86	99	99	99	99	19	1	99	99	4	99	0	6	7	99	3	1.8	99	99	
1293	125	93	99	99	3	302	13	21	311	99	3	99	0	6	2	4	99	22.4	99	99	
1294	125	86	99	99	3	302	16	7	302	2	4	99	0	1	6	99	2	33.9	3	99	
1295	125	87	99	99	3	304	14	14	99	1	4	99	0	1	5	99	3	31.4	99	99	
1296	79	H4	99	99	6	2	203	3	99	2	4	99	0	6	3	99	4	6.9	99	99	
1297	79	H2	99	99	99	99	19	1	99	99	4	99	0	1	0	99	2	1.1	99	6	
1298	79	H1	99	99	99	99	19	1	99	99	4	99	0	1	7	99	4	1.6	99	99	
1299	79	H3	99	99	99	503	19	1	99	99	4	99	0	6	4	99	3	2.2	7	99	
1300	85	137	99	99	3	312	14	7	99	2	4	99	0	1	7	99	4	86.1	99	99	
1301	85	139	99	99	6	206	15	1	99	99	2	99	0	6	7	99	4	14.7	99	99	refit w/ 1345
1302	119	59	99	99	3	314	603	21	99	2	4	99	0	1	4	99	3	5.6	99	99	
1303	119	58	99	99	3	501	19	1	99	99	4	99	0	6	6	99	4	8.4	99	99	
1304	10	999	99	99	9	1	1	1	99	3	3	99	0	0	0	99	1	0.2	99	99	gopher sized
1305	6	G4	99	99	3	202	14	21	99	99	4	99	0	1	3	99	2	9.9	99	99	
1306	6	G0	99	99	3	113	21	1	99	99	4	99	0	6	0	99	4	3.2	99	99	
1307	114	145	99	99	3	104	705	8	99	3	4	99	0	8	5	4	4	26.1	99	99	prob. same as 1310
1308	114	145	99	99	3	503	19	1	99	99	4	99	0	6	5	99	4	4.3	99	99	
1309	114	145	99	99	3	304	14	21	99	99	4	99	0	1	3	99	2	10.1	99	99	
1310	114	145	99	99	3	104	701	1	99	3	3	99	0	8	4	3	4	34.5	99	99	prob. same as 1307
1311	117	82	99	99	3	113	21	4	99	99	4	99	0	7	5	99	5	6.2	99	99	
1312	117	82	99	99	3	113	21	5	99	99	4	99	0	7	5	99	5	5.1	99	99	
1313	117	999	99	99	3	113	21	21	99	99	4	99	0	7	5	99	5	0.5	99	99	
1314	117	81	99	99	6	203	7	1	99	2	2	99	0	1	5	3	3	22.3	99	99	
1315	83	157	99	99	3	302	14	14	99	1	4	99	0	1	6	99	3	21.5	7	99	
1316	120	91	99	99	6	2	209	20	99	2	4	99	0	6	6	99	4	13.8	99	99	MNI w/ 1000
1317	121	75	99	99	3	304	14	7	413	99	4	99	0	1	4	99	3	3.7	99	99	
1318	121	71	99	99	3	113	16	1	99	1	4	99	0	6	7	99	4	23.9	99	99	rib 1-7
1319	121	68	99	99	99	99	11	1	99	1	4	99	0	1	7	99	4	2.7	99	99	
1320	121	73	99	99	3	113	16	1	99	2	3	99	0	1	6	4	4	17.7	99	2	rib 8-14
1321	118	94	99	99	3	202	16	17	99	2	4	99	0	5	3	99	3	25.6	7	3	
1322	118	999	99	99	3	305	1	1	99	1	3	99	0	0	3	3	3	11.8	99	99	articulate w/ 997
1323	118	95	99	99	7	113	21	21	99	99	4	99	0	6	7	99	4	1.1	99	99	prob. refit w/ 1324
1324	118	95	99	99	7	113	21	21	99	99	4	99	0	6	7	99	4	1	99	99	prob. refit w/ 1323
1325	111	175	99	99	1	202	7	1	99	2	3	99	0	1	4	3	3	32.6	99	99	
1326	111	171	99	99	3	113	2	1	99	99	0	99	0	6	5	99	3	13.1	99	99	
1327	111	174	99	99	3	503	19	1	99	99	4	99	0	6	2	99	4	1	99	99	
1328	111	156	99	99	3	503	19	1	99	99	4	99	0	8	2	99	5	3.3	99	99	
1329	111	172	99	99	3	503	19	1	99	99	4	99	0	6	7	99	5	2.5	99	99	
1330	111	176	99	99	3	113	21	1	99	1	4	99	0	1	4	99	3	25.2	99	99	
1331	111	179	99	99	3	302	15	6	99	1	4	99	0	1	5	99	3	23.6	7	99	
1332	113	144	99	99	99	99	19	1	99	99	4	99	2	6	0	99	7	1.6	99	99	
1333	9	999	2	99	6	304	4	1	99	1	2	99	0	1	4	99	3	36.5	99	99	
1334	12	K2	99	99	99	99	11	1	99	99	4	99	0	1	3	99	4	1.5	99	99	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1335	12	K3	99	99	3	202	14	21	99	99	4	99	0	1	5	99	3	29.3	7	99	
1336	12	K4	99	99	3	302	15	14	99	2	4	99	0	1	0	99	3	23.8	99	99	
1337	116	29A	99	99	3	1	111	24	99	1	4	99	0	6	6	99	4	28.5	99	99	7 pieces
1338	26	Q,J2	99	99	6	1	119	1	99	99	5	1	0	5	7	99	4	30.4	9	99	
1339	97	149	99	1	3	210	1	1	99	1	3	99	0	0	6	4	4	16.8	99	99	
1340	97	147	99	99	3	113	21	1	99	99	4	99	0	6	5	99	4	7.1	99	99	
1341	97	148	99	99	3	403	1	1	99	99	3	99	0	0	7	4	4	14.1	99	99	
1342	64	135	99	99	3	202	14	17	15	2	4	99	0	1	4	99	3	33.2	99	99	
1343	64	136	99	99	3	501	11	1	99	99	4	99	0	1	5	99	4	10.9	99	99	
1344	64	135	99	99	3	501	19	1	99	99	4	99	0	6	6	99	5	6.3	99	99	
1345	64	140	99	99	6	405	13	1	99	99	2	99	0	0	6	99	3	3.5	99	99	refit w/ 1301
1346	71	999	99	99	3	501	19	1	99	99	4	99	0	1	4	99	3	6.3	99	99	
1347	71	999	99	1	3	211	1	1	99	1	3	99	0	0	7	4	4	31.3	99	99	refit w/ 1339
1348	71	999	99	99	3	403	2	1	99	99	3	99	0	6	2	4	4	24.9	99	99	
1349	49	O4	99	99	3	113	21	21	99	99	4	99	0	1	5	99	2	2.5	99	3	
1350	49	O4	99	99	3	501	19	1	99	99	4	99	0	1	2	99	5	15.1	99	99	
1351	49	O2	99	99	3	501	19	1	99	99	4	99	0	1	3	99	2	11.2	99	99	
1352	49	O1	99	99	3	304	16	5	99	2	4	99	0	1	5	99	2	3.4	99	2	refit w/ 1354
1353	49	O3	99	99	99	99	19	1	99	99	4	99	0	1	3	99	3	1.4	99	99	
1354	49	O2	99	99	3	304	16	5	99	2	4	99	0	1	6	99	3	6.2	99	99	refit w/ 1352
1355	49	O0	99	99	3	10	1	1	99	99	5	99	0	0	4	2	99	0.8	99	99	
1356	49	O	99	99	3	501	19	1	99	99	4	99	0	1	0	99	5	3.1	99	99	
1357	47	18A	99	99	3	501	19	1	99	99	4	99	0	6	6	99	4	6.8	99	99	
1358	47	32A	99	99	6	202	14	14	99	2	4	99	1	1	2	99	1	3.5	99	99	refit w/ #1
1359	47	32A	99	1	6	304	7	1	99	2	3	99	1	1	3	99	2	34.5	99	99	
1360	47	146	99	99	3	105	1	1	99	3	3	99	0	3	4	4	4	156	99	99	CE1 or CE2
1361	63	119	99	99	3	209	1	1	99	2	3	99	0	0	7	4	4	22.6	99	99	articulate w/ 1368
1362	63	123	99	99	99	99	19	1	99	99	4	99	0	6	7	99	4	2.6	99	99	
1363	108	18A	99	99	3	501	11	1	99	99	4	99	0	1	6	99	2	11.6	99	99	
1364	108	21A	99	99	3	113	21	7	99	99	4	99	0	1	3	99	2	4.8	99	99	
1365	108	21A	99	99	3	113	21	7	99	99	4	99	0	1	5	99	2	3	99	99	
1366	108	24A	99	99	3	113	21	1	99	99	4	99	0	1	6	99	3	20.5	99	99	
1367	108	16A	99	99	3	2	203	21	99	1	4	99	0	6	3	99	3	7.9	99	99	refit w/ 1412
1368	108	17A	99	1	3	212	1	1	99	2	3	99	0	0	6	4	4	15.5	99	99	articulate w/ 1361
1369	110	19	99	99	99	99	19	1	99	99	4	99	0	1	7	99	4	2.8	7	99	
1370	110	20	99	99	99	99	19	1	99	99	4	99	0	1	7	99	4	4.8	99	99	
1371	110	18	99	99	3	203	3	5	99	2	3	99	0	6	6	99	4	56.4	99	99	
1372	102	48	99	99	99	99	19	1	99	99	4	99	0	1	7	99	5	2.2	99	99	
1373	102	49	99	99	99	99	19	1	99	99	4	99	0	1	7	99	5	2.7	99	99	
1374	102	47	99	99	99	99	19	1	99	99	4	99	0	6	7	99	5	1.6	99	99	
1375	102	47	99	99	99	99	19	1	99	99	4	99	0	6	7	99	5	0.2	99	99	
1376	102	47	99	99	99	99	19	1	99	99	4	99	0	6	7	99	5	0.3	99	99	
1377	102	48	99	99	99	99	19	1	99	99	4	99	0	6	6	99	3	3.8	99	99	
1378	109	21	99	1	3	406	1	1	99	99	3	99	0	6	6	4	4	4	99	99	
1379	109	24	99	99	99	99	19	1	99	99	4	99	0	6	3	99	4	0.3	99	99	
1380	109	24	99	99	99	99	19	1	99	99	4	99	0	6	6	99	4	0.6	99	99	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1381	109	24	99	99	99	99	19	1	99	99	4	99	0	6	6	99	4	0.3	99	99	
1382	109	24	99	99	99	99	19	1	99	99	4	99	0	6	4	99	5	0.7	99	99	
1383	109	24	99	99	99	114	707	1	99	99	4	99	0	6	4	99	4	2.2	99	99	
1384	75	74	99	99	3	113	21	1	99	2	4	99	0	6	7	99	4	74.1	99	99	
1385	75	V	99	99	3	113	21	1	99	1	4	99	0	6	7	99	4	74.6	99	99	
1386	81	C0	99	99	3	401	1	1	99	99	3	99	0	0	6	4	4	51.5	99	99	
1387	81	C3	99	99	99	501	19	1	99	99	4	99	0	1	5	99	3	6.7	99	99	
1388	81	C3	99	99	3	113	21	21	99	99	4	99	0	1	5	99	3	1.6	99	99	
1389	81	C3	99	99	99	99	11	1	99	99	4	99	0	1	4	99	2	1.1	99	99	
1390	81	C3	99	99	99	99	19	1	99	99	4	99	0	1	5	99	3	1.7	99	99	
1391	81	C3	99	99	99	99	11	1	99	99	4	99	0	1	6	99	2	0.3	99	99	
1392	81	C3	99	99	3	99	11	1	99	99	4	99	0	1	2	99	2	2	99	99	
1393	81	C3	99	99	3	501	11	1	99	99	4	99	0	1	4	99	2	6.8	7	99	
1394	81	C2	99	99	3	1	19	1	99	99	4	99	0	1	4	99	2	10	99	99	
1395	81	C1	99	99	3	305	1	1	99	2	3	99	0	0	4	4	4	8.9	99	99	articulate w/ 911
1396	126	97	99	99	99	99	19	1	99	99	4	99	0	1	3	99	2	1.1	99	99	
1397	126	61	99	1	3	204	401	1	99	2	3	99	0	6	3	99	3	64.5	99	99	
1398	58	P	99	99	3	10	1	1	99	99	5	99	0	7	2	99	7	0.4	99	99	
1399	58	P	99	99	3	10	1	1	99	99	5	99	0	7	2	99	7	0.6	99	99	
1400	58	P	99	99	3	10	1	1	99	99	5	99	0	0	3	99	7	1	99	99	
1401	58	P	99	99	3	10	1	1	99	99	5	99	0	0	4	99	7	0.4	99	99	
1402	58	P4	99	99	99	503	19	1	99	99	4	99	0	6	0	99	2	2.2	99	99	
1403	58	P2	99	99	99	99	19	1	99	99	4	99	0	1	4	99	3	2.8	99	99	
1404	58	P	99	99	99	99	19	1	99	99	4	99	0	6	0	99	4	3.4	99	99	
1405	58	P2	99	99	3	202	14	5	99	1	4	99	0	1	3	99	2	68.8	7	99	
1406	105	15A	99	99	3	113	21	21	99	99	4	99	0	6	3	99	2	3.9	99	3	
1407	105	F3	99	99	3	113	21	21	99	99	4	99	0	6	7	99	4	4.8	99	99	
1408	105	15A	99	99	99	99	19	1	99	99	4	99	0	1	0	99	3	0.5	99	99	
1409	105	15A	99	99	3	14	117	1	99	99	5	99	0	7	0	99	7	0.6	99	99	
1410	105	15A	99	99	99	99	19	1	99	99	4	99	0	6	0	99	4	0.2	99	99	
1411	105	15A	99	99	3	14	117	1	99	99	5	99	0	7	0	99	7	0.3	99	99	
1412	105	15A	99	99	3	2	202	1	99	1	4	99	0	8	4	99	3	82.6	99	99	
1413	106	84	99	99	3	314	603	8	99	2	4	99	0	5	5	99	3	15.2	99	99	
1414	106	83	99	99	99	99	19	1	99	99	4	99	0	6	6	99	3	2.5	99	99	
1415	106	83	99	99	3	113	21	1	99	1	4	99	0	6	6	99	3	35.4	99	99	
1416	52	U	99	99	3	1	111	24	99	2	4	99	0	8	4	99	3	41.9	99	99	
1417	52	V4	99	99	99	99	19	1	99	99	4	99	0	1	3	99	2	1.1	99	99	
1418	52	V3	99	99	99	99	19	1	99	99	4	99	0	1	6	99	4	3	99	99	
1419	52	V1	99	99	99	503	19	1	99	99	4	99	0	6	4	99	4	2.6	99	99	
1420	52	V2	99	99	3	113	21	21	99	99	4	99	0	1	5	99	2	1	99	99	
1421	127	7A	99	99	3	113	21	21	99	99	4	99	0	1	5	99	2	5.6	99	4	
1422	127	8A	99	99	3	113	21	21	99	99	4	99	0	1	4	99	2	9.8	7	99	
1423	127	2A	99	99	3	312	14	21	99	99	4	99	0	1	6	99	3	7.8	99	99	
1424	127	6A	99	99	99	99	19	1	99	99	4	99	0	6	7	99	3	3.9	99	99	
1425	127	4A	99	99	3	302	14	7	99	1	4	99	0	6	0	99	5	25.8	99	99	
1426	107	62	99	99	99	99	19	1	99	99	4	99	0	7	0	99	5	0.5	99	99	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1427	107	62	99	99	99	99	19	1	99	99	4	99	0	1	6	99	4	1.6	99	99	
1428	107	62	99	99	99	113	21	21	99	99	4	99	0	6	7	99	4	1.1	99	99	
1429	107	62	99	99	3	113	21	1	99	99	4	99	0	1	3	99	4	27	7	99	
1430	87	124	99	99	3	304	14	4	99	2	4	99	0	1	3	99	3	14.7	99	99	
1431	87	126	99	99	3	113	21	21	99	99	4	99	0	6	4	99	4	2.9	99	99	
1432	87	127	99	99	3	113	21	21	99	99	4	99	0	6	4	99	4	7.4	99	99	
1433	87	125	99	99	99	99	19	1	99	99	4	99	0	1	7	99	4	1.3	99	99	
1434	87	124	99	99	99	99	19	1	99	99	4	99	0	5	3	99	3	0.9	99	99	
1435	87	128	99	99	3	113	21	21	99	99	4	99	0	1	4	99	3	4	99	99	
1436	87	134	99	99	3	202	14	21	99	99	4	99	0	1	5	99	4	38.6	99	99	
1437	2	M	99	99	3	14	117	1	99	99	5	99	0	7	4	99	7	3.2	99	99	
1438	80	B1	99	99	3	1	115	21	99	1	4	99	0	6	4	99	4	2.2	99	99	
1439	80	B1	99	99	3	304	14	16	408	1	4	99	0	1	3	99	3	26.3	7	99	
1440	80	B1	99	99	3	15	117	1	99	99	5	99	0	7	5	99	7	6.3	99	99	
1441	80	B1	99	99	99	113	21	21	99	99	4	99	0	1	6	99	3	0.8	99	99	
1442	80	B3	99	99	3	113	21	1	99	99	4	99	0	1	4	99	3	7.6	99	99	
1443	80	B0	99	99	3	113	21	1	99	99	4	99	0	6	2	99	4	16.6	99	99	
1444	80	B1	99	99	3	113	21	21	99	99	4	99	0	1	7	99	3	2.4	99	99	
1445	80	B4	99	99	6	304	13	1	99	1	4	99	1	5	4	99	3	19	99	99	
1446	82	999	99	99	99	99	19	1	99	99	4	99	0	6	7	99	4	0.5	99	99	
1447	82	999	99	99	99	99	19	1	99	99	4	99	0	6	7	99	4	0.7	99	99	
1448	82	999	99	99	99	99	19	1	99	99	4	99	0	6	6	99	4	0.8	99	99	
1449	82	999	99	99	99	99	19	1	99	99	4	99	0	6	2	99	4	0.4	99	99	
1450	82	999	99	99	99	99	19	1	99	99	4	99	0	1	4	99	3	0.1	99	99	
1451	82	999	99	99	99	99	19	1	99	99	4	99	0	6	0	99	4	0.2	99	99	
1452	82	999	99	99	99	99	19	1	99	99	4	99	0	6	5	99	4	1.6	99	99	
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1454	82	999	99	99	99	99	19	1	99	99	4	99	0	6	2	99	4	0.6	99	99	
1455	82	999	99	99	99	99	19	1	99	99	4	99	0	6	3	99	3	0.9	99	99	
1456	82	999	99	99	99	99	19	1	99	99	4	99	0	1	3	99	3	0.7	99	99	
1457	82	999	99	99	99	99	19	1	99	99	4	99	0	1	3	99	4	0.4	99	99	
1458	82	999	99	99	7	214	19	1	99	99	4	99	0	1	2	99	2	0.8	99	4	
1459	82	999	99	99	3	14	117	1	99	99	5	99	0	7	2	99	7	1	99	99	
1460	82	999	99	99	99	99	19	1	99	99	4	99	0	6	4	99	3	0.4	99	99	
1461	82	999	99	99	99	99	19	1	99	99	4	99	0	6	7	99	4	0.5	99	99	
1462	82	999	99	99	99	99	19	1	99	99	4	99	0	6	4	99	4	0.4	99	99	
1463	82	999	99	99	99	99	19	1	99	99	4	99	0	6	5	99	4	0.2	99	99	
1464	82	999	99	99	99	99	11	1	99	99	4	99	0	1	2	99	3	0.6	99	99	
1465	82	999	99	99	99	99	19	1	99	99	4	99	0	6	0	99	4	0.2	99	99	
1466	82	999	99	99	99	99	19	1	99	99	4	99	0	1	7	99	3	0.9	99	99	
1467	82	999	99	99	99	99	11	1	99	99	4	99	0	1	2	99	4	0.3	99	99	
1468	82	999	99	99	99	99	19	1	99	99	4	99	0	6	6	99	4	0.4	99	99	
1469	82	999	99	99	3	14	117	1	99	99	5	99	0	7	3	99	7	0.5	99	99	
1470	82	999	99	99	99	99	19	1	99	99	4	99	0	6	4	99	4	0.7	99	99	
1471	82	999	99	99	3	14	117	1	99	99	5	99	0	7	2	99	7	0.3	99	99	
1472	82	999	99	99	99	99	19	1	99	99	4	99	0	6	3	99	4	0.3	99	99	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1473	82	999	99	99	99	99	19	1	99	99	4	99	0	6	7	99	4	0.2	99	99	
1474	82	999	99	99	99	99	19	1	99	99	4	99	0	1	4	99	3	0.3	99	99	
1475	82	999	99	99	99	503	19	1	99	99	4	99	0	1	6	99	3	0.5	99	99	
1476	82	999	99	99	3	113	21	21	99	99	4	99	0	1	7	99	4	0.9	99	99	
1477	82	999	99	99	99	99	19	1	99	99	4	99	0	1	3	99	4	0.1	99	99	
1478	82	999	99	99	99	99	19	1	99	99	4	99	0	1	5	99	3	0.7	99	99	
1479	82	999	99	99	99	99	19	1	99	99	4	99	0	1	5	99	4	0.5	99	99	
1480	82	999	99	99	99	99	19	1	99	99	4	99	0	1	5	99	3	0.6	99	99	
1481	82	999	99	99	99	99	19	1	99	99	4	99	0	6	6	99	4	0.3	99	99	
1482	82	999	99	99	99	99	19	1	99	99	4	99	0	6	0	99	5	0.3	99	99	
1483	82	999	99	99	99	99	19	1	99	99	4	99	0	1	7	99	4	0.4	99	99	
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1486	82	999	99	99	3	113	21	21	99	99	4	99	0	6	5	99	3	1	99	99	
1487	82	999	99	99	99	99	19	1	99	99	4	99	0	1	3	99	2	0.4	99	99	
1488	82	999	99	99	99	99	19	1	99	99	4	99	0	1	6	99	4	0.3	99	99	
1489	82	999	99	99	99	99	19	1	99	99	4	99	0	1	4	99	3	0.2	99	99	
1490	82	999	99	99	99	99	19	1	99	99	4	99	0	1	7	99	4	2	99	99	
1491	82	999	99	99	99	99	19	1	99	99	4	99	0	1	6	99	4	0.1	99	99	
1492	82	999	99	99	99	99	19	1	99	99	4	99	0	1	3	99	3	0.5	99	99	
1493	82	999	99	99	99	99	19	1	99	99	4	99	0	1	6	99	4	0.2	99	99	
1494	82	999	99	99	99	99	19	1	99	99	4	99	0	1	5	99	4	0.6	7	99	
1495	82	999	99	99	99	99	19	1	99	99	4	99	0	1	6	99	4	0.8	99	99	
1496	82	999	99	99	99	99	19	1	99	99	4	99	1	1	0	99	7	0.1	99	99	
1497	82	999	99	99	99	99	19	1	99	99	4	99	0	1	4	99	3	0.4	99	99	
1498	82	999	99	99	99	99	19	1	99	99	4	99	0	6	0	99	5	0.5	99	99	
1499	82	999	99	99	99	99	11	1	99	99	4	99	0	1	5	99	3	0.2	99	99	
1500	82	999	99	99	3	501	19	1	99	99	4	99	0	6	2	99	4	1.9	99	99	
1501	82	999	99	99	99	99	19	1	99	99	4	99	0	6	6	99	4	0.5	99	99	
1502	82	999	99	99	99	99	19	1	99	99	4	99	0	1	4	99	4	0.1	99	99	
1503	82	999	99	99	99	99	19	1	99	99	4	99	0	1	1	99	4	0.3	99	99	
1504	82	999	99	99	99	99	19	1	99	99	4	99	0	6	0	99	3	0.1	99	99	
1505	82	999	99	99	99	99	19	1	99	99	4	99	0	6	7	99	4	0.8	99	99	
1506	82	999	99	99	99	99	19	1	99	99	4	99	0	6	7	99	4	0.6	99	99	
1507	82	999	99	99	99	99	19	1	99	99	4	99	0	6	3	99	5	0.4	99	99	
1508	82	999	99	99	99	99	19	1	99	99	4	99	0	6	6	99	4	0.9	99	99	
1509	82	999	99	99	99	14	117	1	99	99	5	99	0	7	0	99	7	0.2	99	99	
1510	82	999	99	99	99	10	117	21	99	99	5	99	0	7	3	99	7	0.3	99	99	
1511	4	G1,J1	99	99	3	2	202	1	99	2	4	99	0	5	4	99	3	67.8	99	99	
1512	84	D3	99	99	3	201	304	21	99	1	4	99	0	1	4	99	4	15.3	99	99	
1513	84	D4	99	99	99	99	19	1	99	99	4	99	0	1	5	99	3	1.9	99	99	
1514	84	D1	99	99	6	109	19	1	99	99	4	99	0	6	0	99	5	1	99	99	
1515	84	D2	99	99	3	501	19	1	99	99	4	99	0	1	0	99	5	10	7	99	
1516	60	N3	99	99	6	306	1	1	99	2	3	99	0	6	6	5	5	16	99	99	
1517	60	N1	99	99	6	109	19	1	99	99	4	99	0	4	4	99	5	1.2	99	99	
1518	60	N4	99	99	3	303	19	1	99	1	3	99	0	4	0	99	4	31.7	99	4	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1519	1	M1	99	99	3	2	202	3	99	2	4	99	0	6	7	99	4	8.8	99	99	refit w/ 1524
1520	1	N	99	99	3	2	206	1	99	99	4	99	0	6	5	99	4	3.8	99	99	refit w/ 913
1521	1	M3	99	99	99	99	19	1	99	99	4	99	2	1	2	99	7	1	99	99	
1522	1	M4	99	99	3	501	11	1	99	99	4	99	0	1	3	99	2	4.5	99	99	
1523	1	M	99	99	3	14	117	1	99	99	5	99	0	7	5	99	7	0.8	99	99	
1524	59	I1,S1	99	99	3	2	205	1	502	2	4	99	0	1	7	99	4	25	7	99	
1525	59	S3	99	99	3	501	19	1	99	99	4	99	0	1	4	99	2	8.3	99	99	
1526	59	S2	99	99	99	99	19	1	99	99	4	99	0	1	6	99	3	1.8	99	99	
1527	59	S3	99	99	1	401	1	1	99	99	3	99	0	0	7	99	3	5.3	99	99	
1528	59	S3	99	99	1	401	1	1	99	99	3	99	0	0	7	99	3	5.4	99	99	
1529	104	10A	99	99	7	113	21	1	99	99	4	99	0	8	3	99	3	1.7	99	99	
1530	104	10A	99	99	7	113	21	1	99	99	4	99	0	8	5	99	3	0.7	99	99	
1531	104	10A	99	99	3	6	1	1	99	2	5	99	0	7	0	99	7	13.2	99	99	refit w/ 1524
1532	104	12A	99	99	6	1	114	1	99	2	0	99	0	6	4	99	4	20.3	10	4	
1533	104	13A	99	99	3	1	112	1	99	99	4	99	0	6	4	99	4	49.5	99	99	

Appendix B. Lithic Debitage Data

1 - NUMBER
number assigned during CCN analysis
999 = Not Assigned

2 - CATALOG NUMBER
original catalog number

3 – HORIZONTAL PROVENIENCE
1 = Grid 1
2 = Grid 2
3 = Grid 3
4 = General
5 = Unknown

4 - VERTICAL PROVENIENCE
0 = Surface
1 = Level 1
2 = Level 2
3 = Level 3
4 = Level 4
5 = Unknown

5 – DEBITAGE TYPE
1 = Flake
2 = Shatter
3 = Potlid
4 = Edge Modified Flake
5 = Core
6 = Tested Cobble
7 = Biface
8 = Preform
9 = Endscraper
10 = Arrowpoint
11 = Retouch Flake

6 – MATERIAL
1 = Local Quartzite
2 = Unknown Chert
3 = Unknown Quartzite
4 = Silicified Material
5 = Morrison/Dakota Quartzite
6 = White Chert

7 = Dendritic Chert
8 = Gray Chalcedony
9 = Quartz Crystal
10 = Obsidian
11 = Unknown
12 = Chert or Chalcedony

7 = SOURCE
1 = Local
2 = Non-Local
3 = Unknown

8 = PORTION
1 = Complete
2 = Proximal
3 = Distal
4 = Lateral
5 = Midsection
6 = Broken/Unknown

9 = PLATFORM TYPE
1 = Cortex
2 = Flat
3 = Abraded
5 = Missing/Unknown
6 = Not Applicable

10 = DORSAL FLAKE SCARS
0 = Cortex
1 = One
2 = Two
3 = ≥ Three
4 = Unknown

11 – CORTEX
0 = None
1 = 1 to 49%
2 = 50 to 99%
3 = Complete

12 – SIZE GROUP
1 = ≤1 cm
2 = > 1 to ≤ 2 cm
3 = > 2 to ≤ 3 cm
4 = > 3 to ≤ 4 cm
5 = > 4 to ≤ 5 cm

6 = > 5 cm

13 – MASS
mass in grams
999 = Not Weighed

14 – THERMAL MODIFICATION
1 = Potlidded
2 = Heated
3 = Unknown
999 = None

1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	133	3	3	1	1	1	5	5	2	0	2	0.3	999
2	133	3	3	1	1	1	2	2	1	0	2	0.2	999
3	133	3	3	1	1	1	6	5	1	0	2	0.1	999
4	133	3	3	1	1	1	3	5	1	0	2	0.2	999
5	133	3	3	1	1	1	6	5	1	0	2	0.1	999
6	133	3	3	1	1	1	4	5	1	0	2	0.1	999
7	133	3	3	1	1	1	6	5	2	0	2	0.1	999
8	133	3	3	1	1	1	5	5	2	0	2	0.1	999
9	133	3	3	1	1	1	2	4	1	0	2	0.1	999
10	133	3	3	1	1	1	1	4	1	0	2	0.2	999
11	133	3	3	1	1	1	2	1	0	3	2	0.2	999
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999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	119	2	3	11	11	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3

1	2	3	4	5	6	7	8	9	10	11	12	13	14
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3
999	142	1	2	11	12	3	1	5	4	0	1	999	3

Appendix C. Lithic Tool Data

1 - NUMBER
number assigned during CCN analysis

2 - ACCESSION NUMBER
accession number from Laboratory of Public Archaeology (LOPA)

3 - CATALOG NUMBER
original catalog number

4 – HORIZONTAL PROVENIENCE
1 = Grid
2 = Unknown

5 – VERTICAL PROVENIENCE
1 = Surface
2 = Level 1
3 = Unknown
4 = Level 2

6 – TOOL TYPE
1 = Arrowpoint
2 = Preform
3 = Endscraper
4 = Retouched Flake
5 = Grooved Abrader

7 – MATERIAL TYPE
1 = Chert
2 = Chalcedony
3 = Sandstone

8 – BREAKAGE
1 = Complete Minus Tip and Ear
2 = Complete
3 = Tip
4 = Base
5 = Fragment

9 – COLOR
1 = Reddish Brown
2 = Brown Banded
3 = Pinkish Gray
4 = Brownish Yellow

5 = Gray Banded
6 = Reddish Brown
7 = Light Brown
8 = Tan

10 – MASS
in grams

11 – MAXIMUM LENGTH
in millimeters

12 – BLADE WIDTH
in millimeters

13 – MAXIMUM THICKNESS
in millimeters

14 – MAXIMUM WIDTH
in millimeters

15 – BLADE LENGTH
in millimeters

16 – NECK HEIGHT
in millimeters

17 – HAFT LENGTH
in millimeters

18 – NECK WIDTH
in millimeters

19 – BASAL WIDTH
in millimeters

20 – NOTCH DEPTH
in millimeters

21 – NOTCH DEPTH
in millimeters

22 – NOTCH DEPTH
in millimeters

23 – EDGE ANGLE
to nearest whole degree

24 – LENGTH OF RETOUCH
in millimeters

25 – GROOVE LENGTH
in millimeters

26 – GROOVE WIDTH
in millimeters

27 – GROOVE DEPTH
in millimeters

28 – GROOVE SHAPE
1 = U-Shaped
2 = V-Shaped

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
382	8		1	1	1	1	1	1	0.6	18.90		2.44			5.41		7.70		3.44								
383	7	105	1	2	1	1	2	2	0.5	17.78	11.98	2.19		13.66	2.96	5.68	9.60	13.46	2.61	2.54	2.78						
368	47	79	1	3	2	2	3	3	1.5	23.97	15.69	4.16															
371		19A	1	3	2	2	4	4	0.5	11.92	19.20	2.30															
373	18	G	1	4	3	1	2	5	14.5	40.40		8.55	32.42									84	25.18				
390	48	3A, 46	1	2	4	1	2	6	95.5	113.57		17.86	41.00									66	67.44				
391	49	14A	1	4	4	1	2	7	169.2	107.99		21.88	70.82									75	96.79				
392	60	X4	2	4	5	3	5	8	20.1	33.91		21.64	21.74											21.57	6.93	1.97	1
393	59	B	2	4	5	3	5	6	26.8	39.34		17.37	34.96											33.55	8.85	2.41	1
394	29	5A	2	4	5	3	5	6	314.4	102.08		31.51	83.11											78.06	8.50	4.38	2

Appendix D. Plotted Artifacts From Ohr et al. (1979)

1 - NUMBER
number assigned during CCN analysis

2 – FIGURE NUMBER
corresponds with figure number in Ohr et al. (1979)

3 – GRID
1 = Grid 1
2 = Grid 2
3 = Grid 3

4 – LEVEL
1 = Level 1
2 = Level 2
3 = Level 3

5 – SPECIES/ARTIFACT CATEGORY
1 = Bison
2 = Deer or Pronghorn
3 = Deer
4 = Pronghorn
5 = Horse
6 = Lithic Artifact
7 = Item of European Manufacture
8 = Unknown Ceramic

6 – FAUNAL ELEMENT
1 = Rib
2 = First Phalanx
3 = Long Bone
4 = Third Phalanx
5 = Proximal Sesamoid
6 = Radius
7 = Carpal
8 = Ulna
9 = Ulnar Carpal
10 = Femur
11 = Tibia
12 = Intermediate Carpal
13 = Metatarsal
14 = Metacarpal
15 = Metapodial
16 = Radial Carpal

17 = Scapula
18 = Cranium
19 = Costal Cartilage
20 = Maxilla
21 = Mandible
22 = Antler
23 = Tooth
24 = Incisor
25 = Calcaneus
26 = Humerus
27 = Frontal
28 = Horn Core
29 = Thoracic Vertebra
30 = Lumbar Vertebra

7 – SIDE
1 = Right
2 = Left

8 – SKELETAL UNIT/ARTIFACT TYPE
1 = Axial
2 = Appendicular
3 = Forelimb
4 = Hindlimb
5 = Cranial
6 = Ground stone
7 = Utilized Flake
8 = Projectile Point
9 = Tinkler
10 = Bead
11 = Pipe Fragment
12 = Endscraper
13 = Fired Piece
14 = Grooved Abrader
15 = Flake
16 = Chalk
17 = Metal Fragment

9 – NUMBER OF FRAGMENTS
if artifact is fragmented

1	2	3	4	5	6	7	8	9
	1	1	1	1	1		1	
993	2	1	1	1	2		2	
	3	1	1	1	1		1	
	4	1	1	2	1		1	
	5	1	1	2	3		2	
	6	2	1	1	4		2	
1378	7	2	1	1	5		2	
1314	9	2	1	1	6	1	3	
	10	2	1	1	7		3	
	11	2	1	2	3		2	
	12	2	1	1	1		1	
	13	2	1	1	1		1	
	14	2	1	2	1		1	2
	15	2	1	1	1		1	
1397	16	2	1	1	8	1	3	
	17	2	1	1	9	2	3	
	18	2	1	2	3		2	
	19	2	1	1	10		4	
	20	2	1	1	1		1	
	21	2	1	1	3		2	
1359	22	2	1	3	11	1	4	
	A	2	1	6			6	
	B	2	1	6			7	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	

1	2	3	4	5	6	7	8	9
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
		2	1	7			10	
1361	23	3	1	1	12	1	3	
990	24	3	1	3	13	1	4	
	25	3	1	1	1		1	
	26	3	1	1	3		2	2
	27	3	1	1	3		2	
	28	3	1	1	3		2	
	29	3	1	1	3		2	2
	30	3	1	1	3		2	
	31	3	1	3	14	1	3	
1345	32	3	1	3	15		2	
	33	3	1	2	1		1	
	34	3	1	1	4		2	
1339	35	3	1	1	16	2	3	
	36	3	1	1	1	1	1	
	37	3	1	1	1		1	
	38	3	1	1	3		2	
	39	3	1	2	3		2	
	40	3	1	1	1		1	
	41	3	1	1	1		1	
	42	3	1	1	4		2	
	43	3	1	1	4		2	
	44	3	1	1	1		1	
	C	3	1	6			6	
	D	3	1	6			8	
	E	3	1	6			8	
	F	3	1	7			9	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
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		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	

1	2	3	4	5	6	7	8	9
		3	1	7			10	
		3	1	7			10	
		3	1	7			10	
		3	1	7			11	
		3	1	7			11	
		3	1	7			11	
		3	1	7			10	
		3	1	7			11	
		3	1	7			11	
1015	1	1	2	1	14	1	3	
	2	1	2	2	17		3	
	3	1	2	1	18		1	2
	4	1	2	2	1		1	
	5	1	2	2	3		2	
	6	1	2	2	9		3	
	7	1	2	2	18		5	
	8	1	2	2	3		2	
1514	9	1	2	3	19		1	
	10	1	2	2	17		3	
	12	1	2	1	11	1	4	
	13	1	2	1	4		2	
	14	1	2	1	3		2	
	15	1	2	3	18		5	2
998	16	1	2	3	20	1	5	
1000	17	1	2	3	21	1	5	
1519	18	1	2	1	21	1	5	
1524	19	1	2	1	21	1	5	
1067	20	1	2	3	20	1	5	
	21	1	2	1	3		2	
1021	22	1	2	3	21	2	5	
	23	1	2	1	1		1	
402	24	1	2	3	22		1	
	25	1	2	1	3		2	
1016	26	1	2	3	11	2	4	
	27	1	2	1	21		5	
	28	1	2	1	23		1	
	29	1	2	2	3		2	
913	30	1	2	1	21	2	5	
913	31	1	2	1	21	2	5	
913	32	1	2	1	21	2	5	
913	33	1	2	1	21	2	5	
1517	34	1	2	3	19		1	
848	35	1	2	3	24		5	
	36	1	2	2	3		2	
	37	1	2	1	10		4	
	38	1	2	1	3		2	
	39	1	2	2	21		5	

1	2	3	4	5	6	7	8	9
	40	1	2	1	3		2	
	41	1	2	2	1		1	
1051	42	1	2	3	22		5	
1338	43	1	2	3	22		5	
1511	44	1	2	1	21	1	5	
1511	45	1	2	1	21	1	5	
1018	46	1	2	3	11	2	4	
1019	47	1	2	4	25	2	4	
1020	48	1	2	3	21	2	5	
	49	1	2	1	3		2	
1416	50	1	2	1	20	1	5	
	50	1	2	2	21		5	
	51	1	2	1	3	1	1	
1058	52	1	2	1	11	2	4	
1057	53	1	2	3	19		1	
	54	1	2	2	3		1	
	55	1	2	1	18		5	
	A	1	2	6			12	
	B	1	2	8			13	
	C	1	2	6			14	
	D	1	2	6			14	
	E1	1	2	6			15	
	E2	1	2	6			15	
	E3	1	2	6			15	
	E4	1	2	6			15	
	E5	1	2	6			15	
	E6	1	2	6			15	
	E7	1	2	6			15	
	F	1	2	6			6	
	G	1	2	6			6	
1286	56	2	2	1	8	2	3	
1314	57	2	2	3	6	1	3	
	58	2	2	1	1		1	
	59	2	2	2	17		3	
	60	2	2	1	10		4	
	61	2	2	1	10		4	
	62	2	2	1	10		4	
1032	63	2	2	1	26	1	3	
1359	64	2	2	1	11	1	4	
1194	65	2	2	3	21	1	5	
	66	2	2	1	3		2	
	67	2	2	1	3		1	
	68	2	2	1	23		5	
	68	2	2	2	1		1	2
1532	69	2	2	3	27	2	5	
1533	70	2	2	1	28		5	
997 or 1046	71	2	2	1	11	2	4	

1	2	3	4	5	6	7	8	9
	72	2	2	1	3		2	2
	73	2	2	1	20		5	
1412	74	2	2	1	21	2	5	
	H	2	2	6			16	
	I	2	2	6			14	
	J	2	2	6			7	
910	75	3	2	5	17	1	3	
	76	3	2	1	29		1	
	77	3	2	1	30		1	
	78	3	2	1	3		2	
	79	3	2	1	3		2	
	80	3	2	1	1		1	
1325	81	3	2	4	26	1	3	
	82	3	2	1	3		2	
911	83	3	2	1	11	1	4	
	K	3	2	6			15	
		3	2	7			17	
		3	2	7			17	
	1	1	3	1	2		2	
	2	1	3	1	3		2	
1513	3	1	3	3	25		4	
	4	1	3	1	3		2	
	5	1	3	1	1		1	
1527	6	1	3	4	2		2	
1528	6	1	3	4	2		2	

Appendix E. 2006 Fieldwork Report

Introduction

The fieldwork at the Lykins Valley site was undertaken last summer as part of a larger survey project aimed at recording the cultural resources on the Red Mountain ranch property. The property was purchased by Larimer County with the intention of converting the land to open space. Because Lykins Valley is a NRHP eligible site located on the property it became important to assess the site condition. Fieldwork was conducted at the Lykins Valley Site (5LR263) from June 26th to July 3rd of 2006. Personnel who participated in this work were Dr. Jason LaBelle, Dr. David Meltzer, Chris von Wedell, and Cody Newton. The work was undertaken in order to assess the site condition in terms of remaining intact cultural deposits and natural impacts to the site since the original excavation that took place in 1974 (Ohr et al. 1979) and the construction of the flood retardation structure in 1977-78. The specific goals of the fieldwork were to: (1) establish a grid with new site datums that would facilitate topographic mapping of the site, as well as location of any artifacts or relevant features; (2) perform a systematic surface artifact survey of the site area; (3) perform a metal detector survey to locate any historic artifacts in the site area; (4) relocate the 1974 excavation block and associated control datums from that excavation and (5) document the site with photographs for vegetative and topographic changes since 1974.

Methods

(1) Datums and mapping. The establishment of a grid at 5LR263 began with the placement of a datum (D6-1) with the arbitrary origin coordinates in meters of 1000 North, 1000 East, 100 Elevation. Using a sub-centimeter EDM, a second datum (D6-2) was established on true north line to triangulate from. From this baseline, two more datums (D6-3 and D6-4) were established to complete the control used in mapping. This control network was used to map in the topography of the site with special attention paid to the cutbanks and other dynamic topographic features that can indicate change (Figure 1). Surface artifacts and other relevant features, such as the 1974 excavation block, were mapped in using the same equipment. The resultant map of the site area and inclusive artifacts and features indicates that the site has undergone significant erosional changes subsequent to the original excavations.

(2) Surface survey. The survey area encompassed the site boundaries defined in Ohr et al. (1979: 18) as the limit of high density artifacts. The surface survey also was expanded out past the boundaries and onto the surrounding terraces. The survey was performed in transects with 2 meter spacing in the high density area and along the cutbanks and 4 meter spacing on the terraces outside the high density limits. The area outside the 1974 site boundaries failed to yield any surface artifacts and was not understood until this photo (Figure 2) was acquired showing the extent of the destruction due to the building of the dam. The surface survey of the site resulted in the collection of 87 field specimens (Table 1). Of these specimens, 11.5% (n=10) were lithics and 81.6% (n=71) were bone. As Figure 1 indicates the majority of the artifacts were recovered along the banks of the no longer active stream channel. The

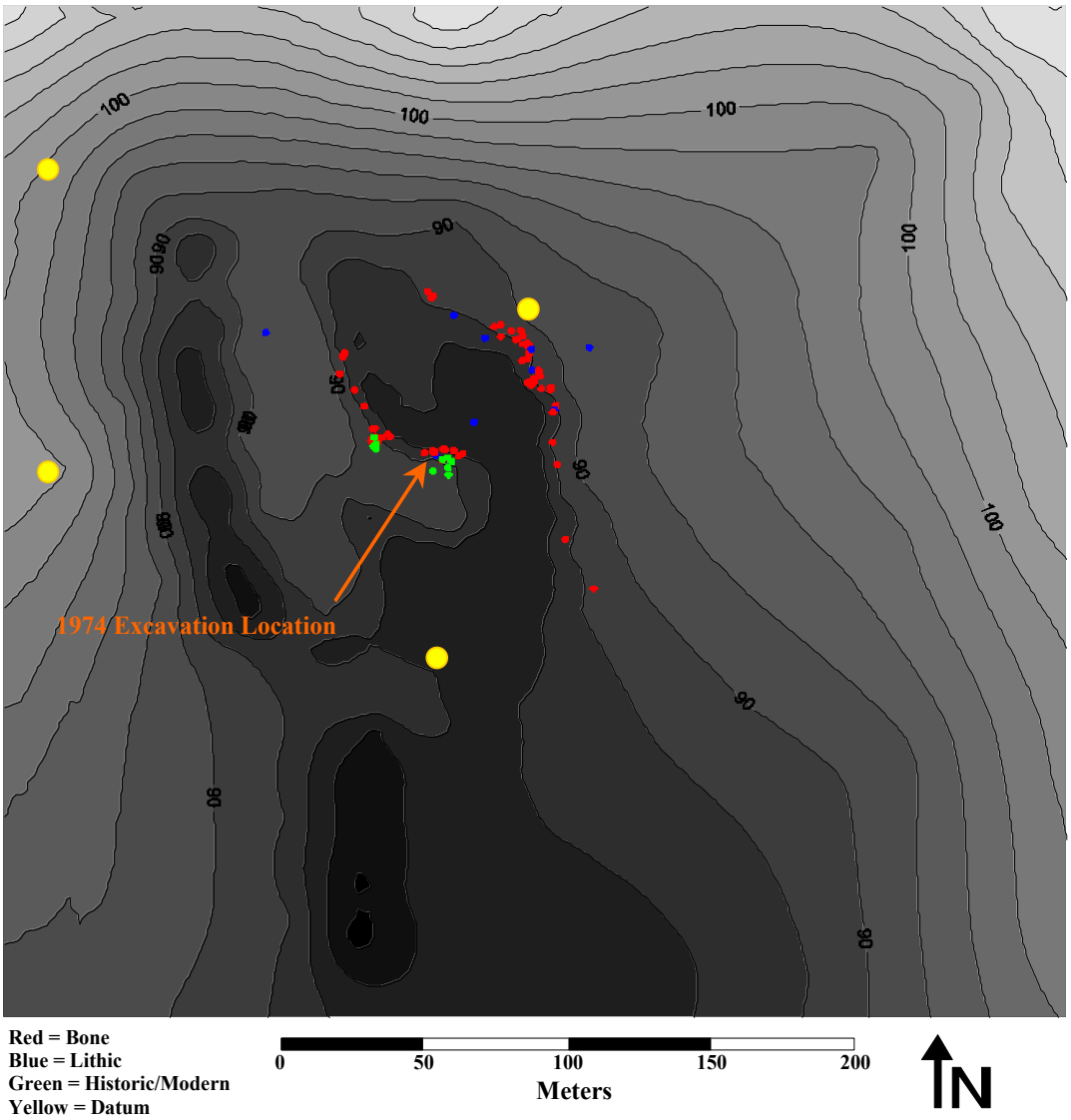

Figure 1. Planview map from 2006 fieldwork.

lithic materials were all flakes made of local material and do not exhibit any use-wear on the macroscopic level. No stone tools were recovered during the surface survey. Based on a preliminary examination, the bone assemblage is mainly from deer and bison sized animals and 67% (n=47) are identifiable to at least the skeletal element. Some of these specimens exhibit green bone breakage for possible cold marrow extraction (Figure 3). These two specimens are the exact same skeletal element,

Figure 2. Dam construction in 1977 red oval encloses site location.

portion, segment and side of a bison and a deer sized animal. These two surface finds are not associated but the pattern similarity is striking.

(3) Metal detector survey. The use of the metal detector at the site enabled the location of metal artifacts that would have otherwise would have gone unnoticed. The metal detection was limited to an area of approximately 225 m^2 that was defined by an open area in the vegetation encompassing the 1974 excavation block area. As with the surface survey, the metal detecting was done in transects with overlapping sweeps that covered 100% of the aforementioned area. The possibility of more metal historic artifacts at the site was realized with the detection and recovery of a portion of a cast brass kettle lug that matches the pieces recovered in 1974 from the excavation (Figure 4). This artifact is the only definite historic piece that matches

Table 1. Artifacts from 2006 fieldwork

Field Number	Material	Element	Portion	Segment	Side	Size	Mass (g)	Number of Fragments	Comments
1	Lithic	Flake					13.8		chalcedony
2	Bone	Long Bone	Unknown				2.2		
3	Bone	Unknown					7.8		
4	Bone	Long Bone	Unknown				1.8		
5	Bone	Long Bone	Unknown				3.5		
6	Bone	Long Bone	Unknown				15.7		
7	Bone	Unknown					5.3		
8	Bone	Unknown					3.5	4	
9	Bone	Unknown					6.8		
10	Bone	Unknown					1.5		
11	Bone	Unknown					1.5		
12	Lithic	Flake					4.7		
13	Bone	Long Bone	Unknown				2.2		
14	Bone	Tooth	Unknown				4.4		
15	Lithic	Rock					28.8		non-cultural rock
16	Bone	Tooth	Unknown				9.5		
17	Bone	Long Bone	Unknown				1.2		
18	Bone	Unknown					2.3		
19	Bone	Long Bone	Unknown				3		
20	Bone	Unknown					5.9		
	Bone	Tooth	Unknown				1.2		
21	Bone	Tooth	Unknown				2.5		
22	Bone	Humerus	Distal End	Complete	Left	Bison	426.6		
23	Bone	Tooth	Unknown				2.7	6	
24	Bone	Long Bone	Unknown				3.6		
25	Bone	Long Bone	Unknown				12.1	3	
26	Bone	Humerus	Distal End	Complete	Left	Deer/Pronghorn	35.9		
27	Bone	Long Bone	Unknown				7.4		
	Bone	Long Bone	Unknown			Deer/Pronghorn	2		
28	Bone	Tibia	Distal End	Complete	Left		87		
	Bone	Radius	Proximal End	Complete	Left		64.2		
	Bone	Unknown	Unknown				22.5	11	
	Lithic	Flake					37.5		
29	Bone	Tibia	Distal End	Complete	Left		204.6		
30	Lithic	Flake					0.6		brown chert
31	Lithic	Flake					0.4		chalcedony
32	Bone	Unknown	Unknown				3.1		
33	Bone	Long Bone	Unknown				2.5		
34	Bone	Unknown	Unknown				1.3		
35	Bone	Unknown	Unknown				2.3		
36	Bone	Long Bone	Unknown			Deer/Pronghorn	3.6		
37	Bone	Humerus	Shaft	Complete			59		
38	Bone	2nd Phalanx	Complete	Complete			21.8		
39	Bone	Tooth	Unknown				0.3		
40	Bone	Unknown					1.8		
41	Bone	Unknown					0.4		
42	Lithic	Flake					0.4		chalcedony
43	Bone	Long Bone	Unknown				2.1		
44	Bone	Unknown	Unknown				0.8		
45	Bone	Unknown	Unknown				1.7		
46	Bone	Long Bone	Unknown				13.2		
47	Lithic	Flake					0.6		chalcedony, crazed
48	Bone	Unknown					0.4		
49	Bone	Unknown					1.7		
50	Bone	Tooth	Unknown				19.4		in road
51	Bone	Scapula	Glenoid/Spine	Complete		Deer/Pronghorn	7.7		
52	Bone	Rib					66.3		
53	Bone	Antler				Deer/Pronghorn	9.8		deer
54	Bone	Long Bone	Unknown				6.8		
55	Bone	Long Bone	Unknown			Bison	8.2		
56	Bone	Mandible	Tooth Row			Deer/Pronghorn	23.3		M1, M2
57	Bone	Unknown					0.3		
58	Bone	Unknown					0.6		
59	Bone	Radius	Shaft	Complete			14.5		
60	Bone	Femur	Proximal End	Medial	Right	Bison	106.3		
61	Bone	Os coxae	Ilium	Complete		Bison	138.3		
62	Bone	Mandible	Ascending Ramus	Complete		Bison	60.2		
63	Bone	Cervical Vertebra	Complete	Complete			164.3		
64	Bone	Cervical Vertebra	Complete	Complete			151.1		
65	Metal	Kettle Lug					39		
66	Bone	Cervical Vertebra	Complete	Complete			148.4		
67	Lithic	Flake					3.5		pink chert
68	Bone	Long Bone	Unknown			Deer/Pronghorn	2		
69	Metal	Wire					7.7		
70	Metal	Wire					17.2	2	one barbed
71	Metal	Wire					8.2		
72	Metal	Wire					7		
73	Metal	Wire					3.4		
74	Lithic	Flake					<0.1		in situ in balk
75	Bone	Unknown					5.5		
76	Bone	Incisor	Unknown				2.7		
77	Bone	Unknown					1.1		subsurface - 1cm
78	Metal	Bullet					2.2		.22 caliber/subsurface - >2cm
79	Metal	Tack					0.5		subsurface - >2cm
80	Metal	Fragment	Unknown				0.5		subsurface - >5cm
81	Metal	Bullet					2.4		.22 caliber/in situ surface
82	Metal	Nail					3.6		subsurface - 5-10cm
83	Lithic	Flake					2.9		chalcedony w/ patina
84	Bone	Long Bone	Unknown				4.1		
85	Bone	Long Bone	Unknown				38.1		poss. green bone break
86	Bone	Flat Bone	Unknown				5.4		
87	Bone	Unknown					0.5	2	

Figure 3. Examples exhibiting with green bone breakage.

with the 1974 assemblage. The rest of the metal assemblage is composed of pieces of wire, .22 bullets, nail and tack pieces which may be modern and/or archaeological debris left by the 1974 researchers.

(4) Relocation of 1974 excavation block. The mapping and surface survey of the site area found features that were thought to be from the 1974 excavation. A wooden stake with a tack imbedded in the top of it was located that was in a position indicating it is the datum in the 1974 planview map (Ohr et al. 1979: 18). Plastic sheeting eroding out of the north facing bank at the same location as the stake were uncovered and traced back to reveal the excavation block, which affirmed the stake as the original datum. These features were mapped along with the modern location of the cutbank edge throughout the excavation block area. This provided baseline data

Figure 4. Kettle fragment recovered in 2006 (upper) with example from 1974 (lower).

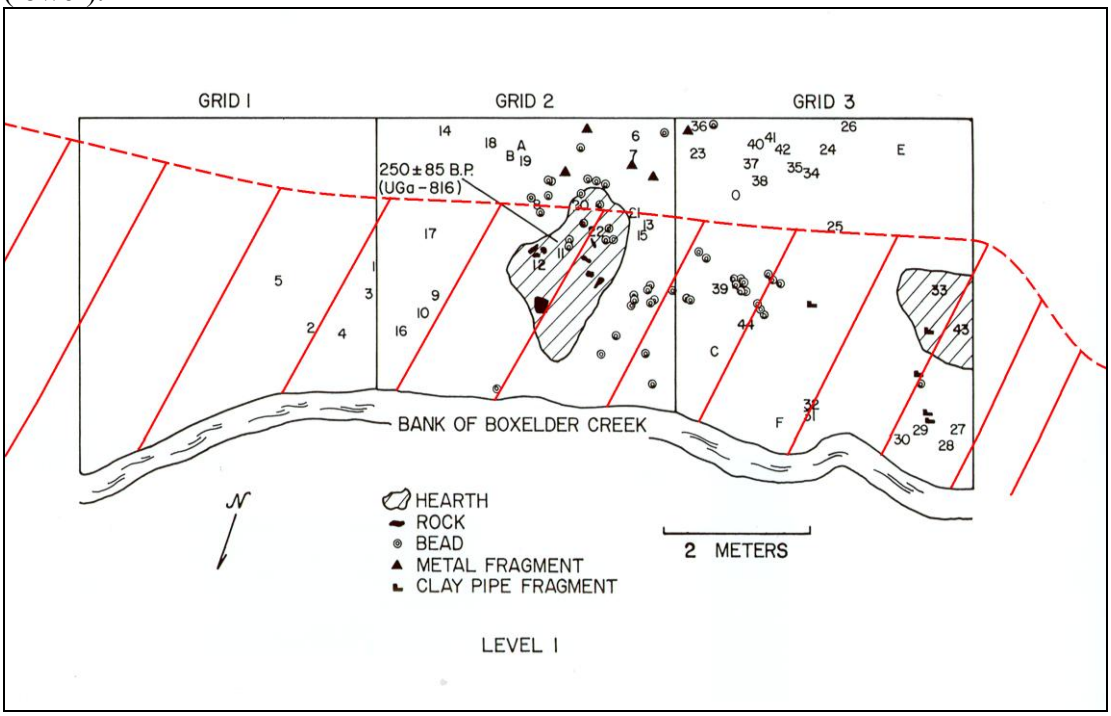

Figure 5. Planview of excavation block show in erosion (in red) since 1974 (adapted from Ohr et al. 1979).

to gauge the erosion of the excavation block area and shows that 70 % of the original excavation block has been lost (Figure 5).

(5) Photographic documentation of the changes. Site photographs were taken to assess the current site conditions versus the conditions that the original researchers encountered. These photographs indicate that despite the erosion that has taken place the site has much more vegetative cover than before. This is evident in the two photographs, one from 1974 and one from 2006 that are from roughly the same perspective (Figure 6). The increased amount of vegetation was inhibited the surface and metal detection survey by decreasing visibility and pedestrian accessibility to zero in some portions of the site.

Conclusions

The results of the 2006 fieldwork at the Lykins Valley Site (5LR263) indicate that the site condition has changed dramatically since the 1974 excavations, (see Figures 5,6) with marked erosion and increased vegetation. This is not unexpected given the construction and erosional events of Boxelder Creek in the site area. The artifacts recovered during the fieldwork, with the majority being found along the banks and in the slump of the stream channel (Figure 1) gives a good indication of the in situ artifacts in subsurface contexts. Figure 7 indicates the recovery of the bone artifacts may be slightly clustered by elevation showing patterned exposure in levels. This is bolstered by the recovery of the brass kettle lug fragment during the metal detector survey (Figure 4) that was located 20 cm below the surface seven meters southwest of the original excavation block. This gives a good indication that there may be a post-contact component still intact at the site. The erosion of the site was probably the

Figure 6. 1974 (upper) and 2006 (lower) view of site area arrow points to same location.

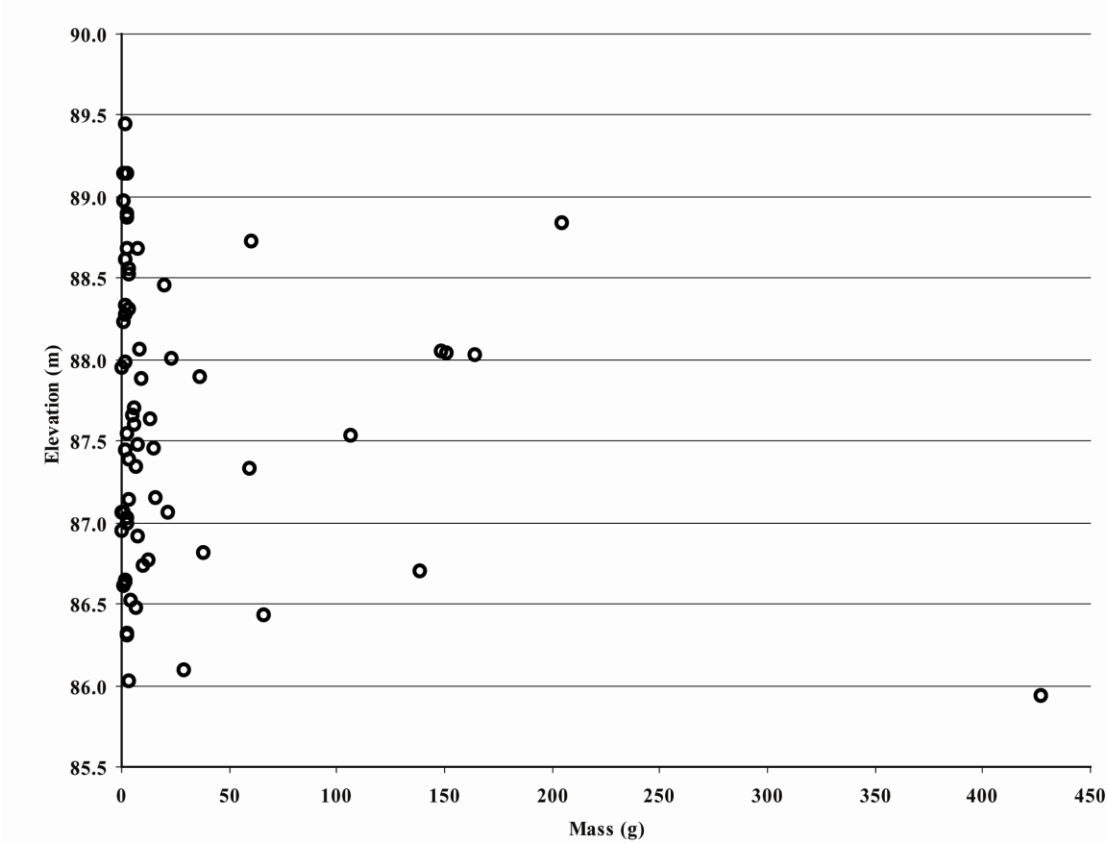

Figure 7. Artifact recovery based on elevation (elevation is arbitrary and for comparative purposes only).

most active before Boxelder Creek was re-channelized to the west and the much thicker modern vegetation is indicative of a less dynamic area. The measurement of the erosional impacts at the site point toward a substantial loss of sediment since 1974, but this erosion has been minimized after the construction of the dam and rechannelization of Boxelder Creek. The increased vegetation is probably a result of lessened grazing and the protection of the site area from erosion by the dam. The vegetation at this point provides stabilization to the sediment in the site area. Overall, the 2006 fieldwork provided a solid baseline of data that indicates the site has remaining cultural integrity despite environmental impacts within the limits defined by the 1974 fieldwork.

References Cited

Ohr, N. Ted, Kenneth L. Kvamme and Elizabeth Ann Morris
1979 *The Lykins Valley Site (5LR263): A Stratified Locality on Boxelder Creek, Larimer County, Colorado.* A report prepared for the U.S. Department of Interior Interagency Archaeological Services, Denver Heritage Conservation and Recreational Service Contract No. C3517(74).