THESIS

ARCHAEOLOGICAL INVESTIGATIONS OF THE RIVER BLUFFS OPEN SPACE, WINDSOR, COLORADO: A CASE STUDY IN COOPERATION BETWEEN ARTIFACT COLLECTORS, THE PUBLIC, AND ARCHAEOLOGISTS

Submitted by

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ABSTRACT

ARCHAEOLOGICAL INVESTIGATIONS OF THE RIVER BLUFFS OPEN SPACE

WINDSOR, COLORADO

The River Bluffs Open Space, located in Windsor, Colorado has experienced changes to both its environment and its cultural resources throughout history. The Harvester site (5LR12641) and the Weinmeister site (5LR12174), located at the confluence of Fossil Creek and the Cache la Poudre River on the northern boundary of the Open Space, have been affected by agricultural practices from the 1950s until the early 1990s, as well as amateur artifact collecting for nearly the same amount of time.

The land now belongs to Larimer County and has been developed as the River Bluffs Open Space and as an extension of the Poudre River Trail. The transition of the Open Space from private land to publicly owned recreation space allows archaeologists and education professionals an opportunity to engage the public in local archaeological education. However, this opportunity would have been impossible without the help and involvement of Garry Weinmeister, the owner of a large extant collection of Native American artifacts collected from the Open Space.

The goal of this thesis is to highlight the importance of archaeologists and artifact collectors working collectively towards a better understanding of the past. Each party has specialized knowledge concerning the past, either through independent research and extensive local knowledge, or painstakingly connecting the local idiosyncrasies of the past into a larger methodological and theoretical framework. By combining

archaeological survey work on the Harvester site with an extant artifact collection from the Harvester and Weinmeister sites, my thesis research presents a well-rounded archaeological interpretation of the Open Space, which would have been lost without the help of a private collector.

To answer specific archaeological questions about the prehistoric uses of the River Bluffs Open Space property, this research addresses the mobility practices of Early Ceramic groups. Movement between two diverse environments, the mountains and the plains, is evident based upon the analysis of the raw materials of 120 projectile points from Weinmeister's private collection. In addition, the analysis of one of the largest assemblages of small, incised, tubular bone beads yet found in eastern Colorado addresses the connections of the River Bluffs Open Space with the Plains Woodland cultures from the Plains of Nebraska and Kansas. This research suggests that the River Bluffs Open Space was part of both eastern and western cultural traditions. Finally, the River Bluffs Open Space was developed for public recreation. Therefore, a chapter of this work is devoted to detailing the importance of archaeological site stewardship. This is completed through detailing the different groups of the public affected by this research, and the creation of an interpretive sign that imparts the archaeological story the River Bluffs Open Space.

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CHAPTER 1

INTRODUCTION TO THE RIVER BLUFFS OPEN SPACE PROJECT

Northern Colorado provides a rich history within a landscape that is constantly changing. This area has been inhabited for the last 12,000 years by all of the major cultural groups of Colorado prehistory and history ranging from Paleoindian hunter-forager groups to modern farmers. Increasingly, the demands of modern living and development have played a major role in how quickly this landscape is changing. This leaves lasting impacts not only on the land itself, but also on the cultural resources that have been left behind. A common, and very important source of change to sites is the impact of private or amateur artifact collectors. Just like development, surface collectors contribute to the destruction of the archaeological record by changing the context of artifacts (Elia 1996; Fagan 1996; Mallouf 1996).

The River Bluffs Open Space in Windsor, Colorado contains a wealth of archaeological information affected in both of the above ways. Farming activities during the last 50 years disturbed buried archaeological deposits, while artifact collecting has removed much of the surficial cultural material from the Open Space. The Harvester (5LR12641) and Weinmeister (5LR12174) sites, two Early Ceramic sites on the northern end of the Open Space, represent the two largest concentrations of material culture on the property, and have been the most affected by development and artifact collecting. Because of the activities of a private collector, a large extant artifact assemblage has been amassed, mostly representing these two sites.

The purpose of the development of the River Bluffs Open Space is to provide protection to both archaeological and natural resources, as well as educate the public in the natural and human history of the area. However, the archaeological story of the Open Space is missing information without the cooperation and involvement of the private collector. Therefore, the goals of this thesis are to highlight the importance of archaeologists and artifact collectors working together towards a better understanding of the past. Each party involved has specialized knowledge concerning the past, either through independent research and extensive local knowledge, or painstakingly connecting the local idiosyncrasies of the past into a larger methodological and theoretical framework. By combining archaeological survey work on the Harvester site with the extant collection of artifacts taken from the Harvester and Weinmeister sites, my thesis research presents a well-rounded archaeological interpretation of the Open Space. It is obvious that the local artifact collector compromised the archaeological integrity of the Harvester and Weinmeister sites by collecting artifacts because the locations of the collected objects were not formally recorded. However, he also shared the artifact collection and his knowledge of the area and the more modern history of the Open Space. This exchange of knowledge allows archaeologists working on this project to form a more complete picture of the archaeological story on the Harvester and Weinmeister sites, which without his cooperation would have been lost forever.

Formal archaeological research conducted at the Weinmeister and Harvester sites and the collaboration of the collector have aided in understanding the use of the River Bluffs Open Space, as well how the sites fit into Early Ceramic and local Colorado prehistory. Two main questions direct this research:

1. *How was the River Bluffs Open Space used prehistorically, and how does it relate and contribute to other Early Ceramic/Colorado Plains Woodland sites in the area?*

This question of this research is addressed using two different studies of artifacts from the extant collection and field work conducted on the Harvester Site by Colorado State University students. The first study consists of analysis of 120 projectile points. The raw materials of this projectile point assemblage have been macroscopically compared to a raw material comparative collection from eastern Colorado, the Front Range, mountain parks of the Rocky Mountains, and southern Wyoming. This comparison aids in understanding mobility patterns of Early Ceramic hunter-gatherer groups, as well as confirms the use of different ecological environments of Colorado and Wyoming during the Early Ceramic period. The second study consists of 537 incised, tubular, mammalian bone beads. These beads are compared to other Early Ceramic sites in the environmental zones that create the eastern hogbacks, the Front Range, and the Great Plains of Colorado. Because prehistoric groups in Colorado did not recognize the modern political boundaries that break up the Plains and the Mountains, this assemblage is also compared to similar assemblages and contexts within southern Wyoming, and western Nebraska and Kansas. The mammal bone bead assemblage represents one of the largest known assemblages of this style of bead in eastern Colorado. This bead collection will also add information to hypotheses on mortuary practices and ideas of ritual space on the landscape during the Early Ceramic Period, as well as illuminate possible connections to eastern Plains Cultures.

2. How can archaeologists impart the importance of archaeological stewardship to the public, in order to preserve archaeological sites?

The second question of this work concerns the public interpretation of the River Bluffs Open Space. Public involvement and understanding of archaeological sites encourages the stewardship of these sites. River Bluffs Open Space was purchased by Larimer County to serve and educate the public about the important resources around them. Therefore chapter 7 is devoted to the description of how archaeological research on the Open Space serves three involved groups of the public: Archaeologists and students, artifact collectors, and the general public. To aid in the archaeological interpretation of the site, I document the process of creating an interpretive sign related to the results of the field work on the Harvester site. The sign is devoted to telling the archaeological story of the Harvester site and the River Bluffs Open Space.

The River Bluffs Open Space: History and Context

The River Bluffs Open Space was acquired by Larimer County from the City of Fort Collins in 2004 with funds from Great Outdoors Colorado, as well as funds from Larimer County (Boring 2010). The 162 acres were purchased in part to connect communities from Bellvue to Greeley and add to the existing Poudre River Trail that begins northwest of Fort Collins (Figure 1.1).

The larger goal of this Open Space is not only to provide recreation and education, but to also protect sensitive ecological areas and provide agricultural use along the Cache la Poudre River (Boring 2010).

Figure l.1. The River Bluffs Open Space with completed trail system

The Open Space opened to the public in the spring of 2011, and contains a multi-use paved trail, a trailhead and parking lot, picnic tables and interpretive signs to aid in public education (Figure 1.1). The property contains diverse environments including riparian zones, bluffs, wetlands and agricultural fields, which provided important resources for plant and animal species as well as to people, both past and present.

The creation and protection of valuable resources on the Open Space also extends to the cultural resources found on the property. During the summer of 2008, at the request of Larimer County Parks officials, Dr. Jason LaBelle conducted a reconnaissance survey of the entirety of the Open Space to determine the presence, absence and density of archaeological deposits. This survey uncovered considerable evidence for prehistoric and historic use of the landscape including extensive lithic scatters, lithic tools, and historic farming equipment and a vehicle (LaBelle 2008). While the entire property contained evidence of prehistoric and historic use, the northern bluff and toe slope near the confluence of Fossil Creek and the Cache la Poudre River exhibited the most evidence of prehistoric use. After additional research by LaBelle, an independent environmental consulting company, and the author of this work, two archaeological sites were documented and recorded on this northern portion of the Open Space: The Weinmeister and the Harvester sites (Figure 1.2).

The Weinmeister Site (5LR12174)

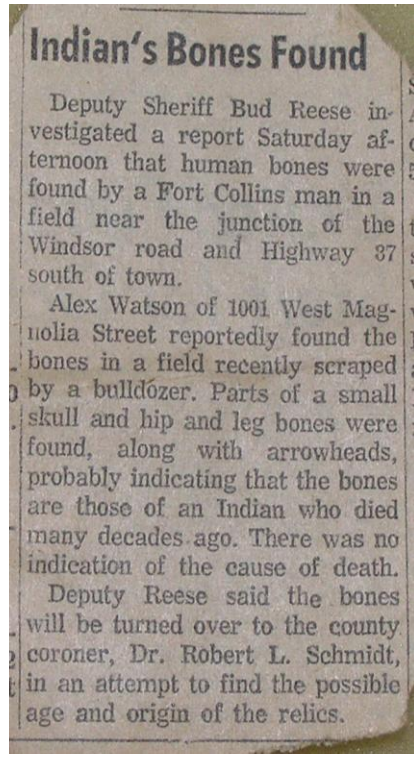
After conducting the 2008 archaeological survey, LaBelle suspected that the River Bluffs property was extensively collected by amateur archaeologists in the recent past. He began asking local collectors for information regarding previous collecting on the property. LaBelle discovered that a local man, Garry Weinmeister, had routinely collected from what is now the River Bluffs property during the 1960s through the early 1990s while the area was being used as farmland. Weinmeister collected from the entirety

Figure 1.2. The River Bluffs Open Space in Windsor, Colorado. The Harvester and Weinmeister sites are located at the northern end of open space.

of the Open Space. However, he focused on northern end of the property, where material culture was the densest. During this time, the prehistoric components of the River Bluffs property were extensively disturbed by farming practices. In the late 1950s, previous to Weinmeister's involvement, a silage pit was excavated in the northern toe slope of the property. During the excavation of this pit, a prehistoric burial was uncovered. Additionally, blading activities directly east of the silage pits uncovered another prehistoric burial with associated prehistoric artifacts (Figure 1.3; Weinmeister 2004;

Burnett and Kennedy 2009). The current locations of both of these remains are unknown (Weinmeister 2004).

After his employment by the landowner in the 1960s, and throughout the next two decades, Weinmeister legally collected artifacts from the River Bluffs Open Space while it was being used as privately owned farmland, both from the bluffs above the river to the west, as well as from the exposed walls of the silage pit installed in the 1950s. In the late 1960s, another silage pit was excavated directly east of the first one. Weinmeister collected extensively from the exposed walls of the eastern pit, and found numerous projectile points, as well as 537 incised tubular mammal bone beads. This extant collection is the Weinmeister Collection, and forms the baseline for much of the archaeological context of the property.



Indian's Bones Found

Deputy Sheriff Bud Reese investigated a report Saturday afternoon that human bones were found by a Fort Collins man in a field near the junction of the Windsor road and Highway 87 south of town.

Alex Watson of 1001 West Magnolia Street reportedly found the bones in a field recently scraped by a bulldozer. Parts of a small skull and hip and leg bones were found, along with arrowheads, probably indicating that the bones are those of an Indian who died many decades ago. There was no indication of the cause of death.

Deputy Reese said the bones will be turned over to the county coroner, Dr. Robert L. Schmidt, in an attempt to find the possible age and origin of the relics.

Figure 1.3. Newspaper article describing the discovery of the second burial from the Weinmeister Site. Image courtesy of the Weinmeister collection.

After Larimer County acquired the land, the northern toe slopes of the bluffs were under a development plan to build the parking lot and the trail head for the Open Space. However, because of the known density of archaeological deposits in this area of the Open Space (as witnessed by Weinmeister and LaBelle), officials from Larimer County Open Lands Program released a call for proposals to conduct archaeological testing. The environmental consulting group SWCA was selected for the project. Half (13 of 26) of the shovel tests conducted by SWCA archaeologists were positive for cultural material (Burnett and Kennedy 2009). Because of the high density of cultural material in the shovel tests and the previously demonstrated knowledge of deep archaeological deposits from the Weinmeister collection, SWCA recommended that the parking lot be relocated to another area of the Open Space property. Larimer County consented to this idea, and moved the parking lot and trail head to the eastern side of the Cache la Poudre River. The Weinmeister site (5LR12174) was recorded and is now protected by the Open Space.

This site has not been radiometrically dated. However, artifacts typologies found within the silage pits on the site suggest a range of occupation from the Middle Archaic to the Early Ceramic (3050 BC – AD 1150) (Burnett and Kennedy 2009:17). Despite this range, the majority of materials from the Weinmeister site (cord-marked ceramics, and corner and side notched projectile points) indicate an Early Ceramic Period occupation of the site (AD 150 – AD 1150) (Burnett and Kennedy 2009:17).

The Harvester Site (5LR12641)

The bluffs above the Weinmeister site to the south were not within the area of potential effect for the parking lot construction project. Therefore, they were left unsurveyed by SWCA archaeologists, despite the density of cultural material that was noted by LaBelle in his 2008 survey. Weinmeister also reported finding many artifacts from his collection from this area. Because of the high artifact density of this bluff, it is now recorded as the Harvester site (5LR12641). This area forms the basis of the field work portion of this thesis project, and is discussed in detail in chapter 5 of this work, when field work results are introduced.

Research on the Harvester site was conducted to supplement the information gained from the analysis of the Weinmeister site by SWCA, as well as contextualize the Weinmeister collection. Field work included pedestrian survey and surface mapping of artifacts, mapping features and artifacts that Weinmeister recalled while collecting the site, and the excavation of one of the four hearth features and two test pits on the site. In addition, magnetometry surveying was conducted to locate buried features on the site. Like the Weinmeister site, the area now known as the Harvester site was also heavily collected by Weinmeister during the 1960s through the 1990s (Weinmeister 2004). The Weinmeister collection contains many diagnostic projectile points from the Harvester site, which will be further discussed in Chapter 4 of this work. However, it is important to note here that these projectile points and other diagnostic artifacts, including cord-marked ceramics and distinctive "guitar pick" style bifaces, suggest an Early Ceramic occupation for the Harvester site (AD 150 – AD 1150). The Weinmeister and Harvester sites are most likely connected culturally and temporally, as evidenced by the similarities in artifact assemblages from each site. The boundaries of these sites were drawn based on the natural contours of the topography, as well as to aid in management for both archaeologists and Larimer County.

Archaeological Context of the River Bluffs Open Space

These two sites are part of a larger chain of prehistory along the Cache la Poudre River and Fossil Creek. For example, the Late Archaic bison bone bed, Kaplan Hoover (5LR3953), is located only a half a mile directly south of the River Bluffs property. This bone bed was excavated by Dr. Lawrence Todd and CSU students during the late 1990s and early 2000s and is important because it remains one of the few investigated Late

Archaic/Late Prehistoric bone beds in Colorado (Todd et al 2001:125). There were relatively few diagnostic artifacts found within the bone bed. Only nine projectile points were present and these points resemble similar tools from Wyoming and Montana (Todd et al 2001). The site was radiocarbon dated to 850 BC, placing the event near the end of the Late Archaic period in Colorado prehistory.

The documentation of the Harvester and Weinmeister sites add to important contextual information about the habitation and use of the bluffs along the Cache la Poudre River. Considering the proximity of Kaplan Hoover, and the Weinmeister and Harvester sites, it is evident that this area was incredibly important to prehistoric groups of the Late Archaic and Early/Middle Ceramic for both habitation and food procurement. Weinmeister also recalls finding bison bones with an associated projectile point on the south end of the River Bluffs Open Space. While this feature was not rediscovered by our field work, it further suggests the continuity of human occupation of the bluffs.

In addition to the continuity of prehistoric use along the bluffs, Kaplan Hoover also serves as an example of how archaeological sites can be used in public education opportunities for the local community. Like the Harvester and Weinmeister sites, the Kaplan Hoover site is conveniently close and easily accessible from the towns of Windsor and Fort Collins. This close proximity to these urban centers made Kaplan Hoover a prime site to use as a tool for archaeological education, as well as to promote site stewardship. Over 2000 elementary, middle, and high school students visited Kaplan Hoover bone bed while it was being excavated (Todd et al 2000). These types of educational opportunities exist for the River Bluffs Open Space as well. While open excavation is probably not as feasible on the Open Space due to money and time constraints, there is still high potential for students and the public to learn about archaeological methods, stewardship, and the history of the area from research from the Weinmeister and Harvester sites.

Goals of Research

This research aims to use the shared knowledge gained from the Weinmeister collection, Weinmeister himself, and field work on the Harvester site to place the River Bluffs Open Space into archaeological context within northern Colorado. The archaeological story of the River Bluffs Open Space rests on the complete analysis of all of the archaeological components of the Open Space. This is why it is so important for professional archaeologists and amateur archaeologists to foster professional relationships. Without the Weinmeister collection and the knowledge of Weinmeister himself, the formal archaeological analysis of the Harvester site would be extremely limited.

The use of the Open Space for public recreation provides the perfect opportunity to inform the public about the importance of archaeological research and the history of their communities. The close proximity of Open Space to large cities (Windsor, Loveland, Greeley, and Fort Collins) provides easy means for public interaction in the forms of tours, talks and other educational programs. This thesis work relies on the archaeological investigations of the Harvester site and the data from the Weinmeister collection to produce an interpretive sign that describes the archaeology of the Open Space.

Thesis Organization

Chapter 2 offers context for the archaeological work and interpretations of the Harvester site and the River Bluffs Open Space. This chapter outlines the major stages of Colorado prehistory, and focuses on environmental, technological and economic changes that define each of these stages.

Chapter 3 outlines the methods used to complete this research. This chapter is split into two sections, outlining the laboratory and field methods.

Chapter 4 focuses on the results of laboratory research concerning the extant Weinmeister collection. Artifacts from this amateur collection were taken from the entirety of the Open Space, but most originated from the Harvester and Weinmeister sites. This collection was generously loaned to the Center for Mountains and Plains Archaeology in order to complete this thesis research. This chapter describes the general locations of artifacts from the Open Space as remembered by Weinmeister. In addition, artifacts are quantified and sorted into artifact categories to aid in possible future research of this collection. The description includes the basic metrics, typology, raw material type (if known) of projectile points, scrapers, ground stone, ceramics, bone tools, and debitage.

Chapter 5 describes the process and results of field research conducted on the Harvester site. This chapter details pedestrian surveys and two test unit excavations, as well as the excavation of a small basin shaped hearth. Like the Weinmeister collection, artifacts found in the field are analyzed to provide basic metrics, typology, and raw material type. Artifact distribution will be an important addition to this chapter. Almost all of the artifacts recorded during field research consist of flakes, although a small number of formal tools were found, including projectile point fragments, scrapers, ceramics, and ground stone fragments. Microflakes collected from the ant mounds are also discussed.

Chapter 6 details the analysis of mobility patterns and the extent of ideological attributes gleaned from research of the lithic raw materials of the projectile point assemblage as well as the mammal bone bead assemblage. Both of these artifacts assemblages are from the Weinmeister collection. Projectile points are part of a curated tool kit, and are often not discarded until they are broken or reduced down beyond functional use. The range of mobility patterns made by Early Ceramic groups can be interpreted by identifying the locations of these raw materials sources. Also, the comparison of the collection of tubular mammal bone beads to other similar assemblages from Early Ceramic sites across the state of Colorado, Wyoming and the eastern Plains, aids in understanding the function of beads in an artifact assemblage as well as movement of people and perhaps ideology.

Chapter 7 focuses on the role of three interested parties of the public who have interacted with the River Bluffs Open Space during this project. The process of archaeological research of the Open Space has trained students from Colorado State University in archaeological techniques. Weinmeister has not only aided in the research of the Open Space through the donation of his collection, but has also become part of the research process itself. His interest in archaeology is validated by the use of his collection in regional research and his involvement in the research process. The involvement of the public contributes to the stewardship of archaeological sites. People are emotionally invested in the places that they call home and this investment promotes the archaeological stewardship of places in which they have shared experiences as a community. The River Bluffs Open Space and its archaeological heritage will become part of this shared investment, and part of a shared past that the public feels worthy of protection. This shared knowledge can only come through education. This chapter defines the three affected publics (students and archaeologists, artifact collectors, the general public) as well as details the production of an interpretive sign that aids public understanding of prehistory on the Open Space.

Finally, chapter 8 summarizes the findings of the field work and laboratory research conducted on the Harvester Site and with Weinmeister's assemblage from both the Harvester and Weinmeister sites. The importance of working with collectors to find the missing pieces of the archaeological record will be stressed; without this collaboration between professional and avocational archaeologists, researchers are ignoring an important source of information, and this leaves the work only half done on any archaeological site.

The cultural resources on the River Bluffs Open Space have encountered change through different agencies through time. One of the largest activities that changed the context of the archaeological resources on the Open Space was the past collection of artifacts. The vast majority of the artifacts collected from the Open Space originated from what is now known as the Weinmeister and Harvester sites. The research conducted within this thesis uses this extant collection to help place the Weinmeister and Harvester sites into archaeological context of the local region as well as the Platte River Basin.

Archaeological survey, mapping, and excavation on the Harvester site, coupled with the knowledge gained from the Weinmeister collection attempts to answer these contextual questions. The River Bluffs Open Space was developed in order to preserve not only environmental resources, but also cultural resources. The preservation of these resources, and the Open Space's designed use as public recreation space, provides the perfect forum for public education about these resources, as well as encourages site stewardship. The execution of these two goals highlights the need for archaeologists and private artifact collectors to work together in piecing together the past. In this case, the field research and subsequent conclusions about context of the Harvester site would have been sorely lacking.

CHAPTER 2

SETTING THE STAGE: THE PREHISTORIC CULTURAL HISTORY OF COLORADO

The occupation of the Harvester site showcases only a small portion of prehistoric and historic adaptations in the Platte River Basin. Prehistory in the Foothills and eastern Colorado spans at least 13,000 years, and is separated into four different cultural stages, each of which contain multiple periods. These stages are discussed below, in order to provide the reader context for the prehistory of Colorado, as well as place the Harvester site into that larger prehistoric temporal framework.

Archaeological research in eastern Colorado is split into two regions of context: the South Platte River Basin to the north and the Arkansas River Basin to the south. These boundaries are defined by their watersheds (Chenault 1999:1). The River Bluffs Open Space is located within the Platte River Basin region, and therefore research focus and temporal definitions are based upon the chronology for this basin. There are four stages within the South Platte prehistoric chronology, and each contains at least one period. Stages are defined as chronological units in time and the periods define technological attributes and subsistence strategies, especially when these attributes represent changes from the previous period (Chenault 1999:1). It is important to remember that some technological attributes may carry over into subsequent periods, and that the dates provided in the chronology table represent general dates. The stages are broken down into the Paleoindian, the Archaic, the Late Prehistoric and, finally, the

Protohistoric period (Table 2.1). This chapter is devoted to a short summary of each stage of Colorado prehistory, as well as their defining characteristics.

Table 2.1. Prehistoric chronology for the Platte River Basin. Adapted from Chenault 1999.

Stage	*Period*	*Date Range*
Paleoindian	*Overall Range*	*10,000 – 5,500 B.C.*
	Clovis	10,000 – 9,050 B.C.
	Folsom	9,050 – 8,050 B.C.
	Plano	8,050 – 5,500 B.C.
Archaic	*Overall Range*	*5,500 B.C. - A.D. 150*
	Early Archaic	5,500 –3,050 B.C.
	Middle Archaic	3,050 – 1,050 B.C.
	Late Archaic	1,050 B.C. - A.D. 150
Late Prehistoric	*Overall Range*	*A.D. 150 – 1540*
	Early Ceramic	A.D. 150 – 1150
	Middle Ceramic	A.D. 1150 - 1540
Protohistoric	-	A.D. 1540 – 1860

Pre-Clovis Archaeology in Colorado

The earliest and most hotly debated stage of human occupation in North America and Colorado is a grey area known as the Pre-Clovis stage. Recent discoveries and new research provides definitive evidence that there were groups of people in North America before the Clovis period, or 10,000 years ago. In eastern Colorado, there are three sites that contain pre-Clovis components: the Dutton, Selby, and Lamb Spring sites (Hoffman and Graham 1998:89). The evidence of human occupations at these sites consists of broken bones and small flakes as well as the possibility of animal butchering. However, problems in dating and questions of actual human modification or involvement have undermined the validity of pre-Clovis occupations for these sites.

The Paleoindian Stage

The first, explicit archaeological evidence of people in the New World falls during the late Pleistocene and early Holocene transition, approximately 10,000 years B.C. (Chennault 1999b; Kornfeld 2010). The climate during the Paleoindian stage has been characterized as dramatically changing (Kelly and Todd 1988:232; Kornfeld et al 2010:36). By the end of the Pleistocene and the beginning of the Holocene (9,500 – 8,050 B.C.) the climate on the Great Plains had warmed to melt the large ice sheets that covered the northern third of North America. The abrupt change in climatic settings, as well as the introduction of a new spear-wielding predator (humans) on the landscape may have caused the large megafaunal extinction around 9,500 BC (Haynes 2002:391). By 8,650 BC the climate became cooler and wetter in a brief climatic episode known as the Younger Dryas (Kornfeld et al 2010:37). While this interpretation of megafaunal extinction is highly debated within the archaeological literature, it is apparent through the archaeological research of large bison and mammoth kill sites that these animals were heavily used.

The diagnostic large, fluted and unfluted spear points typify the Paleoindian tool assemblage. The addition of spurred endscrapers is also suspected to be of Paleoindian origin based upon their frequency within Paleoindian tool assemblages (Rogers

1986:338); however the trait has also been discovered within the tool assemblages of Archaic and Late Prehistoric ages (Morris and Blakeslee 1987: 830). Large fluted points representative of the Clovis period are often found with the remains of mammoths, while smaller fluted points have been more reliably noted with bison remains. During the late Paleoindian period, many different cultural complexes emerge, each with its own unfluted lanceolate point typology. These complexes include Agate Basin, Alberta, Cody, Hell Gap and James Allen projectile styles. The James Allen typology, first described by Mulloy (1958) and extensively researched by James Benedict (1979), is often found at high altitudes in the mountains of Colorado.

Paleoindian archaeological sites are found in a range of ecological zones in Colorado, from the mountains above timberline to the Plains. Notable Paleoindian sites in northeastern Colorado include the Lindenmeier, Powars, Dent, and Twin Mountain site (Hofman and Graham 1998:98).

The Archaic Stage

The Paleoindian stage is followed by the Archaic stage (5,050 BC – AD 150), which brought changes in climate, subsistence strategies and preferences, and technological adaptations. The climate during the Archaic stage on the Great Plains varied greatly (Kornfeld et al 2010:37). However, a trend of increasingly warmer and drier climatic conditions known as the Altithermal prevailed, which resulted in reductions in resources for prehistoric people (Meltzer 1999:404). The dry and hot conditions of the Altithermal had many impacts on flora and fauna present during the Archaic. For example, grasses on the plains were not as lush or nutritious due to the summer droughts and the bison population decreased (Meltzer 1999:406). This decrease in a main food source meant that people living during the Archaic had to find alternative food sources to bison and more emphasis was placed on smaller animals such as deer and rabbits (Butler 1997).

Archaic groups of people inhabited both the Plains and the Rocky Mountains. However, there is a relatively high number of Archaic occupations in the Rocky Mountains when compared to the low number of Archaic sites on the Plains. This discrepancy has resulted in three different models to explain the cultural use of the Rocky Mountains. The Mountain Refugium model posits that a "cultural hiatus" took place on the Plains as the inhabitants of the Plains moved into the Mountains to take advantage of the cooler, wetter conditions (Tate 1999:92). Benedict's research near the Continental Divide has led him to designate this group as the Mount Albion complex. This group of people used a "piston" or up-down model to gain access to the Continental Divide from the foothills and hogbacks of the Rocky Mountains during the Early Archaic (Benedict and Olsen 1979; Benedict 1990). The second model, also suggested by Benedict, is known as the Grand Circuit model. This model is a suggested as a mode of seasonal migration for people using the mountains and foothills during the Late Archaic and Early Ceramic (Benedict 1990). Unlike the Piston model as described in the Mountain Refugium hypothesis, groups that used the Grand Circuit model of migration moved in a circular direction north from the foothills of Colorado, into the Medicine Bow mountains in Wyoming and finally south again into the Colorado mountains to take advantage of food and lithic resources of North Park and Middle Park (Benedict 1990). Finally, the third model, the proposed Mountain Tradition model, stems from differences in tool kits of the Paleoindian and Early Archaic periods found within the Rocky Mountains and the

Plains. Black (1991) has suggested that the tool kits in the Rocky Mountains are more similar to Western Pluvial Lakes or Stemmed Point tradition (Tate 1999:93), located far to the west in the Great Basin. The Mountain complex has been suggested to be a year round mountain occupation.

The most visible change in tool technology during the Archaic is the inclusion of large corner and side notched dart points. While these projectile points are large, they are still smaller than previous Paleoindian spear points. Technological changes also included the expansion of ground stone tools, and architectural features begin to appear on the landscape (Tate 1999:91). The relative increase of architectural features found during the Archaic is most likely attributed to taphonomic issues of preservation that did not allow older dwellings to be preserved.

The Late Prehistoric

The River Bluffs Open Space contains two sites from the Late Prehistoric stage, which more specifically fit within the Early Ceramic period. The Late Prehistoric stage contains two periods that are pertinent to the discussion of this research, the Early Ceramic and the Middle Ceramic.

The Early Ceramic. The Early Ceramic period dates from AD 150 – AD 1150, and contains the cultural complex known as the Colorado Plains Woodland Tradition (Gilmore 1999:177). The terms Early Ceramic and Colorado Plains Woodland Tradition are essentially synonymous within the literature. This period marks the introduction of cord-marked pottery as well as technological innovations such as the bow and arrow in eastern Colorado (Gilmore 1999:177). The Colorado Plains Woodland Tradition also shares similarities in material culture to Woodland Cultures from the eastern and

Midwestern United States (Gilmore 1999:177; Wedel 1986). This possible connection is discussed further in Chapter 6 of this work.

The tool assemblage for the Early Ceramic consists of small- to medium- sized corner notched projectile points, cord-marked connoidal pottery, ovid "guitar pick" knives or preforms, ground stone, bone awls, shell (Calhoun 2011), and tubular and disk shaped beads made from bone (Butler 1988; Nelson 1971). Typical sites that fall into the Early Ceramic tradition are seasonal camps found near permanent water and located on or near a prominent landform (Butler 1988; Gilmore 1999; Nelson 1971; Scott 1973).

The increasing occurrence of ground stone as well as the introduction of pottery within Early Ceramic assemblages indicate a heavier reliance on plants for subsistence, and may signify a change from a highly mobile to a more semi-sedentary lifestyle. This change in mobility patterns is also supported by a perceived change in landscapes reflected by changing burial patterns (Gilmore 2008). This topic is also discussed further in Chapter 6 of this work.

Although the landscape of the River Bluffs Open Space proved a desirable place for people to continuously live throughout the past, the main archaeological component of the Harvester site dates to AD 950. This date places the occupation of the site at the end of the Early Ceramic (AD 150 – AD 1150). The Harvester site is one of many Colorado Plains Woodland sites that line the eastern extent of the foothills between the Plains and the Rocky Mountains. Other Woodland sites and components in this area include the Lindsey Ranch Site (Nelson 1971), LoDaiska (Irwin and Irwin 1959), Magic Mountain (Irwin and Irwin-Williams 1969) and Hall-Woodland Cave (Nelson 1967). The foothill and hogbacks provide advantages for habitation that sites on the open Plains would not. Bluffs provide shelter from prevailing west winds, as well as a large view shed of the Plains to the east, and the area between the ridge and the Rocky Mountains to the west. As well, the foothills ecotone provides not only distinct plant and animal resources, but also allows movement and utilization of resources from both the Mountain and Plains ecosystems (Benedict 1992; Travis 1986).

The seasonal migration of human populations between the Plains and the Rocky Mountain environments has been illustrated by Benedict (1990,1992) as an explanation for seasonal campsites containing Colorado Plains Woodland artifacts found in both of these environments. Benedict explains that the foothills region between the Colorado Front Range and the Plains provided a temperate wintering environment, which was used by prehistoric people after summer hunts conducted within the Front Range of Colorado (1992:11). As with earlier groups of people, the rotary model of transhumance was based out of winter camps along the eastern edge of the Hogbacks, and most closely correlates to the cultural remains of the Colorado Plains Woodland tradition. The diagnostic cord-marked pottery, corner notched points, and bifacial knives that are common in assemblages in sites like the Harvester site are also found in mountain parks and at higher altitudes (Benedict 1992). The Harvester site, therefore, may represent a winter camp of this type of semi-nomadic movement. The roles of the Harvester and Weinmeister sites within this mobility strategy are further discussed within Chapter 6 of this work.

Middle Ceramic. This period ranges from AD 1150 – AD 1540, and contains mostly the same technological artifacts as those in the Early Ceramic. A few exceptions include the dominance of side notched projectile points, and changes in pottery shape and decoration. Most Middle Ceramic sites have large Early Ceramic components (Gilmore

1999:254). This is true also for the Weinmeister and Harvester sites; both contain predominately Early Ceramic assemblages, but contain a few side-notched projectile points indicative of the Middle Ceramic. The similarities in assemblages and in some cases, the lack of stratigraphic separation indicate cultural continuity between the Early and Middle Ceramic periods (Gilmore 1999:245).

The Protohistoric Stage

The Protohistoric stage is defined by the beginning of European influences on the Plains and ends with permanent literate settlements, which appeared in Colorado when gold was discovered on Clear Creek, near the South Platte River 1858 (Clark 1999:309). The life of Native Americans at the beginning of the Protohistoric was often recorded through a Eurocentric lens, and therefore the "native narrative is largely unknown" (Newton 2008:2). The end of this Period marks a time of massive cultural and territorial changes as indigenous groups are forced to relocate through warfare (with other native groups or Euroamericans), economic dependence and ecological subjugation (Newton 2008:2). During the Protohistoric, archaeological research is supplemented with formal ethnographies and journal entries made by European traders, travelers and surveyors. Using combinations of these ethnographic and archaeological resources, researchers have been able to piece together a cultural history of Native American groups living on the Plains and hogbacks of eastern Colorado (Newton 2008; Von Wedell 2011).

Euroamerican goods such as small glass beads, weapons, clay pipes, and horses contributed to the changing artifact assemblages that Native Americans adapted and remade to fit their own needs (Kornfeld et al 2010:136). One of the most recognizable of these artifacts are the metal knives and projectile points manufactured from European metal goods. However, as Newton points out in his thesis, Native American groups did not always choose European goods over their traditional goods (Newton 2008:4). Rather, they used and manipulated European goods when it benefited them (Newton 2008:4).

The complexity and changes of the prehistoric and Protohistoric timeline in Colorado are not easily contained within a short summary chapter. However, in order to place the Harvester site and the Weinmeister collection into larger archaeological contexts, basic knowledge of these stages is imperative.

Northern Colorado prehistory is complex, but broad patterns have emerged within each of these stages. The Paleoindian Stage is the earliest known appearance of groups in Colorado and consists of the Clovis, Folsom and Plano Periods. This stage can be characterized by small, highly mobile hunter-forager groups of people with a distinctive lanceolate style projectile points and a reliance on big game for subsistence. There are distinct differences in tool morphology between the periods that make up the Paleoindian Stage, however earlier projectile points are all much larger than later projectile points in Colorado. The Archaic Stage is marked by changes in climate which may be related to the subsequent changes in tool morphology and complexity than those of the previous stage. Archaic tool assemblages consist of large corner and side notched dart points and the appearance of ground stone tools. The Late Prehistoric Stage marks the appearance of ceramics in eastern Colorado, and small corner and side notched points dominate lithic tool assemblages. The Late Prehistoric diet is varied and subsistence includes both small mammals such as rabbits, and large mammals such as deer, pronghorn and bison. The cultural materials fall into the Colorado Plains Woodland Tradition, a tradition that may have ties to Woodland variants of the eastern Plains. Finally, the Protohistoric Stage introduces vast changes to native lifestyles. Horses, guns and other items changed the way Native Americans lived, and have ingrained in modern culture what a Native American looks like. Despite the forced migrations and attempts at assimilations in the later part of the Protohistoric and into the historic era, Native Americans adapted Euroamerican goods to benefit their own needs and reflect their distinctive cultural legacies.

CHAPTER 3

LABORATORY AND FIELD RESEARCH METHODS

Weinmeister's collected assemblage of projectile points, bone beads, and other artifacts represent the parts of the artifact assemblage that archaeologists dream to find *in situ* in the field. Even though exact (i.e. pinpoint) locations for artifacts are not known in many cases, the general locations of most formal artifacts can be placed in general locations of the Open Space. A lack of exact provenience does not render the collection without research value. Temporally and culturally diagnostic artifacts offer clues to the diffusion and reach of the people who lived during the Early Ceramic in eastern Colorado. Also, conclusions based on the prehistoric use of the Harvester Site and the larger River Bluffs property can be discussed using just the general location of these artifacts, as well as comparisons between the ratios of artifact classes. Specifically, lithic raw materials, bone beads, and ceramics from the extant collection are analyzed to understand how people on the River Bluffs Open Space used the place, and how these people fit into larger patterns of migration and of cultural traditions of the Early Ceramic. This chapter outlines the different analytical approaches used to document and record both the Weinmeister collection and the field work conducted on the Harvester site.

Addressing the questions proposed in chapter 1 required two different analytical approaches. Specifically, this thesis is based on the analysis of the Weinmeister collection and field work conducted on the Harvester Site. The first research approach consisted of field work conducted during the fall of 2009 and Spring of 2010 the Harvester site. The Harvester site is the most culturally dense area of the River Bluffs Open Space, even after the heavy collection of the site, and therefore made it the best candidate for field work. Field research consisted of pedestrian survey, mapping with a total station, magnetometry survey, and the excavation of one hearth and two test units. These surveys yielded the identification of four hearths, numerous flakes, and ceramic sherds. One hearth eroding out of the western boundary of the site contained ceramic fragments, burned bone, and flakes.

The second analytical approach consisted of laboratory analysis, focused on the results of the field work on the Harvester site, as well as analysis of the Weinmeister collection. The Weinmeister collection was largely obtained from the Harvester and Weinmeister sites, and is used to inform the field research conducted on the site. The laboratory methods remained the same for artifacts from field work and the Weinmeister collection.

The methods employed in this study were not only used to answer the driving questions of this thesis research, but also to extend knowledge of the Early Ceramic period in eastern Colorado. Limitations in spatial context of the extant collection restricted several potential questions that could have been researched in this thesis, therefore I have focused on two specific areas to research. However, the topic of this research in no way exhausts the research potential of this collection or of the Harvester site. Therefore, basic measurements and descriptive data of all the extant collection and field specimens are offered in the appendices, in order to make this dataset available to other researchers.

Methods of Laboratory Analysis

Artifacts from the Weinmeister collection were loaned to the author in various states of cataloging. Artifacts were found in a mixture of plastic boxes, display cases, bags, and loose within a cardboard box.

Lithic Artifacts

Lithic artifacts were sorted and analyzed using guidelines set out by Andrefsky (Andrefsky 2005). Lithic artifacts from this analysis were separated into two categories: flaked stone and ground stone. Flaked stone consists of artifacts created by reduction processes through fracturing. Flaked stone artifacts were further separated into two subgroups consisting of flaked stone tools and debitage. Ground stone consists of stone used in the process of grinding materials. These were separated into two functional subclasses as well. Handstones include cobbles that have been ground on one or more edges, and netherstones are slabs that exhibit basins or ground surfaces. Analysis for all lithic artifacts consisted of four basic steps: cataloging, classification, raw material identification, and metric measurements.

Artifact Cataloging: Lithic artifacts that were taken out of a display case were given a sequential number and “D” as the suffix (e.g. 10D) to mark that the artifact originated from a display case. This way, artifacts in display cases could be returned to their original case after analysis was completed. Artifacts that were loose pieces (inside of boxes, bags, etc.) were given a sequential number and “G” as the suffix (e.g. 10G), to identify artifacts that came did not come from displays, and were part of the Weinmeister collection. Adding the “G” differentiated “Garry” Weinmeister’s collection from any artifacts that were collected from field work. Artifacts cataloged with the suffix “D” or

"G" exclusively refer to formal lithic tools. Any numbers physically inked on the artifacts themselves were previously done so by Weinmeister. The catalog numbers assigned by Weinmeister were recorded in the database, next to the temporary number assigned by the author. However, Weinmeister did not mark all of his artifacts with numbers, and most non-tool artifacts he has only inscribed with "LR-1". Debitage were assigned numbers sequentially to accurately tally and describe flake attributes, but were not kept separate after analysis. An atlatl weight, large netherstone, and miscellaneous singular artifacts were not given numbers, and were simply described in the database.

Classification: Artifacts were separated into groups based upon their assumed function, technological and morphological attributes. Artifacts were also separated into groups based on comparisons and contexts of artifacts in the known literature available for Early Ceramic sites along the hogbacks of northern Colorado. Artifact groups for chipped stone include projectile points, preforms, bifaces, knives, scrapers, drills, retouched flakes, and flakes.

Raw Materials: Lithic raw materials were determined using a macro-visual approach. This method determines raw materials based on visual characteristics such as color, inclusions, texture, and translucency. Lithic raw materials used on the River Bluffs Open Space include five basic rock types: chert, chalcedony, quartzite, petrified wood, and obsidian. A detailed analysis of projectile point raw materials and their sources is discussed in Chapter 6. However, flakes and other tools were categorized under the very basic raw material types above.

Measurements: All measurements taken for this research are metric. The documented lithic artifact physical forms dictated the attributes that were recorded. Thus chipped stone flakes included less metric measurements than that of a formal tool. Every artifact was measured for maximum length, maximum width, and maximum thickness. In addition, projectile points included measurements of the shoulder width, neck width, base width, stem height, blade height, and cutting edge length, if applicable (figure 3.1).

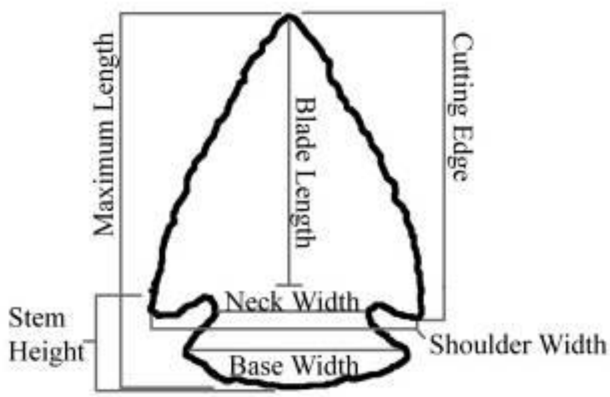


Figure 3.1. Measurements obtained for projectile points analysis. Maximum thickness is not shown. Shoulder width and maximum width are often the same measurement.

Bone Beads

The Weinmeister collection included an assemblage of 537 small, tubular, incised, mammalian bone beads. As far as this research has documented, it is the largest known assemblage in eastern Colorado. In addition, excavations of the hearth revealed three bone disk beads. Basic measurements including maximum length and width were recorded for each style of bead. The tubular bone bead documentation also included counts of the number of incised rings present on each bead. Chapter 6 explores the tubular bone beads within the context of the Plains Woodland Mortuary Tradition, and the implications of their presence on the western edge of the Plains of Colorado.

Ceramics

Fragments of Early Ceramic style pottery were recovered during the field investigations, and also made up a large part of the loaned extant collection. Again, basic measurements including the maximum length, width, and thickness were recorded. If recognizable and present, the portion of the vessel was recorded.

Faunal Remains

Unmodified faunal remains were rarely found during field investigations of the Harvester site, and are not present within the extant collection. Most faunal remains were present within the context of the hearth excavation, and all of these examples were burned. Faunal remains were fragmentary and were quantified only.

Bone Tools

Four bone tools were recovered from the River Bluffs Open Space. Three were included in the extant collection; the last was found during a survey conducted for the location of a trail at the eastern base of the bluff system. The three tools from the Weinmeister collection consist of two bone awls and an unidentified bone tool. The tool resembles an awl, but has a flattened, rounded tip. Basic measurements were taken and include the maximum length and width. The awl found during the survey of the trail was compared against complete faunal remains in the CSU zoology department comparative collection with the help of Dr. Robert. E. Lee.

Hearth Fill

All of the sediment from the hearth excavation was collected. This fill went through two different laboratory analyses: sediment floatation and wet-screening. Floatation procedures were supervised by fellow CSU graduate student Michael Troyer.

Students from the 2010 CSU archaeological field school were responsible for completing floatation of this hearth. The entire hearth feature fill was floated. The light fraction and the heavy fraction from floatation were retained for further analysis. The light fraction was saved for macrobotanical identification and the heavy fraction was sorted in the lab and all artifacts were bagged according to level distinctions.

Macrobotanical Tests: A sample of the light fraction was sent to Dr. Daniel Bach of High Plains Macrobotanical Services, located in Cheyenne, Wyoming. This analysis provided information about the hearth's plant remains, including the genus, species (if recognizable), and quantity of remains. This analysis also identified some of the fuel used in the hearth, as well as the charcoal sample used in radiometric dating (see Appendix II).

Radiometric Tests: A sample of charcoal from the feature was sent to Beta Analytic Inc., a radiometric testing facility in Florida. The fragmentary and eroded state of the hearth charcoal necessitated an accelerated mass spectrometry (AMS) date. AMS dating provides a more accurate date with less material than traditional radiocarbon dating techniques. The AMS assessments used a 2-sigma calibration range, and relied on the most recent calibration database available (IntCal04) (see Appendix I).

Field Methods

Field work was conducted on the Harvester site during September, October and November of 2009 as well as May 2010. The Harvester site was chosen as the subject of this research and of fieldwork for two reasons. The research conducted on the Harvester provides educational opportunities for the interpretation of the River Bluffs Open Space. Secondly, the high density of chipped stone on the surface as well as within the harvester ant mounds on the site rivals any other area on the River Bluffs Open Space.

Five goals were defined in the research proposal submitted to Larimer County for field work conducted on the open space (LaBelle 2009):

1. Walk the property with the local collector, Garry Weinmeister, and record the locations of his previous finds, to the best of his recollection.
2. Record the known historic features on the bluffs portion of the property. This includes a1920s era car as well abandoned farming equipment.
3. Map the location and document and collect the microdebitage from harvester ant mounds on the Harvester site. Collecting the microdebitage allows future researchers to monitor the movement of artifacts within and around the ant mounds. Protohistoric glass trade beads are sometimes found on ant mounds, and Weinmeister has in fact documented at least one glass trade bead (1750s-1870s) from the River Bluffs property.
4. Map in the location of all stone flakes and tools located on the site surface, as well as pieces of animal bone that may be related to human use (burned bone or other evidence of human modification). Attributes of the flakes have been recorded in place, and will be left in the field. Diagnostic items, such as tools and pottery, have been mapped and collected because they are at risk from further collecting by unauthorized parties.
5. Record prehistoric features found on the bluff top and salvage excavate one fire hearth that is eroding out of the western bluff of the site. This research allow us to obtain macrobotanical and radiocarbon samples to understand past behavior related to cooking/hearth activities, as well as place the Harvester site within a temporal context.

The survey work on the Harvester site was conducted on Saturday mornings between the dates of August 29th, 2009 and May 18th, 2010, for a total of 352 hours (Table 3.1).

Table 3.1. Schedule of CSU field work conducted on the Harvester site.

Date	*Hours worked*	*Work Performed*
9/20/2009	20	Survey
9/26/2009	24	Survey
10/3/2009	20	Survey
10/17/2009	28	Survey
10/24/2009	30	Survey
10/26/2009	18	Survey
11/9/2009	18	Survey
5/16/2010	18	Magnetometry Survey
5/17/2010	88	Hearth and Test Unit Excavation
5/18/2010	88	Hearth and Test Unit Excavation
Total Hours	352	

Survey was completed by Colorado State University undergraduate students Rae Mosher, David Anderson, and Ashley Dillon under the field direction of the author and overall supervision of Dr. LaBelle as the principal investigator. These three students gained 3 units of class credit for Anth 486 (field/laboratory practicum class) for their participation in the field work. Weinmeister proved invaluable in helping us survey and record artifacts on the site. A handful of generous volunteers also helped in survey work, with the number of volunteers varying on each weekend. Informal survey was conducted before more systematic, formal surface survey was completed. This allowed us to acclimate to the density of artifacts in the area and to become accustomed to finding artifacts in the tall grass and shrubland environment of the Harvester site.

Table 3.2. Volunteers and students who participated in field work on the Harvester Site.

List of Volunteers for the Harvester Site Survey and Analysis	*Students Enrolled in Anth 486/686*
Garry Weinmeister	Rae Mosher
Vlisha Stanerson	David Anderson
Sarah Millonig	Ashley Dillon
Jason Chambers	Jessica Anderson
Jason LaBelle	
Brian Fredericks	
Chris “Skippy” Reed	
Raphael Ruiz	
Michael Troyer	
CSU Field School, 2010	

Surface Recording

Total Station: The flagged locations of artifacts were then mapped using an electronic total station. This machine is able to map a specific item to the nearest millimeter and can then be digitally overlaid on a topographic map of the site. A datum and backsight were placed on the site to facilitate mapping using the total station. The locations of both the datum and backsight were marked with orange flagging, a long nail, and a rock cairn surrounding the nail to ensure that the nail is not disturbed by animals. The grid is oriented to magnetic north. The backsight is located approximately 100 meters south of the datum, due to unfavorable terrain to the north of the datum. The horizontal and vertical grid was established based on an arbitrary grid and elevation with the datum established with coordinates of N2000.000 E2000.000 and an elevation or Z of Z1000.000

Each surface artifact was assigned a number which corresponds with its location, artifact measurements, and general raw material descriptions. The locations of these artifacts were mapped using a total station. All flakes were measured in metric units and the measurements included the maximum length, thickness, and width. These measurements were recorded on field forms, and then transferred to electronic documents. Flakes were marked with a semi-permanent marker dot and left in the field. This dot on the flakes helped the crew recognize flakes that were previously recorded during surveys. Formal artifacts and tools including pottery, projectile points, scrapers, and ground stone were collected and given a sequential field specimen number.

Ant mounds on the Harvester site were given a sequential number along with corresponding arbitrary total station coordinates and UTM locations using hand held GPS devices. Some ant mounds do not have total station locations due to their location in deep arroyos that limited the ability for the total station to view the rod needed to take the measurement. All microdebitage from the ant mounds on the Harvester site was collected and bagged.

Magnetometry

Magnetometry was conducted on a portion of the Harvester site by then CSU adjunct professor Dr. A. Creekmore in May 2010. Magnetometry testing measures and analyzes magnetic differences in soil composition. Differences in magnetic readings of soil are commonly caused by episodes of burning, therefore testing for buried hearths are ideal. A 10x10 meter grid was set up on the northwestern corner of the Harvester site, using four plastic stakes to mark the four corners of the grid, and plastic rope to mark the grid lines. The grid lines were set at 25cm intervals and tested 16 samples per meter. A test reading of one the known hearths was conducted and used as a control to aid in discovering other, similar buried features. This survey was completed using a FM-256 Gradiometer operated by Creekmore.

Test Pit Excavations

Two 50cm x 50cm test pits were excavated over the course of this field work. The location of the test pits were placed based on their proximity to hearth features on the site. Excavations were conducted under the direction of the author, and performed by student volunteers from Colorado State University. Excavation was conducted in arbitrary 10 cm levels using shovels, trowels and dust pans. Both units were excavated to 70 cm below the ground surface. Soil was screened in 1/4" inch mesh screens, and artifacts and faunal remains were bagged and numbered based on excavation level and material type. The locations of the four corners of each test unit were recorded using the total station.

Hearth Excavation

Hearth 2 was excavated under the direction of the author, as well as Michael Troyer, an anthropology graduate student at CSU studying the variability of hearth construction and styles in northern Colorado. Three other archaeology students (Ashley Dillon, Brian Fredricks, and Jason Chambers) from CSU assisted in this excavation over the course of May 17th and 18th of 2010. This hearth was chosen from three additional hearths on the Harvester site based on the on-going destruction of the hearth from erosion, the amount of cultural material located within and on the surface of the feature, and the location of this hearth compared to concentrations of other artifacts on the site.

Hearth 2 was excavated inside of a 1x1 meter unit, which was subdivided into quadrants. The northwest and southwest quadrants were excavated first in order to define the profile of the hearth feature. The first level of the western quadrants was excavated to a depth of 10 centimeters below the datum, and subsequent levels were excavated in 5 centimeter levels. This first 10 centimeter level allowed excavators to sift through the overlying sediment, as well as create a controlled and even surface in which to define the feature and begin the removal of the hearth fill.

Methods Summary

Field work on the Harvester site was conducted for two reasons: to better contextualize the prehistoric occupations on the River Bluffs Open Space, and to aid in public education and promotion of site stewardship. In order to complete these goals, field research has a variety of research gathering methods. These include pedestrian survey and artifact mapping with use of the total station, which aids in identifying artifact density; magnetometry surveys to discern the possibilities of buried thermal features; test unit excavations to define the vertical extent of the site, and finally, the hearth excavation to provide macrobotanical information and radiometric dates for the Harvester site, helping place it into larger, regional research contexts. The combination of field work on the Harvester site and laboratory research on the Weinmeister collection creates a stronger story for the overall interpretation of the Open Space. Analyzing the Weinmeister assemblage from the Harvester and Weinmeister sites and adds context to research conducted on the Harvester site. Also, the assemblage allows me to research aspects of the material culture that would not have been found on the Harvester site due to its collection (i.e. projectile point raw material origins and how this relates to migration patterns). The combined field research of the Harvester site and the laboratory analysis of the Weinmeister collection complete the archaeological story of the River Bluffs Open Space.

CHAPTER 4

THE WEINMEISTER COLLECTION

The Weinmeister collection consists of a variety of cultural material, including stone tools, flaked stone, ground stone, ceramic fragments, an atlatl weight, and 537 tubular, mammal bone beads. As noted before, this collection originated mostly from the Harvester site and the Weinmeister sites, with a few examples originating from other areas on the Open Space. Before the analysis of the Weinmeister collection is described, it is important to clarify and reiterate the historic disturbances at the Weinmeister and Harvester sites to better describe the locations in which Weinmeister discovered and came to gather these artifacts. This chapter begins with a brief history how Weinmeister collected the Harvester and Weinmeister sites, and describes the general locations for the artifacts and features as he recalls them. The chapter then continues with descriptions and basic analysis of each artifact class in the Weinmeister collection. These descriptions are followed by brief contextual summaries (if needed) to place the artifacts within regional assemblage contexts.

Provenience of the Weinmeister Collection

As noted in the introduction to this work, Garry Weinmeister began his collection while he was employed as a farmhand on the River Bluffs Open Space during the 1960. Weinmeister continued collecting on the property through the 1970s and 1980s (Weinmeister 2004). During this time, the area that is now

Figure 4.1. Location of the excavated silage pits on the Weinmeister site.

recognized as the Weinmeister site was heavily disturbed by the construction of silage pits (Figure 4.1) and bulldozer scraping. Unlike the Weinmeister site, the Harvester site was not historically affected by earth moving activities, so buried archaeological deposits remain intact.

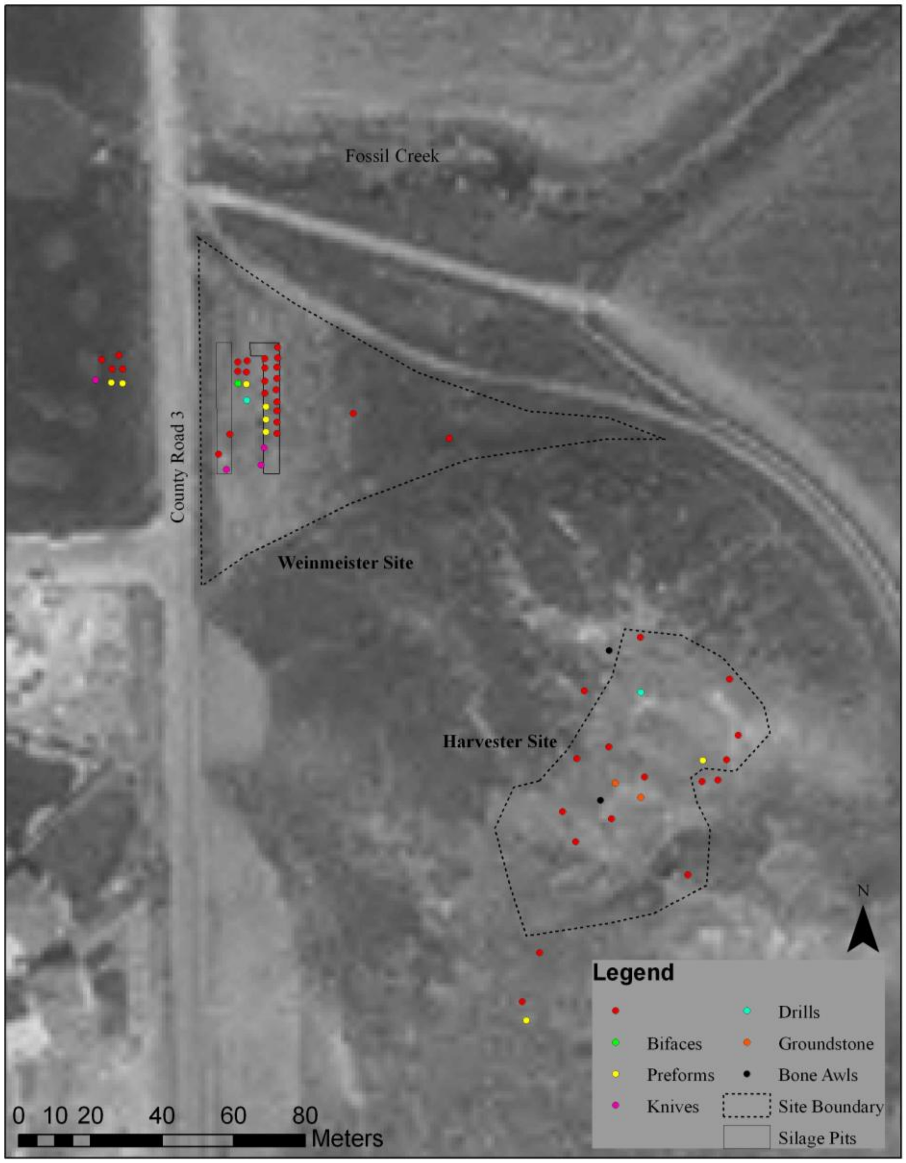


Figure 4.2. The general locations of artifacts from the Weinmeister collection on the Harvester and Weinmeister sites, as recalled by Weinmeister.

These silage pits remained open and in use throughout the agricultural use of the landscape that is now the Weinmeister site, and became prime real estate for artifact collecting. A large portion the artifacts with known locations from the Weinmeister collection originate from these two pits (Figure 4.2, Table 4.1) including the large assemblage of tubular mammalian bone beads. The artifacts collected from the

Weinmeister site were collected on the ground surface, as well as up to 10 feet below the surface within the silage pits (Weinmeister 2004). All collection on the Harvester site was limited to surface finds.

The entire Weinmeister collection contains 879 artifacts (Appendix IV). Of this total, 878 represent artifacts with prehistoric contexts. The exceptions are a square nail and one glass bead. Of the prehistoric total, 693 artifacts have a general provenience to the Harvester site, the Weinmeister site, and other specified areas of the River Bluffs Open Space (Table 4.2). Artifact categories that are not represented in this total consist of mostly undiagnostic categories from the Weinmeister collection including flakes, retouched flakes, and scrapers, and their locations could not be recalled by Weinmeister. Table 4.1 summarizes the artifacts whose provenience could be recalled by Weinmeister. The table breaks down locations to a general region of the Weinmeister and Harvester sites, and areas of the River Bluffs Open Space. These locations are visually represented in Figures 4.2, 4.3 and 4.4.

The Weinmeister Collection contains 120 projectile points and projectile point fragments. Of this total, 46 projectile points (38%) were placed to a specific location on the Open Space. Additionally, 36 (78%) of the 46 provenienced projectile points are complete or contain diagnostic bases, which is important in typology identification. Projectile point typologies from this dataset mirror the typology patterns of the entire Weinmeister collection.

Typologies from points that have a general location include Plains Corner Notch and Foothills Corner Notch, which are Early Ceramic in date (Nelson 1971, Johnson 1997), and Plains Side Notched, which are dated to the Middle Ceramic,

Table 4.1. Descriptions of artifact locations from the Weinmeister collection.

Artifact Number	*Weinmeister Number*	*Artifact Type*	*Typology*	*General Location on the Open Space*
19D	112	Projectile Point	Pelican Lake	Possible Bison Bone Bed
02D	423	Projectile Point	Plains Side Notch	Golf Course west of Weinmeister Site
16D	433	Projectile Point	Foothill Corner Notch	Golf Course west of Weinmeister Site
45D	426	Projectile Point	Plains Corner Notch	Golf Course west of Weinmeister Site
64G	n/a	Projectile Point	-	Golf Course west of Weinmeister Site
01G	n/a	Projectile Point	unknown	Harvester Site
09D	41	Projectile Point	Plains Corner Notch	Harvester Site
15D	35	Projectile Point	Plains Side Notch	Harvester Site
20D	33	Projectile Point	Plains Corner Notch	Harvester Site
21D	54	Projectile Point	Plains Corner Notch	Harvester Site
22D	124	Projectile Point	Foothill Corner Notch	Harvester Site
25D	478	Projectile Point	Plains Corner Notch	Harvester Site
28D	556	Projectile Point	Foothill Corner Notch	Harvester Site
39D	34	Projectile Point	Plains Corner Notch	Harvester Site
63G	n/a	Projectile Point	-	Harvester Site
97G	104	Projectile Point	Plains side Notch	Harvester Site
32D	32	Projectile Point	Plains Corner Notch	Harvester Site
95G	15	Projectile Point	Plains Corner Notch	Harvester Site
04G	571	Projectile Point	unknown	Southwest of Harvester Site
86G	lr-1	Projectile Point	Plains Corner Notch	Southwest of Harvester Site
07D	466	Projectile Point	Plains Corner Notch	Weinmeister Site
12D	492	Projectile Point	Plains Side Notch	Weinmeister Site
01Bead	n/a	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit, with Beads
02Bead	n/a	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit, with Beads
02G	579	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit
05D	631	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit
11G	lr-1	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit

Table 4.1. Descriptions of artifact locations from the Weinmeister collection, continued.

13G	lr-1	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit
14D	322	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit
17D	441	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit
34D	489	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit
36D	147	Projectile Point	Foothill Corner Notch	Weinmeister Site, East Silage Pit
37D	287	Projectile Point	Foothill Corner Notch	Weinmeister Site, East Silage Pit
54G	lr-1	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit
55G	lr-1	Projectile Point	Plains Corner Notch	Weinmeister Site, East Silage Pit
67G	LR-1	Projectile Point	-	Weinmeister Site, East Silage Pit
03G	578	Projectile Point	Foothills Corner Notch	Weinmeister Site, Near Silage Pits
08D	493	Projectile Point	Plains Corner Notch	Weinmeister Site, Near Silage Pits
11D	400	Projectile Point	Plains Corner Notch	Weinmeister Site, Near Silage Pits
24D	434	Projectile Point	Plains Corner Notch	Weinmeister Site, Near Silage Pits
31D	353	Projectile Point	-	Weinmeister Site, West Silage Pit
33D	494	Projectile Point	unknown	Weinmeister Site, West Silage Pit
10G	n/a	Projectile Point	Plains Side Notch	Agricultural Field
29D	53	Projectile Point	Plains Side Notch	Agricultural Field
98G	67	Projectile Point	Plains Side Notch	Agricultural Field
10	479	Biface	-	Weinmeister Site, Near Silage Pits
44D	425	Preform	-	Golf Course, west of Weinmeister Site
26	424	Preform	-	Golf Course, west of Weinmeister Site
23D	111	Preform	-	Harvester Site
40D	4	Preform	-	Southwest of Harvester Site
1	262	Preform	-	Weinmeister Site, East Silage Pit
10D	548	Preform	-	Weinmeister Site, East Silage Pit
42D	358	Preform	-	Weinmeister Site, East Silage Pit
3	467	Preform	-	Weinmeister Site, Near Silage Pits
41D	481	Knife	-	Golf Course, west of Weinmeister Site
44G	n/a	Knife	-	Weinmeister Site, East Silage Pit
6D	465	Knife	-	Weinmeister Site, East Silage Pit

Table 4.1. Descriptions of artifact locations from the Weinmeister collection, continued.

03D	92	Knife	-	Weinmeister, West Silage Pit
4D	376	Knife	-	South/Central Bluffs
2	427	Knife	-	Central Bluffs
18D	pp	Drill	-	Harvester Site
30D	LR-432	Drill	-	Weinmeister Site, Near Silage Pits
1	442	Atlatl Weight	-	East Central Bluffs
1	-	Metate Fragment	-	Harvester Site
2	-	Ground stone	-	Harvester Site
2	-	Bone Tool/Paddle	-	Harvester Site
3	-	Bone Awl	-	Agricultural Field
-	-	Tubular Bone Beads	-	Weinmeister Site, Silage Pits
-	-	Ceramics	-	Weinmeister and Harvester Sites

Table 4.2. Artifact totals from the Weinmeister collection with general provenience.

Artifact Type	*Total with General Provenience*	*Total of represented artifacts in the Weinmeister Assemblage*
Projectile Points	46	120
Bifaces	1	24
Preforms	7	26
Knives	5	12
Drills	2	5
Atlatl Weight	1	1
Ground Stone	2	2
Bone Awls/Tool	3	3
Bone Beads	537	537
Ceramics	84	84
Total	693	808

Table 4.3. Frequency of projectile point typologies at each location described by Weinmeister.

	Foothills Corner Notch	Plains Corner Notch	Plains Side Notch	Pelican Lake	Calf Creek	Unknown	Not Applicable	Total
Harvester Site	2	7	2	-	-	2	1	14
Southwest of Harvester Site	-	1	-	-	-	1	-	2
Weinmeister Site	-	1	1	-	-	-	-	2
Weinmeister Site, East Silage Pit	2	10	-	-	-	-	1	13
Weinmeister Site, West Silage Pit	-	-	-	-	1	-	1	2
Weinmeister Site near Silage Pits	1	3	-	-	-	-	-	4
Golf Course, West of Weinmeister Site	1	1	1	1	-	-	1	5
Bison Bone Bed	-	-	-	-	-	-	-	0
Agricultural Field	-	-	3	-	-	-	-	3
								47

(Wood 1967; Anderson 1989, Irwin and Irwin 1957), and one projectile point style that emulates Wray or Calf Creek, and one that represents Pelican Lake.

Both of these last two examples date to components from the Middle and Late Archaic point types (Behmenti et al 2004; Kalasz et al 1995). The locations of the projectile points with known point typologies come from the all areas of the Open Space, but are concentrated within the Harvester and Weinmeister sites (Table 4.3). Also, these point typologies overwhelmingly represent typologies that have been relatively dated to the Early Ceramic period (Butler 1988; Nelson 1977)

Of 26 preforms, only 8 were given general locations of origin. Four examples were collected from the Weinmeister site (in the eastern silage pit), two were recovered from the Harvester site, and two were found on the location of the modern golf course just west of the Open Space. These small preforms are commonly found in Early Ceramic assemblages (Butler 1988; Kalasz et al 1995; Nelson 1971).

Two drills also have general known locations on the Harvester site and the Weinmiester site. The drill found on the Harvester site originally represented a Midland point; an unfluted lanceolate style point from the Plano Period of the Paleoindian Stage (8,050 BC – 5,500BC) (Chenault 1999). At some time during the past, this point was reworked for use as a drill. Unfortunately it is impossible it discern whether the drill was manufactured by people living on the Harvester site, or by the original Paleoindian owners.

The tubular mammal bone beads assemblage from the Weinmeister collection is one of the most important parts of the collection because of the large number of beads when compared to other Early Ceramic sites in northern Colorado. Weinmeister found these beads in the eastern wall of the eastern silage pit on the Weinmeister site. After the discovery of the first few beads on the surface of the silage pit wall about 30 inches below the level of the ground surface, Weinmeister began excavating into the side of the wall. The excavated hole measured approximately 20 inches long by 14 inches deep and 8 inches high (Weinmeister 2004). From this excavation, he amassed 537 tubular bone beads, along with two chalcedony Corner Notched projectile points, rodent incisors, charcoal, chert flakes and a small number of "very small bones" (Weinmeister 2004). The cultural context of these beads in Early Ceramic sites across northern Colorado is addressed in chapter 6 of this work.

The ceramics from the Weinmeister collection totaled 84 sherds. They originated from both the Weinmeister and Harvester sites and therefore represent at least two vessels. The sherds vary in color between reddish orange, to tan, and grey. Color is not necessarily indicative of separate vessels, and the different colors may have resulted from different firing temperatures and oxidization conditions during heating of the vessel (Ellewood 2002: 4-5). Weinmeister recalls collecting the reddish colored sherds from the Harvester site, near one of the hearth features on the northwestern portion of the site. The pottery collected from the Weinmeister site was collected below the surface within the exposed walls of the silage pits.

While the majority of the Weinmeister collection originates from the Harvester and Weinmeister sites, a few important prehistoric artifacts and features were discovered on other portions of the Open Space. The atlatl weight, a bone awl, two stone knives and four projectile points were found in the agricultural field and the central and south portions of the property (Figure 4.3).

Figure 4.3. General artifact locations from the Weinmeister collection outside of the Harvester and Weinmeister sites.

One bone awl was discovered in the northern portion of the agricultural field. The four projectile points are located on the south central portions of the Open Space, with one recovered from the bluffs, and three found just east of the two track road at the base of the bluffs.

Prehistoric and Historic Features noted by Weinmeister

A small number of prehistoric and historic features were noted by Weinmeister while he worked and collected on the Open Space (Table 4.4). These features include locations on the Harvester site, as well as the southern portion of the Open Space.

Table 4.4. Features identified by Weinmeister.

Artifact/Feature	*Location*
Hearth 1	Harvester Site
Hearth 2	Harvester Site
Hearth 3	Harvester Site
Hearth 4	Harvester Site
Bison Bone Bed with Projectile Point	Southern end of Open Space, in the bluffs
Charcoal Stain	In County Road 3 road cut, near Atlatl Weight
Old Car	Arroyo south of Harvester Site
Farming Equipment	South end of Open Space, in the bluffs

Hearth features were discovered by Weinmeister and recorded by the field work completed on the Harvester Site. Three of the hearths (1, 2 and 4) are located at the extreme northwest edge of the bluffs, and are in danger of information loss due to erosion. The hearths are defined as unlined, basin shaped hearths that are common throughout Early Ceramic sites (Anderson and Troyer 2010). Hearth 2 was excavated because of the relatively high number of artifacts within the fill, including ceramics and flakes. This hearth was excavated during field work on the Harvester site, and that analysis is detailed in chapter 5. Hearth 3 is located on the south east of the site on a heavily eroded hill. Hearth 3 is more ephemeral than the three hearths on the north side of the site, and the feature consists of light charcoal staining and fire cracked rock that has tumbled down slope from the feature.

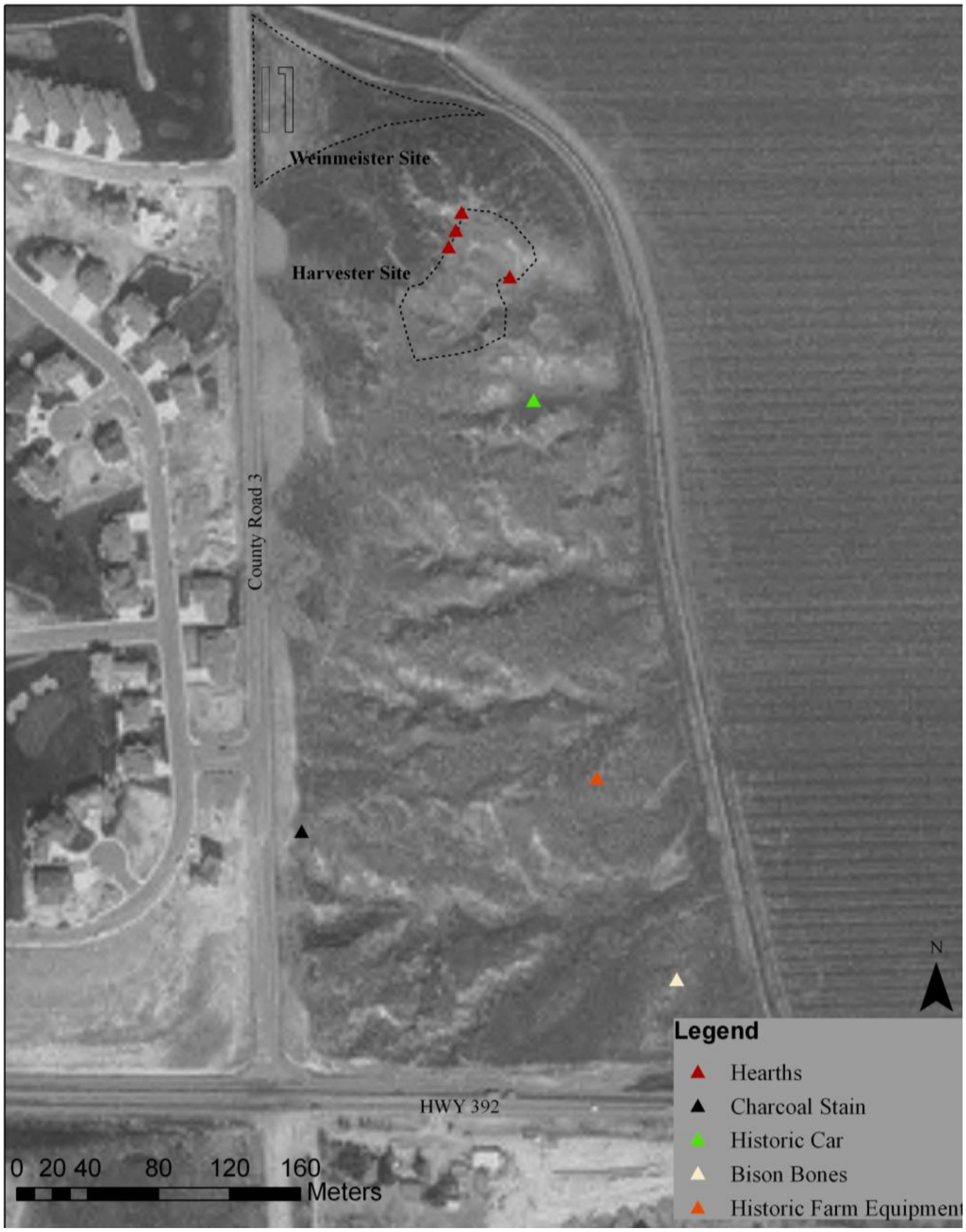


Figure 4.4. Feature locations documented by Weinmeister.

Bison bones and an associated projectile point (the Pelican Lake example) were found on the extreme southwestern portion of the Open Space. Unfortunately, the bones are no longer visible, which may be the result of geomorphic processes re-covering the bones with sediment, or the total erosion of the bones altogether. Also, the close proximity of feature to Highway 392 directly to the south may have tempted passersby to collect the bones. It is unknown how many bones were present, or if these bones represented a bison bone bed. This area should be reevaluated to locate the bones if possible, especially because of the proximity to the very large bison bone bed Kaplan Hoover, located in the same bluff system just ½ mile south of the Open Space.

An ephemeral charcoal stain was noticed by Weinmeister in the cut bank of County Road 3. It is undetermined whether or not this stain represents a hearth. No artifacts were associated with the stain, however it is in the same general vicinity as the atlatl weight.

An historic vehicle was located by Weinmeister, and re-recorded during the field work of the Harvester site. The vehicle is not within the Harvester site boundaries, but it is important to note because of the history of the Open Space as farm land. This vehicle is in a deteriorated condition and is located in the bottom of the arroyo directly south of the Harvester site. Documentation of this vehicle is found in chapter 5.

Finally, an historic piece of farming equipment was rerecorded on the southern extent of the Open Space, near the boundary where the bluffs merge with the floodplain. This piece of equipment is wooden, with a steel rectangular frame and its exact function is unclear. It may have been used in leveling soil before planting season.

The Weinmeister collection was represents a large portion of the artifacts from the Weinmeister and Harvester sites, and luckily, the locations of many of these artifacts were recorded by Weinmeister. In fact, of the 874 prehistoric total artifacts in the collection, 693 artifacts (79%) have a provenience on the Open Space. The projectile points, ceramics, preforms and beads all suggest Early to Middle Ceramic occupations of the Open Space. The features on the Open Space represent both the historic and prehistoric use of the land. This spatial information is incredibly important in understanding the context of the Harvester and Weinmeister sites, as well as the entire Open Space. To aid further in contextual analysis, the following section of this chapter focuses on the descriptive analysis of the individual artifacts in the Weinmeister collection.

Lithic Analysis

Lithic artifacts in the Weinmeister collection consist of flaked stone tools, debitage, ground stone and an atlatl weight. The majority of the lithic collection is represented by chipped stone tools. In this collection formal tools out number flakes and non-formal tools, and this may indicate that tools are more desirable to collect than debitage.

Lithic artifacts were sorted into categories based on functional classes. These consist of hafted and unhafted bifaces, flake tools and scrapers, and drills. This analysis follows methods used to classify tools by Anderson (1989) in the analysis of the Pinon Canyon Maneuver site, as well as methods of lithic analysis laid out by Andrefsky (2008). All measurements are taken in millimeters, unless otherwise stated. The measurements described here offer the largest and smallest measurements of the tool category, followed by the average. The complete measurements for tools can be found in Appendix VI. Projectile point typological classification in the Weinmeister collection was made using seminal reports of well defined Early Ceramic artifact assemblages. These include assemblage descriptions provided by Butler (1988), Nelson (1971), and from the Swallow Site typology (McComb 2009.). Projectile point typologies were discerned through comparisons with the assemblages from the above references, in addition to comparisons using the Early Ceramic components from LoDaiska (Irwin and Irwin 1959) and Magic Mountain (Irwin and Irwin-Williams 1966; Kalasz et. al 1995).

Bifaces

These artifacts are characterized by the reduction through flaking on both sides of the tool, which form a thin, uniform edge all the way around the tool (Andrefsky 2008:77). Bifaces create the base shape of formal tools with more refined forms including knives, projectile points, preforms, and drills. This analysis splits bifaces into hafted and non-hafted categories, specifically to differentiate hafted projectile points, hafted and non-hafted knives from unhafted bifaces, which includes preforms, unhafted knives, and unclassified bifaces.

Hafted Bifaces

Hafted bifaces consist of projectile points and knives. Hafting is identified by lateral and basal notching, basal grinding, and wear along the proximal and lateral margins of tool. Hafted bifaces are often re-sharpened while still in the haft, which changes the morphology of the tool, especially prehistoric knives. Knives were distinguished from projectile points based on the asymmetry of both the blade and notches, the large size of the tool and the helicoid cross-section of the tool, which is indicative of re-sharpening activities consistent with maintaining knife edges. However, helicoid cross sections can be present when any hafted biface is re-sharpened (Andrefsky 1998:77). This was taken into account when examining the possible knives in this collection, and other indicators such as the thickness and the asymmetry of the blades were used in determining functional classes.

Projectile Points. The projectile point sample from the Weinmeister collection consists of 120 points in various sizes and levels of completeness. Point styles range from small, corner notched and side notched points to large corner notched points. Of the 120 points, 65 points are temporally diagnostic in that they contain complete bases. Nine projectile point morphologies are unknown. The remaining 46 examples of projectile points are fragments of the midsection or tips of the tool and typology could not be determined. Without diagnostic base portion of the projectile point, it is difficult to assign a timeframe to the point.

<u>Type 1: Small Corner Notched with Expanding Stem</u>

Figure 4.5. Type 1: Small Corner Notched with Expanding Stem

N = 41

Maximum Length: 10.4 mm – 44.8; mean = 19.9 mm

Maximum Width: 7.5 mm – 26.3 mm; mean = 15.8 mm

Maximum Thickness: 0.6 mm – 8.7 mm; mean = 3.7 mm

Material Types: Quartzite, Chalcedony, Chert

This style of point is represented by a sharp tip and a straight, triangular blade. The cross section is generally biconvex. Shoulder shapes vary between rounded to weakly barbed and the tang exhibits both pointed and round shapes. Shoulder shape ranges from slightly rounded to abrupt, and the base shape ranges from straight to slight convex.

This projectile point style is most commonly recognized as the Plains Corner Notch style. Along with ceramics, this type of point is often used by researchers to identify the Early Ceramic period. However, this style of point overlaps the end of the Late Archaic and the beginning of the Early Ceramic and maintains a strong presence within collections until the introduction of the Middle Ceramic (AD 1150) (Gilmore et al 1999: 177). Nevertheless, this style of point is has been confidently dated to the Early Ceramic period in eastern Colorado, and represents the main style of point within the Weinmeister collection (Gantt 2007). Type 1 points most closely resemble MM34, MM35 and MM36 from the Magic Mountain site (Irwin-Williams 1966); small corner notched points from the Lindsey Ranch site (Nelson 1971); Woodland Corner Notched points from Ken Caryl Ranch (Johnson 1997); Type 1 points from the Early Ceramic component of the Oeskeso site (Gantt 2007); Hogback Corner Notched points from the Coney lake site (Benedict 1990:Figure 16a-k); Murray site (Benedict 1975a fig. 7 a-l) and Caribou Lake site (Benedict 1985b figure 113, k-l).

Type 1b: Small Corner Notch with Serrated Blades

N = 11

Maximum Length: 12.9 mm – 31.2 mm; mean = 22.8 mm

Maximum Width: 12 mm – 17.1 mm; mean = 14.7

Figure 4.6. Type 1b: Small Corner Notch Points with serrated blades.

Maximum Thickness: 2.4 mm – 4.19 mm; mean = 3.3 mm.

Material Types: Quartzite, Chalcedony, Chert

This style is very similar to Type 1 of this analysis. The tip is sharp and the cross section is biconvex. The blade is straight and slopes to slightly convex near the shoulders. The Type 1b example exhibits serrated blades. The shoulders range from abrupt to barbed, although most specimens fall into the barbed category. The stem shape is straight to expanding, and the shoulders are generally pointed. The base shape is convex to straight.

This style of point is a variation of the Plains Corner Notch style of points, and is referred to the Foothills/Hogback point. The only difference between these two styles is the serration present on the blades of the Foothills Corner Notch style. Nelson first described this distinction in his report of the Lindsey Ranch Site (Nelson 1971). It occurs within most Early Ceramic assemblages alongside the Corner Notch styles (Type 1). Corner notched points with serrated blades are thought to be manufactured within the constraints of the Plains Woodland Tradition because of their association with cord-marked pottery and non-serrated corner notched points (Type 1a of this work) from Early Ceramic components. Nelson (1971) identified the serrated points as an indicator artifact of the "Hogback phase", and tentatively added a new phase to Front Range prehistory. However, projectile points examples at the Coney Lake site suggests that serration was not part of the original arrow point design but rather added to the points later to make them more effective in other functions, such as cutting tools (Benedict 1990:74). The addition of serrations on these projectile points may answer why many of the serrated points from the Weinmeister collection as well as other collections appear to have asymmetrical blades.

Butler (1988) also refuted Nelson's addition of the Hogback phase to Colorado prehistory, citing that many of the diagnostic artifacts for the Hogback phase were identical to those of the Early Ceramic, and therefore did not warrant a separate phase distinction. This style is similar to serrated examples found along the hogbacks of the Front Range at the Lindsey Ranch site (Nelson 1971), Magic Mountain (Irwin-Williams and Irwin 1966), and LoDaiska (Irwin and Irwin 1959), as well as high altitude sites in the mountains along the Front Range, such as the Coney Lake site (Benedict 1990).

<u>Type 1c: Small Corner Notch Point with Basal Notch</u>

N = 1

Maximum Length: 21.99 mm

Maximum Width: 15.61 mm

Maximum Thickness: 5.45 mm

Material Types: chalcedony

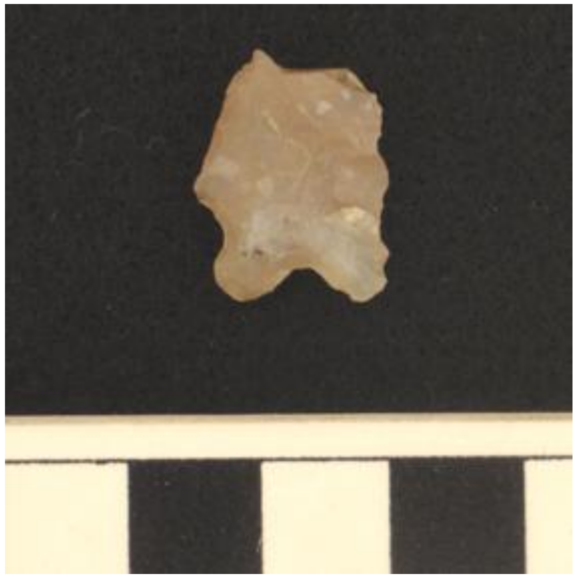


Figure 4.7. Type 1c: Small corner notch point with basal notch.

This proximal portion of a corner notched projectile point displays a straight blade edge with an abrupt shoulder shape. The stem is straight, and the tangs are pointed. The base is characterized by a notch or an indent in the center.

This projectile point resembles those within the McKean Shouldered style, which dates to the Middle Archaic (2650 BC - 1550 BC). This style is similar to examples found at the Coney Lake site in the Colorado foothills (Benedict 1990:22, Fig. 16, Y) and the Type 5 projectile points are associated with Archaic contexts from the Magic Mountain site (Kalasz et. al 1995:102). This style is also similar to style 3d from the Swallow site, which was also found within Middle Archaic components (McComb 2009:3)

<u>Type 2: Medium Corner Notched Point</u>

N = 1

Figure 4.8. Type 2: Medium corner notched point.

Maximum Length: 34.3 mm

Maximum Width: 24.8 mm

Maximum Thickness: 4.4 mm

Material Types: Chalcedony

This medium sized projectile point exhibits a sharp tip shape and a biconvex cross section. The shape of the blade begins straight and becomes slightly convex near the shoulders. The blade is slightly serrated. The shoulders are weakly barbed and the tip is slightly rounded. An expanding and slightly convex shape characterizes the stem. The notches are placed at the lower corners of the point, giving the stem a slightly flared look when compared to other corner notch styles from this collection.

This point type resembles those found within the Pelican Lake style of projectile points. This style is found within components dating to the Middle and Late Archaic period (3,050 BC – AD 150) and is similar to Type 2b from the Swallow site (McComb

2009:9), Lodaiska K (Irwin and Irwin 1959), and MM 23/Type 7c points from Magic Mountain (Kalasz et al 1995:101), and an Archaic point from the Bradford House site (Johnson 1997:76, Figure 19-D). This form may also represent a large Plains Corner Notched point style (Type 1), however due to the presence of greatly expanded stem compared to Type 1 tools it was placed within its own type.

Type 3a: Small Side Notch Point Expanding Stem and Deep Notching

Figure 4.9. Type 3: Small side notched point with Expanding stem and deep notching.

N = 3

Maximum Length: 15.83 mm - 22.2 mm; mean - 21.95 mm

Maximum Width: 11.4 mm – 11.00 mm; mean - 12.12 mm

Maximum Thickness: 4.14 mm – 2.9 mm; mean - 3.57 mm

Material Types: Quartzite, Chalcedony, Chert

These small projectile points have a sharp tip and a biconvex cross-section. The blade is straight to convex, and the shoulders range from rounded to abrupt. The stem is straight. The base is considered a straight flange, and the base shape is straight. The notches are close to the base, and are incised deeply towards the midline of the tool.

These side notched projectile points resemble those found within the Plains Side Notch style. They are most similar to examples of type 11b from the Swallow Site (McComb 2009:5), as well as examples from the Agate Bluff sites (Irwin and Irwin 1957) The examples from the Swallow site are found within Middle Ceramic contexts (AD 1150 – 1540).

Type 3b: Small Side Notch Points with Expanding Bases and Shallow Notches

Figure 4.10. Type 3b: Small Side Notch Points with Expanding Bases and Shallow Notches.

N = 2

Maximum Length: 22.92 mm – 30.14 mm; mean – 26.53 mm

Maximum Width: 12.34 mm – 15.51 mm; mean – 13.92 mm

Maximum Thickness: 3.85 mm – 4.89 mm; mean – 4.37 mm

Material Types: Quartzite

These two projectile points have a sharp tip with a biconvex cross-section and a straight blade edge. The shoulder shape is rounded to abrupt and the stem is expanding.

The tangs are pointed and the base straight is straight. The notches are very shallow and very close to the base of the point. The two projectile points are made from quartzites.

These projectile points resemble small nick-notch points described from the Magic Mountain excavations undertaken by Centennial Inc. in 1994/1995 (Kalasz et al 1995:105). The examples of these points from the Early Ceramic (AD 150 – AD 1150) components of Magic Mountain site are described as knives (Zier et al 2005:106). This style of point has also been found within Early Ceramic components from southeastern Plains sites, including the Pinon Canyon Maneuver Site (Anderson 1989:214:214). The examples from the Weinmeister are large in thickness, but do not exhibit the helicoid cross section that is indicative of resharpening activities.

Type 3c: Small Side Notched Points with Greatly Expanding Bases

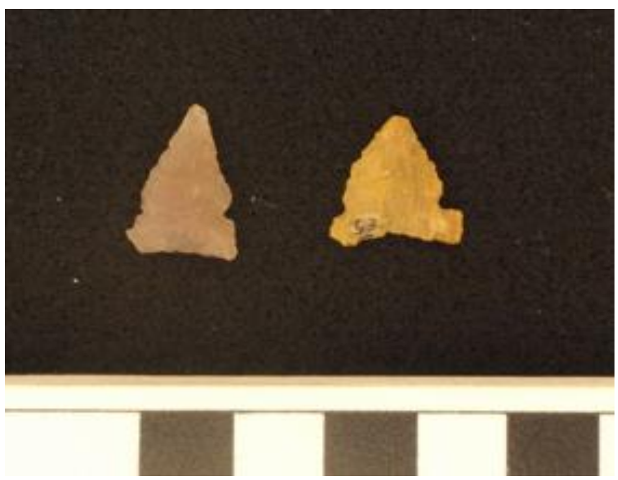


Figure 4.11. Type 3c: Small side notched points with greatly expanding bases.

N= 2

Maximum Length: 16.35 mm - 19.27 mm; mean - 17.81 mm

Maximum Width: 13.06 mm - 15.35 mm; mean - 14.20 mm

Maximum Thickness: 2.79 mm - 2.94 mm; mean - 2.86 mm

Material Types: Petrified Wood, Chert

These small side notched points have sharp to dull tips and a biconvex cross section. The blade edge is straight, and the shoulders are rounded and very small, almost invisible. The stem is greatly expanding and extends beyond the shoulders of the point. The flanges are slightly contracting and the base is concave. The blades on both examples are very small, suggesting extensive resharpening activities.

These projectile points resemble example L from category 80 from the Pinon Canyon Maneuver Site (PCMS) in the Arkansas River basin (Anderson 1989:305). In northeastern Colorado, type 2b from the undated McEndeffer shelter show similarities in point styles (Wood 1967; Anderson 1989:214). The very small size and thinness of the points, as well as the placement of the notches suggest that they are of Middle Ceramic origin.

Type 3d: Side notched with Expanding Stem, Dull tip

Figure 4.12. Type 3d: Side Notched Expanding Stemmed Points with Dull Tip

N= 3

Maximum Length: 16.5 mm – 27.66 mm; mean – 21.52 mm

Maximum Width: 16 mm – 21.74 mm; mean – 15.6 mm

Maximum Thickness: 4.21 mm - 5.6 mm; mean – 3.8 mm

Material Types: Chert, Quartzite

This category consists of three small side notched projectile points with very dull, rounded tips, convex blades and rounded shoulders. The stems are expanding and the bases are straight. The blades resemble that of type 4 of this analysis, and may have been extensively retouched to use as knives or scrapers. None of these examples show evidence of helicoid cross sections, and are mostly symmetrical in blade structure that is indicative of functions as knives; therefore, these retouched tools may be more representative of scraping tools.

<u>Type 4: Large Basal Notched Points</u>

Figure 4.13. Type 4: Large basal notched point.

N= 1

Maximum Length: 15.64 mm

Maximum Width: 17.39 mm

Maximum Thickness: 2.64 mm

Material Types: Orange/Red Chert

This projectile point has a dull tip that has been extensively retouched. The cross section is biconvex, and the blade edge extends straight to the tip of the tang. There are no shoulders to this point. The tang is flat and slightly rounded at the edges and the base is very slight convex and heavily ground. The notches are located in the basal portion of the point, and one tang is missing, and extensively ground.

This projectile point appears similar to those found within the Wray style of point from eastern Colorado (Taylor 2006). The very dull, reworked distal portion of the point suggests it may have been reused as a hafted scraper or knife. The notched base tentatively suggests an Archaic date range. This tool also resembles a Calf Creek point (Bement et al 2004). This style is found predominantly in southern Midwestern states and dates to the Early Archaic. However examples of this style have been found in southern Nebraska. In a notable case, a Calf Creek point was found embedded in the skull of a bison which tentatively dates nearly 5,000 old (3,000 BC) and places it within the Early to Middle Archaic period (Bement et al 2004).

<u>Unclassifiable Projectile Points</u>

This category includes 46 unclassifiable tools of which only the medial or distal fragments are present, therefore making a classification or assigning a cultural typology impossible.

The majority of broken tools consists of chert and represents 47% of the sample. Quartzite contributes the lowest frequency of broken fragments and only consists of 17% of the raw material sample. Thirty one of the 46 portions are represented by tip portions, and 9 portions are represented by midsections. Base sections make up the smallest sample of the unclassifiable portions with only 6 examples. Table 4.5 provides portion and raw material for these fragmented tools.

Table 4.5.Portion breakdown for fragmented, unclassifiable projectile points.

Material Type	*Portion*	*Frequency*
Chalcedony	Base	0
	Tip	12
	Medial	3
	Raw Material Total	*15*
Chert	Base	4
	Tip	14
	Medial	4
	Raw Material Total	*22*
Quartzite	Base	2
	Tip	4
	Medial	2
	Raw Material Total	*8*
Petrified Wood	Tip	1
Overall Total		46

Knives: The Weinmeister collection contains portions of 12 knives: four complete knives, six fragments and two possible knives. Two of the complete knives were hafted. Again, prehistoric hafted knives can be easily confused with hafted projectile points or large darts. These tools were determined as knives based on the larger thickness of the blade, the asymmetry of the notches and blades, and the presence of a helicoid cross section.

The hafted knives are very similar in morphology and exhibit deep corner notches, asymmetrical blade lengths and are much larger than the projectile points of the previous section (Figure 4.14). Both of these examples display slightly convex bases and sharp tips.

Figure 4.14. Hafted knives.

The six knife fragments as well as the two possible knives in this collection consist of the distal portions of the tools. The assignment of knife was made based on the thick nature of the blade, as well as the helicoid cross section of the blade. However, because there is no proximal portion of the tool, it is impossible to determine if these fragments were hafted, and these fragments may also represent distal portions of projectile points.

Unhafted Bifaces

In general, unhafted bifaces can serve as cores, or can be reduced into other forms including knives and projectile point preforms (Andrefsky 2008:181). Unhafted bifaces in the collection consist of projectile point preforms, unhafted knives, and uncategorized bifaces.

Preforms. Twenty-six small unnotched bifaces have a sharp tip with a biconvex cross section. The blade is straight to convex and the base is either straight or slightly convex. These items could represent preforms or be completed unnotched projectile

Figure 4.15. Bifacial preforms from Weinmeister's extant collection.

points. This artifact style is commonly found within Early and Middle Ceramic assemblages and is similar to those found at Swallow Site Type 12, (McComb 2009:5) Magic Mountain 74, Magic Mountain 75 (McComb 2009:5), the Coney Lake site (Benedict 1990:28, figure 19, M) and from the Lindsey Ranch site (Nelson 1971:8, Figure 6, examples W, X, Y).

Unhafted Knives. The collection also includes two large, complete unhafted bifacial knives. These were determined based on the asymmetry of the blades, as well as the sloping nature of one of the faces of the biface which indicates extensive resharpening. One knife is constructed from gray/tan quartzite, and the other from white chert (Figure 4.16).

Figure 4.16. Unhafted knives from the Weinmeister Collection

Both knives are almost identical in length measurements, reaching 80 mm (8 cm) in length and 33 mm (3 cm) in width. This size is large when compared to the hafted knives from the collection.

Finally, 23 unhafted miscellaneous bifaces and biface fragments were recorded from this collection. Only three examples were complete, and the rest consisted of distal, proximal, and midsection portions. These fragments were separated from projectile point fragments based on the convex shape of the blades. Raw materials for this category include chalcedony, quartzite, chert and petrified wood.

Drills

The drills have concave, convex, straight, and excurving bases with straight blades. None of the drills are notched. One of the drills (center, figure 4.17) was made

Figure 4.17. Drills from Weinmeister's extant collection.

from a Midland style projectile point, which dates to the early Paleoindian stage in Colorado. However, it is not clear if Midland point was developed into a drill during the Paleoindian period, or collected by prehistoric people living on the Harvester site and turned into a drill at a later date.

Scrapers

The Weinmeister collection includes 14 scrapers, which include both end and combination scrapers. End scrapers are classified by a working edge located on the distal end opposite the platform of the tool. Similarly, side scrapers are characterized by a working edge located on the lateral margins of the tool. Basic raw materials include chert, chalcedony and quartzite. Four of the 14 end scrapers show worked edges on both a side and an end of the tool. Scrapers are present throughout prehistory in Colorado, and are generally not temporally diagnostic with the exclusion of Paleoindian spurred scrapers (Andrefesky 2008:34). However, even this diagnostic trait may represent a side effect of resharpening edges while still in the haft, and may not be diagnostic to the Paleoindian tool kit (Andrefsky 2008:34).

Flake Tools

Retouched flakes are a product of human modification and occur either through purposeful manufacture or can occur through the tool use of the flake. Twelve flakes with evidence of edge modification were found within Weinmeister's collection. These tools were sorted into raw material type and categories describing the location of retouch. Six flakes are chalcedony, three are chert, and with one each of petrified wood, quartz and quartzite. Seven of the flakes exhibit bifacial retouch, and five show unimarginal retouch. Bifacial retouch occurs when both the ventral and dorsal surface exhibits modification at the same place on the flake, while unimarginal retouch occurs when retouch is located either on the dorsal or ventral surface, but not in the same location on the flake (Andrefsky 2008:79). The predominance of microcrystalline raw materials (chalcedony, chert) in this category suggests that prehistoric people took advantage of the inherently sharp edge of a fresh flake to use as a cutting or scraping tool.

Debitage

Weinmeister's collection contains 32 pieces of unmodified flaked stone. Raw materials consist of chert (n=14), quartzite (n=8), chalcedony (n=6), petrified wood (n=2) and quartz (n=2). Four flakes exhibited heat alteration in the form of crazing and potlid fractures. Flakes ranged between 6 mm to 58 mm in length, with an average of 21 mm in maximum size.

Ground Stone

Two examples of ground stone are included in the extant collection. The first included a small, fine grained sandstone disk (Figure 4.18). This thin, tabular artifact is smooth on both sides, but does not contain any discernable facets. It is small and measures only 46.6 mm long, 36.2 mm wide and 10 mm thick. The smooth sides suggest it was not part of a larger broken metate. Similar artifacts have been discovered in the excavations of Bradford House II on the Ken-Caryl Ranch (Johnson 1997:41). It is hypothesized that these small disks, termed pallettes, may be used in grinding pigments and similar materials (Johnson 1997:42). The other ground stone artifact is a large sandstone metate with two basin impressions on both surfaces (Figure 4.19 and 4.20). The netherstone is broken, and measures 25.5 cm in length, 17.3 cm in width and 5.0 cm in thickness, at the thinnest portion in the middle of the basin. This is the largest example of ground stone known from the Harvester site.

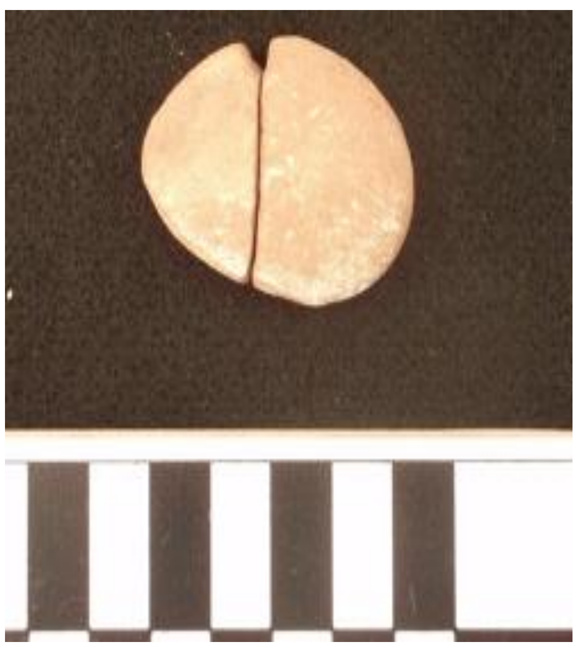


Figure 4.18. Ground stone “pallette” from Weinmeister collection.

Figure 4.19. Large sandstone netherstone.

Figure 4.20. Netherstone fragment in cross section.

Figure 4.21. Atlatl weight from the Weinmeister collection.

Atlatl Weight. One atlatl weight was recovered in Weinmeister's collection (Figure 4.21). The atlatl weight has ten ground, smooth facets. Both ends are ground flat, and a natural, dark brown "watermark" dominates the decoration. The tool measures 78 mm in length, 20 mm in width and 13 mm in thickness. The material type is a very fine grained, unknown material. These artifacts are rare to find in the archaeological record, which may be due to the use life of these tools when compared to more expedient tools such as projectile points (Knapp and Ficarrotta 2009). Although these weights are functionally part of atlatl hunting tool kits, they are most commonly found in Early Ceramic assemblages in burial contexts (Knapp and Ficarrotta 2009). This suggests that these weights remained culturally significant even after the atlatl as a tool began to be replaced by bow and arrow technology during the Early Ceramic. This could also imply that atlatls were being used contemporaneously with bows and arrows. The atlatl weight found on the Harvester site was not found within burial contexts, but instead found on the ground surface near the southern boundary of the site. Even though the Harvester site is primarily an Early Ceramic site, other temporally diagnostic artifacts from the assemblage show that there is an Archaic component present. It is impossible to discern whether this atlatl weight represents use during the Early Ceramic, or the Archaic Stage.

Ceramics

The extant collection contains 84 fragments of cord-marked pottery, representing vessel rims, body and base portions according to methods described by Ellwood (2002) (Table 4.6). Body sherds, note by the thinness of the sherd, comprised 69 of 84 fragments of the collection, or 81% of the ceramic assemblage. Rims consisted of 9% of the assemblage, with a total of 7 sherds. Rims were distinguishable by a smooth, straight edge on the sherd. Only one base sherd was noted within the sample. The base sherd was distinguished based upon the thickness of the sherd compared to the other sherds in the collection, however, it could represent a very thick body sherd. Body/base sherds are also relatively thick, but thinner than the base sherd presented in this analysis, and therefore were put within a transitional category of analysis. The rim/body category consists of four fragments that were refitted to form two sherds. Each of the two sherds contains both a body and a rim sherd.

Table 4.6.Ceramic portion frequency within the Weinmeister collection.

Base		*Body*		*Body/Base*		*Rim*		*Rim/Body*		*Total*
Count	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	84
1	1%	69	81%	5	6%	7	9%	2	2%	

The body sherds are thin and average six mm in thickness. Rim sherds are straight and plain and also average six mm in thickness. The one base sherd in this collection measures 7 mm in thickness, not much higher than rim or body sherds.

The temper of these sherds consists of medium to large grained angular and sub-angular inclusions, with large pieces of quartz, feldspar and mica. The mica is visible within the paste of the sherds, and appears to have been a natural part of the clay source rather than something added into the manufacturing process. This observation stems from the inclusion of mica throughout the pottery sherd, and not just contained within the interior of the sherd. Feldspar is indicative of granitic sources of temper, which is easily available in cobbles from river sources flowing from the mountains, in this case, the Cache la Poudre River. This observation appears to be typical within Early Ceramic pottery of the hogbacks of eastern Colorado (Parker and Ellwood 1994). However, a more detailed analysis, including petrography, is suggested here in order to identify temper and paste sources. Carbon streaking, a darkened color within the core of the sherd, is apparent in some samples. This color is a result of ceramics that have been fired at a relatively low temperature for a short period of time, or of extremely finely textured pottery (Rice 1987:88; Ellwood 2002:5).

All of the sherds exhibited surface treatment in the form of both Z- and S-twist of cord-marks, which are thought to be a functional addition instead of a decorative one (Ellwood 2002)s. However, the depth and clarity of the cord-marks vary from sherd to sherd. The cord-marks vary from deep and clear to completely obliterated. Obliteration can be a product of the depositional environment of the sherds, or a cultural manifestation of physically smoothing down the imprints. An exposed environment can erode the surface of the sherds, and the addition of cord-marking while the pottery is still wet can leave messy and unclear imprints of the cord-marks (Ellwood 2002:5). The sherds from the Harvester site were recovered from the surface, and exhibit both very clear and very worn cord-mark designs, so assigning a cultural or taphonomic source of cord-mark clarity is difficult.

Cord-marked pottery is generally characteristic of the Early and Middle Ceramic periods, and this type of pottery marks the first pottery present in eastern Colorado during the Early Ceramic (Dwelis 1996; Ellwood 2002). Cord-marked ceramics are associated with the Colorado Plains Woodland tradition, a cultural tradition within the Early Ceramic period (Butler 1988:451; Dwelis 1996:7). Colorado Plains Woodland ceramics in eastern Colorado are generally conically shaped with pointed bases and relatively straight, thin bodies (Dwelis 1996:8). Rims range from straight, slightly incurving or slightly excurving. No evidence of conical bases was observed within the Weinmeister collection. The association of diagnostic artifacts (Plains Corner Notched and Foothills Corner Notched projectile points) from the Weinmeister collection suggests that these ceramics also date to the Early Ceramic.

Bone Tools

The Weinmeister collection contains three bone tools (Figure 4.22). One tool has a rounded distal portion, and its function is unclear. The other two tools resemble bone awls similar to those found within other Early Ceramic contexts at Bradford House II and III excavations (Johnson 1997:38, 67, figure 6, J-K, and Figure 14, i-j), and the Magic Mountain site (Kalasz et al 1995:187 figure 36, a-b). The shaped awls at these sites are thought to be made from the long bones of deer.

Figure. 4.22. Bone awls from the Weinmeister Collection.

A similar awl was discovered during trail surveys conducted on the River Bluffs Open Space (Appendix IV). Comparative analysis found that awl to be the long bone of a mule deer. The similarities between the tool found during the trail survey and the tools at comparable Early Ceramic sites suggest that the tools from Weinmeister's collection are also deer species.

Historic Glass and Prehistoric Tubular Mammal Bone Beads

Weinmeister collected two historic glass beads and 537 blank and incised small mammal bone beads from the Weinmeister site and the area west of the Weinmeister site. The small irregularly shaped bone bead (Figure 4.23, right) was found near the silage pits on the Weinmeister site. The two blue glass beads were recovered from west of the Harvester site on the area that is now used as a golf course. These tiny beads are representative of the Protohistoric period, when Euroamerican goods and influence reached native peoples in Colorado, between 1540-1860 (Gilmore et al 1999). This period was a time of rapid cultural change, and these small beads were only a small portion of trade goods imported by European and European Americans.

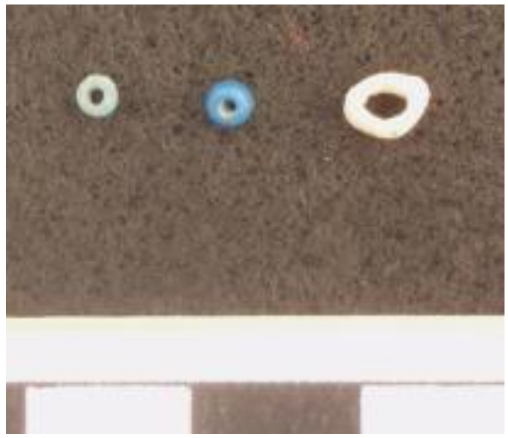


Figure 4.23. Blue glass trade beads and small irregularly shaped bone bead.

During the Protohistoric periods in North America, these beads were only manufactured in Europe (Von Wedell 2011). Additionally, other sites along the Cache la Poudre River basin have returned hundreds of these small European beads, which, among other evidence, attests to the use of this area during the Protohistoric (Newton 2008; Von Wedell 2011).

The eastern silage pit on the Weinmeister site produced 537 small, tubular, mammal bone beads and 47 fragments of beads. All of the beads exhibit polishing on the body of the bead and ground and polished ends. The beads are small, and range from 2 mm to 38 mm in length (0.2 cm – 3.8 cm), with an average length of 8.14 mm (0.8 cm). The highest frequency of bead sizes occurs between 3 and 12 millimeters. The largest beads in this sample most likely represent bones from deer. The width of the beads is much less varied than the lengths, and the vast majority (88%) falls between 3 and 4 millimeters. The width measurements may be useful in discovering the animal remains used in manufacturing the beads. Unlike length, which is a factor of cultural preference, the widths of the bones used in making beads are likely less modified and less arbitrary than lengths. The beads are decorated with two basic patterns, including incised lines that spiral around the width of the bead in one continuous line, and concentric circles that vary in number along the length of the bead. One hundred seventy-six of the beads do not exhibit any type of incising (Table 4.7). The lack of decoration is found almost exclusively on the smaller beads of the collection. The possible purposes of incising are discussed in Chapter 6 of this work.

On other Early Ceramic site in northern Colorado, incised tubular beads are found within camp sites as well as mortuary contexts. While the beads on the Weinmeister site are not directly associated with the burial found in the western pit, or from the bladed area of the Weinmeister site, they may be associated with the mortuary practices of the Colorado Plains Woodland Tradition. The relevance and importance of these beads in context with the Colorado Plains Woodland tradition is also more closely discussed in Chapter 6 of this work

Table 4.7. Incising Styles.

Incising Type	*Ring*	*Spiral*	*No Incising*	*Total*
Bead Frequency	346	15	176	537

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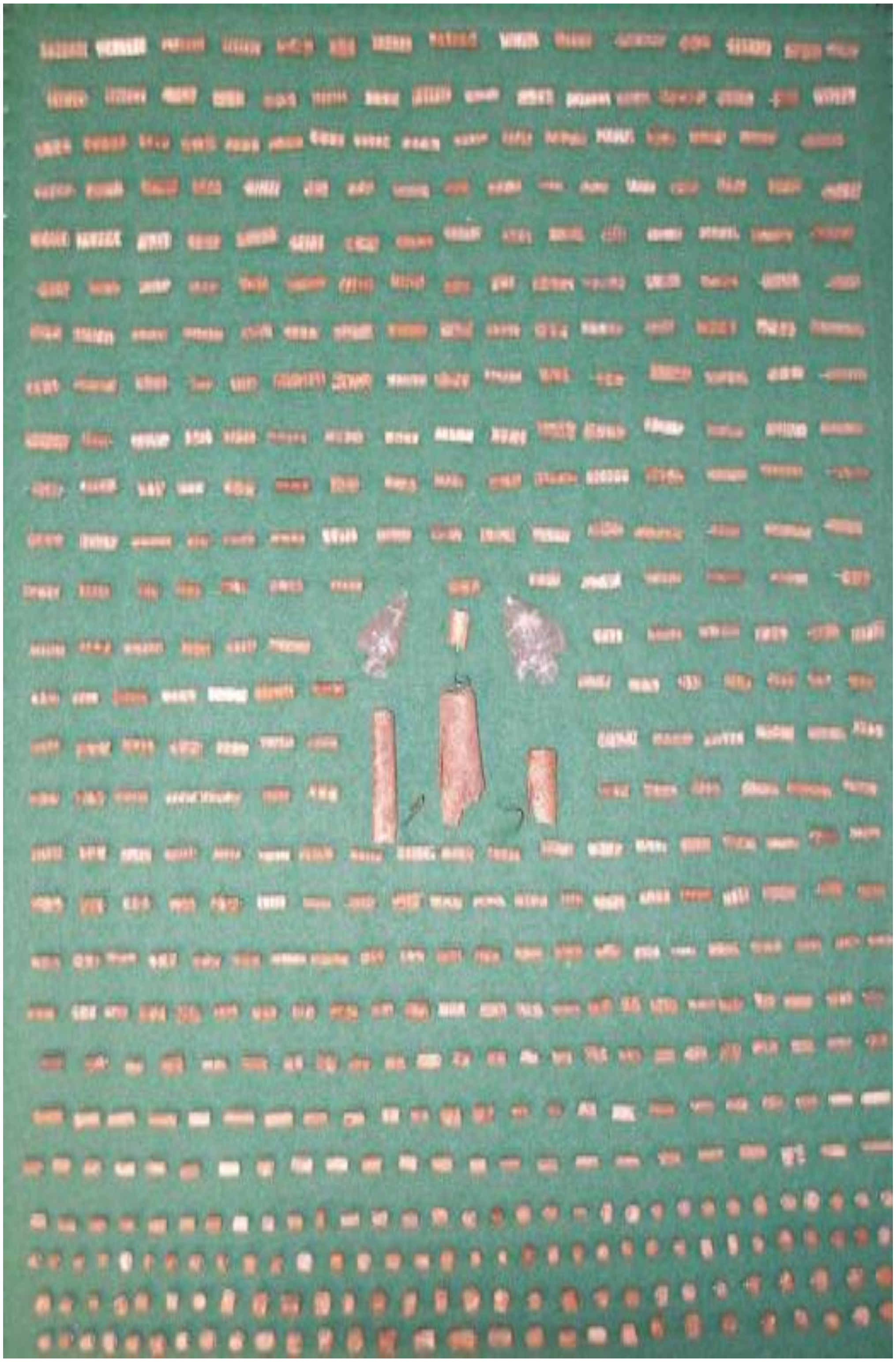


Figure 4.24. Small tubular bone beads from Weinmeister collection. The two small chalcedony corner notch points were also found with the cache of beads.

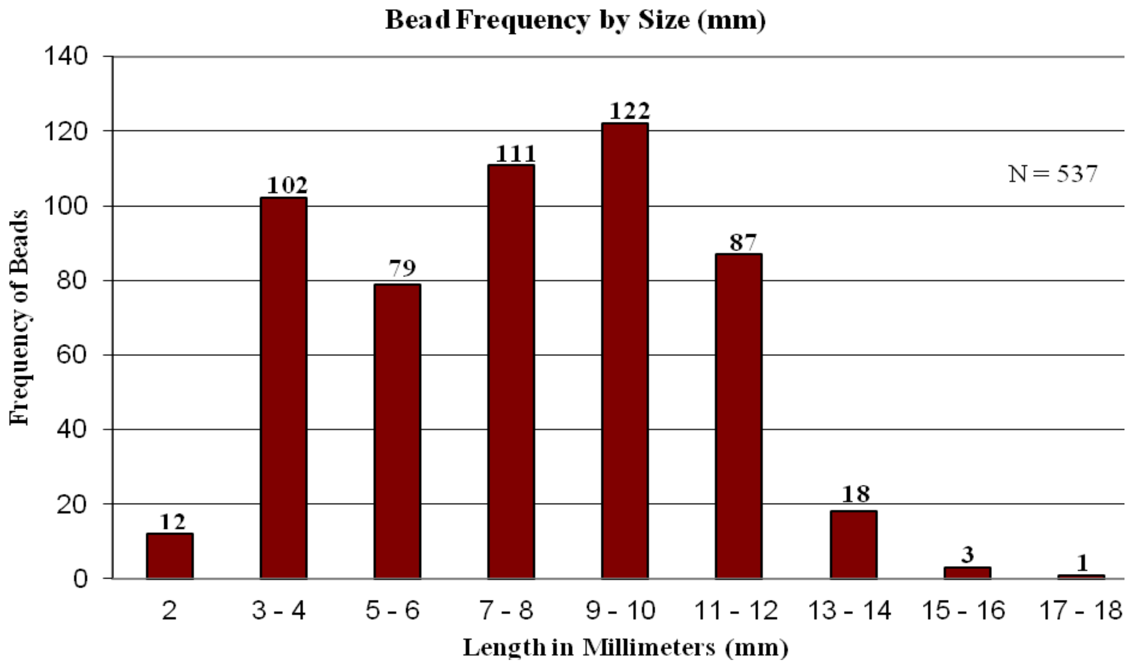


Figure 4.25. Frequency of tubular bone bead size, in mm.

Shell and Fossilized Shell

Two large pieces of shell and nacre and two pieces of fossilized shell were documented from the Weinmeister collection. These items were recovered from the surface of the Harvester site. Shell plays an important part of Early Ceramic sites and its use within cultural contexts is certainly the most apparent during the Late Prehistoric (Calhoun 2011). Shells and shell artifacts during this period were being used for personal adornment and decoration and are sometimes found in burials (Calhoun 2011). On the Harvester site, minute pieces of shell were discovered from many of the ant mounds and on the surface. None of the shell fragments from the field work or extant collection appear to be modified.

Figure 4.26. Shell from Weinmeister's extant collection.

Historic Artifacts

Three historic artifacts were found within the Weinmeister Collection. The two glass beads were discussed above. The third artifact consists of a square nail. This artifact is part of the larger context of the use of the River Bluffs Open Space as farmland.

Discussion

The Weinmeister collection consists of a variety of artifacts, including projectile points, knives, preforms, bifaces, scrapers, drills, historic and prehistoric beads, cord-marked ceramics, historic artifacts and shell fragments. The lithic materials from the Weinmeister site consist of 248 artifacts, including ground stone. These artifacts consist mainly of bifacial tools, which represent 75% of the lithic collection. The tools consist of projectile points, hafted and unhafted knives, bifaces, drills, end and side scrapers, and drills. Debitage includes 32 pieces of flaked stone.

The majority of these tools were collected from the Harvester and Weinmeister sites, from surface and subsurface contexts. The projectile point portion of this collection represents dates from the Middle Archaic to the Middle Ceramic periods of eastern Colorado, which is a range of 3050 BC to AD 1550. The shapes and styles of projectile points are predominately small, corner notched and side notched points, with some examples of larger points that are similar to artifacts dated to Archaic components from other Early Ceramic and Archaic sites along the eastern Front Range and hogbacks.

The Harvester and Weinmeister sites are most likely contemporaneous and culturally related. The artifacts found on the Weinmeister site were collected from the ground surface and subsurface. The subsurface finds were results of the silage pit excavations (figure 4.1), and this area represents the highest frequency of complete projectile points. The excavation of the silage pits damaged the context of the Weinmeister site; however, the amount of artifacts recovered subsurface by Weinmeister proves that deep cultural deposits exist at the site. This fact is also supported by the large number of positive auger tests completed by SWCA during their field work on the Weinmeister site (Burnett and Kennedy 2009). The overlap in styles suggests that the site was being used continuously, or revisited during both of these periods.

The ceramics in this assemblage are diagnostic to the Early Ceramic period in eastern Colorado, or to the Colorado Plains Woodland Tradition. There are a minimum of two vessels present between the Weinmeister and Harvester sites. Pottery on the Weinmeister site was found within one of the silage pits, and ceramics on the Harvester site were recovered from the surface. Even though the occupation of the Harvester site lies on the cusp of the Early/Middle Ceramic transition, the ceramics there exhibit Early

Ceramic traits. There is no decoration besides the cord-marking and the rims are straight. The association of the ceramics with corner notched projectile points also contributes to the Early Ceramic designation.

The Weinmeister collection contains items that are rarely found by professional archaeologists and the reasons for this are varied. First, and most importantly for this research, many sites in eastern Colorado have already been discovered and collected by artifact hunters by the time that formal archaeological research is conducted. This fact leads to skewed ideas of site use and function because of these missing artifacts. Also, many artifact types are highly perishable and subject to taphonomic processes. This applies to the mammal bone bead assemblage and even the ceramics in this collection. Therefore, the importance of documenting the Weinmeister collection is vital for contextual analysis of the Harvester and Weinmeister sites. Without the access to the collection and open line of communication between archaeologists and collectors, much of this information would have been lost.

CHAPTER 5

RESULTS OF CSU FIELD INVESTIGATIONS OF THE RIVER BLUFFS OPEN SPACE

During the fall of 2009 and spring of 2010, the author, Dr. Jason LaBelle, a class of three CSU undergraduate students, and several generous volunteers completed archaeological surveys of the northern-most bluff of the River Bluffs Open Space, as well as survey of the proposed trail system installed in the spring of 2010. This chapter covers the results of that field work.

This work was completed in order to prepare the open space for public interpretation and management as part of the River Bluffs Open Space project. The field research of the Harvester site allowed for more rigorous documentation of archaeological resources on the Open Space, and contextually connects the Harvester and Weinmeister sites.

The Harvester Site

The Harvester site is situated on the northern most bluff on a series of east/west trending bluffs parallelling the Cache la Poudre River. An open floodplain and riparian area extends from the base of these bluffs to the river to the east of the site. The bluff system and the Cache la Poudre River dominate the landscape of the River Bluffs Open Space. The Cache la Poudre River provides a refuge for both people and animals from the highly variable and semi-arid environment of the western edge of the High Plains.

Figure 5.1. Harvester site overview, looking east towards the Cache la Poudre River.

Prevailing plant species on the bluffs at the western boundary of the open space consist of buckwheat (*Eriogonumeffusum*), wild rye sp. (*Elymuselymoides*), yucca (*Yucca glauca*), fringed sage (*Artemesiafrigida*), three-awn (*Aristidapurpurea*) and several different types of shrubs, including four winged salt-brush (*Atriplexcanescens*) (Boring 2010).

Animals that dominate this area include mule deer, coyotes, rabbits, foxes, raccoon, and skunks. Various birds of prey, including red tailed hawks and great horned owls also call the River Bluffs their home (Boring 2010).

Figure 5.2. Overview of the Harvester site, facing south. The arroyo represents the southern boundary of the site.

These diverse plant and animal species certainly played a role in the decision to live on the property. The site boundaries are defined by natural boundaries as well as the concentration of cultural material. The edges of the site are determined by both the physical contours of the bluff system on all sides, as well as the distribution of cultural material on the surface of the site. Artifacts documented on the Harvester site include hundreds of pieces of flaked stone, projectile point fragments, ground stone, and ceramics.

The Harvester site appears to be very typical of Early Ceramic campsites in northern Colorado in terms of diagnostic artifacts and site location (Butler 1988; Ellwood 2004; Nelson 1971; Scott 1973). As demonstrated in Chapter 4, diagnostic artifacts from the Harvester site are dominated by Plains and Foothills Corner Notched projectile points, in association with cord-marked-ceramics, distinctive “guitar pick” style preforms, splinter awls, and the tubular bone beads, all of which are defined as classic Early Ceramic artifacts (Scott 1973). Like other Early Ceramic sites in the area, the Harvester site is located on top of a promontory and situated near two permanent sources of water (Scott 1973). This close proximity to permanent water sources is advantageous in many ways. The Cache la Poudre River, located directly east of the Harvester site provides water and other aquatic resources all year long. This would have allowed prehistoric groups to inhabit the Open Space for a longer period through different seasons. Fossil Creek, a small drainage that flows into the Poudre River, runs directly north of the site (Figure 5.3). This creek flows seasonally, but still would have provided fresh water to inhabitants of the Harvester site during peak flow times.

Previous Archaeological Work on the Harvester Site

Limited archaeological research has been conducted on the Harvester site prior to this research. A pedestrian survey, conducted by Dr. Jason LaBelle of Colorado State University, was initiated after Larimer County approached him to confirm the presence of archaeological material on the Open Space. This survey was conducted over the entire Open Space in the summer of 2008. LaBelle found considerable evidence for prehistoric and historic use of the landscape including extensive lithic scatters, lithic tools, and historic farming equipment. The most concentrated area of cultural material was located on what is now denoted as the Harvester site (LaBelle 2008). File searches conducted on the Colorado Office of Archaeology and Historic Preservation website turned up one previously recorded site on the extreme southwest portion of River Bluffs

Figure 5.3. The River Bluffs Open Space. The northern tip of the bluff system is the Harvester site (in red).

property (LaBelle 2008). This site was recorded during a CDOT project concerning Hwy 392, and consisted of a single flake (Jepson 1994; LaBelle 2008).

The connection and history of the Harvester site to the Weinmeister site and the Weinmeister collection make it an extremely valuable resource for compiling the history of the prehistoric occupation on the Open Space. The rest of this chapter is devoted to the results of field work on the Harvester site, and the data it provides to contextualize the Open Space during the Early Ceramic.

Results of CSU 2009-2010 Field Work

This field research was guided by five goals which were previously detailed in Chapter 3 of this work. The first four of the five goals that were completed during the 2009 field work, and the last goal was completed in the spring of 2010.

Goal 1 and 2: Consultation with Garry Weinmeister and Recordation of Historic Artifacts

The first and second goal of this field work included consultation with Weinmeister to relocate the areas in which he found prehistoric features and artifacts in the past, as well as the historic features. These locations were recorded in UTM coordinates using a handheld GPS unit.

The results of these two goals were covered in Chapter 4 of this work. Because these previous descriptions focused mostly on the location of artifacts and features, this section is devoted to describing the context and the state of preservation of the finds.

On August 29th, 2009, Weinmeister and the author visited River Bluff Open Space to record areas where he recovered artifacts in the past, as well as artifacts and features remaining on site. Weinmeister was able to identify the locations of many features including hearths, the location of a possible bison bone bed, past silage pits, as well as a historic car and farming equipment. He also identified the locations of several artifacts that he collected during the 1960s-1990s, including bone awls, projectile points, knives, and the tubular mammal bone beads.

Four hearths were documented on the extreme western boundary of the Harvester site. These hearths contained flakes, burned bone, and fire altered rock, as well as cord-marked ceramics that are diagnostic of the Early Ceramic period. Hearth 2 was excavated in the spring of 2010 and samples were obtained for radiocarbon and macrobotanical analysis to contextually place the Harvester site into the prehistory of northern Colorado. The results of this hearth analysis are explored in goal 5 of this chapter.

Historic Vehicle. An historic vehicle was found in very poor condition. The body has rusted and contains multiple bullet holes, and a portion of the car has been taken over by grass and scrub. Analysis completed by Ashley Dillon, a CSU archaeology graduate, identified the car as a 1928 Ford Model A truck. This identification was possible based on the design characteristics of vehicle, such as the shape of the frame of the vehicle and the gas cap on the top front of the vehicle. This age was also assessed by relatively dating a 1930s antifreeze can near the vehicle. Although there are many types of Model A vehicle styles, it is assumed that the vehicle is a Model A pickup truck, rather than a sedan given its context in a rural farm environment (Figures 5.4 to 5.5). However, this cannot be verified because of the poor state of preservation of the vehicle, unless additional research is conducted.

Possible Bison Bone Bed. Weinmeister located an area in the southern portion of the Open Space that once contained bison bones. This area is highly visible to motorists on the Hwy 392, which south of the River Bluffs property. As stated in Chapter 4, we were unable to locate any evidence of the bison bones that Weinmeister found in the

Figure 5.4. Historic vehicle located within a drainage on the River Bluffs Open Space.

Figure 5.5. Historic antifreeze can located with the vehicle. This can predates 1935.

1960s, but his collection contains one projectile point that he found associated with this probable bison kill. The bones are either buried under sediment, eroded away, or were collected by some unknown party in the past.

Goal 3: Ant Mound Survey and Microdebitage Collection

The third goal of the project was to determine the extent of ant mounds that contain artifacts on the River Bluffs property.   Three undergraduate students, Rae Mosher, David Anderson, and Ashley Dillon, began by conducting informal surveys around the northernmost three bluffs of the property to gain a familiarity of the artifact densities, topography and environment of the site. After completing this informal survey, these students began to locate and flag every ant mound on these first three bluffs. Each student was responsible for locating and recording the UTM locations of each mound with a GPS device, as well as recording the presence of absence or cultural material in the ant mounds. All ant mounds were marked using a nail and a metal tag with the ant mound number etched in to the tag. These tags were placed on the disk of the ant mound, and are part of a long term study to understand the types, sizes and frequencies of cultural materials that Western harvester ants use in building their mounds. Studying these mounds and their relationship with archaeological material can also aid archaeologists in recognizing archaeological deposits that have been buried, as well as different densities of materials on different portions of the site. The numbering system on the tag corresponds with different areas of the River Bluffs site; specifically, these numbers identify which bluff the mound was found on. Numbers 1 through 100 were given to ant mounds on the first bluff (the Harvester Site), 101 through 200 were given to those ant mounds on the second bluff, and finally numbers 201 through 300 were assigned to ant mounds on the third bluff. While ant mounds from the first three bluffs were identified and marked, only ant mounds from the Harvester Site were combed for artifacts. All ant mounds marked on these three bluffs have associated GPS coordinates. Only the ant mounds recorded as part of the Harvester Site were mapped using the total station. The Harvester Site contains 26 of the total 77 ant mounds recorded. Of the 26 mounds on the site, 25 mounds contain cultural material.

The quantity of microflakes in these ant mounds is high with the total from 26 ant mounds reaching 1,808 flakes. These tiny pieces of flaked stone are by-products of tool manufacturing activity. Typically, ant mounds in archaeological sites reveal only a small number of flakes per ant mound, if there are any at all. One ant mound on the Harvester site alone contained 400 flakes. This high frequency of flaked stone found in the ant mounds supports the assertion that the Harvester Site is a main activity area, and that there is a larger archaeological deposit just beneath the surface. The high density of microflakes also suggests that the Harvester site was used for sustained lithic reduction activities, which are common in prehistoric campsites (LaBelle 2008).

The lithic raw materials represented in the ant mounds varied but mostly consisted of chert, quartzite and chalcedony. Some instances of glass or obsidian were noted, as well as pieces of the nacre (mother-of-pearl) from freshwater shells. Bone, petrified wood flakes, and quartz flakes make up a very small portion of the total assemblage. The obsidian is of great significance, as it came from very distant sources to make it to the

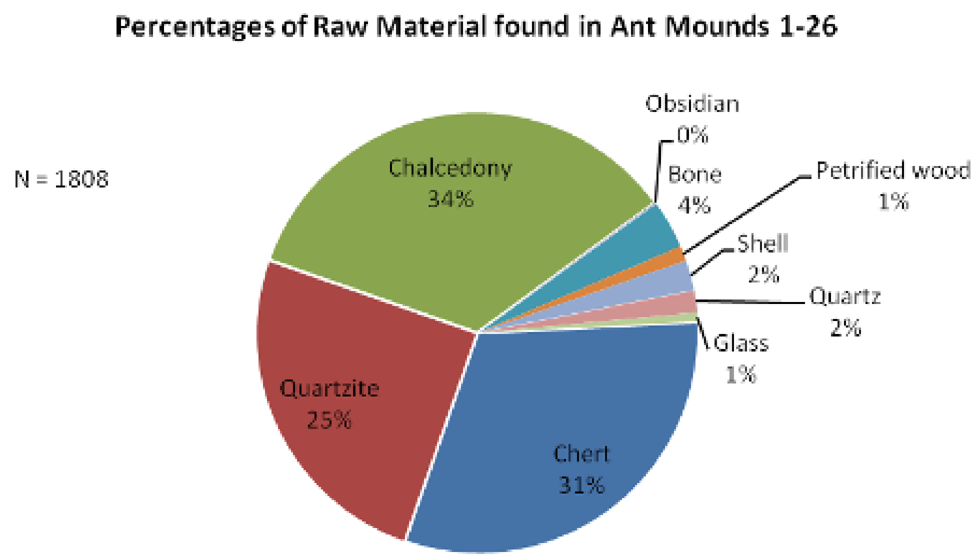


Figure 5.6. Percentages of lithic raw material found in the Harvester Ant Mounds on the Harvester site.

River Bluffs property. The nearest obsidian sources are near Yellowstone National Park, Wyoming, and the Valles Caldera, outside of Los Alamos, New Mexico. Therefore the presence of obsidian in the ant mounds, as well as from tools in the Weinmeister collection, suggests distant trade ties for the prehistoric inhabitants of the River Bluffs Open Space. Table 5.1 breaks down the frequencies of raw material type in each ant mound.

Because these ant mounds were permanently tagged, future studies will be able to be completed to understand the size of artifacts that ants bring back to their mounds. These studies can aid archaeologists in understanding buried deposits of sites, as well as the relationship in artifact density of ant mounds and how these artifacts are affected by natural processes (Burris 2005).

Table 5.1. Flaked stone and shell artifacts collected from 26 Harvester Ant mounds on the Harvester site.

Ant Mound Number	*Chert*	*Quartzite*	*Chalcedony*	*Obsidian*	*Quartz*	*Petrified. Wood*	*Shell*	*Bone*	*Glass*	*Total*
1	68	36	81	-	-	-	3	4	-	192
2	4	6	11	-	-	-	1	-	-	22
3	2	7	5	-	1	-	1	-	-	16
4	1	-	0	-	-	-	1	-	-	2
5	10	21	20	-	6	-	4	-	-	61
6	20	14	15	-	-	2	-	-	-	51
7	161	75	112	-	-	7	-	45	-	400
8	23	6	40	-	1	-	3	-	-	73
9	-	-	2	-	2	1	-	1	-	6
10	2	1	1	-	-	-	2	-	-	6
11	3	-	5	-	-	-	-	-	-	8
12	88	69	104	-	-	3	14	3	1	282
13	12	13	22	-	2	-	1	2	-	52
14	12	6	8	-	1	-	-	2	-	29
15	21	50	43	1	-	-	5	2	6	128
16	1	-	2	-	-	-	-	-	-	3
17	20	15	21	-	1	-	3	-	-	60
18	4	9	4	-	-	-	-	1	-	18
19	40	67	29	-	8	-	-	2	-	146
20	9	6	4	-	-	-	-	-	-	19
21	3	1	8	-	1	-	-	-	-	13
22	18	12	18	-	6	5	-	2	-	61
23	30	32	61	-	-	2	2	-	3	130
24	-	-	-	-	-	-	-	-	-	0
25	1	-	-	-	-	-	-	-	-	1
26	11	6	9	-	-	-	-	1	2	29
Total	564	452	625	1	29	20	40	65	12	*1808*

Goal 4 – Surface Artifact Mapping

During the 2009 surface survey of the Harvester site, every artifact that was found was marked with a pin flag and assigned a sequential number and recorded with the total station. We began our surveys by completing random, informal surveys.

This consisted of walking the survey area and getting adjusted to the environment of the site. Using an informal survey is useful to gain an understanding of what to look for in different environments, as well as get an initial sense of artifact concentrations in the area. After completing the random survey, formal topographic or contour survey was completed. This type of surveying technique allows surveyors to follow the contours of the landscape in a systematic way. We began at the western edge of the bluff and moved across the site from south to north. While the number of people surveying varied from day to day, surveyors were spaced two meters apart. This short distance between each person serve two purposes. First, by surveying with smaller distances between each person, there is a greater chance of discovering artifacts. Secondly, this technique ensures that there was a greater visibility of the ground surface through the tall grasses and shrubs. The southern boundary of the Harvester Site was defined by the topography of the top of the bluffs, and the ravines were not surveyed because the total station equipment could not gain a reading in those areas (as the total station needs a "line-of-sight" to take a reading). The southern boundary of the site was marked by a significant drop in artifact density compared to the rest of the Harvester Site.

Every artifact located was given an artifact number and the location was recorded with the total station. We recorded a total of 281 artifacts from the area surveyed (Figure 5.8). The artifact assemblage consists mostly of chipped stone flakes, but bone fragments, ground stone fragments, portions of tools, ceramics, and miscellaneous items including a historic shotgun shell and a piece of freshwater shell were also recorded. Only diagnostic artifacts such as pottery, tools and ground stone were collected from the site. The flakes were marked with a black pen dot (to note which flakes had been recorded) and left in place.

Figure 5.7. Systematic survey of the Harvester site, fall of 2009, looking south.

Flakes consisted of 76% of the artifacts documented during this field work. The raw materials of these flakes were confined to cherts, chalcedony, quartzite, and limited amounts of quartz. The recovered pottery was found mainly within the vicinity of the hearths that line the western boundary of the surveyed area. The burned bone was also found within the vicinity of the hearths, but a few pieces were found further down the slope to the east on the site. The majority of ground stone fragments were located near the southern boundary. Some ground stone fragments were also found around the hearths, and within hearth fill.

Table 5.2. Artifact type breakdown for artifacts recorded during 2009 field work.

Artifact Type	Flakes	Pottery	Bone	Ground stone	Tools	Other	Total
Frequency	224	8	28	11	8	2	281

Table 5.3. Raw material breakdown for flakes recorded from the Harvester site.

Raw Material	Chalcedony	Chert	Quartz	Quartzite	Total
Frequency	70	79	12	63	224

Tools from the Harvester Site

As per the agreement between Dr. LaBelle and the Open Space, all formal artifacts discovered during the fall of 2009 were collected. This was done to limit the damage of possible looting on the site after it opens to the public for recreation. The following are descriptions of formal artifacts collected from the Harvester site.

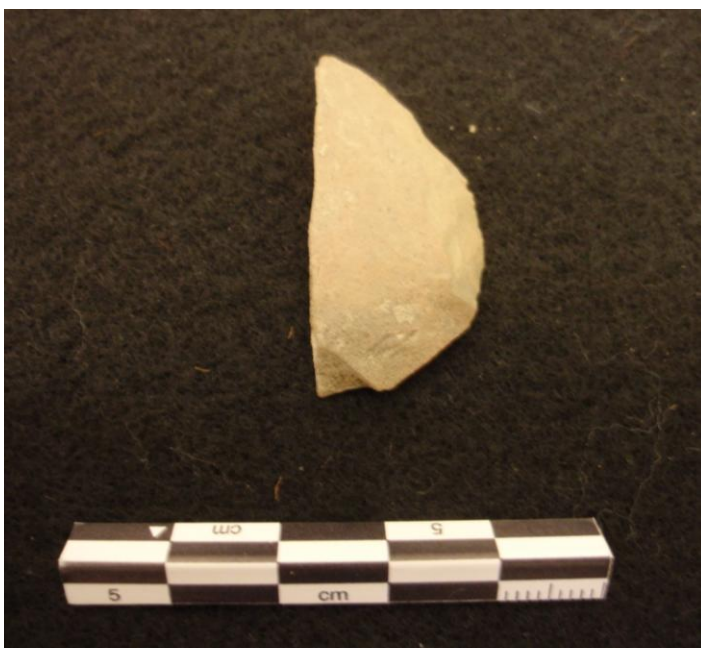


Figure 5.8. Small projectile point preform from field work on the Harvester site.

FS# 12: Projectile Point Preform/Blank

This projectile point preform/blank is made from chert, and was broken laterally across the face of the blank, probably during the manufacturing process. Preforms are a step in the manufacturing process of projectile points, and allow the manufacturer to create the basic outline of a projectile point and then add in the notches at the end of the process. Ovid preforms like this have also been found at other Early Ceramic sites across the Front Range, most notably the Lindsey Ranch Site (Nelson 1971), the Harvester site, and the Weinmeister site.

Figure 5.9. Projectile point fragments from field work on the Harvester site: FS# 219 (left) FS# 13 (center), FS# 156 (right).

FS# 219: Projectile Point Fragment (proximal portion)

This projectile point fragment is made from quartzite and is an example of a Duncan point from the McKean Complex, which dates to the Middle Archaic 3,050 – 1,050 years B.C. (Tate 1999).

FS# 13: Projectile Point Fragment (medial portion)

This medial portion (mid-section) of a projectile point is made from chalcedony. Unfortunately, the temporally diagnostic portion of the tool is missing, so it is impossible to assign a date to this artifact.

FS# 156: Projectile Point Fragment (distal portion)

This distal portion (tip) of a projectile point is made from chert. Again, there are no temporally diagnostic features available for this projectile point fragment.

Figure 5.10. Ceramics found during field work on the Harvester site.

FS# 5, 6, 7, 8,9,10,11,150: Cord-marked Ceramic

Cord-marked ceramics are a diagnostic cultural feature of the Early Ceramic era in Colorado Prehistory. These fragments of cord-marked pottery were found near the two hearths that line the north edge of the Harvester site, and range in color from light tan, to brown, to red.

Figure 5.11. Scrapers found during field work on the Harvester site.

FS #16, Unnumbered: End Scrapers

These end scrapers are made of chert and quartzite, and were found on the northern end of the Harvester Site. End scrapers were used prehistorically to clean animal hides by scraping away hair and flesh for preparation in tanning.

Figure 5.12. Shotgun shell found during field work on the Harvester site.

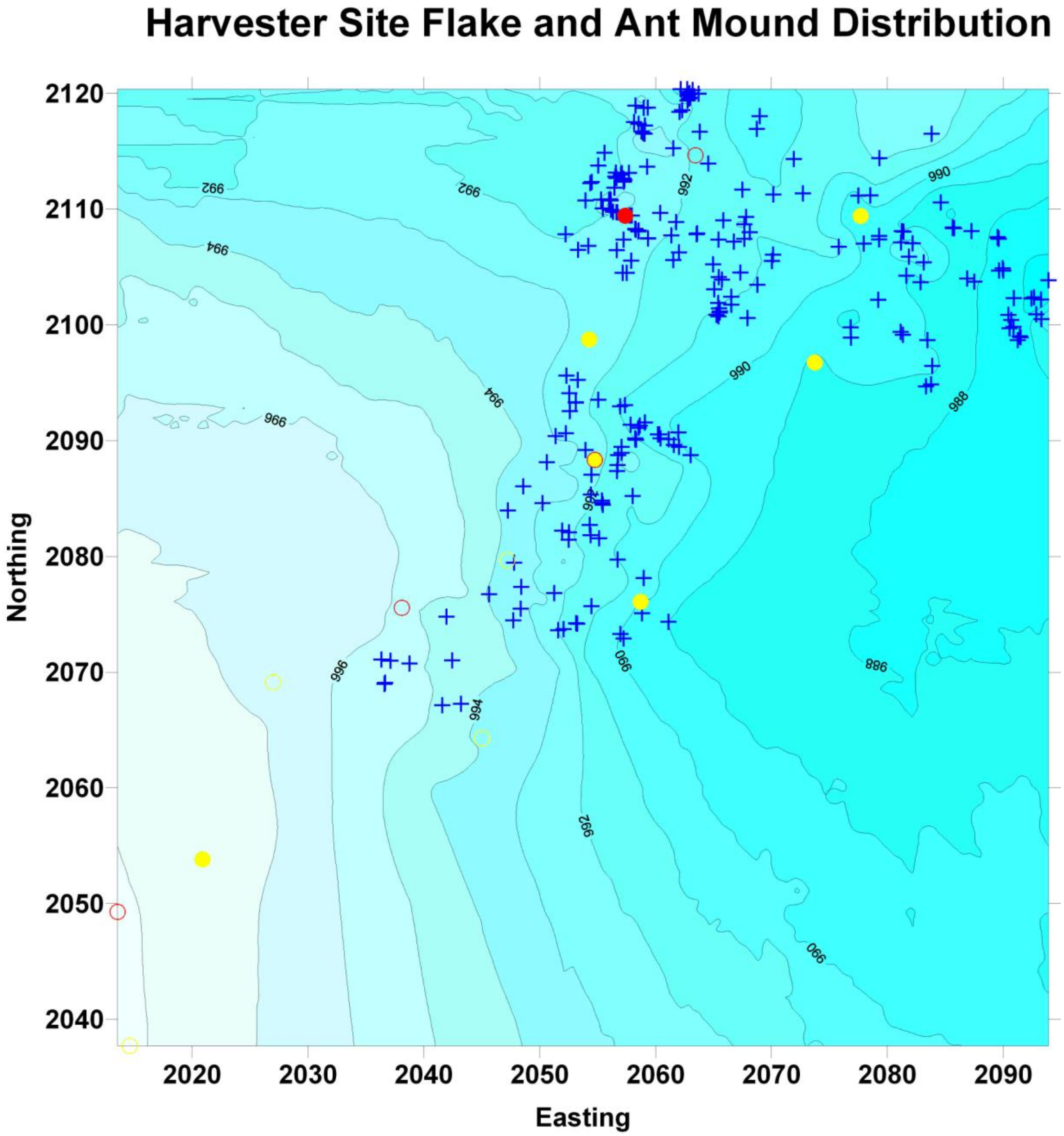
FS# 313: Shotgun Shell

This modern, plastic shotgun shell shows the historic use of this site as not only farm land, but also its use for recreational or hunting activities.

Artifacts and features on the Harvester site were mapped on the site using an EDM or Total Station machine, which measures points on a grid to the nearest millimeter. The maps below illustrate artifact locations within the Harvester site. It is easy to notice that all of the artifacts are grouped into two large concentrations, one in the north and one on the south portion of the site. These concentrations represent the tops of bluffs. The negative space between the bluffs represents steep draws. These draws did not contain artifacts.

Figure 5.13 displays the <u>distribution of flaked stone and ant mounds</u> at the Harvester Site. The empty area between the two large concentrations of artifacts represents arroyo drainage. The artifacts clearly delineate the edge of the bluff system to the west. All but the four southern ant mounds are directly associated with large concentrations of flaked stone.

Figure 5.14 demonstrates the <u>spatial distribution of flakes, formal tools, fire affected flakes and a collector pile of flakes</u>. Three formal tools were found on the northern portion of the site, and one tool was found to the south of these tools. Fire affected flakes were found in close proximity to the hearths, located at the western edge of the bluff. The collector pile is a pile of diverse flakes that Mr. Weinmeister remembers collecting and leaving in the documented location, a so-called “collector’s pile”.



Blue = flake
Yellow open = 1-50 microflakes in ant mound
Yellow closed = 51-100 micro
Red open = 101-199 micro
Red closed = 200+ micro

Figure 5.13. Distribution of flakes and ant mounds at the Harvester site. Produced by Dr. Jason LaBelle

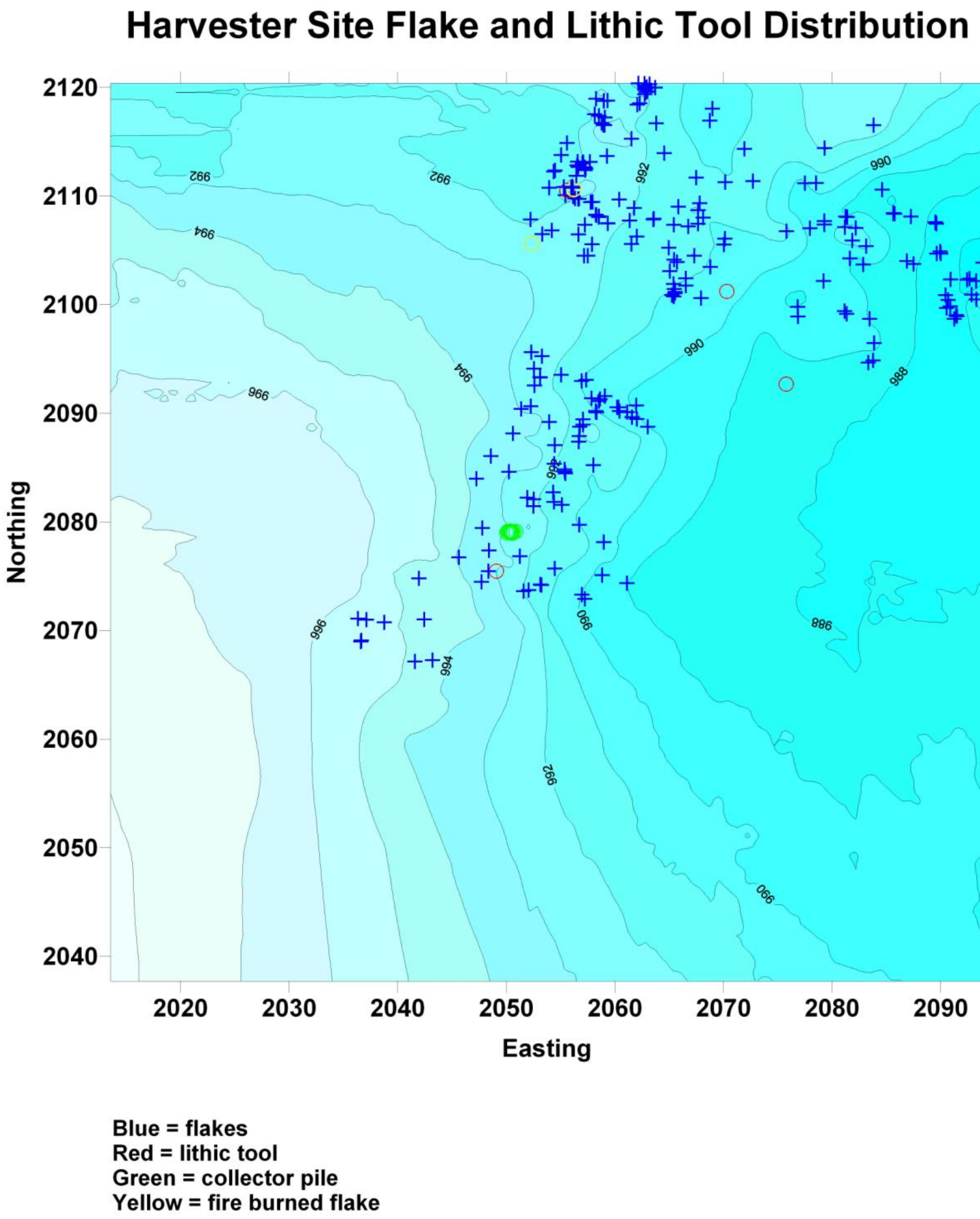


Figure 5.14. Distribution of flakes, lithic tools, fire affected flakes, and a collector's pile of flakes at the Harvester site. Produced by Dr. Jason LaBelle.

Figure 5.15 illustrates the frequency and location of flaked stone and ground stone on the Harvester Site. While some fragments of ground stone were recorded and collected from the north side of the site, the majority of ground stone fragments were recorded at the southern end of the site.

Figure 5.16 shows the location of the hearths, flakes, and ceramic fragments on the Harvester site. The flakes are found uniformly across the Harvester site, but the ceramics were discovered exclusively near hearth features.

Finally, figure 5.17 illustrates the spatial relationship of important cultural features found on the River Bluffs property. Ant mound data includes the first three ‘fingers’ of the bluff system, beginning at the northern end and working south. Again, the northern most ‘finger’ or bluff is the Harvester Site. Our mapping datums are represented by the blue triangles. Red circles represent ant mounds with cultural material present. The pattern of cultural material within the ant mounds decrease towards the southern end of the River Bluffs property and ant mounds with no cultural material are represented by black circles. This high concentration of artifacts, both in the mounds and on the surface on the northern end of the Open Space is the Harvester site.

Goal 5 – Mapping and Excavation of Hearths

Four hearths, or cooking fires, were identified on the site during the beginning stages of this project by LaBelle and Weinmeister. The goals during survey work was to map the hearths and excavate one of the hearths in order to obtain radiometric dates, as well as macrobotanical information using flotation methods. The radiometric information helps place the Harvester site into the prehistoric chronology of Windsor and the

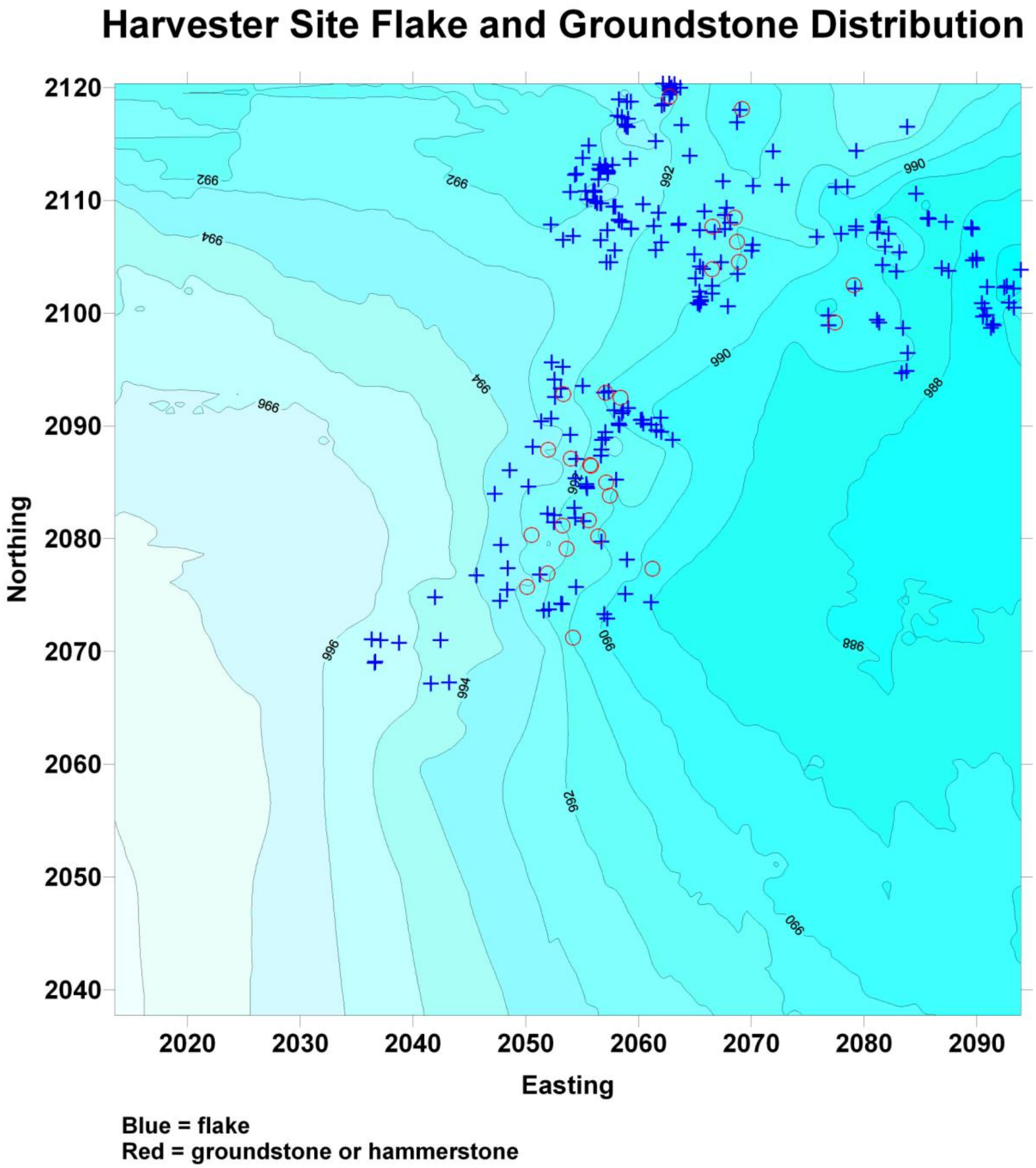


Figure 5.15. Distribution of flakes, ground stone, and hammer stones at the Harvester site. Produced by Dr. Jason LaBelle.

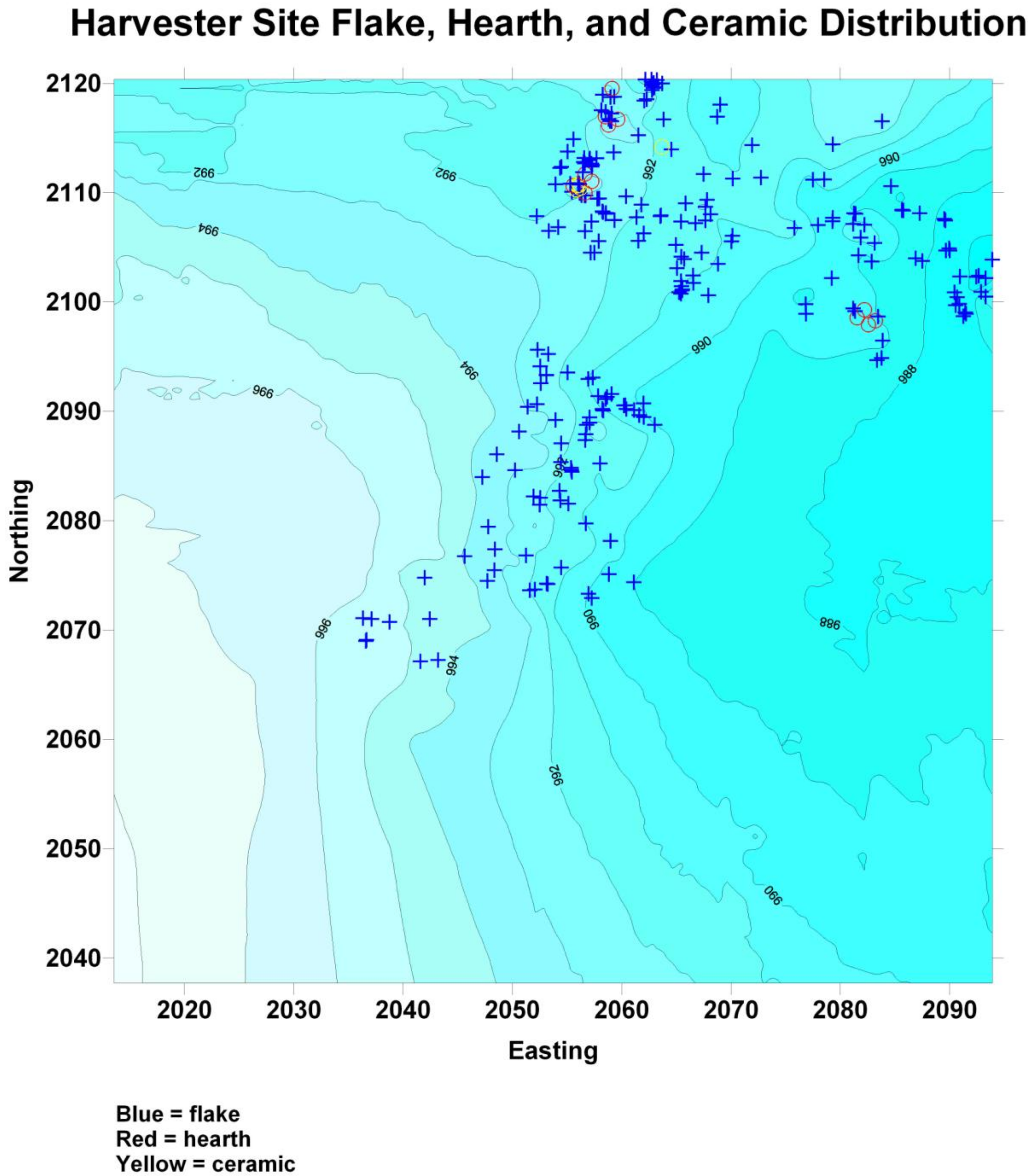


Figure 5.16. Distribution of flakes, ceramics, and hearths (corners of hearths were mapped) at the Harvester site. Produced by Dr. Jason LaBelle.

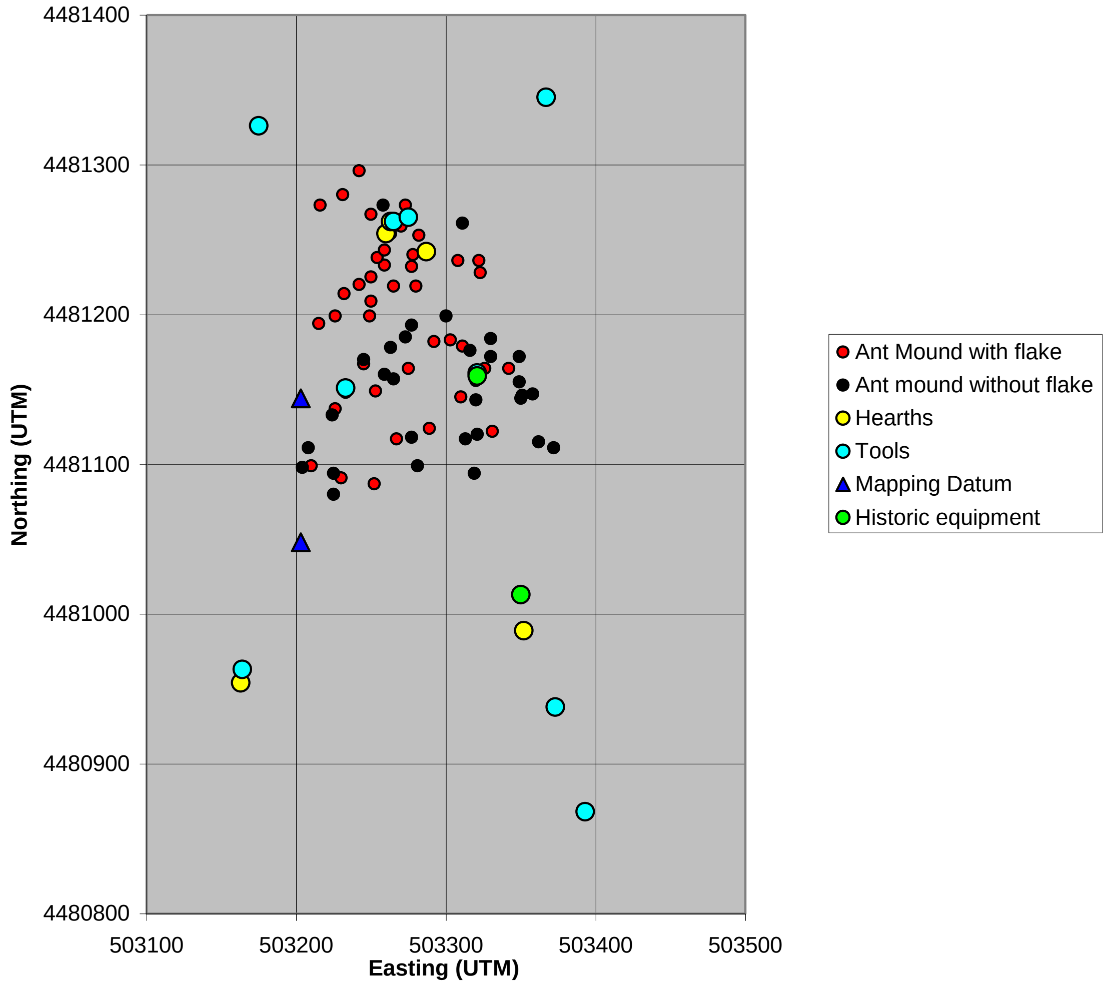


Figure 5.17. Location of ant mounds, tools, and features noted by Weinmeister and the author at the River Bluffs Open Space, including the Harvester Site. Produced by Dr. Jason LaBelle.

Maps and permanent metal identification tags accompany each hearth. Total station coordinates are also connected with surface artifacts associated with these hearths.

Hearth 1 and Hearth 2 represent most intact examples of the four hearths on the Harvester site. These two hearths are located at the extreme northwestern boundary of the Harvester site, and are quickly eroding down slope to the west. The third hearth is located to the southeast of the first two hearths at the southeastern edge of the site. According to LaBelle and Weinmeister, the fourth, unidentified hearth from this survey is also located on the western bluff edge on the northern side of Hearth 1. All of the hearths and the information contained within them are in danger of being lost due to erosion. The hearths exhibited distinctive charcoal stained soil and associated artifacts. The associated artifacts include flakes, fire altered flakes, fire altered rocks (which were either cracked or showed evidence of heat alteration), and burned bone. Only Hearth 2 contained pottery fragments. All of the artifacts within and around the hearths were mapped using the total station.

Hearth Excavation: Hearth 2 was chosen for excavation based on the destruction of the hearth due to erosion, the amount of cultural material located within and on the surface of the feature, and the location of this hearth in relation to artifact concentrations on the site.

Hearth 2 is located on the western extent of the northern most bluff of the River Bluffs Open Space and was badly eroded on the western side. The hearth is unlined, shallow and basin shaped with grayish brown soil. Sandstone, as well as fire cracked river cobbles were found surrounding the hearth feature, but this does not indicate that it was used as a lining. Sandstone is not uncommon in Early Ceramic hearths of the Front Range, and is part of the natural sediments at the Harvester site (Burgess 1981; Kainer 1976). Hearth 2 was excavated inside of a 1x1 meter unit, which was subdivided into quadrants. The northwest and southwest quadrants were excavated first in order to define the profile of the feature. Both the northwest and southwest quadrants contained very little hearth fill. Level 2 of both of these quadrants contained hard packed/fired soil at the end of the level, indicating the bottom of the feature. The hard soil found at the bottom of level 2 most likely indicates the high amount of heat produced by this feature, which "cooked" the soil. With the removal of the western quadrants,

Figure 5.18. The northern portion of the River Bluffs property showing the Harvester Site (in red) and the locations of the three hearths.

Figure 5.19. Hearth 2 found on the western edge of the bluffs. This hearth contains pottery, flakes, fire altered rock and burned bone.

Figures 5.20. Hearth 2 location on western edge of the Harvester site. Note the steep slope, trending west. The red circle indicates the location of the hearth.

Figure 5.21. Cross-section of Hearth 2 fill; note charcoal streaking at the base of the hearth, and the yellow oxidization.

the hearth profile became clearly visible in the western wall of northeastern quadrant of the unit. The profile shows a concentration of charcoal and ash that extended 9 cm in depth and 30 cm in length from north to south (Figure 5.21). Four areas of charcoal streaking were visible beneath the lower boundaries of the feature.

The northeastern quadrant contained 95% of the hearth feature. Like the two western-most quadrants, the northeastern quadrant began with the excavation of a 10 cm. level, and then continued in 5 cm levels. The feature fill was left as intact as possible when being removed from the ground in order to preserve the macrobotanical information from the fill. The hearth fill did not contain as much datable charcoal as originally anticipated, but one twig of charcoal was recovered from the bottom of level 3 which was used for AMS dating. Like the previous three quadrants, the first level of the southeastern quadrant was excavated in a 10 cm. level. This quadrant extended 4 levels, and the same hard packed soil that is present in the two western most quadrants is present in the bottom of level 4, indicating the bottom of the thermal feature.

The northeastern and southeastern quadrants of this unit contained the highest number of cultural material including the highest number of flakes, ceramics and charcoal of the unit. This is expected, as the northeastern quadrant contained almost the entire hearth feature. One ground stone fragment was found within this quadrant as well. The southeastern quadrant contained the highest concentration of burned bone, and contained less than half of the flakes that the main feature fill contained.

Hearth Morphology: Hearth morphology is an important aspect of hearth analysis, as it leads to a better understanding of hearth functions. Hearth 2 fits perfectly within the larger, regional morphological pattern for depth, length and size (Troyer 2010). It is an unlined, shallow, basin shaped hearth which is the most common in the area and the least functionally specific (Troyer 2010). This shape of hearth requires the least energy and the least amount of resources to construct. The excavation of the hearth did not reveal significant amounts of stone to indicate that the hearth was used as an earth oven.

Hearth Fill Flotation and Wet Screening Results. Two techniques were used to gain information from the hearth excavation. Floatation methods use water to separate heavy material from less heavy material. The light material, called the light fraction, floats to the top of the water and is collected. The light fraction consists of macrobotanical remains, whole seeds, charcoal and small pieces of bone. Conversely, the heavy material is labeled the heavy fraction and is collected at the bottom of the receptacle. The heavy fraction contains non cultural items such as rocks. Heavy artifacts such as bone beads, flakes and ceramics also sink. All of the feature fill from Hearth 2 was separated using floation. Floating hearth features is an important step in analyzing the contents of hearths, and often reveals artifacts that can be missed during excavations and normal screening processes. Wet screening was used to analyze all of the soil that was not feature fill from the excavation. This process involved spraying water through a 1/8th inch mesh screen to wash away soil. The remains left in the screen are then sorted.

The northeastern quadrant contained the most cultural material, which was expected since the majority of the hearth feature itself was within this quadrant. Unfortunately, due to an error in sorting the hearth fill and the normal excavation soil in the lab, I am unable to document the exact frequency of artifacts from the hearth fill itself. However, the ceramics and the three beads were observed during the floatation process of the hearth fill and so their provenience is intact.

Artifacts recovered during the floatation analysis include flakes, disk bone beads, and ceramics. Burned or charred animal bone was also recovered. Charcoal recovered in the floatation analysis was counted, but not used for radiometric dating. Flaked stone constituted the large majority of cultural material within the northeast and the southeast quadrants of the excavation unit. Only 11% of flakes from the hearth excavation exhibited heat alteration; 89% of flakes did not. The lack of heat alteration to flakes found in the hearth fill may be explained by taphonomic factors. The hearth was eroding out of a western sloping hill, and the unaltered flakes may have been deposited by slope movement after the hearth was used. Translucent chalcedony represents the highest frequency of raw material as compared to either quartzite or chert.

Table 5.4. Artifact frequencies for Hearth 2 fill analysis.

	SE Quadrant	*NE Quadrant*	*SW Quadrant*	*NW Quadrant*
Flaked Stone	110	94	10	9
Bone Beads	0	3	0	0
Shell Fragment	5	7	1	1
Pottery	5	6	1	0
Burned Bone	198	285	19	12
Charcoal	317	202	11	19

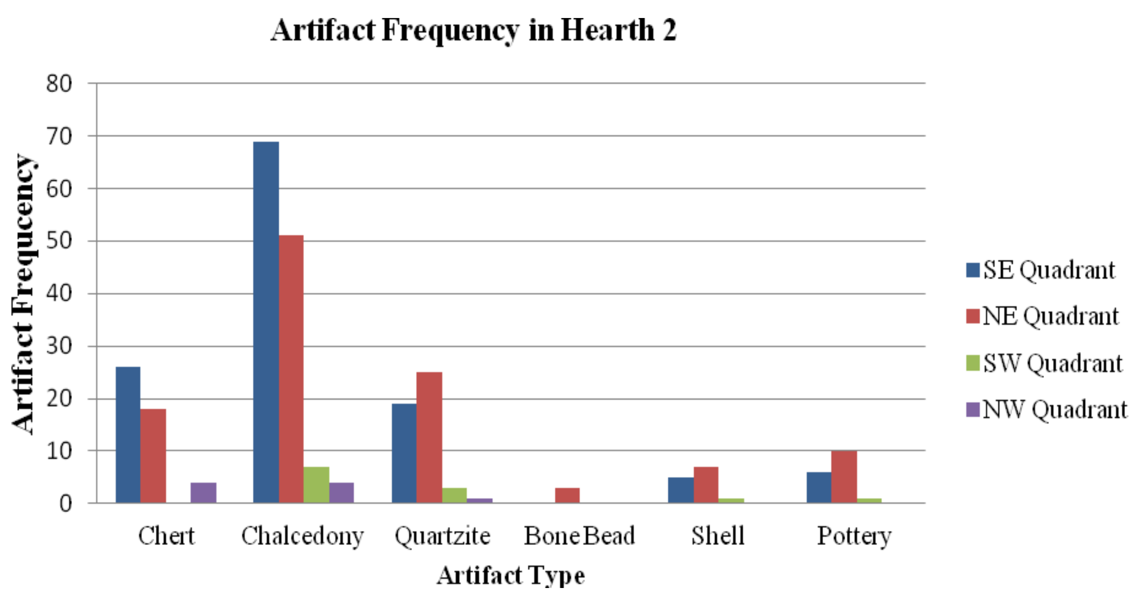


Figure 5.22. Artifact frequency within Hearth 2.

Flake sizes ranged from 5 mm to 35 mm; however the majority of flakes are between 5mm and 10mm in length. The small size of these flakes and the lack of cortex suggest that late stage reduction was taking place near the feature.

Three disk bone beads were found within the heavy fraction of the main feature fill from the northeastern quadrant of the unit (Figure 5.23).

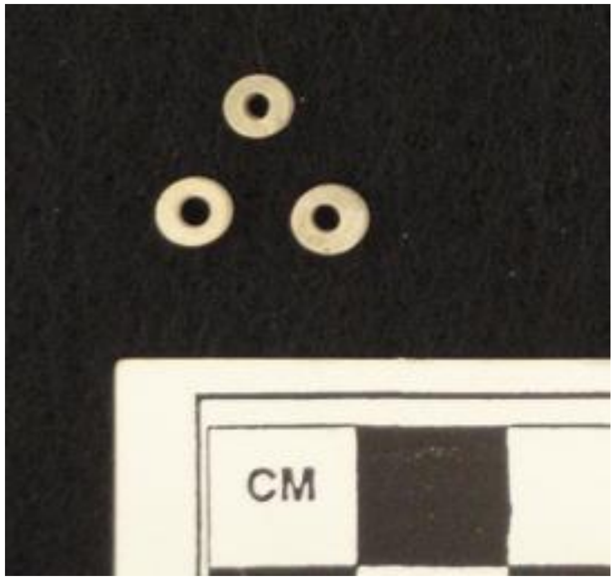


Figure 5.23. Disk bone beads, found during flotation analysis of Hearth 2.

Beads are a common cultural element within assemblages from the Early Ceramic period, and are often documented within burial contexts (Gilmore 2008, Kivett 1953). The three bone disk beads found in the hearth may represent items lost during site activities.

Twelve fragments of ceramics were recovered from the southeast, northeast and southwest quadrants of the feature (Figure 5.24). Six fragments came directly from hearth fill. The Early Ceramic period in Colorado represents the first time that pottery appears in eastern Colorado. This style of pottery is recognizable by the cord-marked exterior of the pot and the large temper size (Ellwood 2002). Complete vessels from the Early Ceramic are rare due to their delicate nature, but known and reconstructed vessels typically exhibit conically shaped bottoms, cord-marking and can vary between excurvating, incurvating and straight rims (Ellwood 2002).

Figure 5.24. Examples of cord-marked ceramic sherds found within Hearth 2.

The conical base of the vessels allows them to sit snuggly into the loose soil and embers of hearths for cooking and heating purposes. Therefore, the presence of pottery in the Harvester hearth feature is not unexpected; it may have broken in the fire during use. The radiometric date from the hearth directly applies to the ceramics as well.

Charcoal and faunal remains recovered during the wet screening and flotation analysis were tallied and recorded by quadrant and level. The entire excavation revealed 514 fragments of unidentified, charred animal remains. The presence and abundance of burned bone suggests that the hearth was being used at least partially for food cooking tasks.

Five samples of marcobotanical remains were taken from the light fraction of the floatation analysis and sent to Daniel Bach of High Plains Macrobotanical Services in Cheyenne, Wyoming. All of these samples were taken from the northeastern quadrant of the feature. The findings of this analysis were consistent with archaeological sites and the general ecology of the Windsor area (Bach 2010). The fuel source for this hearth consisted of Ponderosa Pine (*Pinus ponderosa)* and saltbrush or shadescale (*Altriplex sp*.). While Ponderosa Pine is no longer associated with the natural vegetation in the Windsor area, historic accounts recall Ponderosa Pine in the area (Bach 2010). *Altriplex sp*. is also a common species within the Windsor environment. The five samples also revealed 10 charred seeds, representing three different species (Table 5.6).

Table 5.5. Charred Seeds found in five samples of light fraction from Hearth 2.

Common Name	*Scientific Name*	*Frequency*
Goosefoot	*Chenopodium sp.*	8
Sunflower	*Helianthus sp.*	1
Indian Rice Grass	*Oryzopsishymeodies*	1

Goosefoot, sunflower and Indian rice grass seeds have all been identified ethnographically as food sources for native people in the Windsor area (Bach 2010). However, the presence of these seeds does not necessarily indicate that the hearth was being used for plant processing purposes. Because the seeds are native to the Windsor area, they may have been introduced into the hearth with the firewood, or blown in. The morphology of the hearth as well as the paucity of seeds within the macrobotanical samples suggest that the hearth was being used in a purpose other than plant food processing (Bach 2010).

Radiometric Dates: A charcoal sample was identified by Daniel Bach of High Plains Macrobotanical Services as either saltbrush or a shadescale (*Altriplex* sp.). This sample was sent to Beta Analytic Inc, in Miami, Florida, to undergo Accelerated Mass Spectometery (AMS) dating. The sample was dated to 1000 +/- 40 BP, calibrated with a 2-sigma range Cal AD 980 to 1060 (Cal BP 970 to 900) and a 1-sigma range of Cal AD 1080 to 1150 (cal BP 870 to 800). The radiocarbon age midpoint intercepted the calibration curve at AD 1020 (Cal BP 930). This date puts the occupation of the

Harvester site at the end of the Early Ceramic (AD 150 – 1150) and the beginning of the Middle Ceramic periods (AD 1150-1500). Artifacts from the extant collection and the artifacts recovered during field work suggest more of an association with the Early Ceramic rather than the Middle Ceramic period. Therefore, even though the dates of the Harvester site lie on the cusp of the Early and Middle Ceramic periods, the occupation of the site is most likely within the Early Ceramic.

Subsurface Research

Field research also included two subsurface research techniques. Considerable evidence of substantial buried deposits was observed on the Harvester site within ant mounds and eroding features. The following research was completed in order to gain an understanding of the extent and nature of the buried deposits on the Harvester site.

Magnetometry Testing

Magnetometry testing using a Geoscan FM256 Gradiometer was conducted on the Harvester site by Dr. Andrew Creekmore, an adjunct professor at CSU (Appendix III). Creekmoore, Jason Chambers (a graduate student from Colorado State University) and I participated in this research on May 16th, 2010. The testing was conducted within a 10 x 10 meter grid on the northern end of the Harvester site, just east of the series of hearths eroding out of the western bluff edge. A control reading of one of the hearths was established by Creekmore to provide comparative material for anomalous readings within the 10 x 10 meter grid (Creekmore 2010).

The test readings within the grids produced three anomalous readings, represented by the black concentrations in Figure 5.25. These readings were located in the southeastern, northwestern and northeastern quadrants of the grid (Table 5.6).

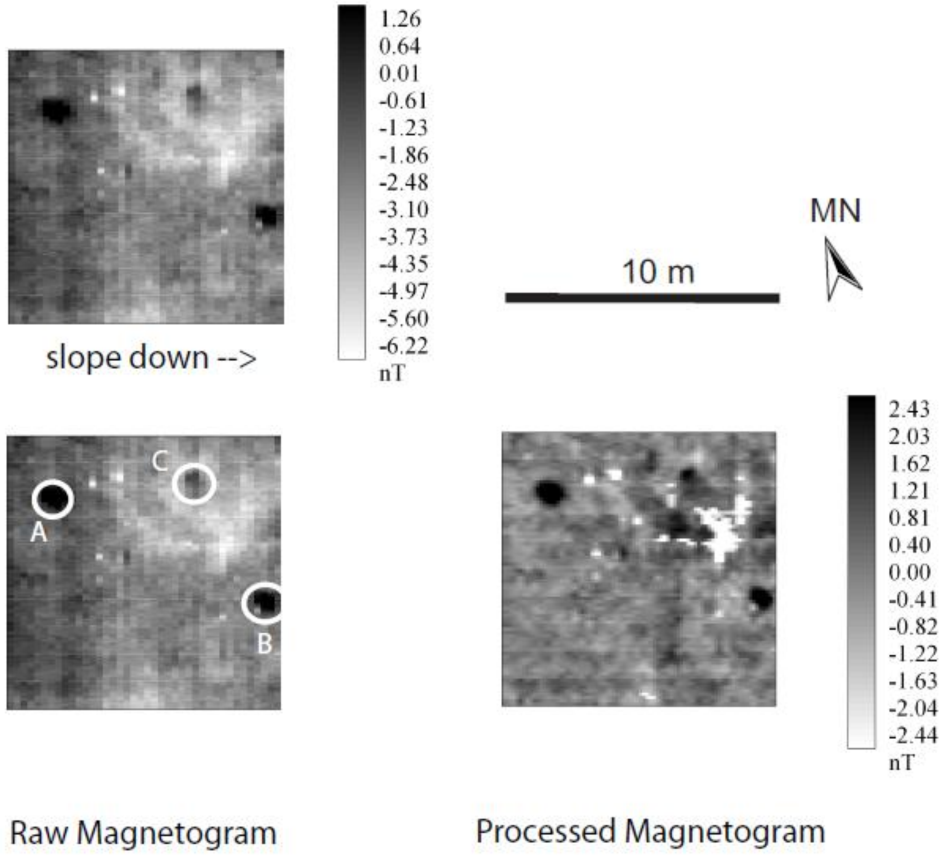


Figure 5.25. Anomalous magnetometry readings from the Harvester site, represented by the dark concentrations. Reproduced from Creekmore 2010.

Table 5.6. Locations of magenetometry anomalous readings, read from the southwest corner of the survey grid.

Feature	*Quadrant*	*Meters North*	*Meters East*	*Center of Anomaly*
Anomaly 1 (A)	Northwest	7.34 – 8.15	1.5 - 2.25	7.84m N; 1.75m E
Anomaly 2 (B)	Southeast	3.72 - 4.22	9.25 - 9.75	3.97m N; 9.50m E
Anomaly 3 (C)	Northeast	-	-	8.47m N; 7m E

The test revealed that the magnetic fields of the anomalies closely matched that of the test sample of the known hearth. This may indicate the presence of additional buried hearth features on the Harvester site (Creekmore 2010). Based upon these readings, the depth of the buried features is most likely less than one meter from the ground surface. The use of magnetometry has provided very good results for research on the Harvester site, and should be considered for future research on this site.

Test Units

Field research on the Harvester site also consisted of excavating two 0.5 x 0.5 meter test units to determine the vertical extent of cultural material on the Harvester site. These test units were placed on the northern end of the bluff. Test unit 1 was excavated near the documented hearths on the western edge of the bluff, and test unit 2 was excavated downslope from the hearths, near the eastern boundary of the site. Both of the test units revealed flaked stone, bone fragments, and charcoal.

Test Unit1 was excavated in 10 cm to a depth of 70 cm below the ground surface. This test unit contained flecks of charcoal throughout the excavation, but no evidence of a defined feature was found. Soil consisted of olive brown 2.5 Y 4/4 silty sandy loam, which continued until level 6 (50 – 60 cm below ground surface) when the soil transitioned to a loamy dark olive brown 2.5 Y 3/2. The last level (60 – 70 cm below ground surface) consisted of dark brown loam 7.5 YR 3/2. Undocumented soil was soil not documented by researchers in the field. Test Unit 1 produced a total of 110 artifacts from all levels, with the highest concentration of artifacts from a single level located at the bottom of the unit (level 4). This test unit also contained two formal artifacts consisting of a biface fragment and a piece of ground stone that is utilized on both sides, as well as a tested pebble.

Table 5.7. Test Unit 1 artifact frequency by level and artifact type.

Test Unit 1 (0.5 m x 0.5 m)	*Flakes*	*Bone*	*Shell*	*Formal Tools*
Level 1	3	0	0	0
Level 2	4	0	0	1
Level 3	16	3	1	0
Level 4	30	5	1	0
Level 5	21	13	3	0
Level 6	7	3	0	0
Level 7	3	4	3	0
Total in Artifact Category	84	28	8	0
Total Artifacts in Test Unit				121

Test unit 2 was excavated to a depth of 45 cm, and then halted due to a large rock that covered the majority of the floor of the unit, making further investigations impossible. This test unit contained 67 artifacts, with the largest concentration of artifacts in any level located near the bottom of the unit (level 4). One biface fragment was found in level 2. The soil consisted of olive brown 2.5 Y 4/4 fine sandy loam at the top of the unit, and very dark greyish brown fine sandy loam at the last 10 cm of the unit.

A total of 198 artifacts were recovered from these two test units, including two biface fragments and one ground stone fragment. The magnetometry results and the presence of large amounts of cultural material throughout all of the levels of the two test units suggests that the Harvester site has been used for an extended period. The dense assemblage of artifacts from level four of each test pit also tentatively suggests a more intense occupation at this depth. The high density of artifacts from ant mound surveys also supports buried deposits. Because the current investigations have failed to reveal sterile soil, further testing in the form of probes or test units is recommended.

Table 5.8. Test unit 2 artifact frequency by level and artifact type.

Test Unit 2 (0.5m x 0.5m)	*Flakes*	*Bone*	*Shell*	*Formal Tools*
Level 1	1	0	0	0
Level 2	5	0	0	1
Level 3	10	1	0	0
Level 4	19	24	0	2
Level 5	5	0	0	0
Total in Artifact Category	40	25	0	3
Total Artifacts in Test Unit				67

River Bluffs Trail Survey, 2010

As part of the completion of the River Bluffs Open Space for public use, the planned trail system had to be surveyed by a team of archaeologists in order for work to proceed. While this survey did not directly affect research on the Harvester site, documenting archaeological remains throughout the River Bluffs Open Space is important in understanding the extent of the material culture on the Open Space. This work also helps prepare it for public visitation. Also, the amount (or lack thereof) of archaeological material on other portions of Open Space can help put the Harvester site into context with the entire property. Finally, it is important to include any type of field work conducted by the author on the Open Space during the course of this research. Because this field work did not affect the Harvester site, the entirety of this report can be seen in Appendix IV.

Discussion

Survey work on the Harvester site completed during the fall of 2009 and spring of 2010 revealed intriguing and important information regarding not only the use of the site itself, but also the role this site plays in northern Colorado prehistory. The field work exposed diagnostic artifacts including cord-marked pottery and projectile point fragments. The typology of the projectile points, as well as other tools, including the ovid projectile point preforms place the Harvester site within the context of other Early Ceramic and Late Archaic sites in eastern Colorado and along the Hogbacks of the Front Range.

The excavation of one of the hearths on the site directly dates the occupation of the Harvester Site to AD 1050 at the boundary of the Early Ceramic and Middle Ceramic periods in Colorado. This excavation also directly dates cord-marked pottery found within the hearth, which is diagnostic to the Early Ceramic period. After finishing the preliminary survey with Weinmeister, two types of pedestrian surveys were completed on the first bluff of the site. We completed random informal surveys, or noodle surveys, to gain understanding of the topography and the environment of the site, then completed contour surveys of the bluff, beginning at the west end of the bluff and moving from south to north.

Every artifact and feature, including ant mounds found during our surveys of the Harvester Site, were mapped and measured. The majority of artifacts on this site consisted of flaked stone. The large amount of artifacts found on the Harvester site, along with the hearth features suggest that this area of the site was used as a retooling or manufacturing area for tools. This assumption is supported by the lack of cortex on the flaked stone, as well as the lack of domestic food processing evidence in the macrobotanical results from Hearth 2. The three main types of lithic raw material include cherts, chalcedony and quartzite. However, exotic raw materials such as obsidian were noted as well, specifically in the ant mounds. All the formal artifacts and artifacts found in the ant mounds were collected and are now temporarily housed at the Archaeological Repository at CSU, and will ultimately be curated at the Fort Collins Museum and Discovery Science Center.

The River Bluffs property holds an important place within northern Colorado prehistory. Artifacts found on the Harvester site demonstrate occupations throughout the last 2000 years, and a radiometric date places the occupation of the Harvester site at AD 1020. As a result of our surveys and collaborations with Weinmeister, research on the Harvester site has revealed important clues to prehistoric life on the Open Space. This information help archaeologists understand the movement of artifacts on a site, activity areas based on lithic concentration, and finally determine a buried deposit when no surface artifacts are present. The proximity to water, sheltered floodplain and abundant plant and animal resources has made the River Bluffs Open Space a desirable place for people to live and recreate for thousands of years. This Open Space, and the Harvester site in particular has many more secrets to reveal about the everyday lives of prehistoric people, and this survey only scratches the surface of what we could know about the use of the site as well as the use of the Open Space as a whole.

CHAPTER 6

FURTHER RESEARCH: DISCERNING MOBILITY PATTERNS THROUGH LITHIC RAW MATERIAL AND THE ROLE OF TUBULAR BONE BEADS IN THE COLORADO PLAINS WOODLAND MORTUARY COMPLEX

The analysis of the Weinmeister collection and the completion of basic pedestrian surveys have helped define the occupation of the Harvester and Weinmeister sites. The large amount of flaked stone found during survey work on the Harvester site suggests that this place was used as a prehistoric campsite. The radiometric date from the Hearth 2 excavation, as well as the diagnostic artifacts from the Weinmeister collection, places the occupation of the Harvester site within the Early Ceramic period. This information, along with further research of specific artifact assemblages within the Weinmeister collection allows us to place the Harvester site into regional contexts. This chapter attempts to contextualize the Harvester site and Weinmeister collection by analyzing the lithic raw materials of the projectile points and the tubular bone bead assemblages.

People living during the Early Ceramic period were part of a dynamic and changing cultural landscape on the western Plains. The introduction of new technologies, changing economies and landscape use defines this period. Examining artifact assemblages can aid in understanding these changes in mobility and cultural concepts of geography.

In order to understand aspects of mobility and ideology, two different portions of the Weinmeister collection were analyzed. First, the projectile point assemblage from the Weinmeister collection was analyzed to understand how people living on the Harvester and Weinmeister sites moved across Colorado landscapes to take advantage of different, and productive environments. In particular, each projectile point from the Weinmeister collection was macroscopically examined and compared with the lithic raw material comparative collection housed at the Center of Mountains and Plains Archaeology at Colorado State University. These raw material samples originate from the western Plains, hogbacks, mountain parks, and Front Range of Colorado, and the south central part of Wyoming. Secondly, the analysis of the bone beads from the Harvester and Weinmeister sites aids in understanding nuances of the Colorado Plains Mortuary Complex. The high frequency of tubular bone beads from the Weinmeister site is compared to other Early Ceramic sites in northern Colorado, as well as Kansas and Nebraska. Comparing these beads to examples from sites outside of Colorado helps to understand changing views in landscape based on outside influences, including population pressures and ideological diffusion into Colorado.

Mobility and Raw Material Sources

The study of lithic raw materials provides important insights into raw material preferences for tools, and how far people would travel to obtain them. A macroscopic-visual analysis of the raw materials of the projectile point collection from the Harvester and Weinmeister sites was conducted to determine how the site fits into regional models of mobility in Colorado. Specifically, this analysis was undertaken to determine if the Harvester site fits into Benedict's rotary model of transhumance (Benedict 1992). This analysis indicates that raw materials were obtained not only on the Plains of Colorado and Wyoming, but also in the mountain parks of Colorado. This model was briefly discussed in Chapter 2 of this work, but it bears repeating here.

The Transhumance Rotary Model

The Transhumance Rotary model was developed by James Benedict (1992) to explain similarities in the Late Archaic and Early Ceramic material culture between archaeological sites on the western Plains and in the Rocky Mountains. Specifically, he noticed that typical Early Ceramic projectile points, ceramics and groundstone from the edge of the western Plains were appearing in some archaeological sites in the Rocky Mountains (Benedict 1992). To explain the presence of very similar artifact types in both of these diverse landscapes, his hypothesis posits that these groups took advantage of seasonally abundant resources in the mountains and on the plains. This not only included food resources, but also lithic raw material resources. The model suggests that groups used a circular route to enter the mountains during the summer by following the hogbacks north into Wyoming and then dropping down into the mountain parks of Colorado. During the late fall, these groups would move back into the hogbacks and Plains to take advantage of a more moderate winter climate (Benedict 1992).

Studying the raw materials of the projectile points from the Weinmeister collection and Harvester site allows a tentative test of Benedict's model for the occupations of the River Bluffs Open Space. Understanding land use patterns of groups during the Early Ceramic is an important area of inquiry that informs research on resource exploitation as well as seasonality of movement. Discerning the origins of these tool raw materials from the Weinmeister and Harvester sites allows us to understand possible migration patterns of these groups and what types of raw material resources were being exploited in tool making.

Dataset

One hundred and twenty projectile points from the Weinmeister collection and the CSU field project were examined for this chapter. These points represent both Late Archaic and Early Ceramic styles, with the latter dominating the collection. The projectile points were collected from both the surface of the Harvester site and from the excavated silage pits and surface of the Weinmeister site.

Methods and Results

Raw material types were determined using a macroscopic visual approach which identified specific attributes that are characteristic of each raw material. These included the similarity of grain sizes, dendritic inclusions, color, and the structure of the rock itself. The projectile points were first categorized by basic raw material type: chert, chalcedony, quartzite, and petrified wood. These categories were then grouped by color, ranging from lightest to darkest, translucent to opaque. Using the comparative raw material collection from the Center for Mountain and Plains Archaeology at Colorado State University, the colors of known raw material sources were matched to the projectile points as closely as possible. The projectile points were then compared to the raw materials based on the similarities between grain sizes and shapes and dendritic inclusions. If any of these characteristics did not match, the raw material was removed as a potential source for the projectile point. Of the 120 projectile points examined, only 27 points were matched to 11 specific raw material sources (Table 6.1). These localities range from the Plains of Colorado and Wyoming, to the mountains of Middle Park and South Park (Figure 6.1).

Table 6.1. Projectile point raw material frequencies and their geographic sources.

Region	*Source Name*	*Raw Material*	*Artifact Frequency*
Middle Park	Barger Gulch	Chert	5
	Kremmling	Chert	2
	Table Mountain	Chert	1
	Buffalo Peaks	Chert	1
	Windy Ridge	Quartzite	4
South Park	Trout Creek	Chert	4
Colorado Plains	Pawnee Grasslands	Quartzite	2
	Cherry Creek/Dawson	Pet.Wood	3
	Flattop	Chert	3
Wyoming Plains	Hartville Uplift	Chert	1
	Belvoir Ranch	Chert	1
Total			27

Lithic raw materials included cherts, quartzites, and petrified wood. Regardless of the sources of these raw materials, all of them contain qualities that make them ideal for use in lithic tool manufacturing. Typically, these include small grained raw materials that flake in a predictable manner. This allows the manufacturer some guarantee that the production of a finished, usable tool will be successful.

It is important to note that the locations of these raw materials visually represent the archaeological documented raw material source. In other words, the origins of the raw materials represented on the Harvester and Weinmeister sites may have come from geologically exposed sources that are miles away from the main source (secondarily deposited along rivers for example). The raw material comparative collection may not represent the actual parent source of that raw material. This fact does not invalidate this study because it represents a step in documenting and identifying raw material sources in archaeological sites on the Plains. However, more research should be accomplished to

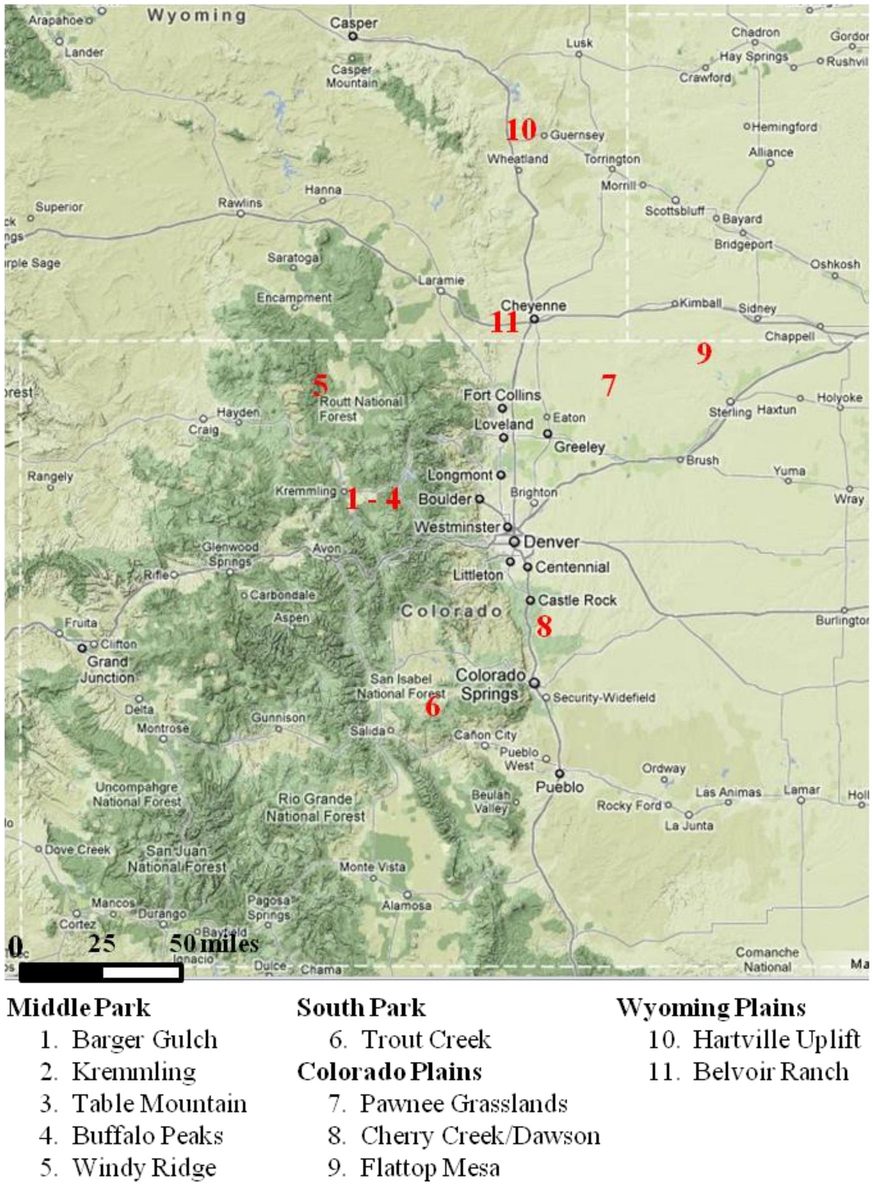


Figure 6.1. Raw material localities represented in the projectile point collection from the Weinmeister and Harvester Sites.

discover the outcroppings of raw material sources throughout the Front Range and Plains. A useful study would include a “map” of the extent of raw material parent sources and their outcroppings. Of course, this type of analysis would entail years of research, and is not feasible for this work.

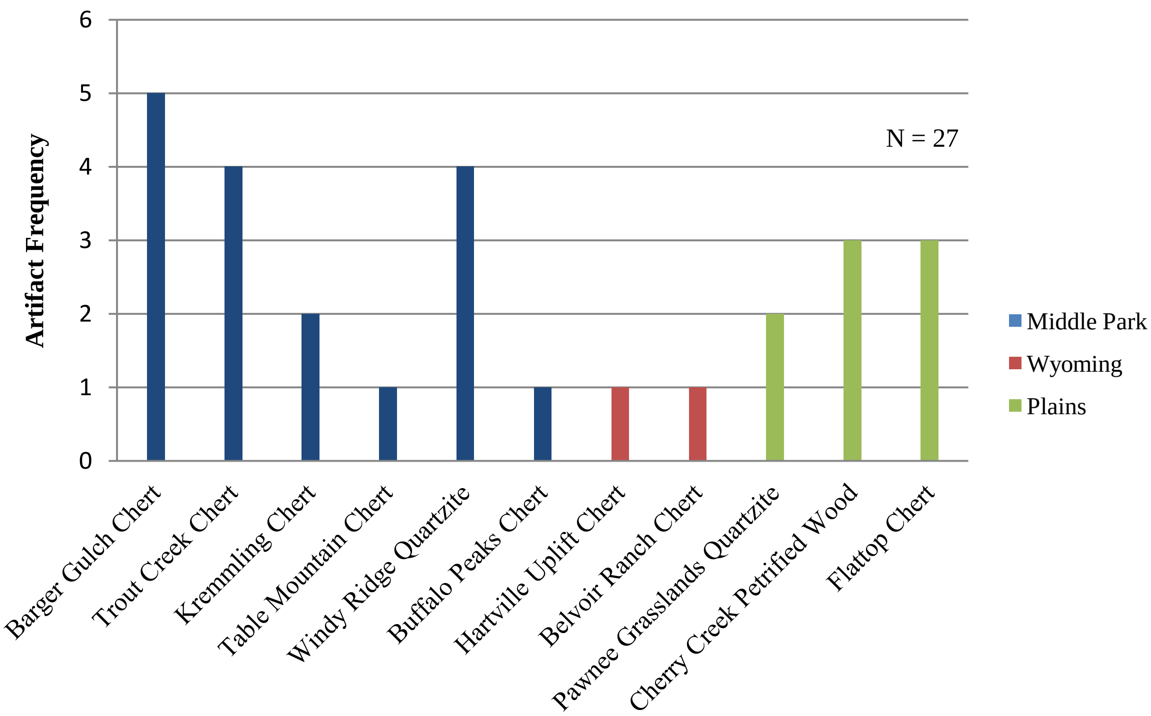


Figure 6.2. Projectile Point raw material locations.

Chert

This sedimentary rock is defined as fine-grained, cryptocrystalline, silicate quartz and occurs in nodules and layers sandwiched within geologic parent material (Andrefsky 2005). Because of the fine-grained texture and uniform fracturing mechanics of chert, it is one of the most common lithic raw materials used in making stone tools (Andrefsky 2005:53). In fact, 53% of the 120 projectile points from the extant collection from the Harvester and Weinmeister sites were made of some variety of chert. This percentage jumps to 78% when chalcedonies are included in the sample. Chalcedony is chemically identical to chert, but is structurally different, and forms as long, very small fibers (Andrefsky. 2005:54). Chalcedony is often identified by archaeologists in the field by its transparency or near-transparency, as well as the white patina that forms on the surface of the rock over time. For the purposes of this analysis, as well as to maintain consistency with existing publications (Andrefsky 2005), chalcedony is included within the chert sample.

Nine varieties of chert were recognized in the extant collection. Six of the nine varieties matched the comparative samples from Middle Park, including Barger Gulch and Kremmling Chert, chert from Williams Fork Reservoir, Table Mountain Chert from Grand County, and Buffalo Peaks Chert. Unlike North Park and South Park, the topographic relief of Middle Park varies widely. The geology of the eastern portion of Middle Park consists of volcanic breccias, arkosic sandstones and conglomerates and mudstones (Mayer and Surovell 2005: 605). The geology of the western half of the park consists of claystones, siltstones and conglomerate rocks from the Miocene Troublesome Formation (Mayer and Surovell 2005: 606). The Troublesome Formation produces lenses of high quality chert which have been utilized by prehistoric people throughout history (Kornfeld et al. 2010; Mayer et al. 2010). Most archaeological work conducted in this area of Middle Park focuses on Paleoindian occupations and use of the vast lithic resources that the Troublesome formation provides (e.g. Kornfeld et al 2001; Mayer and Surovell 2005; Surovell et al 2005).

The visual appearance of chert ranges considerably, and shows variation in color within the same source. Chert from the Troublesome Formation is referred to as both Kremmling and Troublesome chert, and the terms are often used interchangeably. However, for the sake of clarity in discussing the raw materials, Barger Gulch chert and Kremmling chert will be assigned to separate examples of raw materials to clearly identify the difference in the physical appearance within this study.

The Trout Creek chert quarry is a combined workshop and quarry activity center in the south-central mountains of Chaffee County in South Park (Black 2000:122). This extremely large quarry site covers 2,644 acres within the Arkansas River drainage (Black 2000:121).

The Flattop Chert Quarry is located on the top of a mesa on the northeastern plains of eastern Colorado, just south of the Nebraska border. This distinctive chert ranges in color from opaque white and translucent lavender with hues of blue and pink (Greiser 1983). Flattop Mesa has also been used as a quarry for thousands of years, as evidenced by tools found dating from the Paleoindian period to the Protohistoric period. The mesa is dotted with at least 200 depressions that signify quarry pits, making it a very large scale quarrying activity site (Greiser 1983:8).

The Hartville Uplift raw material source located near Guernsey, Wyoming provides both fine grained chert and quartzite for use in tool production (Stafford 2003:74). Like chert varieties from the Troublesome Formation in Middle Park, Colorado, chert from Hartville uplift varies greatly in color, from yellow to a dark brownish purple. The Hartville Uplift has been mined for thousands of years for knappable raw materials in prehistoric tool manufacturing, and is represented in Paleoindian assemblages (Kornfeld et al. 2010:364).

The source of chert from the Belvoir Ranch has not been formally investigated, but samples were collected during field work conducted there during the fall of 2010. This chert was found in the form of nodules eroding out of the parent bedrock of a rocky ridge near the southern boundary of the property. No quarrying pits were documented, however, tested cobbles and bifacial reduction areas were noted. The Belvoir Ranch is situated on the western edge of the Plains, near the city of Cheyenne. The Belvoir ranch is now owned by the City of Cheyenne and the land is protected as open space. The property contains many archaeological sites, both historic and prehistoric (Roberson and LaBelle 2011).

Quartzite

This class of rock consists of quartz that has metamorphosed from sandstone. Fine-grained quartzites (meta-quartzites) are more often used in tool manufacturing processes because, like chert, the small grain size allows the rock to break cleanly and in a predictable manner. Quartzite is the second most common raw material found on archaeological sites in Colorado (Black 2000:123). Two sources of quartzite were discovered within the Weinmeister collection; one originating in Middle Park, and the other on the plains of the Pawnee Grasslands in the eastern part of the state.

Windy Ridge quartzite is located in northern Middle Park, near the Continental Divide and is one of the largest known quartzite quarries in the state. The southern portion of the site is located on an outcrop of fine-grained quartzite that has a continuous mantle of production waste, and exhibits at least 182 depressions of excavated pits (Bamforth 2006:512).

The Pawnee Grasslands are comprised of a large swath of Federally protected short grass prairie on the eastern Plains of Colorado. Quartzite from the Pawnee Grasslands is not endemic to the area, but instead the remains of alluvial processes which moved cobbles of this fine grained stone into the area. As a result, the quartzite is highly variable and widespread in source locales.

Petrified Wood

The archaeological sample of petrified wood examined in this analysis was most closely compared to Parker petrified wood. This source is located near Cherry Creek and the town of Parker. This raw material is found within the Dawson arkose and in secondary deposits, and is therefore sometimes referred to as Dawson petrified wood (Black 2000:122). Like chert, petrified wood varies in color. The Weinmeister collection yielded two variations of Parker Petrified wood.

Obsidian

This black, sometimes translucent igneous rock is a form of volcanic glass, and is rare in Colorado due to the lack of large source. Only 15 sources of obsidian and other igneous rocks have been documented in Colorado, and these sources are very small (Black 2000:122). Microflakes of obsidian were recovered during the field work portion of this project (see Chapter 4) from some of the Harvester Ant mounds on the Harvester site. Additionally, fragments of obsidian artifacts collected by Weinmeister were analyzed using the obsidian ED-XRF technique in order to source the materials from the Harvester site. While none of the projectile points from the Weinmeister collection are manufactured from obsidian, the presence of this non-local material at the Harvester and Weinmeister sites is important to include here due to the implications of long distance trade from larger sources in Montana, Idaho and Wyoming.

Raw Material Analysis

Raw Materials from Middle Park

<u>Barger Gulch and Kremmling Chert, Grand County</u>

Figure 6.3 Barger Gulch raw material sample (right) and matching projectile points from the Weinmeister and Harvester sites.

The Barger Gulch raw material localities are situated within the geographic boundaries of western Middle Park, Colorado, just 8 km east of the town of Kremmling (Surovell et al. 2005:629). Middle Park is one of three mountain basins enclosed by multiple mountain ranges, including Front Range to the east and the Gore Range to the west (Figure 6.3). Barger Gulch chert is represented in the comparative collection and the raw material sample as having a translucent base with yellow undertones. One of the defining visual characteristics of this variety of chert is the black, starburst, dendritic inclusions. Five projectile points from the Harvester and Weinmeister collection exhibit the same characteristics to the raw material sample. The large projectile point (Figure 6.3, top left) represents a Pelican Lake point, which dates to the Late Archaic. Three of the projectile point morphologies fall into the Plains Corner Notch style, which is the dominant style within Early Ceramic occupations. Finally, a small Plains Side Notched point (Figure 6.3, bottom row, middle) from the Middle Ceramic period is also represented in the sample. The presence of projectile point styles spanning 3,000 years demonstrates continued use of both of these sites through time as well as the continued use of Barger Gulch chert from Middle Park.

<u>Kremmling Chert, Grand County</u>

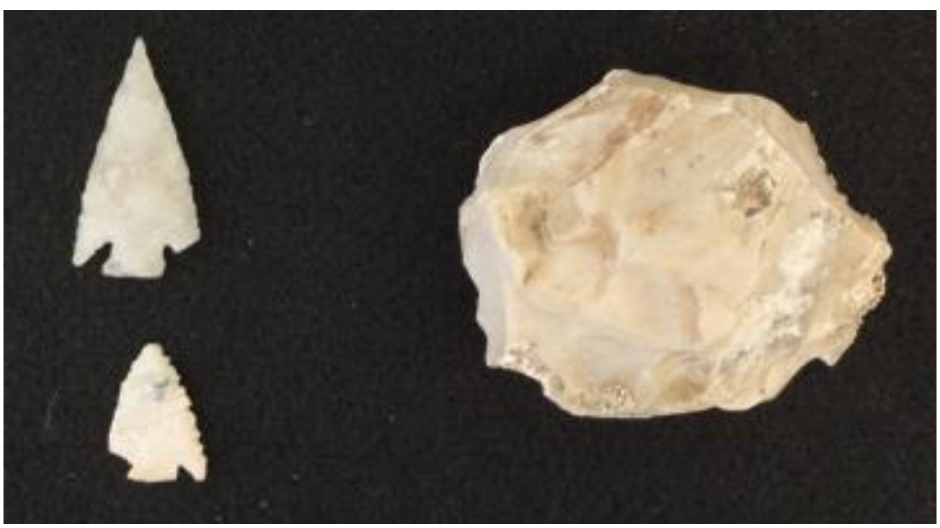


Figure 6.4. Kremmling Chert raw material sample (right) and matching projectile points from the Weinmeister and Harvester sites.

The Troublesome Formation produces many varieties of chert. Similar to Barger Gulch Chert, Kremmling Chert originates from the Troublesome Formation in Middle Park, but displays slightly different color characteristics. This variant of chert has an opaque, white, base color, and the same starburst dendritic inclusions found in the Barger Gulch chert. Two projectile points from the extant collection match the raw material example of Kremmling chert. Both the Plains Corner Notch point (Fig. 6.4, top) and the Foothills Corner Notch point (Fig. 6.4, bottom) fit within the context of the Early Ceramic period.

Unidentified Chert, Grand County –Table Mountain Jasper

Figure 6.5. Table Mountain Chert raw material sample (right) and matching projectile points from the Weinmeister and Harvester sites.

This chert sample, collected by James Benedict from a hill south of 5GA175 in Grand County, matches the raw material of one of the projectile points from the extant collection. This chert exhibits orange and red coloring with veins of clear material. The source of this chert also originates from the Troublesome Formation, which dominates the chert raw material sources in Middle Park (Shroba 2010). The matching projectile point falls into the Foothills Corner Notch typology, as evidenced by the serrations on the blade of the tool. This typology is part of the classic Early Ceramic assemblage (Benedict 1990; Nelson 1971).

Buffalo Peaks Chert, Middle Park

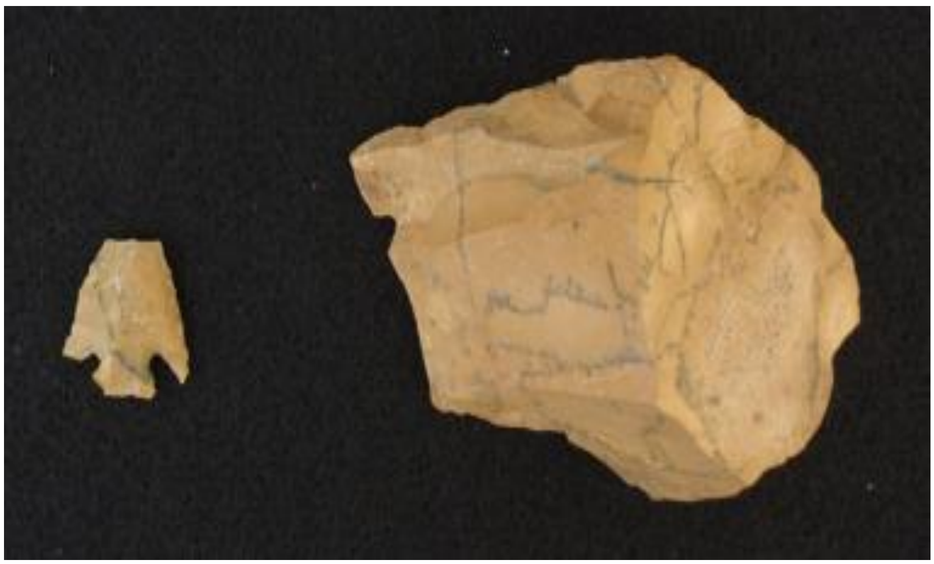


Figure 6.6. Buffalo Peaks chert raw material sample (right) and matching projectile points from the Weinmeister and Harvester sites.

This sample of Buffalo Peaks chert was also part of the sample collected by James Benedict from Middle Park. This chert is characterized by a yellow/tan color with linear black inclusions. The matching projectile point falls into the Plains Corner Notch type, which, like the Foothills Corner Notched point, falls into the Early Ceramic artifact assemblage.

Trout Creek Chert, South Park

Figure 6.7. Raw material sample from Trout Creek (top) and matching projectile points from the Weinmeister and Harvester sites.

Like most chert veins, Trout Creek chert varies in color. Two colors of chert are represented in this sample. The first example is characterized by a deep reddish brown base with yellow undertones, best seen when light is passed through the stone. This variation of chert also exhibits black circular or starburst shaped inclusions. The projectile points representing this raw material are Plains Corner Notched points, which fall into the Early Ceramic period.

The second variation of chert color is most likely not a natural occurrence. This bright orange red color is most likely achieved through placing the raw material in a fire. Heat alteration is also evidenced by the crazing visible on the surface of the material (Figure 6.8)

Figure 6.8. Raw material sample from Trout Creek (right) and matching unidentified projectile point from the Weinmeister and Harvester collection (left).

Windy Ridge Quartzite, Grand County

Figure 6.9. Windy Ridge Quartzite raw material sample (right) and matching projectile points from the Weinmeister and Harvester sites.

The Weinmeister collection contains four examples of projectile point fragments that share the same characteristics as Windy Ridge Quartzite from Grand County. This medium to fine grained quartzite sample is characterized by two different colors. One sample is a tan/yellow color with deeper undertones of grey, while the second sample is a pink/rose color. The Windy Ridge quarry also contains grey/silver examples of raw material, however this color was not represented in the Weinmeister or Harvester collection (Bamforth 2006). Only one of the projectile point fragments consists of a complete base. This projectile point is a small side notched point which fits within the Plains Side Notched typology, a predominantly Middle Ceramic style.

Raw Materials from Wyoming

Hartville Uplift Chert

Figure 6.10. Raw material sample from the Hartville uplift (right) and matching projectile points from the Weinmeister and Harvester sites.

One example of Hartville Uplift chert from the plains of south central Wyoming was recorded in Weinmeister's collection. While the colors of chert veins from this formation vary, this example consists of a dark brown/purple color. The projectile point also belongs to the Foothills or Hogback Corner Notch typology, as evidenced by the finely serrated blade of the point.

Chert from Belvoir Ranch, South Central Wyoming

Figure 6.11. Raw material sample from the Belvoir Ranch (right) and matching unidentified projectile point from the Weinmeister and Harvester collection (left).

This source is located on the western edge of the plains near Cheyenne, Wyoming. This chert is characterized by its reddish brown base color, dark brown and purplish veins and circular white inclusions.

This matching, unidentified projectile point from the Weinmeister collection most likely falls into a Late Archaic tool complex, due to the presence of the larger blade width and large base, compared to projectile points from the Early Ceramic (Figure 6.11).

Raw Materials from the Plains

Pawnee Grasslands

Two projectile point fragments match the extremely fine grained quartzite example from the Pawnee Grasslands. This extremely fine grained quartzite is yellow/tan in color, and demonstrates a distinctive mark on the exposed surface of

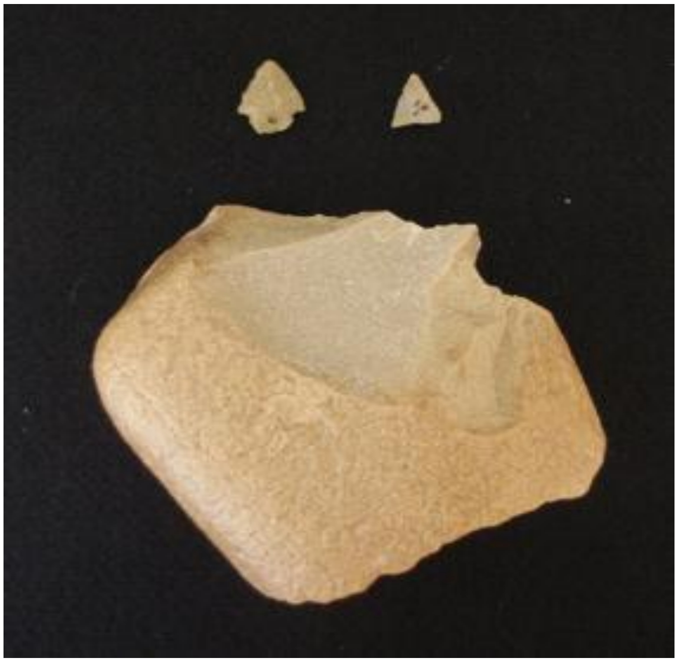


Figure 6.12. Raw material sample from alluvial settings on the Pawnee grasslands (bottom) and matching projectile points from the Weinmeister and Harvester sites (top).

the rock that is visible on both the raw material sample and the projectile point examples. This mark does not appear to be an inclusion, but rather a type of fracturing scar that represents crushed individual crystals in the rock. The raw material sample does not appear to be culturally modified. One projectile point has an undetermined typology as it is missing the diagnostic base. The diagnostic point belongs to the Plains Corner Notched typology, and shows significant retouch on the blade.

Cherry Creek/Parker Petrified Wood

Cherry Creek or Parker petrified wood is found near the town of Parker, Colorado and exhibits unique physical characteristics. Parker petrified wood is characterized by its yellow/tan color and inclusions of clear linear material within the rock matrix (Figure 6.13).

Figure 6.13. One variation of Parker Petrified Wood raw material (left) and matching unidentifiable point from the Weinmeister and Harvester sites (right).

Also, this raw material turns an orange/red color when heated, and transformation is apparent in both the raw material sample and the tool example from the Weinmeister collection.

The second variation of this raw material consists of a reddish/tan base with dark brown striations of the material (figure 6.14). The typology of one of the three artifacts is unable to be determined due to the absence of the diagnostic base of the point. One of the two diagnostic projectile points falls into the Plains Corner Notched typology (figure 6.15). The second diagnostic point could not be assigned a known typology (not pictured). This small, side notched point has a greatly expanding base and is further described Chapter 5 of this research (Type 3c).

Figure 6.14. One variation of Parker Petrified Wood raw material (right) and matching Plains Corner Notch point from the Weinmeister and Harvester sites (left).

Flattop Chert

Figure 6.15. Raw material samples of material from the Flattop Mesa quarry (right), and two unclassifiable projectile point tips (left).

Three examples from the Weinmeister collection correspond with the Flattop chert raw material sample. All of these tools are distal fragments, and the typology could not be determined. The tools match the distinctive purplish blue hue of the raw material sample from the Flattop Mesa quarry.

Discussion

Twenty eight projectile points from the Weinmeister and Harvester sites match raw materials from the Colorado mountain parks and the plains, as well as the plains of Wyoming. Raw materials for the projectile points from these two sites represent three basic categories: chalcedony/chert, quartzite, and petrified wood.

The projectile points in this study represent three periods in Colorado prehistory. The large side notched projectile point (Figure 6.3) represents a Pelican Lake style projectile point. This style is placed within the Middle to Late Archaic stage in Colorado, which ranges from 3050 B.C. – to A.D. 150 (Gilmore et al. 1999). Two Plains Corner Notch projectile points are also represented in the sample of Barger Gulch chert. Small corner notch points are one of the characteristics of archaeological sites from the Early Ceramic period (A.D. 150 – A.D. 1150). Plains Corner Notch points comprise 52% of extant projectile point collection, and are the dominant style of points, especially of those found on the Harvester site. A variant of the Plains Corner Notch Point has been defined by Nelson as the Foothills or Hogback Corner Notch point style (Nelson 1971). This point style is contemporaneous with Plains Corner Notch points, and occurs frequently within the assemblages of Early Ceramic sites. Foothills Corner Notched points are identical to Plains Corner Notch points in shape, size, and notch style. However, unlike Plains Corner notched examples, Foothill Corner Notch points include serrations on the blade. Finally, the presence of Plains Side Notch points in the sample also suggests a Middle Ceramic occupation or influence (AD 1150 – AD 1860) to the sample.

Raw materials from the mountain areas of Colorado contribute the largest category to the sample with 7 of 11 sources. Raw materials from this area are also dominated by Early Ceramic projectile point typologies, with a total of 9 of 12 Corner Notch points being manufactured from raw materials from the mountains. The three points representing the Plains Side Notch typology consists of raw material from quarries from Table Mountain and Windy Ridge in the mountains, and Parker Petrified Wood on the Plains. Of the three Archaic style points in this sample, two are made of materials from the mountains including Barger Gulch and Trout Creek cherts. The third example is manufactured from chert from the Belvoir Ranch on plains in Wyoming.

At least one other site on the western Plains demonstrates the use of non-local raw materials from the mountain basins. The Rock Creek site, a primarily Early Ceramic campsite located south of Denver, contains raw material sources very similar to those found in the Harvester and Weinmeister collection. Sources include Parker (Dawson Formation) petrified wood, Kremmling cherts, Table Mountain jasper/chert, and Windy Ridge quartzite from Middle Park (Gleischman and Philips 1995).

Artifacts manufactured of raw materials found along the eastern hogbacks have been recovered from many Early Ceramic sites in the mountains. Conversely, artifacts made from raw materials with sources originating in the mountain parks are found on Early Ceramic sites in the eastern hogbacks and Plains (Benedict 1990; Gilmore et al 1999). In fact, 11 sites within the Coney Creek Valley all contained ground stone artifacts made from Lyons Sandstone (Benedict 1990:70), which is only found along the eastern edge of hogbacks. Early Ceramic sites in the mountains are also linked with Early Ceramic sites in the Hogbacks and on the eastern Plains, linked by presence of serrated corner notched projectile points in both places. These similarities, along with the abundance of raw materials coming from the mountain parks of Colorado, the Plains of Colorado, and Wyoming, suggests that Early Ceramic groups were taking advantage of these environments. This movement has been described as a "Grand Circuit" transhumance from the plains to the mountains (Figure 6.16)

Raw Materials and the Transhumance Rotary Model

As introduced earlier in this chapter, Benedict (1992) has hypothesized that Early Ceramic people moved in a large counterclockwise circuit. This circuit was used to take advantage of the abundant game and moderate climate in the mountains during the summer and the mild winter climate of the eastern hogbacks during the cold months of the year (Benedict 1990; Benedict 1992). This circuit begins along the eastern edge of the hogbacks and moves north into the Laramie Basin, where a low pass in the Medicine Bow Mountains allows people to move west into the mountains. From here, people moved south into North Park and Middle Park which is abundant with game and edible plants during the late summer. As demonstrated above, Middle Park provides abundant raw material quarries to replenish lithic tool kits, including the types found in the Weinmeister and Harvester collection.

Additionally, many Early Ceramic sites in the mountain parks of Colorado are directly related to the use of game drive systems during the summer and the fall (Benedict 1990).

By the late summer and autumn, large groups organized communal

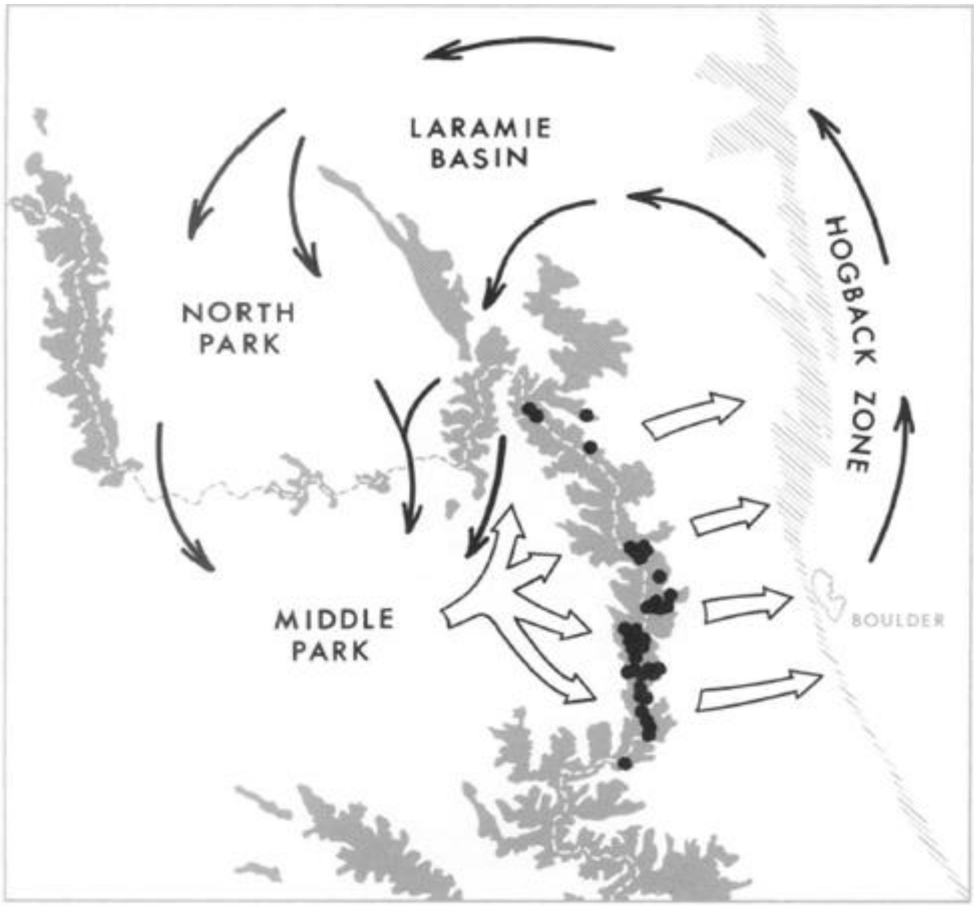


Figure 6.16. Benedict's Rotary model of Transhumance. The small black arrows indicate small bands of Early Ceramic groups moving into the mountains. The large white arrows represent larger, aggregated groups of people moving out of the mountains in the late fall. Reproduced from Benedict 1992.

hunts using the game drives of these mountain ridges.

Finally, in late autumn, groups would move back down to the hogbacks with their amassed food supply to set up winter camps where the climate was milder. The raw materials from the Weinmeister and Harvester collection suggest ties to mountain environments, and groups using these sites may have used this counter-clockwise route. Petrified wood from the Cherry Creek/Parker area, Pawnee Grassland quartzite and Flattop chert indicate raw material sources from the Plains. Raw material from the Hartville Uplift lithic source indicates time spent in southern Wyoming, and finally, the abundance of raw materials in this sample from the Rocky Mountain parks indicates use of these quarries as well.

The location of the Weinmeister and Harvester sites in the hogbacks of the Front Range, the non-local raw material sources, and the characteristic Early Ceramic tool assemblage suggest groups during the Early Ceramic period are taking advantage of diverse ecosystems from both the Mountains and the Plains of Colorado. The peripheral location of these two sites and many other Early Ceramic sites along the hogbacks allow for these groups to easily exploit resources from both of these areas. The presence of raw material from mountain parks of the Rockies within the Harvester and Weinmeister sites indicate that the groups living on these sites relied on lithic resources from the mountains in addition to the plains. This is further corroborated by the presence of artifacts from the Early Ceramic period within high altitude sites (Butler 1992).

It has been indicated in the literature that the cultural groups using this transhumance system are separate from those in eastern Colorado and the western High Plains (Benedict 1992). In other words, there is a cultural divide between groups using the Plains of Colorado and the Mountains of Colorado. For example, Benedict identifies this transhumant cultural group as the Hog Back Complex. This cultural complex follows the definitions provided by Nelson (1971), and describes people using campsites and game drives at high altitudes in the Front Range (Benedict 1992:12). The artifact assemblage that defines the Hog Back Complex by Nelson is identical to artifact assemblages from the Early Ceramic period of eastern Colorado. These artifacts include small, serrated, corner notched projectile points, ovid knives or preforms and cord-marked pottery. Because of these similarities, the guidelines defining the Hog Back

Complex as a separate cultural manifestation from the Colorado Plains Woodland Tradition have been dismissed by Butler (1988).

The lithic raw materials from the Weinmeister and Harvester sites suggest a heavy use of natural resources originating in the mountains for tool manufacturing. However, another assemblage within the Weinmeister collection suggests that the people on these sites were not tied solely to the western edge of the Plains. The Weinmeister and Harvester sites contain ideological or non-utilitarian artifacts indicative of the Colorado Plains Woodland tradition, which has roots within eastern Plains cultural manifestations.

Tubular Bone Beads and the Colorado Plains Mortuary Complex

The tubular bone beads in the Weinmeister collection represent decorative items tied to a prehistoric culture's ideologies, which are difficult to understand and infer solely from the study of them as objects. The style and make of the bone beads from Weinmeister's collection are similar to beads found in other Early Ceramic sites in eastern Colorado and the bead assemblage from the Weinmeister collection represents the largest assemblage of beads of this style yet found in the region. This analysis focuses on synthesizing the distribution of these beads within eastern Colorado, as well cataloging the type of site contexts in which they are found. These insights demonstrate how these beads were culturally important, the range of these styles of beads in eastern Colorado, and finally touch on the possibility of eastern Plains influences on material culture in during the Early Ceramic.

The Colorado Plains Woodland Tradition

Weinmeister's beads represent a portion of the artifact assemblage that defines the cultural manifestation known as the Colorado Plains Woodland Tradition. This tradition is defined within the Early Ceramic period in eastern Colorado and is often used interchangeably to describe Early Ceramic material culture. The term “woodland” originates from cultural taxonomic schemes used to describe periods and cultures in the Midwestern United States, and due to some material culture similarities, it has been used to describe the Plains Woodland tradition on the Eastern Plains. The Plains Woodland Tradition of the eastern Plains encompasses areas of western Nebraska and Kansas. The Colorado Plains Woodland tradition is considered a variant of the Plains Woodland tradition, and this analysis considers the similarities in material culture from the Plains Woodland Tradition and the Colorado Plains Woodland Tradition.

The beginning of the Early Ceramic period in eastern Colorado prehistory is marked by dramatic changes in technology and subsistence strategies, increases in populations, and changes in landscape use (Gilmore 1999:177; Gilmore 2008:73). The Early Ceramic period saw the introduction of small projectile points that begin to appear alongside large dart points characteristic of the Archaic period, the appearance of cord-marked ceramics, and an increase in ground stone artifacts (Butler 1988; Gilmore 1999: 177). Additionally, changes that indicate shifts in ideologies include the increase in cultural material in burial contexts compared to the previous period, especially the addition of non-utilitarian goods such as shell and bone beads, and pendants (Gilmore 2008). Changes in the physical placement of these burials on the landscape are also prominent during this time (Gilmore 2008: 77).

Gilmore (2008) has addressed these changes in landscape use in terms of population pressure. Based upon the prevalence of radiocarbon dates, the population increase culminated at the end of the Early Ceramic (AD 1150) and then decreased during the Middle Ceramic (Gilmore 1999; Gilmore 2008:82,). He posits that population increase not only spurred changes in technology and economies during the Early Ceramic, but also led to changes in landscape use because of the increased need to obtain "greater control of territory… which contributed to the redefinition of community identity and territorial ties" (Gilmore 2008:103).

It is not clear how the Harvester or Weinmeister sites fits into this model of changing landscape use during the Early Ceramic Period. The occupation of the Harvester site coincides with the largest increases in population during the Early Ceramic (A.D. 1020), so some of these changes are expected to be observed on these sites. However, the lack of intact burials from the Weinmeister and Harvester sites also limits the information gained from changes in patterns of burial goods. In order to place the Weinmeister and Harvester sites into this theory, much more research is needed from these two sites.

Tubular Bone Beads in Colorado and the Eastern Plains

Little has been written in the literature about tubular bone beads and most site reports only mention the presence of beads, without offering much analysis on them. Weinmeister's collection of tubular bone beads was at first thought to represent long bones from birds because of the delicate and thin walled nature of the beads. However, it was determined that the bones were too large to represent birds, and instead may be made of rabbit or other small mammal bone (Dr. Danny Walker, personal communication 2010). An identification of species is impossible due to the amount of cultural modification to the beads. Faunal remains are scarce and extremely fragmentary on both the Harvester and Weinmeister sites. There were no unmodified bones recovered that

Figure 6.17. Tubular bone bead sample from the Weinmeister site.

were similar to the size of the bones used to manufacture the beads.

Examples of bone beads being constructed from rabbit long bones has been documented at a Late Prehistoric site in the Wyoming Basin (Lubinski 2003). While these beads are not identical in length or decoration to beads from the Weinmeister site, the remains offer insights as to how tubular beads were constructed. The groove and snap technique appears to be the easiest way to produce tubular beads, and this was evidenced by bead waste products from the Raptor site (48SW1090), a Late Prehistoric site in Wyoming. An incision is cut into the bone using flake tools, then the bone is snapped at the cut, and the raw ends are ground smooth. Many Early Ceramic sites along the hogbacks contain rabbit and small mammal remains suitable for manufacturing these small beads (Gilmore 1999). Additionally, a suggested bead manufacturing tool kit was discovered at the Sand Creek Burial in south central Wyoming, and includes bone and shell raw materials, a mano, and unfinished tubular and shell beads (Scoggin 1978). The beads in progress from the Sand Creek burial are from a canine species, and while larger in diameter, look very much like the incised bone beads from the Weinmeister site.

Beads from the Weinmeister site exhibit two different forms of incising: concentric rings around the circumference of the bead, and one continuous spiral that wraps around the bead. The majority (n=346 or 64%) of the beads exhibit concentric rings. The grooves that are incised in concentric rings around the circumference of the bead may indicate that they are unfinished beads and in the process of being broken via the groove and snap technique. However, the depths of the incisions vary, and some are only lightly inscribed, suggesting more of an ornamental function to the grooves. The sheer number of beads with concentric rings, and the prominence of very shallow incising suggest that the incisions were meant to be decorative, rather than functional. However, some of the smaller beads in the Weinmeister collection (generally with one or two incised grooves) show very deep grooving. If any of the beads in the Weinmeister collection were in the process of being manufactured, these small beads are the most likely candidates.

Early Ceramic sites represent the largest proportion of prehistoric sites in the Platte River Basin (Gilmore et al 1999:181). The sample of Early Ceramic sites represented in this discussion in no way encompasses all of the sites that could have beads present within their boundaries. Early Ceramic sites have a variety of beads present (see bone disk beads in Chapter 4); however, this study focuses directly on the cache of tubular beads found on the Weinmeister site. This greatly reduced the number of sites in the sample. In order to find Early Ceramic sites containing tubular beads, record searches were conducted through the Compass database at the OAHP website and site reports were scoured for mention of this style of beads. The selected sites are the most well represented in the literature, and again, due to differences in recording details, more sites with tubular bone beads probably exist than is represented here. The difficulty of locating specific information about the style and number of beads most likely stems from the fact that many of the sites were documented in a presence or absence capacity, and not sufficiently described. Also, sites with beads present in the assemblage were discarded if the beads in question were not bone, or not described as tubular in shape which may skew the results of this analysis.

The sample size for sites with tubular bone beads in eastern Colorado totals 12 sites (Table 6.2). Again, many Early Ceramic sites were mentioned to contain beads; however, the beads were not described and therefore not applicable to this analysis. These sites are located within two physiographic regions. Five are located within the Plains physiographic region, and seven are located in the Hogbacks. It should be noted that two of the sites (Lena Gulch and Weinmeister) are located on the ecologically productive and sheltered transition zone between the Hogbacks and the Plains. Weinmeister in particular is located at the toe slope of one of the last points of physical relief before the Plains physiographic region begins.

The bead assemblages were found in a mix of site contexts, including mortuary, open camps and rockshelters. Mortuary contexts represent the highest presence of tubular bone beads, totaling 9 of 13 sites. Bradford House II and III and LoDaiska

Table 6.2. Early Ceramic sites with tubular bone beads.

Site Number	*Site Name*	*Tubular Bone*	*Site Context*	*Region*	*References*
5LR12174	Weinmeister Site	537	Disturbed /Unknown/Open Camp	Plains	Burnett and Kennedy 2009; this thesis
5LR1683	Roberts Ranch Burial	235	Mortuary	Hogbacks	Black 1997
5JF1780	Lena Gulch Burials	9	Mortuary	Plains	Jepson and Hand 1999;Wendt 2004
5LR284	Lightening Hill Site	122	Mortuary	Hogback	Morris and Mayo 1979; Gilmore 1999
5LR97	Hutcheson Burial Site	135	Mortuary	Hogback	Wade 1966
5AM3	Hazeltine Heights Burial	78	Mortuary	Plains	Buckles et al 1963;Gilmore et al 1999
5WL1478-81	Agate Bluff Sites	118	Rockshelter/ Non-Mortuary	Plains	Irwin and Irwin 1957
5JF223	Magic Mountain Site	16	Open camp and Mortuary	Hogback	Irwin and Irwin Williams 1966
5JF52/5JF53	Bradford House II & III	10	Open Camp and Rockshelter	Hogback	Johnson et al 1997
5FN1210	Coaldale-Fox Burial	5	Mortuary	Hogback	Black 1997
5WL1813	Ehrlich Burial	1	Mortuary	Plains	Gilmore et al 1999
5JF142	LoDaiska Site	"Numerous tubular beads of birds and small mammal bone."	Open Camp	Hogback	Irwin and Irwin 1969
5MR3	-	“Many bird bone beads around the necks of individuals”	Mortuary	Plains	Scott and Birkedal 1967; Gilmore et al 1999

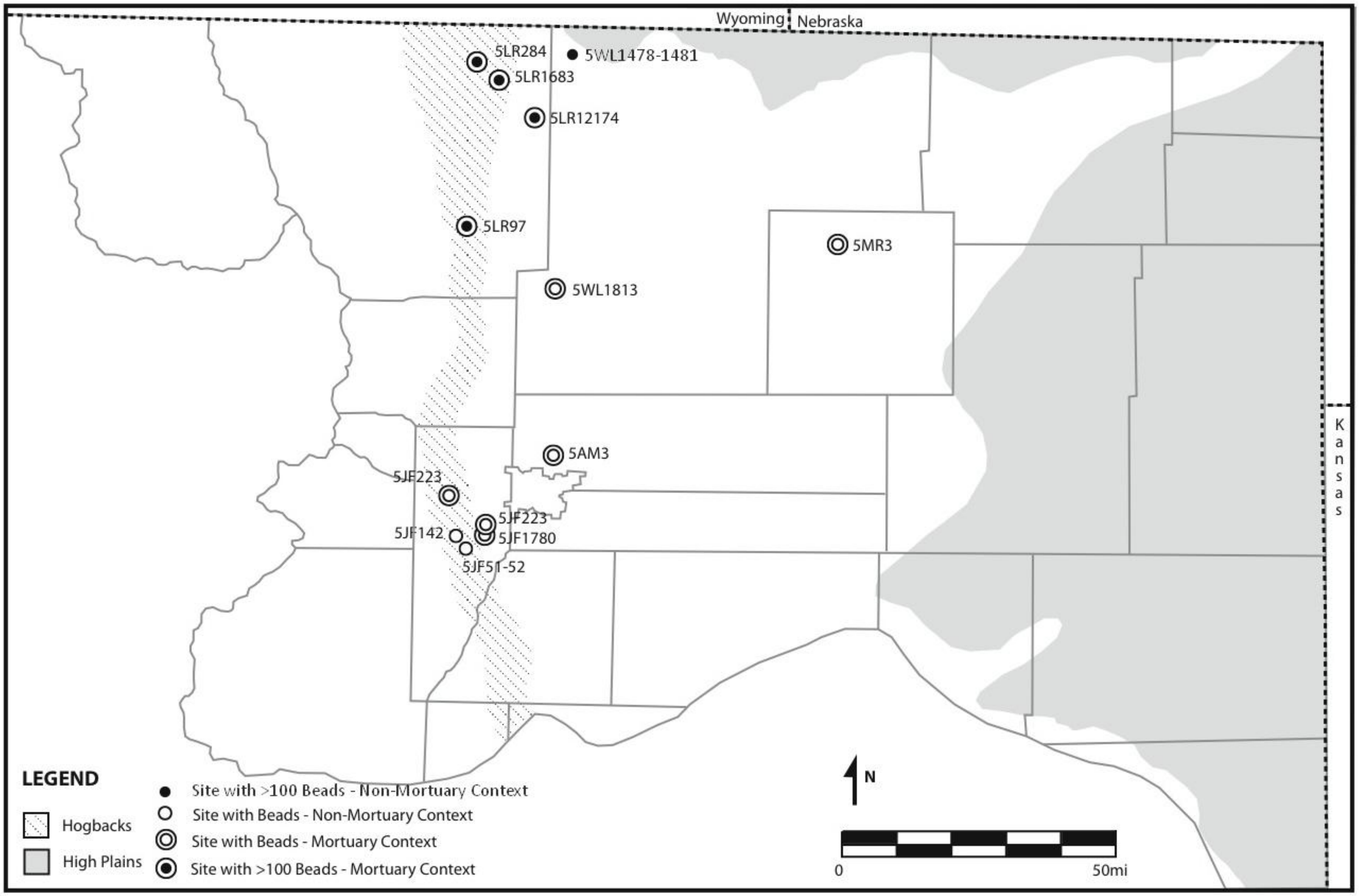


Figure 6.18. Locations of Early Ceramic sites in the Platte River Basin with tubular bone beads present. Adapted from Gilmore 1999:183.

represent the only three sites where beads were not found within a mortuary context, and the Bradford House sites represent the lowest number of beads found per site. It is undetermined how many beads the LoDaiska site contains, so a quantitative analysis could not be completed. The four largest assemblages of tubular bone beads are found within Larimer County and include the Weinmeister site, the Roberts Ranch Burial, the Lightening Hill site and the Hutcheson burial. Three of the sites are located along the base of the Hogback physiographic region and the Weinmeister site is situated at the last topographic relief of a small bluff before the eastern Plains begin. All of these assemblages of beads were found within mortuary contexts (possibly excluding the Weinmeister site).

The Weinmeister bead cache was discovered in the wall of one of two silage pits excavated during the 1960s. Weinmeister discovered the beads eroding out of a sidewall and collected them by excavating a small hole into the side of the silage pit. Most of the beads were found jumbled, without any clear pattern. However, according to Weinmeister, a small number of the beads were found laid end to end as if they were strung together on a cord. The small pit excavated by Weinmeister also revealed charcoal, two small chalcedony Plains Corner Notch points, and small rodent incisors. Charcoal, small projectile points and rodent incisors have been found as mortuary goods within the Early Ceramic period in Colorado and Kansas (Kivett 1953; Jepson and Hand 1999). The presence of these artifacts, as well as the vast number of beads from the cache, suggests that the beads were placed there within a mortuary context. However, without the presence of human remains, the Weinmeister bead cache cannot be attributed to any mortuary practices, and remains simply a cache.

The Roberts Ranch Burial is located on a privately owned ranch, and was discovered eroding from an arroyo cut-bank in the early 1990s. Salvage excavations uncovered numerous artifacts including shell disk beads, tubular bone beads, large grinding stones and lithic artifacts. The decoration of the beads were not described, and they appear to be constructed from small mammals and birds, including sizes similar to ducks, grouse, hawks, rabbits, and hares (Black 1997:9). Like the Weinmeister site, the Roberts Ranch burial contained charcoal, which was thought to be a fire built above the pit as part of the burial ritual (Black 1997).

The Hutcheson Burial is located near Buckhorn Creek, just west of Fort Collins, Colorado. The bead assemblage consists of 135 tubular bone beads found with two individuals. The beads are made from small mammals and possibly bird humeri and completely undecorated (Wade 1966).

The style and large quantity of beads at the Lightening Hill site are identical to tubular bone beads found at the Weinmeister site. This site is located 37 miles northwest of the Weinmeister site in the hogbacks of Livermore, Colorado. These beads were analyzed by the author prior to their repatriation, and consisted of small mammal bone (raptor and unknown species) as well as large deer phalanges. These beads exhibit the same variation of decoration as beads from the Weinmeister and include unadorned and concentric circle decorations (figure 6.19).

Tubular bone beads assemblages in this analysis are overwhelmingly found within mortuary contexts, contributing to 81% of the sample, excluding the Weinmeister site. The high frequency of tubular bone beads found within mortuary contexts can be attributed to many different factors, both taphonomic and cultural in nature.

Figure 6.19. Bone beads from the Lightening Hill burials near Livermore, Colorado.

Faunal remains are often the first to deteriorate in open camp settings. Delicate, hollow, beads are subjected to taphonomic destruction by animal trampling, forces of nature, and general deterioration. These unfavorable conditions for faunal preservation may be the reason that there are relatively few bone beads (or other delicate bone tools) found in open camp sites, such as the Harvester site. Another important consideration to account for this discrepancy is the role that these items play in prehistoric ideology. Beads represent non-utilitarian items that are culturally important and were therefore most likely curated and taken care of by their owners while they were living. Also, their cultural importance is reinforced by their inclusion in burials. Burials represent deliberate cultural acts that are imbued with meaning (Gilmore 2008:75). The items interred with individuals during this ritual have deep community meanings, and this is especially true if the objects are consistently found within the same context across space, as is found with these beads across eastern Colorado. The high prevalence of tubular bone beads found within mortuary contexts may also be due to sampling biases.

Complete beads are more likely to be found within mortuary contexts because they are purposely placed there, instead of discarded or lost in an open camp site setting. The reason that there are more beads within mortuary contexts is most likely attributed to the role of tubular beads in the Colorado Plains culture, and the purposeful placement of them in mortuary sites. In other words, mortuary contexts are the primary place in which archaeologists can expect to find these beads. However, because the beads from the Weinmeister site were not found within the context of a burial, it is impossible to connect the beads with mortuary contexts despite the large assemblage size.

The Colorado Plains Mortuary Complex

The beads from this analysis fit within an assemblage of artifacts defined as the Colorado Plains Mortuary Complex (Breternitz and Wood 1975; Scott and Birkedal 1973; Wendt 2004; Wood 1965). This complex is defined as a break in burial trends from the preceding Late Archaic period. Colorado Plains Woodland burials are recognized by primary burials, and the introduction of secondary burials, specially dug ovid pits, lack of pottery found with burials, and the introduction of non-utilitarian grave goods, which most commonly manifest in shell and bone beads and shell pendants. Bone beads consist of both disk and tubular shaped beads, and shell beads include freshwater shell from local sources as well as *olivella* shell from either the Gulf of Mexico or the Gulf of California (Calhoun 2011). The primary differences in mortuary practices between the Late Archaic and the Early Ceramic is the inclusion of non-utilitarian grave goods and the placement of burials in specialized locations on the landscape (Gilmore 2008:86). Tubular bone and disk shell beads have been observed more frequently to accompany burials with females and sub-adults (Butler et. al 1986) and this trend was found to be statistically significant in research conducted by Gilmore (2008).

Two burials were uncovered during excavations related to farm activities at the Weinmeister site; one from the western silage pit, and another from a short distance east within the boundaries of the floodplain. No associated artifacts were discovered or recorded for these burials, and the burials were turned over to the county coroner. The Harvester site, located just south of the Weinmeister site is most likely temporally and culturally related to the Weinmeister site. The presence of burials in the Weinmeister site may indicate that it was a designated space for burials, while the Harvester site remained the main activity area. However, due to the multitude of other functional artifacts recovered from the Weinmeister site, it is difficult to impossible to determine if the Weinmeister site was indeed a place reserved for burials and related to the Harvester site. This fact remains speculation due to the lack of extended research on the Weinmeister site, and the disruption and loss of the context of the burials.

The material culture and burial styles found in eastern Colorado Mortuary Complex is very similar to those found within the Plains Woodland Mortuary Complex. The inclusion of secondary burials along with primary burials and the presence of bone and shell beads are common to both complexes. Three large burial sites from the western Great Plains are often cited within the literature to imply a connection between the Plains Woodland mortuary complex of Kansas and Nebraska and the Colorado Plains Mortuary Complex. These sites are identified in the following summary.

The Woodruff Ossuary in western Kansas is a large (20 x 25 feet) burial that contains at least 61 individuals. Thousands of shell disk beads and tubular beads were found within the ovid pit, as were charcoal, and large amounts of unmodified rabbit teeth around one individual. The unmodified teeth are similar to those found within the Lena Gulch burial and may represent a bracelet or other similar decorative artifact (Kivett 1953; Gilmore 1999:226). Similarly, small, unmodified rodent teeth were also discovered within the Weinmeister bead cache (Weinmeister 2004).

The Bisterfeldt Potato Cellar is located near Scotts Bluffs, Nebraska and the North Platte River. This site consists of four pits that contained the remains of 32 adults and five infants (Mattes 1965). One infant was wrapped in strands of tubular beads that contained at least 110 beads; the total number of tubular beads found with all of the infant remains totals over 700 beads.

The Massacre Canyon site, located in southwestern Nebraska consists of seven burials (Kivett 1952). One contained the remains of a child, interred with large shell disk beads and 21 tubular beads. The majority of the tubular beads were inscribed with concentric rings and spiral designs, identical to those recovered at the Weinmeister site.

While many of material remains from the Colorado Plains Woodland Mortuary Complex are similar or identical to those found within the Plains Woodland Mortuary Complex to the east, important differences remain. Large ossuaries that contain dozens of individuals have not been reliably recorded in eastern Colorado. Only two sites in eastern Colorado have been documented that may represent large ossuaries like those described in the Plains Woodland Mortuary Complex. The Garcia site (5WL1986) was discovered in Weld County by workers excavating a silage pit (Anonymous 1961). The remains consisted of at least 27 skulls, and “uncounted numbers of beads” among other artifacts were taken from the site. Archaeological excavations and research have not been conducted on the Garcia site, and most of the context was destroyed by looters. It is not known what styles of beads are represented in the short description of this site, but the extremely high number of individuals found within the burial, and the tentative Early Ceramic designation makes it an interesting and relevant case that should be further explored by researchers. The Lightning Hill site (5LR284) is described by Scott (1979) as being the second ossuary found in eastern Colorado. This mortuary site contained two individuals and dates to the Early Ceramic period. It is unclear whether this site should be considered an ossuary due to the small number of remains found in the site when compared to the Garcia site and other described ossuaries in the Plains Woodland complex.

Population Pressure, Rivers as Highways and Similarities in Bead Assemblages from Eastern Plains Woodland Sites.

Eastern Colorado is laced with a network of rivers and creeks, especially between the South Platte River in north eastern Colorado, and the Arkansas River of southeastern Colorado. It has been observed that mortuary sites in eastern Colorado (with and without the mention of beads) are located along river systems and their tributaries (Scott and Birkedal 1972:3). The locations of the Hazeltine Heights and the Hutcheson burial to the South Platte and Cache la Poudre Rivers, respectively, also support this observation. Scott and Birkedal insist that all burial sites with the Colorado Plains Woodland Mortuary association are found near rivers and their tributaries. This trend in landscape use is interesting and brings up questions about population pressures, cultural diffusion, and landscape use.

Population pressures have been described as the catalyst for some of the cultural change that is evident in the beginning of the Early Ceramic period (Gilmore 2008). In eastern Colorado, population begins to steadily increase during the beginning of the Early Ceramic and peaks at the transition between the Early and Middle Ceramic periods, which coincides with the occupation of the Harvester site (A.D. 1020). Gilmore argues that population increase and the shift to a more sedentary life caused people to view landscapes in a different way and to “stake their claim” on a piece of land, which is witnessed by the adjustment in burial practices which emphasized the location of a certain place (Gilmore 2008:100). The incidence of burials with higher numbers of individuals interred within one site, such as the Woodruff Ossuary on the western High Plains, suggests either a larger population used the site, or that the site was used for extended amounts of time. If larger populations are in fact using one specific mortuary site, this may indicate higher population are present in the western High Plains. Perhaps, population pressures are responsible of the similar assemblages of burial goods on the western High Plains of Kansas and Nebraska, as well as the western boundary of the Plains in eastern Colorado.

Tubular bone beads, both incised and plain, are found ubiquitously within burials from both the Colorado Plains Woodland Mortuary Complex and the Plains Mortuary complex of the western High Plains. The mortuary setting in which these beads are commonly found, as well as their non-utilitarian nature, suggests that tubular beads are culturally and ideologically important. The fact that the same styles of beads are found within the same settings with the same accompaniments within two different regions suggests that perhaps people and culturally specific ideologies are moving from east to west into eastern Colorado. The movement of ideas or people may be related to the seemingly high occurrence of burials found along the river systems of the Great Plains, especially in the western High Plains and eastern Colorado. After all, rivers provide direct and easily navigable routes to neighboring regions.

Discussion

The largest known assemblage of tubular bone beads in eastern Colorado was discovered on the Weinmeister site, totaling 537 complete beads. These beads exhibit two basic decorations: concentric circles around the circumference of the bead, and incised spirals around the bead. While these beads were not found within direct context with human remains, the style of the beads, as well as other accompaniments in the cache, very tentatively suggest a mortuary context. These include numerous rodent incisors, charcoal pieces, and two small corner notched projectile points. Aside from the corner notched points, these artifacts have been found within many other Colorado Plains Woodland burials and Plains Woodland burials.

These practices vary greatly from observed mortuary practices from the Archaic period. The inclusion of non-utilitarian grave goods, the introduction of secondary burials, and the placement and curation of landscapes specifically near stream terraces separate Archaic burials from Early Ceramic burials (Gilmore 2008:100). The repeated use of distinctive landscapes documented during the Early Ceramic suggests importance placed in these landscapes which served as an ownership message to outside groups, and reinforced this message within the community (Gilmore 2008:101).

This complex is an attenuated version of the of the Plains Woodland Mortuary Complex on western High Plains, and both complexes show similarities in material culture, including the style of the tubular bone beads. The similarities between both mortuary complexes, as well as the dominance of burial sites found near major river systems that connect the western High Plains to eastern Colorado and the Colorado Hogbacks, suggests movement of people or ideologies into from east to west. This tentative hypothesis would benefit from further research into the use of rivers in eastern Colorado and the connection to the western High Plains that is suggested by similarities in mortuary goods, especially tubular bone beads. A useful analysis would include the understanding of radiocarbon dates from these mortuary sites to infer a timeline along the rivers, and to verify the use-life of ossuaries if possible.

There seems to be a contradiction in the cultural identities based on beads and models based on lithics as presented in this chapter. Benedict and others believe that Hogback Complex is separate from the Colorado Plains Woodland Complex, which seems to contain many of the same material culture and ideologies as the Plains Woodland Complex of the western High Plains (Nelson 1971; Benedict 1992; Gilmore 1999). The collections from the Weinmeister and Harvester sites demonstrate that the people living on these sites were part of both of these cultural complexes, and using multiple areas of the Colorado landscape. The raw materials from this collection indicate that people on the Harvester and Weinmeister sites were visiting the mountain parks in order to obtain high quality raw material. The similarities in material culture, including small, serrated corner notched points and sandstone artifacts originating from the eastern hogbacks suggests that these people were also taking advantage of the many Early Ceramic game drive systems on the ridge of the Front Range. Conversely, the tubular bone beads from the Weinmeister site firmly suggest that the inhabitants of these sites are part of the Colorado Plains Woodland Tradition, an extension of the Plains Woodland Tradition from the east. So the question remains, how can these sites represent both, seemingly separate communities? The Weinmeister and Harvester sites could represent a melding of these two different cultural groups, or, perhaps, their separation in the first place is superficial.

Another interesting idea stems from the lack of information about Early Ceramic burials in the mountains. One of the differences between previous Colorado cultural periods is the introduction of secondary burials in the Early Ceramic period and differences in locations of these burials. The increase in secondary burials may be a reflection of the importance placed on particular portions of the landscape and the fact that people are reusing burial sites because of population pressures. Also, these secondary burials on the plains may represent members of the community that died during the summer season while along the Front Range, and were then transferred down to the community's official mortuary space on the Plains. While this hypothesis would greatly benefit from further research to verify or negate this claim, it appears that the Harvester and Weinmeister sites may represent a group of people who were a mixture of both of these complexes.

CHAPTER 7

A CASE STUDY IN COMMUNICATION AND EDUCATION ON THE RIVER BLUFFS OPEN SPACE

Identifying cultural patterns and connecting local patterns with larger, regional patterns is informative and academically important. This type of research allows for theories on the movement of past ideologies and people to be tested, and for a greater understanding of past human environments to be uncovered. But, what is the purpose of uncovering all of this information without educating the people that are the most affected by this archaeology? The tentative research conclusions reached in this work would not be possible without the involvement of a private collector, a member of the interested public, and the fact remains that public opinion and knowledge of archaeology affects how much archaeologists conduct their work.

The River Bluffs Open Space project represents an excellent opportunity to reach different sections of the public who have vested interests in the land, in both an historic and modern sense. This thesis project involves three very different groups of the public who are connected through mutual use, interaction, and commitments to this piece of land. This includes historic use of the land and the farmers and farm workers who became interested amateur archaeologists and collectors. Academic archaeologists were first invested in this land because of the abundant research potential and teaching opportunities that the River Bluffs Open Space provides. Finally, and maybe most importantly, the members of the general public who strive to learn more about the past history of the landscape in which they live, hold the potential to save this same history from destruction. With so many interested parties involved in this project, a problem arises: how can we maximize interactions and education for each of the interested party and communicate the importance of archaeological stewardship? This chapter focuses on the three parties that are most vested in the River Bluffs Open Space, and how research and communication between artifact collectors and the general public contributes to the needs of each. Most importantly, it will highlight how the needs of each party are answered by open communication, education, and public interpretation, as well as how much each of these parties relies on the contributions and cooperation of each of the other participating groups.

The Importance of Archaeological Communication and Education

Professional archaeologists must deal with two segments of the public: those who collect artifacts and the general public who are interested in archaeology in a passing sense. These two segments of the public are not mutually exclusive, and often overlap. For the most part, the people who collect artifacts are genuinely interested in the archaeology in which they take part (Kinnear 2008:175). In the experience of the author, artifact collectors are very excited to talk with professional archaeologists, and in most cases, want their collections to be studied. While the loss of provenience of artifacts taken by collectors can prove detrimental to site interpretation and research, the loss of knowledge of an entire assemblage is even worse. It is important for archaeologists to cultivate relationships with local artifact collectors to document what they do have before the collection itself is lost forever in the hands of uninterested family members who never knew the whole story.

For some archaeologists, working with artifact collectors may seem to violate the archaeological ethics relating to working with those who destroy the record. While this work does not condone amateur artifact collecting, it is unrealistic to believe this practice is going to stop. Communication with private collectors should also include encouragement of proper recording techniques which will lessen the detrimental impact of artifact collection.

The act of engaging the public in archaeological education has encountered several obstacles that stem from miscommunications and misinformation and even lack of cooperation from archaeologists. The general public receives a mixed view of what archaeology is, and in some cases does not even know what kind of work archaeological research entails. Mass media, such as television shows, popular magazines, and even some news broadcasts often sensationalize archaeological finds and misreport or misrepresent research in order to glamorize archaeology (Sabloff 1998:872; Hawkins 1981:29; Latanich 2009) This sensationalistic and misleading coverage warps the public's perception of the discipline of archaeology. Also, some archaeologists have expressed concerns that public education may increase looting or collecting practices (Hawkins 1981:28). However, the same archaeologists that are concerned over public knowledge of archaeological sites agree that there must be some form of communication between themselves and the general public in order to protect sites. The need for communication has been long identified, and now it is up to researchers to take proactive steps in engaging the public.

The projects completed on the River Bluffs Open Space seek to involve all members of the interested public. This is achieved through communicating and including the artifact collector that has been involved with the Weinmeister and Harvester sites. This also means including the instruction of students of archaeology from Colorado State University, who have learned valuable field method techniques through work on the Open Space. Finally, the culmination of this project is engaging the general public through the creation of an interpretive sign that details the importance of the cultural materials on the River Bluffs Open Space, and draws on the research uncovered there.

Artifact Collectors and the River Bluffs Open Space

As demonstrated throughout this thesis, the River Bluffs Open Space has a rich prehistoric story, with many of its secrets not yet uncovered. However, one of the most important contributions to the archaeological research of this Open Space was access to the extant collection of artifacts from this property, owned by Weinmeister. Without his cooperation and interest in archaeology, the Harvester and Weinmeister sites would be difficult to interpret, and the resulting research conclusions would be inaccurate.

Just like archaeological research, surface collectors contribute to the destruction of the archaeological record by taking artifacts from the surface and in some cases, excavating sites (Elia 1996; Mallouf 1996; Fagan 1996). This work is rarely completed with the training and methodology that professional archaeologists receive and the destruction to the archaeological record without any system of recording is unquestionably detrimental to the site and future work on the affected site. However, despite the damage done to archaeological sites, this group of people has been neglected as an incredible resource of local and regional knowledge. The fact that more archaeological sites are discovered by amateur archaeologists and artifact hunters than by professional archaeologists shows the urgent need for collaboration between these groups and professionals (LaBelle 2003). This is especially true in Colorado, where amateur archaeologists and artifact collectors were responsible for finding high profile sites such as the Lindenmeier, Dent, and Olsen-Chubbuck sites (Ooton 1992; Kinnear 2008; LaBelle 2003), among many others. The willful neglect of the impacts that amateur collectors have on archaeological sites as well as the specialized information that they can impart to professionals studying a region is not only damaging to the record, but also irresponsible on the part of archaeologists.

The importance of this communication to the research conducted on the Harvester and Weinmeister sites is evident based upon the discrepancy in the total artifacts that researchers found and the total artifacts from Weinmeister's collection. During field work on the Harvester site, only three fragments of projectile points were recovered. In contrast, the extant collection from both the Harvester and Weinmeister sites contained 120 projectile points, many of which were complete. Also, the very large collection of tubular bone beads and other diagnostic artifacts would have been lost if not for an open communication between researchers and collectors. Despite the fact that pinpoint locations of the artifacts from the extant collection are unknown, the information that they can impart in overarching research questions of Colorado archaeology is important. The fact that most of the analysis portion of this thesis is based upon information gained from the artifacts in the extant collection testifies to the importance of an open line of communication. It is only through active relationships with collectors that research integrity on an archaeological site that has been extensively collected will remain intact. Whenever possible, it is important for archaeologists to understand and seek out information regarding this lasting impact on archaeological sites.

Academic Researchers and Students

The River Bluffs Open Space has also provided opportunities for important archaeological research and teaching. After the brief pedestrian survey conducted by LaBelle in 2008, formal archaeological work on this land was undertaken to assess the planned construction of a parking lot where the Weinmeister site is now located. The large amount of archaeological resources discovered during this field work initiated this thesis work. The field portion of this research not only provided data to add to the larger context of archaeology in Colorado, but also provided important teaching and learning opportunities to students of Colorado State University. Three students enrolled in Anth 486 (Field Methods Practicum) gained three academic credits to complete this field work. Numerous volunteers (mostly CSU students) volunteered their time and weekends to gain experience in archaeological field methods. Students and volunteers were responsible for identifying, recording and measuring artifacts in the field and using a Total Station to record artifact placements on the site. Meticulous excavation of a hearth feature as well as two test pits were also completed by students and volunteers. These students also contributed to lab work involving measuring artifacts, sorting debitage, and conducting historic research. The research involved in this project was dependent upon student participation and interaction with the site. I also gained immense help from these students and learned valuable techniques in teaching and running a basic field project and crew. In this way, this project represents more than just a step in the qualification process of a Master's thesis; students and volunteers gained archaeological field experience that will be helpful to them in their archaeological careers.

The General Public and Archaeological Interpretation

Archaeologists agree that public interpretation is important for the preservation of archaeological sites (Hawkins 1981:3). The public has the power to pass legislation to protect archaeological sites as well as fund the conservation and protection of these sites. The public is also genuinely interested in archaeology, especially if it involves the places to which they are attached. Interest in archaeology can be witnessed by attending the local Stone Age Fair (http://www.stoneagefair.com), an artifact fair held in the city of Loveland every year that attracts hundreds of people; by visiting historical museums; by flipping through a National Geographic or Archaeology magazine. All of these educational and recreational outlets are geared for the general public's interest in archaeology.

A gap in communication between professional archaeologists and members of the public has been discussed and this gap has persisted for decades (Hawkins 1981; Kinnear 2008). This lack of communication between archaeologists and the public has been described as the main problem contributing to the destruction of archaeological sites (Gross, et al. 2006; Jameson 1997; Kinnear 2008; Meltzer 1985; Sabloff 1998). While many researchers have called for better communication with the public, a lack of publications on how to actually put this into action exists. This thesis project uses the placement of the Harvester and Weinmeister sites on a public open space to create a public interpretation project that caters to everyone using the open space recreationally. County and city parks, trails and open space provide the perfect forums to introduce the public to archaeology and to unite the past to the present. These spaces are highly accessible to the public, and people escape to nature trails to feel a connection with the environment and the landscapes in which they live. Interpretive resources within these lands further allow the visitor to understand and connect to cultural and natural processes and history.

The creation of an interpretive sign is used in this project to educate the public about the prehistoric cultures that lived in northern Colorado. Specifically, this sign focuses on telling the story behind the archaeological resources found on the River Bluffs Open Space and how the Colorado Plains Woodland cultural group used the Cache la Poudre River. The River Bluffs Open Space and the Harvester site are nestled in the middle of a residential community, a golf course and farmland near the Cache la Poudre River. The theme of this sign connects the modern and prehistoric preference for living near the Cache la Poudre River. Even though river front property has been prime real estate for modern developers and prehistoric communities, past people relied on the river for far more than just a pretty view. This sign focuses on how the prehistoric community chose rivers as winter camps, as people in the past preferred to live near the Cache la Poudre River.

There are many ways to disseminate information to the public on trail systems. The high visibility of interpretive signs on publically accessible land allows archaeologists to reach a large, varied audience. Specifically, interpretive signs allow visitors to read the information at their own pace, remains available all year long, and most importantly has the ability to reach more people than any other interpretive medium (Ward and Wilkinson 2006).

Finally, public outreach and education in archaeology can have tremendous conservative impacts on the archaeological record. The completion of this project aids in connecting the present to the past through common interests and landscapes, which adds archaeological relevance to modern life. Making the past interesting and connected to modern communities makes the public understand why archaeological sites are important to protect. One of the goals of my research is public education of the Harvester Site and encouragement of public stewardship on archaeological sites. This goal can be partially completed with the public interpretation of archaeology. Making the archaeological record accessible and relevant to modern communities reinforces the importance of the archaeological record.

Two types of resources were used to research and create this sign. To build the dialogue and story for the sign, I used archaeological reports and articles on the Colorado Plains Woodland culture as well as my own research on the Harvester site. Creating an archaeological story that was friendly to the public required help from Rob Novak, the education director for Larimer County, as well as independent research in graphic design and interpretive sign building.

Building interpretive signs requires a few key elements to be successful within a public setting. Logistical requirements were placed on the construction of this sign by Rob Novak, as well as sign building texts in order to make the sign readable, interesting and relevant.   The sign measures 36 x 24 inches and will be placed at the trailhead of the trail system. The recommended reading level for interpretive signs is between 7th and 9th grade, and the total word count should be between 300 and 500 words (Ward and Wilkinson 2006). The sign presented for this project is on the high end of the word count, with 500 words total.

Sign building begins with a theme or topic that dominates the educational purpose of the sign (Gross, et al. 2006). Making the theme known in the title of the sign allows visitors to understand what you are trying to interpret, and what the important part of the interpretation is. The theme of this prototype is "Rivers of Life: Colorado Plains Woodland Life on the Cache la Poudre River" (Figure 7.1). This lets the reader know that the remainder of the sign will detail the realities of life on the Cache La Poudre River during the Colorado Plains Woodland period, nearly 1000 years ago. The text below the sign supports this theme. This section introduces mobility patterns and explains how prehistoric people moved seasonally into the floodplains of the Poudre River during the winter time, following Benedict's Rotary Model of Transhumance (Benedict 1992). The next paragraph highlights the physiographic features that drew prehistoric communities to the area, and out of the mountains. These include high vantage points (the bluffs that parallel the river), permanent sources of water (the Cache la Poudre River and Fossil Creek), and open spaces, possibly used to set up camps (the floodplains beneath the bluffs). Finally, a large picture of a campfire in the snow emphasizes the use of the land as a residential camping space during the winter time. The text next to this picture also points out an important consideration of living near rivers during the winter, and the importance of reliable sources of firewood to stay warm in the winter.

The large yellow box on the right of the sign is referred to as a "gator box" and allows the designer to include material that is relevant to the sign, but does not directly relate to the theme. The addition of this feature of interpretive design is used to emphasize and specifically connect the Colorado Plains Woodland culture to the River Bluffs Open Space property. The theme of the gator box is "Things Left Behind: The

Material Culture of the Colorado Plains Woodland People". The focus of this box consists of the material culture of the River Bluffs Open space, and feature three different artifacts types that are important and indicative of the Colorado Plains Woodland culture. The first artifact featured is the cord-marked pottery that defines the Colorado Plains Woodland period. The whole pot was included in order to give the audience an idea of how the pot was shaped, and how the shape corresponds with the function of the pot. Plains Corner Notched projectile points and Hogback/Foothills Plains Corner Notched points are used to demonstrate visually the tools that were used to hunt. However, the text again reinforces the seasonal movement of these people by explaining where these points are found along the hogbacks and as well as in the mountains. Finally, bone beads found on the River Bluffs Open Space are included in order to explain how these artifacts are commonly used in mortuary contexts. The text also demonstrates how important the River Bluffs Open Space is because the cache of beads is the largest found in eastern Colorado to date.

This sign is a prototype for the sign that is going to be erected at the trailhead of the River Bluffs Open Space. The message and the text will remain the same, but the images and art will be done professionally. The proposed art for this sign includes a winter camp scene along the river. This will include campfires, housing structures and people. Hopefully, this artwork will give a lifelike quality to the sign, and make it more connected to the audience.

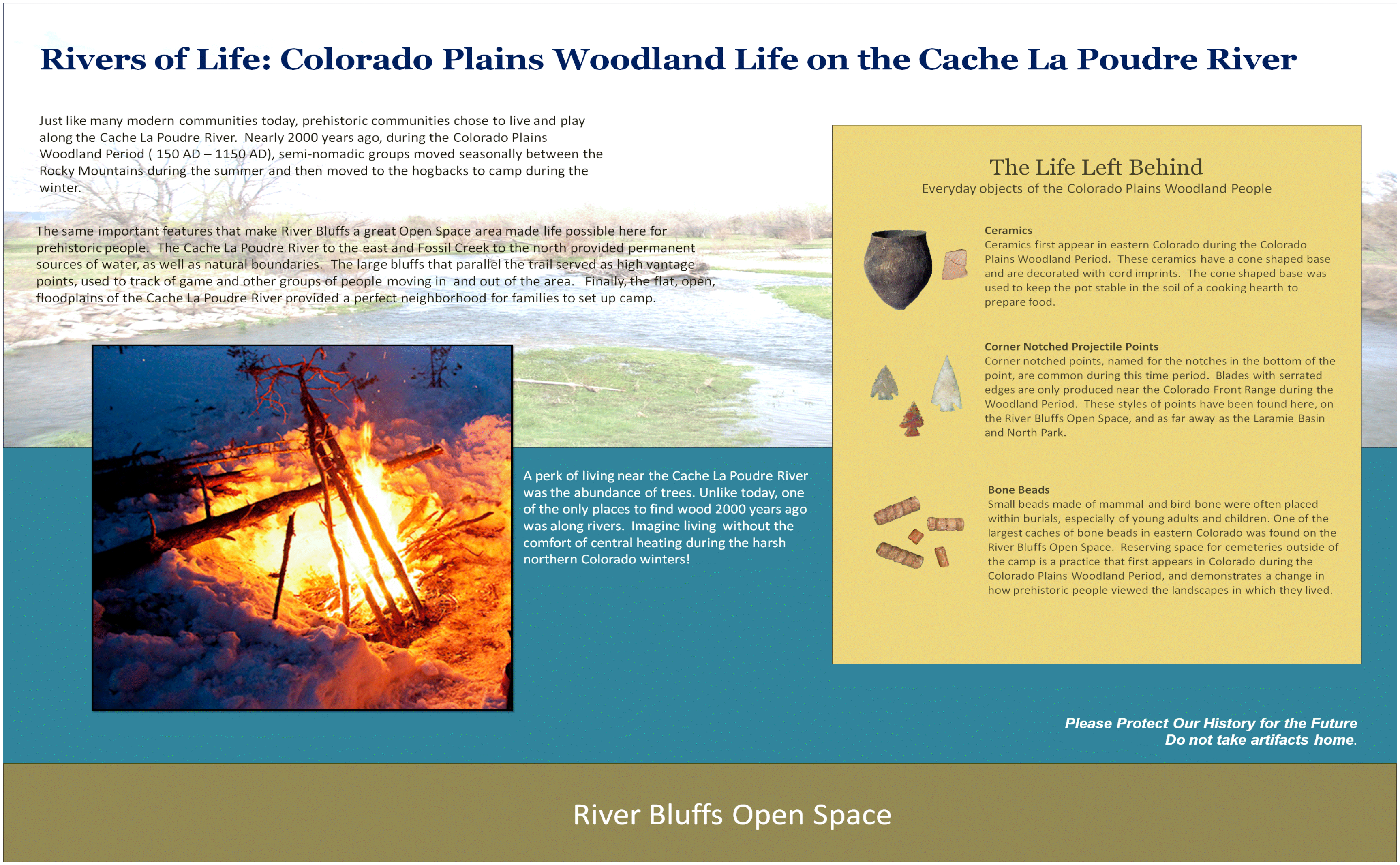


Figure 7.1. Interpretive sign prototype for the River Bluffs Open Space public education component.

Producing this sign proved difficult in many areas, including decisions on the style of art to include and the depth of the content. Making the text as interesting as possible in order to engage the public but not at the expense of the science behind it was difficult to balance. There is a fine balance between science and fantasy, especially when presenting the science to the public, and many authors of scientific literature for the public cross the line into the "fantastic" (Sabloff 1998:87). Perhaps, apprehensiveness of straying too far from the scientific side of the archaeological record caused the story to suffer. Instead of an engaging narrative, the story that was produced was more like a string of facts tied together.

In creating the content for this sign, it became clear that the text should not just take the form of "dumbed down" archaeology. While it is important to break away from the jargon-filled bubble that academia fosters, it is important to realize that your audience is not stupid. The responsibility of the interpreter is not to present a watered down history of a subject, but to present complex, difficult research in a simple, concise, manner. This was the real challenge of this project. The best way to make archaeology important in the 21st century is to present it to the public and make it a part of everyday life. By making archaeology highly visible in community buildings, roads, signs and parks, the public recognizes it as important part of their own community, and as something that should be protected (Goddard 2002).

Discussion

Three segments of the public are invested in archaeological research at the River Bluffs Open Space: the artifact collectors, the professional archaeologists and students of archaeology, and the general public. The research on the River Bluffs Open Space has been positively affected by these three groups. The importance of communicating with three different interested groups is important not only for the preservation of archaeological sites, but also for the survival of archaeology as a discipline (Sabloff 1998:869).

Artifact collectors are one portion of the public that is highly interested in archaeological sites, and this is no different for the sites located on the River Bluffs Open Space. Often, these people destroy the context of sites by collecting artifacts; sometimes until there is no site left to recognize (LaBelle 2003:115). However, the fact that some information has been lost does not mean that the artifact assemblage is completely useless. This is evidenced by the research contained within this thesis; for without the communication and contributions made by the person who collected artifacts on the River Bluffs Open Space, most of this analysis would not have been possible. In this way, academic archaeologists and archaeology students rely on the information that artifact collectors can impart about a site.

Talking to the public about archaeology increases and encourages critical thinking and discourages the perpetuation of archaeological myths. Public interest in archaeology is growing, and many mass media sources have seized this opportunity to make money writing programs that often continue these myths. By involving the public in archaeological research and presenting the scientific method in the steps we use to tell the story of the past, they will be able to tell the difference between junk science and real science. Hopefully, if more archaeologists decide to interact with the public, the public will come to understand why archaeological sites and research are relevant and important to protect.

CHAPTER 8

DISCUSSION AND FUTURE RESEARCH

The Cache la Poudre and Fossil Creek has proven to be a desirable place to live, work, play and learn for thousands of years, with the River Bluffs Open Space representing a continuation of this ancient practice. This legacy of human occupation and use is continuing through its status as public open space, and hopefully will continue to be studied given its archaeological research potential.

The research conducted on the Harvester and Weinmeister sites and the Open Space has contributed valuable data to the regional knowledge concerning the Early Ceramic Period as well as the Colorado Plains Woodland Tradition. This information was obtained by conducting formal archaeological survey and excavation research as well as the involvement and contributions of an artifact collector. Two overarching research questions were used as guides while research was being conducted on the Open Space.

1. *How was the River Bluffs Open Space used in the deep past, and how does it relate and contribute to other Early Ceramic/Colorado Plains Woodland sites in the area?*

This question was answered using two assemblages from within the Weinmeister collection, as well as formal archaeological research conducted on the Harvester site.

The Harvester site is a large prehistoric activity area which contains numerous artifacts and features, both from prehistoric and historic contexts. Pedestrian surveys revealed the presence of over 200 flakes, cord-marked ceramics, projectile point fragments, scrapers, and ground stone fragments. The excavation of one of the four hearth features found on the site dates the site to 1020 A.D., which places this occupation at the end of the Early Ceramic period. This analysis also recovered three bone disk beads, pottery fragments and macrobotanical information. The vast abundance of microdebitage within 26 ant mounds on the Harvester site indicate extensive tool reworking on the site, and suggests the presence of subsurface archaeological deposits. This conclusion is also supported by the presence of cultural material found at least 70 cm subsurface within the test pits, and magnetometry results that suggest buried thermal features. The field work on the Harvester site only scratched the surface of the amount of information to be gained by further archaeological research on the site.

The research of the two assemblages from the extant collection focused on fitting the movements of people living on the Harvester and Weinmeister sites into a broader mobility pattern for Early Ceramic settlements, as well as understanding some aspects of the Colorado Plains Woodland Mortuary Complex. The projectile point collection contained a large number of complete and almost complete projectile points, which are associated with Late Archaic and Early Ceramic occupations in eastern Colorado. Using knowledge of lithic raw material sources in Colorado, the raw material sources were determined to understand the use of the landscape and mobility patterns of Early Ceramic peoples. This analysis indicates that people from the River Bluffs Open Space (the Harvester and Weinmeister sites), were utilizing raw materials from the plains of Eastern Colorado, the transition zone between the Hogbacks and the Front Range of the Rocky mountains in Colorado and Wyoming, and finally finding some of their raw material sources from the Mountain Parks of Colorado. The conclusion that Late Archaic and

Early Ceramic peoples were moving in and out of the mountains from the hogbacks of Colorado fits into a well known model of transhumance. The Rotary Model of Transhumance set forth by Benedict (1990), suggests that Early Ceramic people who lived along the hogbacks of Eastern Colorado were moving into the mountain parks to take advantage of seasonally abundant game and sprouting plants. This model is evidenced by the presence of Early Ceramic sites found in the mountains that contain nearly identical artifact assemblages. Based upon the raw material results, as well as similarities to Early Ceramic assemblages in sites in the mountains, it seems as if people living on the Harvester and Weinmeister sites were also part of this larger cultural mobility pattern.

The second assemblage from Weinmeister's extant collection used in this analysis consisted of 537 tubular, incised, small, mammal bone beads. These beads were collected from an extremely disturbed context on the Weinmeister site, and are consistent with mortuary goods placed within burials from the Plains of western Nebraska and Kansas as well as some burials sites in eastern Colorado. While the beads from the Weinmeister site were not directly associated with a mortuary component, there have been burials discovered on the Weinmeister site. Other remains from Weinmeister's bead cache, including two small, corner notched projectile points, charcoal, and rodent incisors were discovered. These goods are similar to other mortuary assemblages across the hogbacks and eastern Plains.

The Colorado Plains Woodland Tradition is a cultural complex within the Early Ceramic period that describes the perceived cultural traits of that group. The term "woodland" refers to similarities in artifact assemblages from the Plains Woodland groups of Kansas and Nebraska. The presence of these tubular bone beads found on the Weinmeister site, and within 12 sites from eastern Colorado, as well as very large burial mounds in Kansas and Nebraska point to continuity across space. This suggests that ideologies from Kansas and Nebraska are present within eastern Colorado, and that these ideologies stayed pertinent until the end of the Early Ceramic period.

The second question of this research is pertinent to the future of the River Bluffs Open Space and deals with public education:

2. *How can archaeologists impart the importance of archaeological stewardship to the public, in order to preserve archaeological sites?*

The River Bluffs Open Space has affected three different interested groups of the public. These groups include artifact collectors, professional archaeologists and the general public who interact with the Open Space through recreation. These groups of people have different needs, and this project has contributed to each of these needs. The cooperation of the artifact collector was instrumental in the research and results obtained for the River Bluffs Open Space. The need for archaeologists and collectors to maintain a professional relationship is vital to properly document and study archaeological sites. Working with a collector on this project has illuminated this need; formal archaeological research has only recovered two projectile point fragments, while Weinmeister's collection contains 120 examples. Academic archaeologists have benefited from this project both in research settings as well as teaching opportunities. New generations of professional archaeologists have learned basic field and laboratory methods from participating in the research of this site. Finally, the general public has been involved through the production and planned installation of an interpretive sign which tells the prehistoric story of the River Bluffs Open Space. The addition of the interpretive sign on this Open Space hopefully makes people realize the archaeological importance of the place, and how connected they are to the past.

Research on the River Bluffs Open Space and the Harvester and Weinmeister sites is far from finished. It is interesting to note a slight discrepancy in archaeological theories about the same group of people, especially when considering the material culture of burials, as well as the mobility patterns discerned from projectile point raw material sources. It has been thought that the groups of people using the mountains within the "Rotary Model of Transhumance" were endemic to the hogbacks of eastern Colorado. While the River Bluffs Open Space is located within this region, the tubular bone beads from the extant collection suggest ties to the eastern Plains cultures of Nebraska and Kansas. This analysis would greatly benefit from future studies concerning the extent to which raw materials from the mountains make it onto the eastern plains, as well as their relative frequencies, to determine if groups from farther east were making use of this type of mobility pattern as well.

This project has touched on many aspects that are important to building the archaeological story of eastern Colorado. The prevalence of artifact collecting in eastern Colorado has made it difficult to find or interpret archaeological sites in the area. Work on the River Bluffs Open Space begins to patch holes in knowledge about life during the

Early Ceramic and relationships to local and non-local sites and cultural manifestations through formal academic research and the cooperation of a private collector.

The potential archaeological information gained from River Bluffs Open Space is far from exhausted. Further research should be conducted through excavation, surveys of the surrounding areas (including the floodplain) as well as along the Cache la Poudre River. This work is only a jumping off point for further contextualizing the prehistory of Eastern Colorado and the Cache la Poudre River.

Finally, and most importantly, protection of these important resources is only achieved through public education and public involvement, both from the general public and amateur archaeologists. The River Bluffs Open Space provides important and relevant opportunities to teach the public about the history and prehistory in their own backyard. Public education increases the awareness of the importance of saving and protecting these fragile resources. Without public involvement and protection, places like the River Bluffs Open Space would be unprotected and potentially developed. Without their involvement, archaeology like this would be impossible.

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APPENDIX I

AMS Date from Hearth 2

Ms. Jessica E. Anderson — Report Date: 9/20/2010

Colorado State University — Material Received: 9/7/2010

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 284074	760 +/- 40 BP	-10.6 o/oo	1000 +/- 40 BP

SAMPLE : HEARTH02
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal AD 980 to 1060 (Cal BP 970 to 900) AND Cal AD 1080 to 1150 (Cal BP 870 to 800)

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-10.6:lab. mult=1)

Laboratory number: **Beta-284074**

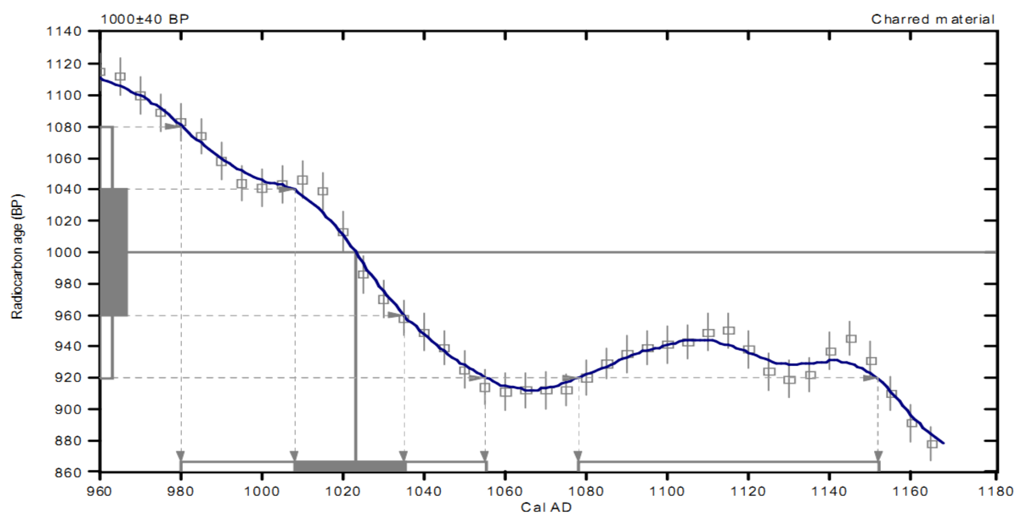
Conventional radiocarbon age: **1000±40 BP**

2 Sigma calibrated results: (95% probability) **Cal AD 980 to 1060 (Cal BP 970 to 900) and Cal AD 1080 to 1150 (Cal BP 870 to 800)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1020 (Cal BP 930)

1 Sigma calibrated result: (68% probability) Cal AD 1010 to 1040 (Cal BP 940 to 920)



APPENDIX II

Macrofloral Analysis

MACROFLORAL ANALYSIS OF FEATURE 2 AT THE HARVESTER SITE, WINDOR, COLORADO.

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September 12, 2010

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Introduction:

Macrofloral analysis was conducted on five light fraction samples from Feature 2 at the Harvester Site which is located in Windsor, Colorado. This was done to ascertain if charred macrofloral and non-macrofloral remains were present. If present, then insights into understanding prehistoric subsistence and subsistence patterns can lead to a better understanding of seasonality of site occupation, the possibility to reconstruct past plant and animal compositions, resource utilization patterns and the possibility to determine to what extent charred organic material has degraded. The overall results yielded two species of fuel wood which were identified as ponderosa pine (*Pinus ponderosa*) and a saltbush or shadscale (*Atriplex* sp.) species. Carbonized macrobotanical remains included one Indian rice grass (*Oryzopsis hymenodies*) seed, one sunflower (*Helianthus* sp.) achene and eight goosefoot (*Chenopodium* sp.) seeds. Unburned macrobotanical remains included several sclerotia (*Cenococcum* sp.) spores along with Indian rice grass seeds, goosefoot seeds and one Rocky Mountain beeplant (*Cleome serrulata*) seed. No zoological remains were present in the light fraction. Insect chitin fragments were present and a representative sample was collected.

Methodology:

Colorado State University, Department of Anthropology, floated the feature fill and sent the light fraction samples to High Plains Macrobotanical Services for analysis. The light fraction was passed through ¼ ", 2.0 mm, 1.0 mm and 500 µm sieves. Separating the light fraction into different sizes allows for more manageable viewing thereby decreasing the amount of time required to analyze a feature. The organic material was identified using a SWIFT stereo SM80 widefield microscope (10-40X). Recovered macrofloral materials were identified using the author's seed and charcoal collection and wood and seed identification manuals (i.e., Boonstra et al. 2006a, Boonstra et al. 2006b, Core et al. 1979, Davis 1993, Hoadley 1990, Hurd et.al. 1998, Kirkbride et al. 2000, Martin and Barkley 2000, Musil 1978, Panshin and Zeeuw 1970, Young and Young 1992).

Charcoal fragments were removed from the ¼", the 2mm and 1mm screens. The charcoal was weighed and identified.

Plant names are listed by both their common name and scientific name. Scientific nomenclature of plant names will follow Weber 1990. The term "sp." (such as *Pinus* sp.) indicates the plant has been identified to the genus level but not to the species level. The term "seed" can represent seeds, caryopses and/or achenes.

A representative sample of insect fragments was collected in the ¼" screen, 2mm, 1mm and 500 µm screens.

Results:

<u>Feature 2, NE Quad, Level 20-25cm.</u>

A total of 19.67 grams of light fraction containing grass roots and charcoal was analyzed. Ponderosa pine (*Pinus ponderosa*) was the only charcoal present in the light fraction, of which, 0.24 grams were recovered in the 2mm screen and 0.26 grams in the 1mm screen. Carbonized macrofloral remains included one Indian rice grass (*Oryzopsis* *hymenodies*) seed, one fragment and four complete goosefoot (*Chenopodium* sp.) seeds and one sunflower (*Helianthus* sp.) achene. Unburned macrofloral remains included one fragment and six complete Indian rice grass seeds and one sclerotia (*Cenococcum* sp.) spore. No zoological remains were present in the light fraction. Insect chitin fragments were present and a representative sample was collected.

Feature 2, NE Quad, Level 25-30 cm, Bag 4.

A total of 4.28 grams of light fraction containing grass roots and charcoal was analyzed. The overall results yielded two species of fuel wood which were identified as ponderosa pine (*Pinus ponderosa*) and a saltbush or shadscale (*Atriplex* sp.) species. Approximately 80% of the sample was ponderosa pine while the remaining 20% represented *Atriplex* sp. The 2mm sample yielded 0.73 grams of charcoal while the 1mm sample yielded 0.14 grams. Carbonized macrofloral remains included three complete goosefoot (*Chenopodium* sp.) seeds. Unburned macrofloral remains were absent in the light fraction. No zoological remains were present in the light fraction. Insect chitin fragments were absent in the light fraction.

Feature 2, NE Quad, Level 25-30 cm, Bag 5

A total of 2.61 grams of light fraction containing grass roots and charcoal was analyzed. The overall results yielded two species of fuel wood which were identified as ponderosa pine (*Pinus ponderosa*) and a saltbush or shadscale (*Atriplex* sp.) species. Approximately 80% of the sample was ponderosa pine while the remaining 20% represented the *Atriplex* sp. The 2mm sample yielded 0.19 grams of charcoal while the 1mm sample yielded 0.09 grams. Carbonized macrofloral remains included one complete goosefoot (*Chenopodium* sp.) seed. Unburned macrofloral remains included three goosefoot seed fragments and one sclerotia (*Cenococcum* sp.) spore. No zoological remains were present in the light fraction. Insect chitin fragments were absent in the light fraction.

Feature 2, SE Quad, Level 2, Bag 4.

A total of 2.28 grams of light fraction containing grass roots and charcoal was analyzed. The overall results yielded two species of fuel wood which were identified as ponderosa pine (*Pinus ponderosa*) and a saltbush or shadscale (*Atriplex* sp.) species. Approximately 50% of the sample was ponderosa pine while the other 50% represented the *Atriplex* sp. The 2mm sample yielded 0.12 grams of charcoal while the 1mm sample yielded 0.07 grams. No carbonized or charred macrofloral remains were present in the light fraction. Unburned macrofloral remains included one complete Rocky Mountain beeplant (*Cleome serrulata*) seed and one goosefoot (*Chenopodium* sp.) seed. No zoological remains were present in the light fraction. Insect chitin fragments were absent in the light fraction.

Feature 2, SE Quad, Level 2, 22-27cm.

A total of 6.63 grams of light fraction containing grass roots and charcoal was analyzed. The overall results yielded two species of fuel wood which were identified as ponderosa pine (*Pinus ponderosa*) and a saltbush or shadscale (*Atriplex* sp.) species. Approximately 10% of the sample was ponderosa pine while the remaining 90% represented the *Atriplex* sp. The 2mm sample yielded 0.38 grams of charcoal while the 1mm sample yielded 0.14 grams. Carbonized macrofloral remains included three complete goosefoot (*Chenopodium* sp.) seeds. Unburned macrofloral remains included one Indian rice grass (*Oryzopsis hymenodies*) seed. No zoological remains were present in the light fraction. One insect chitin fragment was present in the light fraction and it was collected.

Charcoal Sample from NEQuad, Level 20-35cm.

The charcoal sample was identified as either a saltbush or a shadscale (*Atriplex* sp.) species.

Discussion:

One must remember this feature could have been used for purposes other than plant processing. A review of the ethnographic record show hearths used for food processing represents only one out of many possible uses. Some hearths were used as a source of light, food preparation (faunal and floral), fires in religious context, hunting-food gathering methods, tanning hides, signaling, fire as a tool in warfare, production of tools, keeping pests away, and, play fires (Guernsey 1984: Appendix F). Additional uses include ceramic production, a place to gather and socialize (Bach 1998:5-6) and, a hearth used to heat stones for regulating and storing heat (Ives 1999:17.1-2).

A total of 2.42 grams of charcoal was recovered from Feature 2. This is more than enough for a standardized AMS date. The charcoal appeared clean and showed no signs of mineralization.

The presence of the ponderosa pine is not unusual. Historic reports from early trappers observed pine trees in the area. It was only during the Settlement Era and the building of the railroad were the trees cut down for housing or tie hacked by the railroad.

The presence of the saltbush or shadscale is also normal. According to Weber both species are common on clay hills in the sagebrush zone on the eastern plains (Weber 1990:145). Further to the north ponderosa pine trees can still be found along the bluffs in Pine Bluffs, Wyoming and throughout the area around Guernsey, Wyoming.

It is unfortunate the charcoal could not be identified to the species level, however, this is quite common. Wood specimens can be easily identified to the family level. Some woods can be identified to the genus level but most cannot be identified to the species level. According to Tennessen et al., “Accurate taxonomic identification is an essential part of archaeological wood analysis. However, making identifications more precise than the genus level is usually not possible since species within the same genus typically possess very similar cellular morphology (Tennessen et al. 2002:521).

Feature 2 contained one fragment and eight complete carbonized goosefoot seeds. The presence of these seeds may or may not be culturally significant. These seeds may have been accidentally introduced into the hearth with the kindling, or, may have blown in (see Bach 1997). Furthermore, an individual goosefoot plant can produce up to 100,000 seeds (Kindscher 1987:82). If processing of goosefoot seeds was an activity associated with Feature 2 then one would expect higher number of carbonized seeds to be present in the light fraction. Conversely, others believe that the presence of several charred seeds represent seed processing. It is up to the reader to determine if these seeds are culturally significant. With that said, the ethnographic record concerning goosefoot seeds indicates:

> The seeds were commonly used by the Indians as a source of meal for bread or gruel. They can be gathered in large quantities in various ways; for example, by placing them in large paper or cloth sacks, or by beating them out on rocks or canvas. The seeds are small and smooth so it may be necessary to boil them, mash them, and then dry the material before grinding. The flour is dark colored from the blackish seed coats, but bakes up into a nice tasting and surely a nutritious product. . . . The seeds can be parched and eaten partly raw. . . (Harrington 1967:71).

Kindscher states:

> The seeds are ground, mixed with corn meal seasoned with salt, and made into a stiff batter, which is formed into balls or pats and steamed. Upon first reaching this world the seeds were prepared without the meal, as the Zuni had no corn at this time (Kindscher 1987:81).

The presence of the one carbonized sunflower seed and Indian rice grass seed is also speculative. With that said, the ethnographic record does indicate sunflowers were consumed by Native Americans. The seeds were eaten raw, roasted or dried and ground (see Harrington 1967:312-314, Kindscher 1987: 124, Moreman 1999:257-258) while Indian rice grass seeds were also eaten raw, dried or ground (see Harrington 1967:320-322, Kindscher 1987:232-233, Moreman 1999:370-371).

The presence of the unburned seeds should be dismissed as intrusive. Keepax (1977:226) stated “It is often a simple matter to reject all uncharred seeds as modern in origin and to retain only the charred material as genuine.” The presence of the sclerotia spores should also be dismissed. Sclerotia is a soil fungus which “appears to be ubiquitous” and is found in multiple ecosystems (McWeeney 1989:227) and it is not culturally significant. The presence of the unburned insect chitin fragment along with roots indicates this feature has undergone very limited modern day bioturbation/disturbance. This bioturbation/disturbance does not appear to have affected the overall preservation of the feature contents (see Bach 2005).

The presence of the three carbonized goosefoot seeds located outside of the hearth in the southeast quadrant could represent a clean out area, however, further testing would be require to verify this statement.

To summarize, Feature 2 yielded a small number of carbonized goosefoot seeds, one sunflower seed and one Indian rice grass seed. It is unlikely these seeds are culturally significant. With that said, one can not dismiss the possibility that the seeds may be important although it is unlikely. Feature 2 yielded 2.42 grams of ponderosa pine and an *Atriplex* sp. charcoal. Both wood sources were common in the area prehistorically and were present up until recently. The charcoal appears clean and shows no signs of mineralization.

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APPENDIX III

Harvester Magnetometry Report
Andy Creekmore
June 10, 2010

Introduction

The Harvester site is located in the town of Windsor, Colorado. The site sits on a low, eroded bluff and is known to contain artifacts and features dating to approximately 2000 BP. The author conducted one exploratory 10m X 10m magnetometry grid at the site on May 16, 2010, with the assistance of Colorado State University anthropology graduate students Jessica Anderson and Jason Chambers. The goal of this research is to locate pyrotechnic features for possible testing and sampling in conjunction with ongoing research at the site.

Methodology

For the survey we used a geoscan FM-256 gradiometer, and due to the small size of the grid and expected features, we collected data at the highest practicable resolution and clarity, as follows:

Grid size: 10X10m
Samples per meter (along traverse) 16
Traverse interval: 0.25m
Traverse type: parallel
Georeferencing: to local grid, see appendix.

We oriented our grid with respect to the bluff, roughly NNE of magnetic north. Weather during our afternoon data collection was sunny, about 75-80 degrees, with relatively little breeze. Ground cover included low grass, cactus, and dry brush. The surface sloped down West to East, and was relatively uneven, with significant rises and drops towards the northeastern portion of the grid.

Results

We processed data in Geoplot 3.0. Raw data were very good, with great clarity and few magnetic spikes (Figure 1).[1] Three anomlies are visible in the raw data, and are somewhat enhanced upon further processing to remove slope effects and clip outlying values. Round anomalies A and B are about 0.5m in diameter and have low positive values between 0 to 4 nT, consistent with the dimensions and values recorded for a hearth eroding out of the bluff to the west of the survey area. It is likely that these two anomalies are hearths buried within the first 1m of the ground surface.[2] Anomaly C is less pronounced than the first two anomalies, but presents a low bipolar value that may derive from a more deeply buried, smaller, or less preserved hearth than anomalies A and

B. The white halo of negative values around anomaly C probably derives from topography, which slopes down in this area, in combination with raised, eroded “edges” whereupon thicker, taller vegetation necessitated lifting the gradiometer slightlyto avoid heading errors. This slight raising of the machine likely contributed to enhanced negative values.

Conclusions

The excellent results from work at the Harvester site are a strong argument for continued use of magnetometry at this site to locate, sample, and analyze the patterning of pyrotechnic and other features along the bluff. Ground truthing of anomalies A, B and C would improve the interpretive potential of future work. Given that the fields below the bluff likely consist of soils eroded from the bluff, it is probable that magnetometry would yield similar good results in this area along the river if archaeological remains are present.

Footnotes

[1] Soils on the bluff apparently have low magnetic values, providing an even background against which even low positive features are highly visible.

[2] The FM-256 can detect anomalies up to about 1m below the ground surface, depending on their strength and the magnetism of the surrounding soil. Given the magnetically low values of the soil on the bluff, it is possible, but unlikely, that the identified anomalies are up to 1m deep.

Appendix: Data collection, processing and anomaly details.
Processing regime for the grid in figure 1
Zero mean traverse (threshold at -5/5)
High pass filter (10/10, uniform weighting)
Interpolation (Y, Expand, Sin X/X); (X, Shrink – linear)

Anomaly Locations for Ground Truthing (measured from SW corner of grid):

Anomaly A (NW quadrant):
7.34m – 8.15m N; 1.5m - 2.25m E (center 7.84m N, 1.75m E)

Anomaly B (SE quadrant):
3.72m - 4.22m N; 9.25m - 9.75m E (center 3.97m N, 9.50m E)

Anomaly C (NE quadrant):
Center: 8.47m N; 7m E

Collection Grid coordinates, Datum NAD27

NW Corner
N - 2116.498
E - 2060.247
Z - 992.239

SE Corner
N - 2103.555
E - 2065.824
Z - 991.400

NE Corner
N - 2112.763
E - 2069.527
Z - 990.989

SW Corner
N - 2107.202
E - 2056.548
Z - 992.583

APPENDIX IV

Archaeological Reconnaissance of the River Bluffs Open Space Proposed Trail System
Larimer County, Colorado

Jessica Anderson and Dr. Jason LaBelle
Department of Anthropology
Colorado State University
Fort Collins, Colorado

April 27th, 2010

Introduction

As part of the completion of the River Bluffs Open Space for public use, the planned trail system was surveyed by Colorado State University students Vlisha Stanerson, and Rae Mosher and led by Jessica Anderson on the morning of Sunday, April 24, 2010. This survey covered the proposed trailhead located on the east side of the Cache La Poudre River, and extended to the area of potential effect of the planned trail system. The trail begins at the trailhead and crosses an unnamed creek and the Cache La Poudre River on the south side of County Road 32. The trail continues west to County Road 3 and another fork of the trail parallels the Cache La Poudre River and meets the dirt two-track road that runs along the toe slopes of the bluffs. The new trail meets the existing trail at the underpass on the south side of the property.

The boundaries of the survey were recorded with the tracking feature on a portable GPS receiver. This feature allows users to map and save all areas that were covered in the surveys. All artifacts and possible features were mapped using the GPS receiver. These features and artifacts are documented in Table 1.

Methods and Results

Trailhead Survey

The boundaries of the trailhead was marked by five large stakes. We began our survey at the southern stake and moved from east to west. The survey crew was spaced at three meters apart which allowed our crew to cover approximately nine meters at a time. The visibility of the ground surface varied. The trailhead area was a mix of dense grass and leaf cover from the trees that surround the creek to the west of the trailhead, and gravel/dirt road fill. The grassy portion of the proposed trailhead allowed 0-5% visibility of the ground surface. No prehistoric artifacts were found in either area of the survey. However, historic farming equipment was noted and its position was recorded near the western boundary of the trailhead (Table 1). The trailhead also contained modern trash and glass.

Trail Survey

The trail system on the River Bluffs Open Space was separated by the survey crew into two different areas in order to conduct more systematic surveys. The northern trail is the portion of the trail that runs parallel to county road 32, north of the Cache La Poudre River (Figure 1 in red). The west trail is the portion of the trail that parallels the toe slopes along the bluffs, west of the Cache La Poudre River (Figure 1 in yellow).

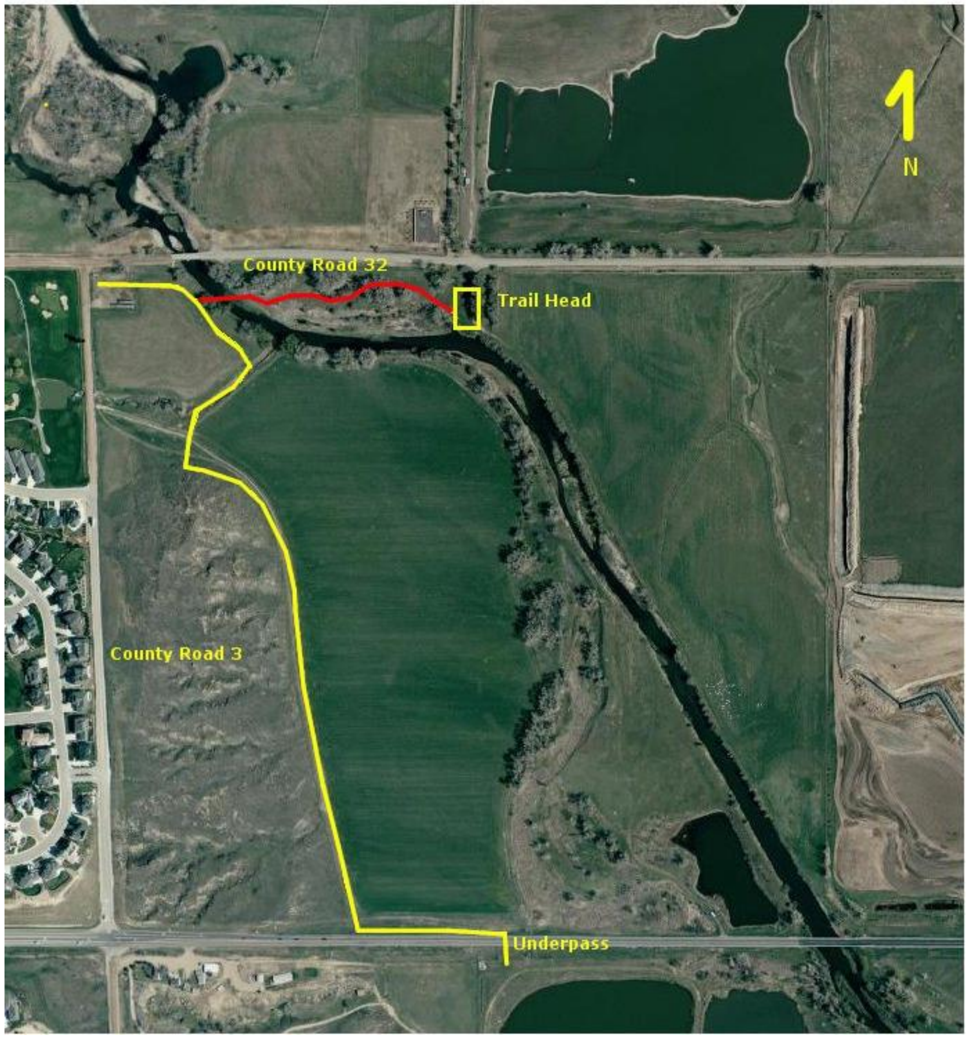


Figure 1. River Bluffs Open Space Trail System. The portion of the trail marked in red is referred to as the northern portion of the trail system; the portion in yellow is referred to as the west trail.

The trail system was marked by personnel from Larimer County with large wooden stakes and red and white flagging. The survey crew walked the trail at two meter intervals. One person was always positioned in the middle of the trail (following the line of the trail markers), and spaced out in two meter intervals from the center. At the end of a section of trail, we pivoted our positions on the person in the center of the trail and surveyed the other side of the trail in the opposite direction. This method allowed us to gain a total coverage area of approximately 12 meters (6 meters on each side from the center of the trail).

The survey of the northern portion of the trail began at the trailhead and ended on the east bank of the Cache La Poudre River. Ground visibility was 0-5% due to thick grass and leaf duff. No prehistoric or historic artifacts were found on this portion of the trail. Small concentrations of charcoal were noted in the disturbed soil of gopher/prairie dog burrows. However, the lack of cultural material and the disperse concentrations suggest that the charcoal is not associated with human activities.

The western portion of the trail begins at the western bank of the Cache La Poudre River and ends at the underpass that connects it to the existing trail. Ground visibility along this portion of the trail varied from 0-10% visibility along the river and 95% visibility on the two track road. Three flakes, bone fragments, and a bone awl were discovered and recorded. The bone artifacts from this survey represent a Mule Deer (*Odocoileus hemionus*). The bone awl is made from the ulna of the deer, and the other bone fragments represent portions of the scapula, vertebrae and ribs. One brown quartzite flake was found at the fork of the trail near the Cache La Poudre River. The poor ground visibility on the trail near the river hindered the discovery of more prehistoric material. Two chalcedony flakes and the possible awl were found along the two track road.

Table 1. Feature/Artifact results of the trail survey on the River Bluffs Open Space.

Artifact/Feature	*Easting*	*Northing*	*Location Description*
Historic Farm Equipment	0503543	4481521	west boundary of trailhead; Near creek bed
Charcoal Concentration	0503382	4481526	Northern portion of trail; mixed with gopher/prairie dog back dirt
Flake 1	0503260	448150	Fork of trail on west bank of the Cache La Poudre River
Flake 2	0503387	4481000	Two Track Dirt Road
Flake 3	0503397	4480944	Two Track Dirt Road
Possible Bone Awl	0503328	4481270	Two Track Dirt Road
Bone Concentration	0503334	4481263	Two Track Dirt Road
Scapula Fragment	0503331	4481267	Two Track Dirt Road

UTMs correspond with Zone 13T, Datum NAD27CONUS

Table 2 Prehistoric artifact descriptions and photographs.

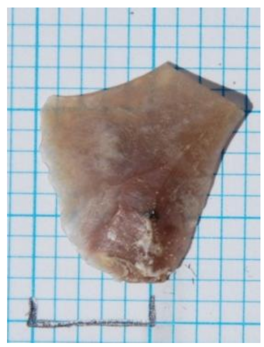
Artifact Type	*Material*	*Portion*	*Color*	*Maximum Length (mm)*	*Maximum Width (mm)*
Flake 1	Quartzite	midsection	Brown	13.1	10.7
Flake 2	Chalcedony	proximal	White/ transparent	20.02	17.0
Flake 3	Chalcedony	complete	Mauve/ lavendar	18.9	13.5
Tool/awl	Bone	-	-	-	-

Recommendations

Based on the sparse amount of prehistoric and historic material found in the area of potential effects, it is recommended that construction of the trail system proceed as planned. However, it is also recommended that fill is used (instead of blading) to mitigate impacts to undetectable buried archaeological deposits that may not have been discovered due to the low surface visibility during this survey. Because the River Bluffs Open Space contains considerable amounts of archaeological material on other parts of the property, it is recommended that a trained archaeologist be present during any excavation during the trail construction.

Appendix: Artifact and Feature Photographs

Flake 1 – Brown quartzite (Scale is 1cm)



Flake 2 – Chalcedony (Scale is 1cm)

Flake 3 – Chalcedony (Scale is 1cm)

Mule Deer awl

Historic Farm Equipment


Charcoal concentration in burrowing rodent back dirt

APPENDIX V

Data from Research on the Harvester Site

Artifact summary totals from all work on the Harvester and Weinmeister sites.

Artifact Category	*Weinmeister Collection*	*Harvester Site Surface Survey*	*Hearth 2 Excavation (Harvester site)*	*Test Unit 1 (Harvester Site)*	*Test Unit 2 (Harvester Site)*	*River Bluffs Trail Survey (River Bluffs Open Space)*
Projectile Points	120	3	0	0	0	0
Knives	13	0	0	0	0	0
Preforms	26	1	0	0	0	0
Bifaces	24	0	0	1	1	0
Scrapers	14	2	0	0	0	0
Drills	4	0	0	0	0	0
Retouched Flakes	12	0	0	0	0	0
Flakes	32	224	227	84	40	3
Core	0	2	0	0	0	0
Groundstone	3	11	2	0	1	0
Bone Tools	3	0	0	0	0	1
Bone Beads	537	0	3	0	0	0
Bone Fragments	0	29	514	28	25	0
Glass Beads	2	0	0	0	0	0
Ceramics	84	8	17	0	0	0
Shell	4	1	0	8	0	
Historic Artifacts	1	1	0	0	0	0
Total Artifacts per Collection	879	282	763	121	67	4

EDM Coordinates Datum and Back Sight

	Northing	*Easting*	*Elevation (Z)*
Back Sight	1901.915	2000	999.437
Datum	2000.000	2000.000	1000.000

GPS location of Datum (NAD 27)

Easting	*Northing*
503203	4481144

GPS location of Datum back sight (NAD 27)

Easting	*Northing*
503203	4481044

Total Station locations of artifacts mapped on the Harvester Site.
Note: Locations with missing information indicate that an artifact was initially identified, and then determined to be natural or could not be relocated. These were not included in the total artifact count.

FS #	*Northing (N)*	*Easting (E)*	*Elevation (Z)*	*Artifact*
1	2119.986	2063.701	991.888	Groundstone
2	2120.303	2063.205	991.805	Flake
3	2120.028	2062.912	991.856	Ground stone
4	2119.918	2062.86	991.879	Burned Bone
5	2110.39	2056.237	993.643	Ceramic
6	2110.245	2055.883	993.558	Ceramic
7	2110.621	2055.939	993.456	Ceramic
8	2110.657	2055.944	993.442	Ceramic
9	2110.731	2055.921	993.487	Ceramic
10	2110.676	2056.119	993.485	Ceramic
11	2110.601	2055.573	993.414	Ceramic
12	2110.531	2055.598	993.356	Biface
13	2092.68	2075.783	988.572	Medial Projectile Point Fragment
14	-	-	-	-
15	2099.164	2081.342	989.621	Flake
16	2099.405	2081.157	989.672	Scraper
17	2098.925	2076.857	989.965	Flake
18	2094.684	2083.34	988.349	Flake
19	2094.869	2083.761	988.578	Flake
20	2096.466	2083.861	989.312	Flake
21	2105.404	2083.135	990.319	Flake
22	2105.898	2081.856	990.464	Flake
23	2107.14	2081.165	990.503	Flake
24	2107.053	2082.186	990.249	Core

Total Station locations of artifacts mapped on the Harvester Site continued.

FS #	*Northing (N)*	*Easting (E)*	*Elevation (Z)*	*Artifact*
25	2111.201	2078.525	990.854	Flake
26	2106.771	2075.793	991.439	Flake
27	2111.385	2072.719	991.836	Flake
28	2114.346	2071.926	991.217	Flake
29	2114.413	2079.31	992.127	Flake
30	2111.277	2070.165	992.252	Flake
31	2108.711	2067.648	992.715	Flake
32	2116.532	2083.81	992.725	Flake
33	2115.266	2061.532	993.303	Flake
34	2118.418	2062.068	992.491	Flake
35	2118.551	2062.285	992.415	Flake
36	-	-	-	-
37	2119.385	2062.764	991.985	Flake
38	2119.566	2062.884	991.871	Flake
39	2120.165	2062.725	991.706	Flake
40	2120.366	2062.733	991.646	Flake
41	-	-	-	-
42	2119.634	2062.987	991.855	Burned Bone
43	2118.75	2058.969	992.706	Flake
44	2118.774	2059.326	992.658	Burned Bone
45	2118.955	2058.258	992.994	Burned Bone
46	2117.526	2058.138	992.901	Burned Bone
47	2117.384	2058.54	993.064	Flake
48	-	-	-	-
49	2092.559	2052.607	992.421	Flake
50	2093.324	2053.12	992.421	Flake
51	2094.118	2052.556	992.28	Flake
52	2093.545	2055.044	991.815	Ground stone
53	-	-	-	-
54	2104.513	2057.506	992.2	Flake
55	2107.344	2059.264	992.116	Bone
56	2107.503	2059.335	992.125	Flake
57	2108.149	2058.544	992.234	Flake
58	2109.465	2057.942	992.293	Flake
60	2107.741	2061.357	991.973	Flake
61	2106.284	2062.011	991.725	Flake
62	2107.914	2063.577	991.782	Flake
63	2108.899	2061.783	992.016	Flake
64	2090.659	2052.251	992.698	Flake
65	2104.513	2057.153	992.22	Flake

Total Station locations of artifacts mapped on the Harvester Site continued.

FS #	*Northing (N)*	*Easting (E)*	*Elevation (Z)*	*Artifact*
66	2104.519	2067.305	992.222	Flake
67	2105.334	2057.499	922.207	Flake
68	2105.563	2057.904	992.165	Bone
69	2106.467	2056.646	992.261	Flake
70	2107.366	2057.235	992.261	Flake
71	-	-	-	-
72	2107.47	2059.34	992.127	Flake
73	2105.599	2061.532	991.692	Flake
74	2107.838	2063.525	991.78	Flake
75	2109.675	2060.388	992.136	Flake
76	2109.459	2057.949	992.271	Flake
77	2109.45	2057.778	992.272	Flake
78	2109.731	2056.687	992.344	Flake
79	2109.745	2056.613	992.323	Bone
80	2109.774	2056.319	992.245	Bone
81	2109.949	2056.146	992.208	Flake
82	2110.562	2056.209	992.099	FCR
83	2110.562	2056.209	992.133	Flake
84	2110.639	2056.228	992.16	Flake
85	2110.753	2056.127	992.115	Flake
86	2110.865	2056.079	992.057	Flake
87	2110.781	2055.993	992.038	Flake
88	2110.556	2055.92	992.04	Burned Bone
89	2110.08	2055.431	992.017	Bone
90	2110.827	2055.303	991.81	Bone
91	2111.506	2054.656	991.562	Burned Bone
92	2110.757	2053.94	991.582	Flake
93	2110.505	2053.252	991.517	Burned Bone
94	2107.845	2052.221	991.765	Flake
95	2106.493	2053.321	992.664	Flake
96	2106.845	2054.193	992.679	Flake
97	2105.611	2052.349	992.838	Burned Bone
98	2112.361	2054.479	991.59	Missing
99	2112.267	2054.366	991.506	Flake
100	2112.188	2054.267	991.494	Burned Bone
101	2113.769	2055.046	991.551	Flake
102	2111.868	2056.444	992.025	Burned Bone
103	2111.615	2056.929	992.126	Flake
104	2112.375	2057.261	992.134	Flake

Total Station locations of artifacts mapped on the Harvester Site continued.

FS #	*Northing (N)*	*Easting (E)*	*Elevation (Z)*	*Artifact*
105	2112.535	2057.316	992.141	Flake
106	2112.661	2057.235	992.089	Flake
107	2112.987	2057.022	992.051	Flake
108	2113.11	2057.084	992.003	Flake
109	2113.146	2057.702	992.201	Flake
110	2113.175	2056.567	991.903	Flake
111	2112.813	2056.52	991.929	Flake
112	2112.689	2056.612	991.941	Flake
113	2114.877	2055.582	991.504	Flake
114	2113.689	2059.277	992.125	Flake
115	-	-	-	-
116	2113.949	2064.539	991.613	Flake
117	2116.693	2063.818	991.295	Flake
118	2108.298	2058.242	992.234	Flake
119	2108.227	2058.284	992.233	Flake
120	2116.59	2058.933	991.981	Flake
121	2116.523	2059.059	992.016	Flake
122	2116.721	2058.79	991.947	Flake
123	5117.064	2058.763	991.854	Burned Bone
124	2117.239	2059.072	991.84	Flake
125	2117.539	2057.992	991.519	Burned Bone
126	2117.356	2058.213	991.63	Burned Bone
127	2120.369	2062.16	990.267	Flake
128	2116.94	2068.738	990.425	Flake
129	2118.096	2069.187	990.115	Ground Stone
130	2118.042	2068.994	990.136	Flake
131	2100.88	2065.255	990.906	Flake
132	2100.756	2065.416	990.395	Flake
133	2101.062	2065.522	990.918	Flake
134	2101.165	2065.554	990.933	Flake
135	2101.442	2065.483	990.983	Flake
136	2101.907	2065.412	991.019	Flake
137	2101.751	2066.54	990.92	Flake
138	2102.435	2066.533	991.022	Flake
139	2103.094	2065.061	991.249	Flake
140	-	-	-	-
141	2103.918	2065.723	991.279	Flake
142	2104.14	2065.454	991.349	Flake
143	2105.236	2064.956	991.465	Flake
144	2107.214	2066.749	991.358	Flake

Total Station locations of artifacts mapped on the Harvester Site continued.

FS #	*Northing (N)*	*Easting (E)*	*Elevation (Z)*	*Artifact*
145	-	-	-	-
146	2107.365	2065.422	991.49	Flake
147	2109.034	2065.831	991.426	Flake
148	2109.347	2067.805	991.267	Flake
149	2111.698	2067.492	991.065	Flake
150	2114.173	2063.686	991.635	Ceramic
151	-	-	-	-
152	2108.018	2068.128	991.188	Flake
153	2107.453	2067.656	991.229	Flake
154	-	-	-	-
155	-	-	-	-
156	2105.545	2070.039	990.811	Distal Projectile Point Fragment
157	-	-	-	-
158	2103.482	2068.796	990.76	Bone
159	2100.615	2067.916	990.474	Flake
160	2101.212	2070.315	990.245	Core
161	2098.796	2077.003	998.199	Flake
162	2099.801	2076.838	988.536	Flake
163	-	-	-	-
164	2102.48	2079.095	989.126	Ground Stone
165	2107.042	2077.949	989.614	Flake
166	2107.39	2079.291	989.388	Flake
167	-	-	-	-
168	2111.183	2077.49	989.599	Flake
169	2108.109	2087.244	988.813	Flake
170	2108.112	2081.247	988.82	Flake
171	2108.069	2081.394	988.79	Flake
172	2110.601	2084.616	988.01	Flake
174	2108.36	2085.766	988.145	Flake
175	2108.387	2085.637	988.169	Flake
176	2108.436	2085.655	988.163	Flake
177	2104.272	2081.649	989.045	Flake
178	2103.701	2082.87	988.869	Flake
179	2107.534	2089.532	987.601	Flake
180	2107.603	2089.51	987.591	Flake
181	2107.45	2089.612	987.578	Flake
182	2104.711	2090.004	987.652	Flake
183	2104.7	2089.646	987.72	Flake
184	2104.91	2089.959	987.667	Flake
185	2103.752	2087.496	988.07	Flake

Total Station locations of artifacts mapped on the Harvester Site continued.

FS #	*Northing (N)*	*Easting (E)*	*Elevation (Z)*	*Artifact*
186	2104.008	2086.887	988.18	Flake
187	2098.686	2083.45	988.448	Flake
188	2101.364	2089.881	987.497	Shell
189	2100.874	2090.439	987.384	Flake
190	2100.439	2090.679	987.308	Flake
191	2099.84	2090.892	987.245	Flake
192	2099.713	2090.537	987.308	Flake
193	2098.705	2091.255	987.206	Flake
194	2099.034	2091.43	987.211	Flake
195	2098.932	2091.492	987.19	Flake
196	2100.499	2093.295	989.712	Flake
197	2100.925	2092.859	986.834	Flake
198	2102.19	2093.272	986.394	Flake
199	2102.399	2092.646	986.704	Flake
200	2102.296	2092.436	986.84	Flake
201	2103.864	2093.899	986.457	Flake
202	2102.326	2090.92	987.35	Flake
203	2069.001	2036.607	995.262	Flake
204	2069.091	2036.657	995.279	Flake
205	2071.091	2036.33	995.387	Flake
206	2070.959	2036.777	955.336	Flake
207	2071.011	2037.123	995.275	Flake
208	2070.751	2038.759	995.021	Flake
209	-	-	-	-
210	2067.148	2041.575	994.33	Flake
211	-	-	-	-
212	2071.017	2042.435	994.447	Flake
213	2067.263	2043.192	994.163	Flake
214	2074.8	2041.964	994.487	Flake
215	-	-	-	-
216	2076.752	2045.625	993.836	Flake
217	2074.491	2047.713	993.836	Flake
218	2075.479	2048.361	993.138	Flake
219	2075.463	2049.092	993.004	Proximal Projectile Point Fragment
220	-	-	-	-
221	2073.632	2051.582	991.891	Flake
222	2073.721	2052.05	991.802	Flake
223	2074.19	2053.227	991.573	Flake
224	2074.239	2053.139	991.573	Flake
225	2071.234	2054.181	990.581	Ground Stone

Total Station locations of artifacts mapped on the Harvester Site continued.

FS #	*Northing (N)*	*Easting (E)*	*Elevation (Z)*	*Artifact*
226	2072.924	2057.243	989.89	Flake
227	2073.31	2056.97	989.935	Flake
228	2075.098	2058.817	989.711	Flake
229	2074.364	2061.113	988.993	Flake
230	2078.281	2046.923	993.649	Bone
231	2079.453	2047.779	993.506	Flake
232	2077.38	2048.399	993.09	Flake
233	2079.127	2050.153	993.09	Collector Cache/Flake
234	2079.107	2050.219	993.057	Collector Cache/Flake
235	2079.073	2050.327	993.019	Collector Cache/Flake
236	2079.146	2050.365	992.995	Collector Cache/Flake
237	2079.056	2050.386	992.988	Collector Cache/Flake
238	2079.061	2050.448	992.97	Collector Cache/Flake
239	2079.008	2050.39	993.011	Collector Cache/Flake
240	2078.963	2050.526	992.908	Collector Cache/Flake
241	2079.065	2050.564	992.911	Collector Cache/Flake
242	2078.993	2050.039	992.894	Collector Cache/Flake
243	2079.073	2050.691	992.872	Collector Cache/Flake
244	2079.125	2050.884	992.823	Collector Cache/Flake
245	2076.834	2051.253	992.396	Flake
246	-	-	-	-
247	-	-	-	-
248	2075.721	2054.461	991.181	Flake
249	-	-	-	-
250	-	-	-	-
251	2083.977	2047.246	993.406	Flake
252	2086.064	2048.566	993.197	Flake
253	2084.62	2050.244	993.017	Flake
254	2082.229	2051.928	992.39	Flake
255	2082.085	2052.535	992.201	Flake
256	2081.448	2052.504	992.168	Flake
257	2081.174	2053.262	991.886	mano
258	2082.73	2054.324	991.606	Flake
259	2081.844	2054.394	991.566	Flake
260	2081.565	2055.123	991.347	Flake
261	2081.634	2055.597	991.257	Ground Stone
262	-	-	-	-
263	2079.738	2056.717	990.922	Flake
264	-	-	-	-
265	2084.478	2055.436	991.454	Flake

Total Station locations of artifacts mapped on the Harvester Site continued.

FS #	*Northing (N)*	*Easting (E)*	*Elevation (Z)*	*Artifact*
266	2084.641	2055.391	991.456	Flake
267	2084.835	2055.368	991.507	Flake
268	2085.356	2054.424	991.917	Flake
269	-	-	-	-
270	-	-	-	-
271	2088.156	2050.613	993.09	Flake
272	-	-	-	-
273	2087.089	2054	992.306	Ground Stone
274	2087.078	2054.456	992.191	Flake
275	2086.533	2055.701	991.839	Ground Stone
277	2085	2057.138	991.217	Flake
278	2085.226	2058.007	991.134	Flake
279	2087.382	2056.662	991.806	Flake
280	2087.9	2056.726	991.83	Flake
281	2089.2	2053.945	992.393	Flake
282	2090.408	2051.382	992.927	Flake
283	2092.685	205.502	992.726	Flake
284	-	-	-	-
285	-	-	-	-
286	-	-	-	-
287	2088.758	2056.778	991.78	Flake
288	2088.953	2057.052	991.705	Flake
289	2089.46	2057.056	991.705	Flake
290	-	-	-	-
291	2095.252	2053.28	992.504	Flake
292	2093.295	2053.104	992.292	Flake
293	-	-	-	-
294	2092.971	2056.929	990.935	Flake
295	2092.95	2057.096	990.89	Ground Stone
296	2091.389	2057.845	990.805	Flake
297	2090.076	2058.307	990.931	Flake
298	2090.133	2058.248	990.919	Flake
299	2090.204	2058.238	990.939	Flake
300	2090.538	2058.276	990.835	Burned Bone
301	2091.114	2058.525	990.697	Flake
302	2091.315	2058.642	990.645	Flake
303	2091.584	2059.069	990.401	Flake
304	2092.496	2058.401	990.524	Ground Stone
305	2090.543	2060.201	990.237	Flake
306	2090.56	2060.329	990.209	Flake

Total Station locations of artifacts mapped on the Harvester Site continued.

FS #	*Northing (N)*	*Easting (E)*	*Elevation (Z)*	*Artifact*
307	2090.213	2060.418	990.228	Flake
308	2090.121	2061.122	990.24	Flake
309	2090.726	2061.979	989.898	Flake
310	2089.639	2061.585	990.585	Flake
311	2089.477	2062.008	990.123	Flake
312	2088.757	2063.015	989.922	Flake
313	2086.113	2064.193	989.351	Shotgun shell
314	-	-	-	-
315	2078.141	2058.963	990.199	Flake
173a	2109.444	2085.596	987.9	Burned Bone
173b	2109.444	2085.596	987.9	Burned Bone
276a	-	-	-	-
276b	-	-	-	-
59a	2107.839	2061.237	992.002	Bone
59b	2107.839	2061.237	992.002	Bone
59c	2107.839	2061.237	992.002	Bone
Unnumbered				Scraper
Total Artifacts Mapped				*282*

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site.
Note: missing information indicate that an artifact was initially identified, and then determined to be natural or could not be relocated. These were not included in the total artifact count.

FS	*Maximum Length (mm)*	*Maximum Width (mm)*	*% Cortex Present*	*Portion*	*Material*	*Artifact*	*Collected*
1	2	2.5	-	-	Sandstone	Groundstone	Yes
2	2.6	1.2	1-49%	Complete	Chert	Flake	No
3	3.2	3	-	-	Sandstone	Groundstone	Yes
4	1.1	0.9	-	-	Bone	Burned Bone	No
5	2.6	2.1	-	-	Ceramic	Ceramic	Yes
6	2	1	-	-	Ceramic	Ceramic	Yes
7	2	1.1	-	-	Ceramic	Ceramic	Yes
8	2.4	2.7	-	-	Ceramic	Ceramic	Yes
9	2.4	1.6	-	-	Ceramic	Ceramic	Yes
10	2.4	1.9	-	-	Ceramic	Ceramic	Yes
11	1.7	1.4	-	-	Ceramic	Ceramic	Yes
12	1.8	0.8	0%	Distal	Chert	Biface	Yes
13	1.6	0.9	0%	Medial	Chalcedony	Projectile Point Fragment	Yes
14	-	-	-	-	-	-	-
15	1.2	0.7	0%	Proximal	Chert	Flake	No
16	3.2	2.6	0%	-	Chert	Scraper	Yes
17	2.5	0.9	0%	-	Chert	Flake	No
18	2.1	1.1	0%	Complete	Chert	Flake	No
19	3	2.1	0%	Complete	Quartzite	Flake	No
20	1.8	1.7	0%	Complete	Chalcedony	Flake	No
21	1.9	1.7	0%	Distal	Chert	Flake	No
22	2.7	1.6	1-49%	Complete	Chalcedony	Flake	No
23	2.2	0.4	50-99%	Complete	Chalcedony	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

FS	*Maximum Length (mm)*	*Maximum Width (mm)*	*% Cortex Present*	*Portion*	*Material*	*Artifact*	*Collected*
24	3.9	2.4	1-49%	-	Chalcedony	Core	Yes
25	1.8	1.7	0%	Complete	Chert	Flake	No
26	1.8	0.4	0%	Medial	Quartzite	Flake	No
27	0.8	0.6	1-49%	Complete	Chalcedony	Flake	No
28	2	1.9	1-49%	Complete	Chalcedony	Flake	No
29	1.5	1.3	1-49%	Complete	Chalcedony	Flake	No
30	1.4	0.9	0%	Complete	Chalcedony	Flake	No
31	2.1	2.8	0%	Complete	Quartzite	Flake	No
32	0.9	-	0%	Complete	Quartzite	Flake	No
33	1.1	-	0%	Medial	Quartzite	Flake	No
34	1.7	-	50-99%	Distal	Chert	Flake	No
35	1.8	-	1-49%	Proximal	Chalcedony	Flake	No
36	-	-	-	-	-	-	-
37	2.6	-	1-49%	Distal	Chert	Flake	No
38	1	-	1-49%	Complete	Chalcedony	Flake	No
39	1	-	50-99%	Distal	Chert	Flake	No
40	1.9	-	0%	Complete	Chert	Flake	No
41	-	-	-	-	-	-	-
42	1.7	-	-	-	Bone	Burned Bone	No
43	1.7	-	1-49%	Complete	Chalcedony	Flake	No
44	0.9	-	-	-	Bone	Burned Bone	No
45	0.8	-	-	-	Bone	Burned Bone	No
46	1.2	-	-	-	Bone	Burned Bone	No
47	1	-	-	Medial	Chert	Flake	No
48	-	-	-	-	-	-	-

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

FS	*Maximum Length (mm)*	*Maximum Width (mm)*	*% Cortex Present*	*Portion*	*Material*	*Artifact*	*Collected*
49	15.03	12.39	0%	Medial	Chert	Flake	No
50	12.12	10.1	0%	Proximal	Chert	Flake	No
51	10.73	10.65	0%	Distal	Chert	Flake	No
52	82.29	76.88	-	-	Sandstone	Ground Stone	Yes
53	missing	missing	missing	missing	missing	missing	-
54	15.32	11.34	0%	Distal	Chalcedony	Flake	No
55	13.01	4.03	-	-	Bone	Bone	No
56	12.45	6.59	0%	Distal	Chert	Flake	No
57	17.23	12.5	1-49%	Complete	Chalcedony	Flake	No
58	13.1	9.42	1-49%	Medial	Chalcedony	Flake	No
60	9.83	8.79	0%	Distal	Quartzite	Flake	No
61	11.29	6.91	1-49%	Distal	Chalcedony	Flake	No
62	15.64	8.42	50-99%	Distal	Chalcedony	Flake	No
63	11.37	9.41	0%	Medial	Quartzite	Flake	No
64	13.34	9.38	50-99	proximal	Quartzite	Flake	No
65	10.22	7.62	1-49%	Complete	Chalcedony	Flake	No
66	15.6	11.38	1-49%	Complete	Chalcedony	Flake	No
67	8.67	6.98	1-49%	Complete	Chert	Flake	No
68	8.5	4.99	-	-	Bone	Bone	No
69	12.05	7.02	0%	distal	Chert	Flake	No
70	8.87	7.59	0%	Distal	Chalcedony	Flake	No
71	-	-	-	-	-	-	-
72	11.92	7.12	0%	Distal	Chert	Flake	No
73	22.12	16.05	0%	Distal	Quartzite	Flake	No
74	12.2	6.78	0%	Proximal	Quartzite	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

FS	*Maximum Length (mm)*	*Maximum Width (mm)*	*% Cortex Present*	*Portion*	*Material*	*Artifact*	*Collected*
75	13.08	10.37	1-49%	Complete	Chalcedony	Flake	No
76	14.08	9.43	0%	Complete	chalcedony	Flake	No
77	12.82	10.02	0%	Distal	Chalcedony	Flake	No
78	10.17	9.26	1-49%	Complete	Chalcedony	Flake	No
79	5.15	3.33	-	-	Bone	Bone	No
80	8.17	3.98	-	-	Bone	Bone	No
81	20.81	9.02	1-49%	Distal	Chalcedony	Flake	No
82	27.72	12.71	-	-	FCR	FCR	No
83	17.11	10.22	0%	Distal	Chert	Flake	No
84	12.09	11.89	0%	Medial	Chert	Flake	No
85	20.4	10.95	0%	Complete	Chalcedony	Flake	No
86	19.74	13.46	0%	Distal	Chert	Flake	No
87	21.15	17.88	0%	Distal	Quartzite	Flake	No
88	23.2	11.74	-	-	Bone	Burned Bone	No
89	7.28	3.91	-	-	Bone	Bone	No
90	10.39	4.85	-	-	Bone	Bone	No
91	14.07	4.42	-	-	Bone	Burned Bone	No
92	13.84	8.91	0%	Complete	Chalcedony	Flake	No
93	9.11	3.06	-	-	Bone	Burned Bone	No
94	16.23	12.08	0%	Medial	Chert	Flake	No
95	17.91	12.29	0%	Complete	Chert	Flake	No
96	8.22	5.63	0%	Medial	Chert	Flake	No
97	22.26	8.61	-	-	Bone	Burned Bone	No
98	-	-	-	-	-	-	No
99	10.38	5.41	0%	Distal	Chalcedony	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

FS	*Maximum Length (mm)*	*Maximum Width (mm)*	*% Cortex Present*	*Portion*	*Material*	*Artifact*	*Collected*
100	6.45	3.66	-	-	Bone	Burned Bone	No
101	7.96	6.52	0%	Distal	Chert	Flake	No
102	21.3	4.08	-	-	Bone	Burned Bone	No
103	14.78	10.58	0%	Complete	Chert	Flake	No
104	10.06	6.63	0%	Complete	Chert	Flake	No
105	8.03	6.96	0%	Distal	Quartzite	Flake	No
106	14.3	13.58	0%	Medial	Quartzite	Flake	No
107	30.46	20.37	1-49%	Complete	Chalcedony	Flake	No
108	10.49	9.93	0%	Complete	Chert	Flake	No
109	10.53	7.9	0%	Medial	Chalcedony	Flake	No
110	14.7	8.03	0%	Distal	Chalcedony	Flake	No
111	13.72	8.4	0%	Distal	Chert	Flake	No
112	12.29	7.53	0%	Distal	Chert	Flake	No
113	12.73	7.3	1-49%	Medial	Chalcedony	Flake	No
114	17.93	11.36	1-49%	Distal	Chert	Flake	No
115	Missing	Missing	Missing	Missing	Missing	Missing	Missing
116	30.87	26.43	50-99%	Proximal	Chalcedony	Flake	No
117	7.57	5.53	0%	Distal	Chalcedony	Flake	No
118	18.34	8.01	1-49%	Proximal	Chert	Flake	No
119	15.12	15.61	0%	Proximal	Quartzite	Flake	No
120	27.7	17.77	1-49%	Proximal	Chalcedony	Flake	No
121	11.92	8.67	0%	Distal	Chalcedony	Flake	No
122	12.09	8.2	0%	Distal	Chalcedony	Flake	No
123	6.75	3.62	-	-	Bone	Burned Bone	No
124	16.8	9.23	0%	Distal	Chert	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

FS	*Maximum Length (mm)*	*Maximum Width (mm)*	*% Cortex Present*	*Portion*	*Material*	*Artifact*	*Collected*
125	10.47	5.5	-	-	Bone	Burned Bone	No
126	8.09	3.64	-	-	Bone	Burned Bone	No
127	13.12	6.91	1-49%	Proximal	Chert	Flake	No
128	18.37	12.67	0%	Proximal	Quartzite	Flake	No
129	50.59	47.04	-	-	Sandstone	Ground Stone	Yes
130	11.14	8.61	0%	Proximal	Chert	Flake	No
131	26.47	21.2	0%	Complete	Quartzite	Flake	No
132	11.22	10.19	1-49%	Complete	Chalcedony	Flake	No
133	18.01	13.12	1-49%	Medial	Chert	Flake	No
134	19.29	13.13	0%	Complete	Quartzite	Flake	No
135	13.85	10.14	1-49%	Complete	Chert	Flake	No
136	27.9	15.24	1-49%	Complete	Chert	Flake	No
137	17	11.28	0%	Complete	Chert	Flake	No
138	12.85	7.4	0%	Complete	Sandstone	Flake	No
139	14.76	11.62	0%	Complete	Chert	Flake	No
140	-	-	-	-	-	-	-
141	11.12	6.52	0%	Complete	Chert	Flake	No
142	9.31	7.89	0%	Complete	Chalcedony	Flake	No
143	7.82	3.47	0%	Complete	Chert	Flake	No
144	13.65	12.74	0%	Distal	Quartzite	Flake	No
145	-	-	-	-	-	-	-
146	7.81	7.61	0%	Medial	Quartzite	Flake	No
147	6.16	5.56	0%	Complete	Chert	Flake	No
148	8.72	5.24	0%	Medial	Chert	Flake	No
149	9.98	5.94	0%	distal	Chert	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

FS	*Maximum Length (mm)*	*Maximum Width (mm)*	*% Cortex Present*	*Portion*	*Material*	*Artifact*	*Collected*
150	20.5	19.58	-	-	Ceramic	Ceramic	Yes
151	-	-	-	-	-	-	-
152	12.11	6.2	0%	Medial	Chalcedony	Flake	No
153	18.27	18.21	0%	Medial	Quartz	Flake	No
154	-	-	-	-	-	-	-
155	-	-	-	-	-	-	-
156	10.39	7.73	-	Distal	Chert	Projectile Point Fragment	Yes
157	-	-	-	-	-	-	-
158	19.07	10.4	-	-	Bone	Bone	No
159	30.22	16.4	50 - 99%	-	Quartzite	Flake	No
160	30.76	27.21	50-99%	-	Chalcedony	Core	No
161	22.76	13.39	50-99%	?	Quartz	Flake	No
162	17.73	10.71	1-49%	Distal	Chalcedony	Flake	No
163	-	-	-	-	-	-	-
164	27.99	24.79	-	-	Sandstone	Ground Stone	Yes
165	16.66	12.57	1-49%	Complete	Chalcedony	Flake	No
166	14.94	9.42	0%	Complete	Chalcedony	Flake	No
167	-	-	-	-	-	-	-
168	13.42	11.63	0%	Distal	Chalcedony	Flake	No
169	14.59	14.46	0%	Medial	Chert	Flake	No
170	9.22	6.45	1-49%	Proximal	Chalcedony	Flake	No
171	10.68	8.16	0%	Distal	Chalcedony	Flake	No
172	20.02	12.25	0%	Complete	Chalcedony	Flake	No
174	10.28	7.36	0%	Medial	Quartzite	Flake	No
175	5.43	3.85	0%	Complete	Quartzite	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

FS	*Maximum Length (mm)*	*Maximum Width (mm)*	*% Cortex Present*	*Portion*	*Material*	*Artifact*	*Collected*
176	6.73	5.03	0%	Complete	Chert	Flake	No
177	27.05	24.5	0%	Medial	Chert	Flake	No
178	27.63	9.74	0%	Proximal	Quartzite	Flake	No
179	13.66	11.11	0%	Complete	Chalcedony	Flake	No
180	12.62	11	0%	Complete	Chert	Flake	No
181	15.17	10.43	0%	Complete	Quartzite	Flake	No
182	13.15	9.77	1-49%	Distal	Chert	Flake	No
183	13.94	8.6	0%	Proximal	Chalcedony	Flake	No
184	7.99	5.2	0%	Distal	Chalcedony	Flake	No
185	13.02	10.94	0%	Distal	Quartzite	Flake	No
186	6.91	7.55	1-49%	Proximal	Quartzite	Flake	No
187	18.67	14.04	0%	Proximal	Quartzite	Flake	No
188	12.23	6.18	-	-	Shell	Shell	No
189	23.55	12.06	1-49%	Proximal	Chalcedony	Flake	No
190	7.35	6.41	0%	Distal	Chalcedony	Flake	No
191	11.16	5.83	0%	Medial	Chalcedony	Flake	No
192	17.46	11.44	0%	Proximal	Chert	Flake	No
193	12.81	11.26	0%	Proximal	Chalcedony	Flake	No
194	13.78	6.72	0%	Medial	Chalcedony	Flake	No
195	10.29	5.38	0%	Proximal	Chalcedony	Flake	No
196	9.53	6.95	0%	Proximal	Chert	Flake	No
197	24.8	8.7	1-49%	Proximal	Chert	Flake	No
198	19.47	9.63	50-99%	Medial	Chalcedony	Flake	No
199	31.93	23.12	0%	Proximal	Chert	Flake	No
200	10.19	9.34	0%	Proximal	Chert	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

201	23.72	12.8	0%	Proximal	Quartzite	Flake	No
202	11.8	9.2	0%	Medial	Chert	Flake	No
203	20.25	13.42	1-49%	Complete	Chalcedony	Flake	No
204	20.48	14.96	0%	Complete	Chert	Flake	No
205	11.47	7.28	0%	Complete	Quartz	Flake	No
206	11.93	25.53	0%	Distal	Chert	Flake	No
207	12.28	9.69	0%	Medial	Quartzite	Flake	No
208	9.84	10.28	0%	Distal	Chalcedony	Flake	No
209	-	-	-	-	-	-	-
210	16.4	8.83	50-99%	Complete	Chalcedony	Flake	No
211	-	-	-	-	-	-	-
212	22.82	17.43	0%	Distal	Quartzite	Flake	No
213	16.6	13.13	0%	Distal	Quartzite	Flake	No
214	6.94	3.6	0%	Proximal	Quartzite	Flake	No
215	-	-	-	-	-	-	-
216	5.65	2.96	0%	Complete	Chalcedony	Flake	No
217	14.87	13.14	0%	Complete	Chert	Flake	No
218	12.94	10.18	1-49%	Complete	Chalcedony	Flake	No
219	18.03	14.86	0%	Proximal	Chert	Projectile Point Fragment	Yes
220	-	-	-	-	-	-	-
221	13.03	19.61	0%	Complete	Chalcedony	Flake	No
222	12.26	11.43	0%	Proximal	Quartzite	Flake	No
223	34.61	30.59	50-99%	Complete	Quartz	Flake	No
224	19.49	12.19	1-49%	Distal	Quartzite	Flake	No
225	76.46	64.02	-	-	Sandstone	Ground Stone	Yes
226	15.75	11.25	0%	Medial	Quartzite	Flake	No
227	17.13	15.85	1-49%	Complete	Quartzite	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

228	10.85	9.02	0%	Distal	Chert	Flake	No
229	11.88	14.76	1-49%	Distal	Chalcedony	Flake	No
230	7.41	5.88	-	-	Bone	Bone	No
231	23.39	17.4	0%	Complete	Quartzite	Flake	No
232	9.26	8.49	0%	Distal	Quartz	Flake	No
233	12.44	11.63	1-49%	Complete	Chert	Weinmeister Cache/Flake	No
234	31.32	28.11	0%	Complete	Quartzite	Weinmeister Cache/Flake	No
235	16.6	14.21	0%	Distal	Chert	Weinmeister Cache/Flake	No
236	23.04	25.33	50-99%	Distal	Quartzite	Weinmeister Cache/Flake	No
237	22.1	16.36	1-49%	Complete	Quartzite	Weinmeister Cache/Flake	No
238	21.78	18.71	1-49%	Proximal	Chalcedony	Weinmeister Cache/Flake	No
239	22.42	17.93	0%	Medial	Quartz	Weinmeister Cache/Flake	No
240	22.29	9.91	0%	Medial	Chert	Weinmeister Cache/Flake	No
241	14.62	11.28	1-49%	Distal	Chalcedony	Weinmeister Cache/Flake	No
242	29.66	21.21	0%	Distal	Quartzite	Weinmeister Cache/Flake	No
243	25.55	18.4	0%	Complete	Quartzite	Weinmeister Cache/Flake	No
244	20.3	12.66	1-49%	Proximal	Chalcedony	Weinmeister Cache/Flake	No
245	14.69	15.63	0%	Distal	Quartz	Flake	No
246	-	-	-	-	-	-	-
247	-	-	-	-	-	-	-
248	12.26	9.65	0%	Medial	Quartzite	Flake	No
249	-	-	-	-	-	-	-
250	-	-	-	-	-	-	-
251	14.82	11.85	0%	Distal	Quartzite	Flake	No
252	4.72	12.71	0%	Proximal	Quartzite	Flake	No
253	15.86	16.34	0%	Complete	Quartzite	Flake	No
254	9.61	6.34	1-49%	Complete	Chalcedony	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

255	10.66	7.73	0%	Medial	Chert	Flake	No
256	23.15	14.3	0%	Medial	Quartzite	Flake	No
257	-	-	-	-	-	-	-
258	14.09	10.9	0%	Distal	Quartz	Flake	No
259	28.1	14.98	0%	Complete	Quartzite	Flake	No
260	13.41	5.05	0%	Distal	Chalcedony	Flake	No
261	39.59	25.1	-	-	Sandstone	Ground Stone	Yes
262	-	-	-	-	-	-	-
263	31.9	54.49	0%	Proximal	Chert	Flake	No
264	-	-	-	-	-	-	-
265	20.34	9.89	0%	Medial	Quartzite	Flake	No
266	17.45	13.72	0%	Distal	Quartzite	Flake	No
267	15.05	11.89	0%	Distal	Quartzite	Flake	No
268	12.7	11.43	1-49%	Proximal	Chert	Flake	No
269	-	-	-	-	-	-	-
270	-	-	-	-	-	-	-
271	14.06	9.53	1-49%	Proximal	Quartz	Flake	No
272	-	-	-	-	-	-	-
273	93.71	86.18	-	-	Sandstone	Ground Stone	Yes
274	14	10.89	0%	Medial	Quartzite	Flake	No
275	53.95	42.28	-	-	Sandstone	Ground Stone	Yes
277	14.92	14.27	0%	Medial	Quartzite	Flake	No
278	15.8	8.65	0%	Distal	Chalcedony	Flake	No
279	11.83	8.64	0%	Medial	Chert	Flake	No
280	19	11.36	0%	Medial	Quartzite	Flake	No
281	26.4	14.71	1-49%	Medial	Chert	Flake	No
282	13.2	10.85	0%	Medial	Chert	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

283	12.3	6.5	0%	distal	Chert	Flake	No
284	-	-	-	-	-	-	-
285	-	-	-	-	-	-	-
286	-	-	-	-	-	-	-
287	30.09	15.71	1-49%	Distal	Chert	Flake	No
288	26.67	20.34	0%	Distal	Chert	Flake	No
289	14.17	11.38	0%	Distal	Chert	Flake	No
290	-	-	-	-	-	-	-
291	11.08	14.26	50-99%	Distal	Quartz	Flake	No
292	12.02	10.3	1-49%	Complete	Quartzite	Flake	No
293	-	-	-	-	-	-	-
294	31.11	23.24	50-99%	Medial	Quartzite	Flake	No
295	93.72	57.31	-	-	Sandstone	Ground Stone	Yes
296	19.19	16.84	1-49%	Medial	Chert	Flake	No
297	12.73	13.84	0%	complete	Chert	Flake	No
298	25.96	21.97	1-49%	Proximal	Chert	Flake	No
299	10.06	6.32	1-49%	Medial	Quartz	Flake	No
300	16.5	8.21	-	-	Bone	Burned Bone	No
301	11.82	12.96	1-49%	Proximal	Chert	Flake	No
302	11.17	7.19	1-49%	Complete	Quartzite	Flake	No
303	7.6	7.75	0%	Distal	Quartzite	Flake	No
304	44.35	32.97	-	-	Sandstone	Ground Stone	Yes
305	16.92	16.15	0%	Medial	Quartzite	Flake	No
306	14.57	15.44	0%	Complete	Quartzite	Flake	No
307	10.66	5.36	1-49%	Distal	Chalcedony	Flake	No
308	15.48	6.44	1-49%	Complete	Chalcedony	Flake	No
309	6.99	17.02	1-49%	Medial	Quartzite	Flake	No

Descriptive data of mapped artifacts found during pedestrian survey of the Harvester site continued.

310	8.38	8.33	0%	Complete	Quartzite	Flake	No
311	11.52	15.52	1-49%	Proximal	Quartz	Flake	No
312	18.11	11.55	1-49%	Complete	Quartzite	Flake	No
313	70.4	27.04	-	-	Shotgun shell	Shotgun shell	Yes
314	-	-	-	-	-	-	-
315	5.32	13.7	0%	Distal	Chert	Flake	No
173a	5.18	4.35	-	-	Bone	Burned Bone	No
173b	3.73	4.02	-	-	Bone	Burned Bone	No
276a	-	-	-	-	-	-	-
276b	-	-	-	-	-	-	-
59a	11.52	2.72	-	-	Bone	Bone	No
59b	7.46	2.6	-	-	Bone	Bone	No
59c	5.06	1.78	-	-	Bone	Bone	No
unnumbered	-	-	-	-	Quartzite	Scraper	Yes
Total				*282*			

GPS UTM and Total Station locations (NAD 27) of Ant Mounds on the River Bluffs Open Space. Ant Mounds with no data represents ant mound locations on the Harvester Site that could not be accessed with the Total Station equipment.

Ant Hill Number	*GPS UTM Easting*	*GPS UTM Northing*	*Total Station Northing*	*Total Station Easting*	*Total Station Elevation*	*Presence of Flakes?*
Harvester Site						
1	503270	4481259	2114.664	2063.446	991.686	Yes
2	503273	4481273	-	-	-	Yes
3	503242	4481296	-	-	-	Yes
4	503231	4481280	-	-	-	Yes
5	503259	4481233	2088.332	2054.75	992.241	Yes
6	503259	4481243	2098.735	2054.255	992.78	Yes
7	503263	4481254	2109.445	2057.369	992.398	Yes
8	503282	4481253	2109.409	2077.697	989.52	Yes
9	503322	4481236	-	-	-	Yes
10	503323	4481228	-	-	-	Yes
11	503308	4481236	-	-	-	Yes
12	503289	4481241	-	-	-	Yes
13	503278	4481240	2096.766	2073.73	988.816	Yes
14	503277	4481232	-	-	-	Yes
15	503254	4481238	2088.332	2054.75	992.241	Yes
16	503280	4481219	-	-	-	Yes
17	503265	4481219	2076.082	2058.712	989.951	Yes
18	503250	4481225	2079.67	2047.213	993.609	Yes
19	503242	4481220	2075.567	2038.11	995.035	Yes
20	503250	4481209	2064.268	2045.029	993.218	Yes
21	503232	4481214	2069.132	2026.992	996.386	Yes
22	503226	4481199	2053.829	2020.918	997.334	Yes
23	503215	4481194	2049.288	2013.584	998.183	Yes
24	503258	4481273	-	-	-	No
25	503216	4481273	2037.714	2014.628	998.133	Yes
26	503250	4481267	-	-	-	Yes

GPS UTM locations of Ant Mounds on the River Bluffs Open Space south of the Harvester site (NAD 27). No Total Station locations were taken for these ant mounds.

Ant Hill Number	*Easting*	*Northing*	*Presence of Flakes?*
Bluff 2 (south the Harvester site)			
101	503311	4481261	No
102	503330	4481184	No
103	503330	4481172	No
104	503326	4481164	Yes
105	503316	4481176	No
106	503303	4481183	Yes
107	503275	4481164	Yes
108	503259	4481160	No
109	503263	4481178	No
110	503273	4481185	No
111	503277	4481193	No
112	503311	4481179	Yes
113	503292	4481182	Yes
114	503265	4481157	No
115	503253	4481149	Yes
116	503300	4481199	No
117	503249	4481199	Yes
118	503245	4481167	Yes
119	503245	4481170	No
Bluff 3 (south of Bluff 2 and the Harvester site)			
201	503342	4481164	Yes
202	503349	4481172	No
203	503320	4481156	No
204	503349	4481155	No
205	503351	4481146	No
206	503358	4481147	No
207	503350	4481144	No
208	503320	4481143	No
209	503310	4481145	Yes
210	503289	4481124	Yes
211	503313	4481117	No
212	503321	4481120	No
213	503331	4481122	Yes
214	503372	4481111	No
215	503362	4481115	No
216	503277	4481118	No
217	503267	4481117	Yes

GPS UTM locations of Ant Mounds on the River Bluffs Open Space south of the Harvester site (NAD 27). No Total Station locations were taken for these ant mounds.

Ant Hill Number	*Easting*	*Northing*	*Presence of Flakes?*
Bluff 3 (south of Bluff 2 and the Harvester site)			
218	503233	4481148	No
219	503226	4481137	Yes
220	503224	4481133	No
221	503252	4481087	Yes
222	503225	4481080	No
223	503281	4481099	No
224	503208	4481111	No
225	503210	4481099	Yes
226	503319	4481094	No
227	503225	4481094	No
228	503230	4481091	Yes
229	503204	4481098	No

Harvester site hearth Total Station UTM locations.

Hearth	*Northing*	*Easting*	*Elevation*
Hearth 1			
NW Corner	2117.515	2059.129	993.266
SW Corner	2116.94	2058.51	993.276
SE Corner	2116.181	2058.795	993.524
NE Corner	2116.711	2059.624	993.624
Hearth 2			
NW Corner	2111.691	2056.647	993.589
SW Corner	2110.651	2055.571	993.419
SE Corner	2109.974	2056.63	993.787
NE Corner	2111.035	2057.265	993.823
Hearth 3			
SW Corner	2098.548	2081.534	989.327
NW Corner	2099.297	2082.207	989.909
SE Corner	2097.911	2082.555	989.661
NE Corner	2098.279	2083.192	989.621

Artifact totals and measurements (mm) from the Hearth 2 excavation. The grey cells indicate a new level.

NE Quadrant								
Quad	*Level*	*Artifact*	*Material*	*Max. Length (mm)*	*Max. Width (mm)*	*Max Thickness (mm)*	*Burned*	*Total*
NE	10-20 (Level 1)	ceramic	ceramic	14.8	14.2	4.2	no	2
NE	10-20 (Level 1)	ceramic	ceramic	22.2	15	5.3	no	
NE	10-20 (Level 1)	flake	chalcedony	33.1	17.4	4.7	yes	1
NE	10-20 (Level 1)	flake	chert	17.5	13.6	3.7	yes	2
NE	10-20 (Level 1)	flake	chert	17.7	8.1	1.3	no	
NE	10-20 (Level 1)	charcoal	organic	n/a	n/a	n/a	yes	1
NE	10-20 (Level 1)	flake	quartzite	21.8	16.7	2.7	no	4
NE	10-20 (Level 1)	flake	quartzite	20	17.2	4.9	no	
NE	10-20 (Level 1)	flake	quartzite	12,6	8.5	1.4	no	
NE	10-20 (Level 1)	flake	quartzite	10.7	10.1	1.4	no	
NE	20-25 (Level 2)	ceramic	ceramic	25.8	18.7	5.6	no	2
NE	20-25 (Level 2)	ceramic	ceramic	27.4	21.2	8	no	
NE	20-25 (Level 2)	Mano	cobble	n/a	n/a	n/a	yes	1
NE	20-25 (Level 2)	charcoal	organic	-	-	-	-	2
NE	25-30 (Level 3)	flake	chalcedony	20.4	17	1.4	no	3
NE	25-30 (Level 3)	flake	chalcedony	14.8	11.1	1.6	yes	
NE	25-30 (Level 3)	flake	chalcedony	15.4	8.4	3.5	yes	
NE	25-30 (Level 3)	flake	chert	11.7	9.4	2.1	yes	1
NE	25-30 (Level 3)	charcoal	organic	-	-	-	-	4
NE	30-35 (Level 4)	charcoal	organic	-	-	-	-	2
NE	surface	charcoal	organic	-	-	-	-	1
NE	surface	flake	quartzite	22.5	15.3	6.2	no	1

Artifact totals and measurements (mm) from the Hearth 2 excavation continued. The grey cells indicate a new level.

Quad	*Level*	*Artifact*	*Material*	*Max. Length (mm)*	*Max. Width (mm)*	*Max Thickness (mm)*	*Burned*	*Total*
NW Quadrant								
NW	Surface	bone	bone	22.6	11.3	7	yes	1
NW	Surface	flake	quartzite	20.9	17.9	4.1	no	1
NW	surface	flake	chert	20.2	10.6	1.3	no	2
NW	surface	flake	chert	10.9	9.3	0.5	yes	
Southeastern Quadrant								
SE	surface	flake	chert	16.8	10	3.4	yes	1
SE	surface	bone	bone	65	40.3	4.9	yes	1
SE	surface	flake	Pet. wood	10.8	6.5	1	no	1
SE	surface	flake	chalcedony	6.7	2.7	0.5	yes	1
SE	12-22 (level 1)	ceramic	ceramic	19.9	12.8	5.1	no	1
SE	12-22 (level 1)	flake	chalcedony	13.6	12.2	1.2	no	1
SE	12-22 (level 1)	bone	bone	2.4	2.1	0.3	yes	4
SE	12-22 (level 1)	bone	bone	11.7	7.4	3.4	yes	
SE	12-22 (level 1)	bone	bone	10.1	4.2	0.6	yes	
SE	12-22 (level 1)	bone	bone	7.3	3.7	0.5	yes	
SE	Level 2	bone	bone	22.1	13.5	6.3	yes	4
SE	Level 2	bone	bone	10.4	4	2.4	yes	
SE	Level 2	bone	bone	10.2	7.8	0.7	yes	
SE	Level 2	bone	bone	3.7	2	0.5	yes	
SE	Level 2	flake	chalcedony	7.6	4.9	0.9	yes	1

Artifact totals and measurements (mm) from the Hearth 2 excavation continued. The grey cells indicate a new level.

Quad	*Level*	*Artifact*	*Material*	*Max. Length (mm)*	*Max. Width (mm)*	*Max Thickness (mm)*	*Burned*	*Total*
SW Quadrant								
SW	surface	Flake	quartzite	19.9	10.7	3.3	n	2
SW	surface	flake	quartzite	15.8	13.4	4.7	n	
SW	surface	flake	chert	26	12.8	9.2	yes	1
SW	surface	bone	bone	11	7.4	3	yes	2
SW	surface	bone	bone	21	16.6	2.7	yes	
SW	35-40	bone	bone	-	-	-	yes	1

Artifact frequencies and measurements (mm) found within hearth fill screening and floatation.

SE Quadrant									
Quad	*Level*	*Artifact Type*	*Material Type*	*Portion*	*Color*	*Max Length*	*Max Width*	*Max Thickness*	*Count*
SE	1	Flake	Chert	Distal	grey	17.82	8.52	2.44	1
SE	1	Flake	Chert	complete	grey	11.77	7.47	1.14	1
SE	1	Flake	Chert	complete	red	8.83	8.05	1	1
SE	1	Flake	Chert	complete	brown	10.21	7.47	0.93	1
SE	1	Flake	Chert	Distal	grey	5.62	5.46	0.77	1
SE	1	Flake	Chert	proxmal	grey	10.65	7	2.36	1
SE	1	Flake	Chert	complete	tan	11.54	8.74	1.08	1
SE	1	Flake	Chert	complete	white	6.6	6.38	1.15	1
SE	1	Flake	Chert	Distal	brown	5.21	4.56	1.1	1
SE	1	Flake	Chalcedony	complete	grey	14.26	10.83	2.34	1
SE	1	Flake	Chalcedony	complete	brown	15.08	10.23	1.68	1
SE	1	Flake	Chalcedony	complete	translucent	6.34	4.24	0.52	1

Artifact frequencies and measurements (mm) found within hearth fill screening and floatation continued.

SE Quadrant									
Quad	*Level*	*Artifact Type*	*Material Type*	*Portion*	*Color*	*Max Length*	*Max Width*	*Max Thickness*	*Count*
SE	1	Flake	Chalcedony	complete	white	6.33	4.96	1.41	1
SE	1	Flake	Chalcedony	midsection	brown	16.56	12.77	2.31	1
SE	1	Flake	Chalcedony	complete	brown	6.69	5.12	1.62	1
SE	1	Flake	Chalcedony	Distal	translucent	6.44	4.48	0.82	1
SE	1	Flake	Chalcedony	complete	translucent	11.09	5.07	2.45	1
SE	1	Flake	Chalcedony	complete	translucent	7.32	5.79	1	1
SE	1	Flake	Chalcedony	Distal	translucent	7.61	5.51	1.08	1
SE	1	Flake	Chalcedony	complete	translucent	8.31	5.92	0.56	1
SE	1	Flake	Chalcedony	complete	translucent	8.91	5.83	0.64	1
SE	1	Flake	Chalcedony	complete	translucent	7.37	4	0.61	1
SE	1	Flake	Quartzite	complete	tan	8.93	4.95	1.51	1
SE	1	Flake	Quartzite	complete	grey	7.2	5.2	0.94	1
SE	1	Flake	Quartzite	complete	pink	10.04	7.65	1.54	1
SE	1	Flake	Quartzite	Distal	brown	7.32	5.79	1.66	1
SE	1	Flake	Quartzite	complete	pink	5.84	4.27	1.1	1
SE	1	Flake	Quartzite	complete	tan	9.09	3.79	1.66	1
SE	1	Flake	Quartzite	complete	red	6.26	4.78	2.01	1
SE	1	Flake	Quartzite	complete	pink	6.81	2.36	1.02	1
SE	1	Flake	Chert	-	-	> 5mm	> 5mm	> 5mm	11
SE	1	Flake	Chalcedony	-	-	> 5mm	> 5mm	> 5mm	18
SE	1	Flake	Quartzite	-	-	> 5mm	> 5mm	> 5mm	7
SE	1	Burned Bone	Bone	-	-	-	-	-	120
SE	1	Charcoal	charcoal	-	-	-	-	-	133

Artifact frequencies and measurements (mm) found within hearth fill screening and floatation continued.

SE Quadrant									
Quad	*Level*	*Artifact Type*	*Material Type*	*Portion*	*Color*	*Max Length*	*Max Width*	*Max Thickness*	*Count*
SE	1	nacre	nacre	n/a	n/a	n/a	n/a	n/a	4
SE	1	ceramic	ceramic	midsection	grey	40.34	40.12	6.72	1
SE	1	ceramic	ceramic	midsection	grey	8.67	7.17	6.41	1
SE	1	ceramic	ceramic	midsection	grey	14.29	11.97	5.66	1
SE	1	ceramic	ceramic	midsection	grey	20.27	17.36	7.06	1
SE	1	Bone	Bone	n/a	n/a	7.03	5.58	0.7	1
SE	1	Bone	Bone	n/a	n/a	2.9	3.12	0.69	1
SE	2	Flake	Chert	complete	tan	10.04	6.14	1.37	1
SE	2	Flake	Chert	complete	brown	8.74	6.58	1.14	1
SE	2	Flake	Chert	midsection	white	30.99	21.24	11.1	1
SE	2	Flake	Chert	complete	tan	6.66	5.96	0.75	1
SE	2	Flake	Chert	complete	red	9.02	5.33	0.85	1
SE	2	Flake	Chert	complete	red	6.83	4.35	0.68	1
SE	2	Flake	Chert	complete	orange	4.48	4.3	0.52	1
SE	2	Flake	Chert	Distal	white	27.8	19.32	6.6	1
SE	2	Flake	Chalcedony	complete	translucent	10.43	6.22	0.92	1
SE	2	Flake	Chalcedony	complete	translucent	7.78	4.68	0.81	1
SE	2	Flake	Chalcedony	complete	translucent	6.35	4.61	0.47	1
SE	2	Flake	Chalcedony	complete	translucent	21.11	10.8	1.96	1
SE	2	Flake	Chalcedony	complete	translucent	12.84	11.07	1.9	1
SE	2	Flake	Chalcedony	complete	translucent	10.54	9.01	1.32	1
SE	2	Flake	Chalcedony	complete	translucent	9.7	6.13	1	1
SE	2	Flake	Chalcedony	complete	translucent	6.3	3.86	0.68	1

Artifact frequencies and measurements (mm) found within hearth fill screening and floatation continued.

SE Quadrant									
Quad	*Level*	*Artifact Type*	*Material Type*	*Portion*	*Color*	*Max Length*	*Max Width*	*Max Thickness*	*Count*
SE	2	Flake	Chalcedony	complete	translucent	8.79	5.89	0.87	1
SE	2	Flake	Chalcedony	proximal	translucent	6.24	5.95	0.67	1
SE	2	Flake	Chalcedony	complete	translucent	6.25	5.65	0.61	1
SE	2	Flake	Chalcedony	complete	translucent	7.32	3.96	0.68	1
SE	2	Flake	Chalcedony	complete	translucent	7.52	4.15	0.93	1
SE	2	Flake	Chalcedony	complete	translucent	8.73	4.92	1.13	1
SE	2	Flake	Chalcedony	complete	translucent	8.56	5.94	0.61	1
SE	2	Flake	Chalcedony	complete	translucent	9.65	6.21	0.6	1
SE	2	Flake	Chalcedony	complete	brown	15.83	8.46	4.24	1
SE	2	Flake	Quartzite	Distal	red	33.8	19.01	9.39	1
SE	2	Flake	Quartzite	Distal	brown	9.37	8.41	1.19	1
SE	2	Flake	Quartzite	complete	tan	7.51	3.64	0.41	1
SE	2	Flake	chert	-	-	>5mm	>5mm	-	1
SE	2	Flake	Chalcedony	-	-	>5mm	>5mm	-	7
SE	2	Flake	Quartzite	-	-	>5mm	>5mm	-	1
SE	2	Shell	nacre	-	-	-	-	-	3
SE	2	Charcoal	charcoal	-	-	-	-	-	132
SE	2	Bone	Bone	-	-	-	-	-	5
SE	2	Burned Bone	Bone	-	-	-	-	-	87
SE	3	flake	Chert	complete	brown	5.8	3.06	0.41	1
SE	3	Flake	Chalcedony	complete	translucent	17.62	8.87	2.74	1
SE	3	Flake	Chalcedony	complete	translucent	8.32	5.55	1.24	1
SE	3	Flake	Chalcedony	complete	translucent	6.79	4.01	0.43	1

Artifact frequencies and measurements (mm) found within hearth fill screening and floatation continued.

SE Quadrant									
Quad	*Level*	*Artifact Type*	*Material Type*	*Portion*	*Color*	*Max Length*	*Max Width*	*Max Thickness*	*Count*
SE	3	Flake	Chalcedony	complete	brown	10.06	5.04	0.46	1
SE	3	Flake	Chalcedony	-	-	>5mm	>5mm	>5mm	7
SE	3	Charcoal	charcoal	-	-	-	-	-	52
SE	3	Burned Bone	bone	-	-	-	-	-	9
NE Quadrant									
NE	3	Flake	chert	complete	brown	10.02	5.72	1	1
NE	3	Flake	chert	complete	red	6.48	4.25	0.31	1
NE	3	Flake	Chalcedony	complete	brown	12.95	10.59	2.73	1
NE	3	Flake	Chalcedony	complete	grey	8.79	6.59	1.47	1
NE	3	Flake	Chalcedony	complete	translucent	8.19	6.75	1.17	1
NE	3	Flake	Chalcedony	complete	translucent	7.4	3.25	0.31	1
NE	3	Flake	Chalcedony	complete	translucent	5.59	4.04	0.67	1
NE	3	Flake	Chalcedony	complete	tan	6.01	4.48	0.78	1
NE	3	Flake	Chalcedony	complete	white	5.8	5.33	0.89	1
NE	3	Flake	Chalcedony	complete	translucent	6.67	2.94	0.85	1
NE	3	Flake	Quartzite	complete	orange	6.77	5.24	1.21	1
NE	3	Flake	chaclcedony	n/a	translucent	>5mm	>5mm	>5mm	8
NE	3	Bead	Bone	complete	white	4.46	n/a	2.06	1
NE	3	Shell	nacre	-	-	-	-	-	1
NE	3	Charcoal	charcoal	-	-	-	-	-	115
NE	3	Burned Bone	bone	-	-	-	-	-	20
NE	2	Flake	Chert	distal	white	11.67	11.61	4.5	1
NE	2	Flake	Chert	distal	white	5	4.84	2.88	1
NE	2	Flake	Chert	complete	white	6.23	3.17	1.11	1

Artifact frequencies and measurements (mm) found within hearth fill screening and floatation continued.

NE Quadrant									
Quad	*Level*	*Artifact Type*	*Material Type*	*Portion*	*Color*	*Max Length*	*Max Width*	*Max Thickness*	*Count*
NE	2	Flake	Chalcedony	complete	translucent	9.35	8.03	1.77	1
NE	2	Flake	Chalcedony	complete	translucent	7.9	5.12	0.88	1
NE	2	Flake	Chalcedony	complete	translucent	7.99	3.66	1.26	1
NE	2	Flake	Chalcedony	complete	translucent	6.96	3.65	0.69	1
NE	2	Flake	Chalcedony	distal	translucent	5.81	4.81	0.72	1
NE	2	Flake	Chalcedony	complete	translucent	5.78	4.97	0.66	1
NE	2	Flake	Chalcedony	complete	translucent	5.32	3.38	0.8	1
NE	2	Flake	Chalcedony	complete	translucent	5.34	4.33	0.7	1
NE	2	Flake	Quartzite	complete	grey	17.53	2.88	0.83	1
NE	2	Flake	Quartzite	complete	grey	6.42	3.97	1.86	1
NE	2	Flake	Quartzite	complete	tan	13.98	6.85	1.65	1
NE	2	Flake	Quartzite	complete	pink	17.23	11.02	1.85	1
NE	2	Flake	Quartzite	complete	red	7.1	3.61	0.88	1
NE	2	Flake	Chert	-	-	-	-	-	2
NE	2	Flake	Chalcedony	-	-	-	-	-	9
NE	2	Flake	Quartzite	-	-	-	-	-	2
NE	2	Shell	Shell	-	-	-	-	-	3
NE	2	Bone	Bone	-	-	-	-	-	6
NE	2	Burned Bone	Bone	-	-	-	-	-	45
NE	2	Charcoal	Charcoal	-	-	-	-	-	42
NE	2	Ceramic	Ceramic	midsection	tan	17.34	13.1	5.95	1
NE	2	Bead	Bone	complete	white	5.02	n/a	1.81	1
NE	1	Flake	Chert	distal	red	23.83	20.01	5.31	1

Artifact frequencies and measurements (mm) found within hearth fill screening and floatation continued.

NE Quadrant									
Quad	*Level*	*Artifact Type*	*Material Type*	*Portion*	*Color*	*Max Length*	*Max Width*	*Max Thickness*	*Count*
NE	1	Flake	Chert	complete	red	13.93	4.98	2.11	1
NE	1	Flake	Chert	complete	red	14.27	13.25	3.34	1
NE	1	Flake	Chert	complete	red	10.81	8.16	3.72	1
NE	1	Flake	Chert	complete	tan	9.78	8.44	2.37	1
NE	1	Flake	Chert	complete	brown	7.52	5.49	1.73	1
NE	1	Flake	Chert	complete	orange	5.35	4.54	1.3	1
NE	1	Flake	Chert	-	-	>5mm	>5mm	>5mm	3
NE	1	Flake	Chalcedony	complete	translucent	5.9	2.56	0.28	1
NE	1	Flake	Chalcedony	complete	translucent	10.42	5.86	0.65	1
NE	1	Flake	Chalcedony	complete	translucent	9.63	7.46	1.11	1
NE	1	Flake	Chalcedony	complete	translucent	7.58	4.1	0.64	1
NE	1	Flake	Chalcedony	complete	translucent	5.06	4.82	0.79	1
NE	1	Flake	Chalcedony	complete	orange	7.91	6.37	1.68	1
NE	1	Flake	Chalcedony	complete	translucent	10.07	7.51	1.93	1
NE	1	Flake	Chalcedony	complete	translucent	7.91	7.53	1.06	1
NE	1	Flake	Chalcedony	complete	red	9.07	5.93	1.72	1
NE	1	Flake	Chalcedony	complete	translucent	11.59	3.5	2.15	1
NE	1	Flake	Chalcedony	complete	translucent	7.11	5.71	1.15	1
NE	1	Flake	Chalcedony	complete	tan	7.04	4.48	1.64	1
NE	1	Flake	Chalcedony	complete	white	6.25	3.79	0.94	1
NE	1	Flake	Chalcedony	complete	translucent	6	4.43	0.46	1
NE	1	Flake	Chalcedony	complete	tan	5.69	3.28	0.89	1
NE	1	Flake	Chalcedony	Distal	grey	7.91	4.33	2.69	1
NE	1	Flake	Quartzite	Distal	tan	23.63	15.22	3.58	1

Artifact frequencies and measurements (mm) found within hearth fill screening and floatation continued.

NE Quadrant									
Quad	*Level*	*Artifact Type*	*Material Type*	*Portion*	*Color*	*Max Length*	*Max Width*	*Max Thickness*	*Count*
NE	1	Flake	Quartzite	complete	tan	8.53	7.05	1.34	1
NE	1	Flake	Quartzite	complete	red	9.91	4.2	1.18	1
NE	1	Flake	Quartzite	Distal	tan	6.52	6.21	2.13	1
NE	1	Flake	Quartzite	complete	red	8.13	5.48	1.04	1
NE	1	Flake	Quartzite	proximal	red	6.94	4.79	1.57	1
NE	1	Flake	Quartzite	complete	tan	8.75	5.68	0.8	1
NE	1	Flake	Quartzite	complete	brown	6.15	4.59	0.76	1
NE	1	Flake	Quartzite	complete	tan	6.26	4.3	0.86	1
NE	1	Burned bone	Bone	-	-	-	-	-	130
NE	1	Shell	Shell	-	-	-	-	-	3
NE	1	Charcoal	Charcoal	-	-	-	-	-	38
NE	1	Ceramic	Ceramic	midsection	tan	18.37	15.22	5.9	1
NE	1	Ceramic	Ceramic	midsection	tan	11.39	10.6	5.08	1
NE	1	Ceramic	Ceramic	midsection	tan	31.19	22.82	5.43	1
NE	1	Ceramic	Ceramic	midsection	tan	20.51	18.1	5.84	1
NE	1	Ceramic	Ceramic	midsection	tan	23.11	19.67	7.01	1
NE	1	Bead	Bone	complete	white	4.87	-	2.08	1
NW Quadrant									
NW	1	Flake	Chert	complete	tan	8.71	6.16	1.16	1
NW	1	Flake	Chalcedony	complete	grey	19.66	12.81	3.47	1
NW	1	Flake	Chalcedony	complete	translucent	6.08	4.38	1.17	1
NW	1	Flake	Chalcedony	distal	translucent	6.2	5.82	0.87	1
NW	1	Burned Bone	Bone	-	-	-	-	-	8

Artifact frequencies and measurements (mm) found within hearth fill screening and floatation continued.

NW Quadrant									
Quad	*Level*	*Artifact Type*	*Material Type*	*Portion*	*Color*	*Max Length*	*Max Width*	*Max Thickness*	*Count*
NW	1	Charcoal	Charcoal	-	-	-	-	-	19
NW	2	Flake	Chert	complete	white	15.43	13.01	2.4	1
NW	2	Flake	Chalcedony	complete	translucent	7.19	6.14	1.49	1
NW	2	Burned Bone	Bone	-	-	-	-	-	3
SW Quadrant									
SW	1	Flake	Chalcedony	midsection	translucent	7.29	6.91	0.86	1
SW	1	Flake	Chalcedony	proximal	translucent	5.91	4.19	0.82	1
SW	1	Flake	Chalcedony	complete	translucent	9.17	5.96	1.12	1
SW	1	Flake	Chalcedony	complete	translucent	6.31	3.41	0.82	1
SW	1	Flake	Chalcedony	complete	translucent	5.34	4.34	0.87	1
SW	1	Charcoal	charcoal	-	-	-	-	-	1
SW	1	Burned Bone	Bone	-	-	-	-	-	8
SW	1	ceramic	ceramic	midsection	tan	35.33	19.45	5.41	1
SW	2	Flake	Chalcedony	complete	translucent	16.32	10.33	1.9	1
SW	2	Flake	Chalcedony	Distal	grey	9.5	7.95	3.09	1
SW	2	Flake	Quartzite	complete	grey	<5mm	<5mm	<5mm	1
SW	2	Burned Bone	Bone	-	-	-	-	-	10
SW	2	Charcoal	Charcoal	-	-	-	-	-	1
SW	2	Shell	Shell	-	-	-	-	-	1

Total artifact frequencies from Hearth 2 excavation, wet screening, and floatation.

	SE Quadrant	*NE Quadrant*	*SW Quadrant*	*NW Quadrant*	*Total*
Chert	26	18	-	4	48
Chalcedony	69	51	7	4	131
Quartzite	19	25	3	1	48
Bone Bead	-	3	-	-	3
Shell	5	7	1	-	13
Pottery	6	10	1	-	17
Total	125	114	12	9	260
Burned Bone	198	285	19	12	514
Charcoal	317	202	11	19	549
Total					*1583*

Artifact frequencies and measurements (mm) from test units 1 and 2 from the Harvester site.

Test Unit	*Level*	*Artifact type*	*Raw Material*	*Max Length (mm)*	*Max. Width (mm)*	*Max. Thickness (mm)*
1	1	Shatter	Chert	12.88	11.25	5.84
1	1	Flakes	Quartzite	18.61	14.24	6.76
1	1	Flakes	Quartzite	13.78	6.9	3.47
1	2	Biface frag	Chalcedony	22.06	11.75	8.09
1	2	Flakes	Chalcedony	12.35	5.59	2.67
1	2	Flakes	Chert	9.49	8.15	2.06
1	2	Flakes	Chert	28.92	18.81	6.96
1	2	Flakes	Chalcedony	13.25	10.51	3.69
1	3	Bone	Bone	7.05 - 6.05	5.71 - 4.40	1.36 - 0.63
1	3	Flake	Quartzite	21.99	18.5	5.89
1	3	Flake	Quartzite	5.04	4.89	0.56

Artifact frequencies and measurements (mm) from test units 1 and 2 from the Harvester site continued.

Test Unit	*Level*	*Artifact type*	*Raw Material*	*Max Length (mm)*	*Max. Width (mm)*	*Max. Thickness (mm)*
1	3	Flake	Chalcedony	8.27	5.28	1.03
1	3	Flake	Chalcedony	8.5	5.46	1.91
1	3	Flake	Chert	4.07	3.45	0.52
1	3	Flake	Chert	3.97	4.1	0.41
1	3	Flakes	Chalcedony	5.47	3.65	0.97
1	3	Flakes	Quartzite	8.14	7.45	0.64
1	3	Flakes	Chalcedony	4.59	3.7	0.4
1	3	Flakes	Quartzite	10.23	6.7	1.77
1	3	Flakes	Quartzite	7.67	5.08	1.57
1	3	Flakes	Chalcedony	4.03	3.84	0.74
1	3	Flakes	Chert	6.47	4.55	1.18
1	3	Flakes	Quartzite	17.17	7.54	3.62
1	3	Flakes	Quartzite	13.01	8.2	2.2
1	3	Flakes	Chert	31.55	28.22	3.27
1	4	Flake	Quartzite	16.24	13.89	3.51
1	4	Flake	Chert	19.82	19.35	3.99
1	4	Flake	Chert	19.29	8.01	4.55
1	4	Flake	Quartzite	13.97	11	2.27
1	4	Flake	Quartzite	24.21	15.95	6.73
1	4	Flake	Chalcedony	20.94	16	2.43
1	4	Flake	Chalcedony	17.74	15.02	2.7
1	4	Flake	Chalcedony	17.54	11.33	5.7
1	4	Flake	Quartzite	18.14	10.87	4.12

Artifact frequencies and measurements (mm) from test units 1 and 2 from the Harvester site continued.

Test Unit	*Level*	*Artifact type*	*Raw Material*	*Max Length (mm)*	*Max. Width (mm)*	*Max. Thickness (mm)*
1	4	Flake	Quartzite	11.52	7.2	1.97
1	4	Flake	Chert	14.44	13.23	7
1	4	Flake	Chalcedony	12.67	11.93	3.01
1	4	Flake	Quartzite	13.85	9.08	3.07
1	4	Flake	Chert	14.35	11.16	5.33
1	4	Flake	Quartzite	11.46	7.27	2.41
1	4	Flake	Quartzite	16.1	12.38	2.21
1	4	Flake	Chert	10.57	7.9	3.22
1	4	Flake	Chert	11.16	7.88	1.74
1	4	Flake	Quartzite	16.05	8.43	2.1
1	4	Flake	Chalcedony	10.63	8.06	1.53
1	4	Flake	Chalcedony	10.54	6.33	1.3
1	4	Flake	Chert	8.72	6.52	1.42
1	4	Flake	Quartzite	7.13	6	2.59
1	4	Flake	Chert	5.78	5.42	1.61
1	4	Flake	Quartzite	5.86	5.03	0.89
1	4	Flake	Chert	6.96	3.33	1.22
1	4	Flake	Chalcedony	4.23	2.83	0.27
1	4	Flake	Quartzite	6.04	4.86	0.5
1	4	Flakes	Chert	7.78	3.17	1.61
1	4	nacre	Shell	n/a	n/a	n/a
1	4	Bone	Bone	5.08-18.11	1.92-4.44	1.42-2.85
1	5	Flake	Chert	7.49	6.83	1.4
1	5	Flake	Chalcedony	5.73	5.56	0.68

Artifact frequencies and measurements (mm) from test units 1 and 2 from the Harvester site continued.

Test Unit	*Level*	*Artifact type*	*Raw Material*	*Max Length (mm)*	*Max. Width (mm)*	*Max. Thickness (mm)*
1	5	Flake	Chalcedony	8.35	5.07	0.79
1	5	Flake	Chalcedony	11.37	5.61	1.84
1	5	Flake	Quartzite	4.84	4.72	0.87
1	5	Flake	Chalcedony	5.05	3.19	0.89
1	5	Flake	Quartzite	6.99	6.52	2.11
1	5	Flake	Quartzite	4.02	3.89	1.29
1	5	Flake	Quartzite	8.8	5.06	1.58
1	5	Flake	Quartzite	11.89	7.37	2.33
1	5	Flake	Chert	7.61	7.51	1.58
1	5	Flake	Quartzite	7.76	6.19	1.65
1	5	Flake	Chalcedony	9.13	7.61	1.32
1	5	Flake	Quartzite	11.49	9.02	1.5
1	5	Flake	Chalcedony	8.77	6.25	1.31
1	5	Flake	Chert	8.84	8.66	1.01
1	5	Flake	Quartzite	11.82	6.85	1.35
1	5	Flake	Chert	9.73	8.21	1.97
1	5	Flake	Chert	12.17	8.41	1.3
1	5	Flake	Quartzite	19.42	14.27	7.26
1	5	Flake	Chalcedony	29.68	22.38	8.25
1	5	Bone	Bone	6.31-23.08	2.54-11.89	1.23-4.43
1	5	Shell	Nacre	n/a	n/a	n/a
1	6	Bone	Bone	40.94-9.07	15.45-4.99	3.52-1.75
1	6	Flake	Chalcedony	18.23	14.62	4.13

Artifact frequencies and measurements (mm) from test units 1 and 2 from the Harvester site continued.

Test Unit	*Level*	*Artifact type*	*Raw Material*	*Max Length (mm)*	*Max. Width (mm)*	*Max. Thickness (mm)*
1	6	Flake	Chalcedony	11.6	10.85	2.24
1	6	Flake	Chert	12.87	8.55	1.46
1	6	Flake	Chert	13.71	10.52	1.92
1	6	Flake	Chalcedony	7.11	5.56	1.06
1	6	Flake	Quartzite	13.4	9.96	2.26
1	6	Flake	Chert	7.73	5.6	1.26
1	7	Bone	Bone	11.42-3.93	6.03-2.87	1.22-0.65
1	7	Flake	Quartzite	30.25	30.15	6.07
1	7	Flake	Chalcedony	10.68	8.83	3.15
1	7	Flake	Quartzite	12.37	7.53	2.51
1	7	Shell	nacre	n/a	n/a	n/a
2	1	Flake	Quartzite	8.26	4.3	1.13
2	2	Flake	Chalcedony	9.73	6.49	1.45
2	2	Flake	Chalcedony	11.95	8.27	1.46
2	2	Flake	Chalcedony	5.03	3.57	0.79
2	2	Flake	Quartzite	26.82	16.97	4.86
2	2	Flake	Chalcedony	7.18	4.61	0.84
2	2	Ground stone	sandstone	39.06	38.32	10.47
2	3	Bone	Bone	29.52	7.48	3.14
2	3	Flake	Chert	5.79	4.67	1.11
2	3	Flake	Quartzite	21.45	20.14	4.77
2	3	Flake	Chalcedony	12.99	11.64	2.06
2	3	Flake	Quartzite	25.22	23.93	5.96

Artifact frequencies and measurements (mm) from test units 1 and 2 from the Harvester site continued.

Test Unit	*Level*	*Artifact type*	*Raw Material*	*Max Length (mm)*	*Max. Width (mm)*	*Max. Thickness (mm)*
2	3	Flake	Chalcedony	13.7	11.13	4.11
2	3	Flake	Chert	7.3	4.51	0.65
2	3	Flake	Quartzite	7.11	6.34	1.12
2	3	Flake	Chert	13.17	10.92	1.5
2	3	Flake	Quartzite	19.4	10.51	5.49
2	3	Flake	Quartzite	6.13	4.68	1.31
2	3	Flake	Chert	37.49	26.26	10.83
2	4	Bone	Bone	25.71-5.08	6.13-3.13	2.96-0.89
2	4	Flake	Chert	37.68	22.72	11.43
2	4	biface fragment	Quartzite	39.11	19.02	5.52
2	4	Flake	Chalcedony	13.05	11.03	5.86
2	4	Flake	Quartzite	9.06	8.94	2.35
2	4	Flake	Chalcedony	17.96	11.76	2.18
2	4	Flake	Chert	8.68	7.99	3.02
2	4	Flake	Chert	11.79	6.58	4.5
2	4	Flake	Chert	13.41	7.59	1.35
2	4	Flake	Chert	12.95	7.76	3.83
2	4	Flake	Chert	9.63	6.89	1.22
2	4	Flake	Chalcedony	8.67	4.84	0.65
2	4	Flake	Chalcedony	8.86	5.05	1.11
2	4	Flake	Quartzite	8.08	6.49	1.36
2	4	Flake	Quartzite	7.58	6.75	1.81
2	4	Flake	Chert	5.65	4.11	0.92

Artifact frequencies and measurements (mm) from test units 1 and 2 from the Harvester site continued.

Test Unit	*Level*	*Artifact type*	*Raw Material*	*Max Length (mm)*	*Max. Width (mm)*	*Max. Thickness (mm)*
2	4	Flake	Chert	10.16	8.4	2.15
2	4	Flake	Chalcedony	5.26	4.08	0.71
2	4	Flake	Chalcedony	5.94	4.1	0.72
2	4	Flake	Chalcedony	5.38	3.12	0.59
2	4	Flake	Chalcedony	4.3	3.75	0.7
2	5	Flake	Chalcedony	17.03	12.39	3.81
2	5	Flake	Chert	13.2	12.75	3.25
2	5	Flake	Chert	8.25	5.48	1.36
2	5	Flake	Chalcedony	7.34	7.9	1.04
2	5	Flake	Chalcedony	7.36	5.63	0.97

Artifact totals from test unit 1 on the Harvester site.

Test Unit 1 (0.5 m x 0.5 m)	*Flakes*	*Bone*	*Shell*
Level 1	3	0	0
Level 2	4	0	0
Level 3	16	3	1
Level 4	30	5	1
Level 5	21	13	3
Level 6	7	3	0
Level 7	3	4	3
Total in Artifact Category	84	28	8
Total Artifacts in Test Unit			120

Artifact totals from test unit 2 on the Harvester site.

Test Unit 2 (0.5 m x 0.5 m)	*Flakes*	*Bone*	*Shell*
Level 1	1	0	0
Level 2	5	0	0
Level 3	10	1	0
Level 4	19	24	0
Level 5	5	0	0
Total in Artifact Category	40	25	0
Test Unit 2 Tools	*Groundstone Fragment*	*Biface Fragment*	
Level 2	1	0	
Level 4	0	1	
Total Artifacts in Test Unit		*67*	

APPENDIX VI

Data from the Weinmeister Collection

Table Key

01D	Arbitrary number followed by "D" indicating that the artifact was taken from one of Weinmeister's display cases	*abc*	<u>All but complete</u>. Indicates a projectile point that is mostly complete but may be missing an ear or tang.
01G	Arbitrary number followed by "G" indicating that the artifact originated from the Weinmeister Collection	*ms*	<u>Medial portion</u>. A projectile point with no distal (point) or proximal (base) portions.
01B	Projectile points displayed with Weinmeister's bead cache	*pr*	<u>Proximal portion.</u> A projectile point represented only by a base
co	<u>Complete</u> projectile point	*ds*	<u>Distal portion</u>. A projectile point represented only by the blade (no base is present)

Projectile point data from the Weinmeister collection.

Artifact Number	*Weinmeister Number*	*Portion*	*Raw Material*	*Mass*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thick (mm)*	*Shoulder Width (mm)*	*Neck Width (mm)*	*Base Width (mm)*
01B	n/a	co	Chalcedony	-	-	-	-	-	-	-
01D	546	co	Chert	0.6	14.74	13.93	2.84	12.39	8.9	11.58
01G	n/a	abc	Quartzite	2.7	27.66	21.74	4.21	21.74	12	-

Projectile point data from the Weinmeister collection

Artifact Number	*Weinmeister Number*	*Portion*	*Raw Material*	*Mass*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thick (mm)*	*Shoulder Width (mm)*	*Neck Width (mm)*	*Base Width (mm)*
02B	n/a	co	Chalcedony	-	-	-	-	-	-	-
02D	423	co	quartzite	2.2	22.92	15.51	4.89	15.19	13.54	15.51
02G	579	abc	Buffalo Peaks Chert	1.9	20.65	1970	4.87	19.7	8.08	10.14
03G	578	abc	Barger Gulch Chert	0.8	19.97	14.6	3.17	14.52	6.62	8.42
04G	571	abc	chert	1.1	17.48	13.91	4.42	14.17	11.19	12.14
05D	631	co	chert	0.3	10.51	9.69	2.64	8.88	7.46	9.69
06G	lr-1	ms	chalcedony	1.2	12.1	22.41	3.81	-	-	-
07D	466	co	chalcedony	2.3	28.6	16.89	5.22	16.89	11.48	-
07G	lr-1	pr	chalcedony	0.7	14.03	15.91	7.28	-	9.36	10.72
08D	493	co	quartzite	2.1	27.56	16.63	4.77	16.63	10.85	13.47
08G	lr-1	pr	quartzite	0.9	15.83	11.4	3.67	-	9.08	12.13
09D	41	co	quartzite	1	18.92	15.49	4.12	15.49	9.82	-
09G	lr-1	pr	chert	2	18.22	21.42	4.47	21.42	11.13	15.78
10G	lr-1	pr	unknown	7.1	37.85	26.34	6.82	-	17.86	26.34
11D	400	co	unknown	1.6	21.27	18.31	4.64	18.31	14.31	16.25
11G	lr-1	pr	chert	3.1	22.36	25.36	4.94	25.36	11.49	15.47
12D	492	co	quartzite	1.7	30.14	12.34	3.85	12.31	9.24	11.78
13D	n/a	abc	Hartville Uplift Chert	1.4	24.12	17.17	3.6	17.17	7.1	-
13G	lr-1	pr	chert	1.8	17.87	20.33	4.47	20	12.32	16.82
14D	322	co	chalcedony	0.4	13.78	15.66	2.64	15.66	7.72	9.6
14G	lr-1	pr	chalcedony	0.3	10.44	11.59	2.26	11.59	7.33	8.3
15D	35	co	chert	0.6	19.27	13.06	2.79	10.38	19.27	13.06

Projectile point data from the Weinmeister collection continued.

Artifact Number	*Weinmeister Number*	*Portion*	*Raw Material*	*Mass*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thick (mm)*	*Shoulder Width (mm)*	*Neck Width (mm)*	*Base Width (mm)*
15G	lr-1	pr	Chert	1.8	27.82	13.96	4.14	13.75	9.26	13.92
16D	433	co	Chert	1	25.16	15.69	3.33	15.69	6.92	8.7
17D	441	abc	Chert	0.9	25.53	12.49	3.39	-	4.72	5.64
19D	112	co	Barger Gulch Chert	3.1	34.34	24.87	4.45	24.87	14.51	20.64
19G	lr-1	pr	Chalcedony	2.1	21.99	15.61	5.45	-	-	13.86
20D	33	abc	Kremmling Chert	1.4	34.84	18.06	3.11	-	7.19	8.33
21D	54	abc	Chert	1.2	25.7	14.92	3.54	-	5.94	7.89
21G	lr-1	pr	Windy Ridge Quartzite	0.6	10.83	14.26	3.54	-	-	-
22D	124	co	Chert	0.7	21.79	15.52	3.2	15.52	7.28	8.65
22G	lr-1	ms	Chert	1.2	21.27	15.68	3.51	-	-	-
23G	lr-1	pr	Chert	0.6	12.96	12.08	3.04	12.04	8.98	-
24D	434	abc	Chalcedony	0.5	15.58	15.78	0.6	-	8.06	9.08
24G	lr-1	pr	Chert	1.7	16.59	19.86	4.65	18.75	12.18	14.35
25D	478	abc	Quartzite	1.3	22.99	18.3	3.94	18.3	8	10.33
26D	547	abc	Quartzite	0.6	12.73	11.3	2.81	10.61	8.75	10.61
26G	lr-1	pr	Chalcedony	0.6	14.45	11.73	3.42	-	7.58	10.37
27D	lr-1	ds	Chalcedony	1.2	31.25	15.59	3.62	-	-	-
27G	lr-1	pr	Chert	1.7	17.84	16.31	4.95	-	-	-
28D	556	ds	Kremmling Chert	0.6	19.94	13.72	2.43	-	6.43	-
28G	lr-1	pr	Chert	0.5	7.74	11.5	3.98	-	-	10.31
29D	53	abc	Petrified Wood	0.6	16.35	15.35	2.94	11.62	11.12	15.35
29G	lr-1	pr	Petrified Wood	2.8	17.77	7.32	20.38	20.38	12.3	-
30G	lr-1	pr	Quartzite	0.9	13.52	12.04	4.21	12.04	8.75	12.04

Projectile point data from the Weinmeister collection continued.

Artifact Number	*Weinmeister Number*	*Portion*	*Raw Material*	*Mass*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thick (mm)*	*Shoulder Width (mm)*	*Neck Width (mm)*	*Base Width (mm)*
31D	353	ds	Chert	0.9	29.1	12.15	3.51	-	-	-
31G	n/a	pr	Chert	0.8	15.17	18.6	2.94	18.36	7.72	8.28
32D	32	abc	Chert	1.3	26.29	15.26	3.9	26.29	8.53	11.77
32G	lr-1	pr	Petrified Wood	0.7	15.64	17.39	2.64	-	9.95	-
33D	494	abc	Chert	2.9	28	22.43	4.29	-	12.06	13.99
33G	lr-1	pr	Chert	1.2	11.06	17.29	4.62	-	13.78	16.77
34D	489	abc	Chert	1.7	30.02	16.82	3.74	16.82	7.31	9.63
35D	lr-1	ds	Windy Ridge Quartzite	1.5	25.58	13.34	4.73	-	-	-
35G	lr-1	pr	Quartzite	2	20.49	15.54	4.59	-	-	-
36D	147	abc	Chert	0.6	20.78	13.93	2.96	-	5.65	8.61
36G	lr-1	pr	Chalcedony	0.4	11.11	12.56	2.99	-	-	-
37D	287	abc	Chert	0.7	23.51	13.58	3.27	-	5.5	5.95
37G	n/a	pr	Quartzite	1.2	11.44	18.39	5.95	-	13.05	12.05
38D	103	abc	Chert	0.7	16.8	14.57	3.18	-	8.76	9.39
38G	5	pr	Chert	0.6	17.24	10.93	2.8	-	-	-
39D	34	abc	Chalcedony	0.5	16.4	12.18	2.67	12.18	5.95	8.7
39G	lr-1	pr	Chert	0.8	9.56	17.47	4.18	-	-	-
40G	lr-1	pr	Chert	0.6	14.46	13.5	2.58	-	-	-
41G	lr-1	pr	Chert	0.5	10.46	13.21	3.39	-	-	-
42G	lr-1	ds	Chert	2.1	24.54	17.3	4.73	17.3	-	-
43D	n/a	co	Chert	0.8	25.75	13.32	3.73	13.32	6.51	8.9
43G	lr-1	ds	Chert	0.9	25.85	16.79	4.19	-	-	-
45D	426	abc	Quartzite	3.1	30.2	21.48	4.87	21.48	13.24	-

Projectile point data from the Weinmeister collection continued.

Artifact Number	*Weinmeister Number*	*Portion*	*Raw Material*	*Mass*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thick (mm)*	*Shoulder Width (mm)*	*Neck Width (mm)*	*Base Width (mm)*
46G	185	ds	Chalcedony	0.4	15.97	12.59	2.17	-	-	-
47G	lr-1	ds	Chalcedony	1.4	23.54	17.27	5.35	-	-	-
48G	lr-1	ds	Chert	0.5	16.21	11.93	2.47	-	-	-
49G	lr-1	ds	Chalcedony	0.3	13.39	10.34	2.37	-	-	-
50G	lr-1	ds	Chert	0.5	17.05	13.84	1.92	-	-	-
51G	lr-1	ds	Flattop Chert	1.3	25.12	18.56	4.65	-	-	-
52G	lr-1	ds	Quartzite	1.1	19.21	16.29	4.53	-	-	-
54G	lr-1	ds	Quartzite	0.7	25.62	10.65	3.35	-	-	-
55G	lr-1	ds	Chalcedony	0.8	22.04	14.37	2.65	-	-	-
56G	lr-1	ds	Chert	0.6	15	11.96	3.9	-	-	-
57G	lr-1	ds	Pawnee Grasslands Quartzite	0.4	13.32	11.85	2.54	-	-	-
59G	lr-1	ds	Chert	0.4	17.86	9.59	9.97	-	-	-
60G	lr-1	ds	Chalcedony	0.3	10.1	11.44	2.49	-	-	-
61G	lr-1	ds	Chert	0.2	9.43	1.4	1.86	-	-	-
63G	n/a	ds	Chalcedony	0.5	17.75	10.89	2.82	-	-	-
64G	lr-1	ds	Chert	0.3	16.32	9.96	2.65	-	-	-
65G	lr-1	ds	Chalcedony	0.4	12.05	12.52	3.1	-	-	-
66G	lr-1	ds	Chalcedony	0.1	7.11	6.09	2.11	-	-	-
67G	LR-1		Middle Park Chert		25.03	13.3	2.33	-	-	-
68G	lr-1	ds	Chalcedony	0.4	13.28	13.08	2.44	-	-	-
70G	lr-1	ds	Chert	0.5	12.55	12.74	7.28	-	-	-
71G	lr-1	ds	Chalcedony	0.4	14.38	11.68	2.86	-	-	-
72G	lr-1	ds	Quartzite	0.6	18.51	14.2	2.65	-	-	-

Projectile point data from the Weinmeister collection continued.

Artifact Number	*Weinmeister Number*	*Portion*	*Raw Material*	*Mass*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thick (mm)*	*Shoulder Width (mm)*	*Neck Width (mm)*	*Base Width (mm)*
73G	lr-1	ds	Petrified Wood	1.6	26.14	14.25	4.29	-	-	-
74G	lr-1	ds	Chalcedony	0.2	12.67	9.86	2.74	-	-	-
75G	lr-1	ds	Chert	0.7	12.87	14.22	4.03	-	-	-
76G	n/a	ds	Chert	0.1	7.82	11.46	2.66	-	-	-
77G	lr-1	ds	Chert	6.5	44.87	24.02	8.7	-	-	-
78G	lr-1	ds	Chalcedony	0.5	13.48	13.09	2.96	-	-	-
80G	lr-1	ds	Chalcedony	0.4	16.27	14.55	1.8	-	-	-
82G	lr-1	ds	Chert	0.3	12.37	11.87	2.14	-	-	-
83G	lr-1	ds	Chert	0.4	12.58	11.72	2.85	-	-	-
84G	lr-1	ds	Chert	0.2	11.57	10.51	2.56	-	-	-
85G	lr-1	pr	Chert	0.4	7.69	11.34	3.33	-	9.25	11.34
86G	lr-1	pr	Chalcedony	0.4	12.94	10.01	2.41	-	-	-
87G	lr-1	ms	Chalcedony	0.1	8.01	10.82	2.19	-	-	-
88G	lr-1	ms	Chert	0.6	15.48	12.63	2.47	-	-	-
89G	lr-1	ms	Chalcedony	1.2	15.75	12.65	4.33	-	-	-
90G	lr-1	ms	Quartzite	1.3	17.59	15.95	4.11	-	-	-
91G	lr-1	ms	Chert	0.2	7.9	12.7	2.57	-	-	-
92G	lr-1	ms	Chert	0.8	13.66	14.59	3.61	-	-	-
93G	lr-1	ds	Chert	0.3	8.57	12.07	2.71	-	-	-
94G	289	co	Chert		20.4	20	5.6	20	17.2	18.5
95G	15	pr	Quartzite		15	12.3	2.8	12.3	6.5	7.3
96G	97	pr	Chert		23.4	20.5	5.2	19.9	12.3	20.5
97G	104	abc	Barger Gulch Chert		22.2	11	2.9	10.6	7.4	-

Projectile point data from the Weinmeister collection continued.

Artifact Number	*Weinmeister Number*	*Portion*	*Raw Material*	*Mass*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thick (mm)*	*Shoulder Width (mm)*	*Neck Width (mm)*	*Base Width (mm)*
98G	67	co	Chert		16.5	16	4.8	16	12.3	14.2
99G	lr-1	pr	Chert		14.4	7.5	3.8	9999	9999	14.4
100G	lr-1	ms	Quartzite		23.3	20.6	5.9	22	14.3	9999

Projectile point data from the Weinmeister site, continued.

Artifact Number	*Weinmeister Number*	*Stem Ht (mm)*	*Blade Ht (mm)*	*Mx Blade Cutting Length (mm)*	*Typology*
01Bead	n/a	-	-	-	Plains Corner Notch
01D	546	5.04	9.11	10.07	Plains Corner Notch
01G	-	4.75	19.07	17.64	unknown
02Bead	-	-	-	-	Plains Corner Notch
02D	423	9	20.45	21.01	Plains Side Notch/knife (nick notched category from MM/Oeskeso
02G	579	6.22	15.77	19.05	Plains Corner Notch
03G	578	4.72	15.34	16.64	Foothills Corner Notch
04G	571	8.43	10.229	10.8	Unknown
05D	631	5.22	6.4	7.22	Plains Corner Notch
06G	lr-1	-	-	-	-
07D	466	4.77	25.38	25.4	Plains Corner Notch
07G	lr-1	4.77	-	-	Plains Corner Notch
08D	493	9.49	18.09	20.34	Plains corner Notch
08G	lr-1	5.95	-	-	Plains Side Notch

Projectile point data from the Weinmeister site, continued.

Artifact Number	*Weinmeister Number*	*Stem Ht (mm)*	*Blade Ht (mm)*	*Mx Blade Cutting Length (mm)*	*Typology*
09D	41	5.93	14.19	15.52	Plains Corner Notch
09G	lr-1	7.45	-	-	Plains Corner Notch
10G	lr-1	20.2	-	-	Plains Corner Notch
11D	400	9.5	13.94	15.57	Plains Corner Notch
11G	lr-1	7.66	-	-	Plains Corner Notch
12D	492	7.25	24.47	24.78	Plains Side Notch/knife (nick notched category from MM/centennial
13D	n/a	9999	21.65	23.47	Foothill Corner Notch
13G	lr-1	9.97	-	-	Plains Corner Notch
14D	322	4.25	10.39	14.05	Plains Corner Notch
14G	lr-1	4.85	-	-	Plains Corner Notch
15D	35	5.8	12.79	13.13	Plains Side Notch/something
15G	lr-1	7.42	-	-	Plains Side Notch
16D	433	4.57	20.68	23.01	Foothill Corner Notch
17D	441	5.63	19.59	24.4	Plains Corner Notch
19D	112	8.2	25.88	30.01	Pelican Lake/LoDaiska K MM20
19G	lr-1	7.02	-	-	McKean Shouldered (4600-3500)
20D	33	5.46	29.19	34.15	Plains Corner Notch
21D	54	5.32	20.64	25.48	Plains Corner Notch
21G	lr-1	-	-	-	Plains Corner Notch
22D	124	4.02	17.25	20.2	Foothill Corner Notch
22G	lr-1	-	-	-	-
23G	lr-1	-	-	-	Foothill Corner Notch
24D	434	3.93	10.81	16.32	Plains Corner Notch

Projectile point data from the Weinmeister site, continued.

Artifact Number	*Weinmeister Number*	*Stem Ht (mm)*	*Blade Ht (mm)*	*Mx Blade Cutting Length (mm)*	*Typology*
24G	lr-1	6.83	-	-	Unknown
25D	478	6	18.81	19.48	Plains Corner Notch
26D	547	3.16	8.35	7.13	Plains Corner Notch
26G	lr-1	4.77	9.91	11.9	Plains Corner Notch
27D	lr-1	-	-	-	Foothill Corner Notch
27G	lr-1	8.79	-	-	Plains Corner Notch
28D	556	-	16.85	20.38	Foothill Corner Notch
28G	lr-1	5.22	-	-	n/a
29D	53	4.88	11.07	11.58	Plains Side Notch/something
29G	lr-1	-	-	-	unknown
30G	lr-1	4.93	-	-	unknown
31D	353	-	-	-	n/a
31G	n/a	4.56	-	-	Plains Corner Notch
32D	32	7.02	20.6	22.09	Plains Corner Notch
32G	lr-1	5.65	-	-	Plains Corner Notch
33D	494	7.75	12.19	26.26	Wray/Calf Creek
33G	lr-1	7.54	-	-	Plains Corner Notch
34D	489	6.48	23.28	25.84	Plains Corner Notch
35D	lr-1	-	-	-	-
35G	lr-1	-	-	-	-
36D	147	5.7	15.38	-	Foothill Corner Notch
36G	lr-1	4.6	-	-	Plains Corner Notch
37D	287	5.84	18.55	20.39	Foothill Corner Notch

Projectile point data from the Weinmeister site, continued.

Artifact Number	*Weinmeister Number*	*Stem Ht (mm)*	*Blade Ht (mm)*	*Mx Blade Cutting Length (mm)*	*Typology*
37G	n/a	-	-	-	-
38D	103	3.69	12.55	13.78	Plains Corner Notch
38G	5	-	-	-	-
39D	34	5.37	11.28	12.23	Plains Corner Notch
39G	lr-1	-	-	-	-
40G	lr-1	-	-	-	Plains Corner Notch
41G	lr-1	-	-	-	Unknown
42G	lr-1	-	24.87	25.6	unknown
43D	n/a	4.92	21.42	21.89	Foothill Corner Notch
43G	lr-1	-	-	-	Foothill Corner Notch
45D	426	10.42	21.31	22.43	Plains Corner Notch
46G	185	-	-	-	-
47G	lr-1	-	-	-	-
48G	lr-1	-	-	-	-
49G	lr-1	-	-	-	-
50G	lr-1	-	-	-	Plains Corner Notch
51G	lr-1	-	-	-	-
52G	lr-1	-	-	-	-
54G	lr-1	-	-	-	Plains Corner Notch
55G	lr-1	-	19.91	22.56	Plains Corner Notch
56G	lr-1	-	-	-	-
57G	lr-1	-	-	-	-
59G	lr-1	-	-	-	-

Projectile point data from the Weinmeister site, continued.

Artifact Number	Weinmeister Number	Stem Ht (mm)	Blade Ht (mm)	Mx Blade Cutting Length (mm)	Typology
60G	lr-1	-	-	-	-
61G	lr-1	-	-	-	-
63G	n/a	-	-	-	-
64G	lr-1	-	-	-	-
65G	lr-1	-	-	-	-
66G	lr-1	-	-	-	-
67G	LR-1	-	-	-	-
68G	lr-1	-	-	-	-
70G	lr-1	-	-	-	-
71G	lr-1	-	-	-	-
72G	lr-1	-	-	-	-
73G	lr-1	-	-	-	-
74G	lr-1	-	-	-	-
75G	lr-1	-	-	-	-
76G	n/a	-	-	-	-
77G	lr-1	-	-	45.07	Plains Corner Notch
78G	lr-1	-	-	-	-
80G	lr-1	-	-	-	-
82G	lr-1	-	-	-	-
83G	lr-1	-	-	-	-
84G	lr-1	-	-	-	-
85G	lr-1	-	-	-	-
86G	lr-1	7.45	2.87	-	Plains Corner Notch
87G	lr-1	-	-	-	-

Projectile point data from the Weinmeister site, continued.

Artifact Number	*Weinmeister Number*	*Stem Ht (mm)*	*Blade Ht (mm)*	*Mx Blade Cutting Length (mm)*	*Typology*
88G	lr-1	-	-	-	-
89G	lr-1	-	-	-	-
90G	lr-1	-	-	-	-
91G	lr-1	-	-	-	-
92G	lr-1	-	-	-	-
93G	lr-1	-	-	-	-
94G	289	5.8	13	16.7	Plains Side Notch
95G	15	5.3	-	-	Plains Corner Notch
96G	97	8.8	-	-	Unknown
97G	104	5.4	15.9	16.3	Plains side Notch
98G	67	6.3	10.5	-	Plains Side Notch
99G	lr-1	-	-	-	Plains Corner Notch
100G	lr-1	-	-	-	-

Projectile point raw material source data.

Artifact Number	*Weinmeister Number*	*Raw Material Source*	*Justification*	*Location*	*Benedicts Description*
19 D	112	Barger Gulch	Clear/Translucent with black starburst inclusions, yellowish hue in the translucent base color	Middle Park, Colorado	Outcrop of white chert caps a hill (ca 1/4 - 1/2 mile south of main road. The chert forms stringers and lenses in a limestone deposit. Some internal surfaces have yellow coatings. Celegans grows on the outcrop. The Colo. R. is in view to the N., at the opening of the gulch. Between here and the river are spectacular sagebrush covered high terraces. The top of the mesa is flat and extensive, with lots of workshop debris and tools, some of yellow and brown cherts and moss agates. The moss agate is probably local (a few unwroked flakes were found-their scarcity prob. due to rock collectors). No quarry pits were seen.
3 G	578	Barger Gulch	Clear/Translucent with black starburst inclusions, yellowish hue in the translucent base color	Middle Park, Colorado	Outcrop of white chert caps a hill (ca 1/4 - 1/2 mile south of main road. The chert forms stringers and lenses in a limestone deposit. Some internal surfaces have yellow coatings. Celegans grows on the outcrop. The Colo. R. is in view to the N., at the opening of the gulch. Between here and the river are spectacular sagebrush covered high terraces. The top of the mesa is flat and extensive, with lots of workshop debris and tools, some of yellow and brown cherts and moss agates. The moss agate is probably local (a few unwroked flakes were found-their scarcity prob. due to rock collectors). No quarry pits were seen.
14 G	none	Barger Gulch	Clear/Translucent with black starburst inclusions, yellowish hue in the translucent base color	Middle Park, Colorado	-

Projectile point raw material source data, continued.

Artifact Number	*Weinmeister Number*	*Raw Material Source*	*Justification*	*Location*	*Benedicts Description*
97G	104	Barger Gulch	Clear/Translucent with black starburst inclusions, yellowish hue in the translucent base color	Middle Park, Colorado	-
7G	LR-1	Barger Gulch (?)	Dark Tan with black wavy lines	Middle Park, Colorado	-
2 G	597	Buffalo Peaks Chert	purplish with faded blue	NE Colorado, near Sterling	-
51 G	LR-1	Flattop Chert	purplish with faded blue	NE Colorado, near Sterling	-
65G	LR-1	Flattop Chert	purplish with faded blue	NE Colorado, Near Sterling	-
23G	-	Flattop Chert	Purplish with faded blue	NE Colorado, Near Sterling	-
13 D	none	Hartville Uplift Chert	very smooth, opaque plum colored	Guernsey Wyoming	-
20 D	33	Kremmling Chert	White and cream colored, opaque chert with small amount of white dendrictic inclusions	Kremmiling Chert, N. Side of Little Wolford Mountain, Middle Park, Grand County Colorado	-

Projectile Point raw material source data, continued.

Artifact Number	*Weinmeister Number*	*Raw Material Source*	*Justification*	*Location*	*Benedicts Description*
28 D	556	Kremmling Chert	White and cream colored, opaque chert with small amount of black dendrictic inclusions	Kremmiling Chert, N. Side of Little Wolford Mountain, Middle Park, Grand County Colorado	-
67G	LR-1	Middle Park Alluvial Deposits/williams Fork Res.	yellowish tan with darker orange fading within the stone	Middle Park, Colorado	Collected by Jim Benedict and Ken Marr from Middle Park Alluvium - Hot Sulpher Springs and Williams Fork Res.
57G	LR-1	Pawnee Grasslands Quartzite	Light tan/yellow very fine crystals	Quartzites from Alluvium, identified by Bendict as Dakota Quartzite	-
9D	LR-1	Pawnee Grasslands Quartzite	Light Tan/Yellow, very large crystals	Quartzites from Alluvium	-
73 G	LR -1 '75	Petrified Wood, southern Denver?	Orange, fades to red in color	Colorado HWY 83 at Cherry Creek, Southern Denver?	-

Projectile point raw material source data continued.

Artifact Number	*Weinmeister Number*	*Raw Material Source*	*Justification*	*Location*	*Benedicts Description*
36 D	147	Unidentified Chert, Grand County/Table Mountain?	Orange, Brown and red with clear, thin lines running through the rock	Hill South of 5GA157, Grand County, Colorado	-
21G	LR-1	Windy Ridge Quartzite	pinkish/rose with fine-medium grain quartzite crystals	North of Lily Lake, Middle Park	-
35G	LR-1	Windy Ridge Quartzite	Tan/Yellow with darker (greyish) undertone, medium to large crystals with	North of Lily Lake, Middle Park	-
37G	none	Windy Ridge Quartzite	pinkish/rose with fine-medium grain quartzite crystals	North of Lily Lake, Middle Park	-
8G	LR-1	Windy Ridge Quartzite	Tan/Yellow with darker (greyish) undertone, medium to large crystals with	North of Lily Lake, Middle Park	-
29D	LR1-53	Petrified Wood, southern Denver?	Orange, brown with clear, thin lines running through the rock indictive of once living material	Colorado HWY 83 at Cherry Creek, Southern Denver?	-
32D	LR1-33	Petrified Wood, southern Denver?	Orange mixed with very dark brown, parallel lines	Colorado HWY 83 at Cherry Creek, Southern Denver?	-

Biface data from the Weinmeister Collection.

Artifact Number	*Weinmeister Number*	*Portion*	*Max. Length (mm)*	*Max. Width (mm)*	*Max. Thickness (mm)*	*Raw Material*	*Color*
1	lr-1	complete	42.4	26.1	9.3	Chalcedony	grey/white
3	lr-1	distal	19.2	22.6	5.8	Quartzite	grey
4	lr-1	distal	21.5	21.2	8.5	Chert	brown/white/grey
7	480	complete	68	43.5	9	Chert	white/yellow
8	lr-1	complete	42.5	23.4	10	Quartzite	grey
9	lr-1	proximal	27.1	24.5	5.5	Chalcedony	dark grey
10	479	complete	35	26.4	7.7	Chert	red
11	312	complete	30.5	26	6	Chert	grey
12	none	complete	3.1	18.2	7.8	Chert	red
13	lr-1 P	midsection	30.2	27.1	7.7	Quartzite	grey with orange
14	LR-1	distal	21.8	17.5	4.9	Quartzite	orange
15	LR-1	proximal	16.4	13.5	5.2	Chert	red
16	LR-1	complete	38.6	29.7	13.6	Chalcedony	white
17	LR-1	proximal	19.8	18.2	3.5	Chert	red
18	lr-1	proximal	13.5	13.3	3	Chalcedony	translucent
19	lr-1	midsection	21	14.1	5.6	Chert	white
20	lr-1	distal	26.3	13.1	4.9	Chalcedony	white
21	lr-1	midsection	16	15.7	6.8	Petrified Wood	tan/red
22	lr-1	proximal	13.2	12.3	2.4	Quartz	clear
23	lr-1	proximal	16.4	11.4	3.8	Petrified Wood	tan
24	186	midsection	16	22.2	6.7	Chert	brown
25	lr-1	proximal	40.2	13.8	8.9	Quartzite	grey
26	lr-1	midsection	15.8	12.8	5.6	Chert	pink
27	lr-1	proximal	7.6	9.3	4.5	Chalcedony	translucent
Total							*24*

Knife data from the Weinmeister Collection.

Artifact Number	*Weinmeister Number*	*Portion*	*Raw Material*	*Mass*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thickness (mm)*
03D	92	co	Quartzite	9.4	40.77	36.01	7.35
05G	-	abc	Quartzite	4.1	31.45	19.69	6.6
41D	481	ds	Chert	3.7	27.14	18.24	7.18
44G	-	ds	Chalcedony	2.4	26.32	21.86	5.04
45G	-	ds	Quartzite	3	27.52	18.71	5.72
53G	-	ds	Quartzite	1.9	22.11	16.32	6.46
62G	-	ds	Chalcedony	0.8	23.32	17.21	3.76
79G	-	ds	Quartzite	1.2	18.9	14	4.69
4D	376	complete	Quartzite	-	80.1	32.2	7.6
5	lr-1	distal	Chalcedony	-	35.8	30.4	9.2
6	lr-1	distal	Quartzite	-	53.7	37.6	6.4
2	427	complete	Chert	-	79.8	34.1	9.1
6D	495	complete	Quartzite	-	-	-	-
						Total	*13*

Preform data from the Weinmeister Collection.

Artifact Number	*Weinmeister Number*	*Portion*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thickness (mm)*	*Raw Material*
1	262	complete	27.9	19.4	4.9	chert
2	lr-1	proximal	26.5	21.5	4.1	chalcedony
3	467	complete	20.9	17.2	3.7	chert
4	-	proximal	24.4	21.3	5.4	chert
10D	548	complete	22.48	15.51	3.48	quartzite
12G	lr-1	proximal	21.17	21.02	4.37	chalcedony
16G	lr-1	midsection	16.92	15.16	4.12	quartzite
20G	lr-1	proximal	11.97	13.02	3.3	chalcedony
23D	111	complete	18.51	13.56	2.32	quartzite
25G	lr-1	proximal	15.61	14.78	2.67	chalcedony
34G	lr-1	proximal	13.13	10.49	2.61	chert
40D	4	complete	32.72	16.18	6.83	quartzite
42D	358	complete	31.52	20.28	5.01	chalcedony
44D	425	complete	28.09	19.37	5.36	chalcedony
69G	lr-1	lateral	20.27	11.85	2.75	chalcedony
81G	-	lateral	23.57	23.43	5.06	chalcedony
17G	lr-1	proximal	18.83	12.35	2.57	chalcedony
18G	lr-1	proximal	18.49	17.35	4.66	chalcedony
20	328	complete	41.3	18.7	7.8	chert
21	lr-1	complete	24.4	19.6	4.7	chalcedony
22	lr-1 '74	proximal	23.4	25.1	6	quartzite
23	125	proximal	19.6	15.1	3.1	quartzite

Preform data from the Weinmeister Collection, continued.

Artifact Number	*Weinmeister Number*	*Portion*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thickness (mm)*	*Raw Material*
25	lr-1	lateral	23	12.3	2	chert
26	424	complete	21.8	14.8	2.8	chert
58G	LR-1	distal	16.76	16.74	2.13	chert
					Total	*26*

Scraper data from the Weinmeister collection.

Artifact Number	*Weinmeister Number*	*Portion*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thickness (mm)*	*Raw Material*	*Color*	*Type of Scraper*
1	lr-1	co	37	26.7	9.9	chert	brown	end
2	lr-1-A	co	34.4	25.7	8.8	chert	tan/with red	end
3	lr-1	co	25.3	22.1	5.3	chert	orange/tan	end and side
4	lr - 1	co	37.3	29.5	11.5	chert	tan	end
5	lr-1 '85	co	36.9	25.5	9.1	chalcedony	purple	end
6	lr-1 Field	co	34.7	25.5	12	chert	mauve and white	end and side
7	lr-1	co	32.2	28.3	8.3	quartzite	beige	end
8	lr-1	co	44.4	26.5	9.7	chert	grey	end
9	Lr-1 EP	distal	21	13.2	6	chalcedony	grey	end
10	lr-1 94	distal	16.7	14.7	4.2	chalcedony	grey	end
11	lr-1	distal	19	12	3.1	chert	red	end
12	lr-1	lateral	26.9	19.5	5.9	chalcedony	pink	end and side
13	lr-1	distal	32.5	15.8	6.4	chalcedony	purple	end and side
14	lr-1	distal	25.5	19.7	6.6	chalcedony	white	end
							Total	*14*

Drill data from the Weinmeister collection.

Artifact Number	*Weinmeister Number*	*Portion*	*Raw Material*	*Mx. length (mm)*	*Mx. Width (mm)*	*Mx. Thickness (mm)*	*Shoulder Width (mm)*	*Drill Width (mm)*	*Drill Height (mm)*
1	LR-1	pr	chert	21.2	19.7	5.2	16.9	6.1	5.8
18D	-	co	quartzite	41.49	14.71	5.37	9999	9999	9999
30D	LR-432	abc	chalcedony	22.38	18.4	3.89	n/a	6.8	7.7
6D	LR-1-466	co	quartzite	41.4	15.3	4.9	15.3	6.3	7
								Total	*4*

Retouched flake data from the Weinmeister Collection.

Artifact Number	*Weinmeister Number*	*Portion*	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thickness (mm)*	*Raw Material*	*Color*	*Location of Retouch*
4	lr-1	ds	16.9	10.9	2.7	chalcedony	translucent	bimarginal
7	lr-1-P	ds	26.4	22.8	6.4	chalcedony	pink	bimarginal
8	lr-1	ds	26.5	14.2	6.5	chalcedony	brown/red	bimarginal
3	lr-1	ds	17.5	12.5	2.2	chalcedony	clear	unimarginal
11	lr-1	ds	18.5	12.5	3.9	chalcedony	grey/red	unimarginal
12	lr-1	co	36.6	30.1	6.9	chalcedony	translucent/brown	unimarginal
1	n/a	ds	16.5	16	3.6	chert	brown	bimarginal
5	lr-1	ds	16.5	16.1	1.9	chert	black	bimarginal
9	lr-1	pr	25.8	16.6	4	chert	dark brown	unimarginal
2	lr-1	ds	16.9	12.3	1.8	Pet wood	tan	bimarginal
6	lr-1-P	ds	1.51	10.9	3.7	quartz	clear	bimarginal
10	lr-1 '66	ds	31.7	14.9	5.2	quartzite	red/pink	unimarginal
							Total	*12*

Flake data from the Weinmeister Collection.

Artifact Number	*Weinmiester Number*	*Portion*	*Max Length (mm)*	*Max Width (mm)*	*Max Thickness (mm)*	*Raw Material*	*Color*
1	lr-1	co	48	25	4.7	quartzite	tan
2	lr-1	co	58.2	36.3	9	quartzite	tan
3	lr-1	ds	13.1	2.5	1.8	chert	red
4	lr-1	ds	17.9	14.7	5.2	chert	tan
5	lr-1	ds	30.6	22.2	5	quartzite	red/tan
6	lr-1	co	26.8	25.9	3.3	quartzite	grey
7	lr-1	co	20.9	20.5	3.6	chert	tan
8	none	co	11.3	6.9	2	chalcedony	clear and black
9	none	co	20.8	18.4	8.3	quartzite	tan
10	none	ds	27.5	26	5.8	chert	red
11	none	ds	20.8	13.9	2.3	quartzite	tan
12	none	co	12.5	9	2.3	chert	white
13	none	co	6	4.3	1.6	chalcedony	clear
14	none	co	17.3	7.6	1.7	chert	white
15	lr-1	co	13.3	10.3	1.9	chert	red
16	none	co	9.2	8.9	2.8	chalcedony	clear
17	none	co	6.6	6	1.3	quartzite	grey
18	none	n/a	n/a	n/a	n/a	chalcedony	clear
19	lr-1	co	27.5	18.6	7.9	chalcedony	grey
20	lr-1	co	28.1	23.1	6.9	chert	tan
21	lr-1	ds	13	12.5	4.2	chalcedony	black and clear
22	none	ds	24.8	20.3	4.3	chert	white

Flake data from the Weinmeister Collection, continued.

Artifact Number	*Weinmiester Number*	*Portion*	*Max Length*	*Max Width*	*Max Thickness*	*Raw Material*	*Color*
23	lr-1	ds	28.5	1.54	6.4	quartzite	brown
24	none	co	21.5	15.9	3.4	chert	red
25	none	ds	26.7	14.8	4.7	chert	tan
26	lr-1	ds	25.2	13.4	4.9	chert	white
27	none	ms	19.2	13.9	5.5	quartz	smoky
28	lr-1	ds	15.8	15.2	4.5	pet wood	brown
29	none	ds	17.1	9.9	2.1	chert	tan
30	none	pr	12.6	11.2	2.2	pet wood	brown
31	lr-1	shatter	17.3	8.3	6.1	quartz	clear
32	lr-1	ds	13.5	8.8	2.4	chert	white
						Total	32

Groundstone artifact data from the Weinmeister Collection.

Artifact Type	*Artifact Number*	*Weinmeister Number*	*Mx. Length*	*Mx. Width*	*Mx. Thickness*
Atlatl Weight	1	442	78mm	20.4mm	13.7mm
Groundstone/Pallette	2	LR-1	46.6mm	36.2mm	10mm
Large Metate	3	-	25.5cm	17.3cm	5cm

Ceramic artifact data from the Weinmeister Collection.

Artifact Number	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thickness (mm)*	*Portion*
LR1-01	35.8	22.4	7.2	Body
LR1-02	39.8	41.4	7.3	Base
LR1-03	41.3	26.2	6.3	Body
LR1-04	27.4	21.5	6.1	Body
LR1-05	13.6	10.5	4.7	Body
LR1-06	43.1	29	6.5	Body
LR1-07	21	18.4	6.8	Body
LR1-08	28.7	25.9	5.7	Body
LR1-09	27.7	20	13.3	Body
LR1-10	26.5	19.8	4.6	Body
LR1-11	23.2	19.2	6.4	Body
LR1-12	23.1	25.5	8	Rim
LR1-13	35.4	25	6.4	Body
LR1-14	31.1	21.8	7.4	Body
LR1-15	28.3	18.3	5.7	Body
LR1-16	19.1	16.5	5.2	Rim
LR1-17	22.6	17.4	6.8	Body
LR1-18	13.43	9.51	3.81	Body
LR1-19	19.38	16.61	6.05	Body
LR1-20	30.31	23.65	5.27	Body
LR1-21	10.74	10.18	3.84	Body
LR1-22	48.67	42.2	6.31	Body
LR1-23	40.42	26.76	6.73	Body
LR1-24	40.28	24.94	6.3	Rim
LR1-25	100.77	65.63	5.64	Rim & Body
LR1-26	23.28	19.51	4.41	Rim
LR1-27	32.61	24.56	7.13	Rim
LR1-28	72.59	41.25	6.31	Rim & Body
LR1-29	35.69	29.07	6.72	Rim
LR1-30	36.98	25.08	7.76	Body
LR1-31	29.04	24.58	7.23	Body
LR1-32	28.48	20.04	6.5	Body
LR1-33	21.78	16.59	7.56	Body
LR1-34	23.84	17.45	6.48	Body
LR1-35	28.4	21.92	6.33	Body
LR1-36	23.34	16.78	8.12	Body
LR1-37	26.46	18.98	5.28	Rim
LR1-38	20.91	16.38	7.33	Body

Ceramic artifact data from the Weinmeister Collection, continued.

Artifact Number	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thickness (mm)*	*Portion*
LR1-39	26.31	15.82	6.55	Body
LR1-40	19.69	18.84	5.69	Body
LR1-41	22.82	16.59	8.82	Body
LR1-42	25.75	14.45	7.63	Body
LR1-43	19.44	16.45	5.2	Body
LR1-44	27.08	18.69	4.87	Body
LR1-45	28.53	21.29	7.4	Body
LR1-46	26.51	21.64	5.97	Body
LR1-47	25.85	17.27	8.76	Body
LR1-48	21.98	18.52	7.6	Body
LR1-49	21.92	17.15	6.82	Body
LR1-50	23.62	19.93	6.13	Body
LR1-51	24.9	17.71	4.43	Body
LR1-52	20.4	18.8	5.6	Body
LR1-53	18.4	15.9	6.3	Body
LR1-54	21.2	16.4	6.9	Body
LR1-55	20.9	16.5	4.9	Body
LR1-56	20.1	14.8	4.2	Body
LR1-57	25.4	22.4	7.3	Body
LR1-58	23	18.4	6.1	Body
LR1-59	21.5	12	6.8	body/base
LR1-60	13.6	13.4	5.9	Body
LR1-61	20.1	20	7.2	Body
LR1-62	28.9	23.1	5.9	Body
LR1-63	15.7	14.2	6.5	Body
LR1-64	18.2	15.7	4.9	Body
LR1-65	19.1	13.3	4.2	Body
LR1-66	19.6	12.3	7.1	body/base
LR1-67	17.3	16.1	4.5	body/base
LR1-68	12.7	14.4	6.1	Body
LR1-69	18.2	13.5	5	Body
LR1-70	17.2	15.3	6.1	Body
LR1-71	16.3	10.8	5.8	Body
LR1-72	12.7	11.1	4.9	Body
LR1-73	14	14.8	7.8	Body
LR1-74	14.1	10	7.5	Body
LR1-75	16.8	9.5	5.7	Body
LR1-76	16.2	14.1	5.6	Body
LR1-77	12.9	10.6	5.3	Body
LR1-78	13	12.2	5.4	Body

Ceramic artifact data from the Weinmeister Collection, continued.

Artifact Number	*Mx. Length (mm)*	*Mx. Width (mm)*	*Mx. Thickness (mm)*	*Portion*
LR1-79	15.6	16.2	5	Body
LR1-80	15.8	13.5	6	Body
LR1-81	19.6	11.7	6	Body
LR1-82	17.9	10.9	5.4	Body/base
LR1-83	8.4	8.6	4.8	Body/base
LR1-84	30.27	23.28	5.61	Body
			Total	84