THESIS

HOW THE PAST CAN BE PRESENT FOR OUR FUTURE: ARCHAEOLOGICAL INTERPRETATION FOR THE PUBLIC, THE LINDENMEIER FOLSOM SITE IN NORTHERN COLORADO

Submitted by

Erin M. Parks

Department of Anthropology

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Master's Committee:

Department Head: Kathleen Sherman

Advisor: Jason M. LaBelle

Lawrence C. Todd
Alan Bright

ABSTRACT OF THESIS

HOW THE PAST CAN BE PRESENT FOR OUR FUTURE:
ARCHAEOLOGICAL INTERPRETATION FOR THE PUBLIC,
THE LINDENMEIER FOLSOM SITE IN NORTHERN COLORADO

The Lindenmeier site is a significant Paleoindian prehistoric site located north of Fort Collins, Colorado in Larimer County. Lindenmeier was discovered in 1924 by Judge C.C. Coffin and later surveyed and excavated beginning in 1934 by Frank H.H. Roberts, Jr. and the Smithsonian Institution (Roberts 1936). The site uncovered thousands of lithic materials dating to the Folsom period that included 468 known Folsom projectile points (Ambler 1999; Gantt 2002; Wilmsen and Roberts 1978). The private ranch Lindenmeier is located on was purchased by the City of Fort Collins Natural Areas Program. Lindenmeier is now part of the Soapstone Prairie Natural Area and open to the public.

Developing an appropriate cultural resource interpretation is essential because Lindenmeier is now open to the public. The opening of Lindenmeier created a necessary examination of other Late Pleistocene and Early Holocene interpretive sites within the Great Plains region. I examined six sites for this analysis: Lubbock Lake Landmark in Lubbock, Texas; Hudson-Meng near Crawford, Nebraska; the Mammoth site in Hot Springs, South Dakota; Blackwater Draw near Clovis, New Mexico; Pine Bluffs

Windows on the Past Interpretive Center and Museum in Pine Bluffs, Wyoming; and Murray Springs near Sierra Vista, Arizona. Each of these six sites were visited and documented by examining three topics: archaeology, visitation, and public interpretation. Examination of archaeology at each site focused on the information visitors are receiving about the archaeological record and archaeological methods at the sites. The examination of archaeology provides a framework for public programs of the site. Second, visitation explores the type of people visiting the site, the reasons people are visiting, what types of facilities are offered to visitors, and site integrity and security. Examining visitation helps determine the logistics of management approach to the interpretation. Third, public interpretation analyzes how information is presented to visitors. Public interpretation includes educational materials such as brochures, interpretive panels, interpretive trails, and exhibits. Public interpretation also covers how the site is funded, associations with organizations, and how information is presented.

The results of archaeology, visitation, and public interpretation analysis from the six sites are compared and contrasted. The results of that analysis are then used to make ideal recommendations for the cultural resource interpretation of Lindenmeier. Overall, examining interpretive sites dating to the Late Pleistocene and Early Holocene period in the Great Plains region will provide the best model for Lindenmeier's interpretation.

Erin M. Parks
Department of Anthropology
Colorado State University
Fort Collins, CO 80523
Fall 2010

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The idea for this thesis came about after spending a summer doing field work at Lindenmeier and the surrounding Soapstone Prairie Natural Area and Red Mountain Open Space. The idea that people were soon going to visit Lindenmeier excited me. I started wondering how anyone would be able to tell people who are not archaeologists how important Lindenmeier is in prehistory. This got me thinking about public interpretation and how much I love sharing the information I learn with people. This thesis is the best combination of my love for archaeology and teaching!

I have had endless support in my endeavors from so many people who mean a lot to me. First, thank you Dr. Jason LaBelle for your continual guidance and support – especially through my slight detours along the way. Thank you to the people who helped me with my research; Dr. Alan Bright, Dr. Larry Agenbroad, Dr. George Crawford, Dr. Eileen Johnson, Dr. Charles Reher, Jim Mahoney, Sharon McLain, Sara Millward, Deborah Bigness, and Sharilee Counce. Thank you Dr. Mica Glantz for your support, ideas, and adventure! To the many professors who have helped me and guided me along the way, especially Dr. Lawrence Todd who began my quest in archaeology, thank you. Thank you to Dr. Nicole Branton, Robyn Watkins-Morris, David Blackstun, and Angie Krall for their support and the great opportunities you have given me to start my career. Thank you to the Karen S. Greiner Endowment and the Alice Hamilton Scholarship Fund for their support in my research. Thank you to all of my fellow graduate students for

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CHAPTER 1

INTRODUCTION

The purpose of this thesis is to research how public interpretation is conducted and presented at "Ice Age" archaeological sites dating to the Late Pleistocene and Early Holocene periods in North America. For this, I examined a sample of Late Pleistocene and Early Holocene archaeological sites currently interpreted for the public. This sample provides an ideal base to suggest interpretation for the Lindenmeier Folsom site, a Paleoindian hunter-gatherer site and National Historic Landmark recently opened to the public and located in Larimer County, Colorado.

In general, public interpretation is important for defining our heritage and determining what we as a community value and respect about the peoples of the past. Public interpretation gives researchers a chance to share information they have gathered about past human lifeways. Interpretation combines data and statistics to tell a story about the struggles and accomplishments people experienced in the past. The general public is fascinated with artifacts and evidence of how people lived thousands of years ago. An up close and personal view of a Folsom point or piece of Puebloan pottery gives people a physical object that can start their imagination and get them thinking about history. This information is also important because once people understand the significance of preserving and learning about the past, they will then be inspired to protect and value archaeology and their community even more.

Figure 1. Visitors listen while a guide leads a tour of the Mammoth Site, South Dakota.

The goal of my thesis research was to examine three topics while visiting several other archaeological sites dating to the Late Pleistocene and Early Holocene periods in the American Great Plains and Southwest. The three topics I examined included Archaeology, Visitation, and Public Interpretation.

First, archaeology focuses on what information visitors are receiving about the archaeological record and archaeological methods. For instance, what is the main message presented, in terms of the Ice Age hunter-gatherers that inhabited the site. In additional, archaeology includes the research focus of the site in question. The research focus is important to understand because it essentially forms the "bones" of the

interpretation (pun intended), providing the framework for the public program related to the site.

Second, the topic of visitation covers what types of people are visiting the site, the reasons people are visiting, and what types of facilities are offered for the visitors. Visitation includes site protection, security and integrity. Visitation is important to understand because it drives the management approach to the interpretation. Knowing why people are coming to the site and how many people to expect helps organize information presentation in a functional way.

Third, the topic of public interpretation is the largest topic examined because it includes information on the forms of interpretation presented to visitors. Public interpretation includes informational brochures, interpretive trails, interpretive exhibits, and educational programs. In addition, public interpretation covers site funding, associations with organizations, how the site was chosen for interpretation, and how the interpretation is presented. The public interpretation portion is important because it is the overall outcome of interpretation at the site. The overall outcome includes the mediums used to present information and how well the site is functioning. Public interpretation was the largest of the three subjects because it contained the most content and had the most variation between sites.

Overall, archaeology, visitation, and public interpretation were chosen to get a detailed look at other regional Ice Age sites to determine what is working in their interpretation and what needs improvement. Many sites had the same types of data to offer and drew similar types of visitors, but the way interpretation was presented is what set sites apart from one another.

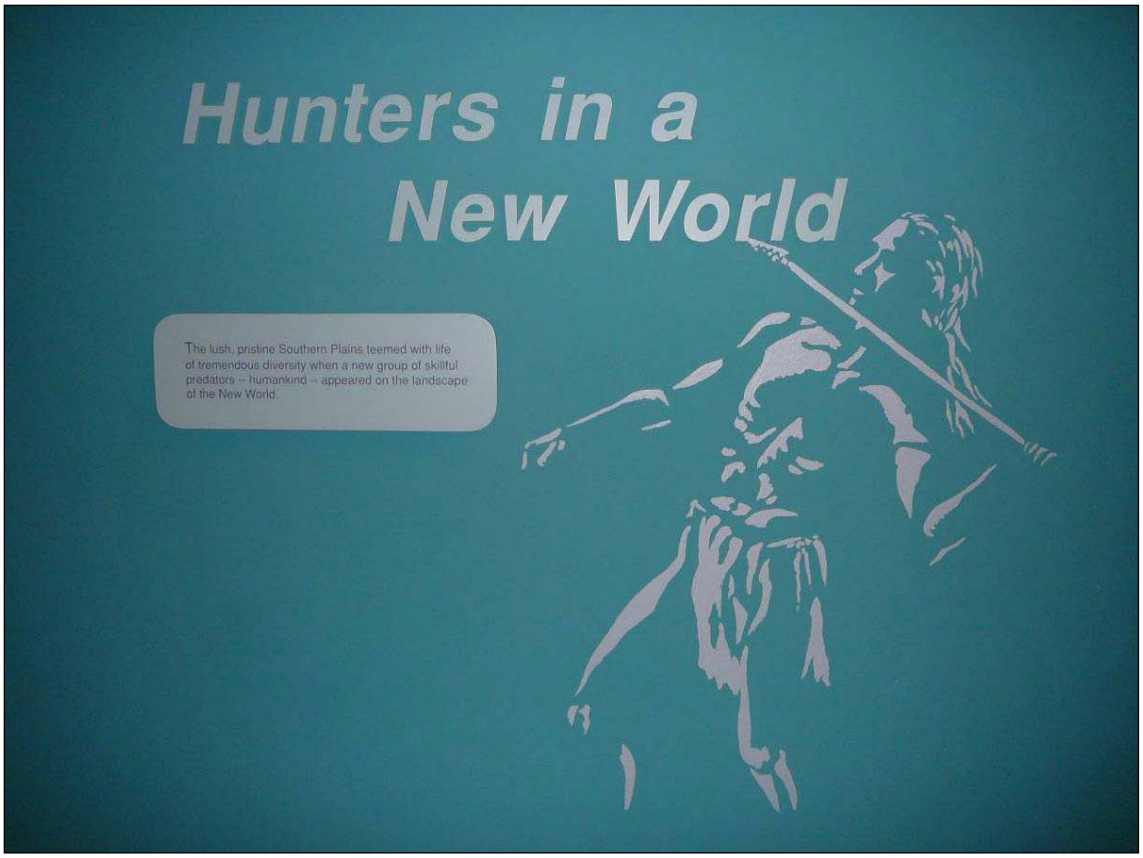

Figure 2. "Hunters in a New World" display at the Lubbock Lake Landmark, Texas.

I visited six Late Pleistocene and Early Holocene archaeological sites interpreted for the public. First, I visited Blackwater Draw in New Mexico, the type site for the Clovis period. Second, I visited Lubbock Lake Landmark in Texas, a multicomponent site dating from the Clovis period through the historic period. Third, I visited Murray Springs in Arizona, a Clovis camp and kill site containing mammoth remains. Next, I visited Hudson-Meng in Nebraska, a large bison bonebed with evidence of the Alberta Paleoindian period. Further, I visited the High Plains Museum and Windows on the Past Interpretive Center in Wyoming, a multicomponent site dating from the Paleoindian through historic period. Finally, the sixth site I visited is the Mammoth site in South Dakota, a paleontological site containing numerous mammoth remains, none of which are

associated with human activities. I chose these six sites for their Late Pleistocene and Early Holocene significance and location throughout the Great Plains. This provided a diverse sample from the region. The information collected from these site visits provided a foundation to base my recommendations for the Lindenmeier site in northern Larimer County.

During my research, I learned the components of good interpretation and how to effectively interpret Ice Age sites for the public. Each of the sites visited were organized in different ways and offered distinct information to their visitors. By observing the variation in site interpretation, I was able to ascertain the strengths of some sites and the weaknesses of others. For example, some sites provided an abundance of information in the form of "raw" data while others used a variety of creative and hands-on projects such as atlatl throwing, flintknapping, and mock digs. I was able to determine the expectation of public visitation to Lindenmeier, which archaeological aspects of Lindenmeier should be interpreted, and what the most effective and desired forms of interpretation would be for the Lindenmeier site. Essentially, archaeology is a fun and exciting subject to visitors and researchers alike. Keeping a balance between factual data and creative narrative in the interpretation of an Ice Age site is most effective to the public. In this way, peoples' minds are stimulated and entertained while still learning new information.

The following chapters explore public interpretation in-depth, describing observations and exploring conclusions. Chapter two, Methods and Theory, describes the steps taken to collect and process data, how the discipline of public interpretation developed, and what makes the Lindenmeier site important enough to interpret for the public. In Chapter three, Background, each of the six research sites are described with

their history and significance. Chapter four, Archaeology, explores what was observed about the archaeology from each of the sites. In Chapter five, Visitation, the who, why, and when of visitation is examined by determining who visits the site, why they visit, and when they visit. Chapter six, Public Interpretation, looks at the foundation of the interpretive program and assesses the interpretation, content, and delivery. Finally, in Chapter seven, conclusions and recommendations for Lindenmeier are presented by compiling and synthesizing data and discussing future public interpretation of the Lindenmeier Folsom site.

CHAPTER 2

METHODS AND THEORY

Initially, this project began by examining Late Pleistocene and Early Holocene interpretive sites located in the Great Plains and Southwest. I determined it would be most effective to examine sites spread throughout the region to gain the most variation in information. This led to the selection of six comparable sites: 1) Lubbock Lake Landmark; 2) Hudson-Meng; 3) The Mammoth site; 4) Blackwater Draw; 5) the High Plains Museum and Windows on the Past Interpretive Site; and 6) Murray Springs.

Questions were then developed based on three sub-topics: Archaeology, Visitation, and Public Interpretation. Within each of these sub-topics, I developed questions to ask during each site tour to ensure I was documenting the same information for each visit. I also developed questions to ask each manager/director of the site to gain better insight of the development and maintenance of the site (see Appendix I).

Questions Examined For This Thesis

Archaeology

The goal of this section is to determine the main idea about the archaeology that is presented and what information is given. Each of the sites visited are significant archaeological or paleontological resources that give researchers an important glimpse into the past. Analyzing what information is given about the archaeology, and what

interpreters most want visitors to understand, helps determine some of the main goals for interpretation of the site.

Questions:

- How much information is given about the archaeology? (General archaeology or specific details?)
- Does the interpretation describe the landscape at the time of site occupation (paleo-environmental reconstruction)?
- Are people visiting the site strictly to learn about the archaeology or do they also come to enjoy the natural environment?
- What is it about hunter-gatherers or Paleoindians that interpreters want the public to understand?

Figure 3. The bison bonebed at the Hudson-Meng site, Nebraska.

Visitation

The goal of this section is to determine the amount and types of people visiting and how the site caters to visitors. Understanding the audience is important to manage the site appropriately as well as provide facilities and programs that fit visitors' needs. Site protection and integrity fall under visitation because it is essential that the site is not compromised while being open to the public. Overall, evaluating and analyzing the visitation of a site is important.

Questions:

- What are the major types of built environments? Does the interpretation incorporate the built environment into the natural landscape?
- What steps are taken to ensure site integrity and security? What problems, if any, are there with vandalism or looting?
- How do people hear about the site? Are people coming on vacation or on educational tours?
- How many people visit each year? What are the peak seasons for visitation? What is the visitor demographic?
- Are there any estimates of tourism dollars or effects on the local economy?

Figure 4. Children participate in a mock excavation at the Mammoth Site, South Dakota.

Public Interpretation

The goal of this section is to determine how information is presented to visitors and how the site is funded. This covers not only interpretive displays but also educational programs and interpretation themes. It is crucial when deciding to interpret a site to determine how a site is funded and if there will be any association with museums or universities. Overall, it is valuable to research the types of interpretation that work best.

Questions:

- How many brochures does the site have?
- How many interpretive panels are presented?
- How long are the interpretive trails?
- What are the major themes of the interpretation? Do my ideas of the themes match the sites' goals or expectations? (Are the sites successful in conveying their educational message?)
- Are their educational materials geared towards specific age groups?
- Are people encouraged to come up with their own interpretation based on information or are visitors 'told' how to think? On a scale from 1 to 5, what is the focus of archaeological interpretation, ranging between factual data and storytelling?
- How was this site chosen as an archaeological interpretive site? When was it decided to make the site an interpretive site?
- Have there been any changes in interpretation over time? If so, what was the cause of change?

- How is the site funded?
- If the site is associated with a university or museum, what is the relationship?

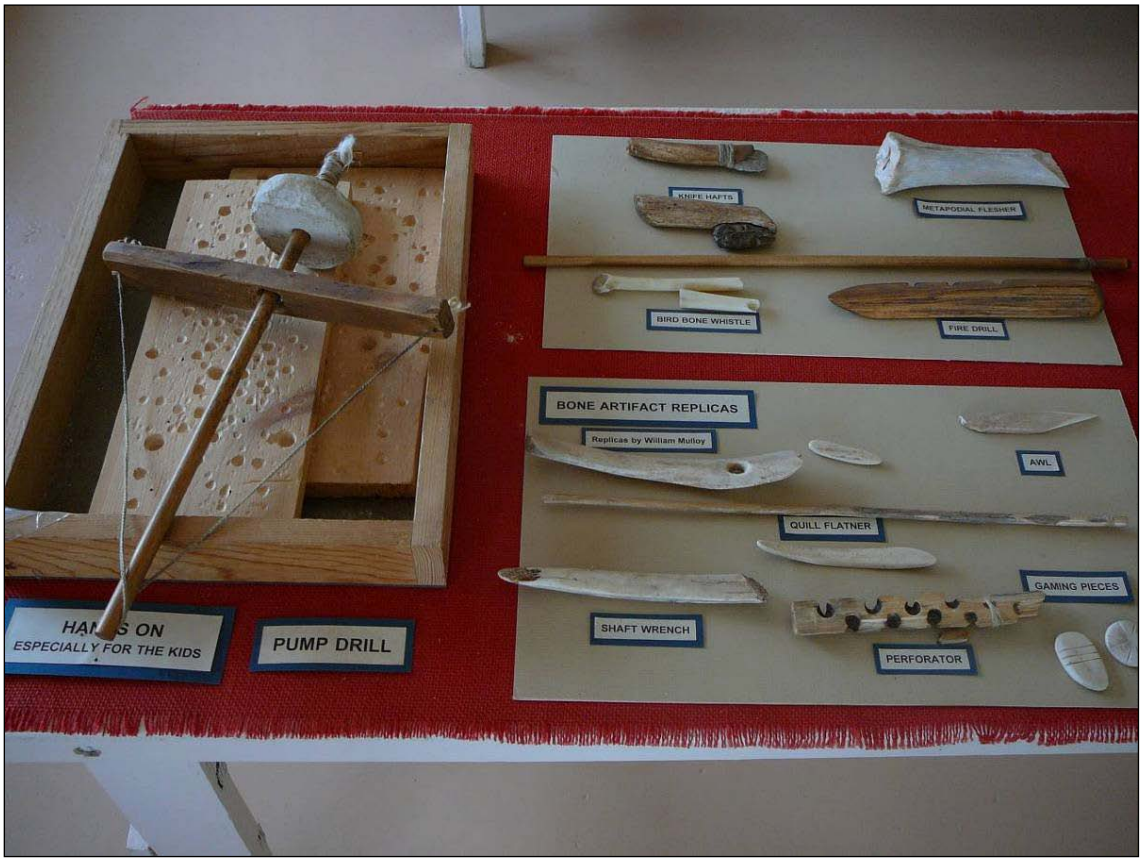

Figure 5. Hands-on display explaining tool function at the Pine Bluffs Museum, Wyoming.

Data Collection Methods

During the site visits, I documented my observations as I walked through, taking notes and answering the questions I had developed. I also took pictures of each interpretive sign, display case, building, and trail. This ensured that each site was observed in the same way and the same information was gathered from each.

Documenting enabled me to look at the photographs later and compare and contrast the sites.

Interviewing the manager or director of each site enabled the collection of additional information that would not be available to the public. This included information about the organizations goals, facility operations, and visitation statistics. Personnel interviews were recorded with a digital voice recorder, supplemented by notes. These interviews lasted anywhere between 20 and 40 minutes in length. A participant consent form was agreed upon and signed before each interview, describing what the interview was for and ensuring consent to participate in the interview. At the Lubbock Lake Landmark, I interviewed Dr. Eileen Johnson, Director of Lubbock Lake Landmark, Curator of Anthropology at the Museum of Texas Tech University, and Professor of Museum Science at Texas Tech University. I phone interviewed Deborah Bigness, Manager of Site Operations from Lubbock Lake, about site visitation. For Hudson-Meng and the Mammoth site I interviewed Dr. Larry Agenbroad, the Director of the Mammoth Site and a researcher at the Hudson-Meng site. I phone interviewed Sharilee Counce, Forest Archaeologist for the Nebraska National Forests and Grasslands, about Hudson-Meng as well. At the Mammoth Site, I interviewed Sharon McLain, Elementary Educator. At the Blackwater Draw Site and Museum I interviewed George Crawford, Site Archaeologist, and graduate student Sara Millward. At Pine Bluffs Windows on the Past Interpretive Site and Museum, I interviewed Dr. Charles Reher, the site and museum Director. Finally, at the Murray Springs site, I interviewed James Mahoney, the Outdoor Recreation Specialist for the Gila District, Bureau of Land Management office.

In processing the data collected from each site, I compiled the answers to each question, reviewed each photograph, and formalized my notes. After all of the information was organized, I systematically compared each question for each of the visited sites. This enabled me to see the similarities and differences between sites.

Methods of Public Interpretation

Public interpretation of archaeological sites has been going on throughout the world for centuries. We have a fascination with the people who came before us and how life was different then. "Every great teacher has been an interpreter" (Tilden 2007:26). However, natural resource interpretation largely formalized the discipline of "on-site" cultural interpretation. In the late 19th century, heritage interpretation became the profession of Enos Mills, often referred to as the "Father of Heritage Interpretation" and one of the largest proponents in the formation of Rocky Mountain National Park (Merriman and Brochu 2006:9). Nearly simultaneously, the creation of the National Park Service and the United States Department of Agriculture (USDA) Forest Service also served as avenues for the growth of the interpretation profession (Merriman and Brochu 2006:13). For example, Freeman Tilden became a significant figure in the development of public interpretation in the 1950s, with the creation of the six principles that are still being used today (Tilden 2007:18). These six principals are:

> "1. Any interpretation that does no somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.
> 2. Information, as such, is not interpretation. Interpretation is revelation base upon information. But they are entirely different things. However, all interpretation includes information.

> 3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical, or architectural. Any art is in some degree teachable.
> 4. The chief aim of interpretation is not instruction, but provocation.
> 5. Interpretation should aim to resent a whole rather than a part and must address itself to the whole man rather than any phase.
> 6. Interpretation addressed to children (say, up to the age of twelve) should not be a dilution of the presentations to adults but should follow a fundamentally different approach. To be at its best it will require a separate program." (Tilden 2007:34-35)

All of these people and organizations have helped the field of interpretation grow into what it is today through principals and guidance.

Cultural resource interpretation is extremely important not only for archaeologists and researchers but also for the public. The most widely used and effective ways of preserving and protecting cultural resources is to inform the public. Archaeology's "most positive conservation measures remain the improvement of the general level of public knowledge about archaeology and the demonstration of the benefits of archaeology to society" (Pokotylo and Guppy 1999:414-415).

Figure 6. "It is Illegal to Dig or Remove Anything", Murray Springs, Arizona. Sign placed at site to discourage visitors from disturbing the site.

Much of the heritage interpretation in place today is through the efforts of the National Association for Interpretation, the National Park Service and other organizations (i.e. Universities, museums, and federal organizations). Today, there are numerous books, journals, and websites that offer information about creating and managing cultural interpretation. Many of these books, journals, and websites document and describe interpretation done at historic sites such as battlefields, cliff dwellings, and historic towns. Heritage interpretation organizations do extremely well at interpreting the larger and more visual historic sites. Organizations offer resources on how to find additional information, give site tours, and use the information gathered at the site as a teaching tool

in the classroom. Archaeological sites containing structures and visual remains are very easily interpreted for the public because visitors can physically "see" evidence of past lifeways in the form of architecture. However, heritage sites having limited visual features, or those that are still partially buried, are much more difficult to interpret for the public. Most Ice Age hunter-gatherer sites examined in this study have relatively little "visual" content to provide visitors, but the sites remain extremely important avenues for exploring prehistory. Heritage sites offer a wealth of knowledge and can be truly fascinating, but require a more creative approach to interpretation. The research in this thesis contributes to the discipline of public and cultural interpretation. Synthesizing how public interpretation has been done at Ice Age sites throughout the Great Plains, as well as determining which aspects are most effective, provides the basis for public interpretation of archaeological sites of this period and lifeway.

CHAPTER 3

BACKGROUND OF SITES

Each of the archaeological sites I chose for examination is a significant Late Pleistocene and Early Holocene site. These sites are some of the earliest examples of human history on the North American continent. They consist of the remains of extinct megafauna, ancient stone tools, and hard to imagine lifeways. I examine the Lindenmeier site to better illustrate its significance and why it is important to be interpreted for the public.

The Paleoindian Period

The Paleoindian, Late Pleistocene and Early Holocene period in prehistory is fascinating and sets itself apart from any other period. Extinct megafauna such as mammoth, bison, and camel coexisted with humans in North America and these sites prove it. Interest in archaeology and the antiquity of man in North America began in the early eighteenth century with Thomas Jefferson (Wilmsen 1965: 174) and continued into the mid nineteenth century with the publication of Darwin and Wallace's theory of evolution (Wilmsen 1965: 176). In the late nineteenth century, W.H. Holmes and Ales Hrdlicka fueled most of the controversy surrounding the idea of man having existing on the North American continent since the Pleistocene and possibly even earlier (Dixon 1999:1; Wilmsen 1965: 178, 179). Holmes and Hrdlicka dominated the field of

archaeology for nearly 40 years and dismissed many site publications by other archaeologists on potential Paleolithic faunal remains associated with lithic materials (Meltzer 1983: 37; Wilmsen 1965: 179). In 1925, with the discovery of the Folsom site in New Mexico, people began to accept that man was present during the Pleistocene in North America (Dixon 1999: 4; Meltzer 1983: 33-34, 2006: 35; Wilmsen 1965: 180). Acceptance came from artifacts that were reliable with the context was intact. In addition, extinct bison bones were directly associated with the artifacts (Meltzer 2006: 40). The Folsom site was the first of its type discovered but was closely followed by the discovery of Lindenmeier (Dixon 1999: 5-6). This period is not only fascinating because it encompasses a period so drastically different than the one we recognize today, but also because of the controversy and history of the early developments of archaeology in North America.

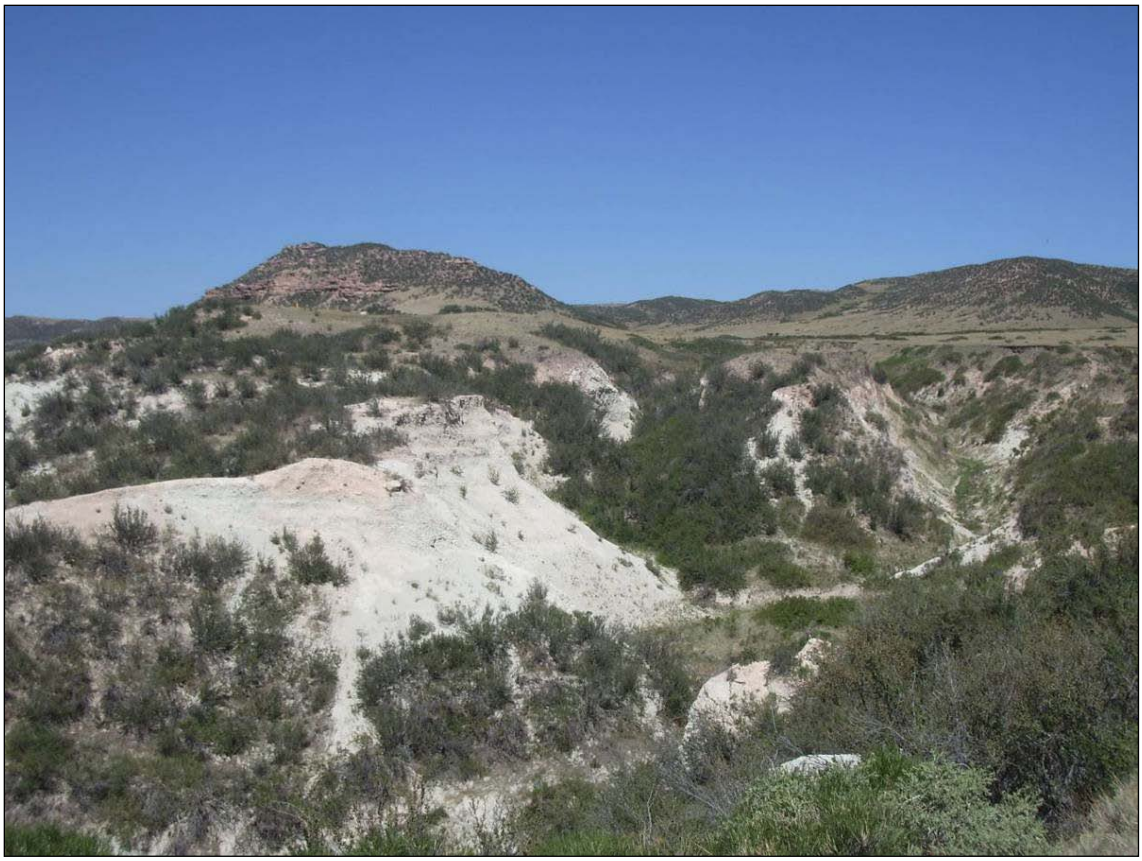

Figure 7. Lindenmeier Folsom site, a National Historic Landmark in Larimer County, Colorado.

Lindenmeier

Lindenmeier is a Paleoindian archaeological site located north of Fort Collins, Colorado. It contains hundreds of Folsom projectile points, processing tools, beads, and bison bone. Lindenmeier dates to around 10,600 radiocarbon years before present (RCYBP). Calibrated, 10,600 RCYBP dates to between 12,886 and 12,434 B.P. (Haynes 1992:91; Fiedel 1999:103; Gantt 2002:1). It was initially discovered in 1924 by Judge C. C. Coffin and his son A. L. Coffin, and later surveyed and excavated beginning in 1934 by Frank H.H. Roberts, Jr. and the Smithsonian Institution (Roberts 1936:338). The site was excavated from 1934 to 1940 by Roberts, who published an initial report on the

findings in 1935 and yearly field progress reports until 1941 (Wilmsen and Roberts 1978:xii-xiv). The research and collections were finally curated in 1964 at the Department of Anthropology, United States National Museum, and it became evident how truly significant these collections are (Wilmsen and Roberts 1978:xii). In 1966, Edwin Wilmsen received permission to continue research on excavated materials from Lindenmeier. At this time he estimated 85% of the materials had been unanalyzed (Wilmsen and Roberts 1978:xiii).

The most recent research on artifacts from the Lindenmeier site includes the analysis of the Roy Coffin family collection by Bridget M. Ambler in 1999. This collection was donated to the Fort Collins Museum by the Coffin family. Additionally, research by Erik M. Gantt was conducted on an anonymous private Coffin collection in 2002. In 2004, the City of Fort Collins Natural Areas Program purchased Soapstone Prairie Natural Area (City of Fort Collins Natural Areas Program 2007:3). Additional archaeological survey and inventory was conducted by Colorado State University and Southern Methodist University in 2006 and continued by Colorado State University from 2006 to the present (City of Fort Collins Natural Areas Program 2007:2). During these surveys and inventories, Lindenmeier was additionally surveyed and documented.

Field excavations from 1934 to 1940 resulted in the excavation of over 1800 square meters through trenches and excavation blocks (Wilmsen and Roberts 1978:16). In addition to the major excavation, 23 test pits were excavated in various areas of the site (Wilmsen and Roberts 1978:16). These excavations produced over 5478 cataloged artifacts as well as an estimated 48,380 flakes (Wilmsen and Roberts 1978:16). Significant artifacts include choppers, bone artifacts, and worked hematite and ochre

artifacts (Wilmsen and Roberts 1978:16). An estimated 10-20,000 faunal remains were recovered during excavation from 1934 to 1940, of which only a sample were collected (Wilmsen and Roberts 1978:16).

Analysis of lithic materials from the Smithsonian collection concluded that artifacts dating to post-Folsom period included Scottsbluff, Eden, Alberta, possibly Goshen or James Allen, and Firstview as well as many Archaic points (LaBelle and Holen 2008:109). Few of these artifacts were retained or recorded well, because research objectives focused primarily on the Folsom materials at the time (Wilmsen and Roberts 1978:61-62). Artifacts from the Smithsonian collection, more specifically recorded from the Folsom period, include channel flakes and Folsom points themselves. There were a total of 948 channel flakes and 241 bifaces recorded from the Lindenmeier Site from 1934 to 1940 (Wilmsen and Roberts 1978:101). Projectile points discovered at Lindenmeier total 645 lanceolate points of which, 59 are fluted Folsom points, 184 are fluted point fragments, 79 are unfluted points, and 323 preforms and preform fragments (Wilmsen and Roberts 1978:102). In addition, 20 fluted Folsom points were found on the surface, and over 150 are estimated to be in private collections (Wilmsen and Roberts 1978:102). To explain, from the Smithsonian collection alone, there were over 800 projectile points discovered in 1800 square meters of excavation.

Additional research by Ambler (1999:33, 35) documented 14 different types of stone tools including approximately 500 artifacts from the Coffin collection curated at the Fort Collins Museum. In Ambler's analysis, she identified 70 channel flakes, 129 scrapers, 8 gravers, 21 bifaces, and 20 fluted projectile points (Ambler 1999:41-76). Comparing the Smithsonian collection with the Coffin collection at the Fort Collins

Museum, some differences are noted. For instance, more projectile points are in the Smithsonian collection, but more end-side scrapers and channel flakes in the Coffin collection (Ambler 1999:86). Another artifact analysis was conducted by Gantt (2002) looking at the artifacts collected by the Coffin family and housed in an anonymous collection. A total of 160 channel flakes, 281 scrapers, 70 gravers, 77 bifaces, and 185 fluted projectile points are in this collection (Gantt 2002:82-117). Differences between artifact assemblages may come from different collection strategies, selective preference of artifacts donated to the museum by the Coffins, differences in artifact distribution, or lack of provenience data (Ambler 1999:35). In total, there were 468 known Fluted Folsom projectile points from the Lindenmeier site were collected by the Smithsonian Institute and the Coffin family.

Twelve species of fauna were identified at Lindenmeier, including 11 mammals and one reptile (Wilmsen and Roberts 1978:45). These species included box turtle, snowshoe hare, whitetail jack rabbit, black-tail prairie dog, gray wolf, coyote, red fox, swift fox, camel, pronghorn, white-tail deer, and long-horn bison (Wilmsen and Roberts 1978:46). Many of these specimens have tool marks and breakage indicating they were associated with the human occupation of the site. In addition, bone artifacts were found in significant numbers at the site. These bone artifacts include 18 fragments of bone needles, other bone perforators, a bone bead, and even decorated or carved bone pieces (Wilmsen and Roberts 1978:131-132).

Additional surface inventory of Lindenmeier conducted by Colorado State University in 2006 recovered burned bone, eight unifacial scrapers, seven bifaces or preforms, and six unifacial tools including gravers and unifacial knives (LaBelle and

Andrews 2007:149-150). Historic artifacts were also identified and correspond with areas where excavators camped during early work at Lindenmeier in the 1930s (LaBelle and Andrews 2007: 147). Work also included the construction of a current topographic map of Lindenmeier to enable the integration of past work with current work (LaBelle and Andrews 2007:147).

Clearly, the research and findings at Lindenmeier are substantial and significant. Lindenmeier represents the largest known Folsom camp site and considerably contributes to our knowledge of this period. Artifacts indicate that prehistoric peoples hunted and camped in the location of Lindenmeier, and elaborate on a deeper understanding of the Folsom culture. Prehistoric peoples practiced a generalized foraging subsistence economy, by taking advantage of bison, camel, pronghorn, rabbit, and other small vertebrates (Dixon 1999:226). The Lindenmeier site also demonstrates that hunter-gatherers were not just "primitive" people. They had and an elaborate culture shown through bone needles, beads, and decorative objects. Unique archaeological sites such as Lindenmeier fascinate researchers and the general public. Sharing the enthusiasm with everyone is not only beneficial, but rewarding. Interpreters and researchers benefit from sharing their research because they are able to express their theories about research and get the public interested about the past. New research and information further demonstrate the intelligence of prehistoric peoples. It is rewarding for researchers and the public to learn about people of the past, because the history is everyone's history to learn and become excited about.

Comparative Sites

Next, I examine the six sites used as examples of public interpretation of Ice Age sites in North America. I chose these sites for their age, content, significance, and location throughout the Great Plains. They offer a sample of interpretive sites from different states, management organizations, and levels of interpretation.

Figure 8. Bronze bison at the entrance of Lubbock Lake Landmark, Texas.

Lubbock Lake Landmark

The Lubbock Lake site is located in Lubbock, Texas and was discovered in 1936 during a project to locate water at a dried up reservoir. Excavations for the well uncovered a Folsom point (Johnson 1988:6-7). Archaeological excavations were first

conducted by Joe Ben Wheat in 1939 and sporadically continued off and on by other organizations until around 1984 with small excavations still occurring today (Johnson 1988:3, 7).

The site is most well known for the Paleoindian period, yet the site has yielded Clovis, Folsom, Plainview, and Firstview material as well as Early, Middle, and Late Archaic, Protohistoric and Historic period occupations (Johnson 1988:22-24). The portion of this site that is from the Clovis period has one Clovis projectile point, one unifacial tool, and one unifacial retouched flake tool (Johnson 1988:104). Also, the remains of fish, amphibians, reptiles, birds, and mammals such as grey wolf, fox, short-faced bear, mammoth, horse, camel, and bison have been found (Johnson 1988:50-63). These artifacts are located in a level covered by a weathered Pliocene bedrock or clay (Johnson 1988:22).

The Folsom level is thought to be a bison kill or butchering location based on artifacts and animal remains. A unifacial tool, a utilized flake, pounding cobbles and ten Folsom points are located in the Folsom level (Johnson 1988:105). Five of the Folsom points were preserved *in situ* and associated with extinct *Bison antiqus* (Johnson 1988:105). The fauna found within the Folsom level include fish, amphibians, reptiles, birds, and mammals including jackrabbit, coyote, gray wolf, antelope, and bison (Johnson 1988:50-63). The Folsom period at the Lubbock Lake site dates from 10,800 to 10,200 RCYBP (Johnson 1988:23).

The Plainview period dates 10,000 RCYBP and is located directly above the Folsom layer (Johnson 1988:23). This period is also thought to be a bison kill and butchering site with projectile points, knives, and flake tools (Johnson 1988:107). One of

the projectile points has serrated edges that might suggest different hunting techniques or the hunting and butchering of other types of fauna such as fish. The fauna associated with this period are fish, amphibians, reptiles, birds, and mammals including rabbits, rats, gray wolf, deer, antelope, and bison (Johnson 1988:50-63). An interesting jump in the number of species of fauna during this period occurs from the previous Folsom and Clovis periods.

The last Paleoindian period represented at Lubbock Lake is the Firstview period. This level occurs directly above the Plainview period and dates around 8,600 RCYBP (Johnson 1988:23). This period is not viewed as drastically different, but looking at the artifacts, there seems to be a slight difference between this period and those before it. Many more lithic tools including one projectile point, 26 tools, 7 cores, 35 utilized flakes, and 71 unmodified flakes are found here (Johnson 1988:109). Researchers determined this period had several activity areas and a small bison kill and butchering locale (Johnson 1988:109). Faunal remains include amphibians, reptiles, birds, and mammals, such as rabbits, mice, badger, bobcat, deer, antelope and bison although these occur in slightly lower numbers than the preceding periods (Johnson 1988:50-63). What sets this period apart from the other Paleoindian periods is evidence of a box turtle shell with incised lines along the inside surface and the presence of a broken bird-bone bead with lines that ring the tube around its circumference (Johnson 1988:111). The diverse activity areas, coupled with the recovery of decorated items, suggests that people during the Firstview period might have been staying at this location for a longer period than before.

The soil from stratum two is the level in which Folsom, Plainview, and Firstview occur. Paleoecological reconstruction suggests that during this time, the area was periodically covered in standing water and at times the water level was just below the surface (Johnson 1988:17). This might explain the presence and absence of certain animals at certain times such as fish.

The faunal record indicates evidence of fluctuations at 11,000 RCYBP and again at 8,500 RCYBP (Johnson 1988:88). Evidence of faunal remains is suggestive of climatic change and supports the theory that humans neither depleted nor altered resources or the environment at this location (Johnson 1988:88). Evidence of faunal remains help determine periods such as the shift from Paleoindian to Archaic. However, it seems the Firstview period acts as a transition period between Paleoindian and Archaic periods at this location.

Clearly, Lubbock Lake was important beginning 11,000 (RCYBP) years ago through the Paleoindian, Archaic, Protohistoric, and Historic periods. The stratigraphic integrity of this site provides a unique look at how humans, as well as flora and fauna, changed throughout time. The site was listed on the National Register of Historic Places and as a National Historic Landmark in 1977.

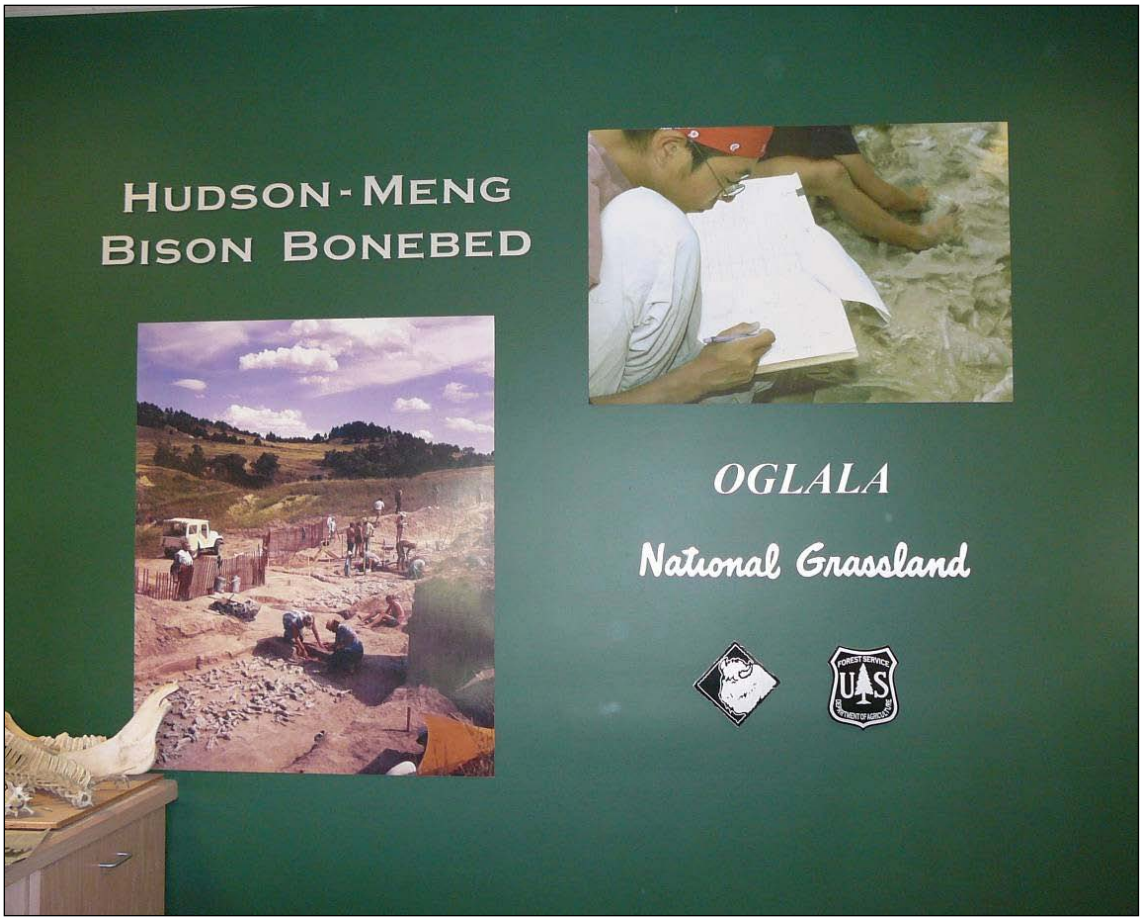

Figure 9. Entrance to Hudson-Meng bison bonebed, Nebraska.

Hudson-Meng

The Hudson-Meng site was first discovered in 1954 during the construction of a dam by the USDA Soil Conservation Service who uncovered bison bones (Agenbroad 1978:3). However, the site was not tested until 1967, when excavations began to determine the extent, era, and cultural association of the bonebed (Agenbroad 1978:5). The site was tested from 1968-70 and intensive excavations began in 1971 (Agenbroad 1978:5). In 1976, an Alberta projectile point made from Knife River flint was recovered from within the bison bonebed and indicated the site had a cultural component (Agenbroad 1978:5).

The initial theory by Agenbroad (1978:26) indicated the bonebed was a bison kill location where bison were driven over a nearby cliff, killed, and later butchered in the location of the bonebed. Agenbroad (1978:19) argues the bonebed represents several small events at the same time of year or one single event based on the thickness of the bonebed being no more than about two bones thick. According to Agenbroad, the bones have no indications of carnivore modification and only a few bones show worm burrowing or rodent gnawing indicating the bones were not exposed on the surface very long (Agenbroad 1978:20). Based on the bone count after the first few years of excavation, Agenbroad (1978:27) estimated over 600 bison were present in the bonebed. Based on dentition and the tooth eruption of the animals, it is estimated the death event is estimated to have occurred in the late fall (Agenbroad 1978:30).

The cultural materials include 20 projectile points or point fragments (Agenbroad 1978:67). Most of the tools were made from Knife River Flint, a source located 320 miles away (Agenbroad 1978:73). The projectile points are mainly Alberta points, but the assemblage also includes a Cody Knife, a few gravers, various expedient tools, and debitage. A charcoal sample taken from the site dates it to 9820 ± 120 RCYBP (Agenbroad 1978:137). Paleo-environmental data also indicates the area was considerably more moist during this period than the present day (Agenbroad 1978:117). Agenbroad finished his work in 1975 (Agenbroad 1978:133).

Excavations were renewed at Hudson-Meng in the early 1990s by Lawrence Todd with Colorado State University and Dave Rapson. Excavations at the Hudson-Meng site continued by Todd through the 1990s and ended in 1999 (Todd and Rapson 1998). Todd and Rapson's research indicated that the bison bonebed might have been

deposited naturally instead of through human action (Todd and Rapson 1999:493; USDA Forest Service 2000). It is argued that indicators identified by Agenbroad that the site was created through human action can be better explained by taphonomy (Todd and Rapson 1999:493). Two of the main points made by Agenbroad that indicated a human caused event were the absence or lack of skulls and phalanx indicating butchery, and the bonebed was a secondary butchery location with a bison jump nearby (Todd and Rapson 1999:488, 493). Todd and Rapson (1999:491) argue that the skulls and phalanx are few in numbers based on bone density and low survivorship of the bone through weathering, burial, and natural processes over time. Paleoenvironmental reconstruction of the paleosol through geomorphological characteristics, stratigraphy, and radiocarbon dating illustrate that there was no cliff to drive bison over, and thus no bison jump (Todd and Rapson 1999:485). Instead, Todd and Rapson (1999:493-494) suggest the site is the result of a catastrophic event occurring naturally such as a lighting storm or prairie fire. Excavations show the bison were tightly packed together and facing a similar direction at time of death, evident in bone density and articulation of the skeletons (Todd and Rapson 1999:493-494). Todd and Rapson argue that it is necessary to view bonebeds as a "mosaic" model verses an "artifact" model. A mosaic model means the bonebed is not a single act frozen in time, but rather a wide range of processes that have developed the bonebed over time (Todd and Rapson 1999:497).

These two opposing viewpoints have created controversy over the interpretation of the site and continue to intrigue visitors and researchers. This is a unique circumstance that invites visitors to look at the information presented and think critically about the two

theories. It also offers a vast area and subject matter for future research. The Hudson-Meng site is listed on the National Register of Historic Places.

Figure 10. Entrance to the Mammoth site, South Dakota.

Mammoth Site

The Mammoth Site of Hot Springs, South Dakota is a natural trap paleontological site containing Pleistocene fauna (Agenbroad et al. 1994:1). The site was discovered in 1974, when an earth mover was excavating the hill where the site is located for backfill (Agenbroad et al.1994:4). Agenbroad (et al. 1994:6) was in the area to begin excavations on the Hudson-Meng site in 1974 and went to look at the Mammoth site discovery. After determining the site was significant, he had a small crew map and stabilize the site before

it was back filled so proper excavation could take place the following summer (Agenbroad et al.1994:6). Small amounts of funding enabled a crew to work for a short time every summer for approximately 5 years (Agenbroad et al 1994:11). Then funding was acquired in 1982 to begin construction of a facility over the site. This facility allowed the site to be excavated continuously and not back filled after every field session (Agenbroad et al. 1994:11). The first part of the facility was completed in 1986. The second phase of the construction began in 1989 and included educational exhibits and a retail area (Agenbroad et al. 1994:14).

The Mammoth site was formed by a breccia pipe from a lava tube that filled with sediment and turned into a mud hole or sink hole fed by an artesian spring (Agenbroad et al. 1994:15-16). Mammoths and other animals would water at the spring and get trapped in the sink hole. "To date, 58 mammoths (55 Columbian and 3 Wooly) have been identified, along with the remains of a giant short-faced bear, camel, llama, prairie dog, wolf, fish, and numerous invertebrates" (The Mammoth Site 2010). Most of the mammoths are male and sub-adult to young adult in age (Agenbroad et al. 1994:370). Eighty percent of the mammoths were 10-29 years old at time of death, with the highest number in the 20-29 year-old age bracket (Agenbroad 1994:370). Based on sedimentary data, very few animals were trapped in the sink hole per year (or decade) over several hundred years of accumulation (Agenbroad et al. 1994:370). Dating bone collagen has given an average of ± 26,000 yr B.P. for the highest concentration of remains at the site (Agenbroad et al. 1994:27).

The Mammoth site is significant because it is the largest *in situ* depositional occurrence of mammoth in North America (Agenbroad et al. 1994:369). The site not

only contains mammoths, but other mammals, plants, fish, and amphibians too. This gives researchers, scientists and the interested public, a snapshot of what life was like over 25,000 years ago. The site was designated a National Natural Landmark in 1980.

Figure 11. Entrance to the Blackwater Draw archaeological site, New Mexico.

Blackwater Draw

The Blackwater Draw site is located in eastern New Mexico near the town of Clovis. It was discovered by Ridgely Whiteman in 1929 and Edward B. Howard started formally investigating in 1932 (Boldurian 1990:5). Gravel miners discovered a gravel bed containing bones and artifacts and the site was termed Blackwater Locality No. 1

(Boldurian 1990:4). Unfortunately, the investigations made by Howard and his team were not very tightly controlled, leading to improper documentation of many artifacts and bone associations (Boldurian 1990:7). The site went through several different investigators after 1936. Two investigations by J.L. Cotter and later E.H. Sellards, tried to document the stratigraphy and the artifact-fauna association. Documentation was difficult because gravel mining continued at the site through 1961 at a frightening pace and left very little of the stratigraphy or cultural remains intact (Hester 1972:8).

Initial excavations in the 1930's indicate that many faunal remains such as bison, carnivore, horse, and three mammoth remains were found. Two of the faunal remains had 22 artifacts associated *in situ* (Hester 1972:28). Documentation of artifacts and faunal remains *in situ* was very important because there was a significant controversy over the antiquity of man at this time. Excavations in the 1940s revealed twelve artifacts *in situ*, 66 total artifacts, and 213 vertebrate fossils (Hester 1972:33, 40). In the early 1950s, excavators ran into trouble with improper documentation of the artifacts recovered. Excavators uncovered 215 artifacts but had to disregard many of them because their provenience was unknown. Many excavations were completed by various people between 1950 and 1963. All of these excavations revealed different species of animals and many artifacts.

The Folsom complex is interesting at this site because they were able to determine there were two types of sites at Blackwater Draw, kill sites and camp sites (Hester 1972:118). "Apparent differences include greater frequency of gravers, projectile point bases, hammerstones, and cores in the campsite debris while kill sites feature flakes, projectile points, knives, and scrapers" (Hester 1972:119). 543 of 1,375 artifacts at the

site were considered to come from the Folsom period, 79 of which were projectile points (Hester 1972:119). Of the 79 projectile points, 65.4% are fluted. This indicates the diversity in Folsom projectile types because archaeologists tend to think that projectile points are only Folsom if they are fluted (Hester 1972:124). Other types of artifacts from the Folsom period include flakes, scrappers, gravers, knives, choppers, cores, and hammerstones (Hester 1972:124-134).

A great number of different vertebrate remains came from the stratified layers dating back to around 8,000 RCYBP based on species types (Hester 1972:148). Species include turtle, gray wolf, coyote, swift fox, saber-toothed cat, muskrat, camel, bison, horse, and mammoth (Hester 1972:148-163). Six of the ten excavated bison kills are from the Folsom period (Hester 1972:170). Bison remains from the Folsom period indicate that bison were a very large staple in the diet of the people and this locality was used more by Folsom cultures as a kill location then other cultures.

The Blackwater Draw site spans periods from Clovis to Archaic and has many associations of human tools with faunal remains. In particular the Folsom period represents over one third of the total artifact assemblage at the site. This Folsom artifact assemblage indicates that this site was used more often or more intensively during the Folsom period. The site was listed on the National Register of Historic Places in 1982 and designated a National Historic Landmark in 1961.

Figure 12. Windows on the Past Interpretive Site, Pine Bluffs, Wyoming.

High Plains Museum and Windows on the Past Interpretive Site

The Windows on the Past Interpretive Site and High Plains Museum is located in Pine Bluffs, Wyoming. The Interpretive Center and Museum are located in Pine Bluffs. Research presented at the site includes work the University of Wyoming has conducted in southeastern Wyoming, northeastern Colorado, and the southwestern panhandle of Nebraska. The site and museum are part of an ongoing research project called the High Plains Archaeological Project. This project began in 1977 and is a partnership with the University of Wyoming and the Town of Pine Bluffs (Reher, personal communication 2008). The High Plains Archaeological Project is a synthesis of 30 years of archaeological work, combined public education, and economic development (Reher,

personal communication 2008). The project research covers campsites, stone circle sites, rock shelters, bison kills, prehistoric and historic trails, and historic sites.

The Pine Bluffs archaeological site is a stratified locale dating 9,800 RCYBP to historic times of approximately 1910 A.D. (Reher, personal communication 2008). The site was always known as a historic trash dump, but construction of a drainage ditch along Interstate 80 revealed prehistoric cultural remains below the historic dump (Reher, personal communication 2008). Excavation began in 1977 and continues today. The construction of a building over the site has protected it, as well as enabling excavation in inclement weather, and allows visitors to view stratigraphy and cultural features at this site. High Plains Museum is located in the town of Pine Bluffs. The museum is only a few minutes from the interpretive center and houses artifacts recovered from the site. The museum displays artifacts and other exhibits for visitors. Continued research provides significant data about prehistoric and historic life on the High Plains. In summary, the High Plains Interpretive Site and Museum are located in an archaeological rich area.

Figure 13. Entrance sign at Murray Springs Clovis site, Arizona.

Murray Springs

The Murray Springs Clovis site is located in Sierra Vista, Arizona in the San Pedro River Valley. The site is the location of a Clovis period camp and kill location with remains of mammoth, horse, bison, and camel in association with Clovis points and other tools from this period. Excavation began in June 1966 under a National Geographic Society (NGS) emergency grant because part of the site was eroding and data would have been lost without the grant (Haynes et al. 2007:xiii). The site was funded by NGS from 1966 to 1971 when excavations ended (Haynes et al. 2007:xiii). Additional funding included grants from the University of Arizona Geography and Anthropology

Departments and the Arizona State Museum in Tucson (Haynes et al. 2007:xiii). The site was originally owned by a cattle ranching company and was exchanged to the Bureau of Land Management (BLM) in 1986 (Haynes et al. 2007:xiii-xiv). A volunteer group, Friends of the San Pedro, constructed gravel trails and pedestrian bridges through the site in 1990 (Haynes et al. 2007:xiv). The BLM put up interpretive signs along the path after 1990 (Haynes et al. 2007:xiv).

The site was exceptionally well preserved by the famous "black mat" or organic soil horizon which post-dates the site occupancy (Haynes et al. 2007:11). Artifacts recovered include 18 Clovis points, numerous scrapers, knives, and even a shaft wrench made of mammoth bone (Haynes et al. 2007:9, 13, 194). Site structure is so well preserved that lithic reduction areas occur with concentrations of debitage in piles (Haynes et al. 2007:9). Excavations revealed both a kill area and a camp area over 70 meters apart. The kill area and camp area are associated through an impact produced flake in the kill area and the matching impact flake scar on a Clovis point in the camp area (Haynes et al. 2007:12). Different areas of the site have been excavated and conclude that Areas one through five are areas where large herbivores including mammoths and bison were killed and processed (Haynes et al. 2007:84). This discovery indicates that there was one mammoth and 11 bison killed at Murray Springs (Haynes et al. 2007:217). Areas six and seven are associated hunting camps indicated by broken points, end scrapers, gravers, blades, and ground stone (Haynes et al. 2007:84, 155-167). The Murray Springs site dates to 10,850 RCYBP with a range of 10,900 to 9,800 RCYBP based on various forms of dating techniques (Haynes et al. 2007:239).

Overall, the Murray Springs Clovis site is significant because it is extremely well preserved and represents not only a kill site but an associated camp demonstrating the hunting of both mammoth and bison during the Clovis period.

Each of the six sites presented offer distinct slices of the prehistory of the Great Plains. Some sites are multicomponent, with large Paleoindian occupations, but later periods are often present. Others sites were only occupied for a single period and likely represent only a single occupation. Some presented sites are not archaeological sites but paleontological locales that offer different perspectives of this period without human influence. Lubbock Lake, Hudson-Meng, the Mammoth Site, Blackwater Draw, Pine Bluffs, and Murray Springs offer an excellent sample for analyzing interpretation and research within the region.

CHAPTER 4

ARCHAEOLOGY

This chapter discusses the results regarding archaeology and public interpretation. The archaeology component of this research focused on examining how archaeology is presented at each of the study sites. To begin my research, I started with questions I could answer through observation, taking a tour, and reading interpretive materials. I hoped to gain information about how much information was presented about archaeology. Examining how well the paleo-landscape was described is important in understanding if the past environment was a topic presented to the public.

During the interviews with site personnel, I was interested in learning if people were visiting for archaeology or for other interpretive materials such as natural resources. I was also hoping to learn what information about hunter-gatherers or Paleoindians the site personnel or interpreters most want their visitors to understand. From these questions, I was hoping to understand site interpreters' main goals about archaeology.

How much information is given about the archaeology?

The amount of archaeological information given to a visitor is an important attribute to assess at each interpretive site. Essentially, this is the reason why there is an interpretive site and why people are visiting the site. People are genuinely interested in archaeology, because they want to see what archaeologists do and what they discover.

Determining how much information is given to visitors is an indicator of the focus of site interpretation.

Figure 14. "Form and Function" exhibit at Lubbock Lake discussing different types of tools and their functions.

Lubbock Lake

Lubbock Lake offers a lot of information about the archaeology of the site including dioramas of native peoples, artifacts to look at, and history about the archaeology. The entire museum has displays describing the archaeological finds and what archaeology is telling us about the people of the past. The displays are set up to direct visitors on a walk "through time," beginning with the earliest periods and ending with the most recent. At the beginning of the exhibits, the history of the site's discovery

and excavation are explained. Visitors are led to the research lab to see how artifacts are processed. Visitors also get a chance to look at the excavation area and watch if any excavations are taking place.

Hudson-Meng

A moderate amount of information is given about the archaeology at Hudson-Meng. Information about the archaeology includes what excavation looks like and what was found at the site. The excavation itself is the centerpiece for site visitors. The building is constructed over the excavation area. Posters and panels are displayed discussing the archaeology as visitors walk around the site. Pamphlets are available for visitors touring the site while other reading materials are available for purchase in the site book store.

Mammoth Site

The Mammoth site offers a wealth of information about paleontology. This information includes viewing current excavation and looking at fossils discovered at the site. Details about the discovery, excavation, and results from analysis are described by tour guides and the informative panels around the building.

Blackwater Draw

A moderate amount of information is given about the archaeology at the Blackwater Draw site. Information about archaeology includes facts about different periods, explanations of how artifacts are created, how researchers date artifacts, and

what types of raw materials were used to make prehistoric tools. Interpretation also explains stratigraphy and what the stratigraphy shows archaeologists. Old photographs of early excavations and discoveries are displayed in the building and welcome center. Photos not only allow visitors to not only learn about the prehistory of the site, but also the history of the archaeological research.

Figure 15. Artifacts on display at the Pine Bluffs Museum.

Pine Bluffs

A large amount of information about the archaeology of the Pine Bluffs site is presented to the public, including displays of many different types of artifacts. General

information is given so visitors can gain broad knowledge of the site and its history. Then, if visitors are more interested, they can read more elaborate posters and displays that go into more depth.

Murray Springs

Interpretation at the Murray Springs site gives general information about the archaeology, but covers how the site was discovered, the types of animals present during that time period, and the types of prehistoric activities that occurred at the site. Interpretive panels along the trail provide information such as what artifacts were found at the site, how archaeologist read stratigraphy, and what the information can tell archaeologists about the past.

Generally, information about archaeology is a difficult topic to find equilibrium for visitors. Guests at interpretive sites are often given real data and research. The challenge is to present data and research so visitors understand the science and meaning behind the data. More archaeological information was presented than originally expected. Each site begins discussion of the archaeology by explaining chronology and stratigraphy, and how it is used to date artifacts and cultural levels. At all six sites, information is given about the artifacts discovered and how archaeologists are able to extrapolate information from the artifacts. Not only is archaeology discussed but the history of the archaeology is also mentioned. The history of the archaeology includes who discovered the site and what was initially found. Sites that focused on giving a lot of factual data seemed to be ones that were associated with a university; these included

Blackwater Draw, Lubbock Lake, and the High Plains Pine Bluffs site. High levels of factual data might be associated with the presence of academic research, students helping with the research and displays, or types of funding received. The Mammoth Site gives a lot of information about the paleontology. However, the information about paleontology is not quite as detailed as Blackwater Draw, Lubbock Lake, and the High Plains Pine Bluff Site. Murray Springs and Hudson-Meng offer a more general overview of the archaeology and do not give a lot of details about how the archaeology work was conducted, details about the artifacts, and who discovered the site and excavated it. Overall, each site does a good job of presenting factual data in a way that visitors can understand.

Does the interpretation describe the landscape at the time of site occupation?

Describing the paleoenvironment at the time of occupation is an important attribute that helps visitors understand the creation of the site and what life was like at the time of past human occupations. Some of the ways landscape can be reconstructed include dendrochronology, pollen, macrobotanical samples, microfauna, and soil profiles. This is beneficial to researchers because it enables them to more accurately theorize what the site was like thousands of years ago. It also helps to identify taphonomic processes that occurred on the site over time that lead to the formation of the site as it is today.

Lubbock Lake

The paleoenvironment is described to visitors in a way that gives them a better idea of the area at different times of occupation. People are told how the site was

discovered and why people continued to return to the site over time. The site also puts great emphasis on keeping the property free of invasive plants and as close to the natural (pre-European contact) environment as possible.

Figure 16. Interpretive sign along the path to the Hudson-Meng bison bonebed, explaining the paleoenvironment.

Hudson-Meng

The Hudson-Meng site briefly discusses the paleoenvironment. The site have a geologist and soil expert working on soil profiles in the drainage to get a better picture of past conditions. During visitor tours, interpretation describes the slope of the site and the

location of the bone bed along a meander of an old stream. Interpretation briefly touches on what the site looked like in the past, but did not elaborate on the subject.

Mammoth Site

Interpretation at the Mammoth site does describe the paleoenvironment. The paleoenvironment is described as a sink hole that megafauna were drawn to for the water and trapped. Visitors learn that the sink hole eroded and over time exposed the bones; this is a significant learning activity for school age children who visit the site. Excavations have identified microfauna and there is discussion about how these organisms can give information about past climate and vegetation.

Blackwater Draw

Paleoenvironmental reconstruction is explained at the Blackwater Draw site through displays of past landscape and vegetation. There is also information describing animals present at the site and what they looked like. Other displays describe how people hunted, gathered, moved across the landscape, and generally, how they lived.

Figure 17. Native medicinal and edible plants at the Pine Bluffs Museum.

Pine Bluffs

Interpretation at the Pine Bluffs site explains to visitors how the environment of the area has changed over time. Examples of types of plants prehistorically present at the site are shown with different uses for the plants, such as edible and medicinal plants.

Murray Springs

Researchers have done paleoenvironmental reconstruction at the Murray Springs site. Information about the paleoenvironment and stratigraphy is explained to visitors. Using stratigraphy, researchers can tell how the climate changed through evidence in the changes of plants and animals through time.

Every site visited has information describing the landscape at the time of occupation. Interpreters explain how the sites were formed, how the environment has changed, and how or why people chose that location. Understanding the environment at the time of occupation helps archaeologists determine what resources people needed or wanted for survival. Every site explains stratigraphy and how it is used for dating the site and artifacts, but also to see how the environment changed through time. Information describing the landscape at the time of occupation helps visitors imagine what the site would have looked like thousands of years ago.

Are people visiting the site strictly to learn about the archaeology or do they also come to enjoy the natural environment?

Often, archaeological sites are located in an area that is also appealing to people who are interested in natural resource tourism. Natural resource tourism consists of destinations for people to participate in activities related to being outdoors such as hiking, biking, horseback riding, and rock climbing. "Information on visitors' motives for visiting can be very useful in preparing programs that meet their needs and satisfy their expectations" (Ward 2006:57). The reasons people are visiting are important to determine so visitors con be offered a wide variety of experiences.

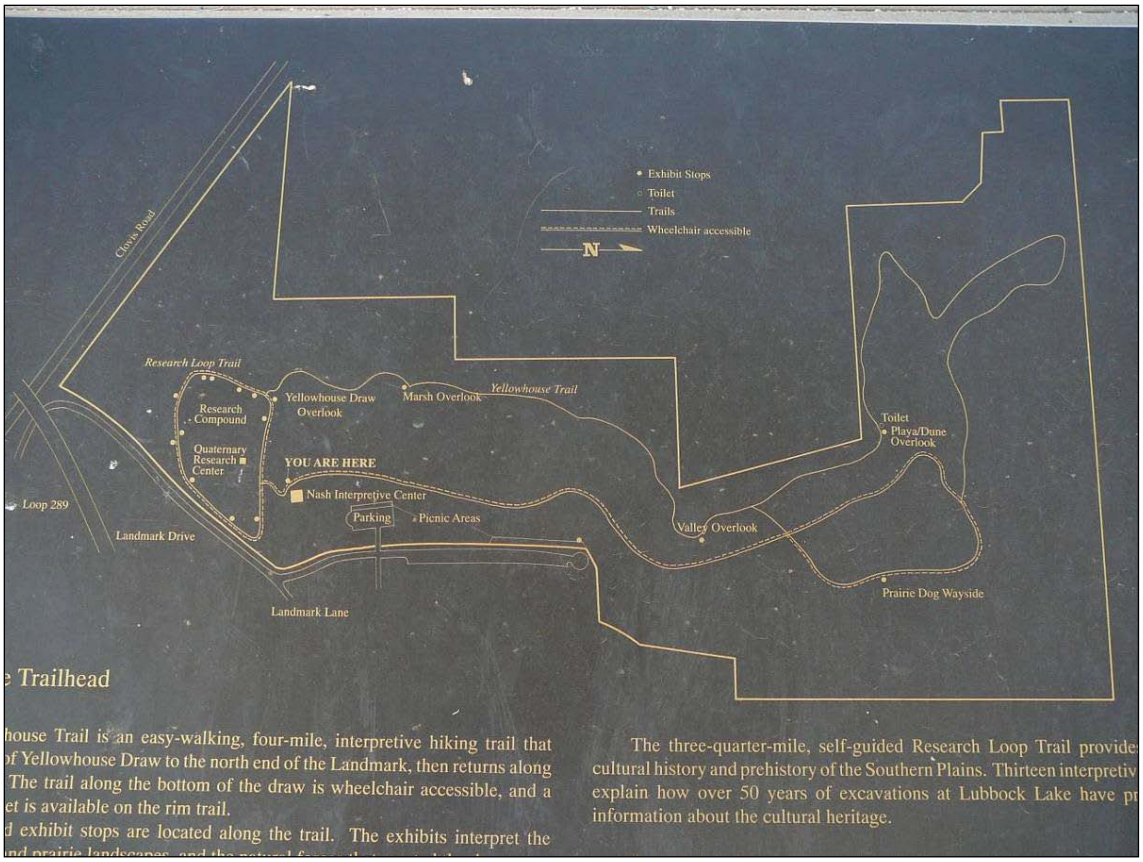

Figure 18. Map of the three trails at Lubbock Lake Landmark; one archaeology trail, one wildflower trail, and one general nature trail.

Lubbock Lake

Lubbock Lake Landmark has done a great job of keeping the property true to its natural setting while interpreting its cultural history. People are visiting Lubbock Lake Landmark for a variety of reasons. Children visit as part of their curriculum for school, locals come to learn more about their local history, and researchers come to learn more about the site and periods. Many visitors to the site are interested in history and are looking to learn more about the history and prehistory of the site. People also enjoy the natural area through the sites trails. The Landmark has visitors who use the paths for nature walks, exercising, and training.

Hudson-Meng

People mainly visit Hudson Meng for the archaeology. The site is a fair distance from the main road, so most people visiting the site are interested in the archaeology of the site.

Mammoth Site

People visit the Mammoth Site for the paleontology, because the site is not related to human occupation. People mainly want to see fossils and excavation.

Blackwater Draw

People visiting Blackwater Draw mainly come to learn about the archaeology. Geologists and geomorphologists visit the site because the site has about two million years of exposed stratified deposits. The site is well known as one of the first sites geoarchaeology was studied. Biologists, especially botanists, visit the site because it contains many old stands of plants that have gone extinct in other areas. Biologists take some plants and transplant them for research or to reintroduce the plant to new areas (Crawford, personal communication 2009).

Pine Bluffs

People primarily visit Pine Bluffs for the archaeology and the history, but some are drawn for the geology and natural surroundings. The cliffs and the area are very noticeable from a distance and people are interested in learning about the area. There is

a short path from the rest stop in Pine Bluffs to the interpretive center so people who stop along the highway can walk to see the site.

Murray Springs

People are visiting Murray Springs for both the archaeology and the natural resources. About 80 percent of the people visiting the area are coming because they are interested in the Paleoindian site and know about the period and its archaeological significance (Mahoney, personal communication 2008). The trail that leads visitors through the site ties into a larger trail system that runs along the San Pedro River. This trail system increases site visitation from people in the area recreating and visiting for the natural resources.

It appears that people mainly come to see the site and artifacts at the sites visited. People like to be hands-on and are more engaged if they can see what the excavation and artifacts look like. At every site, people want to learn more about archaeology in general or look to build on the knowledge they already have about the subject. Four of the six sites have walking trails that enable visitors to look at the natural setting and be outdoors. Both Lubbock Lake and Murray Springs have much longer trails than other sites that take advantage of the natural setting and interpret the natural resources of the area. In all, visitors are mainly coming to the sites to learn about archaeology, see what archaeologists do, and see what is discovered.

What about hunter-gatherers or Paleoindians do interpreters most want people to understand?

It is important to understand the messages site interpretations convey about Paleoindians or hunter-gatherers. Messages about Paleoindians or hunter-gatherers play into the major themes interpreters use as take home messages about the site for the visitors.

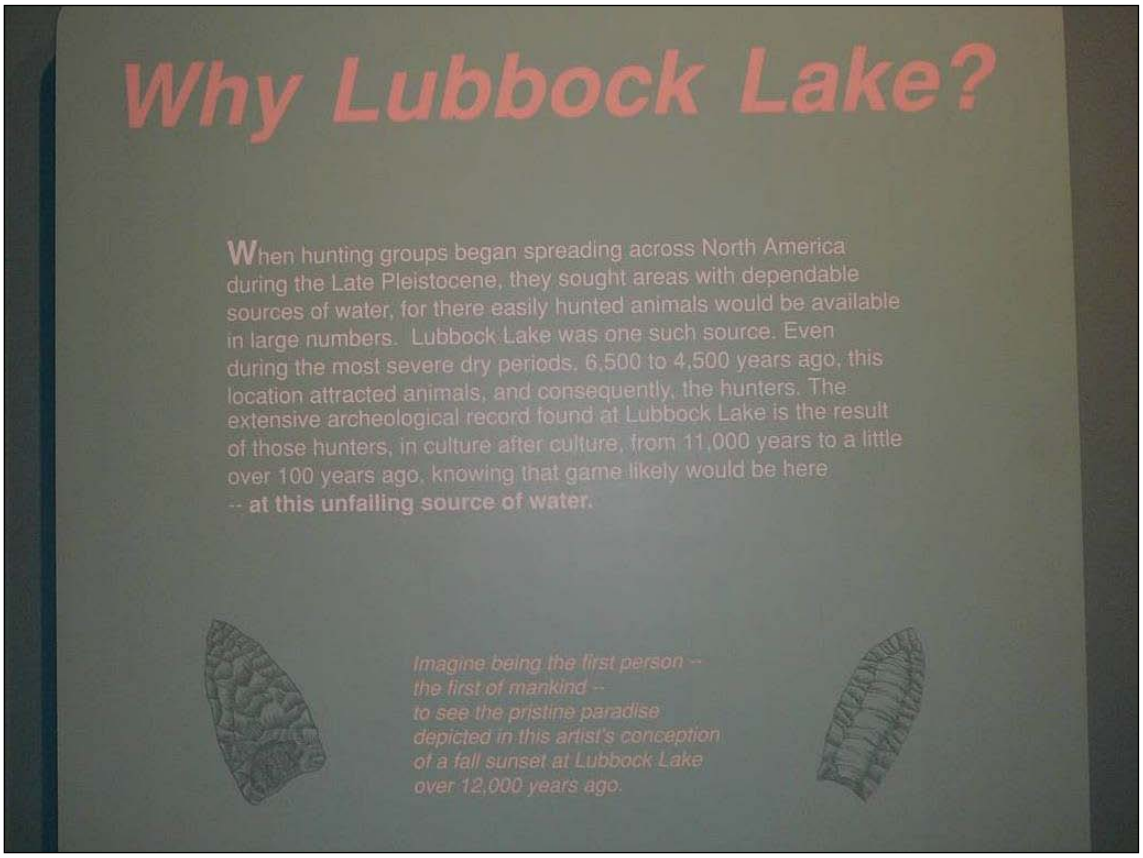

Figure 19. "Why Lubbock Lake?" sign explaining the significance of the Lubbock Lake Landmark.

Lubbock Lake

Lubbock Lake interpreters want visitors to take away the message that people have lived in the area and at the location for the last 10,000 years or more. People have continuously occupied the site because of its abundant resources and location. People were a part of the landscape and the landscape was ever changing, making it necessary for people to adapt.

Hudson-Meng

Interpreters at Hudson Meng want people to understand that hunter-gatherers and Paleoindians were very knowledgeable. This knowledge included lithic resources, animals, and their environment, making them successful hunters.

Mammoth Site

The Mammoth Site wants visitors to understand the paleontology of the site. The interpretation describes that mammoths existed with humans and humans hunted and consumed megafauna. The Mammoth Site explains that even though the site dates to 26,000 years ago, the mammoths that existed then were the same ones that co-existed with humans a few thousand years later.

Blackwater Draw

Interpreters at the Blackwater Draw site want people to understand that there were people existing in the area long ago. Visitors are given an idea of what the area looked like long ago and why people chose to live in the area. Visitors are told how the

landscape has changed over time including a large lake that was part of a larger landscape. It is important for visitors to see that people practiced mobility, had a pattern moving and utilized the landscape (Crawford, personal communication 2009). Visitors learn Blackwater Draw was the first Clovis site discovered, recorded, and how this discovery was extremely significant for archaeologists. The site is also a resource for the community, in that it gives the local town an identity that draws people to the area (Millward, personal communication 2008).

Pine Bluffs

Interpretation at the Pine Bluffs site gets people to understand the extensive chronology of people living at that location. Visitors learn about the dynamics of migration and how people lived across the landscape. It is also important to teach people how and what we can learn from archaeology. Sites should explain that archaeology is a science and researchers use the scientific method to gather information about the past. This explanation is important to the interpretation.

Figure 20. "The struggle for survival - happened right here!" sign at Murray Springs.

Murray Springs

Interpreters at the Murray Springs site want archaeology and interpretation to speak for itself. Managers want visitors to understand the site based on the evidence presented. Interpretation at the site explains the archaeological data through artifacts found, dendrochronology, stratification, and chronology.

The major concepts interpreters want people to understand about Paleoindians and hunter-gatherers are, their intelligence, their movement across the landscape, and their presence thousands of years ago in the area surrounding the sites. Interpreters at the Lubbock Lake, Blackwater Draw, and High Plains Pine Bluffs sites all feel the importance for people to realize the presence of humans thousands of years ago.

Although the Mammoth Site is a paleontological site, interpreters want people to realize that megafauna and humans interacted (though not at that particular site). At the Pine Bluffs and Murray Springs site, interpreters think it is important to tell visitors what was found at the sites and what those discoveries can tell us about people of the past.

Table 1. Chapter 4 Archaeology Topic Summary

	Lubbock Lake	Hudson-Meng	Mammoth Site	Blackwater Draw	Pine Bluffs	Murray Springs
How much information about the archaeology is given?	Large Amount	Moderate Amount	Large Amount	Moderate Amount	Large Amount	Moderate Amount
Do they describe landscape at time of site occupation?	Yes, Large Amount	Yes, Small Amount	Yes, Large Amount	Yes, Moderate Amount	Yes, Small Amount	Yes, Moderate Amount
Are people visiting strictly for the archaeology or do they also come for the natural environment?	Yes, For Both	No, Just Archaeology	No, Just Paleontology	Yes, For Both	Yes, For Both	Yes, For Both
What about hunter-gatherers or Paleoindians do you most want people to understand?	- People lived there for thousands of years - People are part of the landscape and it is always changing	- They were intelligent - They were successful hunters	- Learn about Paleontology - Humans interacted with megafauna/ mammoths	- People lived there thousands of years ago - The landscape has changed over thousands of years - It was the first Clovis site	- People lived there thousands of years ago - What we can learn from archaeology	-Artifacts tell the story about what happened at the site

Discussing archaeology presentation at the sites is important because archaeology is essentially the reason the site is being interpreted for the public. Generally, all sites in this study presented a moderate or large amount of information about the archaeology of each site. Similarly, each site describes the landscape at times of occupation, but each at varying levels discussion. For instance the Mammoth Site discusses the paleoenvironment of the site in great depth because it is an important element in how the site was formed. In contrast, the Pine Bluffs site briefly discusses paleoenvironment with a display of plants and their edible and medicinal uses. The differences in information about archaeology at Pine Bluffs and Murray Springs demonstrate the variability among sites and how different focuses change the interpretation presented. Sites with interpretive trails and outdoor activities in addition to archaeology were visited both to learn about archaeology and take advantage of the natural area. The key point sites convey through their interpretation is that people occupied the area thousands of years ago. Many of the sites focus on this point, but other key ideas include the knowledge we gain from archaeology and artifacts. Another key idea is the landscape changes over time. Landscape change ties into sites discussing the paleoenvironment. Overall, sites visited touch on a large to moderate amount of information about the archaeology itself; the artifacts, the paleoenvironment and the messages they were presenting to visitors about hunter-gatherers and their sites.

CHAPTER 5

VISITATION

This chapter discusses the results about visitation. For the visitation portion of my research, I hoped to understand who was visiting the sites. Questions I asked while visiting were, what types of built environments were present, and if the buildings were incorporated into the natural landscape. This was to get ideas about how or if the architecture played a part in the interpretation. When conducting the interviews, questions I asked about visitation included: how many people visit the site each year, what is the demographic of people visiting, how the site is protected from vandalism and looting, and how does the site affect the local economy. These questions looked at the business side of managing an interpretive site. This type of information is essential when planning a site for interpretation, one must account for numbers of people visiting and decide how to control and manage visitation appropriately.

Built environments and incorporating them into natural landscape

Built environments are environments in which the landscape or area has been modified from its natural form for the intention of public interpretation. This can be in the form of buildings over the site or structures in another part of the site. "The center, located at or near the resource, serves as a portal and orientation, an invitation to the 'living museum' just beyond it, which is the visitor's principle destination." (Knudson

1999:178) Build environments at the sites also include parking areas, restrooms, trails, and picnic areas. These vary from permanent structures built of concrete with footings to less permanent ones made to move or change when needed. Permanent structures are often visitor centers and museums, but can be trails and waysides. Structures such as museums or interpretive centers can facilitate large interpretative exhibits and programs in addition to the on-site interpretation. "[Structures] can also furnish indispensable support services in a controlled and often more hospitable substitute environment" (Sharpe 1982:415). These places offer visitors places to get out of the elements, house cultural artifacts, and offer supplemental information. Visitors often desire to take additional information or souvenirs home, and items to purchase can often be found in gift shops and book stores within the museum or interpretive center (Tilden 2007:129).

Some sites make it a priority to incorporate their built environments into the natural landscape. Walkways can be used to protect the ecosystem around the site as well as to provide designated areas for people to walk if some areas of a site are sensitive with erosive soils, or have a high probability of artifacts being exposed (Whyman 2008:66). Types of subtle built environments might include making a subterranean facility, keeping dirt trails, mimicking the topographic features with shelters, or painting buildings in natural colors that blend into the local scene. Often, the design of a site does not include development of permanent facilities. This may be done to create a specific natural setting or to keep the costs and maintenance down (Whyman 2008:67). On the other hand, sites may choose not to worry about incorporating their facilities into the natural landscape, but rather build a facility in a traditional manner.

Figure 21. Interpretive Center at Lubbock Lake Landmark.

Lubbock Lake

Only a portion of the 315 acres at Lubbock Lake have been developed for interpretation. The types of built environments include the large interpretive center and museum, laboratory, and a trail system. The interpretive center was built in 1991 and allows the site to be open to the public. The interpretive center is built near the site and houses the staff offices, the museum, gift shop, viewing theater, class rooms, and lavatories. A separate building houses the artifact collection and laboratory. All material is processed, catalogued, and stored in this building. The trail system consists of three trails; a short wild flower trail that is handicap accessible, an archaeological trail that follows around the areas of excavation, and a longer nature trail that encompasses the

grounds. It is important for the facility to allow visitors into the area and allow them to have controlled access to the information the site provides.

Only a small portion of the Landmark is incorporated into the natural landscape. The archaeological trail is a slightly improved trail made of dirt. The wild flower trail is a "no impact" trail made of composite decking placed on a layer of gravel. The longer nature trail is a paved concrete trail. The Landmark buildings are all permanent structures. The main building is located down slope from the parking area so it does not excessively stand out when walking around the grounds. Kiosks along the nature trail are painted neutral colors and are allowed to blend in with the surrounding area.

Hudson-Meng

The type of built environment is mainly a large metal building with permanent footings. A portion of the building is a poured concrete floor which is over a portion of the bone bed. The building contains personnel offices, a souvenir shop, an artifact processing area, and a visitor's entrance with a large walkway around the perimeter of the excavation. There is a rain water collector used for supplying water for washing and screening artifacts. A large parking lot is located uphill from the site with lavatory facilities. A trail leads from the parking lot to the site and has wooden benches and signs periodically down the trail.

A portion of the Hudson-Meng site is incorporated into the natural setting; the trail has not been paved and is made of dirt, thus keeping it closer to nature. The building and other facilities at Hudson-Meng are not built into the natural landscape and serve more for functionality than aesthetics.

Mammoth Site

The built environments include a large building, a museum, storage, offices, and a gift shop. A large parking lot is next to the site with a short walkway to the entrance. The main building was built over the site and enables excavation to continue while people look over the site from walkways along the inside perimeter of the building. The exhibit and museum building is attached to the site building. This area has large dioramas and also includes offices for the personnel working at the site. There is a large storage facility in the basement of the museum with movable shelves where all the artifacts from the site are stored. The two buildings are also connected to a large gift shop that has books, stuffed animals, clothing, toys, and more.

The buildings at the Mammoth site are not incorporated into the natural landscape. The building is large and made of brick built over the excavation. The site is within town so it fits into the cityscape.

Figure 22. Visitor's center at Blackwater Draw.

Blackwater Draw

The built environments at the Clovis site include a museum, a building over a small portion of the site, and a welcome center. The museum is located along the nearby highway about two miles from the actual site. The museum contains dioramas and information about the site and chronology. There are two on-site buildings, one consists of a smaller building as the welcome center, with a few offices, a small gift shop, and a small amount of artifact storage. The other is a building stands over a small portion of the excavated site. These areas are connected with a trail that encompasses the site and has interpretive signs.

The Blackwater Draw site is not built into the landscape. The museum is a brick building along the highway with very little other development around it. The on-site buildings include a trailer-type building for the welcome center and a metal building over the excavated portion of the site. The trail is slightly improved dirt trail but has been cleared. The path it follows blends in with most of the natural surroundings.

Pine Bluffs

The types of built environments include a building over the excavated site, a parking lot, a trail to the site, and the museum building. The museum building is located in town and has a large display area, offices, artifact storage, and an equipment garage. At the site, a building standing over the site holds a walkway on one side to view the excavation. The building has a parking lot and a paved trail leads from the nearby Interstate 80 rest-stop to the site.

The buildings and facilities associated with the Pine Bluffs site are not built into the natural landscape. The buildings are made of concrete and metal and are not shaped or blended with the surroundings. The pathway leading from the rest area to the interpretive center is concrete.

Figure 23. Ramada and picnic table for visitors as they travel along the Murray Springs trail.

Murray Springs

Murray Springs is located just outside of Sierra Vista, Arizona. The site is located outside of town in an area with no other attractions or infrastructure, so the built environment is less than that of other sites. There is dirt parking area with an improved dirt trail. The dirt trail is approximately1/3 of a mile long and leads visitors around the site with benches and interpretive signs along it. There is a ramada with a picnic table, so visitors can stop, get out of the sun, have lunch, and rest. The site also has two bridges that lead the trail over the arroyo, although when I visited, one was closed and needed repairs while the other was washed out and needed to be rebuilt.

The ramada at the Murray Springs site was built out of local mesquite logs that blend well with the natural environment and give visitors a place to rest. The interpretive trail is a non-improved dirt trail and is incorporated into the environment. The site kept the natural environment undisturbed throughout the site. Visitors can learn about the environment with labels of the local plants.

Each visited site had some form of built environment with a wide range in application. For example, Murray Springs has a dirt parking area, dirt trail, and picnic bench with ramada. In contrast, the Lubbock Lake Landmark had a paved parking lot, three picnic benches, a laboratory, three concrete or decking trails, large megafauna sculptures, and a concrete building that housed the museum, offices, classrooms, and a small theater. These two facilities are clearly different in their approach to the built environments for interpretation. For instance, a site focuses the visitor on being in the natural setting of the site in order to experience a closer affiliation with the present-day (versus past) environment. On the other hand, a site might focus on giving the visitor a structured learning environment with displays and classrooms available to present information. One reason for this difference might be the result of the amount of funding the site received for interpretation. Another reason may be a differentiation in goals the site is trying to convey to their visitors.

In summary, most of the sites did not have an emphasis on incorporating their facilities into natural settings or surroundings. Only Murray Springs had structures that were built into the natural landscape using local wood. Lubbock Lake, Hudson-Meng, Blackwater Draw, and Murray Springs all had trails that were slightly improved dirt

trails. These trails had less impact on the environment in and around the site than improved paved trails. Five of the six sites had a permanent structure which is used as a visitor's center or museum. Overall, a significant amount of attention was not put into incorporating the built environment into the natural environment.

Site integrity, security, and problems with vandalism or looting

Ensuring site integrity and security is extremely important at sites that are interpreted to the public because there is an increase in visitors to the site. An increase in visitors can cause harm to exposed materials, increase erosion, or lead to looting. Interpretive techniques can be used to deter and prevent artifact collection, rock art defacement, littering, and traveling in unauthorized areas (Sharpe 1982:15-16). Security can include fences, gates, facilities with locked doors, and alarms. Fences define a boundary for visitors, guide foot traffic, add security, and act as a barrier to keep people away from sensitive areas and hazardous areas (Whyman 2008:67). Integrity includes proper excavation and curation of materials, monitored ground disturbance, and proper mitigation. Interpretation and security ensure that the site and its contents are being properly cared for, enabling the visitors to gain the most knowledge from the site.

The fear of looting and vandalism is one of the biggest concerns about interpreting archaeological and paleontological sites. These sites can be the target of looting for artifacts. It is a concern that these activities may occur when sites are interpreted and allow access to the public. Educating the visitors as well as the surrounding communities about the importance of an archaeological or paleontological site is helpful in deterring people from vandalizing or looting the sites. In the words of

Freeman Tilden (2007:65), "He that understands will not willfully deface, for when he truly understands, he knows that it is in some degree a part of himself." Preventing vandalism and promoting awareness of a site is one of the main objectives to interpreting to the public and can be a large part of its mission. "Building awareness of the resource, encouraging understanding and appreciation, and recruiting people as active stewards usually aligns with the mission, goals, and objectives of the interpreter's organization" (Merriman 2006:49). If more people are involved in the site and are educated about its importance, then it is less likely to be harmed.

Figure 24. Fence along the archaeology trail at Lubbock Lake Landmark ensuring people do not go onto the site.

Lubbock Lake

The mission statement at Lubbock Lake holds site integrity and security to the highest priority. Structures are built on areas that have been investigated and contain no cultural materials subsurface. No ground disturbance is allowed without prior approval and investigation. For example, six surveys were conducted in advance of construction of their newest trail and all the archaeological materials were mapped and collected before the construction began. A gravel base is put down for all trails to be built upon so construction and use in no way affects the stratified subsurface deposits. Site integrity ensures that activities do not affect the organic potential for radiocarbon dating. For instance, chemical samples were sent to a lab for testing when conducting weed eradication to ensure eradication will not affect dating techniques. Cultural surveys are conducted before prescribed burning of noxious weeds. One fence provides a boundary to limit afterhours access and site security. A second fence is higher and sturdier around the research compound. Local city and university police patrol the landmark routinely and will apprehend trespassers. Personnel are required to wear identification badges, both buildings are locked with key code pads, and there are alarms for security and fire.

Lubbock Lake Landmark has experienced minimal looting in the past but does not have any current problems. There have been two incidents of attempted looting since 1972 but on both occasions' perpetrators were caught right away and no artifacts were collected. The site was initially discovered in 1936 but it was not officially recognized until 1977. Collectors recreationally looked for artifacts during this intermediate time. In the 1940s and 1950s, looters collected much of the surface artifacts but were usually caught before they could excavate any artifacts subsurface. Since the 1970s, there have

only been the two attempts at looting and no surface collecting. The manager even receives calls from people wanting to return artifacts collected in the past.

Hudson-Meng

The facility and 40 acres property at Hudson-Meng is locked to ensure site integrity and security. There is a security system in the building that notifies State Patrol to come to the facility in the event of an alarm.

The Hudson-Meng site has had no problems with vandalism or looting, a result of the secured building that is not easily accessible.

Mammoth Site

Integrity and security at the Mammoth Site is primarily maintained primarily with a building that encompasses the site. The main building was constructed in 1986 while the exhibit building and offices were added in 2001. The entire facility is locked and has 24-hour security with cameras and alarms.

There has not been any vandalism or looting incidents at the Mammoth Site. Early on, the site was reburied at the end of every field season to protect the site and uncovered to work on it during the subsequent field season. When the back dirt was removed, excavators had someone on the site 24-hours to protect it from looting (Agenbroad, personal communication 2008). Security was ensured when the building was constructed by locking the facility and having surveillance.

Blackwater Draw

Site integrity and security at Blackwater Draw is ensured in many ways. First, a person lives on site and that creates some security. Second, the site is monitored every few days, if not every day, for artifacts exposed and disturbance. All artifacts or areas of the site that are exposed or in danger are looked at in some way. Third, site stabilization is taken care of with the help of Eastern New Mexico University (ENMU) by preventing or mitigating erosion. Areas in danger of being exposed are covered with soil when proper excavation in the area may not be immediately feasible. Finally, the property is fenced with a locked gate and the interpretive center is locked every night (Crawford, personal communication 2009).

No major cases of vandalism and no known cases of looting have occurred since the Blackwater Draw site was opened to the public (about 20 years) and owned by ENMU. A long tradition of people collecting at the site dates back to the 1920s. The University is only a partial owner of the landmark (1/4 of the property); another portion is owned by a private owner (1/4) and another by the State Land Office in Santa Fe (1/2). The private land owner uses his portion for agriculture. He plows every year, has center pivot irrigation and produces two yield crops. The state-owned land is used for open range cattle grazing. These two areas are unprotected and not monitored. Archaeologists do not have the opportunity to make sure the activities related to cattle grazing and agriculture does not have an impact on archaeological resources (Crawford, personal communication 2009).

Pine Bluffs

Site integrity and security at the Pine Bluffs Site is maintained at the site by having a security and alarm system at the museum, all of the doors and gates to the facilities locked, and a locked building over the excavated site itself.

No problems with vandalism or looting have occurred since a building is built over the excavated portion of the site and the doors and gates are kept locked.

Murray Springs

Site integrity and security is ensured at the Murray Springs archaeological site with a locked entrance gate that is only open from sunrise to sunset. Physical barriers, such as ropes and signs, prevent people from entering sensitive areas of the site. Signs warning people to respect the site include, "Do Not Leave Path," and, "Do Not Remove Artifacts." People are prosecuted for looting and trespassing if they are caught disturbing the site.

People have been caught at the Murray Spring site with shovels in a few incidents and have been charged with looting. There have also been problems with people taking artifacts eroding from arroyo walls, artifacts visible on the surface, and people scraping arroyo walls looking for artifacts. The site has had no incidents of people defacing signs, but there was a problem with a person defecating in the register box. The person was never caught, but the problem eventually stopped.

Security and integrity are extremely important and take top priority at every site. The best example of ensuring site integrity comes from the Lubbock Lake Landmark.

Personnel are extremely aware and cautious of the impacts on the site. Personnel create as little ground disturbance as possible and ensure that all activities will not alter information gathered from the site. The Mammoth site has a very extensive security system associated with the site, including a large facility, hidden cameras, and an alarm system. Overall, the minimum an interpretive site should have is a locked access gate with fences to keep people from trespassing and deter looting.

To summarize, vandalism or looting at the sites visited was a minimal or non-problem. Lubbock Lake and Murray Springs have had minimal problems with people excavating or going off trail. All other sites reported no vandalism or looting and feel their safety and integrity measures deterred illegal actions.

How people hear of the site and are they visiting during vacation or for education

Determining how people hear about an interpreted site is an important factor when determining a budget or advertizing plan. Sites have a hard time deciding if more money should be spent on the interpretation of the site or on advertizing the site. Building off the demographic of people visiting, one can determine why different types of visitors are coming , improve interpretation, and target groups not coming as potential visitors (Ward 2006:55).

Personnel can determine what times of year to expect the most people by determining the intent of people visiting a site. Determining the intent of people visiting can guide the interpretation to fit a larger audience. People can visit a site to gain education or as a destination while on vacation. Educational tours are often offered to school children during the school year. In comparison, many people visit on vacation.

Vacationers are more likely to visit during the summer when the weather is nice, children are out of school, and the people can take trips.

Lubbock Lake

People hear about the Lubbock Lake site through newspaper coverage and advertizing when the site has extra funding. The site advertizes with billboards in town and the surrounding area occasionally because it has been effective in the past. People hear about the site internationally through word of mouth. The University's research program also recruits participants internationally. Travel organizations give information about the area and site, especially in Europe, because of Buddy Holly's connection between England and the town of Lubbock. Buddy Holly was an early rock and roll legend who influenced the likes of The Beatles and The Rolling Stones. People travel from abroad to see where he lived, so travel organizations give visitors information about other area attractions.

People generally visit Lubbock Lake for both vacation and for education. People most often come from outside the region while on vacation. People within the region visit the site for their own enjoyment and educational opportunities, while children most often visit during school tours.

Hudson-Meng

People hear about the Hudson-Meng site from local press, wayside areas throughout Nebraska, and promotions from South Dakota. Research from the site has appeared in media such as Archaeology Magazine and the Denver based *Rocky Mountain*

News who did a newspaper feature on the site. Additionally, visitors are recommended to visit the Mammoth site and visitors to the Mammoth site are recommended to visit Hudson-Meng since they are near each other.

People visiting Hudson-Meng mainly come while on vacation, passing through the area, or staying near the site. Fort Robinson draws a lot of people and many large family reunions occur in the area.

Mammoth Site

People hear about the Mammoth site through word of mouth from people who have visited and enjoyed it – especially in the first 10 to 15 years. There is information about the site in visitors' centers throughout South Dakota and the Mammoth site has a website. The site has also been featured in news releases and in national television programs on the *Discovery Channel* and *History Channel*.

People visit the Mammoth Site for both education and vacation. Many of the visitors are children coming with school groups or children who request to visit the site as a destination during a vacation or trip.

Blackwater Draw

People hear about the Blackwater Draw site and want to come mainly because of the name and popularity it has drawn from being featured on television channels like *NOVA*, the *History Channel*, and the *Discovery Channel*. The site is in many children's text books. There are a few brochures in the state highway visitor's centers. The site has advertized in the past, but it has not had an impact in a good or bad way. State highways

have put up signs along the highway to point the site out as a state park. The signs have helped increase visitation. Visitation was up in 2009 which might have to do with an increase in the sites' presence on the web. Blackwater Draw has a blog on the website about what staff is doing with the field school and new developments in the archaeology. The internet has been very helpful in getting information out to a large audience. The site has been featured in newspapers, some even in Central America, and has drawn researchers from as far away as Paris, France (Crawford, personal communication 2009).

People are mainly visiting the Blackwater Draw site on an educational vacation tour. Many retirees come because they like to visit state parks and museums around the country as they travel. The site has also been getting more locals because it is right next to a military base. Military families are well traveled so they seek out places to visit in their local communities (Crawford, personal communication 2009). Other local visitors say they have driven by the museum for years and just decided to stop in (Millward, personal communication 2008).

Pine Bluffs

People hear about the Pine Bluffs site through rest area signs and information, the sign on the building that is visible from the interstate, and stories in the local paper. When people stop at the rest area, there is a walkway from the rest area to the site if people want to stretch their legs while traveling. There are hopes to develop a website for the site and museum specifically, but it is simply mentioned on the city's website for now.

People are mainly visiting Pine Bluffs while on vacation but people are also visiting for educational tours. About ninety percent of the 5,000 visitors per year are travelers.

Murray Springs

People mainly hear about the Murray Springs site from media such as television, journals, or magazines. About 80 percent of people visiting have some prior knowledge about the site (Mahoney, personal communication 2008). The site has been featured on *NOVA* and *National Geographic*, in many magazines, and many journals. Popular media is very interested in mammoths so many people are drawn to the site from the media. The Bureau of Land Management gives the city, county, and chamber of commerce brochures describing the entire conservation area. These brochures have some information about sites in the area, including Murray Springs.

People are visiting Murray Springs while on vacation, as school groups, and during recreation activities. The office has site stewards who occasionally give tours and monitor the site for vandalism.

Many of the smaller sites, such as Pine Bluffs and Hudson-Meng, are known through wayside information and brochures at other area attractions. Larger sites, like Lubbock Lake, Blackwater Draw, the Mammoth site and Murray Springs, are well known by their name, journal articles, and educational television like *Discovery Channel* and *History Channel*. People make these sites destinations during vacations or traveling. Many people who visit well known sites like Murray Springs and Mammoth know some

history of the site and are visiting first time or building on their knowledge of prehistory. Advertizing for interpretive sites can be tricky. Advertizing can vary from billboards to brochures to websites. One of the simplest ways to get people interested in visiting a site is through word of mouth. For example, Lubbock Lake funded billboards in the town of Lubbock for the site and saw an increase in visitation. On the other hand, Blackwater Draw advertized and did not see changes in visitation, positive or negative. However, Blackwater Draw visitation has increased since a blog was established with information about recent investigations and on-going excavations. Overall, it seems very important to reach out to large audiences via the internet or advertizing to draw the most visitors to a site.

The most common reasons people are visiting archaeological interpretive sites are educational visits with schools or expanding their knowledge of the site or archaeology in general. People are also visiting while on vacation or on "an educational vacation." There are quite a few visitors coming to the Mammoth site to visit as a vacation destination. At almost all of the sites, people visit while in the area or passing through on vacation. Local visitors are mainly children with school groups, visiting as part of a class or field trip.

Visitation each year and demographic

It is important to know approximately how many visitors are coming to an archaeological or interpretive site each year for many reasons. These numbers can be reflective of good publicity, word of mouth, or a good education resource. Determining visitation can help the site with funding issues, can be used to get organizations interested

in the site, or can be used to apply for grants. Some limiting factors to site visitation include distance to nearby cities or towns, other area attractions to visit simultaneously, and ease of access.

Understanding the peak seasons for visitation at a site ensures there are enough staff, there are special events planned, and the facility can accommodate the anticipated crowd.

Obtaining information about the demographics of people visiting helps site program design, interpretation, and goals in order to best fit visitors and their preferences (Brochu 2003:92, Ward 2006:58).

> "Audiences can be described in a variety of ways – by age, gender, ethnicity, income levels, or family status. Families with young children, 'empty nesters', and seniors are some to fit the more common demographic generalizations about audience subgroups. But you should also be interested I knowing where they are from – cities, towns, farms, near or far – and why they have chosen to come to your program" (Brochu 2002:39)

It is important to recognize and consider that the public visiting the site will be both local residents and visitors traveling from outside the state or country (Ward 2006:55). The origination visitors are coming from can indicate differences in cultural norms that affect the interpretation for the visitor (Machlis 1992:55, Trotter 1989:130). "Cultural associations or ethnic background information can be helpful in deciding what facilities, programs, topics, and recreational opportunities should be provided" (Ward 2006, 56). It is important to know who is coming to the site and their motives for visiting. This helps meet the needs and expectations of the visitor (Ward 2006:55). Knowing who is not visiting the site is also important to evaluate the services, facilities and programs to ensure there is not a deficiency in these areas causing people not to come (Ward

2006:55). Ultimately this information can be used to make the interpretation of the site best fit visitors.

Lubbock Lake

Lubbock Lake Landmark receives around 12 to 15 thousand visitors per year (Johnson, personal communication 2008). The Lubbock Lake Landmark facility is open year round, Tuesday through Saturday from 9 a.m. to 5 p.m., Sunday from 1 p.m. to 5 p.m., and closed on Monday. Their peak seasons for visitation are late spring, summer, and early fall when people are traveling and have more time to visit.

People visiting the Landmark range from locals to international visitors. The local population includes local and regional school children visiting on field trips and local people interested in the site visiting regularly. Visitors come from different states and countries. There are more international visitors than state visitors some years. The visitation is greatly affected by the economy when people can to afford to travel. The site is fairly close to the interstate, so the site used a billboard to advertize for a short period of time and increased visitors.

Hudson-Meng

About 6,000 people visit the Hudson-Meng site each year. The Hudson-Meng site is open to the public from Memorial Day through Labor Day, 9 a.m. to 5 p.m. Peak visitation occurs on Fourth of July and Labor Day weekends. The site offers a knapp-in over Labor Day weekend where stone tool replicators come to the site to visit and

practice their skills. The close proximity to Fort Robinson, a Nebraska State Park, increases visitation during the holidays.

The demographic of people visiting Hudson-Meng is diverse. People visit the site from everywhere, including internationally. Many people visit Hudson-Meng after visiting the Mammoth site located about 45 minutes away. Elementary and middle school children visit the site during the school year which is the site's off season. Agenbroad is promoting the "Fossil Freeway" to let visitors know about interesting sites along highways and interstates while they are traveling in this area. The "Fossil Freeway" is a self guided tour with a map that visits sites like Hudson-Meng, the Mammoth Site, Toadstool Geologic Park, Agate Fossil Beds National Monument, and more (Agenbroad, personal communication 2008; Nebraska National Forests and Grasslands 2010).

Figure 25. A family on a visit to the Hudson-Meng bison bonebed participating in a mock excavation.

Mammoth Site

About 110,000 people visit the Mammoth Site per year (Agenbroad, personal communication 2008). The site is open year round since it is inside of a climate controlled building. Peak seasons of visitation are June through August. Hours of operation are May 15 to August 15 from 8 a.m. to 8 p.m., August 16 to August 31 from 8 a.m. to 6 p.m., September 1 to October 31 from 9 a.m. to 5 p.m., November 1 to February 28 from 9 a.m. to 3:30 p.m., and March 1 to May 14 from 9 a.m. to 5 p.m. (The Mammoth Site 2010).

The Mammoth Site is known worldwide so visitors come from many different locations. The site is highly recognized in Europe and Asia as well as North America. For insistence, there were seven Italian bus tours that visited the site during the summer of 2008.

Figure 26. Visitors on a tour of the Mammoth Site, overlooking the bone bed.

Blackwater Draw

The number of people visiting the Blackwater Draw site each year varies and has not been tracked until fairly recently. At the lowest, the site had about 3,500 visitors in one year. On average it is estimated to have about 5,000 visitors per year. There have

been higher numbers of visitors, such as ENMU field trips, but not everyone was counted at the time (Crawford, personal communication 2009). Peak seasons for visitation at the Blackwater Draw site are the summer months and around holidays. The site is open every day from Memorial Day to Labor Day, Monday to Saturday from 9 a.m. to 5 p.m. Blackwater Draw is open on the weekends from 9 a.m. to 5 p.m. during April, May, September, and October. The site is closed for three months from November to March to the public. However, during the three month closure, staff may still conduct archaeological work (Crawford, personal communication 2009; Eastern New Mexico University 2010). Funds are too limited to keep the interpretive part of the site open through the winter, but accommodations can be made if a group wants a tour (Crawford, personal communication 2009).

The largest population of visitors to the Blackwater Draw site is school groups. They do not come voluntarily because they are required to visit with their class. There is a wide variety of visitors who come from as far away as Europe. People come from the East Coast, from big cities, to visit the American West and make the area part of their tour. The site has a large population of retirees who like to visit historic places and monuments and will go out of their way to visit places because they have time to spend at leisure. Other large populations that visit the site are academia and university students who are interested in archaeology.

Pine Bluffs

The High Plains Museum in Pine Bluffs gets around 5,000 visitors each year, with more visitors to the site along the Interstate than the in-town museum (Reher, personal

communication 2008). The Pine Bluffs peak season runs the entire time the site is open daily from Memorial Day to Labor Day, 9 a.m. to 5 p.m. (Pine Bluffs, Wyoming 2010). Tours are given to school groups during the school off season. Special tours for other organizations are also scheduled during the off season, such as, when the Plains Anthropological Conference is scheduled in the area.

A large number of the people visiting the Pine Bluffs site are traveling along the Interstate 80 corridor for business or travel. Many visitors are traveling through the area from other states. Visitors include the local town population of about 1,100 and current and retired farmers in the surrounding area.

Murray Springs

The Murray Springs site receives approximately 25,000 visitors per year (Mahoney, personal communication 2009). The site is open daily, year round from sun up to sun down (Mahoney, personal communication 2009). The peak season for visitation is from October through April. This is opposite to most other sites because the summer months in Arizona are much too hot for people to be outside for a long time. The area is especially nice to visit in the spring because it is not as hot and the area is becoming green.

People visiting the Murray Springs site are mainly school groups and retired people staying in the area over the winter. People who are really interested in the archaeological component of the site understand the site as dating to the Paleoindian period and about 80 percent of visitors have previous knowledge of the site (Mahoney, personal communication 2008). If people visit the site more than once, they are usually

hiking in the area because of the trail system along the river. The area is also open to bow hunting in the fall so occasional visitors are related to that activity.

On average, archaeological sites saw between 5,000 and 15,000 visitors per year. The Mammoth site is a bit different from others, as it is located in town and has become a major tourist attraction with its large facility and covered excavation. Areas that are remote may expect fewer visitors due to lack of convenience or publicity.

All of the sites are open during the summer and summer is most of the peak time for visitation. Murray Springs is open year round, but is located in a warmer part of the country so the peak season of visitation is fall, winter and spring. The Mammoth Site and Lubbock Lake are open year round but get peak visitation during the summer months. Many of the sites with smaller indoor facilities, or that are located further from large cities, are only open seasonally. Many of the sites see peak visitation around holidays, when guests are on vacation or traveling through the area.

The demographic for people visiting archaeological interpretive sites varied from site to site. The two most common visitors to every site were school children and vacationers. Many school children visited the interpretive sites as part of a class field trip or school group. People visiting while on vacation were either visiting just the site as a vacation, at places like the Mammoth Site, or were in the area on vacation and stopped at local attractions. Some of the sites in the warmer parts of the states, like Arizona or New Mexico, received a lot of retirees as visitors. The 'snow bird' demographic tends to have time on their hands and they often travel to historic sites around the country. Two sites had visitors because of their association with natural resource trails. Lubbock Lake and

Murray Springs were both associated with natural area trails so many visitors to the sites were hiking in the general area.

Estimates of tourism dollars or effects on local economies

The creation of an interpretive site often has positive impacts on the local economy in terms of tourism income. Tourists visiting sites from out of town will generally stay in the area to have a meal, stay the night, or participate in other local activities. This revenue has positive impacts for a community. This support is part of a feedback loop that can support the site itself and the local community as well.

Lubbock Lake

The tourist industry and its effect on the local economy are not well studied, but the Lubbock Lake Landmark speculates that the site does have an effect on the local economy. There were 12,010 visitors to Lubbock Lake in 2008. About 2,000 or 15-20 percent of the total visitors were from out of town. When you add visiting school groups from out of town the percentage goes up 20-25 percent of the visitors were from out of town. Those visitors will spend money locally on hotels, restaurants and shopping. This has a positive effect on the local economy because these are people who would not have otherwise visited Lubbock. Breaking these statistics down even further, one percent of the visitors to the site each year are from outside the United States. Ten percent of the total visitors were from outside of Lubbock but were still from Texas. Then five percent of the visitors were from inside the United States but outside the state of Texas (Bigness, personal communication 2009). Overall, Lubbock Lake Landmark has a significant

effect on the local economy by bringing people to the town to visit the site and spend money locally.

Hudson-Meng

Tourism from the Hudson-Meng site increases people visiting the nearby towns of Chadron and Crawford. Local motels, groceries, and gas stations benefit from the tourism. About 100,000 people a year camp or visit Fort Robinson, a nearby State Park. This often serves as the base camp for visitors coming to Hudson-Meng. A nearby ranch located along the way to Hudson-Meng has a restaurant that many people visit on their way to or from the site.

Mammoth Site

Tourism from the Mammoth Site has had a significant effect on the local economy. The site was listed as the third most popular destination in South Dakota after Mount Rushmore and the Crazy Horse Monument, based on the *Rapid City Journal*, a regional newspaper (Agenbroad, personal communication 2008).

Blackwater Draw

No analysis has been made at Blackwater Draw about increased tourism dollars or effects from the site on the local economy. The state of New Mexico thinks the site does have an impact on the local economy. Both cities of Portales and Clovis have done studies of 'head-to-bed' that count the number of tourists visiting the area and staying in

the cities that might not have stopped otherwise. The site is estimated to bring in a few thousand people each year (Crawford, personal communication 2009).

Pine Bluffs

Activity from the archaeological site and museum contribute to the local economy by increasing visitors to the area and supporting local business. The project purchases at least two-thousand dollars in food and beverages from the local stores in addition to lumber and automotive related supplies. Local people are hired as tour guides for the site increasing community involvement. People working at the nearby gas station and rest area have visitors asking about the site when they stop for a roadside break. Charles Reher had a business model put together by marketing experts, and backed by legislative funding, when the site was first opened. The model demonstrated a significant increase of people and income to the local area from the site.

Murray Springs

The entire National Conservation Area brings in approximately seven to ten million dollars per year for eco-tourism and tourism for the San Pedro area (Mahoney, personal communication 2009). The archaeological site is individually ranked third most visited area in the San Pedro Natural Area (Mahoney, personal communication 2009).

All sites in this study contribute to local economies. Two of the sites that bring in the greatest amount of economic support are the Mammoth site and the Murray Springs site. The Mammoth site, it is listed one of the top three destinations for vacations in

South Dakota. The Murray Springs site is part of the larger San Pedro National Conservation Area and brings millions of dollars of revenue per year to the local area through eco-tourism (Mahoney, personal communication 2009). These two examples are larger in scale, but some of the other sites also provide economic support for local communities. For example, the Pine Buffs site purchases as much of their supplies from local businesses as possible. Small initiatives like local purchases go a long way to gain local support and interest.

Table 2. Chapter 5 Visitation Topic Summary

	Lubbock Lake	Hudson-Meng	Mammoth Site	Blackwater Draw	Pine Bluffs	Murray Springs
Built Environments	Yes, Building and Trails	Yes, Building and Walkway	Yes, Building	Yes, Building and Trail	Yes, Building and Walkway	Yes, Trail and Ramada
Are built environments incorporated into the natural landscape?	Yes, with a wild flower trail	Yes, with a dirt trail	No	Yes, with a dirt trail	No	Yes, with a dirt trail and Ramada
What steps are taken to ensure site integrity and security?	Clearance before ground disturbance, chemicals don't effect radio carbon dating, fenced, police patrol, ID badges, doors locked with keypad entry, alarms	Locked property, security alarm, building over excavation	Building over excavation, locked facilities, security cameras and alarms	Caretaker on site, monitored, fenced, locked gate and facilities	Building over excavation, security system and alarms, doors and gates locked	Locked gate, ropes along walkway, signs
What problems, if any, are there with vandalism or looting?	2 attempts but no looting	None	None	None	None	Some looting

	Lubbock Lake	Hudson-Meng	Mammoth Site	Blackwater Draw	Pine Bluffs	Murray Springs
How do people hear about the site to want to come?	News paper, advertisements, billboard, word of mouth, travel agencies	Local press, waysides, South Dakota promotions, magazines, newspapers	Word of mouth, South Dakota visitor centers, website, news, TV programs	TV, Textbooks, brochures, highway visitor centers, internet, news paper	Rest area, sign visible from highway, local paper, city website	TV, magazines, journals, BLM office
Are people coming on vacation or educational tours?	Both	Vacation	Both	Education	Both	Both
How many people visit each year?	12-15,000/year	6,000/year	110,000/year	3,500-5,000/year	5,000/year	25,000/year
What are the peak seasons for visitation?	Open year round, 6 days/week; Peak late spring through early fall	Open May 15 – Labor Day; Peak July 4th and Labor Day	Open year round; Peak June-August	Open Memorial – Labor Day; Peak Summer and Holidays	Open 2nd week in June - 2nd week in August; No Peak	Open year round; peak October - April
What is the demographic of people visiting?	Local to international visitors, also children	Mainly out of town visitors and children	Local to international visitors, also children	Out of town visitors, international and children	Locals and people traveling on I-80	School children, retired people and recreators
Are there estimates of tourism dollars or effects on local economies?	Yes, moderate effect	Yes, small effect	Yes, large effect	Yes, small effect	Yes, small effect	Yes, moderate effect

Discussing visitation at archaeological interpretive sites is important because it is essential when planning to account for the number of visitors and how to manage the site appropriately. Making sure visitors are comfortable and facilities meet their needs is necessary when interpreting for the public. All sites in this study have some type of built environment. Built environments included buildings, interpretive centers, museums and trails. These structures, for the most part, were not built to blend in with the natural surroundings, but mainly for functionality. The exceptions were trails at two different sites and a Ramada built of wood at the Murray Springs site. On average, archaeological sites saw between 5,000 and 15,000 visitors per year. The highest number of visitors came to the Mammoth site which had 110,000 visitors each year, due in part to the popularity of the site and the fact that it is open year round. The peak season of visitation for most sites was during the summer months when people are traveling and sightseeing. The one exception is the Murray Springs site that saw the majority of their visitors during the winter because of extremely hot summer months. The majority of people visiting these sites are from out of town and other countries. A large portion of the demographic visiting is school-aged children visiting with a school group or with their parents. Many visitors learn about the site through visitor centers, newspapers, television, and word of mouth. Visitors are coming to the interpretive sites as part of a vacation as well as an educational experience. It is very important to keep in mind where to advertize and why people are visiting the site while planning, because it helps to know where to invest money to get visitors to come. Interpretive sites also can bring tourism dollars to the surrounding communities because visitors are getting gas, eating and staying in the surrounding area while they visit. Facilities and gates are locked and many of the sites

have fences around them or barriers to keep people out of the site to ensure that the site is protected from vandalism and looting. All of the buildings are locked, alarmed, or have security cameras. There have been few incidents of vandalism or looting at two of the sites, but for the most part there have been no looting attempts since the sites became interpretive sites. Overall, knowing who is visiting an interpretive site, when they are visiting, and ensuring that the site is protected are all important components to acknowledge and plan when managing an interpretive site.

CHAPTER 6

PUBLIC INTERPRETATION

This chapter discusses the results of public interpretation at the visited sites. Cultural resource interpretation is extremely important not only for archaeologists and researchers, but for the public as well. For example, the most widely used and effective way of preserving and protecting cultural resources is informing the public. Archaeology's "most positive conservation measures remain the improvement of the general level of public knowledge about archaeology and the demonstration of the benefits of archaeology to society" (Pokotylo and Guppy 1999:414-415). These benefits include knowledge, understanding, and appreciation of past cultures and people.

> "Remembering that the goal of interpretation is understanding, good interpretation will help visitors understand what the site can reveal about the importance of people or events connected with it, about a way of life, or about the cultural tastes of the past. It consists of what is shown, said, or done that will help those visitors experience a personal involvement and a sense of identification with their heritage" (Alderson 1976:26).

During the interpretation portion of my research, I asked several related questions, including how many interpretive panels did the site present, how long were interpretive trails, did my ideas of their themes match their expectations, are people encouraged to come up with their own interpretation based on information, and are educational materials geared specifically towards different age groups. These questions address how interpretation is undertaken at the sites and what materials were presented.

Questions I asked of personnel were: what are the major themes for interpretation, how the site was chosen for interpretation, how the interpretation has changed over time, how the site has been funded, what associations the site has with other organizations, and if the interpretation told a story or gave factual data about the site. These questions also determined what interpretive strategies were used and how the site developed into the interpretive site it is today.

Brochures

Brochures are paper publications presenting the site with images, maps and information that introduce the visitor to the site and explain its significance.

> "Its content should include basic historical information, the schedule of the site's operation, and the visitor services available. It should be illustrated with a good map and a few representative photographs or drawings. It should be available in the local language, in English and in other languages frequently spoken by visitors. It should be designed to easily fold into a shape that fits into a pocket or purse and be easy to use" (US/ICOMOS 1993:50).

Brochures are helpful to sites because they can be passed out at local rest stops, at nearby attractions and at the site itself so visitors will remember to come back or pass it on to a friend to visit. Brochures are most valuable to a site when they are valuable to the visitor (Caputo 2008:76). This is significant when designing brochures to keep in mind that there is a small space in which the visitor will be inspired to pick up the brochure, read it, or take it with them (Caputo 2008:76). Brochures can also assist in education and can deliver information that is specifically designed for school aged children or they can highlight the important aspects of the site and its discovery. It is especially important to have brochures at sites that are more self-paced and have no guide or interpreter available to give the information about the site.

Figure 27. Sample brochures from some of the visited sites.

Lubbock Lake

Six interpretive brochures were free for visitors to read and take with them at Lubbock Lake. The first described the "Three Sisters Garden Project" held for students of the Spring Break Fest 2008. The project had students plant a garden using corn, beans, and squash following a Native American story. The second brochure describes the 'Nature Trails at Lubbock Lake Landmark'. There is a map of the trails within the grounds and descriptions of the length of each trail and what the trail features. The third brochure gives information about the discovery, history, tours, programs, and volunteering at Lubbock Lake. It also features information on why archaeological sites are important and a brief overview of the chronology of Lubbock Lake. The last three brochures are Nature Guides for kids. Each describes the plants, birds and landforms at

Lubbock Lake. These brochures are easy to read and offer a lot of information as well as illustrations.

Hudson-Meng

There is one brochure available at the site and interpretive center containing photos of the bison kill during the 1973 excavation, as well as photos of the bonebed today. The brochure also contains a brief description of the site and a map of how to get there. The other brochures at the visitor's center describe additional local attractions.

Mammoth Site

Three educational brochures are available to visitors, one discussing careers in paleontology, one describing the formation of a fossil, and the third for children participating in the junior paleontologist excavation program. There are about ten additional one-page flyers and informational papers available, including surveys about the experience, a scavenger hunt, descriptions of the educational programs, sign-ups for programs, fundraiser information about the new theater, and information about the nearby Hudson-Meng bison kill to attract visitors. This information was readily available and was easily accessible for visitors.

Blackwater Draw

At Blackwater Draw, five brochures are offered to visitors. The first describes the museum, giving visitors the hours, admission, a basic history of the museum, the cultural sequence, and a brief description of the site itself. The second brochure, about the site,

has information about guided tours, entrance fees, hours, and a map of the trail that describes significant areas of the site. The third brochure is titled "Just the Facts" and gives information about site significance, stratigraphy, periods represented, site protection, and on-going research. The fourth brochure is not about the site, but describes the byway of "New Mexico's Ancient Way", a guide to the Native Heritage Trail along scenic Route 53. The last brochure offered was for visitors to visit Lubbock Lake Landmark in Lubbock, Texas. It describes the facilities, activities, and a map to the location.

Pine Bluffs

Five brochures were available on a table in the interpretive center in Pine Bluffs. Three of the brochures are not related to the site but instead feature the local town rodeo series, the Texas Trail Museum, and a general "things to do" in Pine Bluffs brochure. The other two brochures are about the site. One brochure is about living in 1904 and the second brochure describes the High Plains Archaeology Project in the town.

Murray Springs

No brochures were available at the Murray Springs site but one informational paper was available within the BLM office. The paper explains the Clovis period, artifacts found at the site, the trails around the site, and has a map of how to the site. There is also a forewarning about protection of the site reminding visitors that it is illegal to remove artifacts. A second flyer in the BLM office described the Lehner archaeological site, though the site is not yet open to the public.

In sum, each site had brochures available for visitors, either for local area attractions or for more information on the site itself. Lubbock Lake had the widest range of brochures available including brochures describing the site, information on the programs, and a nature guide for children. The Mammoth Site offered a lot of brochures about the site and programs. The Pine Bluffs site had the fewest brochures. "Brochures are often the first contact a visitor receives…[and] also provide a take-home souvenir that is highly valued" (Ward 2006:5). It is helpful to have brochures about the site so people can read additional information not provided else ware. Brochures are used to inform visitors about the programs offered so they can return in the future.

Interpretive panels

Interpretive panels are present at almost every interpretive site and offer visitors the chance to read and gain knowledge about the site through examples and information about what was found at the site and why it is significant. "Nonpersonal interpretive services involve the communication of a message without physical interaction or discourse. Signs and brochures are classic examples of nonpersonal services" (Ward 2006:4). These types of interpretation offer the greatest flexibility for sites. Visitors are allowed to tour the site themselves and learn at their own pace. "Signs are user-friendly: visitors choose which signs they will or won't read. They also select the amount and detail of information to take in" (Gross 2006:11). There are many different guidelines for interpretive panels, including different combinations for placement as well as content. Signs can be made of wood, metal, porcelain enamel, or fiberglass embedment and are usually two dimensional with text and graphics (Ward 2006:5). It is valuable to have

signs at interpretive areas because they are accessible to visitors at all times and it is not necessary to have guides or personnel on site (Ward 2006:5). These signs can be located inside facilities as well as along trails and points of interest. "A wayside exhibit is an outdoor interpretive panel (versus one found inside a building), or a cluster of interpretive panels and informational signs, usually found along trails and roads (wayside) or near significant features" (Gross 2006:10). Panels located inside a building are usually associated with a museum or interpretive center and include diagrams and displays. Effective interpretive signs need to communicate to the visitor quickly, concisely, and dramatically (Gross 2006:50). Interpretive messages are most effective when the visitor can see and relate what is being displayed (Gross 2006:50). Overall, signs play an important role in the successful interpretation of a site and give visitors a lasting impression about what they learned on their visit.

Lubbock Lake

The interpretive panels at Lubbock Lake Landmark consist of 66 panels or wall displays in the interpretive center. These include life size dioramas, artifacts behind glass, interactive tables and informational panels. The interpretive center is divided by periods and the visitor literally 'walks' through time, keeping a real focus on human re-occupation of the area through time. In addition to the interpretive center, the grounds of the facility are used for education as well. Thirteen informational panels are along the trails covering the grounds. The archaeological trail has signs relating to specific areas of excavation and the discoveries made there. Signs on other trails explain how humans have interacted with the landscape over time.

Figure 28. Interpretive panel at Hudson-Meng bison bonebed describing how the site was preserved for the future.

Hudson-Meng

The interpretive panels at Hudson-Meng archaeological site consist of 18 posters and panels inside the interpretive center. These include pictures of artifacts, maps of the bone bed, and descriptions of what researchers have learned from the site. The interpretive center is focused around the bone bed in the center of the building with a walkway around the perimeter. The path from the parking lot to the interpretive center also has six panels. These panels describe the paleoenvironment, deposition, and history of the discovery and archaeology.

Mammoth Site

The interpretive panels at the Mammoth Site consist of six panels on the sidewalk as the visitor approaches the interpretive center. Forty-six panels are inside the interpretive center around the excavation. In the exhibit hall of the interpretive center there are eight panels or cabinet displays and five large exhibit models. The five large exhibits consist of a life-size model of a mammoth bone hut, life-size replication models of mammoths, a short faced bear, and one life-size model of a mammoth kill including humans. These interpretive panels and displays are very educational and allow visitors to picture what animals looked like thousands of years ago.

Figure 29. "The Perfect Campsite." Interpretive panel at the Blackwater Draw site.

Blackwater Draw

At the Blackwater Draw site, the museum and the excavation area are in two separate locations. The museum contains 55 dioramas and display cases describing periods, mammoths, bison, and the human chronology. Out at the site, there are 16 posters and displays inside the visitors building describing this history of the excavation and what materials were found there. In the building built over a portion of the excavation block, there are ten posters helping visitors understand what is going on with the current excavation and what visitors are viewing. A trail that goes around the site has 20 panels describing different periods and the prehistoric landscape.

Pine Bluffs

The Pine Bluffs Windows on the Past Interpretive Center is located along the highway just outside of the main part of town. Twenty panels are displayed along the walls of the interpretive center. Two of these displays are table displays, one with a flake sorting activity for children and the second is a touch table with lithics and bones. A third display features diagnostic artifacts recovered from excavation and examples of the forms archaeologists used to record data during excavation. The displays along the wall explain the High Plain's projectile point chronology, Native American tribes and their locations, living off the land, and historic homesteading.

There is also a museum in the town of Pine Bluffs which also offers displays and educational information to visitors. There are approximately 18 interpretive panels and 14 table displays. An abundant amount of information is available including background notes on the High Plains Archaeology Project, identification of edible and medicinal

plants, bison bone identification, historic bottle and ceramic identification, projectile point identification, and a pump drill demonstration area.

Murray Springs

At Murray Springs, there are 10 interpretive panels along the trail. These panels describe how the site was first discovered, stratigraphy, past environmental conditions, how people came to North America, lessons we can learn from the past, what types of animals existed during the Ice Age, what types of activities occurred at the site, and how people hunted mammoths. The signs are also interpreted in Spanish, due to the site's location in the American Southwest.

In general, it is difficult to determine how many signs and panels to provide for interpretation. "The best interpretation is concise…a good graphic with a short headline may be all that is needed" (Gross 2006:5). Visitors are there to experience the site and will often ignore long or busy interpretive materials (Gross 2006:5). Similarly, if there are too many panels, people can become overwhelmed and pass by without reading them. On the other hand, if there are too few panels, people might walk through the site quickly and not gain much information.

> "Interpretive panels tell the story of a resource, site or feature. Their primary purpose is to guide visitors to discover meanings. They may have multiple messages and are designed for learning at leisure" (Gross 2006:10).

The number of panels varies greatly over the sites visited. The fewest number of panels was Murray Springs with 10 and the most was Blackwater Draw with 86. In general, the

signs discussed chronology, descriptions and explanations of artifacts, and many of them tell visitors about the site's discovery and early excavations.

Trails

Trails are a significant feature that offers visitors a chance to get out and see the site. Walkways and trails are essential at a site to lead visitors between buildings and through program areas (Whyman 2008:66). "Participants can use the walkways for solitude, exploration, learning, and physical activity" (Whyman 2008:66). Trails can vary from short to long and can include interpretation as the visitor walks along. Many of the trails at interpretive sites also include panels at various points of interest that give more information about the site.

> "Some authors have recommended fifteen to eighteen stops on a half-mile (800 m) trail. …Although few studies have been conducted that could tell us which range is best, it's probably better to err on the lower side. More than twenty stops would put one stop at least every 120 feet (40 m). Since it's generally considered bad technique to have stations in view of one another, spacing them so closely together could present a problem" (Ham 1992:319).

Not only can trails have interpretive panels guiding visitors along the path to discover the site but they can also have brochures that correspond to certain stops and give more information. Brochures, signs, and audio tours are often associated with trails as ways of communicating messages and information (Ward 2006:5). Self-guided trails using these types of mediums allow the visitor to read and listen only to messages they are interested in and tour at their own pace (Ward 2006:5). Some trails include benches, picnic tables, and shade shelters. The trails can also be improved with pavement or boardwalk, or they remain natural dirt. Trails work best when integrated with the landscape, built well, and are well maintained (Gross 2006:122). "Trails can be classified into three broad

functions: recreation, interpretation, and education" (Gross 2006:122). Determining the use of the trails and who will be using them will also determine which types of trails to build and what materials to use (Gross 2006:122). Overall, trails are significant in getting visitors to explore and learn about an outdoor site or location.

Figure 30. Handicap accessible trail at Lubbock Lake Landmark.

Lubbock Lake

Three interpretive trails are located at Lubbock Lake; an archaeological trail, a nature trail and a wildflower trail. The archaeological trail is a 0.7 mile paved trail and leads visitors around the old reservoir and features different parts of the archaeological excavations. The nature trail is a 2.7 mile dirt trail and leads visitors around the entire

expanse of the preserve. Finally, the wildflower trail is a 0.5 mile decking trail that is handicap accessible and gives visitors information about the local flora and fauna in the preserve.

Hudson-Meng

Hudson-Meng has a walking trail that goes from the parking lot to the visitors' center which is about 0.05 mile long. The short tour takes about 15 minutes and goes around one half of the building outside then through the inside, explaining the location of the site and its history of discovery.

Mammoth Site

There were no trails at the Mammoth Site, only the short walk from the parking lot, which is about 0.03 miles. The walk did have panels along the way, describing rock formations and past eras such as the Precambrian, Paleozoic, Mesozoic, and Cenozoic. There is also a panel describing the new construction of the theater at the visitor's center. Inside the building you can also sign up to go on a 15-20 minute tour through the excavation area. The tour offers a lot of information about the formation of the site and continual discoveries.

Figure 31. Dirt trail leading around the Blackwater Draw site, going past the excavation building.

Blackwater Draw

At the Blackwater Draw site, a trail surrounds the gravel pit which is about 0.5 mile long. There are 20 panels located along the trail that describe locations of former excavations and discoveries. Locations such as mammoth bone beds and the oldest hand-dug well in North America are a few of the features highlighted along the trail.

Figure 32. Trail leading from the rest stop to the Windows on the Past Interpretive Site in Pine Bluffs.

Pine Bluffs

The Windows on the Past Interpretive Center does not have any interpretive or nature trails. However, a short concrete path leads from the interstate rest stop to the interpretive center. The path is about 0.15 mile long and many people walk the path to stretch their legs while traveling. No panels or information is located along the trail, but information is given at the rest stop to encourage people to visit the interpretive center.

Figure 33. Wooden bridge is part of the dirt interpretive trail at Murray Springs.

Murray Springs

The trail at Murray Springs is about 0.5 mile long and has ten interpretive signs along the trail. The trail is also part of a larger trail system along the San Pedro River.

Four of the six interpretive sites have interpretation trails associated with their facilities. The site with the best trail system was Lubbock Lake with three trails. Two of the trails were improved and one was a dirt trail. These trails went throughout the property and offered interpretation on the archaeology as well as the natural environment. The shortest interpretive trail connects the parking area to the interpretive building at Hudson-Meng. This natural dirt trail has a few signs along it giving visitors background

about the site before they reach the facility. The trail is not long but is well maintained, offers information, and serves its purpose of leading visitors around the site. The two sites that did not have a trail were the Mammoth Site and the Pine Bluffs site. The Mammoth Site did not need a trail because the parking lot was adjacent to the facility, and the facility surrounds the entire site. The Pine Bluffs site had a trail leading from the rest area to the interpretive center. The trail was not interpretive and had no signs or information about the site along the path. The trails average about one-half mile long and have panels giving visitors information about the site. "In almost every natural and cultural history area, the title Nature Trail invites visitors to stroll in the woods and learn a thing or two about what's there" (Kundson 1999, 240).

Interpretive themes

Developing an interpretive theme is an important part of creating an informative and cohesive interpretive site. A unified theme based around why the site is important or why it is being preserved will reveal the meaning of the site to visitors (Gross 2006:5). Themes help unify the information for visitors so they can get the most out of their visits. Themes also help by keeping the information limited to a few topics so visitors are not confused or overwhelmed. Interpretive themes can be overarching topics or specific details. Themes are dependent on the points that are highlighted as most important about the site. From the central theme, the subject matter can be further split into sub-themes.

> "Subthemes further develop the central theme statement and allow a logical progression into storylines. Subthemes may help guide the arrangement of facilities (for instance, when each subtheme area becomes a 'pod' or wing of a building or an area within the site) or they may simply help to organize storylines during the planning process and have no obvious physical relationship on the ground" (Brochu 2003:102-103).

Each of the brochures, signs, panels, and displays should fit into and follow the main theme or subtheme (Gross 2006:5). Ultimately, the themes and messages presented to the visitors are what will form their memories of the site and the messages they take home and share their experiences.

Figure 34. Diorama depicting prehistoric lifeways at the Lubbock Lake Landmark.

Lubbock Lake

While walking through the Lubbock Lake site facility, I observed that the major focuses of the interpretive themes were past human lifeways and chronology. The actual interpretive displays focused on how the archaeology has helped us understand past lifeways. The exhibits go in chronological order from the Paleoindian period to the

ceramic period. These displays are very archaeologically oriented, but when talking with staff the focus is more on lifeways. During interviews with Eileen Johnson, the interpretive themes she focused on were cultural chronology and scientific research. Through understanding chronology, visitors see that people have continuously occupied the area and each period is important. The scientific aspect of archaeology explains how things are discovered at the site and subsequently researched. Johnson (personal communication 2008) also indicated that interpretive exhibits are from the 1990s and they need to be redone because interpretation should not be static and it needs to be periodically updated.

Figure 35. Poster restating the hypothesis that the Hudson-Meng site is a cultural and not a paleontological site.

Hudson-Meng

At the Hudson-Meng site, panels around the facility and down the walkway relate to Lawrence Todd's 1990s work and interpretation. These panels are general describing the site and what the artifacts can tell researchers. However, there are posters around the walls of the interpretive center, put up by Agenbroad, which try to counter the 1990s interpretation. Therefore, in the past the interpretation given by Todd was describing the site, its artifacts and what information the artifacts were telling researchers. Todd believed that the site was probably a natural event. On the other hand, Agenbroad believes the site is a bison kill by human hunters. He believes the site is an arroyo trap that is a onetime event or a series of small events over a short period. The interpretation is now describing how it is believed that humans interacted in the site and how the information by Todd is believed to be wrong by Agenbroad.

Mammoth Site

Throughout the site and on the tour at the Mammoth Site, a lot of information is given about excavations. However, not much "hard" data is given, such as the total number of excavated and recovered bones. The information given focuses on describing the sink hole, what it represents, why animals became entrapped, how the site formed, and what the past environment of the area would have been like (Agenbroad, personal communication 2008). Visitors learn how bones are preserved as they are excavated and how the bones are curated and researched (McClain, personal communication 2008).

Blackwater Draw

Until now the interpretive themes at Blackwater Draw were mainly about hunting and early people, and the interpretation was given in a first person narrative. Now interpreters at the site are currently working on new themes. One theme is that humans lived on the landscape and utilized the lake at Blackwater Draw, returning to the area over and over. Researchers want to emphasize the known facts about the site, such as how the site is a campsite and prehistoric peoples migrated through the area periodically. The second theme is the role of the site in the history of American science. Early in the investigations, researchers decided to think more about the research as science with an environmental approach. Researchers did not theorize in an antiquarian approach of just collecting artifacts for the sake of museums. Their goals were to build a picture of what the landscape looked like, what resources were available, and what animals occupied the area. Many of the early researchers were paleontologists and did not know as much about humans as they know about other creatures (Crawford, personal communication 2009). At the museum, interpretation focuses on chronology, basic archaeological education, and megafauna and how people hunted them (Millward, personal communication 2008).

Pine Bluffs

The major interpretive themes at Windows on the Past Interpretive Center are chronology, historic archaeology, migration, what we can learn from archaeology, and how archaeology is multidisciplinary by including ethnobotany and geology. These themes are important because they help people understand how archaeology can fit into a

bigger picture. People who visit can be twice as interested because they are learning about more than just archaeology. More historic excavation is at the site than prehistoric but much information is given about both periods.

Murray Springs

The interpretive themes at the Murray Springs site are focused on the site in general – what occurred thousands of years ago and the history of the excavation itself. Interpreters want to explain to visitors what occurred in the past and take people back in time to understand the significance of the site. It is important for people to learn about the history of the excavation and the process of archaeology and excavation.

Across sites, the major themes of interpretation were discussing and explaining periods, chronology, continuous occupation, environmental reconstruction, and how or what we can learn from archaeology. Themes at each of the interpretive sites vary slightly from one site to the other, but all seemed to touch on chronology and what we can learn from archaeology. Many sites also thought it was important to show visitors what the site looked like in the past, so visitors can better visualize what life was like at that time.

Education materials

Education materials are fun, diverse, and get visitors involved while they are touring a site. Educational materials can be in the form of programs for school children, mock digs, site tours, and classes. Children's educational materials engage young

attention spans so more is retained from their visit. "Introducing nature and history to children through our interpretive efforts may be their first authentic exposure and, as such, can have a life-altering effect" (Ward 2006:151). Education programs are not only intended for children. Many adults also enjoy interacting in a program or class while on their visit. In publications, brochures, signs and other media, there should be portions for different ages (Sharpe 1982:290).

Figure 36. Part of the "Three Sisters Garden" that was planted by school children at the Lubbock Lake Landmark.

Lubbock Lake

Lubbock Lake has a good education program geared towards different age groups. The site hosts summer camps for two age groups. The seven to ten-year-old age group meets in the morning and the older group, ten-year-old and up, meets in the afternoon. Volunteers 15 years or older can volunteer to help in the lab processing data and artifacts or participate in excavation. The education program also conducts different activities such as the Three Sisters Garden, hikes, and other outdoor activities.

Figure 37. Hands-on activities for children and adults to interact with at the Hudson-Meng site.

Hudson-Meng

The facility at Hudson-Meng has a few programs for children to participate in while visiting. A "junior dig" in a negative results area of the excavation features planted bones that children can excavate and discover. There is a touch table with deer bones, hides, and soils that children and adults can pick up to feel and touch. These types of activities engage children and encourage them to ask questions about people of the past and nature.

Figure 38. Display of the "Sink Hole" activity done with school children when they visit the Mammoth Site.

Mammoth Site

There are many educational materials offered at the Mammoth Site. Educational programs focus on the Mammoth Site itself, touring the site, and educating the children about why the site is there and why it is important. There are K-12 curricular activities, merit badge programs, and educational "Mammoth Trunks". Kindergarteners participate in a mammoth floor puzzle and discuss how animals have the same bones as humans. They also do a mammoth tooth rubbing with paper and crayon. There is a fossil class for first graders that explains the properties of a fossil, the formation of a fossil, the age of fossils. One of the first graders projects is to create fossils from clay casts and plaster. In the second grade class children learn about tracks and what information the tracks give researchers; if the animal is running, walking, injured, what the animal eats and what scat the animals leave behind. For third graders, the lesson is about erosion since the sink hole filled and then eroded down. The project involves planting a small plastic bone in a plastic glass and filling it with potting soil, sugar and plaster. Then the children get to put three holes in the bottom of the cup, cover the cup with sand, and pour water over it to represent the erosion of the sink hole. In the fourth grade class children discuss entrapment by creating a sink hole in a glass with sugar cubes and frosting and a little plastic mammoth where they pour water over the mammoth and see if it sinks. Finally, for the fifth graders the lesson is about Paleoindian culture which discusses rock art, migration, atlatl, and spear throwing (McClain, personal communication 2008).

In 1993 interpreters at the Mammoth site met with local school teachers and discussed how they could incorporate the site into their curriculum, using hands-on lessons that change at every grade level (McClain, personal communication 2008). For

visiting children, there is a junior dig for children ages four to thirteen with cast bones buried under the sand that children can excavate. Schools can also participate in their distance learning program for K-12 children provided by the South Dakota Alliance for Distance Education. Boy Scouts are offered a geology merit badge through a class at the site. Many posters around the site and throughout the exhibit provide information without being overly technical.

Blackwater Draw

At the Blackwater Draw museum, displays and a touch and feel table are designed for children as well as school group tours. School groups, mainly comprised of local area school children, are taken to the site and interpretive center where they talk about changing environments, how people lived off of the land, and are given lessons on throwing an atlatl. Major topics discussed by school groups include context and leaving artifacts *in situ* to preserve the information. They also learn about mapping, the metric system, and the basics about archaeology.

Figure 39. Activity for children to "Sort Matrix" and identify materials in sediment at the Windows on the Past Interpretive Center in Pine Bluffs.

Pine Bluffs

Educational materials at Pine Bluffs' Windows on the Past Interpretive Site range from in-depth information for adults to children's projects. There are tables at the interpretive center offering matrix processing where children sift through soil, find flakes, excavate them with tweezers, and sort them into jars based on different characteristics. At the museum, visitors can try operating a pump drill and go to pottery or flintknapping workshops. For adults, many displays offer in-depth information while publications and articles about site available in the museum gift shop.

Murray Springs

Educational materials for the Murray Springs site are mainly general information intended for all audiences. Some brochures in the BLM office in town are for children but are mainly about the natural resources of the San Pedro River. Not much information is specifically given about archaeology. There is one overview handout that explains the Murray Springs Clovis site as well as rules for visiting the site. Site stewards give tours periodically and bring reproductions of the artifacts discovered at the site out on the tours so that people can learn hands-on.

At the sites visited, there were a wide variety of educational materials offered. The site with the largest educational program was the Mammoth Site. It offered classes for each school age group, mock digs, junior paleontologist programs, and a distance learning program. Lubbock Lake also offered a good educational program with camps during the summer for different age groups, volunteering to help with real excavation, and hikes or other activities. Other sites offered educational activities such as atlatl throwing, flintknapping workshops, and a touch and feel table for children. These types of programs are very important to interpretive sites because activities are for all ages and keep visitors returning to the site.

Visitor's interpretation and given factual data or told story

The way in which visitors are given information is also an important idea to keep in mind when interpreting for the public. Not only is it important to have themes but it is important to determine how the information is presented. Interpretation can be presented

in a "told" manner where facts and conclusions are given that tells the visitor what they should understand about the site. "Heritage interpretation is a communication process that guides visitors in their search for meanings in objects, places, and landscapes" (Gross 2006:6). Information can also be shared in a way that makes the visitor think in depth and come up with their own conclusions or insights about the site. "By providing opportunities for personal interaction with the resources, the interpreter encourages visitors to interpret for themselves" (Tilden 2007:71). This gives visitors the chance to interact during their visit and ultimately increases their knowledge and the information they retain.

Sites have to try and balance what information is given between telling a story about an interpreted site and giving factual information. Giving all factual data might be useful to someone visiting a site that knows what the information means and wants to build on their knowledge. Telling visitors a story is helpful visitors that know little about the site and have little background knowledge of the subject. "This engagement with 'the story' is part of what draws people to history and part of the reason we teach history to children (to 'learn from the story') (White 2000:28). It is important to tell a story because it is a large part of how we as humans pass along information, but it is important that the story is based on factual, tangible data.

Lubbock Lake

When visitors come to Lubbock Lake they are given an interpretation based on facts through a story. The exhibits display artifacts and information collected at the site but also elaborate and tell visitors what story the artifacts are telling.

When asked "On a scale from one to five, what is the focus of archaeological interpretation here between factual data (one) and storytelling (five)?" Johnson agreed that there needs to be an even balance between factual data and storytelling. The story has to be based on facts but presented in a way that people will understand. People are given the story of the site through the exhibits and reading information in a way that is relatable to their own experiences. When visitors go on tours of the facility they are able to ask more questions, participate in activities and build onto the story they read about in the exhibits.

Hudson-Meng

When visitors come to the Hudson-Meng site they are now given a "told" interpretation, making sure visitors know the current Agenbroad story is different than Todd's. If visitors are interested in reading both arguments and deciding which they believe for themselves, there is a spiral bound notebook in the front welcoming area giving both sides of the interpretation.

Agenbroad rated both factual data and storytelling even in interpretation, you need to tell both. It is helpful for people to hear a story to understand what is going on at the site but the story needs to have factual data included with it.

Mammoth Site

For visitors to the Mammoth Site, overall interpretation has not changed much since the site was first discovered. From the beginning of excavation and discovery, paleontologists knew the site was a sink hole. This part of the interpretation has not

changed through additional discoveries. On the other hand, new discoveries lead to the addition of information such as the diversity of animals in the sink hole. There were not only mammoths but short faced bear, camel, llama, and a wolf.

The site focuses its interpretation on giving information through facts and data. Interpretations try to portray what the site tells researchers, what the site means, and why it is important.

Blackwater Draw

For visitors to Blackwater Draw, they are given a told interpretation by explaining what has been discovered at the site and what those discoveries mean. Visitors learn about the history of the archaeological work, which helps in understanding how the research has evolved.

In the future the Blackwater Draw site interpretation is planning on being around a 2 on the scale, where it gives a lot of information and data but with a story. Crawford (personal communication 2009) explains it is important to tell a story for people to understand and find the site interesting.

Pine Bluffs

For visitors to Pine Bluffs, the museum and the site focus on different lifeways and encourage people visiting the site today to relate their lives to the lives of those in the past.

Interpretation at the Pine Bluffs Windows on the Past Interpretive Site is based on both factual data and storytelling. Many people understand and are interested in the larger picture, but more in depth information can quantify the story for people.

Murray Springs

When visitors come to the Murray Springs site, they are expected to come up with their own ideas about the site based on the given information. The interpretive panels give facts and insight, but tell visitors what date from the site means.

The interpretation at Murray Springs leans to the site of factual data rather than telling more of a story. The interpretation gives visitors facts and research results but at the same time tells a story based on what the research is telling archaeologists.

At most of the visited sites, information is given in a "told" manner. Information and the significance of what it means are clearly described. At the Hudson-Meng site for example, visitors are told what the current interpretive theory is but they are given the opportunity to read about the opposing interpretation and decide which one they most agree with. At the Murray Spring site, the goal is for the information to speak for itself so visitors have to come up with meaning on their own. On the other hand, the Blackwater Draw site focuses on making sure visitors understand why the site is significant. These are two opposing ways of presenting information for interpretation. The best approach would be to give enough information that visitors understand the facts and importance of the site but are left with some questions to ponder and come up with understanding in their own mind.

Overall, all sites agreed that interpretation should follow as story but be tied to factual data. Giving all factual data would be hard for visitors to follow and understand, whereas telling a story might leave people without all the information they were hoping to gain from the experience. Therefore, giving visitors a story that incorporates factual data, or has more information for those who are more interested, is the way all sites should present their interpretation.

How chosen for interpretation

Determining why a site should be chosen as an interpretive site is a difficult process. Not all archaeological or paleontological sites can or should become interpretive sites. It is important that they are accessible to the public, contain interesting information, are large enough for interpretation, and are funded. "Planning involves researching the site and its importance, the visitors' demographics and motives, and management goals and objectives" (Ward 2006:52). After the planning research is done for the site, interpretation themes, subthemes and messages can be designed to meet the needs of the visitors and management (Ward 2006:52). Finally, evaluating the outcome of the programs and how the site is operating helps improve management and interpretation in the future (Ward 2006:52). This entire process must be completed before the site can truly be successful as an interpretive site.

Lubbock Lake

Preservation, public involvement and research are the three main reasons why the Lubbock Lake site was chosen for interpretation. During the late 1930s and early 1940s,

W. Curry Holden, the director of the West Texan Museum approved excavation of the Lubbock Lake spring after Folsom points were discovered. The site was decided by W. Curry Holden to become an interpretive site upon discovery in 1936. From the beginning, Curry's vision was to preserve the site for research as well as invite the public to get involved in the history. Curry strongly believed that the site belonged to the community of Lubbock, not just the physical land owner.

There is a community and youth program that runs year round which enables the public to become and stay involved. Some of their visitors are the second or third generation of visitors who come to show their relatives or friends the site and its importance to them and the community. Heritage locations and preservation have to be dynamic and have to have value and be of value to the local community for them to buy into the site. The interpretive center was built with funding by the state of Texas in 1991, to further facilitate education and research.

Hudson-Meng

The site was first discovered in the 1950s, when the Soil Conservation Service was going to put in a dam and encountered buried bones. They tried to contact the local University but the SCS could not generate any interest, so they went ahead and built the dam. Then the land owner Albert Meng and Bill Hudson, the mayor of the town of Crawford tried to get professionals out to visit the site (Agenbroad, personal communication 2008).

Agenbroad from Chadron State College came out in the early 1970s and began excavation of the site. They put a fence around the site and during the summer they

would have 200 to 300 people visiting the site per day. This is when they started having two of the 12 crew members start interpreting the site for the visitors. Shell Oil even came out and used the site for their movie "The First Americans". The site became well known and in the 1990s, the United States Forest Service proposed to make it an interpretive site, acquiring about 8 million dollars for road construction, lavatories, and a parking lot (Agenbroad, personal communication 2008). The parking lot was built on the old Nance Homestead, which had been burned down by a prairie fire and then sold to the Forest Service. Then, Todd and Rapson began excavations in 1991, 1992, 1993 and 1996. The building over the site was erected in 1997 to preserve and protect the site and to allow for interpretation. The building was placed over the old exposed excavation area which left little room to expand the excavation within the protection of the building (Agenbroad, personal communication 2008).

Mammoth Site

The Mammoth Site became an interpretive site from the time of discovery. It is located close to the highway and within the city of Hot Springs, enabling great access for visitors. The hill was being cut back for fill when a bulldozer exposed a mammoth tusk. Agenbroad was traveling to start excavation of nearby Hudson-Meng when he was contacted to look at the remains. At least four to six individual mammoths were exposed by the bulldozer. Agenbroad worked at the site for 34 years with a six year hiatus beginning in 1979 when a building was built over the site to enable faster progress during excavation.

Blackwater Draw

The Blackwater Draw site became an interpretive site because of its significance as the first Clovis type site. In 1934, there was thought of putting a museum or interpretive center at the site. In 1940 the National Park Service looked into making the area a National Park but the area was too far off the beaten path and did not have a lot of natural wonders – even though it had a lot of cultural wonders (Crawford, personal communication 2009). The site has a long history of being considered by larger organizations to become an interpretive site but has not been selected. In the 1960s the museum opened to the public as ongoing excavations were conducted at the site. From 1984 to 1988 the building and the interpretive trail were built at the site. Then in 1996 the interpretive building over the excavation block was built. Interpretation at the site began around 1988, and continues through the present. However, researchers and professors were more focused on conducting research, doing archaeology, geomorphology, and teaching classes (Crawford, personal communication 2009). Interpretation has taken a back seat to the research due to a lack of funding, but ENMU is planning to improve the interpretation soon (Crawford, personal communication 2009). The University is trying to form a coalition with the New Mexico State Parks, so it can get all maintenance, trails, and buildings funded with a different annual appropriation. The site would still be owned by ENMU and the University would handle all of the research. The State Park would handle all of the maintenance and nature related issues. State Parks have a good history of interpretation so the State Parks would produce the interpretation with the University's help.

Pine Bluffs

Charles Reher grew up in the city of Pine Bluffs and knew of the archaeological site since he was a young child. The site was clearly visible from Interstate 80 making the site an ideal candidate for public interpretation. Interpretation started as tours of the site. Then, a grant was received to put in the sidewalk from the interstate rest area to draw in more visitors. Reher received a National Science Foundation grant for three years that gave the site more public involvement. Grants, tours, and field school fees over the years added up to 1.5 million dollars and enabled researchers to build the building over the archaeological site.

Murray Springs

In 1988, the BLM selected the Murray Springs site to be included in the San Pedro National Conservation Area. The site it is one of the top three most significant Clovis sites in the United States and has much international significance. The site is significant because of its diversity of evidence about prehistoric occupation. Based on excavations, the site is rare because there was a definite and intact camp site with a separate butchery area.

Many of the sites were determined to be interpretation sites from the beginning of their discovery. On the other hand, it proved to be a little more difficult for most sites to generate the funding to open to the public. For example, the Blackwater Draw site was discovered in the 1920s, but the nearby museum was not built until the 1960s and the interpretation at the site did not begin until the 1980s. The Mammoth Site has a similar

history. Researchers intended to interpret the site at the time of the discovery, but funding took about ten years before enough money was raised to build the interpretive building. The researchers who discovered and worked at these significant sites intended the sites to be open for the public but it took a few years to gain funding to make it happen.

Changes in interpretation

Interpretation of archaeological and paleontological sites might change as more research is done and more is learned and discovered. New discoveries could change the story of the site. Development of new technology, both for research and for interpretation, can change interpretation as well.

Lubbock Lake

Curry's interpretation in 1936 focused on the site as a Folsom site. The interpretation began by having local community member volunteers giving tours to visitors only on Saturdays. Researchers now know the site is more than a Folsom site and therefore, interpretation now describes all periods. Changes in interpretation include the addition of facilities including the interpretive center, museum, and trails.

Hudson-Meng

From research in the 1970s, Agenbroad interpreted that the site was cultural and formed by one event or a series of events over a short period. Todd then began excavations in the 1990s. Todd interpreted that the site and the bonebed were natural, not

cultural, in formation. These are considerably different interpretations and both provide significant amounts of data backing up their interpretations. This difference in interpretive message makes the site highly controversial in the archaeological world. The controversy is intriguing to both visitors and researchers.

Mammoth Site

Small changes in the interpretation occurred over time with steady improvements and new discoveries at the Mammoth site. The site is paleontological and not archaeological. Interpretation will not change much since there are not multiple functions of the site. Researchers have known what happened at the site since it was first being excavated but they are learning more about the development of the site with new findings like the short faced bear (Agenbroad, personal communication 2008).

Blackwater Draw

The former care taker at Blackwater Draw did not create an interpretive theme for the site, but instead presented overarching information about the site. The information changed slightly from year to year as more was learned. About ten years ago, ENMU started pursuing funding for the interpretive signs and in 2008 they put the signs in. The current signs are intended to hit points about the site but do not have major themes (Crawford, personal communication 2009). The current archaeologist is making the interpretation at the site more cohesive and focusing on the history of the site itself as well as the history of the excavation (Millward, personal communication 2008).

Pine Bluffs

The museum and site started out as small handmade facilities and displays, but both became larger. Some displays are still somewhat handmade, but more improvements are planned. One improvement is moving the museum near the interpretive building. This will improve visitation to both locations and new displays will be created.

Murray Springs

Changes made to the interpretation of the Murray Springs site have to do with visitor comfort. For example, visitors had expressed interest in increasing the amenities offered at the site. New visitor comfort includes benches spaced along the trail and the ramada with a picnic table for shade. Having the ramada and picnic bench not only provides shade but also keeps people at the site longer. This encourages visitors to take more time to read the signs and ponder the site. The BLM wants to replace the recycled fiberglass benches with more natural looking benches that help people to get a better idea of the natural setting of the site and are less distracting the natural area.

Every site has made changes over time to the interpretation presented to the public. The most drastic changes came at the Hudson-Meng site. The site has been researched by two different people over the course of its history. These two professionals have opposite opinions about what occurred at the site. The interpretation switched between these two extremes over time. The Lubbock Lake site interpretation changed since the beginning also. This site was originally interpreted as a Folsom site but more

research has been done and researchers know now the site was revisited throughout every period. Changes to the interpretation might be upgrading educational materials or facilities. Changes at the Murray Springs site include a shaded table and benches along the interpretive walk. Interpretive material has also been updated at the Pine Bluffs site. Overall, it seems appropriate to update information and maintain facilities at interpretive sites as needed, or as can be funded, to ensure a good experience for visitors.

Site funding

Site funding is one of the most important parts of an interpretive site. Not enough funding makes it difficult to open and maintain the site facility and grounds. Funding can come in the forms of grants, associations with museums or universities, charging admission to the site, or government funding. "The success rate [for site funding] in approaching foundations, corporations and philanthropic individuals is commonly believed to be about five percent" (Beck 1998:127). Funding can increase even more by developing symbiotic relationships with organizations and people who support the site and making the relationships beneficial for both parties (Beck 1998:127). A cohesive and successful interpretive management plan helps people understand why a site is important, why it is worth preserving, and why it should be shared with others. Partnerships with both public and private organizations can also offer monetary support as well as program or facility support (Beck 1998, 128).

Lubbock Lake

Lubbock Lake is funded by private funds, public and private grants, federal government funding, tax dollars, state appropriation, small endowments, and local fundraising. There is no charge for the public to visit the site and museum, or to participate in any programs offered. Eileen Johnson feels strongly that the community has already paid their admission and should be allowed to know what is going on at the site.

Hudson-Meng

The site is funded primarily by walk-in payments and the Hudson-Meng fund through the USDA Forest Service. The site was interpreted by the Forest Service until 2005 when the site was going to close unless a non-profit organization took it over. The nearby Mammoth Site set up a cost share agreement for two years which had the Mammoth Site take care of the maintenance, staffing, and insurance and the Forest Service took care of the rest. The Mammoth Site board of directors decided they could no longer participate in the cost share agreement because in 2007, they were short $5,000. In 2009, the Nebraska National Forest and Grasslands took over management of the site and it is open seasonally (Counce, personal communication 2010).

Mammoth Site

The Mammoth Site is mainly funded by entrance fees. However, grants have been used for building, expansion, equipment, and curation. When Agenbroad began at the site, he tested for a year and then wrote a proposal for $500 from the Geological

Society of America. The crew was funded by Earth Watch during early excavations. Earth Watch is a non-profit organization that promotes scientific field research and education about the earth and environment. Funding for the building was started by the Mammoth Site Group who conducted bake sales, yard sales, car washes and auctions. The Mammoth Site Group saved $170,000 over ten years of fund raising. The group also wrote to companies to solicit donations. One of those companies, the 3-M Bush Foundation, sent out a junior executive to look at the site and donated $176,000. The site received a grant for $300,000 through incentive from the State Legislature for the Mammoth Site to create jobs in a low income area. The Mammoth Site then asked the local bank for a loan of $300,000, putting the total amount of money raised for the first building at the Mammoth Site to $946,000. The building was expanded in 2001 through the same company, the county, and loans through the bank. Currently, the site is raising money to add a theater in the near future.

Blackwater Draw

The Blackwater Draw site is funded through the legislation of New Mexico with an annual appropriation. The funding is not enough to make the site run fully so ENMU donates all the utilities and maintenance support for the facilities and grounds. The site archaeologist and museum curator are funded from an appropriation through the university. The anthropology department from ENMU assigns four graduate students as graduate assistants at the site. The site also stores all artifacts at the curation facilities on the ENMU campus. Other forms of funding include grants and gate admission.

Pine Bluffs

The Pine Bluffs site is funded by donations to buy supplies and the city budget. The site is considering admissions but would like to improve displays beforehand. The site is funded by the Town of Pine Bluffs through their city budget as a cooperative University-City venture in which the City owns the buildings and the University of Wyoming staffs the facilities. There is no secure funding for the site other than the City. Reher is supported by the University of Wyoming as a faculty member, but the University does not support the site monetarily. Reher also wrote a $200,000 sales tax initiative in 2008 but it was dropped off the ballot.

Murray Springs

The site is mainly funded through the Bureau of Land Management as well as volunteer projects to help with maintenance. The field office managing the site is trying to get funding to reconstruct the bridge that crosses the arroyo that washed out a few years ago. Research for the site is mainly funded through the University of Arizona and the research is mainly done by C. Vance Haynes.

All of the sites visited had different forms and combinations of funding in order to open and maintain the interpretive site. Two sites, Murray Springs and Hudson-Meng, are funded through government agencies. Both Blackwater Draw and Lubbock Lake are funded through the local government tax money but get funding through grants. Grants are a large part of the funding that interpretive sites receive, whether it is a onetime grant for specific needs, or an ongoing grant. Some sites, such as the Blackwater Draw site

have assistance provided monetarily and with staffing through an associated university. Overall, there are a lot of avenues to fund an interpretive site, but sites often have to utilize more than one to keep their site running smoothly.

Associated with university or museum

The association sites have with universities and museums is often beneficial for both parties. Universities and museums have staff and students who are research oriented and can engage in research and work at the site. Relationships with these entities can bring funding and "free" student help to do research and staff the facilities. It can give students the opportunity to gain experience and learn techniques that will further them in their education and career.

Lubbock Lake

The site is associated with the local museum located at Texas Tech University. Eileen Johnson is the Director of the Lubbock Lake Landmark, the Curator of Anthropology at the Museum of Texas Tech University, and a Professor of Museum Science.

Hudson-Meng

The site is currently not associated with a university or museum. Early on, students from Chadron State College, working with Agenbroad, began excavations at the site. Then in the 1990s, Todd and his students began archaeological field school and excavations at Hudson-Meng. In 2007, Chadron State College was funded through the

Forest Service to conduct soil profiles, botany, and entomology research but did no excavation. Mark Muniz from Saint Cloud University and Doug Bamforth from the University of Colorado came in 2007 to look at the site and previous research. They had a few students from University of Colorado who were assisting with research and excavation (Agenbroad, personal communication 2008). Since 2007, Mark Muniz from Saint Cloud University has continued research at the site in coordination with the Forest Service (Counce, personal communication 2010). Collections are now being held by the Smithsonian museum in Washington D.C.

Mammoth Site

The Mammoth Site is not associated with any museums or universities. All of their collections are stored on site in their curation facility (Agenbroad, personal communication 2008).

Blackwater Draw

The site and museum are both owned and operated by Eastern New Mexico University (ENMU). Although owned and operated by ENMU, the museum and the site act in separate entities from each other. The museum has been static because it was not built with a long term interpretive plan for improvement and upkeep (Crawford, personal communication 2009). The museum does not actively go after outside funding so they are not able to change exhibits very often. The museum and site do not work together but they are both run by the university and answer to the same Vice President (Crawford,

personal communication 2009). The site currently conducts field work with the university and hosts a field school (Crawford et al. 2010).

Pine Bluffs

The site is considered a University of Wyoming research facility though the site is managed with a cooperative agreement between the city of Pine Bluffs and the University. The association with the University of Wyoming and public archaeology allow the Pine Bluffs site to seek public funds such as sales tax initiatives. The Pine Bluffs Museum is directly associated with the Windows on the Past Interpretive Center, and both are run by Charles Reher.

Murray Springs

The Murray Springs site is associated with both the University of Arizona and the Arizona State Museum. These facilities are mainly in charge of the research that goes on at the site while the Bureau of Land Management does the interpretation at the site using data collected during research.

Five of the six sites visited are associated with a university or museum. These relationships vary from being owned by a university (Blackwater Draw), to having some research done by university faculty and students (Hudson-Meng). The only site not associated with a university or museum is the Mammoth Site. All of their work is completed by staff at the site and curation of artifacts is done at the site facility. Even though a site is associated with a museum or university, they might not work that closely

with them. For example, the Blackwater Draw site is also associated with the Blackwater Draw museum but they do not work together on projects or their interpretation. All in all, sites with relationships to universities or museums can be beneficial for interpretive sites but do not have to exist for the site to be successful.

Table 3. Chapter 6 Pubic Interpretation Topic Summary

	Lubbock Lake	Hudson-Meng	Mammoth Site	Blackwater Draw	Pine Bluffs	Murray Springs
Brochures	6	1	3 brochures, 10 flyers	5	5	1
Panels	66 panels	6 panels,18 posters	60 panels	20 panels, 26 posters, 55 dioramas	38 panels, 14 table displays	10 panels
Trails	3 trail; archaeology, nature and wildflower trails	1 walking trail	No trails	1 trail	1 trail	1 trail
Themes	Human lifeways, chronology, scientific research	Artifacts and what they tell, Site was human caused vs. nature caused	How was formed, paleoenvironment, why animals were entrapped	Humans interact with landscape, history of American science	Chronology, history of the archaeology, migration, archaeology as multidiscipline	Human lifeways at site, history of the archaeology
Educational Materials	Education based on age, summer camps, volunteer excavation	Junior dig, touch table	K-12 programs, learning trunk, distance learning, boy scout program	Touch table, atlatl throwing, school group programs	Interactive tables, prehistoric tools, pottery and flintknapping classes	Few brochures, site tours
Visitors Interpretation	Facts through story	"Told" interpretation	"Told" interpretation	"Told" interpretation	Facts through story, develop own ideas	Facts through story, develop own ideas
Factual Data vs. Story	3, balance	3, balance	3, balance	2, facts but with a story	3, balance	2, facts but with a story

	Lubbock Lake	Hudson-Meng	Mammoth Site	Blackwater Draw	Pine Bluffs	Murray Springs
How Chosen for Interpretation	Preservation, public involvement, research	Preservation, protection, education	Education, good location	Education, research, first Clovis site	Education, good location, public involvement	Significant Clovis site, research
Changes in Interpretation	Yes, moderate changes	Yes, large changes	Yes, small changes	Yes, small changes	Yes, moderate changes	Yes, small changes
Funding	Private funds, public and private grants, federal funding, tax funding, small endowments, fundraising	Walk in payments, cost-share with Mammoth Site	Entrance fees, Geologic Society, Earthwatch, 3-M Bush Foundation, fundraising, State funds, bank loan	Site of New Mexico annual appropriation, ENMU, grants, entrance fees	Donations, City of Pine Bluffs, University of Wyoming	BLM, University of Arizona, Arizona State Museum, volunteers
Association with Museum or University	Texas Tech	Chadron State College, CSU, Saint Cloud University, CU	None	ENMU	University of Wyoming	University of Arizona, Arizona State Museum

Public interpretation of a site is important because interpretation is one of the most widely used and effective ways of preserving and protecting cultural resources by informing the public. Interpretation of cultural resources can be done in many different forms including, interpretive panels, brochures, trails, museums, and educational materials. Not including dioramas or other displays, there is an average of 33 informational panels per interpretive site. There was also an average of three brochures per interpretive site. These types of interpretive mediums are very useful and help the visitors become familiar with the site, learn about the sites importance, and tour the site effectively. Many sites have trails either for interpretation or recreation to help with visitors' tour the site. These trails often have interpretive panels along the way that stop at significant areas or brochures that visitors can use to follow along as they walk. Additional educational materials include summer camps for children, flintknapping workshops, K-12 programs, learning trunks, touch tables and junior digs. The interpretation visitors are receiving uses facts and data recovered during excavation and research, but is presented in a way that tells a story. Interpreters from the sites believed that it was important to have a balance between facts and story to best interpret for the visitors. Small to large changes exist in the interpretation presented at the archaeological sites over the years. These changes have resulted from change in management, new technologies, and new discoveries. The main reasons these sites were chosen for interpretation in the beginning were for preservation, research, pubic involvement, education, and an easily accessible location which that draw people. During the development of these sites into interpretive sites, they became associated with universities and museums. This association not only offered some financial assistance

but gave sites access to resources like new technologies, research opportunities, and student and faculty involvement. Other forms of funding have come from public and private grants, endowments, donations, state appropriations, entrance fees, and fundraising. Many of these sites started out small with little funding and have built up their facilities and resources over time to what is presented for the public today. Overall, knowing the most effective and widely used forms of interpretation is helpful in creating a visitor friendly interpretive site. It ensures that visitors have access to information, education and quality programs and facilities that make their experience positive.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

The goal of this thesis was to research how public interpretation is conducted at Ice Age archaeological sites and how this information can be used to make recommendations for the interpretation of the Lindenmeier Folsom site, a National Historic Landmark. This study examined six archaeological sites interpreted for the public and looked at information provided regarding the archaeology, how interpretation is conduct, and what sites experience in visitation.

Figure 40. The author touring and taking photographs of the Lehner Site, a site soon to become an interpretive site near Murray Springs in Arizona.

I documented my observation of each site with photographs of interpretive panels, displays, trails, excavations, and exhibits to analyze and compare content between sites. I also documented observations and interviewed personnel about archaeology, visitation, and interpretation. Research allowed for significant observations and conclusions about the current interpretation of these sites to the public.

It is challenging to interpret archaeological sites from this period because there is often little for the visitor to see because artifacts have been removed by excavation or are remains buried. These sites lack visible architecture and have to rely on the creativity of interpreters to help visitors understand the dynamics of the site and what information the

site tells about past human lifeways. The major topics interpreters at the sites focus on teaching visitors include discussing and explaining periods, chronology, continuous occupation, environmental reconstruction, and how or what we can learn from archaeology. All of the sites touched on portions of these topics that helped the visitor understand how the site was formed and why the site is important. Various types of built environments at each site and the differences in these structures had a significant impact on how the interpretation was presented. For example, there are various types of trails, an interpretive center, and laboratory at Lubbock Lake. In contrast, there is a dirt trail with interpretive panels at Murray Springs, but no larger interpretive center or kiosk. Visitors are educated at Lubbock Lake with many interpretive materials and given access to artifacts and programs. Murray Springs has a good interpretive theme and message, but the learning environment is very independent, as the visitor learns independently by reading the panels. Many sites offer a wide variety of educational materials like mock digs, children's programs, and atlatl throwing. Educational materials engage the visitor with the site and engrain information making the visit memorable.

The State of Paleoindian Public Interpretation

Overall, public interpretation at Paleoindian and Ice Age sites is variable across the Great Plains, but positive in scope. Many of the sites have similar interpretive themes and topics, but the visitor education is handled in different ways. Some sites have larger facilities offering displays, interpretive panels, and programs. Other sites are remotely located with smaller facilities and fewer programs. Both types of interpretation work well, depending on their location and the type of site under interpretation. Personnel at

interpretive sites are good at recognizing their current financial situation and working with what is available financially. Many of the sites continue to seek funding for the improvement of their facilities and interpretation. One area that needs improvement is an aggressive pursuit by the site for additional funding to upgrade and maintain facilities and programs. Some of the sites have brochures and programs geared towards multiple age groups. Other sites need improvement of programs and materials for different age groups, so children and teenagers become interested and engaged in learning during visitation. Further, sites should be communicating with each other to share ideas and information. It would be ideal for the major sites of this ancient period to have similar themes to make regional interpretation cohesive in scope.

Lindenmeier Recommendations

These recommendations are a summation of the observations and research conducted at Lubbock Lake Landmark, Hudson-Meng, the Mammoth site, Blackwater Draw, the Pine Bluffs site, and Murray Springs. These six sites are Late Pleistocene and Early Holocene interpretive sites. Each of the subject areas were analyzed, compared, and contrasted to determine the most ideal method of interpretation. These ideals are the basis of my recommendations for interpretation at the Lindenmeier site.

Archaeology

How much information is given about the archaeology?

Lindenmeier site interpretation needs to rely heavily on information about the archaeology. Visitors can understand relative and absolute dating as well as deposition it they are first introduced to chronology and stratigraphy. An early understanding of absolute dating, deposition, chronology, and stratigraphy helps the visitor understand why archaeologists need to excavate sites to determine the extent of the cultural deposits. It also helps visitors understand how artifacts are preserved and what artifacts can tell us. Next, visitors should be given information about the artifacts found at the site. Information about artifacts ties into chronology because visitors can see how cultural materials changed over time and how these "styles" can help archaeologists figure out what period they are from. Last, it is important to explain how the site was discovered and the history of the archaeological work. This is important because people can see how archaeological and scientific techniques have changed. In summary, archaeological information shows visitors that archaeologists create history while uncovering history.

Does the interpretation describe the landscape at the time of site occupation?

Describing the landscape at the time of occupation is an important topic that should be presented at the Lindenmeier site. This helps visitors understand what the area looked like at the time of occupation. A description of the site helps visitors understand how the site was created and why people wanted to live there thousands of years ago. It is also important for visitors to understand that the Lindenmeier site was occupied over multiple periods, beyond Folsom. Describing what drew people to the area over and over again helps visitors understand its significance.

Are people visiting the site strictly to learn about the archaeology or do they also come to enjoy the natural environment?

People visiting the Soapstone Prairie Natural Area should be expected to visit Lindenmeier and vice versa. People visiting the Lindenmeier site are mainly coming to see the archaeology. People will visit the site during recreation if the site is accessible and incorporated with the trails and activities for the natural area. Incorporating reconstructions of the landscape at the time of occupation may attract visitors not necessarily interested in archaeology and help them imagine a different landscape. Interpretation along the trail can successfully incorporate information about the archaeology with natural resource interpretation.

What is it about hunter-gatherers or Paleoindians that interpreters want the public to understand?

It is important for visitors to take away some knowledge of hunter-gatherers and Paleoindians. First, the interpretation should explain that Native Americans have been living in the area for thousands of years. It is important for visitors to learn how the people of the past survived on the area's resources. Second, one must explain that Paleoindians and hunter-gatherers were mobile people and potentially traveled long distances for resources. These resources not only included forage and water, but also large game like mammoth, camel, and bison. Third, the point that should be made that the initial discovery of the Paleoindian culture was a huge accomplishment in science that fundamentally changed what we know about Native Americans and prehistory. All of these topics are important because they touch on several of the reasons that this period is culturally unique.

Visitation

Built environments and incorporating them into natural landscape

The built environment at Lindenmeier should begin with an improved trail with interpretive signs at significant points of interest. The trail should not be built on the site itself, but at least in proximity to the site, so important features can be identified and discussed. The trail should be improved with a well maintained dirt trail or a paved or floating decking material. The area affected by the trail should be as undisturbed as possible, but if disturbance occurs, proper archaeological survey, recording, and mitigation should take place.

A small interpretive building on site that goes into more detail is extremely helpful to visitors. Four of the six sites visited had current excavation areas exposed with a building over the ongoing work providing shelter an overall site protection. Lindenmeier is not currently being excavated, so it is not necessary to encompass an excavated area in a building at this time. However, an interpretive building would help facilitate ongoing work and research at the site. An interpretive center would also have displays, replicas, additional information and staff to answer question for the visitors. For example, the Blackwater Draw site has a museum closer to town but one also on the site. The on-site building has small displays and visitors can ask the staff questions. The potential building at Lindenmeier could be open seasonally and staffed by students and volunteers.

Incorporating the built environment into the natural landscape at the interpretive sites I visited was not a top priority. Of the six sites visited, only the Murray Springs site made it a point to use natural materials for their built environment. The other sites focused on making sure facilities were suitable for visitors and also accommodated their interpretation. Many of the sites started off small with little funding, so their main priorities were to make the site a good interpretive site and not necessarily to blend in with the surrounding landscape. That being said, Lindenmeier is located in a very open, plains environment that makes it easy to see great distances. Incorporating the built environment into the natural landscape at Lindenmeier would be beneficial to visitors who want to see the natural area undisturbed. Incorporating the built environment into the natural landscape would also set the tone for the setting of the site.

Site integrity, security, and problems with vandalism or looting

Site integrity and security should be one of the highest priorities for the Lindenmeier site. To ensure site security, visitors should not be allowed directly on the site unless monitored and supervised. If excavation occurs on the site at a future date, the excavation should be covered with a building so it can be locked and secure. A fence with locked gates should be placed around the perimeter of the site to ensure people do not wander off trail onto the site. To ensure site integrity, areas that are actively exposed or are deflating should be monitored and artifacts should be mapped and collected. Site integrity should include being cautious that activities do not affect the future potential for radiocarbon dating. Weed eradication and other activities that might disturb the soils of the site need to be checked to make sure there is no effect to buried cultural deposits or the radiocarbon record.

Problems with vandalism and looting should be minimal as long as site integrity and security is ensured. All of the sites visited had little or no problems with vandalism or looting. The two sites that had experienced vandalism or looting included people going off trail and people trying to dig small holes for artifacts. None of the sites experienced defacement of the property or large scale excavation or collection. Therefore, Lindenmeier should hopefully experience little to no vandalism or looting.

How people hear of the site and are they visiting during vacation or for education

The main avenue people will hear about the Lindenmeier site is through brochures, local newspapers, and online information. Word of mouth will also attract people to the site.

People will be visiting the Lindenmeier site for educational tours and during vacation. Visitors from outside the Fort Collins and Front Range region will more than likely be touring while on vacation too. People visiting from the region will be visiting for school trips, on educational tours, and during recreation at the Soapstone Prairie Natural Area.

Visitation each year and demographic

To be safe, the Lindenmeier site should expect at least 5,000 visitors each year, with future visitation possibly reaching 10,000 to 15,000 people per year. For the sites visited, the lowest number of visitors was 5,000 with 110,000 at the high end. When comparing Lindenmeier to the site with the most similar setting and facilities, the closest example I could find would be the Murray Springs site. This site is located six miles east of the city of Sierra Vista, Arizona. Murray Springs is incorporated into the larger San Pedro Riparian Natural Conservation Area which includes nature trails. Based on visitation at Blackwater Draw, Lindenmeier could experience as many as 25,000 visitors per year since it is part of the Soapstone Prairie Natural Area.

The peak seasons of visitation at Lindenmeier should be expected during the summer months of June, July, and August. These are months that people go on vacation

and children are out of school. Families are looking for new and different things to do and explore during this time of year. It is also a time when the weather is mild, enabling people to recreate outdoors.

People most likely to visit Lindenmeier will be children on school trips, local adults interested in archaeology, and recreators. Visitors will also include people from out of state and even international visitors. Lindenmeier is not far from Interstate 25, so the site should attract people traveling through the area while on vacation. A large population of visitors to Lindenmeier will likely be recreating in the Soapstone Prairie Natural Area and stopping to visit the site while they are in the area.

Estimates of tourism dollars or effects on local economy

The effects of tourism and visitation to Lindenmeier might be difficult to estimate. Like other interpretive sites experienced, local businesses may see an increase in customers who are in the area visiting the site or natural area. The site and natural area are several miles from town, so the impact to local economy will be minimal.

Interpretation

Brochures

Brochures are a significant part of the interpretation at an archaeological site. Brochures can be utilized to elaborate on the information given in other mediums. They can also be used to briefly describe the site and important points to remember. Brochures can then be handed out to visitors to read while touring, taken home with visitors, or passed out to local information centers and rest stops. The brochures from my study sites

included general information on the locale, trail maps, periods, artifacts, programs offered, and information about the surrounding areas. The museum is in town and the site is outside of town, so brochures for Lindenmeier can guide visitors from one to the other. Featuring some of the interesting aspects of the other location will draw visitors to and from the site and museum. Another helpful use of brochures is giving information based on specific age levels so children can understand. Lindenmeier will be utilized by school children from surrounding areas, so brochures will provide educational information that children can take them home to encourage their parents to return with them. Overall, the use of brochures at Lindenmeier would be helpful for visitors to understand the site more thoroughly.

Interpretive panels

Interpretive panels are an important part of interpretation and should be included at the Lindenmeier site. Panels should cover basic themes that interpreters want visitors to understand about Lindenmeier. Themes that other sites describe include chronology, artifacts, and the history of the archaeology. Panels can be displayed in the interpretive area and along the interpretive trail. They should also be used to highlight areas of interest throughout the site while not overwhelming the visitor with too much information. Interpretive panels can include photos, descriptions, and even replica artifacts for visitors to touch. Panels are an important part of the interpretation of a site because they are meant to guide and inform visitors when interpreters and personnel are not present for interaction.

Trails

Trails are an essential part of the interpretation of a site if the visitor is not able to park directly at the site location. This is the case at Lindenmeier, so a trail is necessary for the visitor to access the area designated for interpretation from the parking lot. Many of the other sites I visited had interpretive trails that lead visitor around the site, or the general area of the site, to experience the natural area. The Lindenmeier site is not actively being excavated so there is little for people to see by going onto the site directly. Determining the actual extent of the prehistoric site boundary is difficult, so keeping the visitors in an area where they are able to view the site without going onto the site is the best solution for Lindenmeier. Looking around while walking along the trail is important for the visitor to get a sense of why the site was found at that particular location. It is also important to utilize the trail leading to the site overview as a way to introduce the visitor to the site and give them information. Trails should be slightly improved by having a cleared dirt trail, a boardwalk trail, or a paved trail. The areas designated for a trail should be surveyed to ensure the trail and its corridor is not destroying any cultural materials. Trails should be maintained regularly and a portion of the trail needs to be handicap accessible so individuals can fully participate in the experience and activities (Ward et al. 2006:180). Since the site is associated with a Natural Area, tying the trail into the larger trail system will give visitors the chance to explore the local area. Overall, trails at the Lindenmeier site would be useful, informative and provide access for visitors.

Interpretive themes

Interpretive themes create cohesion and help visitors understand the important aspects of an interpretive site. For Lindenmeier, the first interpretive theme should be associated with chronology or periods of occupation. Chronology is important because it allows visitors to understand when people occupied the area and how long ago that was. The second interpretive theme should touch on how humans lived on the landscape and utilized the resources of the area. This will help visitors understand why people chose the location and kept returning to that location over time. The third interpretive theme should discuss the archaeology, how the site was discovered, and what archaeologists were able to determine based on past discoveries. This can also be tied into an additional theme discussing the history of archaeological investigations at the site. All of these themes can transition and tie into one another making the interpretation cohesive and keeping it understandable to visitors.

Education materials

Educational materials are helpful for visitors to make the site fun, exciting, and interactive. These materials can range from simple brochures to interactive "mock digs" and flintknapping workshops. Creating educational materials for a range of age groups is ideal. Education materials ensure each visitor has an activity to engage them at the site. Brochures and additional reading material are great for older visitors to make their experience informative and educational. Teenagers like more adult activities, so flintknapping and atlatl throwing are ideal for this age group. These activities are exciting enough to get teenagers involved but not so childish they will not want to

participate. For younger children, a wide variety of activities could be developed including mock digs, touch-and-feel tables, and various art projects. Making education interactive helps visitors take away more than just what is read on panels and in displays. Visitors are able to participate in activities that they will remember long after they leave the site. It is also important to make sure activities change from year to year. If people enjoy their time at Lindenmeier, they will likely return. Having new activities for education will make sure children and adults learn new things each time they visit. New activities create and excitement to return to see what will be next.

Visitor's interpretation and given factual data or told story

It is best for interpretation to tell the visitor the importance of aspects of the site while leaving some aspects open for critical thinking, hypothesizing and their own imagination. At Lindenmeier, visitors should be presented with facts and information, but interpreters should ask visitors what they think about the significance of the site. This will make adults and children think about the information given and why it was important. Making the site interactive and including the visitor in the interpretation will keep people interested and retain information.

Interpretation can be given with many different combinations of techniques. Interpretation presentation can vary from giving all information in the form of raw data or in the form of a story. On a scale of one to five, with one being "all data" and five being "all story", the Lindenmeier site should have their interpretation fall right in the middle at three. The site should give the visitor facts and details but should also use those facts to tell the history and story of the site. It is important to many visitors that they understand

and hear about the research and what has been discovered to believe that the story given as the interpretation of the site is supported by facts.

How chosen for interpretation

Determining that an archaeological site should become an interpretive site is a difficult and long process. Lindenmeier was chosen for interpretation because, like many of the other sites visited, it holds a unique and important key to the past. It is important for visitors to understand that Lindenmeier is the largest known Folsom camp location and contains hundreds more artifacts than any other known Folsom site to date. This site is ideal for interpretation because it is close to a major city which increases visitation. The site is also part of an outdoor recreation area that has paths and trails for hikers, bikers, and horseback riders.

Changes in interpretation

Over time, there should be changes to the interpretation of the Lindenmeier site. Research and education should never be stagnant. There are constant changes in educational materials as well as research objectives and techniques; therefore, interpretation should also change. Archaeologists are able to uncover more of the story behind the Lindenmeier site as more research is completed, making it important that visitors are learning new and exciting things every time they visit.

Site funding

The Lindenmeier site should take the opportunity to gain funding through as many avenues as possible. Funding by a university or museum could gain Lindenmeier access to funds not readily available to the general public. The Lindenmeier site should also seek funding through grants from local, state, and federal government agencies. More participation from organizations means more funding and participation for the site from the local community. It often takes more than one source of funding to keep an interpretive site open and functioning for the public.

Associated with university or museum

Universities and museums support archaeological sites, not only monetarily, but also through a working association. Associations with universities and museums ensure that high quality research and education is conducted at the site. For example, universities have access to students for research and assistance with programs. They can offer state-of-the-art technologies that make new and innovative research abilities possible. The Lindenmeier site is located about 45 minutes from the city of Fort Collins which is home to Colorado State University. A relationship between the University and the Lindenmeier site would be very beneficial for both parties. The University would have a significant and famous archaeological site to have professors and their students conduct research on. The site would benefit by gaining research from professionals who are extremely well trained and research oriented. Universities and researchers have innovative ideas and access to new technologies and techniques. The Lindenmeier site should also work closely with the Fort Collins Museum because artifacts from the site are

stored in their facility. This is also a great opportunity to make the interpretation between the two locations cohesive. People interested in the site will likely visit both the Lindenmeier site and the Fort Collins Museum, so the site and museum should have similar themes and work together to conceptually tie the information together for visitors. These relationships will bring the site and community together and ensure the site has adequate resources to be successful.

Future Action

During research and writing of this thesis, the City of Fort Collins opened the Soapstone Prairie Natural Area in June of 2009 to the public. The opening included interpretation of the Lindenmeier site and natural trails for hiking, horseback riding, and mountain biking (City of Fort Collins 2010). When talking with the city's Senior Environmental Planner, Daylan Figgs, the goals the city had for interpretation at Lindenmeier were small with no buildings on site (Figgs, personal communication 2008). The City did not want to advertize the site because there is no support for large visitation (Figgs, personal communication 2008). A new museum is currently being built in the City of Fort Collins that will handle most of the interpretation (Figgs, personal communication 2008). A goal is to tie the interpretation at the site to the interpretation at the museum even though they are about 45 minutes apart.

The City of Fort Collins' interpretation of Lindenmeier included a paved trail from a parking area to a shelter overlook. The trail is handicap accessible and is 0.34 miles long (City of Fort Collins 2010). At the end of the trail is an overlook with an open air shelter made of a concrete floor with metal roof of corrugated tin. Benches are

available for visitors to sit and three interpretive panels are located in the shelter. These panels are titled: "The Prairie Provider," "From the Ice Age to Today: A Land of Plenty," and "Discovery Leads to International Fame." Each of these panels touch on a leading theme of interpretation. The first panel, "The Prairie Provider," discusses how the prairie environment has supported not only humans but animals for thousands of years. The second panel, "From the Ice Age to Today: A Land of Plenty," begins to touch on why Lindenmeier is important and what archaeological evidence was discovered. Finally, the third panel, "Discovery Leads to International Fame," discusses how the site was first discovered and briefly explains some of the artifacts discovered. Two of the three panels include a small bronze sculpture for visitors to touch. One sculpture is of a bison vertebra with a point, and the other displays a few examples of what artifacts from the site look like. Overall, these materials are what the City of Fort Collins has provided for interpretation at Lindenmeier.

Noticeably, these materials vary slightly from the ideal interpretation I presented but leave opportunities for additions or changes. One important area the city can improve is the interpretive panels. Since there is a paved trail leading to the interpretive overlook, it is important to entice the visitor along the trail by providing information as they walk. This also provides an opportunity to build up the importance of the site and introduce key interpretive themes. Additional themes that can be added to the ones provided by the city include chronology, stratigraphy, environmental reconstruction, and using science and technology in archaeology. It is particularly important that a portion of interpretation or interpretive materials are geared specifically toward children. This might include a panel lowered to a "child's height" with something interactive such as a telescope, magnifying

glass, or a bronze etched crayon rubbing of an artifact. Additionally, having a brochure with additional information or one geared towards children will engage the young visitor. In the future, interpretation would be stronger with a small visitor's center at the parking lot or trail head of the Lindenmeier trail. This would enable visitors to stop, ask questions, get additional information, look at artifacts or replicas, and over all gain more knowledge about the site. Clearly, Lindenmeier is an amazing archaeological site and deserves amazing interpretation.

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APPENDIX A

SITE VISIT QUESTIONNAIRE

Site Visit Questionnaire

Questionnaire 1: Site Survey Questions

Before I start recording data or interviewing I am going to walk through as a visitor and get a feel for the site.

Archaeology

How much information about the archaeology is given? (General archaeology or details?)

Do they describe landscape at time of site occupations (paleo-environmental reconstruction)?

Visitation

What are the major types of built environments?

Do they try to incorporate the built environment into the natural landscape?

Interpretation

How many interpretive panels do they have?

How many brochures do they have?

How long are their interpretive trails?

Do my ideas of their themes match their expectations? (are they getting across what they were hoping)

Are people encouraged to come up with their own interpretation based on information or are they 'told'?

Are there educational materials geared specifically towards different age groups?

Questionnaire 2: Interview Questions

Archaeology

Objective: What are they trying to say through archaeology?

Are people visiting strictly for the archaeology or do they also come for the natural resources?

What about hunter-gatherers or Paleoindians do you most want people to understand?

Visitation

Objective: Who is expected to visit the site?

How many people visit each year?

What are the peak seasons for visitation?

What is the demographic of people visiting?

How do people hear about the site to want to come?

Are people coming on vacation or educational tours?

What steps are taken to ensure site integrity and security?

What problems, if any, are there with vandalism or looting (type of activities)?

Do you have estimates of tourism dollars or effects on local economies?

Interpretation

Objective: How is the information presented?

What are the major themes of the interpretation?

How was this site chosen as an archaeological interpretive site?

Have there been any changes over time to the interpretation presented? If so, what was the cause of change?

How is the site funded?

If associated with a university or museum, what is the relationship?

On a scale from 1 to 5, what is the focus of archaeological interpretation here between factual data and storytelling?

When was it decided to make the site an interpretive site?

APPENDIX B

SITE VISIT PHOTOGRAPHS AND BROCHURES

Lubbock Lake Landmark Photographs and Brochures

Figure 41. Lubbock Lake Landmark, Entrance.

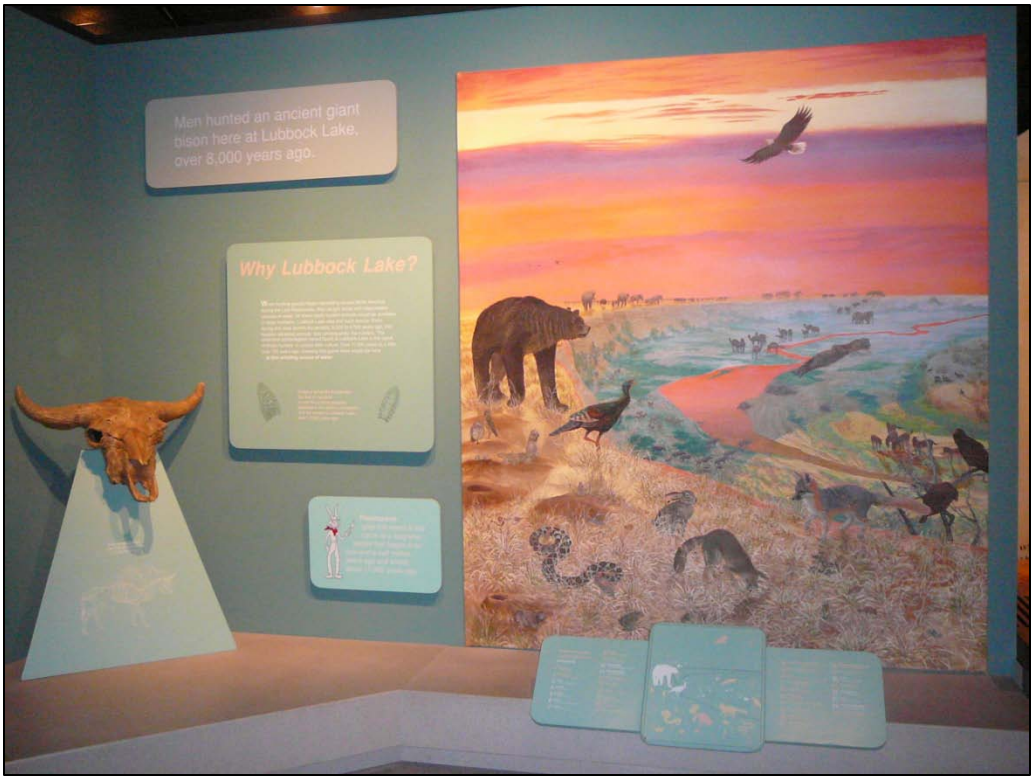


Figure 42. Lubbock Lake Landmark, Mural of a prehistoric Lubbock Lake.

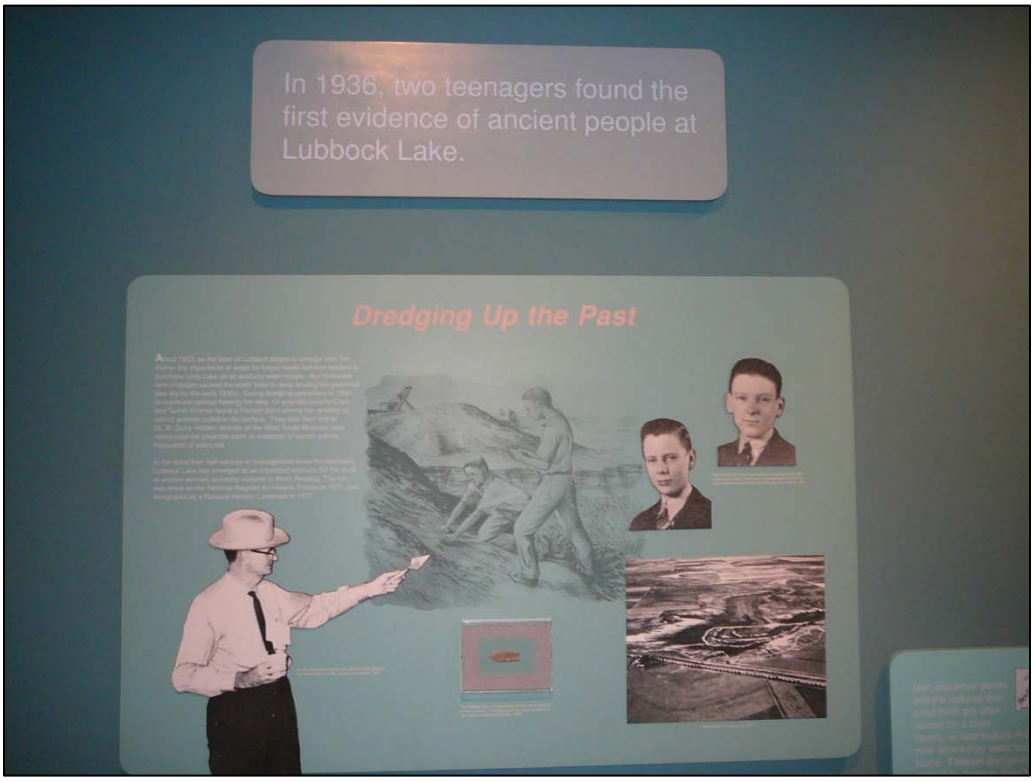


Figure 43. Lubbock Lake Landmark, Initial discovery.

Figure 44. Lubbock Lake Landmark, "Reading the secrets of the past".

Figure 45. Lubbock Lake Landmark, History of the investigations.

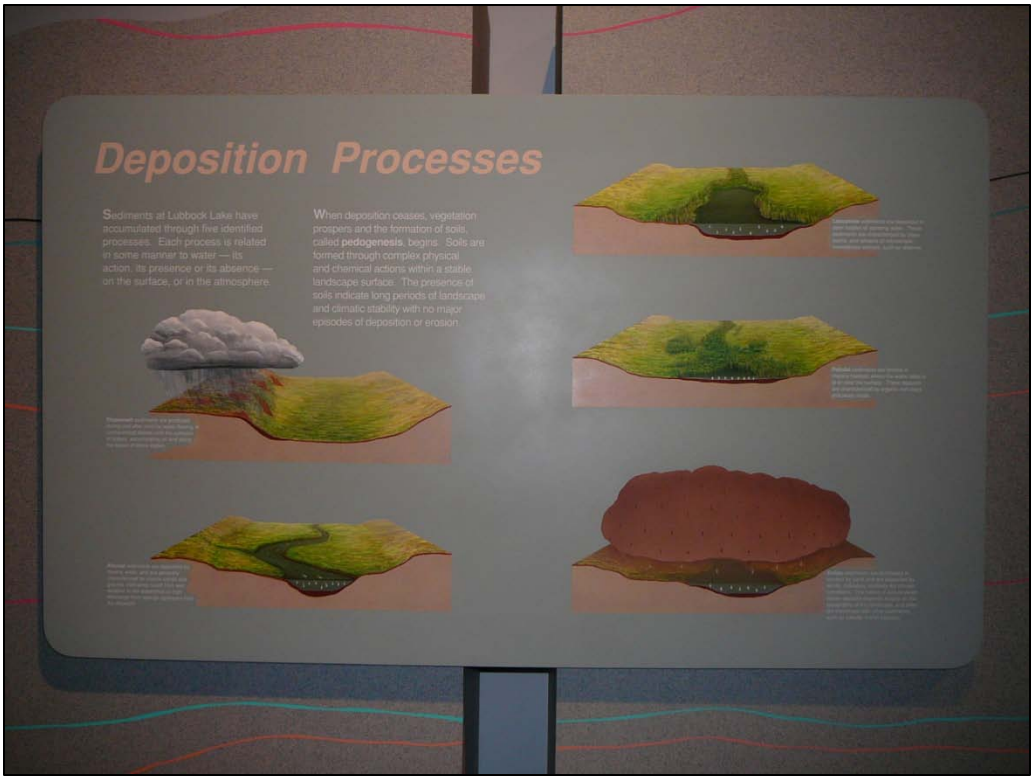


Figure 46. Lubbock Lake Landmark, "Deposition Processes".

Figure 47. Lubbock Lake Landmark, Life-size diorama of prehistoric bison butchering.

Figure 48. Lubbock Lake Landmark, Three sisters garden

Figure 49. Lubbock Lake Landmark, Volunteers excavating.

Figure 50. Lubbock Lake Landmark, Looking at soil profiles in the excavation.

Figure 51. Lubbock Lake Landmark, Interpretive trail.

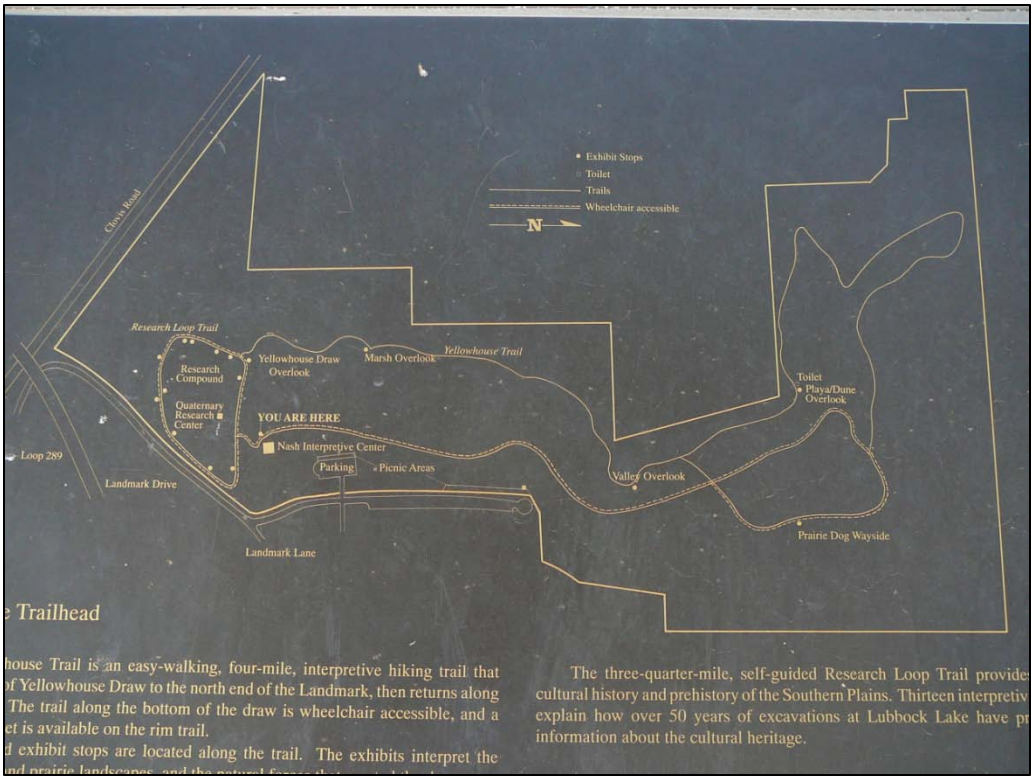


Figure 52. Lubbock Lake Landmark, Trails map.

Figure 53. Lubbock Lake Landmark, Built environment between the parking lot and interpretive center with mammoth statues.

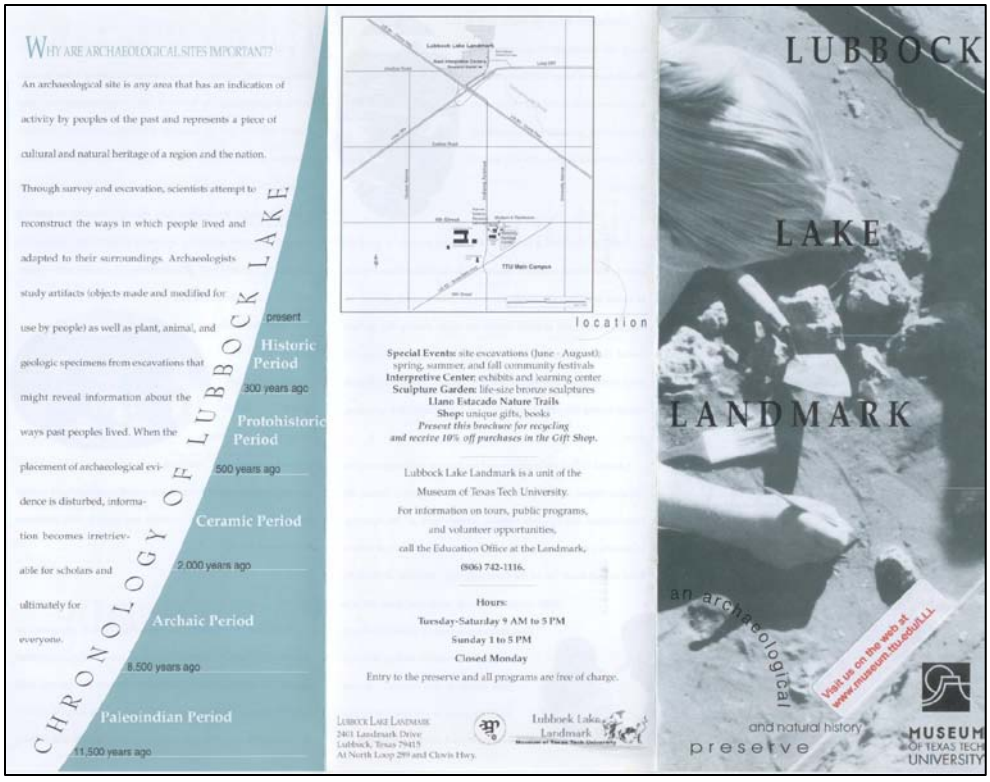


Figure 54. Lubbock Lake Landmark, Brochure 1, side 1.

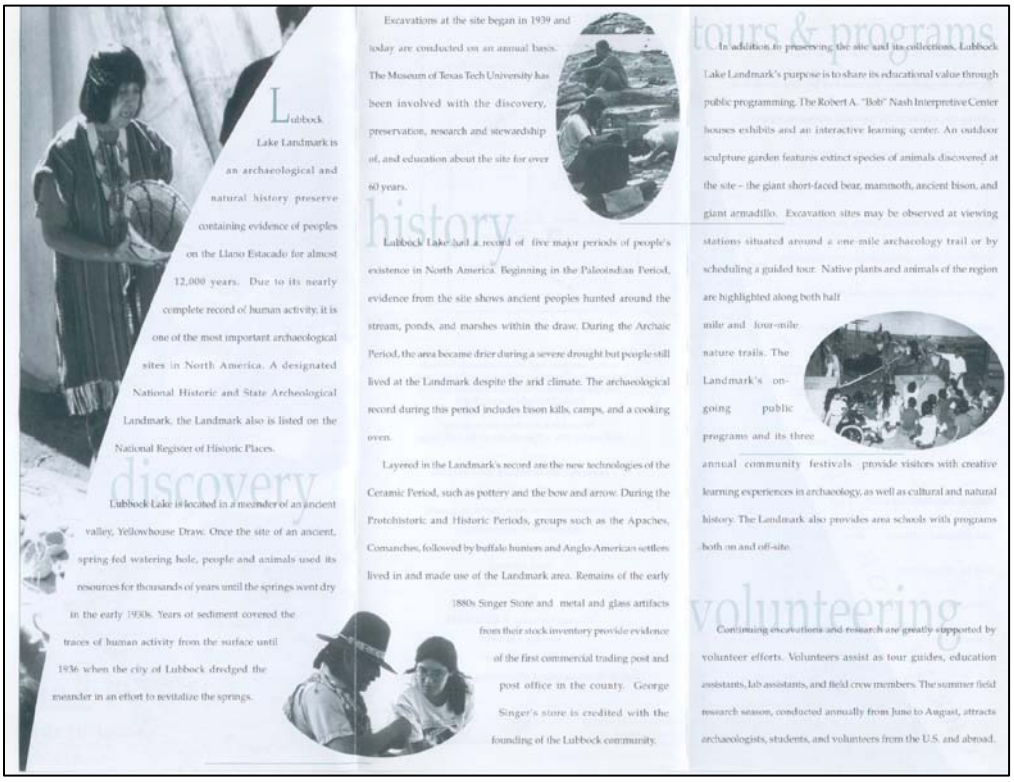


Figure 55. Lubbock Lake Landmark, Brochure 1, side 2.

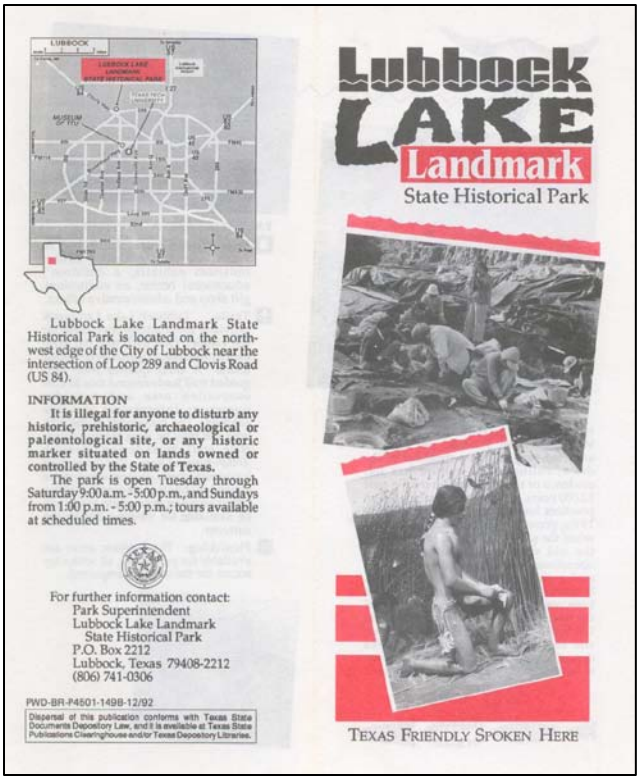


Figure 56. Lubbock Lake Landmark, Brochure 2, side 1.

Figure 57. Lubbock Lake Landmark, Brochure 2, side 2.

The Three Sisters Garden was planted by the students of Spring Break Fest 2008.

The Squash Blossoms: Taylor, Bryan, Taryn, Christian, Marcus

The Bean Poles: Todd, Tanner, Xavier, Aseneth, Araceli

The Corn Kernels: Caleb, Christopher, Georgia, Grace

In addition to preserving the site and its collections, Lubbock Lake Landmark's purpose is to share its educational value through public programming. These on going public programs and community festivals provide visitors with creative learning experiences in archaeology, as well as cultural and natural history. The Landmark also provides area schools with programs both on and off-site.
For more information call the Education Office at the Landmark, 806-742-1116 or e-mail us at lubbock.lake@ttu.edu

Lubbock Lake Landmark
2401 Landmark Drive
Lubbock, Texas 79415
At North Loop 289 and Clovis Hwy

Lubbock Lake Landmark
Museum of Texas Tech University

Three Sisters Garden

Corn Woman

Bean Girl

Squash Blossom

Figure 58. Lubbock Lake Landmark, "Three Sisters Garden" Brochure 3, side 1.

It was the time of the **Trail of Tears**, the time when the Cherokee people were being forced to leave their lands and walk to a strange home far to the West. There were three sisters who had no family except for themselves. They were very afraid, for they had heard of the dangers of the trail.

These sisters were very different from one another. The first sister, Corn Woman, was very tall and strong. The second sister, Bean Girl, was thin, quick, and agile...always moving from here to there, always alert and observant, but she wasn't very strong physically. The third sister, Squash Blossom, was short and thick. She didn't move very fast, and was worried about keeping up with the others on the long trail.

The sisters helped each other out along the way. Corn Woman would use her strength to help her sisters keep upright and moving when they tired towards the end of the day.

Bean Girl would dart about, disappearing often into the thick brush around the trail and often reappearing with food to keep her sisters alive.

Squash Blossom plodded steadily along all day long, seldom stopping, but with her slow steady pace, she noticed things along the trail that the others missed, and several times discovered small springs the refreshed her sisters.

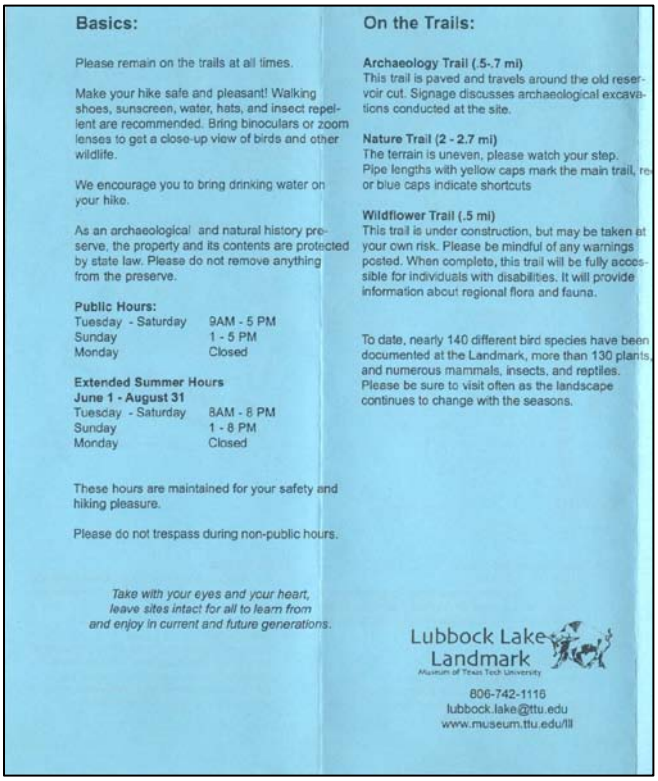
Despair and suffering were all around, but the three sisters helped each other to keep moving.

When the people reached Indian Territory, the elders began to talk about how the sisters helped each other.
When it came time to plant the crops that spring, one old woman used what she had learned from watching the sisters to plant her garden.
She planted the corn, the beans, and the squash together, rather than separately as she had always done.
Sure enough, her garden flourished, and from that day on, the people have planted the three crops together.
The tall strong corn supports the bean plants and keeps them away from the muddy ground and bugs, while the bean takes nourishment from the air to help the corn and squash grow.
The squash grows slowly but steadily, and during the hottest part of the summer shades the ground and keeps the moisture in.

The moral of the story, working together helps everyone, supporting and helping others makes for the best growth.

Figure 59. Lubbock Lake Landmark, "Three Sisters Garden" Brochure 3, side 2.

Figure 60. Lubbock Lake Landmark, "Nature Trails at Lubbock Lake" Brochure 4, side 1.



Basics:

Please remain on the trails at all times.

Make your hike safe and pleasant! Walking shoes, sunscreen, water, hats, and insect repellent are recommended. Bring binoculars or zoom lenses to get a close-up view of birds and other wildlife.

We encourage you to bring drinking water on your hike.

As an archaeological and natural history preserve, the property and its contents are protected by state law. Please do not remove anything from the preserve.

Public Hours:

Tuesday - Saturday	9AM - 5 PM
Sunday	1 - 5 PM
Monday	Closed

Extended Summer Hours
June 1 - August 31

Tuesday - Saturday	8AM - 8 PM
Sunday	1 - 8 PM
Monday	Closed

These hours are maintained for your safety and hiking pleasure.

Please do not trespass during non-public hours.

Take with your eyes and your heart, leave sites intact for all to learn from and enjoy in current and future generations.

On the Trails:

Archaeology Trail (.5-.7 mi)
This trail is paved and travels around the old reservoir cut. Signage discusses archaeological excavations conducted at the site.

Nature Trail (2 - 2.7 mi)
The terrain is uneven, please watch your step. Pipe lengths with yellow caps mark the main trail, re- or blue caps indicate shortcuts

Wildflower Trail (.5 mi)
This trail is under construction, but may be taken at your own risk. Please be mindful of any warnings posted. When complete, this trail will be fully accessible for individuals with disabilities. It will provide information about regional flora and fauna.

To date, nearly 140 different bird species have been documented at the Landmark, more than 130 plants, and numerous mammals, insects, and reptiles. Please be sure to visit often as the landscape continues to change with the seasons.

Lubbock Lake Landmark
Museum of Texas Tech University

806-742-1116
lubbock.lake@ttu.edu
www.museum.ttu.edu/ll

Figure 61. Lubbock Lake Landmark, "Nature Trails at Lubbock Lake" Brochure 4, side 1 continued.

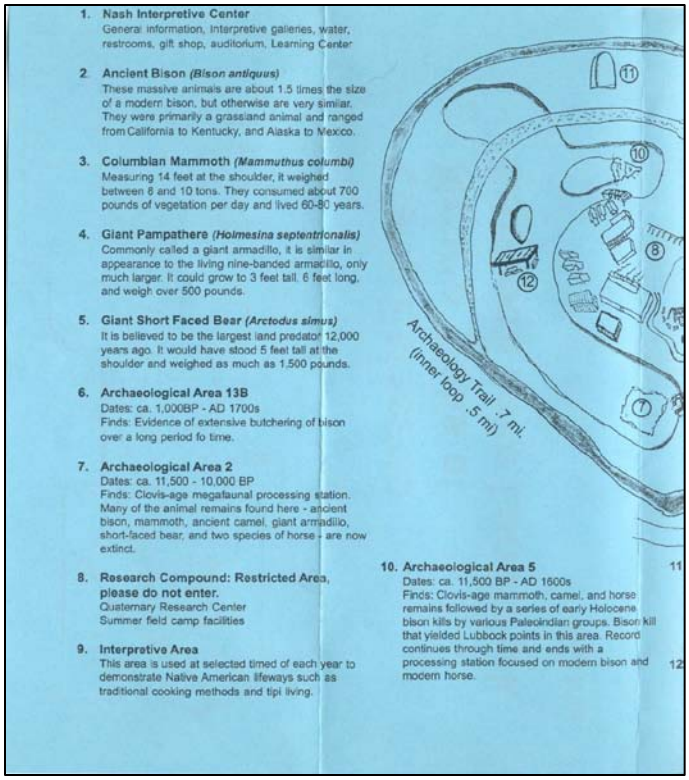


Figure 62. Lubbock Lake Landmark, "Nature Trails at Lubbock Lake" Brochure 4, side 2.

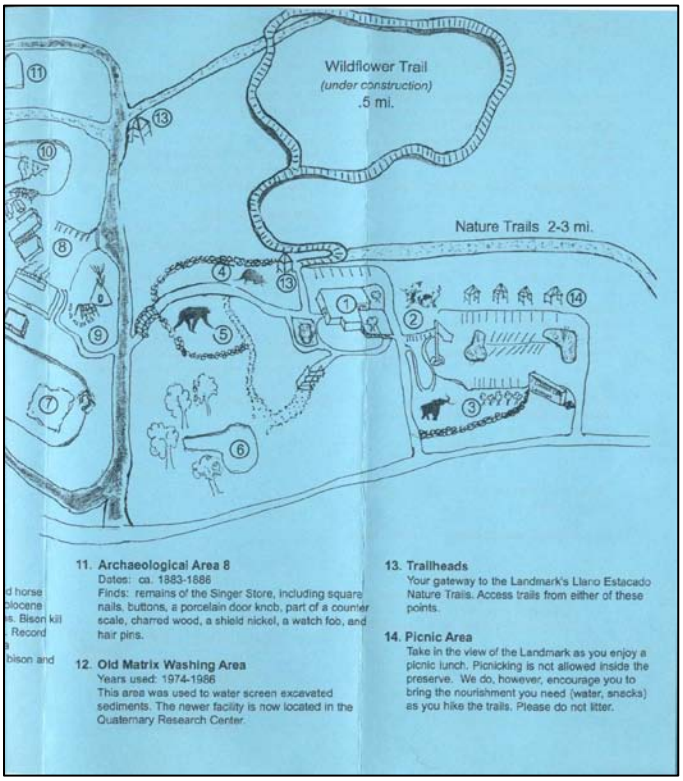


Figure 63. Lubbock Lake Landmark, “Nature Trails at Lubbock Lake” Brochure 4, side 2 continued.

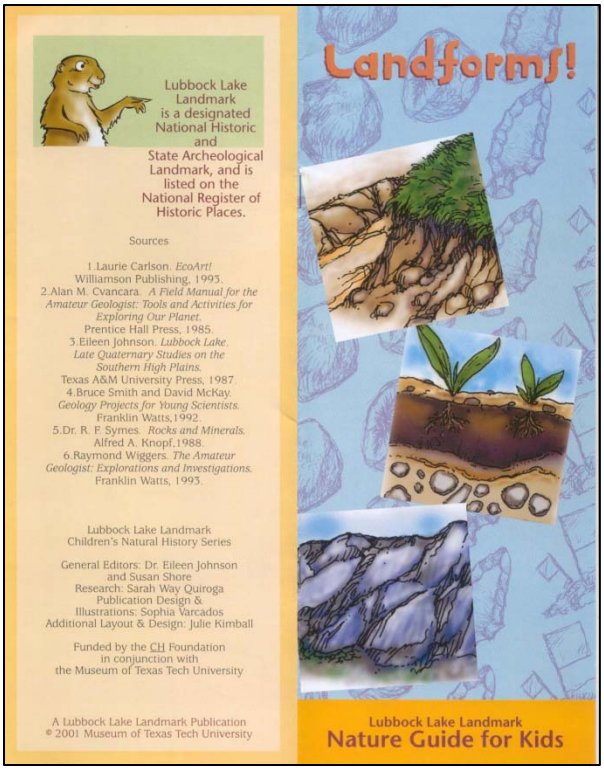


Figure 64. Lubbock Lake Landmark, “Landforms!" Children’s pamphlet, cover and back pages.

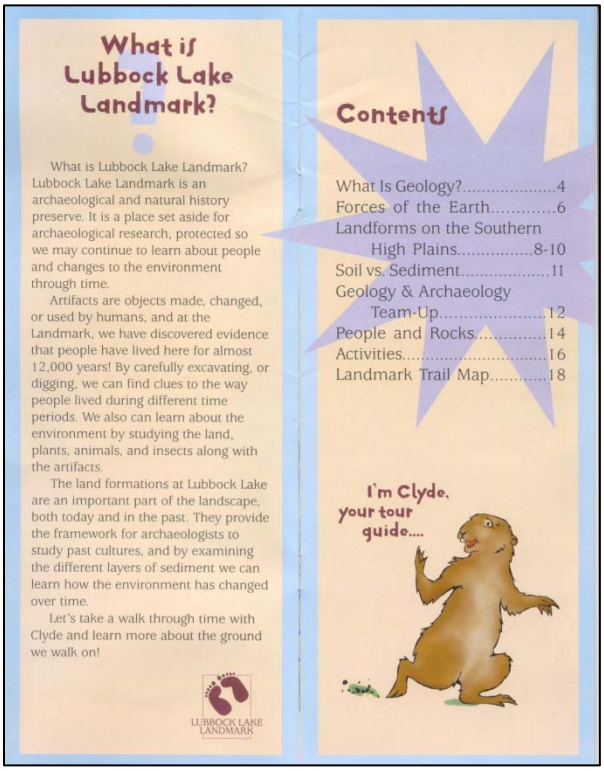


Figure 65. Lubbock Lake Landmark, “Landforms!" Children’s pamphlet, pages 2 and 3.

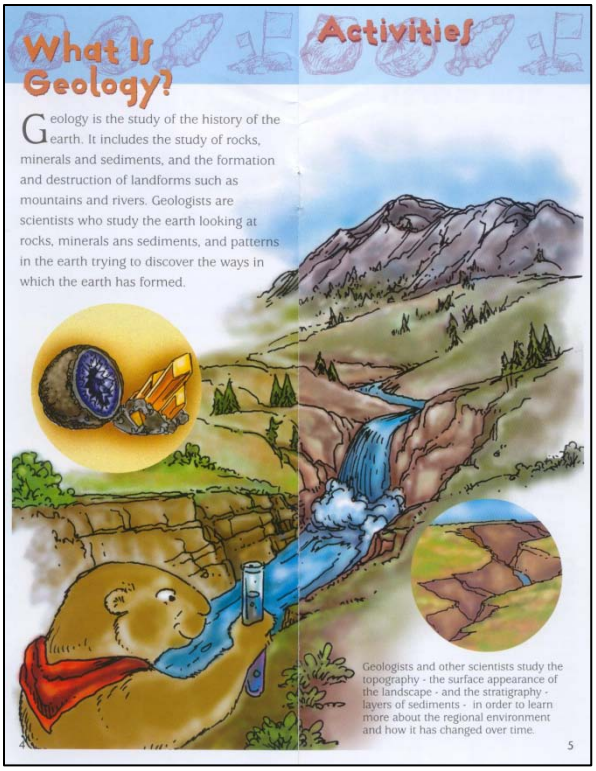


Figure 66. Lubbock Lake Landmark, “Landforms!" Children’s pamphlet, pages 4 and 5.

Figure 67. Lubbock Lake Landmark, “Landforms!" Children’s pamphlet, pages 6 and 7.

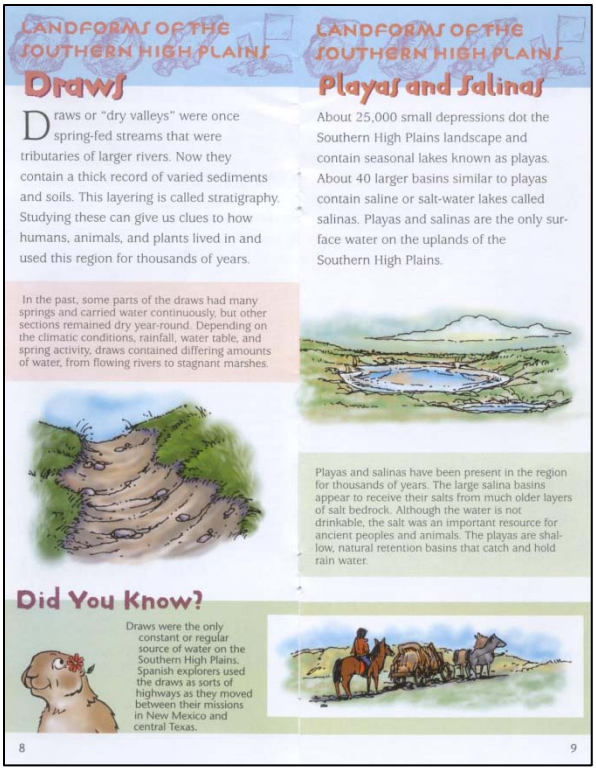


Figure 68. Lubbock Lake Landmark, "Landforms!" Children's pamphlet, pages 8 and 9.

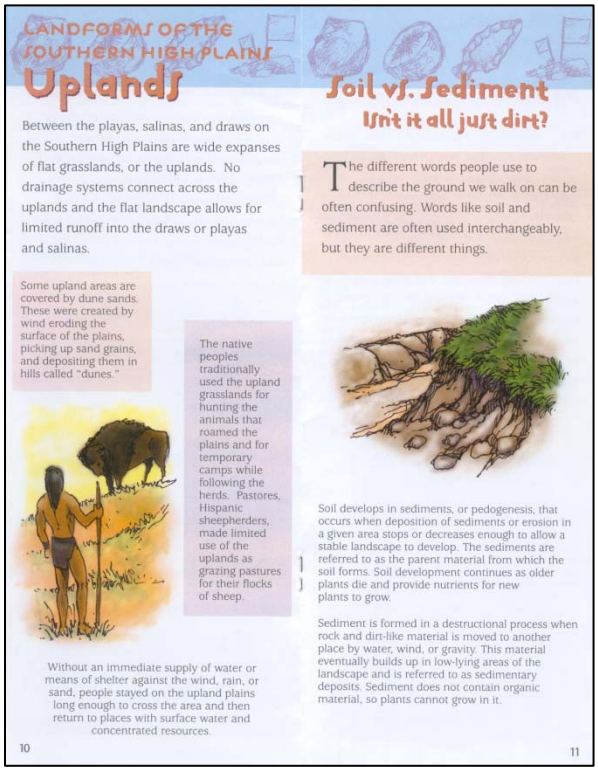


Figure 69. Lubbock Lake Landmark, "Landforms!" Children's pamphlet, pages 10 and 11.

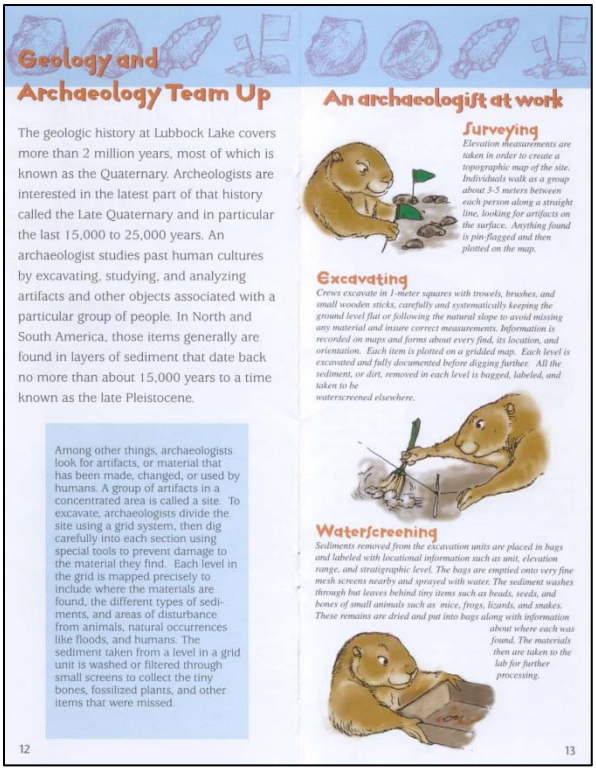


Figure 70. Lubbock Lake Landmark, “Landforms!" Children’s pamphlet, pages 12 and 13.

Figure 71. Lubbock Lake Landmark, “Landforms!" Children’s pamphlet, pages 14 and 15.

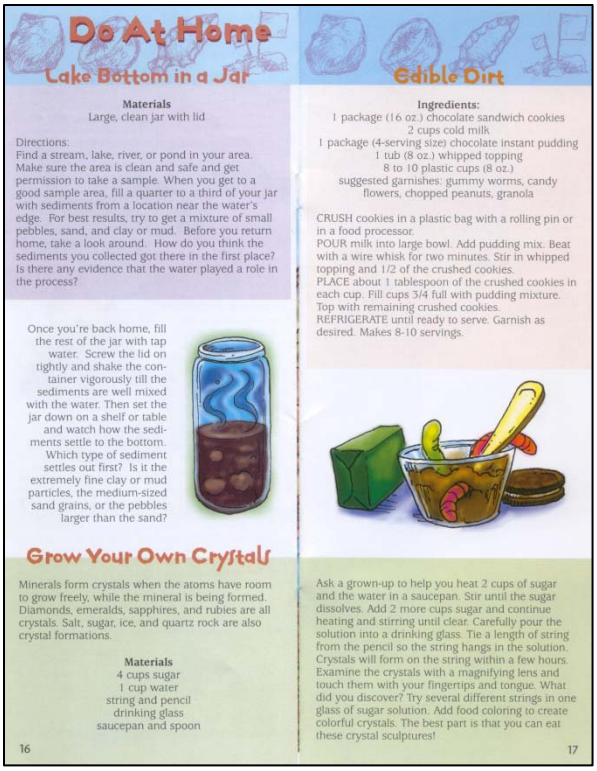


Figure 72. Lubbock Lake Landmark, “Landforms!" Children’s pamphlet, pages 16 and 17.

Figure 73. Lubbock Lake Landmark, “Landforms!" Children’s pamphlet, pages 18 and 19.

Hudson-Meng Photographs and Brochures

Figure 74. Hudson-Meng, Walkway around the excavation inside the interpretive center.

Figure 75. Hudson-Meng, "Reading the Bones" interpretive panel.

Figure 76. Hudson-Meng, "Where are the Skulls?" interpretive panel.

Figure 77. Hudson-Meng, "The Mystery of the Missing Skulls" alternative interpretation.

Figure 78. Hudson-Meng, Touch and feel table.

Figure 79. Hudson-Meng, Replicas of artifacts discovered at the site.

Figure 80. Hudson-Meng, "Screening Room" where artifacts are cleaned and processed.

Figure 81. Hudson-Meng, "CSI: Hudson-Meng" children's discovery table.

Figure 82. Hudson-Meng, "Mock" excavation with visitors.

Figure 83. Hudson-Meng, Bookstore at the interpretive center.

Figure 84. Hudson-Meng, "Heroes of Preservation and Persistence" outdoor interpretive panel.

Figure 85. Hudson-Meng, Atlatl throwing.

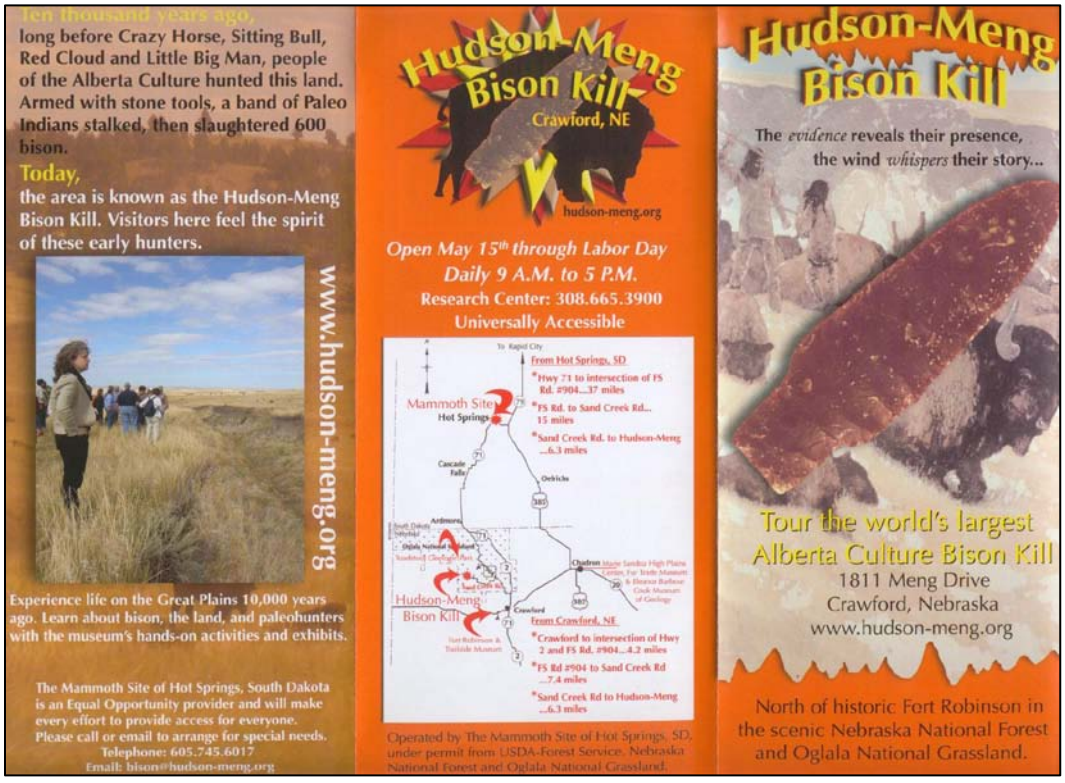


Figure 86. Hudson-Meng, Brochure 1, side 1.

Figure 87. Hudson-Meng, Brochure 1, side 2.

The Mammoth Site Photographs and Brochures

Figure 88. The Mammoth Site, Mammoth Skeleton as visitors enter the visitors center.

Figure 89. The Mammoth Site, Artifact processing laboratory.

Figure 90. The Mammoth Site, Storage of mammoth remains.

Figure 91. The Mammoth Site, Interpretive walkway with excavations below.

Figure 92. The Mammoth Site, "Big Bones" children's touch table.

Figure 93. The Mammoth Site, "Mock" excavation with children.

Figure 94. The Mammoth Site, Rodent remains discovered at the Mammoth Site.

Figure 95. The Mammoth Site, The giant short faced bear skeletal model.

Figure 96. The Mammoth Site, Mammoth bone hut model.

Figure 97. The Mammoth Site, Life-size model of a mammoth.

Figure 98. The Mammoth Site, Educational projects done with school aged children.

Figure 99. The Mammoth Site, Bookstore and souvenir shop at the visitors center.

Figure 100. The Mammoth Site, Children's touch and feel excavation table.
Blackwater Draw

The Mammoth Site is a museum and because it is a museum we ask you observe the following code of conduct:

- Please walk when in the Mammoth Site.
- Please use quiet voices.
- Please leave dirt in working area.
- Please stay in the square you are assigned.
- Please stay with the group.
- Please listen to the interpreter.
- Please be respectful to others.
- Please use equipment in the way it was intended to be used.

If every person in the group follows the code above, we will all have an enjoyable experience on our dig today.

HAPPY DIGGING!

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Junior Paleontologist Excavation Program

An Educational Program
by
The Mammoth Site of Hot Springs, SD Inc.

Figure 101. The Mammoth Site, "Junior Paleontologist" Pamphlet 1, cover and back pages.

JUNIOR PALEONTOLOGIST EXCAVATION
(June 15 - August 15)

This program allows students to experience paleontology as they participate in the simulated dig. We can accommodate up to 16 students between the ages of 4-13. The students learn:

- Excavation techniques
- Identification of Mammoth bones
- Field Note preparation
- Mapping techniques

K-8 CURRICULAR ACTIVITIES

Pre-visit, on-site and post-visit activities are available for kindergarten through 5th grade. These special hands-on activity programs are offered September through May.

Kindergarten	*Using Your Senses*
First	*Fossils*
Second	*Animal Track Detectives*
Third	*Erosion*
Fourth-Sixth	*Sinkhole in a Glass*
Fifth	*Maps*
Sixth-Eighth	*Dr. It's A. Molar*

- Geology of the Southern Black Hills and The Mammoth Site
- Osteology and Tooth Molding
- Tour of Preparation Lab and Molding & Casting Facilities

GUIDED TOURS

The Mammoth Site offers 30-minute guided tours plus a 10-minute informational video. We recommend that groups allow a minimum of 60 minutes at the site to allow time for viewing the exhibits not included on the tour.

The Mammoth Site®
OF HOT SPRINGS, SOUTH DAKOTA, INC.
P.O. Box 692, Hot Springs, SD 57747-0692
605-745-6017 • Fax 605-745-3038
E-mail address: news@mammothsite.org
Internet: http://www.mammothsite.org
A Non-Profit Corporation 501-C-3

Skeleton of a Mammoth

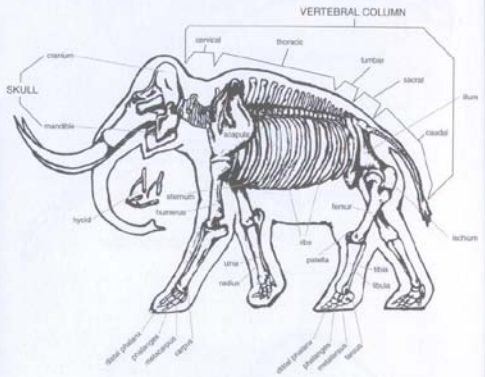

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Figure 102. The Mammoth Site, "Junior Paleontologist" Pamphlet 1, pages 2 and 3.

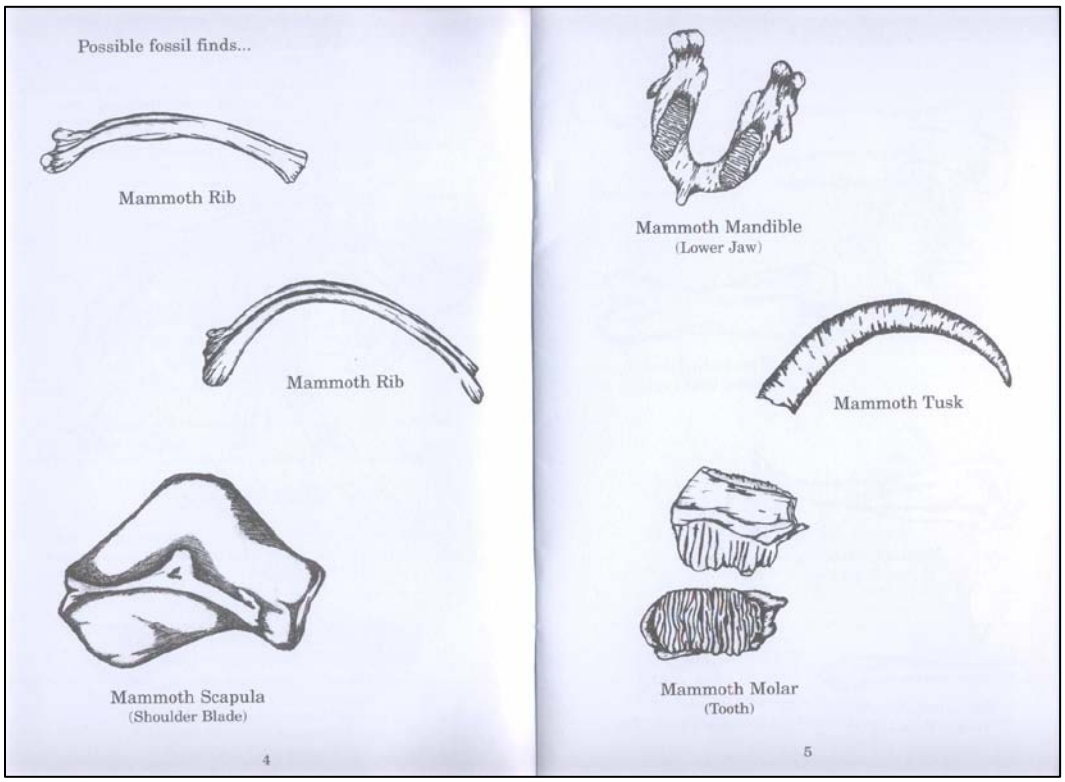


Figure 103. The Mammoth Site, "Junior Paleontologist" Pamphlet 1, pages 4 and 5.

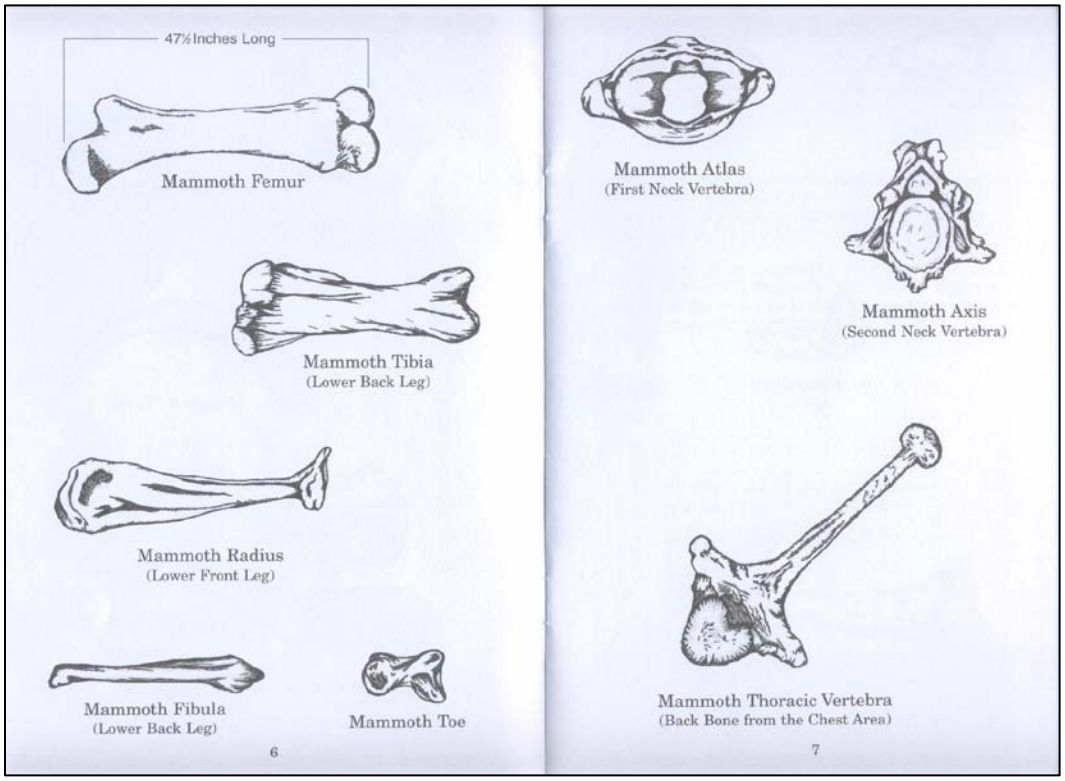


Figure 104. The Mammoth Site, "Junior Paleontologist" Pamphlet 1, pages 6 and 7.

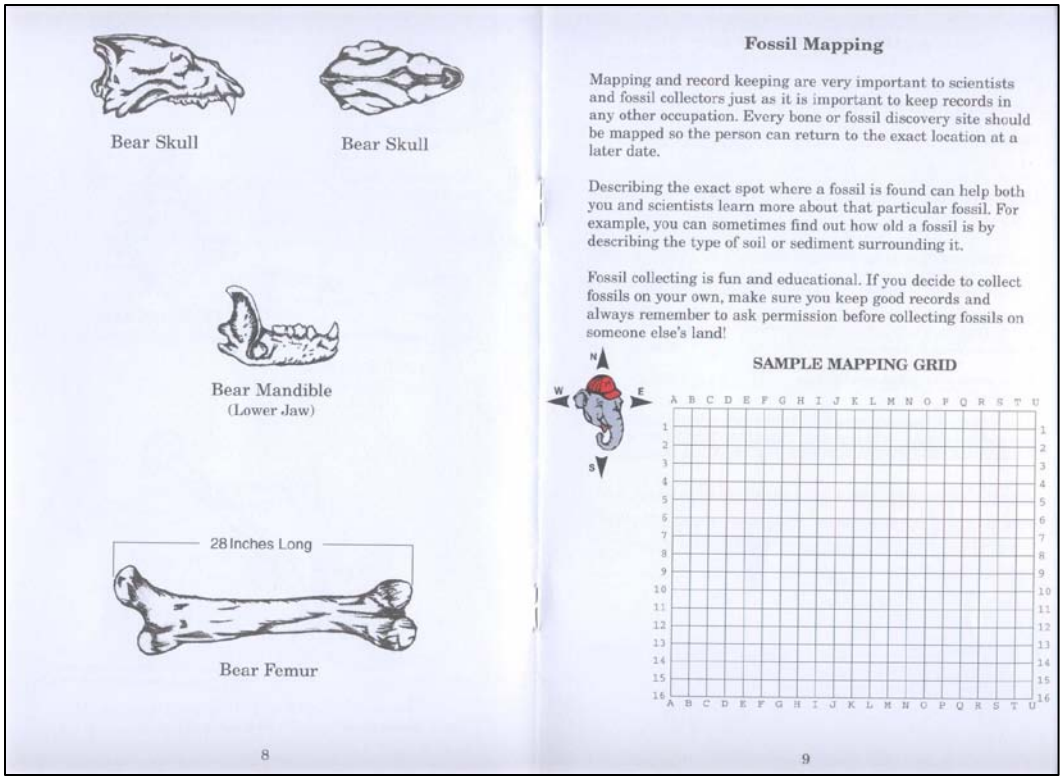


Figure 105. The Mammoth Site, "Junior Paleontologist" Pamphlet 1, pages 8 and 9.

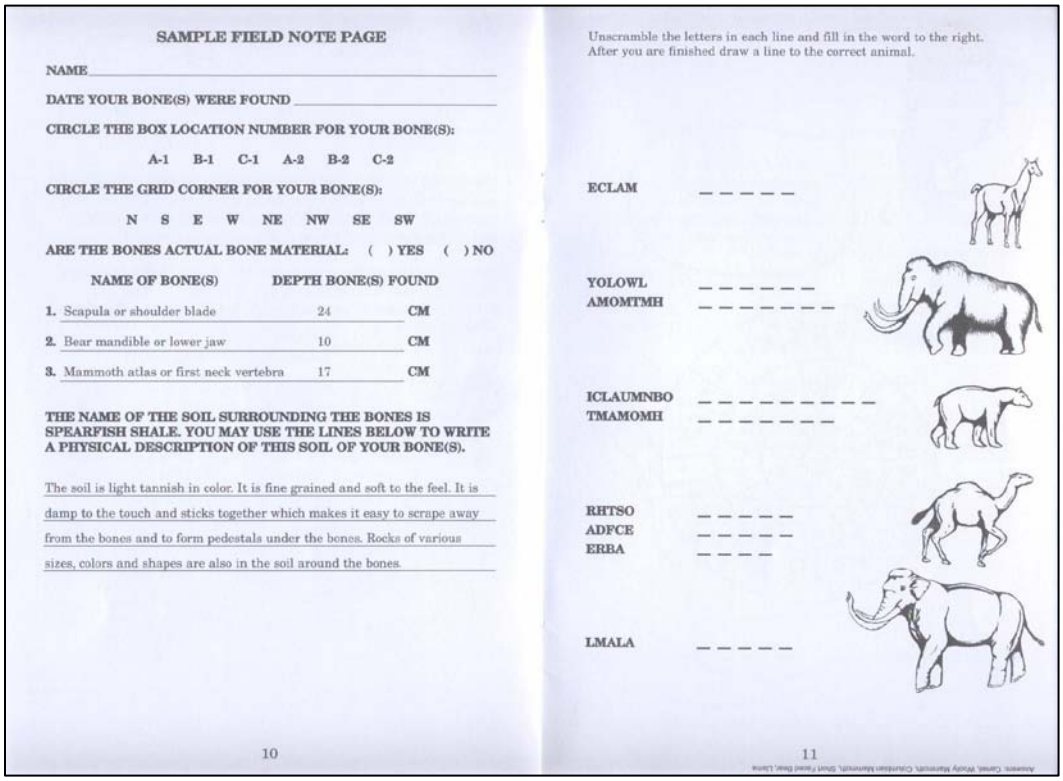


Figure 106. The Mammoth Site, "Junior Paleontologist" Pamphlet 1, pages 10 and 11.

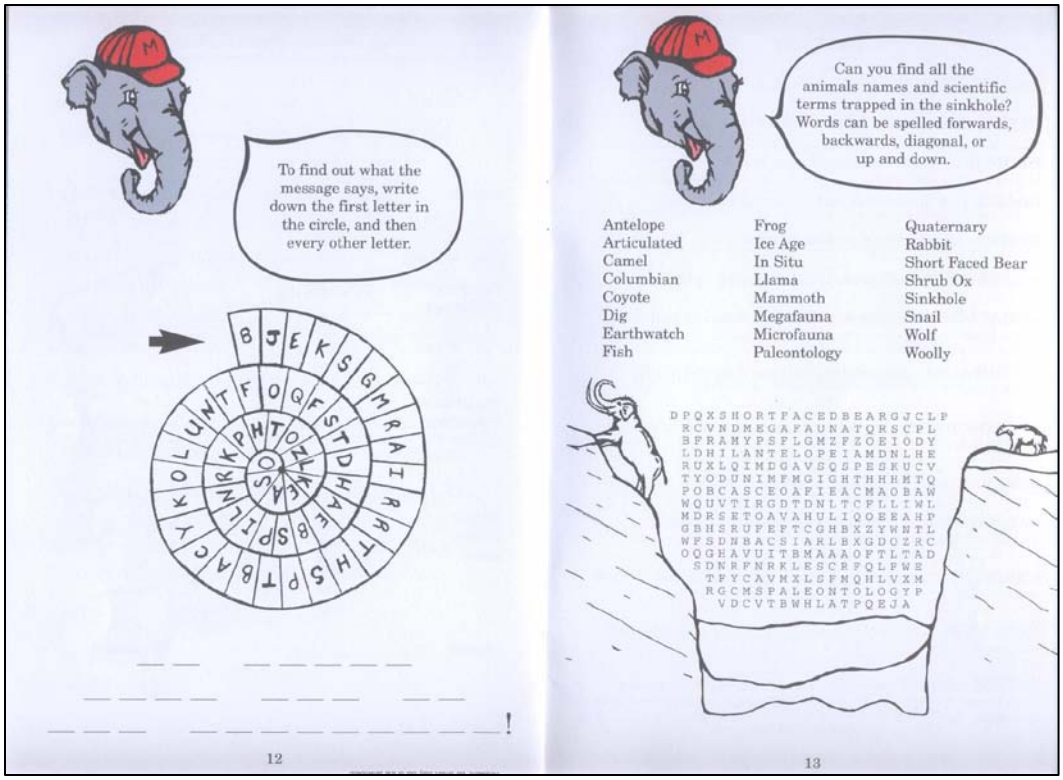


Figure 107. The Mammoth Site, "Junior Paleontologist" Pamphlet 1, pages 12 and 13.

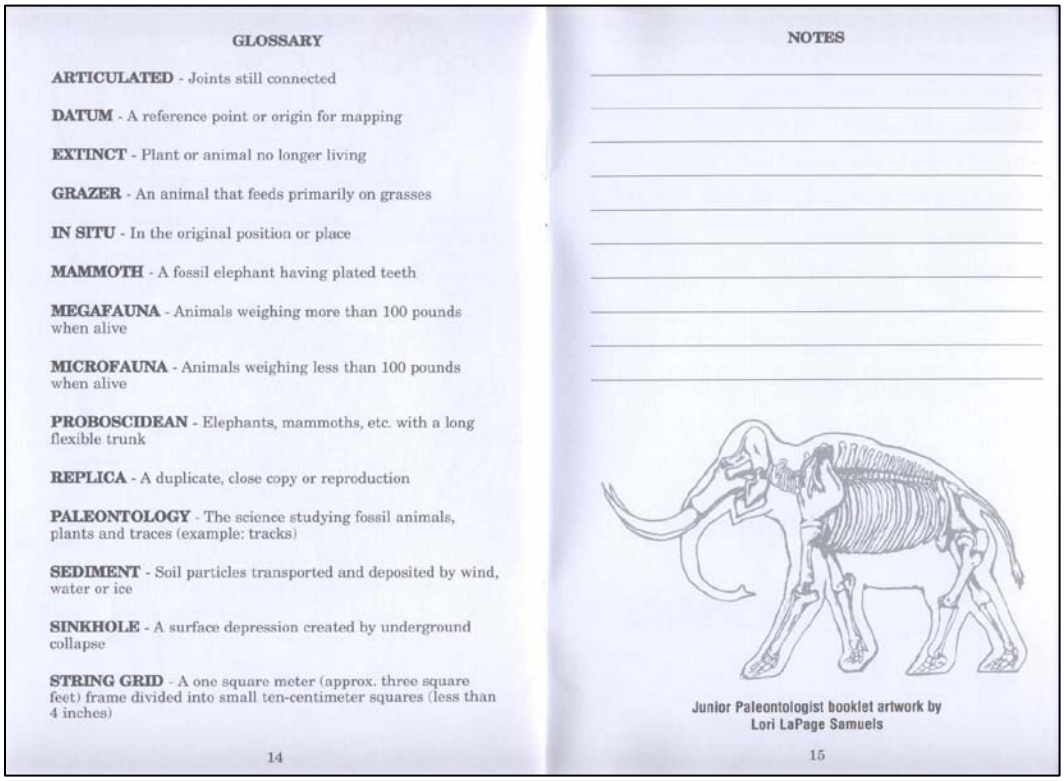


Figure 108. The Mammoth Site, "Junior Paleontologist" Pamphlet 1, pages 14 and 15.

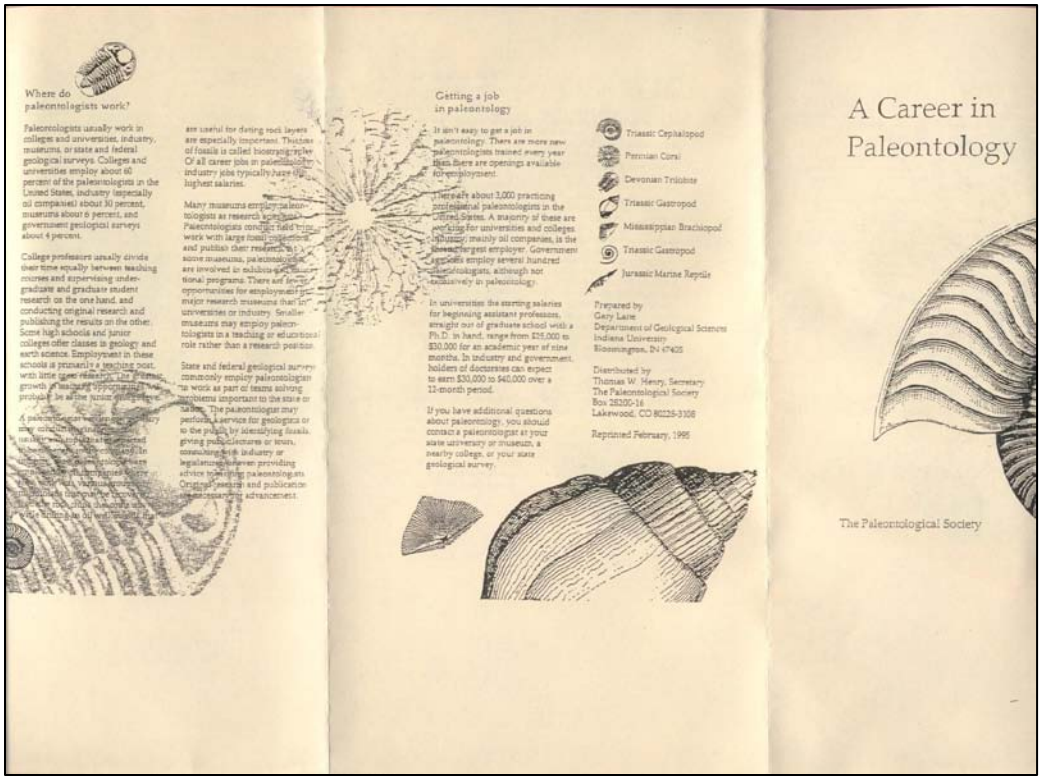


Figure 109. The Mammoth Site, "A Career in Paleontology" Brochure 1, side 1.

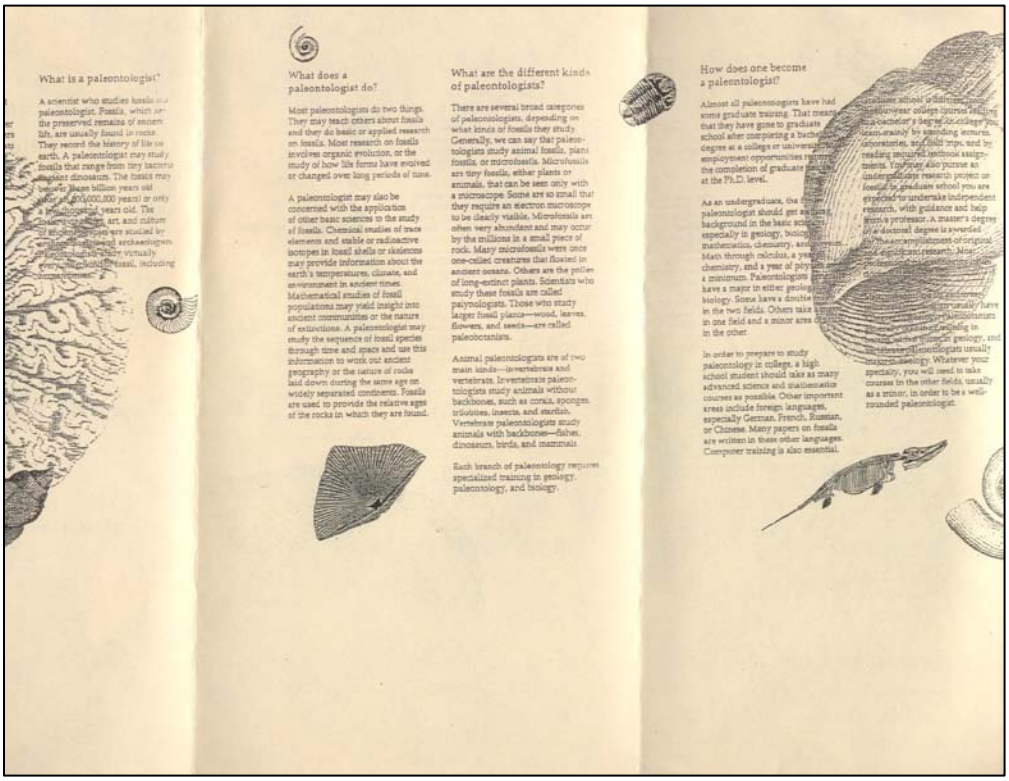


Figure 110. The Mammoth Site, "A Career in Paleontology" Brochure 1, side 2.

Blackwater Draw Photographs and Brochures

Figure 111. Blackwater Draw, Museum entrance.

Figure 112. Blackwater Draw, Mammoth head diorama.

Figure 113. Blackwater Draw, Touch and feel table with artifacts.

Figure 114. Blackwater Draw, "Excavations at Blackwater Draw" a display of research through time.

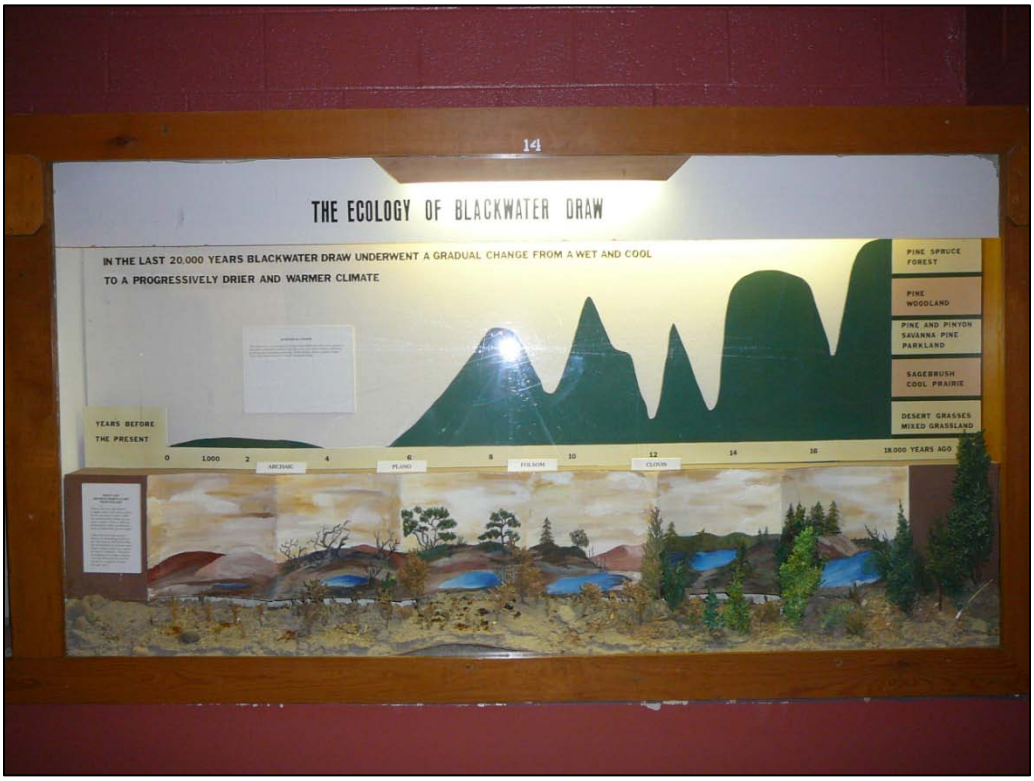


Figure 115. Blackwater Draw, "The Ecology of Blackwater Draw".

Figure 116. Blackwater Draw, Stratigraphy of artifacts at the site.

Figure 117. Blackwater Draw, "Clovis Tools" artifacts and their uses.

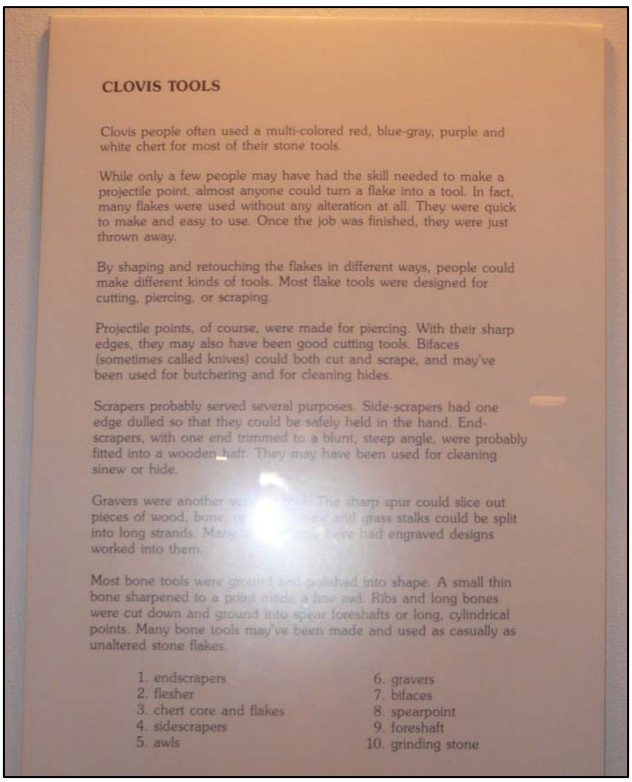


Figure 118. Blackwater Draw, "Clovis Tools" interpretive sign with display.

Figure 119. Blackwater Draw, Interpretive center and offices at the site.

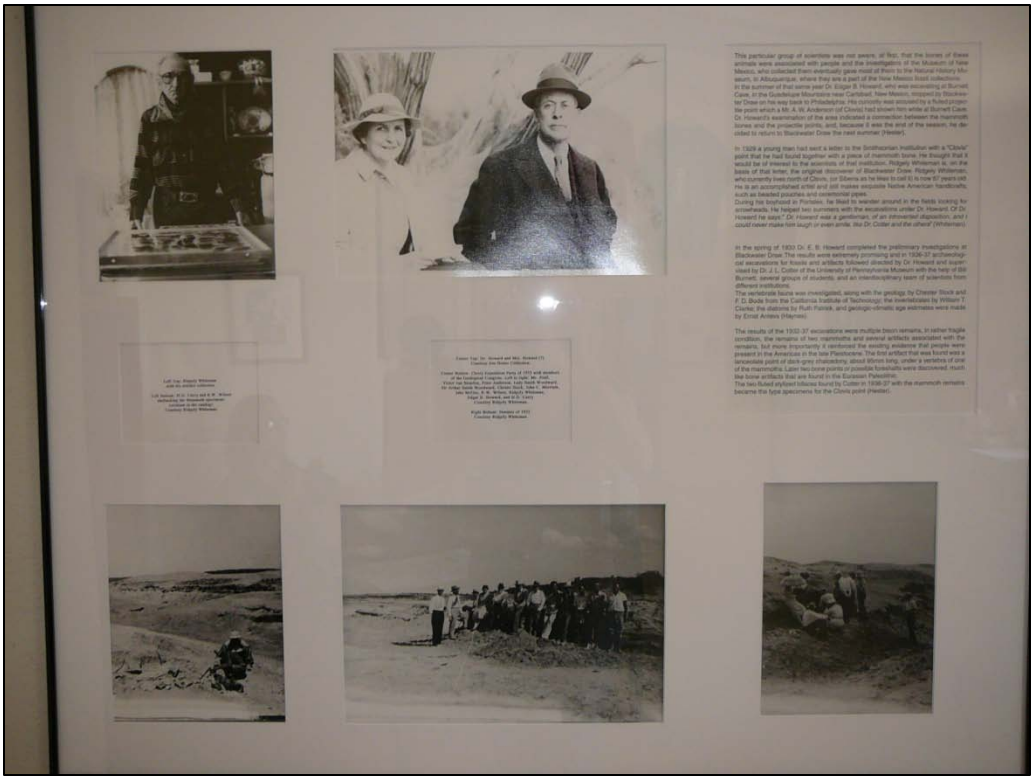


Figure 120. Blackwater Draw, Initial discovery of the site.

Figure 121. Blackwater Draw, Historic photographs of the gravel pit operations.

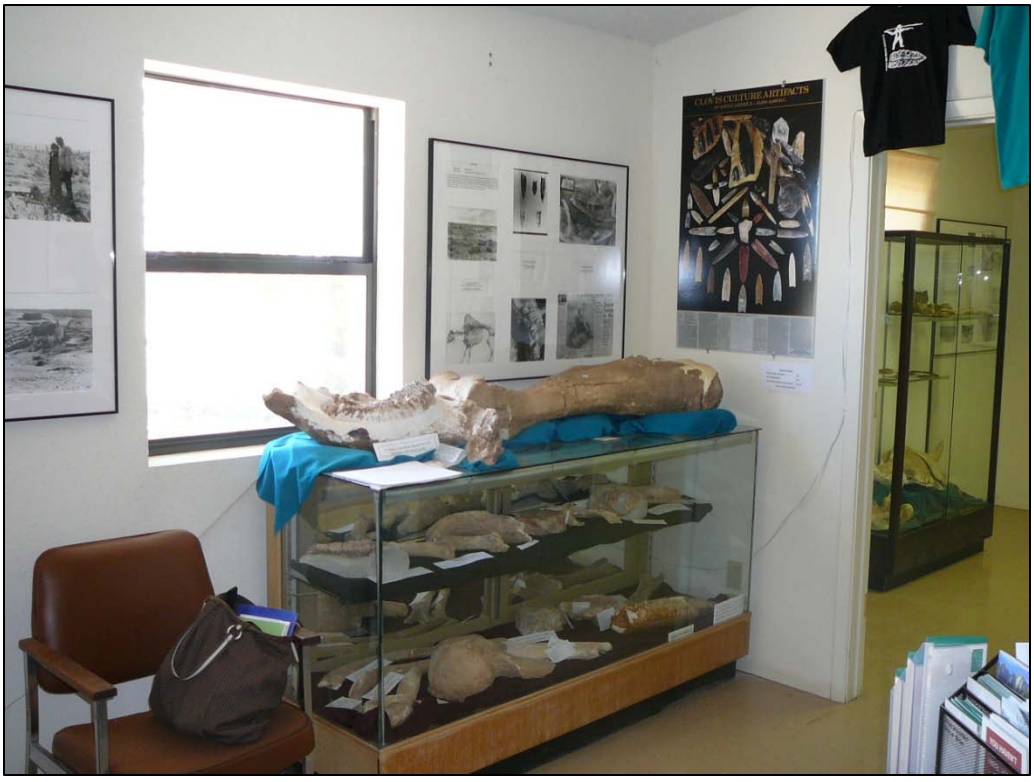


Figure 122. Blackwater Draw, Artifacts on display at the site.

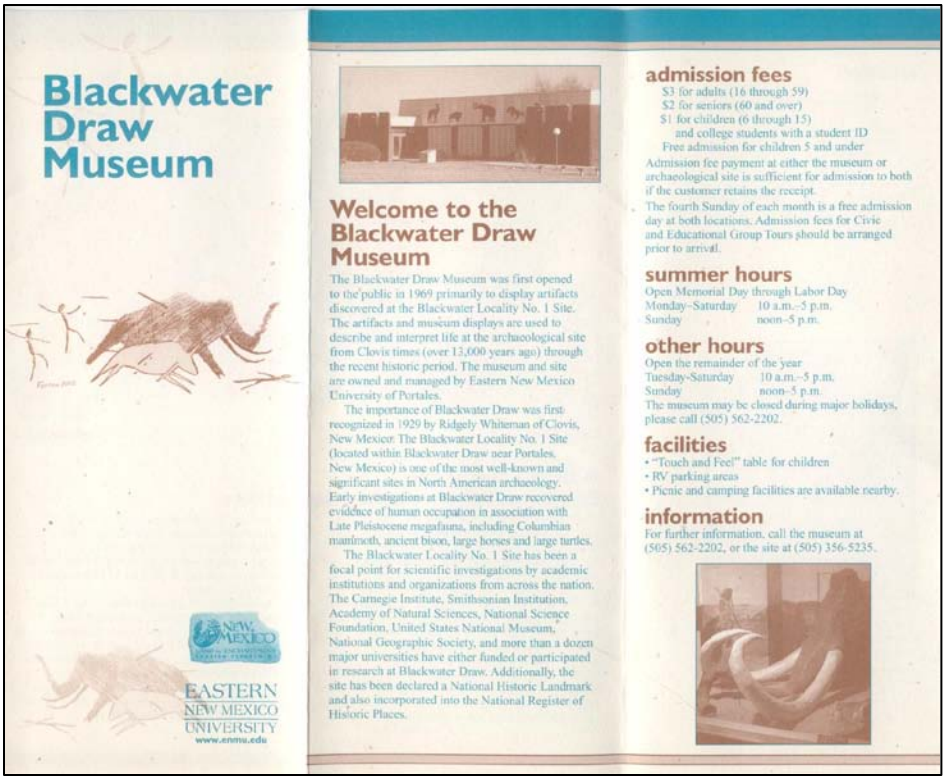
Figure 123. Blackwater Draw, Explanation of site stratigraphy.

Figure 124. Blackwater Draw, "The Spring" interpretive panel along the interpretive trail at the site.

Figure 125. Blackwater Draw, Exposed excavation in building.

Figure 126. Blackwater Draw, "The Lessons of the Past" interpretive panel overlooking the site and trail.

Figure 127. Blackwater Draw, Shelter and picnic table used during interpretive tours.



Blackwater Draw Museum

EASTERN NEW MEXICO UNIVERSITY
www.enmu.edu

Welcome to the Blackwater Draw Museum

The Blackwater Draw Museum was first opened to the public in 1969 primarily to display artifacts discovered at the Blackwater Locality No. 1 Site. The artifacts and museum displays are used to describe and interpret life at the archaeological site from Clovis times (over 13,000 years ago) through the recent historic period. The museum and site are owned and managed by Eastern New Mexico University of Portales.

The importance of Blackwater Draw was first recognized in 1929 by Ridgely Whiteman of Clovis, New Mexico. The Blackwater Locality No. 1 Site (located within Blackwater Draw near Portales, New Mexico) is one of the most well-known and significant sites in North American archaeology. Early investigations at Blackwater Draw recovered evidence of human occupation in association with Late Pleistocene megafauna, including Columbian mammoth, ancient bison, large horses and large turtles.

The Blackwater Locality No. 1 Site has been a focal point for scientific investigations by academic institutions and organizations from across the nation. The Carnegie Institute, Smithsonian Institution, Academy of Natural Sciences, National Science Foundation, United States National Museum, National Geographic Society, and more than a dozen major universities have either funded or participated in research at Blackwater Draw. Additionally, the site has been declared a National Historic Landmark and also incorporated into the National Register of Historic Places.

admission fees

$3 for adults (16 through 59)
$2 for seniors (60 and over)
$1 for children (6 through 15)
and college students with a student ID
Free admission for children 5 and under

Admission fee payment at either the museum or archaeological site is sufficient for admission to both if the customer retains the receipt.

The fourth Sunday of each month is a free admission day at both locations. Admission fees for Civic and Educational Group Tours should be arranged prior to arrival.

summer hours

Open Memorial Day through Labor Day
Monday–Saturday 10 a.m.–5 p.m.
Sunday noon–5 p.m.

other hours

Open the remainder of the year
Tuesday-Saturday 10 a.m.–5 p.m.
Sunday noon–5 p.m.

The museum may be closed during major holidays, please call (505) 562-2202.

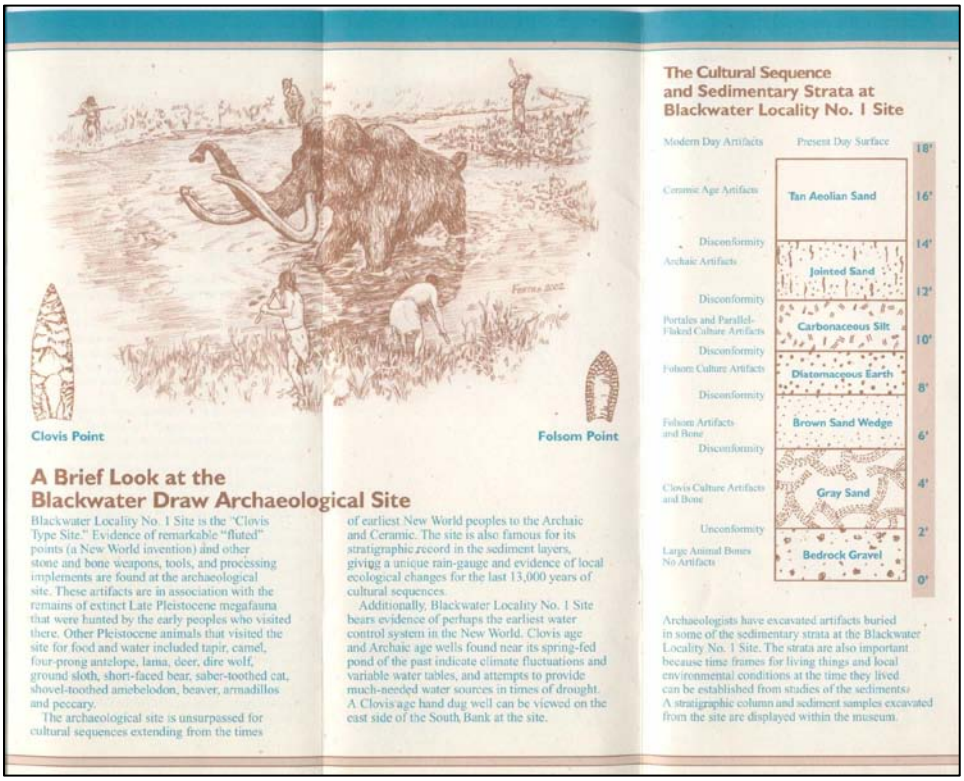
facilities

- "Touch and Feel" table for children
- RV parking areas
- Picnic and camping facilities are available nearby.

information

For further information, call the museum at (505) 562-2202, or the site at (505) 356-5235.

Figure 128. Blackwater Draw, Museum brochure 1, side 1.



Clovis Point

Folsom Point

A Brief Look at the Blackwater Draw Archaeological Site

Blackwater Locality No. 1 Site is the "Clovis Type Site." Evidence of remarkable "fluted" points (a New World invention) and other stone and bone weapons, tools, and processing implements are found at the archaeological site. These artifacts are in association with the remains of extinct Late Pleistocene megafauna that were hunted by the early peoples who visited there. Other Pleistocene animals that visited the site for food and water included tapir, camel, four-prong antelope, lama, deer, dire wolf, ground sloth, short-faced bear, saber-toothed cat, shovel-toothed amebelodon, beaver, armadillos and peccary.

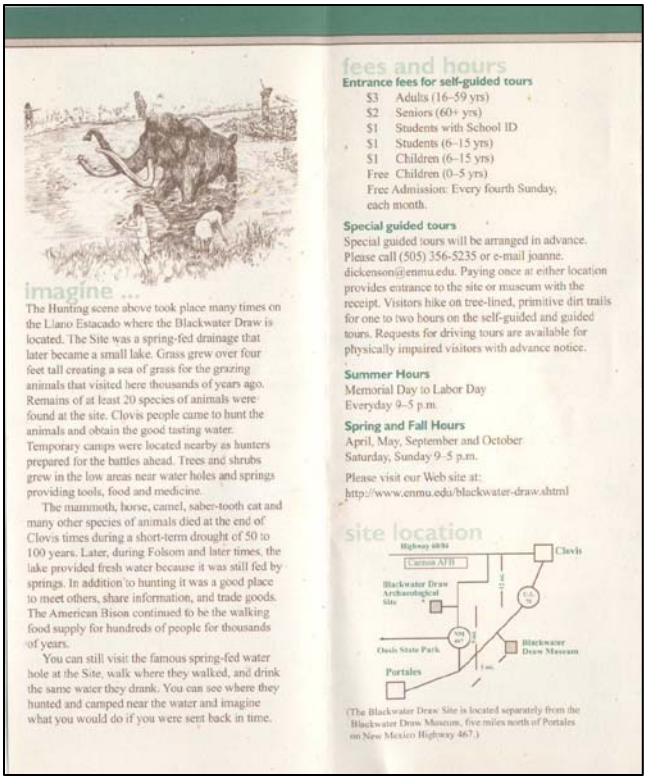
The archaeological site is unsurpassed for cultural sequences extending from the times of earliest New World peoples to the Archaic and Ceramic. The site is also famous for its stratigraphic record in the sediment layers, giving a unique rain-gauge and evidence of local ecological changes for the last 13,000 years of cultural sequences.

Additionally, Blackwater Locality No. 1 Site bears evidence of perhaps the earliest water control system in the New World. Clovis age and Archaic age wells found near its spring-fed pond of the past indicate climate fluctuations and variable water tables, and attempts to provide much-needed water sources in times of drought. A Clovis age hand dug well can be viewed on the east side of the South Bank at the site.

The Cultural Sequence and Sedimentary Strata at Blackwater Locality No. 1 Site

Archaeologists have excavated artifacts buried in some of the sedimentary strata at the Blackwater Locality No. 1 Site. The strata are also important because time frames for living things and local environmental conditions at the time they lived can be established from studies of the sediments. A stratigraphic column and sediment samples excavated from the site are displayed within the museum.

Figure 129. Blackwater Draw, Museum brochure 1, side 2.



imagine ...

The Hunting scene above took place many times on the Llano Estacado where the Blackwater Draw is located. The Site was a spring-fed drainage that later became a small lake. Grass grew over four feet tall creating a sea of grass for the grazing animals that visited here thousands of years ago. Remains of at least 20 species of animals were found at the site. Clovis people came to hunt the animals and obtain the good tasting water. Temporary camps were located nearby as hunters prepared for the battles ahead. Trees and shrubs grew in the low areas near water holes and springs providing tools, food and medicine.

The mammoth, horse, camel, saber-tooth cat and many other species of animals died at the end of Clovis times during a short-term drought of 50 to 100 years. Later, during Folsom and later times, the lake provided fresh water because it was still fed by springs. In addition to hunting it was a good place to meet others, share information, and trade goods. The American Bison continued to be the walking food supply for hundreds of people for thousands of years.

You can still visit the famous spring-fed water hole at the Site, walk where they walked, and drink the same water they drank. You can see where they hunted and camped near the water and imagine what you would do if you were sent back in time.

fees and hours

Entrance fees for self-guided tours

$3	Adults (16–59 yrs)
$2	Seniors (60+ yrs)
$1	Students with School ID
$1	Students (6–15 yrs)
$1	Children (6–15 yrs)
Free	Children (0–5 yrs)
Free	Admission: Every fourth Sunday, each month.

Special guided tours

Special guided tours will be arranged in advance. Please call (505) 356-5235 or e-mail joanne.dickenson@enmu.edu. Paying once at either location provides entrance to the site or museum with the receipt. Visitors hike on tree-lined, primitive dirt trails for one to two hours on the self-guided and guided tours. Requests for driving tours are available for physically impaired visitors with advance notice.

Summer Hours

Memorial Day to Labor Day
Everyday 9–5 p.m.

Spring and Fall Hours

April, May, September and October
Saturday, Sunday 9–5 p.m.

Please visit our Web site at:
http://www.enmu.edu/blackwater-draw.shtml

site location

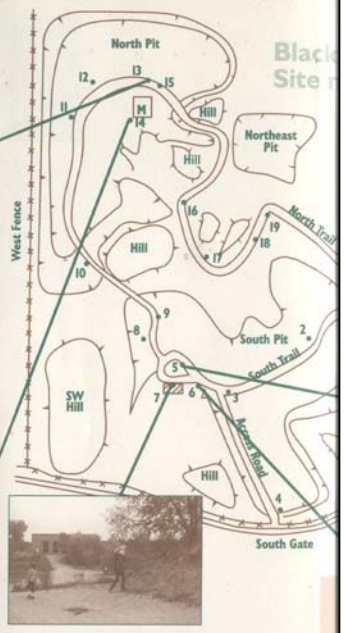
(The Blackwater Draw Site is located separately from the Blackwater Draw Museum, five miles north of Portales on New Mexico Highway 467.)

Jess Collins and Fidel Duran cleaning a mammoth bone.

Between signs #13 and #14 is the location of the discovery of five mammoth, several bison, horses and other animal bone elements found here during the excavations of 1962-1964. Within and around the bone bed were almost two thousand artifacts recorded. Hunters killed some of the animals, while others died at the many springs located at this area in the North Pit.

The springs contained over half of the artifacts. Some of those artifacts were highly polished and others were not. Many fluted Clovis points were found within the cavity of the Mammoth indicating they were killed here. Some large knives were also "lost" in the body of the animals during processing activities. This area must have been the favorite place for Mammoth to come and bathe in the cold spring water because a large fragment of a huge tusk was recovered from the largest spring.

Here at Blackwater Draw, you can walk where these animals walked, and see where they were uncovered thousands of years later by workers who saved evidence of their important discoveries.



Entering the Interpretive Center building on the trail, visitors experience ongoing excavations and displays of mammoth, bison and horse bones. Bison bones, left in place as they were uncovered, are visible in the famous strata of sediment layers. This is sign #7. The trail goes north into the north pit where the people are standing.

Figure 130. Blackwater Draw, Brochure 2, side 1.

Figure 131. Blackwater Draw, Brochure 2, side 2.

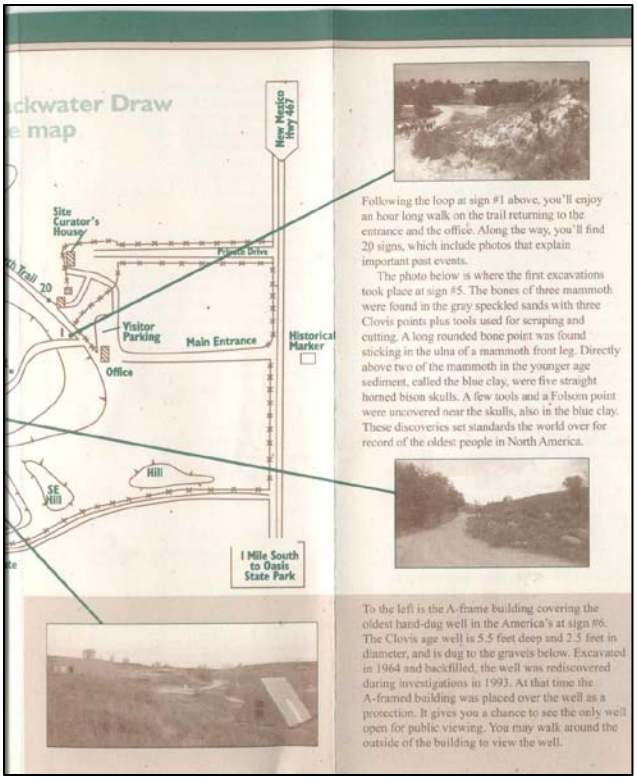


Figure 132. Blackwater Draw, Brochure 2, side 2 continued.

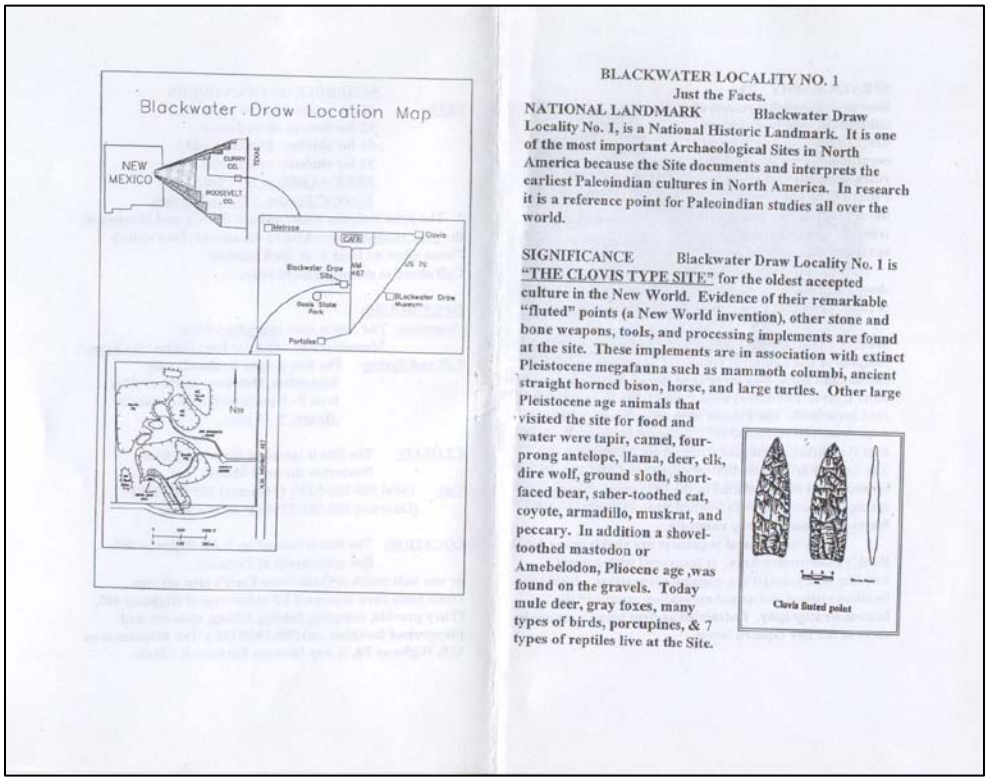


Figure 133. Blackwater Draw, "Just the Facts" Pamphlet 1, page 1 and 12.

STRATIGRAPHY The famous stratigraphic record of sediment in each layer gives a unique rain-gauge of cultural sequences for the last 12,000 years, from the earliest Paleoindians to Ceramic times. Each level contains critically important evidence hidden in the deposits.

Columbian Mammoth

Today the stratigraphy of the deep man-made pits also show 2 million years of deposition. Bone is found in some of those levels that Paleontologists find interesting.

MULTI-COMPONENT SITE The famous multi-component site's cultural sequences are unique from most Paleoindian sites. One layer is on top of another layer after other layers. The dates range from 11,300 to 11,000 B.P. at the Clovis level. The Folsom level directly above Clovis dates from 10,800-10,000 B.P., followed by Agate Basin and then the Portales Complex dating from 9,800-8,500 B.P. The Archaic level dates between 8,400 to 4,400 B.P. The ceramic level was identified in the 1996 excavations near a spring in association with burned bone and caliche rock fragments from a nearby campsite.

Today the cultural sequences are visible at the South Bank's Interpretive Area. It is covered with a metal building that protects the ongoing excavations. Inside the building visitors see actual excavation areas and the famous stratigraphy. Pedestaled ancient bison bone are in three of the five exposed levels.

The interpretive area is inside the metal building. It was constructed in 1997, with money from four sources, to protect the excavation area. The New Mexico Historic Preservation Office & the New Mexico Transportation Environmental funds were matched with funds from El Llano Estacado Research, Conservation, & Development Council of New Mexico and Eastern New Mexico University to build the 72' X 48' metal structure.

Figure 134. Blackwater Draw, "Just the Facts" Pamphlet 1, pages 2 and 3.

The above photo shows a Clovis point sticking in the rib cage of mammoth IV. The discovery occurred in 1963 when the mammoth were being removed by Eastern New Mexico University students.

The Clovis point in the above photo was found in Mammoth IV in addition to other tools and three more Clovis points. They killed this mammoth with a shot between the rib cage. The Clovis projectile point was not damaged at all but was left behind in the animal. In all the action taking place to recover some of the meat and hide it appears the meat processing was interrupted and they had to leave in a hurry.

OLDEST HAND-DUG WELLS Blackwater Draw Locality No. 1 contains the earliest water control system in the New World. At least one Clovis age and 19 Archaic age wells were dug to reach the lowered water table. These events indicate a climate fluctuation and variable water table occurred to one of the most stable spring fed lakes in the region.

MAJOR DISCOVERIES Dr. E. B. Howard and Dr. John Cotter (University of Pennsylvania And Philadelphia Academy of Natural Sciences) held the first professional investigations & excavations at "THE CLOVIS SITE" from August 1932 to the summer of 1937. Their excavations documented the existence of the Clovis people who arrived at the site before the Folsom people, leaving behind their distinctive fluted spear points in mammoth & bison bones. Dr. Sellards (Texas Memorial Museum) & his workers confirmed the previously documented stratigraphic sequence while excavating at the site from 1948 to 1956. They also identified the Portales Complex, above the Folsom level, published in "Early Man in America" in 1952. From 1960-1962 isolated mammoth remains had been found and recorded. In the 1962-63 time period the largest mammoth bone bed was uncovered during strip mining activities. Five Mammoths & a bison were found near seven springs in the north pit with hundreds of artifacts scattered within & around the bones. The El Llano Archaeological Society of Portales, Texas Technological College, & the Museum of New Mexico

Figure 135. Blackwater Draw, "Just the Facts" Pamphlet 1, pages 4 and 5.

excavated the mammoth bed, the north bank & west bank publishing their information. Later in 1963 Eastern New Mexico University's (ENMU) new Anthropology department, director George Agogino, took charge of the bone removal after the plans for a museum over the massive bone bed fell through. The Museum was built ½ way between the towns of Clovis and Portales on U.S. Highway 70, by 1969. Other institutions & ENMU have done research at the site, preserving the bone & deposits after testing the site for cultural deposits.

PROTECTION OF THE SITE Since the discovery of the Site, several unsuccessful attempts were made in 1941 by John Cotter, in 1956 led by Fred Wendorf, & in 1963 led by a host of New Mexico dignitaries and local people to save several acres of the in situ cultural deposits from being destroyed by the gravel mining. Not until 1979 was the Site's 157 acres purchased by Eastern New Mexico University for it's protection. The 1983-1984 investigations, revealed 800 meters of in situ cultural deposits down Spring draw. Buried camp sites also exist around the former ancient lake edge giving a long term research potential for many years in the future. Several locations may contain remnants of the lake, inadvertently left intact during gravel mining activities. State of New Mexico Legislature funding was given to the Site for it's protection and limited development. The Site was ready for tourism from 1989-1991 and being open for more hours & days since then. The Curator lives on the site for its long term protection. It is opened only by prior appointment during closed hours.

Fred Wendorf is trying to hear James Hester over the roar of the stripper machine. They are standing in the mammoth bed, 1962. BWD0513 archives.

RESEARCH Ongoing research is conducted by Eastern New Mexico University and other investigators. Recent discoveries of artifacts in the unit G tan sands are ceramic fragments, stone tools, points and burned caliche pebbles. These artifacts have identified activity areas from Archaic to Ceramic times when springs were rejuvenated, providing water for the visitors.

Figure 136. Blackwater Draw, "Just the Facts" Pamphlet 1, pages 6 and 7.

The site does not have human remains associated with any cultural deposits even though the massive deposits of bone, tools, spear points, and other evidence suggests future excavations may reveal such remains. *"The Clovis Man"* remains were not discovered here, so far, although the Clovis people's tools, bones of animals they killed, and other items were left behind. Evidence of Clovis occupations are also found across the United States.

ORGANIZATION Since 1988 Eastern New Mexico University personnel, the Director Dr. John Montgomery and curator Joanne Dickenson, have made plans and developed the site for security, access, interpretation, and conservation. Today the impact of site development and land use on the environment is being monitored and stabilization efforts are a primary project, following the Master Plan completed by George Crawford. Part-time help is provided by Eastern New Mexico University anthropology graduate students and volunteers. Conservation work is done periodically by volunteers working under the Curator's direction & with Scout troops & the Youth Conservation Corp. Archaeology classes are offered in the Anthropology department periodically.

MINING Gravel mining began in September 1932, beginning with two horses dragging gravel into piles to be loaded onto trucks for road construction. A road was needed between Clovis and Portales. From the 1940's/60's a drag line and later massive earth moving equipment and dynamite were used to move the 20-30 feet of overburden resting on top of the gravels Gravel mining extended into the 1970's until the water table dropped below the surface.

Clovis age blades found in the north pit, 1990. The longest one measures 22.5 cm or 9" long.

The artifacts in the above photo are blades that were used as multi-purpose tools. The Clovis people created these type of tools in addition to the Clovis points that defined them as a hunter - gathering family group. They used a large area in their quest for food, clothing and supplies. Visits were made to various water holes on the Llano Estacado from the plains to the mountains. This water hole was perhaps the best spring fed one that the animals enjoyed, a mammoth playground, and led the people to come, returning every year to hunt for food.

Figure 137. Blackwater Draw, "Just the Facts" Pamphlet 1, pages 8 and 9.

DONATIONS Collections of artifacts found at the Site are donated to the Site periodically. The information is published in Master's thesis and research reports.

The east entrance gate can be recognized by the sign below. You know you are in the right place. The site's schedule of operations are on the last page of this book. Come visit us and enjoy a trip into the past. Its your history!

Joanne.dickenson@enmu.edu

SCHEDULE OF OPEN HOURS

FEES: $3 for adults 16 to 59 years old.
$2 for Seniors 60 and older.
$1 for children 15-6 years old
$1 for students with school ID.
FREE = Children 5 - 0 years old
Every 4th Sunday is free admission.

* The price includes a tour of both the Site and Museum if the pink receipt is presented to the second place visited. Please allow an hour + at each location.
Call ahead to arrange guided tours.

OPEN HOURS:
Summers: The Site is open everyday, from Memorial Day to Labor Day; Hours: 9 - 5 pm.
Fall and Spring: The Site is open weekends only: September, October, April, & May from 9 - 5 on Saturday and Sunday, Hours: 9 - 5 pm.

CLOSED: The Site is closed in the winter, from November through March.
Call: (Site) 505 356-5235; (Museum) 505-562-2202 (Director) 505-562-2254 for information.

LOCATION: The Site is located on N.M. Highway 467, five miles north of Portales; or one mile north of Oasis State Park's turn off sign. Oasis State Park is located 1.9 miles west of Highway 467, (They provide, camping, fishing, hiking, showers, and playground facilities, call 505.356.5331.) The Museum is on U.S. Highway 70, ½ way between Portales & Clovis.

Figure 138. Blackwater Draw, "Just the Facts" Pamphlet 1, pages 10 and 11.

Pine Bluffs High Plains Museum and Windows on the Past Interpretive Center Photographs and Brochures

Figure 139. Pine Bluffs, Museum display "Site Complex".

Figure 140. Pine Bluffs, Museum displays.

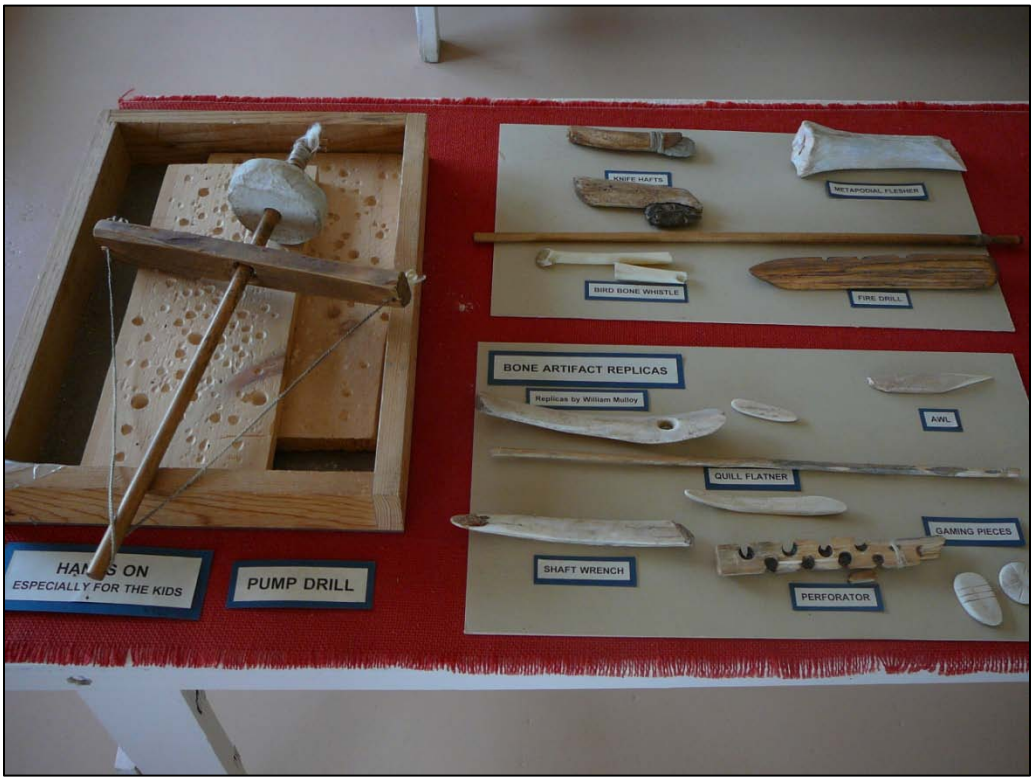


Figure 141. Pine Bluffs, Pump drill hands on display.

Figure 142. Pine Bluffs, Bison skeleton and bones display.

Figure 143. Pine Bluffs, Windows on the Past Interpretive Center.

Figure 144. Pine Bluffs, "The High Plains Archaeology Project".

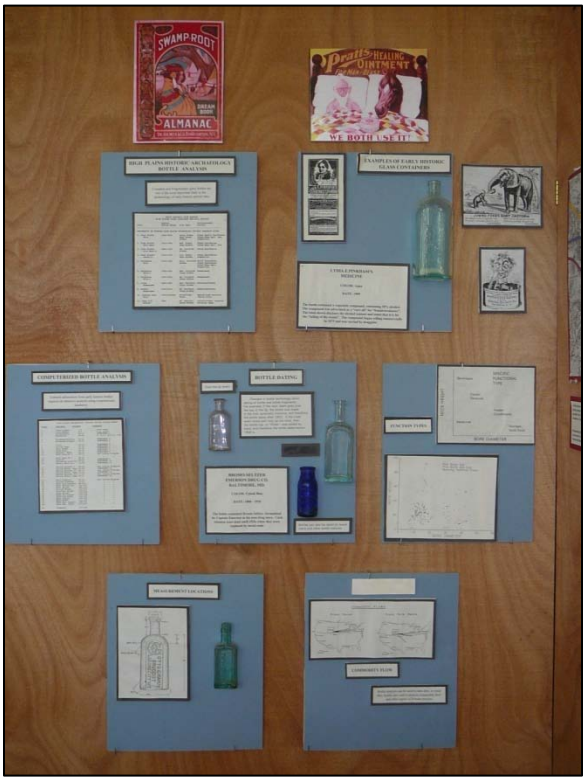


Figure 145. Pine Bluffs, Historic artifacts discovered at the site.

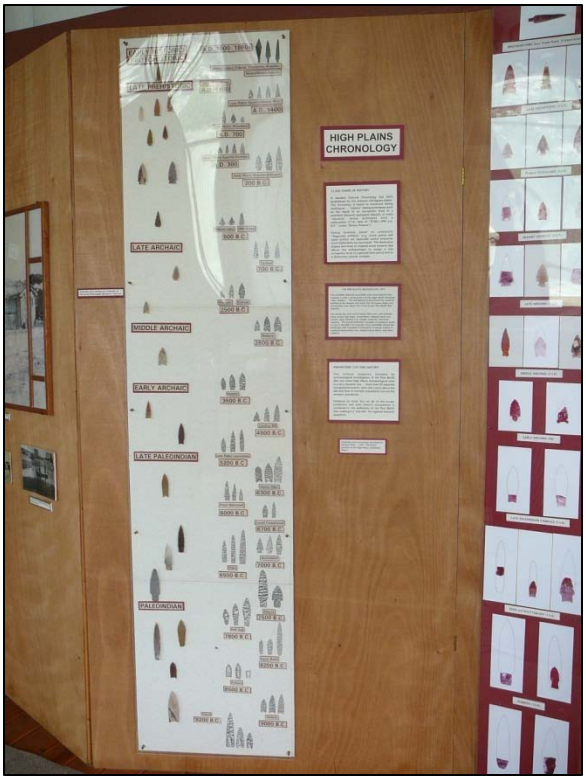


Figure 146. Pine Bluffs, "High Plains Chronology".

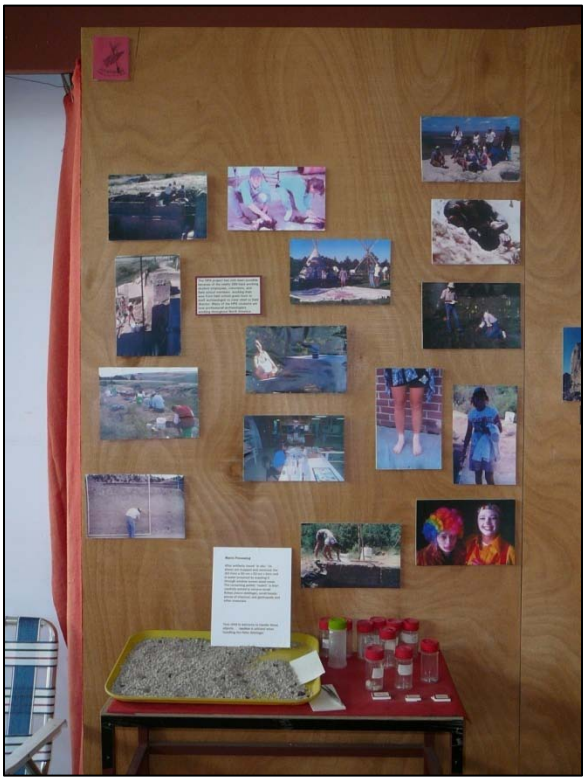


Figure 147. Pine Bluffs, Photographs of crew members and a sorting matrix for visitors.

Figure 148. Pine Bluffs, Artifacts on display for children to touch.

Figure 149. Pine Bluffs, Exposed excavation with visitors walkway.

Figure 150. Pine Bluffs, Walkway from the rest area to the interpretive center.

University of Wyoming
Town of Pine Bluffs

HIGH PLAINS ARCHAEOLOGY PROJECT

The **High Plains Archaeology Project** is a long term, cooperative research, public education, and economic development program. Based in this small Wyoming town during the summer months, HPA archaeologists are investigating prehistoric and early historic sites throughout the region.

The stratified (layered) cultural levels being excavated within the **Windows on the Past Interpretive Center** incorporate the deepest deposit found at the **Pine Bluffs Site**, but this represents only a small portion of this major archaeological "site complex". The Pine Bluffs Site is spread out around and on top of the bluffs behind the town (as well as under the Rest Area and the Interstate). It has small clusters of stone circles or "tipi rings", rock shelters, large buried roasting pits filled with burned rock, caches of chipped stone tools, a U.S. Cavalry overlook from the Frontier era, and many other features. More than 10,000 years of Native American occupation of the bluffs have draped the landscape several hundreds thousands square meters of fire-cracked rock, chipped stone debris, and other artifacts.

The top level at the Pine Bluffs Site excavation is an **early trash dump** from the town of Pine Bluffs, dating from about **1880 to 1915**, and it has complete and broken bottles, ceramic plates, machinery parts, butchered bones, broken toys, even a few coins, and much more. This artifacts, "bits and pieces of daily life" from old Pine Bluffs tell us a lot about the development of commerce systems and occupations, about diet and nutrition, and many other details that are not part of written history.

Below the early historic trash midden are at least **22 prehistoric occupation levels** extending down **more than 6 meters (20 feet) deep.** Diagnostic artifacts representing essentially the entire chronology for the High Plains region have been recovered at the site. Arrow points and spear points, chipped stone knives, scrapers and drills, bone awls, pottery, shell pendants and other ornaments, and thousands of tool sharpening flakes have been recovered. Over 50 fire hearths have been found in the excavation area that is now inside of the Windows on the Past Interpretive Center, yielding numerous radiocarbon dates and other information.

With these artifacts and features, University archaeologists and their students are addressing a broad range of questions, from the **details of nomadic daily life to theoretical explanations of the causes of regional-scale migration**. The Pine Bluffs Site and other sites in the area reveal an exceptionally dynamic prehistoric period, more than 12,000 years with wave after wave of people ebbing and flowing through the area.

Please stop by the **Windows on the Past Interpretive Center,** using the **walking trail from the Rest Area, or driving around to the parking area next to the Shooting Range Road (see enclosed map)**. Guided tours are offered most days during the summer, 9-12 and 1-5. We are occasionally closed for crew days-off, so please check our schedule with **the Rest Area Information Booth** or call HPA at 245-9372.

Interested visitors should also take a few minutes to view the **High Plains Archaeology Museum and Field Lab Complex at 2nd and Elm. Our main displays, including the artifacts from the Pine Bluffs Site and other Wyoming sites,** are on view at this main museum, only a few blocks from the excavation site.

Figure 151. Pine Bluffs, Brochure 1, side 1.

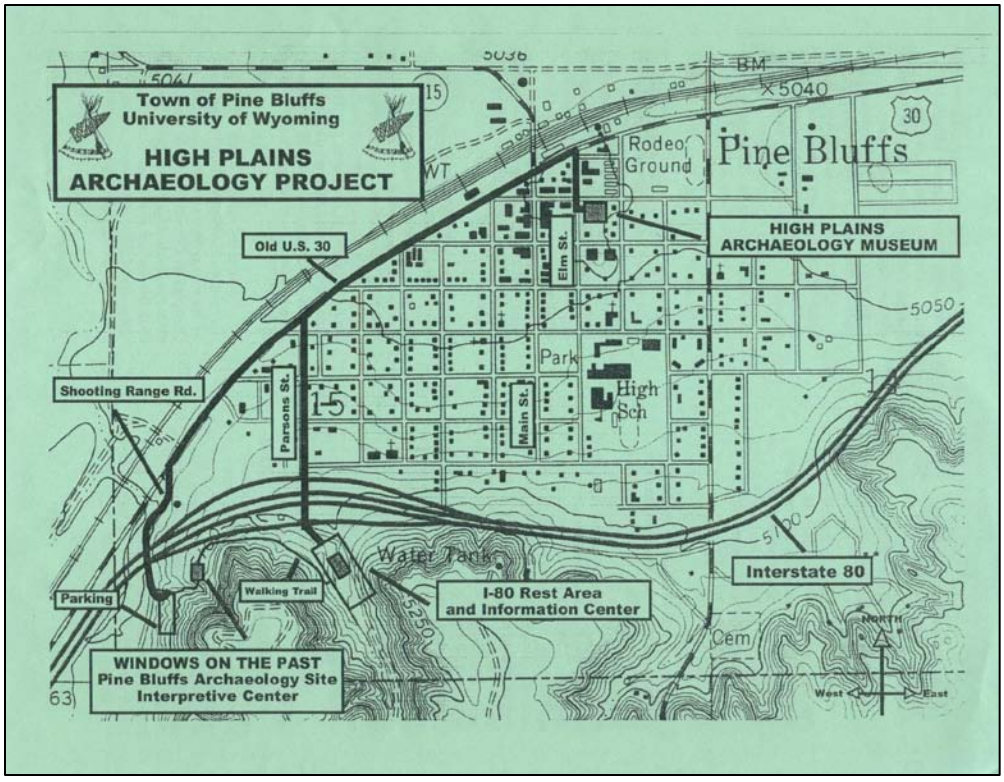


Figure 152. Pine Bluffs, Brochure 1, side 2.

Murray Springs Photographs and Brochures

Figure 153. Murray Springs, Entrance sign.

Figure 154. Murray Springs, Interpretive sign and map.

Figure 155. Murray Springs, Interpretive trail loop.

Figure 156. Murray Springs, Profile of the "black mat".

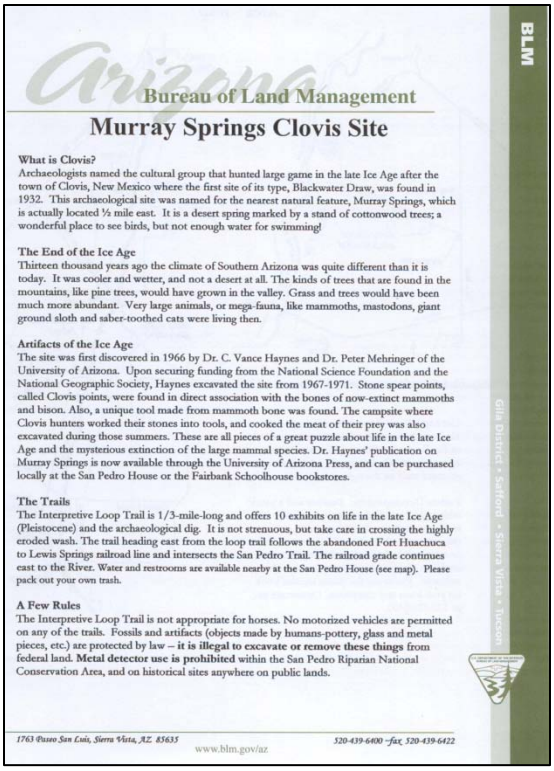
Figure 157. Murray Springs, "The struggle for survival" interpretive sign.

Figure 158. Murray Springs, Bench for visitors along the interpretive trail.

Figure 159. Murray Springs, Ramada and picnic table for visitors.

Figure 160. Murray Springs, Interpretive and walking trail.

Figure 161. Murray Springs, Interpretive sign for natural and cultural trails.



Arizona

Bureau of Land Management

Murray Springs Clovis Site

What is Clovis?
Archaeologists named the cultural group that hunted large game in the late Ice Age after the town of Clovis, New Mexico where the first site of its type, Blackwater Draw, was found in 1932. This archaeological site was named for the nearest natural feature, Murray Springs, which is actually located ½ mile east. It is a desert spring marked by a stand of cottonwood trees; a wonderful place to see birds, but not enough water for swimming!

The End of the Ice Age
Thirteen thousand years ago the climate of Southern Arizona was quite different than it is today. It was cooler and wetter, and not a desert at all. The kinds of trees that are found in the mountains, like pine trees, would have grown in the valley. Grass and trees would have been much more abundant. Very large animals, or mega-fauna, like mammoths, mastodons, giant ground sloth and saber-toothed cats were living then.

Artifacts of the Ice Age
The site was first discovered in 1966 by Dr. C. Vance Haynes and Dr. Peter Mehringer of the University of Arizona. Upon securing funding from the National Science Foundation and the National Geographic Society, Haynes excavated the site from 1967-1971. Stone spear points, called Clovis points, were found in direct association with the bones of now-extinct mammoths and bison. Also, a unique tool made from mammoth bone was found. The campsite where Clovis hunters worked their stones into tools, and cooked the meat of their prey was also excavated during those summers. These are all pieces of a great puzzle about life in the late Ice Age and the mysterious extinction of the large mammal species. Dr. Haynes' publication on Murray Springs is now available through the University of Arizona Press, and can be purchased locally at the San Pedro House or the Fairbank Schoolhouse bookstores.

The Trails
The Interpretive Loop Trail is 1/3-mile-long and offers 10 exhibits on life in the late Ice Age (Pleistocene) and the archaeological dig. It is not strenuous, but take care in crossing the highly eroded wash. The trail heading east from the loop trail follows the abandoned Fort Huachuca to Lewis Springs railroad line and intersects the San Pedro Trail. The railroad grade continues east to the River. Water and restrooms are available nearby at the San Pedro House (see map). Please pack out your own trash.

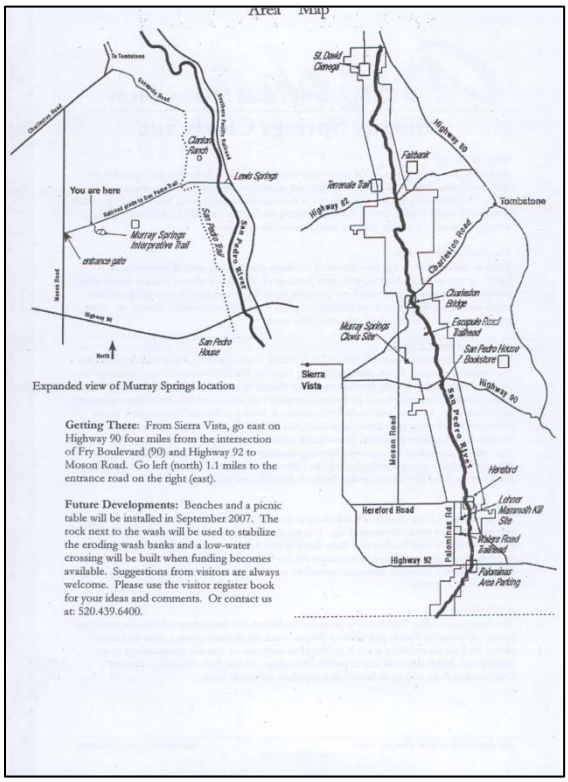
A Few Rules
The Interpretive Loop Trail is not appropriate for horses. No motorized vehicles are permitted on any of the trails. Fossils and artifacts (objects made by humans-pottery, glass and metal pieces, etc.) are protected by law – **it is illegal to excavate or remove these things** from federal land. **Metal detector use is prohibited** within the San Pedro Riparian National Conservation Area, and on historical sites anywhere on public lands.

1763 Paseo San Luis, Sierra Vista, AZ. 85635
520-439-6400 –fax 520-439-6422
www.blm.gov/az

BLM

Gila District • Safford • Sierra Vista • Tucson

Figure 162. Murray Springs, Brochure 1, side 1.



Expanded view of Murray Springs location

Getting There: From Sierra Vista, go east on Highway 90 four miles from the intersection of Fry Boulevard (90) and Highway 92 to Moson Road. Go left (north) 1.1 miles to the entrance road on the right (east).

Future Developments: Benches and a picnic table will be installed in September 2007. The rock next to the wash will be used to stabilize the eroding wash banks and a low-water crossing will be built when funding becomes available. Suggestions from visitors are always welcome. Please use the visitor register book for your ideas and comments. Or contact us at: 520.439.6400.

Figure 163. Murray Springs, Brochure 1, side 2.