A Ditch by Any Other Name is Still a Ditch: An Archaeological Assessment of Ditch Earthworks on the Middle Missouri in the Dakotas

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A Ditch by Any Other Name is Still a Ditch: An Archaeological Assessment of
Ditch Earthworks on the Middle Missouri in the Dakotas

By

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A Thesis

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A Ditch by any other Names is Still a Ditch: An Archaeological Assessment of Ditch Earthworks on the Middle Missouri of South Dakota

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University of Nebraska, 2010

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Abstract: This thesis is an archaeological assessment of ditch earth works on the Middle Missouri sub-area in North and South Dakota. This master’s thesis considers previously publically published materials from fifteen archaeological sites along the northern tier of Missouri River in the Dakotas. The paper questions the use of the terms “fortified” and “fortification” when describing ditch earthworks that surround some Plains Village archaeological sites. The thesis assesses the literature to compare findings from other regions for evidence of prehistoric warfare and how prehistoric war then relates to the ditch earthworks. The paper introduces criteria that can assist archaeologist in determining if prehistoric conflict has occurred and what archaeological evidence should be present. Lastly the this paper makes conclusions based on available data that relates to the form and function of ditch earthworks and their relationship to prehistoric warfare.
Dedicated to:

Ina na Unci Tuwahe Waste Win
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Chapter 1

Introduction

Are ditch earthworks primarily or largely evidence of prehistoric warfare in the middle Missouri?

Throughout our world’s history, wars and interpersonal conflicts have become an integral part of the human evolutionary experience. There exists ample evidence that such conflict’s often occurred in the Old World on a large scale. Leading to the belief that interpersonal conflict is a very human experience. Understandably, where there are humans, there will be interpersonal conflicts. Populations in the New World, the Americas, were not immune from interpersonal conflicts that had led to war. There is archeological evidence of interpersonal conflict on varying scales i.e. war, in South America with the great civilizations of Meso and South America (Palka 2001). Archaeological evidence of conflict is also apparent in the Southwest as well as in the Eastern Woodlands of North America (Brose and Greber 1979, Douglas 2006, Dye 2009, Le Blanc 2006, Lee 2004, Mahon 1958, Potter 1968, Squire and Davis 1847). It would make sense then to assume that there was pre-contact warfare occurring on the Northern Plains of the U.S. as well. There are ample tribal oral histories and anthropological reports that lend to the studies of Plains warfare, both pre-contact and post-contact periods. Yet there is limited archaeological proof of conflict.

Archaeologists have postulated that evidence for warfare on the Plains is the presence of fortification ditches. These earthworks some walled some not, are argued to be a sign of warfare on the Plains (Keeley 2006, Wood 1989, Bamforth 1994, Lehmer
1971, Caldwell 1968, Toom 1981, Hanaus and Winniam 1981, Zimmerman and Bradley 1979, Dye 2009, Ewers 1975, Bowers 1992, Denig 1976). It is the assumption the ditches are solely for fortification that has triggered this master’s thesis. The problem that this paper will address is: Are the presence of ditch earthworks generally or primary evidence of prehistoric warfare within the Middle Missouri Sub-area?

This thesis will look at different views of conflict; from an anthropologic view on why people in general go to war, and to the archaeological evidence left behind after conflict has taken place. It will then discuss the Middle Missouri Sub-area and look for evidence of warfare in a specified geographical location. Finally it will look a single site that has skeletal evidence of interpersonal conflict and analyze it using geophysical prospecting techniques to look for other evidence of warfare at this location. Leaving room for discussion and conclusions at the end of the thesis as well as to analyze the data and suggest further research possibilities.
In order to enter into a discussion on prehistoric warfare, one must assume a certain universal theme; that is interpersonal conflict has and continues to take place worldwide. The degrees of interpersonal conflict can be wide ranging from the actual taking of life to giving someone the “evil eye”. This section investigates the reasons why humans engage in interpersonal conflict.

Theories have been postulated throughout history on the reasons why people engage in warfare. Some believe that it is human trait, and humans are “wired” to go to war. Others believe it is a product of human nature; while other researchers have contemplated the environmental deterministic view of warfare. To objectively look at why pre-historic peoples on the Plains went to war, one must look at the theories on why people in general go to war. Anthropologists and archaeologists have looked to other social science disciplines to gain an understanding of interpersonal conflict.

Accordingly a review of literature (Dawson 1996, Ember and Ember 1992 and Ember 1982) has resulted in five theories that have been established in realm of prehistoric warfare, they are: (1) the Hobbesian thesis: war is part of the human nature and serves to differentiate the “us” and “them”. (2) The Rousseauean thesis: war is not part of human nature but rather a social construct. (3) The Malthusian thesis: war is a human construct to act as population control measure. (4) The Spencerian Thesis: is a combination of the Hobbs and Malthus, war serves as a means to “help” human evolution. And lastly (5) the cultural anthropologist’s thesis: war is an accident produced by social dysfunction. Dawson also argues that as a result of these theories, three (3) new combinations of these theories have more recently developed due to the paradigm shifts in Anthropology. He contests that the three (3) theories evolved out of the writing of
Malthus, Rousseau, Spencer and Hobbs, they are: the sociobiological movement, to which, researchers believe that war is a part of human evolution and it is natural to be “war like”. The second is the cultural ecological movement, where war is a social construct, fulfilling a need in society, where it is male posturing or revenge for a social taboo. Third and finally, the Darwinian movement, which war acts as the great divider of those individuals who are socially fit, compared to those who are not (Dawson 1996:1).

War in general may encompass all of these theories; however I will focus on the idea that the natural environment plays a major role in prehistoric warfare. Ember and Ember look at the environment as a determining factor on why people go to war. The researchers looked at Human Research Area Files (HRAF) to have more of an objective outlook on the causes of war. Ember and Ember looked at one hundred and eighty six “mostly” pre-industrial societies. They tested a hypothesis that resources scarcity will lead to war by using a multicultural approach. They discovered that within the societies that were researched, all had accounts of warfare prior to contact (Ember and Ember 1992:242).

Ember and Ember found through their research, that the fear of future natural disasters (i.e. floods, prolonged droughts, and shortened procurement times) in association with population growth will generally lead to war. The fear of nature and the fear of “others”, play a key role in understanding the beginnings of warfare (Ember and Ember 1996:256). I have already mentioned the fear of nature; this is the fear of the unknown and what will happen next year. If it is a good growing season, then the population must start storing food stuff in order to prepare for the worst case scenario.
The fear of the “others” is a fear based on population growth and the competition with other groups for limited resources (Ember and Ember 1996:256).

Bamforth (2006) tends to agree with Ember and Ember in their analysis of warfare. He suggests that the environmental changes played an integral part in establishing conflict in Middle Missouri sub-area. He suggests that weather was the main determining factor in the establishment of fortified villages. Furthermore, Bamforth suggests that due to the change in weather, archaeologists are able to see the movement of peoples through time.

Whether or not the theories mentioned above are the sole reasons for people to engage in war, the assumption that war is a universal trait and that all populations take part in some type of interpersonal conflict must be recognized. Bamforth tends to agree with Ember and Ember and take an environmentalist point of view on warfare. In the archaeological record, as well as in the historical record, researchers have seen populations relocating due to carrying capacities of the land being exploited (Bamforth 2006, Dye 2009).

ARCHAEOLOGY

What constitutes archaeological evidence of war? What artifacts and associated features would delineate warfare? On the modern battlefield these questions are answered with identifying remnant artifacts used for battle, i.e. armored vehicles, military planes, high explosives and fragments. This is not the case when dealing with prehistoric warfare. Tools and weapons could have served dual purposes. An example would be projectile points, they could have been used for hunting or they could have been used for
interpersonal conflict. Because there have not been any artifacts located on the Plains that have been interpreted as war items during this time period, this minor fact is a cause of an issue in the interpretation of site use.

All things being equal and the assumption that the ditches that surround some earthlodge villages were used for fortification, then it would make sense to see in the archaeological evidences of conflict near or around the ditches. Archaeologists should record artifacts such as an abundance of projectile points, grooved mauls, and knives to name a few. Also evident should be geophysical anomaly that would suggest deliberate destruction of features, presence of mass graves or burial grounds, and other modifications to the village (i.e. construction of other types of defensive positions).

The archaeological evidence for prehistoric warfare is limited and ephemeral at best. Keeley suggests that the presence of a fortification ditch is proof positive for evidence of warfare (Keeley et al 2007). When it comes to the discussion about ditches, Keeley’s research of old world and some new world sites have led him and his colleagues to classify certain construction characteristics as being solely for fortification. He suggests that the shape of the trenches is a calculated engineering phenomenon to prevent penetration of the village. He has concluded that by looking to the cross-section of these ditches, a researcher can distinguish the presences of fortifications. For example, if a ditch’s cross-section shows a deep “V” (<1m) with high angle sidewalls, Keeley suggests that this type was for fortification. Whereas a ditch with a shallow trapezoidal profile with low angle sidewalls (>1m) is representative of something other than fortification (Keeley et al 2007:58)
In the Southwest, LeBlanc suggests that settlement patterns offer the best evidence for the presence of prehistoric warfare. Like Keeley, LeBlanc looks to the interpreted cultural landscape and the presence of defensive structures (LeBlanc 1999:55). He has also developed a method of looking at settlement patterns that would lead to an interpretation prehistoric warfare. Criteria include: Site configurations, Site location, site distribution, and site on a line of site location (LeBlanc 1999:55-56).

The criteria of site configuration would include defensive features incorporated into the development of the settlement; as well as the expansion overtime of population and land acquisition. This would include the abandonment of outlying communities and the development of a central village (LeBlanc 1999:55).
The criteria of site location would include highly defensible locations, i.e. the high ground, or a location where it would be hard to attack. We see this in the construction and use of cliff dwellings in the Southwest. The use of natural defensive structures and enhancing them with construction of an artificial component would also show evidence for prehistoric warfare.

Site distribution and line of sight are similar in that they refer to the location of site concentrations. If archaeologists can see a population move through diagnostic artifacts in to “no man’s land” the buffer zone between different populations, and the archaeological sites within the buffer zone are still within sight of the parent communities this could be interpreted as evidence of prehistoric warfare. To encroach into no man’s land, but still within sight of your allies would make logical sense in case the other population also encroached. The populations would have a location within a short retreat to defend themselves (LeBlanc 1999:55-57).

By looking at these different areas, albeit a brief discussion, one can see how the interpretations on the Plains were formed. Many of the archaeologists who were apart of the Missouri River Basin Survey (MRBS) learned their trade in these areas. It would then make sense to use what information they learned and place use it in a new area. These assumptions have not been challenged.

**Middle Missouri Archaeology**

As stated previously, Bamforth (2006) agrees with Ember and Ember’s explanation for war. He also looks at the environment to support his hypothesis. Bamforth suggests that during a period of time from 900 A.D. to 1700 A.D.,
environmental factors contributed to the development and construction of fortified villages. Furthermore he states that there in fact is archaeological evidence in the form of carbon that can be used to date and analyze weather conditions at the time when the carbon was destroyed (in this case wood).

Bamforth suggests that by using carbon dating from sites with fortified villages he is able to determine the environmental conditions at the time of deposition. His research has shown that according to the carbon dating that walled earthworks were more prevalent during times of sustained drought (Bamforth 2006). The results, according to Bamforth suggest a direct correlation between the climate and the possibility of warfare. The variations of climate episodes on the Plains are not as dramatic as some other worldwide episodes; however as recently we have seen on the Plains there were drought and wet cycles that can last a decade (Bamforth 2006). These cycles correlate with the ebb and flow of construction of walled earthworks.

As stated previously, site formation and locations can and will change. LeBlanc attributes the change to the possibility of warfare in the Southwest. This change can be seen at numerous sites along the Missouri River more notably Sommers Site, Fire Heart Creek Site, Crow Creek Village, and Cattle Oiler. These sites show evidence of possible decline and reoccupation during the time period from 900 A.D. to 1700 A.D. Along with the evidence of new earth lodges, the walled earthworks also show evidence of movement. This is most prevalent at the Double Ditch Site. Double Ditch is a site that has multiple ditches that show the growth of the village. As more people came to the village site the old barricade had to move to accommodate the new arrivals. Again if we
look to the Southwest, this type of population movement may be the result of climatic change or conflict.

This leads to the question what other archaeological evidence is present to support the hypothesis of warfare? There are limited sites that have ostological evidence of interpersonal conflict. Ostological evidence includes cut marks and evidence of blunt and sharp force trauma. The Crow Creek Site is a village site that has evidence of interpersonal conflict. This is the site where a massacre took place and the human remains were deposited into the ditch.

Another site that should be mentioned is the Fay Tolton site. This site uncovered a burial that had a family interned. Missing from the adult male was the head. Researchers have attributed this as possible evidence of warfare (Zimmerman and Bradley 1979, Ahler and Toom 1995, Lehmer Kivett and Jensen 1976). However, there is another ethnographical reason that may explain this, the Mandan have clan bundles; and in these clan bundles contain fetishes and in some cases human remains, most notably skulls (Bowers 2001, 1995,). This could explain the missing skull from this burial.
Chapter 2

Historical Context

In this chapter the discussion turns to the historical background of research on the Middle Missouri. It will first demarcate the location of Middle Missouri and give a brief overview of the climate, vegetation, and fauna. Next the chapter will discuss the historical context from an archaeological overview to the historical overview followed by an ethnographic overview. Lastly the chapter will discuss current research and how that research relates to the history of the landscape.

Geography

The Missouri River flows like a snake through the prairies of the Plains. The headwaters begin in the Rocky Mountains and meander through the Plains and eventually joining with Mississippi River at what is now St. Louis, Mo. The area that is the focus of this thesis is the central region of the Missouri River, which lies in present day South Dakota and North Dakota (see map 1).
Map 2-1 showing Middle Missouri Research area
Climate

The climate on the Plains varies today as it has for centuries. According to Gross and Neusius, they introduce the idea of biomes, this is the idea that plants, animals and possibly humans develop in distinct environments (Gross and Neusius 2007:49). The biome that is the focal point for this research is Plains biome. This biome lies within the rain shadow of the Rocky Mountains. The Rocky Mountains form a “dam” if you will, that will block moister rich air masses on the windward (west) side of the range. This forms a rainshadow on the leeward side (eastern) of the mountain range. Leaving the area within the rainshadow is typically dry and arid.

Typically the Plains are semi-arid grasslands. Average rainfall amounts vary from approximately 99cm in the eastern portions of the Plains to approximately 35cm near the western edge (Gross and Neusius 2007:408). This of course is dependent on the weather patterns and the movement of the jet stream on a year to year basis.

The Plains has an active and diverse climate, temperatures can range from 100 degrees F plus in the summers to -50 degrees F in the winter. This biome has extreme temperature changes which may have lead to the belief that nothing could survive within the region. This adverse climate change and limited rainfall, lead many settlers and government officials to dub this area as the “Great American Desert”.
Vegetation

The vegetation on the Plains is as diverse and extreme as the weather. The Plains vegetation is a mixed grass prairie with riparian areas near lakes, rivers, streams, and springs. Berry producing trees and shrubs are also abundant. As well as cottonwood, elm, ash, and some pine are also present.

The Plains can be separated in two major vegetative regions. The first is the high Plains; this region is characterized by mixed grass prairie. The second is the Missouri River Trench. In essence the trench is actually the flood plain of the Missouri River. This region is the most diverse in vegetative species due the abundance of water from the river.

Fauna

The Northern Plains has a verity of animal species. Lewis and Clark were surprised at the different types of animals that they encountered on their expedition. They have reported seeing seas of bison, multitudes of deer, both white tail and Mule, prong horned antelope, elk, beaver, badger, numerous bird species, as well as a new species, the prairie dog. Along with these species there were the predator species present as well. At the time of Lewis and Clark, the wolf was the major predator on the Plains. However the coyote, fox, and grizzly bear played an important role as predators.

Historical Context

At the turn of the 20th century, after the indigenous populations were placed on Reservations, land that had previously been controlled by Tribes, were now being opened
to homesteaders, and the mass movement of new immigrants began to arrive to the Dakotas. People began to notice strange mounds and earthworks. This led some to begin to study these sites. Archaeology was in its infancy in South Dakota at this time, people began to “dig” these sites with limited to no education in archaeology. The amateur archaeology that was seen in the eastern United States in the 17th and 18th centuries came to the Dakotas.

**Archaeological overview**

To discuss the archaeological history of the Middle Missouri sub-area, one has to decide on where make the distinction between historical research and archaeological research. For the purposes of this master’s thesis, the decision to draw the line at the late 1800s was made. At this time we begin to see scientific methodologies take a hold on the Plains. As I will discuss later in this chapter, before this time, archaeological research was not done by archaeologists. Instead, research and documentation was completed by explorers and curiosity seekers.

The first documented scientific study of earthworks on the Plains was the Northwestern Archaeological Survey (NWAS). This survey included parts of Minnesota and North Dakota. The North Dakota portion of the survey included part of my research area in the late 1800’s. This survey of mounds and earthworks was done by T.H. Lewis and funded by A.J. Hill. Neither of these men was trained in science of archaeology, however, both were fascinated by American antiquities and wished to learn more. They both were employed as general land surveyors through their career and had knowledge of limited engineering principals, so to say they were not specialized in identifying
landforms and earthworks would be a disservice to these pioneers (Haury 1990:15). With that being said, they were in fact still amateur archaeologists, they did not have a research guided survey project in mind. Like other amateur archaeologists, Hill and Lewis were interested and concerned with the disappearance of the earthworks and mounds (Haury 1990:16). In the late 1890’s T.H. Lewis began his survey in North Dakota. He documented two hundred earthwork sites in the State, some of which were earth lodge villages (Haury 1998:17). Hill and Lewis published a series of sites documenting site locations as an end product of their intentions.

One of the foremost amateur archaeologists is South Dakota at the beginning of the 20th century was W.H. Over. Over was a professor at the University of South Dakota beginning in 1912. He studied the natural sciences and was interested at first with paleontology. It was later that he became interested in the human past. In 1917-1919 Over led expeditions to the Missouri River and began to document extant villages that he found (Nehaus 2000). He was one of the first if not the first person in recent history to use scientific ideas to look at these sites in South Dakota. He documented and collected thousands of artifacts that he attributed to the Arikara. Additionally Professor Over during two field seasons found and recorded 156 sites (Nehaus 2000). Although some of his techniques were more destructive then protective, the work that Professor Over did, laid the ground work for the future of archaeology on the Missouri River and in the Dakotas.
Through the work of W.H. Over and William Strong, who were able to conduct limited excavations, a new chapter of archaeology on the Plains began to open. By looking at the locations and orientation of features and artifacts the cultural history begins...
to unfold. This cultural historical approach was en vogue during the late 1930’s to the early 1960’s. It was during this time archaeologists began questioning the cultural historical perspective and began formulating new ideas and theories to answer research questions proposed.

W.C. McKern assisted in the development a taxonomic system in the late 1930’s that would help archaeologists look at sites in a more “scientific” manner. He helped develop the Midwest Taxonomic System (MTS) and separated groups of like artifacts into different types of defined categories. He looked to the biological sciences to develop this type of “family tree” organization. The reason behind the development of this system was a simple one; in that it was an attempt to standardize the lexicon of archaeologists doing work in the Midwest, as well as give credence to the discipline (McKern 1939:302-303). This idea is important because the standardization of what artifacts are called helped archaeologists from what they were studying in the Midwest, to compare findings within the region (McKern 1939:302).

Waldo Wedel was one of the foremost Archaeologists on the Plains during the infancy. He was one of the first to look beyond the cultural historical approach and look at sites as a whole. He primarily worked in the central Plains region (Nebraska and Kansas) and developed the first tradition for the Plains region. The Central Plains Tradition (CPT) was an attempt to classify by change over time of different sites in Republican River drainage. This was done by looking at house types and pottery types. His research can be arguably attributed to the current movements of research orientated projects and results that were being generated from the Southwest. The idea of dating
and chronicling sties as well as using the MTS and those similar in the Southwest became a baseline for archaeologists to use in the future. (Wedel 1986:5).

The next major research episode on the Missouri River was the passing of the Flood Control Act of 1944 and the Rivers and Harbors Act of 1945 respectively. The Pick-Sloan Plan was part the Flood Control Act and was the catalyst for the damming of the Missouri River. The Pick-Sloan Plan designed earthen dams above the main navigation channel which was located from St. Louis, MO to Sioux City, IA. The plan called for six dams to be constructed from Yankton, SD to Fort Peck, MT. The three largest of the dams would be Oahe, Sacajawea, and Ft. Peck. These dams would act as holding reservoirs during the spring run off from the Northern Plains and Rocky Mountains. The lower three dams would provide flood control for portions of the lower Missouri River (Lawson 1982:11, Little 1982:160). The purposes of the this plan as stated previously, was for flood control, secondary purposes included, irrigation, hydroelectric power, stabilize the soil in the Missouri River Valley, improve navigation below Sioux City, IA, encourage mineral and industrial development, and lastly, provide recreation and adequate water supply to the general public (Little 1982:160).

Because there were plans to inundate of millions of acres of land, the scientific community in the United States was in an uproar. The idea of losing irreplaceable information on the past life ways of people that lived on the river was appalling. Due to this uproar, congress allocated funds to the Smithsonian Institute (SI), the Department of Interior (DoI) and the National Park Service (NPS) to conduct scientific research on the tracks of lands that were to be inundated. This was the birth of the Missouri River Basin Survey (MRBS).
In 1945, an inter-agency agreement was reached between the participating agencies and an archaeological plan was devised (Lehmer 1971: iii). The idea of salvage archaeology was new to the realm of archaeology. The idea was to basically “blitz” the land that was to be impacted by the construction of the dams. The goal was to collect as much information as possible before the water levels began to rise. Work began in 1947 and continued for more than 20 years. The work included pedestrian survey, excavation, analysis, and publication (Lehmer 1971:9, Theissen 1999). During this time, attempts at making a chronology of the impact area were being done by numerous archaeologists. As I will discuss later, this has lead to confusion that still exists to this day. Many used pottery fragments to try to type the sites. This procedure worked well in the Southwest but has had varying results on the Missouri River.

After the establishment of the dams and the subsequent inundation, the United States Army Corp of Engineers (USACE) took control of the dams and the management of all resources relative to the Dams. This included the cultural resources. USACE developed an archaeology program that was in charge of the federal laws that governed the land and resources. Most notably the American Antiquities Act of 1906 provided a means to allow scientific research on the Missouri River prior to 1979’s Archaeological Resource Protection Act (ARPA). Also the archaeology program was to watch over impacts to historic resources as outlined by the National Historic Act of 1966 (NHPA). And in 1990 USACE became responsible for the Native American Graves Protection and Repatriation Act (NAGPRA).
Historical Review

As stated previously, I had to justify where I would draw the imaginary line the divided the archaeological review and the historical review. This section discusses the historical review up until the 1880’s when the last recorded Mandan Village was abandoned and the reservation was set up for the Three Affiliated Tribes of North Dakota. This section looks at the historical accounts of travelers and explorers to the area.

In 1742 the first documented accounts of Europeans in the Middle Missouri subarea were the La Verendrye expedition (Little 1982:42). They traveled down the Missouri River and then later down the Cheyenne River to the Black Hills. These explorers left a lead plate at the confluence of the Bad River and the Missouri River on a bluff which is near the current city of Fort Pierre, South Dakota. These explorers were looking for the Northwest Passage (Schell 2004:27). During this trip down the Missouri River they encountered a Mandan Village south of present day Bismarck, North Dakota. They wintered with the village to learn the language and to gain directions (Schell 2004:28).
In 1804, the well known Lewis and Clark expedition began. After the United States obtained the Louisiana Purchase, President Jefferson commissioned Lewis and
Clark to explore the upper regions of the area (Little 1983:44). Again like the La Verendrye, the promise of a quick and easy route to the Western sea (the Pacific) was one of the expectations of the expedition. Also the explorers were charged with documenting the lands, they explorers kept explicit journals. They documented flora and fauna, as well the people.

After the return of the Lewis and Clark expedition, and the publishing of excerpts of their journals, more people ventured into the new territory. One of the more famous individuals was Maxamillian, Prince of Weid, his exploration began in 1833-1834, he like explorers before him made journals of his travels. His primary interest was in the people and life ways of the upper Missouri River. Accompanying Maximillian was Charles Bodmer, a Swiss artist who documented in painting, scenes and people that the party encountered (Schell 2004:62).

Another expedition lead by United States Army had a young artist with them, George Catlin was charged with documenting the trip through paintings. Bodmer’s and Catlin’s paintings provided a glimpse into daily life, albeit romanticized, and the dress of the people that they met. For the purposes of this thesis, Catlin’s paintings show village layouts and more importantly the palisade ditches that surrounded some of the villages.

These explorations laid the ground work for research on the Upper Missouri river. Due to the tense relations with the United States government and Native Tribes on the Missouri River, most notably the Lakota, further research remained limited after the 1850’s. During this time most scientific endeavors were completed by the U.S. Army.
Medical research and the documentation of a disappearing race were the primary concerns during this time (Deloria 1966:34).

**Ethnographic Resources**

Ethnographic resources and the using of oral history and oral tradition have played a role on the Missouri River. As stated in the last section, the first explorers made journals and documented what they saw and in some cases experienced. It was not until the beginning of the 20th century did the field of ethnography began to take hold. The Smithsonian Institution along with the United States Government bureau of Ethnography began to collect oral histories and traditions from different populations. Anthropologists and ethnographers began to flood the West to gather the history of a “vanishing” people. This movement has an important role in middle Missouri archaeology due to the fact that archaeologists today use those ethnographies to aid in the interpretation of archaeological sites.

Ewers, Bowers, and Denig, can be arguably the founders of ethnographic research on the Plains. Each researcher had spent time and effort in gathering histories and taking notes on social structure, as well as social movements within the tribes that occupy the Middle Missouri. Alfred Bowers published his findings with the Smithsonian as well as publishing his own interpretations. John Ewers wrote extensively on the tribes of the Plains. Denig was able to use other ethnographies and began to compare and contrast different societies on the Plains. These authors have allowed modern archaeologist understand site formation and function of known culturally affiliated sites as well as in identifying and assigning cultural affiliation to previously unknown sites.
Current Research on the Middle Missouri

Due to recent developments in the field of archaeology as well as the changing of public perception of Tribal peoples, there has been little new research done on the Plains. In my limited literature search, it appears that the golden era after RBS was in the late 1970’s and early 1980’s as far as field research is concerned. Still this fact has not lessened the discussion on the Plains and the damage that the dams created. Discussions of a stagnate discipline remain a hot topic at regional conferences. Scholars like Mitchell, Bamforth, Keeley, and others still ponder unanswered questions left by MRBS. Debunking of the pacified past had recently became a discussion point for many Plains archaeologist in the recent past. I would contend the reason behind this idea is the lack of archaeological evidence of prehistoric warfare. Evidence like that is commonly seen in modern warfare.

As in modern warfare, earthworks and ditches play an integral role in defending one’s self or community. Archaeologically we can this on the modern battlefields. To this day in Iraq and Afghanistan solders are taught to dig “fox holes” in order to provide protection. The altering of the landscape to provide protection can be seen even further back in history. In Europe during the medieval time period, evidence of altering can be seen in the moats and dugouts that surround some castles (Keeley 2006, Dye 2009).

As Keeley states, one of the tell signs of a warfare are the fortified ditches that surround an archaeological site (2006). If I assume that this is correct, then the ditches that surround the earthlodge villages in the Middle Missouri sub-area are fortifications. However, what other evidences are there to prove that interpersonal conflict between
groups existed? In the United States, historic battlefields will have some evidence of left from the battle. Items like bullets, rifle parts, and personal military effects of a soldier.

1992 amendments to the National Historical Preservation Act (NHPA) played a significant role in the future of archaeological research on the Plains. This amendment allowed Tribes to assume State Historical Preservation Office (SHPO) responsibilities. Along with this change, Tribes began to become involved with the research requests. Tribes also began to take control and responsibility for their cultural resources by establishing cultural preservation/historic preservation offices, and hiring archaeologists to assist them with identification of archaeological resources.

An example of this change of roles of Tribes is the Cheyenne River Sioux Tribe located in north-central South Dakota. The Cheyenne River Sioux Tribe Cultural Preservation Office (CRST CPO) was established in 1996. The purpose for the establishment of this office was to protect and preserve cultural resources that are of significance to the four band of Tetoniu Lakota that live on the Reservation. In 1998 CRST CPO applied for and was granted THPO status from the National Park Service (NPS). This meant that all NHPA actions on the reservation had to be reviewed by the THPO and CPO staff. CRST CPO is the point of contact for all correspondence concerning cultural resources that have significant meaning to the four bands on the reservation within the treaty land of 1851 and 1868. These lands include South Dakota, Nebraska, North Dakota, Montana, Wyoming and Minnesota.

As well as overseeing and concurring or not concurring with projects on reservation lands, CRST CPO also controls research on the reservation with tribal
permits. If a project is being completed with a tribal permit then perpetrator is guilty of
destruction of tribal resources and can face a fine of up to $100,000.00. If the person is a
tribal member the individual may face up to one year in prison.

Within the state of South Dakota, Standing Rock Sioux Tribe (SRST) Cheyenne
River Sioux Tribe (CRST) Rosebud Sioux Tribe (RST) Sisseton-Wahpeton Dakota
Nation (SWO) and recently Ogallala Sioux Tribe (OST) have assumed the SHPO
responsibility on tribal lands. Furthermore, the Lower Brule Sioux Tribe (LBST) has a
strong cultural committee made up of elders. These offices and individuals are at a spear
head of a paradigm shift. This shift is that Native groups are now taking ownership of
their cultural history. As with any paradigm shift there is a learning curve on both sides.
The balancing of tribal knowledge with archaeological evidence will be the next
challenge on the Middle Missouri.
Map 2-4 1851 and 1868 Treaty Lands
Chapter 3

Archaeological Assessment of prehistoric Warfare on the Middle Missouri

Thus far in the discussion of on the idea of war and warfare on the Plains, I have relayed information on the history of both the written accounts and archaeological accounts; as well taking an in-depth look at warfare in general. In this chapter, I focus in on a specific geographical region, the Middle Missouri. This area is defined as being from the mouth of the White River in South Dakota to the confluence of Yellowstone and Missouri Rivers in Montana (Lehmer 1971 and Johnson 2006).

This chapter will also focus in on archaeological evidence of pre-historic war and what one should be looking for when trying to identify prehistoric war. For the purposes of this discussion I will look at for signs that prehistoric warfare may have happened.

1. Modification of Landscape to reflect combat
2. Ostological/Ossuary evidence
3. Artifact association/distribution
4. evidence of the deliberate destruction of defensive structures
5. common and ubiquitous placement of ditch earthworks

The modification of landscape has been a time honored sign of warfare based on historical and archaeological evidence from the Old World. Keeley (2006) suggests that if there was modification of the landscape that appears to the archaeologists to be in a defensive manner, then the modification was created to protect the individuals from attack. Dye concurs with Keeley in that modifications to the landscape, i.e. fortification ditches are a tell tail signs that warfare did occur. One has to question this idea, are these
ditches actually used for fortification or is that what the interpretation is? Because if this question, this is the reason I developed the other criteria.

Secondly, the ostological and ossuary evidence of interpersonal conflict. If the skeletal remains show evidence of blunt force and/or sharp force trauma, then it could be assumed that interpersonal conflict did take place. However, researchers have to be careful of this criteria and the willingness to accept blindly that because there is trauma evidence that it was because of warfare. There are other explanations that could explain the existence of such evidence i.e. human sacrifice, cannibalism, and ancestor warship. (Ewers 1975, Bowers 1992, 2001).

The third criterion looks at artifact association and distribution. Because prehistoric populations did not make weapons solely for interpersonal conflict per se, the distribution and association of common material should play a relevant role in the interpretation of the site. An example of this would be, if there are numerous projectile points on either side of a ditch, this could be interpreted as a possible location of where people were using projectile points against each other. Conversely if notice household refuse, like broken pottery, butchered animal bones, charred seeds, and other broken utensils, this could mean the ditch was a landfill for unwanted refuse.

Lastly, the deliberate destruction of palisades by burning, this criterion is albeit far stretching, burned features can be identified using geophysical techniques. The interpretation of burned futures could indicate the activities associated with warfare in conjunction with other criteria. However like the other criteria, a researcher must be aware of cultural practices that may include the burning of a structure after a death of an
individual, or the burning of the structure to rid the structure of unwanted pests, like a sanitation process.

I argue that if these criteria are present within a site, a researcher can not discount the possibility of prehistoric warfare, but also, cannot state for a fact that prehistoric warfare took place. More research of the site will need to take place through the use of archaeological techniques, ethnographic resources, oral traditions, and historical accounts.

By using the aforementioned criteria researchers on the Middle Missouri should be able to identify locales that may have conflict site therein. But to use the data and see where the data fits in a temporal context a chronology or taxonomic system needs to be made. The next section discusses the issue that has occurred on the Middle Missouri with distinguishing and developing at timeline.

Not only is the Middle Missouri a geographic location, the term refers to a temporal episode as well. As with the MTS, there have been many different attempts to classify temporal changes within this geographical area. I tend to favor the chronologies developed by Lehmer in the 1970’s but as recently at 2006; researchers are still being challenged by the temporal complexity of what is happening on the Middle Missouri.

**Chronological issues**

**Lehmer’s Taxonomy**

I have presented a brief historical overview of actions that have occurred on the Middle Missouri River. There is a need to explain the confusion of the archaeological
chronology of the Middle Missouri Sub-area. All of the aforementioned research episodes have contributed the confusion. From each episode, a new chronology of events was documented. A rolling snowball effect began. Finally when the MRBS began, trained archaeologists were tasked to identify and interpret their findings. Because this was a large project, spread over two decades, there was not a standardized chronology. During the 1950’s the modern thinking at the time was to use the Midwestern Taxonomic System. This system separates changes in the cultural record in terms of components, foci, and aspects (Lehmer 1971:26). Unfortunately this taxonomic system was not precise enough to encapsulate the differences noted by archaeologists. In the case of Middle Missouri archaeology, each archaeologist began to use historical documents and their own experience on the river, to develop their own personal chronologies.

As stated previously some of the MRBS archaeologists used pottery as marker for cultural change. This technique worked well in the Southwest where there are definite changes in pottery type, style, and temper. The issue on the Missouri River is that there is not the definite change as seen in the Southwest. This lack of definite change has lead many archaeologists to classify “like” pottery as new pottery types. With each new pottery type a new phase, component, or foci was created. This leads to a very confusing tree of events.

For the purposes of this thesis I have chosen to use the Lehmer Taxonomy. The reason I have chosen to use this chronology was based on research, Lehmer used the MRBS information to develop a standardized chronology. I do not intend to develop a chronology of events on the Middle Missouri, instead I will use Lehmer’s to discuss change over time and I will use his terminology to discuss different time periods.
In Lehmer’s book, “an Introduction to Middle Missouri Archaeology”, he begins to outline the taxonomic discussion that he used to develop a coherent chronology. He discusses the Plains in general and explains periods and traditions. Like elsewhere on the northern Plains the, the major taxonomic units stated the same. The idea of cultural traditions and the chronology of those remained the same. The example of this is, Paleo-Indian, Archaic, Plains Woodland, Plains Village, Pre-contact, Contact, and Historic.

Instead of using components, Lehmer termed term which he called variants. A variant is defined as:

“as a unique and reasonable uniform expression of a cultural tradition which has a greater order of magnitude than a phase, and which is distinguished from other variants of the same tradition by its geographic distribution, age, and/or cultural content.” (Lehmer 1971:32)
Lehmer's Chronology

<table>
<thead>
<tr>
<th>Major Cultural Tradition</th>
<th>Minor Cultural Tradition</th>
<th>Variant</th>
<th>Dates (A.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coalescent</td>
<td>Disorganized</td>
<td></td>
<td>1780-1862</td>
</tr>
<tr>
<td></td>
<td>Post-Contact</td>
<td></td>
<td>1675-1780</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
<td></td>
<td>1550-1675</td>
</tr>
<tr>
<td>Plains Village</td>
<td>Initial</td>
<td></td>
<td>1550-1400</td>
</tr>
<tr>
<td></td>
<td>Terminal</td>
<td></td>
<td>1550-1675</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
<td></td>
<td>1100-1550</td>
</tr>
<tr>
<td></td>
<td>Initial</td>
<td></td>
<td>900-1400</td>
</tr>
</tbody>
</table>

Figure 3-1 Cultural Traditions and Variants in the Middle Missouri Subarea (Lehmer 1971:33)

Figure 3-1 depicts the chronology that Lehmer developed. I feel that with the exception of the separation of major and minor cultural traditions, Lehmer was trying to keep in pace with the Midwestern Taxonomic System and to lessen the confusion; however, he created a new term described as “variant”. This raises a question of why did not Lehmer create a new term to describe the minor tradition as well. Again I deduct that Lehmer was taking into consideration that all work past and present to develop his chronology and was taking a processualist point of view as his table describes.
In order to discuss Lehmer’s taxonomy, I will have to describe some of the characteristics of the variants. I will begin with the Initial Middle Missouri Variant (IMMV). The sites associated with this variant are located between what is now Chamberlin, SD and Swiftbird, SD. These sites are characterized by rectangular earthen structures, usually in small villages. Some have ditch earthworks whereas some do not. The distribution of the ditch earthworks is usually south to north, with the southern having more earthworks then the northern sites (Lehmer 1971: 69).

Like the Initial Variant, the Extended Middle Missouri Variant (EMMV) has rectangular earthen lodges, villages were generally larger then those in the IMMV, and the villages also had ditches. The major difference in the separation of the IMMV and EMMV is the distribution. Where the IMMV is located between in the middle section of the river between big bend and little bend, the EMMV stretches north in to North Dakota just south of the confluence of the Little Missouri River. Another difference is the age of deposits the information was gathered by Radiocarbon dating.

The Terminal Middle Missouri Variant (TMMV), like the other two variants have the earthen lodges with a difference. We began to see the transformation into a circular layout rather then a rectangle. Also the site distribution has moved
north into North Dakota. Walled earthworks are present and are becoming more elaborate (Lehmer 1971:105).
Figure 3-2 representation of Initial Middle Missouri Ditch Earth Work
Figure 3-3  Representation of a Initial Coalescent Ditch Earthwork
Figure 3-4 Representation of a Extended Coalescent Ditch Earthwork
Change is an important topic to mention, especially when I discuss the Coalescent variants. Lehmer indicates that during the Initial Coalescent (MMIC) what archaeologists are seeing is a melting of late Central Plains Tradition (CPT) and Middle Missouri Traditions (MMT) (Lehmer 1971:111). The MMIC has a limited geography. The sites that were documented during the MRBS (of which there is only 12 recorded) and located on the Big Bend of the Missouri River, and all are located on the east side of the River (Lehmer 1971:111)

The house and village layout resemble those of the CPT. Houses were generally smaller and more circular in shape. This is in contrast with the MMT houses further up the River and on the opposite bank (Lehmer 1971:111). It appears the fortification structures located at these MMIC sites were of secondary construction. The trenches encompass the entire village which, again typically smaller but covered large amounts of land (Lehmer 1971:113). These fortification structures were more elaborate then those of the IMMV and EMMV with bastions and turnabouts as interpreted by archaeologists.
Map 3-2 Location of MMIC
The Middle Missouri Extended Coalescent (MMEC) has a marked difference in the distribution from that of the MMIC. The geography runs the gamut of the upper Missouri River trench from the mouth of the White River to the upper reaches what is now Lake Sacajawea. House styles resemble those that were documented by the earlier explorers. Round circular earth lodges are the “standard” shape of these structures. Village size grew and there was a marked change in the distribution of houses. Houses were more closely spaced together.

The fortification structures were like the MMIC, secondary construction. This is well documented at the Double Ditch site north of present day Bismarck, ND. This site has multiple ditch structures showing an ebb and flow of population during time. Multiple trenches may indicate different occupations or could be due the change in population over time.

The Post-contact and disorganized Coalescent are the time periods were proto-historic and historic tribes began to appear. The Mandan, Arikara, and Hidatsa all begin to form their own villages. It has been argued that Mandan derive from the Middle Missouri, and the Arikara derived from the Coalescent variants Over 1938, Lehmer 1971, Bowers 1996). This has yet to be proven. These villages are the same villages that during the post contact Coalescent the adventurers and explorers may have visited.

The disorganized Coalescent was the result of epidemics of the flu and small pox. This was the time when villages began to combine and abandon sites due to the population decrease. Also there was an incursion of the Teton Sioux into the area at the end of the MMEC, and the demand on natural resources may have lead to warfare on the
Plains. All of these factors combined, lead to the eventual degrading the Plains Village Era.

The geography for these last two episodes in Middle Missouri Village was mainly in north central North Dakota. This was due to the previously mentioned incursion of the Sioux in the lower sections of the Missouri River. The sites during this time were small, due to the population decrease but were densely inhabited, which lead to the spreading of disease. Documented fortifications were the norm of this era. There was a change in fortification placement though, instead of the entire village being encompassed by a ditch, only the centre lodges where protected (Lehmer 1971 141).

Discussion

To gain an understanding of what the issues of developing an accurate time line for the Middle Missouri Sub-area, we must have an understanding of past research. Beginnings from the “age of exploration” individuals have come to the Missouri River to document flora/fauna and people. Each of these researchers documented what was important to them at the time, and left a skewed perspective on the chronology of the area. It was not until the turn of the last century when scholarly interests became a viable means of study did a scientific approach become the standard.

The scientific standard was wrought with its own problems. During the Missouri River Basin Survey archaeologists trained in different parts of the nation were bringing their experiences and how to do things with them, there was limited of no standardization for reporting the results from a site. The archaeologists were testing different types models to place what they were finding in to a temporal context.
Lehmer created his taxonomy by looking at all the information available to him and dissecting the issues he encountered. One of the major issues was the standard taxonomic system, the Midwest Taxonomic System, could not accurately depict what was going on the Middle Missouri. Lehmer recognized this and developed an all encompassing taxonomy. For better or for worse, Lehmer’s taxonomy became the standard.

In 2007, a new set of eyes gazed on the issues that were encountered by Lehmer and a new chronology was developed. Johnson (2007), in reviewing the data noted that Lehmer was lacking some important location information. He recognized that since the Middle Missouri Subarea was so massive, that slight changes locally would actually be a marker for change. Johnson developed a hybrid of the MTS and Lehmer’s taxonomy.

The question that is up for discussion is which chronology is better? I can not answer that question. I feel that Lehmer’s taxonomy can be used to describe broad changes over time and offers a good overview. Johnson uses Lehmer’s taxonomy but tweaks it when one is looking at a very specific area within the subarea. For the purposes of this thesis, I will use Lehmer’s taxonomy because it is a simpler format and has been accepted by Plains archaeologists.

The last section dealt with the temporal identification of different attributes that some archaeologists attribute to culture change. Using Lehmer’s taxonomy, I will now be able to place in context the development and decline of earthworks on the northern reaches of the Missouri River.
Data Sets

By defining the taxonomic system that I will be employing, I can now discuss the data sets that were used to research my topic. Due to the MRBS surveys vast amounts of information was generated. For this reason I focus on the work done on the middle Missouri done during MRBS. As I have mentioned in a previous chapter more recent researched based fieldwork has not been completed within the defined geographical area since the late 1980’s (see chapter 1 for more information).

The sites that I chose to use in my data set are:

The Black Partisan Site 39LM219

The now inundated site lies with in the spill way of the Big Bend Dam. This site was located Lyman County, South Dakota and was considered by Caldwell as a fortified village. The site was first recorded in 1956 by MRBS and was then identified as a site that would be lost if construction of the dam took place. In 1957 and 1958 Caldwell working on the auspices of the MRBS conducted salvage excavations at this site. The site is surrounded by a dry moat feature which is oval in plan and terminates on the eastern side by the river terrace. There are twelve “U” shaped bastions. These bastions are irregularly spaced. The total length of the ditch is approximately 670 m long by roughly a meter deep.
The Hitchell Site 39CH45

This site does not a ditch feature but is placed between to deep drainages on the north side and south side with bluff bottom to the east and the river to west. This is site is a multi-component site with a late prehistoric component.

The Two Teeth Site 39BF204

Is located on the east bank of the Missouri river, like the Black Partisan site, this site too was slated for inundation by the building of the Big Bend dam. The Two Teeth is a multi-component site that encompasses the Plains village tradition to the historic reservation period. It was noted by Smith and Johnson that there were circular earth lodge depressions as well as a rectangle foundation of a log cabin present at the site. Also the researchers did notice numerous wagon ruts that criss-crossed the site. This site was not surrounded by a ditch. The major features associated with this site, are deposition areas the researchers have interoperaated as refuse mounds.

The La Roche Site(s) 39ST9 and 39ST232

There was great controversy on the naming of this site, W.H. Over in his early 20th century study of earthlodge villages on the Missouri River noted at site at this location and was given the site number of 39BF9. During an ethnographic survey, A. Bowers identified a site that was know locally as the La Roche site approximately 3000m to north and east of 39BF9. This location was given the site number of 39BF232. J.J. Hoffman had the task of excavating at both of these sites as both were in jeopardy of becoming inundated by the construction of the Big Bend Dam,
39BF9 is located on a flood plain terrace surrounded by two drainages and a bluff wall. This is has no fortification ditch associated with it. 39BF232 , like BF9 is on a flood plain terrace, but is not as extensive as BF9. There were only limited structures associated with this site. Interpretations suggest that BF232 may have been a younger site during the disorganized coalescent. This BF232 does not have a ditch associated with it either.

**Lower Hidatsa 32ME10**

This village is located near the confluence of the Knife and Missouri River. Located on a t2 terrace.

**Sakakawea Village 32ME11**

Is a village site that is dated to the historic period and it was moved from the Lower Hidatsa village when the second small pox epidemic was active. This is on a t2 terrace overlooking the Knife River and does not have a ditch earthwork.

**Big Hidatsa 32ME12**

This site is unique in that it has linear mounds as well as a ditch earthwork associated with the village. The ditch earthwork is a small unfinished ditch to the south west of the site boundary. The western boundary is the Knife River.

**Molestad**

39DW234 is listed as national historic landmark. This site is on the west side of the Missouri River on an upper terrace above the flood plain. This site is surrounded by a
ditch with a large single bastion that faces the landward side of the village. Excavations by Hoffman indicate that this site did have a palisade wall associated with the ditch.

**Crow Creek 39BF11**

The Crow Creek Site is on an upper terrace that overlooks the Missouri River to the west. This site does have a ditch structure associated with it and in some locations it has been reported that the ditch has palisades. This site is the type site for evidence of prehistoric warfare on the Plains due to a mass burial found on the site.

**Little Pumpkin**

This site is on a T2 terrace overlooking the Missouri River. This village does not have a ditch constructed around it. It appears to be a multi-component site with dates that may reach into the late prehistoric period. This site has been heavily impacted by urban sprawl.

**Potts Site**

This site is on a T3 terrace that has a view of the like Oahe. This site does have a ditch earthwork present with two bastions on the landward side of the structure small semi-circular turnouts that have been interopereated as areas of concentrated defense positions.

**Fay Tolton 39ST11**

The Fay Tolton Site is located on the west side of Missouri river and north of the Oahe Dam, the site is located on an upper terrace and has a ditch that forms the southern boundary of site with the bluff and river forming the northern boundaries and
surrounded by drainages to the west and east. This site appears to be a multi-component site with Middle Missouri and initial coalescent components with earthlodges supporting both rectangular and circular lodges. This site has yielded skeletal remains that may or may not have evidence of interpersonal conflict. In house 1 a young male is missing his skull.

Development of Ditches over time

In this section I discuss the idea of the development of ditch earthworks on the Middle Missouri River. I use Lehmer's discussion from his 1971 research to look at the changes over time. Lehmer suggest that the development and use of the ditches may have or may not have begun in the IMMV (Lehmer 1971:69). The Initial Middle Missouri were generally situated on a T1 terrace just above the flood plain of the Missouri river. When he analyzed different ditch configurations he noticed that in general the ditches of the IMMV used topographic features and would join them by creating a shallow ditch. An example of this would be at the Dodd Site. This site sits on the a terrace toe surrounded by gullies on three sides and the inhabitants build a ditch across the fourth side which is the SW side of the village to join the gullies (see figure3-3, 3-4, and 3-5).

During the EMMV Lehmer noticed new complexity to the ditch outline. The ditch earthworks became longer and a little more complex by incorporating different angles. This could because that the sizes of the villages were getting larger. And in fact, the village sizes were getting larger at this time, or at least more lodge structures (Lehmer, wood). The TMMV and the MMIC are contemporary and some have
suggested that we are beginning to see a mix of CPT and older traditions combining to form this new aspect (Lehmer 1971, Wood 2001, 2006, Ahler 1974,). These ditches encompassed the entire village and were very large in area. They also began to incorporate what archaeologists have termed bastions at semi-regular intervals. Examples of these sites include Black Partisan, Arzberger, and a habitation episode at Crow Creek.

The MMEC and post contact began to look like historic forts. These were palisade walled earth works and seemed to form a “keep” in the center of a village. This could be where all the food stores were, or could have been where the elite may have stayed. But ultimately we see only a fraction of the earthlodges being in side the walled earthwork and the majority is located on the outside of the walls. A researcher as to remember that at this time the Dakota were coming into the region and along with trade goods from the east, a small virus came with it. Small pox invaded and infested unknown amounts of people with the first epidemic. Entire villages were wiped out and we began to see this distrust of people began to happen.

**Bamforth’s discussion of environmental determinism**

I have discussed Ember and Ember’s views on the fear of others, and during the post contact we can see this, at least ethnographically. I have briefly discussed Bamforth’s environmental deterministic view on the reasons for warfare on the Plains. In this section I explore this topic further and discuss how this topic plays a role in the development of ditched earthworks.
Throughout human history we have seen the adaptation of not only our species but others to a changing environment. Changes can be seen as far back as *A. africanus* stood upright to see over the savanna to the development of climate control systems in modern buildings. It would make logical sense then to look at changes in climate and environment as catalysts for war. As discussed in chapter 1, Ember and Ember look to fear as the marker for war. Bamforth in his article entitled, “Climate, Chronology, and the Course of War in the Middle Missouri” the changes in environment was the catalyst for war within the region. Bamforth looks to the Bryson model of Climate change. He explains that due to warm conditions during the Neo-Atlantic approximately 900 A.D to 1250 A.D ago, people began to expand their territory this was probably due to influx of population. With this expansion from the Republican River valley new ideas began to travel up the Missouri River. Of course after a warming trend, there is always a cooling trend, in the Bryson Model the time period is known as the Pacific interval, which was from 1250 A.D to 1450 A.D. this climatic change was punctuated by cold dry periods. This time coincides with the TMMV and IC and where we began to see larger earthworks being constructed. Was this because there was raiding occurring? It is hard to say archaeologically but the time periods are correct and this could be a reason why these elaborate ditches were constructed.
Chapter 4

This chapter will examine the five previously introduced criteria more in depth and the rational behind establishing these criteria. To review, the criteria are:

1. The modification of landscape to reflect combat
2. Osteological/Ossuary evidence
3. Artifact association
4. Common and ubiquitous placement of ditch earthworks
5. Deliberate destruction of defensive structures.

Dye (2009:5) suggests that if there is a ditch that surrounds the village the primary purpose of said ditch was for fortification. This may be true in the eastern portion of the United States but to qualify that statement on the Plains is difficult at best. This is not to say that in the Contact Period when the early explorers and researchers came to the area, that these ditch earthworks were being used as fortification, or at least being used as a barrier to make a separation between the population inside and those who are out of the villages. But does the presence of a ditch earthwork mean that it was because of conflict or was it because the need to separate themselves?

During the expansion of the West, it is known that trade networks existed and that trade items were being traded along this network well before the first explores came to the area. The Middle Missouri was trade center because of the access to the river and to
rare and isolated stone (Winham and Calabrese 1998:285). Because of the trade network along with trade goods, ideas and pathogens may also travel along those routes. These new ideas or pathogens may have lead to the development of walled earth works.

In some cases we can see the change in ideas and the introduction of a new pathogen through the osteological remains. 39BF11 contained a mass burial. Some of the remains showed evidence of sharp force and blunt force trauma. There was also evidence of scalping or trophy taking. Also evident was proof of nutritional deficiencies and possible evidence of new a new pathogen that was present on the remains (Greg and Greg 1987).

This chapter will also analyze the data set with a case study of 39BF11 with respect to the geophysical analysis. As previously stated in the last chapter, the data set consists of fifteen sites that have been published. The reason for choosing sites that have been publically published data sets was for other researchers to review my conclusions and critique it. With that being said, it should also be mentioned that the data is in different formats. Due the difference in the presentation of the data it is difficult to know the provenience of the artifacts within the test units. What I have decided to do is to look at the total number of artifacts from the test units that bisect the ditch earthwork and an earthlodge. This can only be done with villages that have fortifications and testing that bisected the ditch. This limits my data set to only three sites. Because the data set is limited, more research should be completed when it is feasible.
To test for prehistoric warfare, artifact distribution research was done to compare the types of artifacts found within the ditch versus those from a house structure. The test intended to identify a relationship to projectile point deposition versus other types of chipped stone artifacts. In this test, artifacts to be compared are projectile points and end scrapers. In general if one sees a disparity in the number of projectile points within and surrounding the ditch earthworks then one can assume that there may have been an activity that dealt with the use of projectile points occurring at that location. This disparity could satisfy a criterion for evidence of prehistoric warfare.

**Testing of Criteria 3**

The first site that was tested was the Molstad site (39DW234). This site lays on T2 terrace just above the flood plain of the Missouri River in north central South Dakota. The site has been dated through the use of radiocarbon date to 1550 – 1650 AD and is the first village to within the northern tier of the Middle Missouri to begin to use circular earthlodges rather than rectangular (Hoffman 1967:46). This village has a ditch structure that surrounds the entire village and then a palisade was erected on the village side of the ditch. There are four test units from the original excavations that I will focus on. They are XU 4, which bisects the northern portion of the ditch, XU 1, which bisect the ditch and palisade at the southern end of the site, and Feature 7 which excavated the bastion feature and house 2 which lies near the center of the village. By looking at these selected excavations within the site, a comparison should be able to be drawn from the artifacts.
The second site that was tested was the Fay Tolton Site 39ST11. This site lay on a T3 terrace ridge overlooking the Missouri River floodplain in the central part of the state. Unlike the Molstad site the ditch structure does not encompass the entire site. This is most likely due to the site being on a toe ridge with deep drainages on three sides of the site. Instead a single linear ditch was constructed across tow ridge perpendicular to axis of the drainages. Also unlike the Molstad site, Fay Tolton was does not have a palisade present. There are two test units that I will focus on, they are the Ditch earthwork test unit and house 2.

The last site to be analyzed is the Crow Creek site 39BF11. Like Fay Tolton, Crow Creek sits on a T3 terrace that overlooks the Missouri River floodplain. This site is located in the southern portion of my research area near the Big Bend of the Missouri River. Unlike Fay Tolton and Molestad the ditch structure is only present on the landward side (east) of the village and encompasses roughly three quarters of the site. This site is a multi-component site and has yielded evidence of multiple habitation episodes as made present by different house structures. The area that was tested was Lots 19 and 20, Lot 19 is located within a house structure and Lot 20 is located adjacent to Lot 19 but incorporates the ditch structure.
Results

<table>
<thead>
<tr>
<th>Projectile Points</th>
<th>End Scrapers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forifcation Ditch</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>House 2</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>

After reviewing the results of the test it becomes apparent that compared to the house structures, the ditches contained fewer artifacts. More importantly, few projectile points were found within or near the ditch structure, which does not support the idea that
conflict took place at these locations. Feature 7 at the Molstad site is interesting because the researchers excavated the bastion feature; normally bastions are strongholds within a fortification for defenders to protect three sides of the wall (Keeley 2007). Feature 7 did have one projectile point but it also had two end scrapers. One would expect that if the bastion was built for a defensive purpose that there would be more projectile points or chipped stone debitage at the location. However the comparison to debitage was not made, a preliminary look at the data showed limited chipped stone debris.

**Criterion 4**

The fourth criterion that was considered is the commonality of ditched earthworks. Simply put, if in fact Keeley and Dye are correct that ditches are evidentiary proof of conflict, then an area that is relatively densely populated would have an abundance of fortified villages. On the Middle Missouri this is simply not the case. When a comparison of the number of villages with ditched earthworks is compared over time, there are more villages that do not have ditch structures then there are with. To test this idea an $\chi^2$ and a likelihood ratio tests.

Through using data that was collected by archaeologists over time, I have been able to manipulate the data in a way to test to see if there are correlations between time and different Traditions and Middle Missouri Variants.
Data set

The data set was compiled from an electronic database maintained by the United States Army Corps of Engineers (USACE). The data based contained all known archaeological resources within the Omaha District. The Omaha District contains the six main stem dams that run along the Missouri River. The database known as AV-CR uses Arcmap 3.2 to map sites with GPS accuracy. Included in this data base are different attributes that can be attributed to each site. These include: Cultural Affiliation (five categories), Attribute (site number), Site Type (three categories), Elevation, Condition, Resource Management, Recommendations, Impact (three categories), Site name, Project Location (lake location), Lake State, and County.

I ran a query and asked AV-CR to find all sites that had earthlodge, village, earthlodge village, fortification, fortified village, depressions, dugout, cache pits. The reason I chose these to run a query on, is due to the different reporting styles archaeologists have used throughout time on the River. I tried to be all encompassing in my query in order to gain the most data. I copied the results of the query into SPSS.

Upon reviewing the data set, I noticed that there were a lot of multi-component sites. I questioned the validity of running the stats knowing that I had multi-component habitations. In discussing the issue with Dr. LuAnn Wandsnider, she offered some suggestions to make sure that I counted not only the sites but to count the different components. By doing this I would be able to get a good representation of the data and those villages with or without ditch earthworks.
I then added a few new categories that would help further separate the data into a more user friendly data set. I separated the information into time periods and then again into nominal data I labeled as Traditions (see graph 4-1). As we can see from this graph, there is a difference in the presence and absence between time periods (traditions) and fortifications.

**Testing**

The next step in the process to answer my previously stated question was to see if there was statistical difference. In order to test this I first had to develop a null hypothesis. The null hypothesis states: there is no difference between time period and fortification relationships on the Middle Missouri.

![Graph 4-1](attachment:image.png)
$H_0$: $V_g = F_t$, where $V_g$ = to Village and $F_t.$ = to Fortification.

In order to test to see if the null hypothesis I had to decide on what test would be the best fit. I decided that I would run a crosstabs to check the validity of my data. I first ran the crosstabs with a Chi square and likelihood ratio test.

<table>
<thead>
<tr>
<th>Time Periods</th>
<th>Fortification</th>
<th>Absent</th>
<th>Present</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plains Woodland</td>
<td>26</td>
<td>5</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Plains Village</td>
<td>79</td>
<td>13</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>IMMV</td>
<td>42</td>
<td>11</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>EMMV</td>
<td>39</td>
<td>9</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>TMMV</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>MMIC</td>
<td>30</td>
<td>5</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>MMEC</td>
<td>105</td>
<td>25</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Post Contact</td>
<td>52</td>
<td>29</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Historic</td>
<td>97</td>
<td>6</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>470</td>
<td>109</td>
<td>579</td>
<td></td>
</tr>
</tbody>
</table>

Table 4-4 Cross Tabulation of $X^2$ Test
As the above tables show I evaluated the data by Traditions and compared them against fortifications.

**Results of the $X^2$ and likelihood test**

As we can see with a total number of 579 cases, which were separated into nine categories, the results of a Chi Square test show that with a chi square value of 54.63, degrees of freedom of 8 and the probability value of less than 0.001 ($p<.001$), according to Drennan, it is extremely unlikely that the differences noticed are due the vagaries of sampling. More research needs to be completed to check these results.

As the graph illustrates, there is a disparity between the numbers of fortified villages versus those that are unfortified. Keeping in mind the issues with the data set and trying to by all encompassing more testing should be done and use other data besides the USACE to cross check the results. But for an archaeologist on the ground the fact of the matter is there are more village sites without ditch structures than there are with. Which leads back to the question, what is the use and function of these earthworks?

Bamforth suggests that the majority of ditch earthwork villages are on the east side of the river. It is not until later in the sequence that we began to see more ditch earthwork villages on the west side of the river and further north within the study area. This could be interopereated as a movement of a new population to the area. In the transition from the Middle Missouri Variant to the Coalescent archaeologists have observed changes in pottery style (see Johnson 2007, Lehmer 1971, Hoffman 1967, Caldwell 1968, Wedel1961). Could the development of ditch earthworks also be interpreted as evidence of a new population moving in to the area?
Lehmer suggests that there was change in ditch layout over time. From the Middle Missouri where the village may be situated like Fay Tolton to the more extravagant earthworks of extended coalescent like those at Arzberger (see figures 2, 3, and 4). At this time it is hard determine. More research in to this idea will need to be made with a more inclusive data set.

Finally the last criterion to be tested was the destruction of defensive structures. One of the less destructive ways of view a site is through the use of geophysical analysis. In the fall of 2009, a crew of volunteers and professional went to a known site where there are documented accounts of warfare. 39BF11 has osteological evidence of warfare and also has a ditch earthwork. The goal of the project was to identify areas where conflict took place by using remote sensing.

The ability to see under the surface with having little to no impact to the site was one of the major conditions and reasons to use this technology at this site. As seen in appendix A, the imagery of the location is quite clear and concise. Unfortunately the results did not produce what was expected. The expectation was to see evidence of burning of the palisade. In the section that was tested, it appears that there was not a palisade present. A surprising result was also noticed, there appears to be at least one other shallow ditch that lies behind the major ditch. For more information on the results of the survey refer to appendix A.

The criteria were developed to answer the question, what is the archaeological evidence for prehistoric warfare on the Middle Missouri? By using previously discussed criteria researchers will be able to identify archaeological evidence of prehistoric warfare
on the Middle Missouri. As stated previously due to the dual roles of many of the artifacts that can cause blunt force and sharp force trauma, researchers cannot simply rely on the presences or absence of these items. The same can be said about the existence of the ditch earthworks, as well as any of the other criteria discussed, however if the criteria began show up together, then it would be reasonable for a researcher to investigate further the possibility that prehistoric warfare did occur at the location.
Chapter 5

Discussion and Conclusions

The previous chapters have created a funnel of information starting from the anthropological views on war to an archeological site specific study of interpersonal conflict on the Middle Missouri River in the Dakotas. The reason to start big and get specific has been to encapsulate the available information in order to draw reasonable conclusions to a research question. The research question that has been asked is: Is the presence of ditch earthworks primarily or solely for fortification?

In assessing the available information it has become clear that in order to discuss the research question a discussion on what constitutes evidence of prehistoric warfare must take place. The Middle Missouri unlike other archaeological region in the United States has been dominated by nomadic groups for time immemorial. Even in recent history it was stated the Plains in general was the Great American Desert where nothing would grow and people could not survive extended periods of time. As early Americans found out, this was not the case and the Plains became part of the breadbasket of the new nation.

The Plains, unlike the Southwest, does not have huge city-states that those of Chaco Canyon and Mesa Verde. And unlike the Eastern woodlands, the Plains do not have the huge towns like those of Cahokia, Moundville, and Scioto River valley. What Plains villages do have is a lot of land. It makes sense that once a floodplain began to lose yields that a village may relocate to another area. But the question is raised what happens when a new population comes in to the area? Historically conflict ensues when
there is more competition for resources. As stated in chapter one, demand on the resources and the fear of others do play a role in conflict (see Ember and Ember:1992).

To understand and identify the archaeological evidences for prehistoric warfare, the development of criteria was developed. These criteria were based on sites that exhibited the possibility of warfare occurring either at or near the site. If the criteria are met then a researcher may with confidence entertain the idea that the village was in fact fortified. Unfortunately with information that is readily available it is hard to justify that the ditch earthworks are solely for defensive purposes.

However, some researchers have argued that the development of ditches is a result of conflict and the raiding became commonplace on the Middle Missouri (Wood 1996, Lehmer 1971, Ahler 2004). I disagree, if there was rampant raiding why are there more villages that do not have ditches then ones that do? As discussed earlier, statistically there is a slim chance that the pattern that is represented is based on bad data.

Another interesting aspect that I failed to notice in the statistical analysis was the location of the villages in reference to the river. Fortunately Bamforth did analyze the relationship and noticed a trend. This trend was that it appears the villages with ditch earthworks are on the east side of the river. This trend is most prevalent within the big Bend archaeological region. The further north of this region the disparity between east and west is not as prevalent (Bamforth: 2006). The question that must be asked because we are seeing the majority of villages with ditch earth works on the east side of the river; does this fact represent a new population coming from the east? There is no definite answer to this question but Bamforth suggests what archaeologists are seeing is social
change. The dynamics of the “river” culture have changed and people are beginning to
exert more energy in group projects (i.e. building a ditch earthwork) then on individual
needs.

What conclusions can be drawn from this discussion? Static ally there are more
villages that do not have ditch earthworks then villages that do. Overtime as the
population increased the number of villages increased as well as those villages with ditch
earthworks, but the data suggests that even during the time when there was this
explosion of villages, the numbers of those that have ditch earthworks is still less than
those that do not.

Arguments have been made to suggest that at some point near the end of the
Krause 2001, Wedell 1968). The new population began interacting with existing
population and information was traded. Archaeologically this can be seen in the changes
in village layout. Another question that needs to be addressed is these the same
populations at the villages are a different one, if they are the same how are archaeologists
going to see that in the record? As with any good discussion more questions than
answers have been brought up, and will lead to more discussions on this topic.

Conclusions

What conclusions can be drawn from an archaeological assessment of ditch
earthworks on Middle Missouri? As stated previously the goal of this thesis was not to
dispute the notion that ditches that surround some Plains villages could have been used
for defensive purposes, instead it was assess whether or not the ditches themselves were
the stand alone evidence to prove that prehistoric warfare took place. I have discussed certain aspects of human nature from a global perspective, in that people will participate in some sort of interpersonal conflict. The conflict whether it is as simple as talking poorly of someone to the actual taking of a life, will be different from culture to culture. I have presented an anthropological view of warfare and the reasons why individuals would go to war, and have decided that Ember and Ember, along with Bamforth may be correct in that the environment plays a major role at least on the Plains and more importantly within the Middle Missouri Subarea.

I then looked at the historical and archaeological research that has been completed on the Plains. I discussed some of the major contributions by the early explorers and advocational archaeologists. I then discussed state of current research on the Missouri river. A case study of a THPO was presented by me from personal experience, and discussed the issues that will have an impact on future research with in this region.

Following a funnel approach I then focused in the Middle Missouri Sub area and discussed some issues that have plagued research in the area. The chronological data is lacking due to the blitzkrieg approach to salvage archaeology that was used during the MRBS. I introduced criterion that would be easily testable to identify prehistoric warfare sites. And finally I introduced my data set to test my criterion.

I then tested the criterion which leads to some interesting outcomes. I did a case study at a known site where conflict took place and used new prospection techniques to gauge the feasibility to use this equipment to do non-destructive survey of site along the Missouri River. Again this too raised more questions than answers to my original
research question. I then entered into a discussion on the outcomes of the testing. Using the data generated through my research I was able to look objectively at the numbers see an interesting pattern. The pattern was that there were more non-ditch villages (villages with no ditch surrounding them) then there were ditched villages. One of my assumptions was that during the Coalescent I would see a raise in ditch construction, I did but it was proportional to total number of villages during this time period. Again this rose the question that if there was mass movement of people and warfare during this time why are there so many un-ditched villages compared to ditched and walled earthwork villages?

It appeared that the environment was a major catalyst for change. Using a number of different techniques Bamforth was able to see a change in climate during “el Niño” and “la Niña” years. Bamforth then correlated the change in climate with construction phase of the earthworks at a selected number of sites with good radio carbon dates. He noted that there was a direct correlation between the two.

After researching the climatic impacts to the human environment I began to question my data sources. Most of the data was collected during the MRBS, and because of this I believe that some of the information is not as complete as it could be.

Due to the current political environment, future research is in jeopardy unless archaeologists can find a “tribal friendly” way of doing research. The days of going to a village site, and doing ground disturbing activities, has come to an end. Because of this new Native Friendly environment, I feel that doing geophysical prospection is the next major step in research within the Missouri River Trench.
The ability to carry out non-destructive surveys will be a good tool use when it comes to future research. I feel that the 2004 USACE programmatic agreement is correct in stating that a shared stewardship is the next major paradigm shift that needs to occur on the Plains and a working partnership of archaeologists, the Federal Government and Indian tribes needs to be developed. When this partnership is developed the total story of life on the Missouri river can be told.

In conclusion based on my research more studies will need to be completed to answer the research question. As with many research problems, the goal is not to unequivocally answer the question but to add to the discussion of a topic. I do think that calling these ditched earthworks fortifications are an error archaeologists need to address. Ultimately archaeologists do not know if these ditches were used for fortification solely or if there were other uses. It has become apparent in my research that if one looks to the artifact distribution, the ditches could be interpreted as communal middens. Again the goal was not to question if there was warfare on the Plains (it has been demonstrated that it has) the goal was to see if another explanation for these ditches could be explained. I think I have achieved the goal of this thesis in that more research needs to be completed. The existing data is skewed due to archaeological techniques used during MRBS. Research questions were not developed and there was the need to gather as much information to be analyzed at a later date. Unfortunately this was not done and collections are still waiting to be analyzed. I feel the information on the use and function of these ditch earthworks could very well be sitting on a shelf in a dark corner of a basement someplace.
What did learn from my research? The research in to the Plains fortified village has allowed me personally to develop my research capabilities as well as my vocabulary. I also found that the publicly published documents are written inconsistent with sister documents. There is a need to on the Middle Missouri that a standardization of data collected and especially when it comes to the disseminating research data.

My suggestion for work is to do a base line survey for the lands (all) adjacent to the Missouri River. This is needed to check for field conditions and if the sites are in good condition. If this base line survey does not become a priority, more information will be lost to the ever changing environment.

The goal of this thesis was to assess the function of ditch earthworks that surround some Plain Village earthlodge villages and to answer a question: Are these ditch earthworks primarily or solely used for fortification? Based on the available data through publically published documents and my research the answer to this question is no. These ditch earthworks could be used for fortification but the archaeological evidence suggest that this was not the sole purpose. This raises the question, if they are not for fortification what are they for?

Potential answers question there are a multitude of uses that the ditches could serve. I have developed two categories that these ditched earthworks could possibly fit into. The first is a “social” function. The category encompasses social and ceremonial activities that could be associated with the construction of a group project. We can see these types of social and ceremonial projects occurring in the Scioto River Valley of Ohio
with Hopewell culture and also with the platform mounds of the Mississippian culture (Gross and Nesisus 2007).

The second category of explanations is “functional”. This category encompasses the practical purposes for having a ditch that surrounds the village. Examples of this could include: a borrow for earth to place on earthlodges, drainage system to channel water and/or waste away from the village. A midden to dispose of cultural materials no longer needed or a constructed landscape that would promote growth of certain plants and to promote the domestication of these types of plants (Gross and Nesisus 2007, Bleed 2000). The categories that I developed are speculation, in the end more research is needed to answer the question: **what are these ditched earthworks and why did people build them?**
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Appendix A

Results from a Geophysical Survey of an National Historic Landmark: 39BF11 located in Township 106 North, Range 71 West, Section 15, Buffalo County, South Dakota, which lies within the Crow Creek Sioux Tribe Indian Reservation.

-----------------------------
Albert M. LeBeau III M.A.
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University of Nebraska
Anthropology Department

-May 2010 -
Abstract

Albert LeBeau, in partial fulfillment of an academic research project conducted a geophysical survey on October 20\textsuperscript{th} -23rd, 2009. The survey area is within the Big Bend archaeological region.

A literature/records search was conducted by Albert LeBeau with records from the US Army Corps of Engineers and National Parks Service. There are numerous sites located within the research area; however, only one site was the focus of this geophysical survey. The site 39BF11 is listed on the National Historic Landmark and a site of National significantness.<INSERT CRITERIA FOR LISTING>

No artifacts were noticed or collected from the site. All mitigative activities were limited to less than one square meter of disturbance. Therefore no adverse effect was caused by this undertaking.
APPENDIX BB
Tables

APPENDIX CC
Plates

APPENDIX DD
ARPA Permit DACW45-3-10-6011
Introduction

This report documents a Level II sample/intensive cultural resource survey conducted by Albert LeBeau with support of the National Park Service Midwest Archeological Center (NPS MWAC) on October 17th – 19th, 2009. The survey sampled an area of 40x60meters of site 39BF11 (Figure 1).

The field work was conducted by Albert LeBeau, Steven De Vore, Dr. Virgil Noble, Jennifer Winter, Megan Meier, Richard Harnois. The survey is a research project for the purposes of gathering information for Mr. LeBeau’s master’s thesis. All work was supervised by Dr. Mark Lynott (NPS MWAC) and Dr. Peter Bleed (University of Nebraska-Lincoln).

Project Description

Albert LeBeau’s request to conduct a geophysical survey on selected federal lands on the Crow Creek Indian Reservation, Buffalo County, South Dakota. Geophysical prospection is a non-intrusive procedure that allows for subsurface reconnaissance. The procedure uses different types of magnetic and electro-magnetic tools to record features. Tools include the measuring of electric conductivity of soils, electric resistance of soils, eleetro-magnetivity of the soils and ground penetrating radar. Also a detailed topographic map of the location was done with use of TOTAL station.

As stated previously, the purpose is to satisfy Mr. LeBeau’s Master’s thesis. The site was choose due to the presence of a fortified ditch. Also within the sites history, known pre-Colombian conflict had taken place at this location. Mr. LeBeau’s thesis relates to the archaeological evidence associated with pre-Colombian warfare on the Plains. By using Geophysical prospection techniques, Mr. LeBeau goal was to document geophysical features associated with the conflict.
Location: The project area is located in Buffalo County, in central South Dakota and is located within the administrative boundaries of the Crow Creek Sioux Tribe Indian Reservation. The project area is located Township 106 North, Range 71 West, Section 15, Buffalo County, South Dakota. This area is located within the Big Bend Archaeological Region (SARC 2000).

Area surveyed: 40m x 60m grid was used and surveyed (see map 1)

Project Description: The project consisted of geophysical survey of the 40m x 60m grid. A pedestrian survey of the grid was completed as the grid was being set up. Magnetometer, Soil conductivity, resistance and ground penetrating radar (GPR) were used in the survey.

The Survey produced field notes, a photographic record, documents associated with the literature search and maps. This material is on file at the National Park Service Midwest Archaeological Center, Lincoln, Nebraska, and University of Nebraska-Lincoln Love Library.

Literature Search/Records Search

Albert LeBeau conducted the literature search on October 4th, 2009 at the NPS MWAC. As this site is listed as a National Historic Landmark, all documentation was available through Dr. Virgil Noble Archeologist, National Historic Landmark Program.

There are multiple archaeological sites recorded within one mile of the survey area (Table 2). Site 39BF4 is directly adjacent to the project area. No testing or survey was conducted on this site. 39BF4 is listed as habitation/village.

Environmental Context
The project area lies in Buffalo County in central South Dakota. Buffalo County has the Crow Creek Sioux Indian Reservation within its boundaries. The project area and surrounding areas have been formed by glacial activities and other types of erosion, most notably is the Missouri River and Big Bend Dam which lies directly north of the project area. The Missouri River forms the western boundary of the Crow Creek Reservation. All drainages lead and empty into the Missouri River. The area is a continental climate characterized by cold winters, cool spring, hot summers and a mild autumn. The climate is sub arid with relative low annual precipitation. Rain fall is normally greatest during late spring and early summer. The natural vegetation of the area is mostly short and tall prairie grasses: Buffalo grass, western wheat grass, and green needle grass. Sagebrush, yucca and prairie clover are also present as well as fruit bearing trees and plants as the buffalo berry, choke cherry and wild plum with are located in draws and near creeks and rivers.

The region has supported prairie chicken, turkey, bald and golden eagles, migratory waterfowl, numerous borrowing animals, fox, badger, coyote, mule and whitetail deer, mountain lion, bobcat, elk and bison both historically and prehistorically.

**Landforms**

The project area is located within the Missouri River Trench. This river valley was created over millennia as the Missouri River slowly eroded the surrounding prairie. Current use of the land within the project is pasture lands.

**Soils**

The area surveyed is within one soil association. The Rhoades Association is a deep soil, well drained, nearly level to moderately sloping, loamy soils on uplands and terraces (Table 3).

**Survey Methodology**
The lands within the project area were surveyed by visual inspection and geophysical prospection. It was walked in parallel transects at no more then 10 meters. No subsurface testing was done as the area has been excavated extensively in the past. The purpose of this survey was to use Geophysical techniques to identify subsurface features that relate directly to the construction of the ditch.

The project area and any cultural resources encountered were sketch mapped, used a Sokia total station to develop a contour map, and photographed using multiple digital and film cameras. No collection of artifacts was gathered in this survey. All surface artifacts were left in situ. An accurate geographical location is taken using a GPS unit (Trimbal Geo XH) accurate to 1 meter. The examination of pre-historic sites may involve documentary research including examination previous excavations, ethno-historical research, and oral tradition recordation to identify if the survey produces field evidence that such a site my have sufficient integrity to be National Register eligible. These records provide information regarding the identify of the property in question, as well as data with which to assess the significance of the property. The field methodology for pre-historic sites does not deviate substantially from the procedures used on historic sites. However there is greater potential of historic properties to contain structures such as foundations that may require more detailed mapping and recordation.

The site forms are done and stored at the NPS MWAC, USACE Big Bend, and SD SHPO and copies may be sent to SARC.

**Survey Results**

Date: October 20th-22nd 2009

Crew: Albert M. LeBeau III, Steven De Vore, Dr. Virgil Noble, Megan Maier, Richard Harnois Jennifer Winter

Survey Type: Level II Geophysical Survey
NPS MWAC examined approximately 100sq meters that bisected a portion of the earthwork that surrounds the village at 39BF11. The survey crew conducted a pedestrian survey and deployed geophysical equipment to project the area.

The location of the grid was based on field conditions at the time. Due to heavy buck brush the original location was not ideal for prospection. There was discussion with USACE Big Bend office to remove the vegetation, however it was decided that this action my place some of the site’s resources in jeopardy as this site is still actively looted. Instead a decision was made by the LeBeau to set up the 60m x 40m grid on pasture land adjacent to the USACE area. This land is held in trust by the Bureau of Indian Affairs.

Mr. LeBeau and Ms. Winter met with the Land operations manager for the Crow Creek Sioux Tribe Agency and then met with the acting superintendent for the agency to gain access to the land. In a phone conversation with the regional director, Mr. William Benjamin, access was granted to the location. CCST does not have a THPO or a cultural resources’ office, therefore no meeting between Tribal and Crew could be arranged. However, Mr. LeBeau and Ms. Winter did inform the CCST Police Department that we would be out on site as a professional courtesy.

During the initial set up of the grid, a pedestrian survey was completed. All rodent burrows and disturbed ground was intensely scrutinized for cultural materials. No surface cultural materials were noticed or collected with in the project area.

The first piece of equipment that was used was the Barrington duel fluxgate gradiometer. This instrument takes readings at ½ meter intervals and measures magnetic field in the ground. The second was the conductivity meter this instrument measures electromagnetic resistance within the ground surface. The third instrument was the geoscience soil resistance meter; this instrument measures moisture and resistance to moisture. Lastly a GPR was used to identify subsurface features that would be responsive to radar.

As can be seen from the each of the following snapshots of the raw data two major features are can be seen right a way. Those are the earthwork bastion and two-track road
that runs parallel to the ditch. Each instrument has shown different anomalies that could be cultural.

For instance, the soil resistivity shows near what I am calling the bastion, there is another disturbance that mirrors the earthwork. However, this could not be seen on the ground. Another example is the magnetometer data; I can distinguish another ditch feature, and possibly a third within 10 meters of each other. There are also anomalies to the north that can not be explained. They could be staples and clamps used to put up the fence or they could be deeply buried archaeological materials.

What this survey did not find was evidence of pre-historic warfare. As stated previously this survey was based on the research question if Geophysics could be used to identify evidence of pre-historic warfare. Features that the survey team hoped to identify would have been evidence of a palisade wall. Evidence of burning of said wall or evidence of larger features. None of these were present at this location.

It is a know fact based on previous research done by Kievette and Jensen, Gregg and Gregg, Toom, Zimmerman and Bradley, that there was a mass killing of individuals at this location. From a geophysical standpoint the conflict may have been isolated to a single location away from where the survey tested, because there is no geophysical evidence of conflict at this location.
SITE EVALUATION PROCEDURES

Recommendation as to the potential for significant (i.e. National Register of Historic Places eligible) cultural resources in the area of any federally funded construction project are required at the conclusion of a Level II archaeological survey.

For a project that has been intensively surveyed and found to contain no cultural resources, no further archaeological work is recommended.

When prehistoric or historic sites are found during a survey, four basic criteria are utilized in the recommendation process: the physical condition of the site, its content, its relationship to regional research questions, and the expected impact on the site. Site conditions are determined by the amount and nature of post depositional disturbance, such as plowing, construction activities, and natural erosion. Site content is based on any archaeological features or remains discovered or which can be expected to be present in undisturbed areas of the site. The nature of surface distribution, potential for preservation of undisturbed subsurface cultural deposits or features that may contain datable artifacts or other cultural materials that may help determine whether a site requires further evaluation. The information gained about the site is then considered to knowledge about the prehistoric occupation of the region.

These three major factors taken together are useful in making a judgment as to the relative significance of a particular site, with recommendations ranging from no additional work to further testing to determine National Register of Historic Places (NRHP status or Phase III mitigation).

In the case of the site judged not significant, no further work is recommended. This does not mean the site is of no interest as an archaeological manifestation, but rather that further work would not likely increase our knowledge base beyond that acquired in survey and testing. Destruction of such sites will, not seriously affect, our understanding of regional history.
In the case of site judged potentially significant based on Level II (phase I) results, the preferred option is avoidance, this may be accomplished by altering construction plans to avoid direct impact. If avoidance is not possible, further, more intensive testing, extending some cases to Phase II site testing, may be recommended in order to determine its NRHP eligibility (Ranney 2002).

**Summary and Recommendations**

As this site is already listed on the National Register of Historic Places as a National Historic Landmark, evaluation of the site was completed. A visual inspection of site and the condition of the site was completed by Dr. Noble with the assistance of NPS MWAC and USACE crew members. There are slight erosion issues on the lakeside portion of the site, however due to recent mitigation activities by USACE these issues have been addressed and the process has been slowed.

It is the recommendation of this report that the integrity of 39BF11 has been retained and no new issues were noticed, therefore no change to the NHL is warranted at this time.

It is also the recommendation the researchers to continue the Geophysical research on the entire site. And conduct a level III intensive survey using geophysical techniques. It is the belief of the researcher that more information can be drawn from this site that will aid in the telling of history (both recent and ancient) that can shed new light on a tragic event.
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Appendix 2: TABLES

Table 1: Summary of Archaeological Sites within One Mile of the Project Area

<table>
<thead>
<tr>
<th>Site #</th>
<th>NR Status</th>
<th>Date Recorded</th>
<th>Recorder</th>
<th>Sec/Twp/Rng Description</th>
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</thead>
<tbody>
<tr>
<td>39BF11</td>
<td>E</td>
<td>1957</td>
<td>Jones</td>
<td>T106N/R71W/Sect. 15</td>
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Table 2: Soil Associations within the Project Area

<table>
<thead>
<tr>
<th>Soil Association</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deep, well drained, nearly level to moderately sloping, loamy soils on uplands and terraces.</td>
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</tbody>
</table>

Table 3: Soil within the Project Area

<table>
<thead>
<tr>
<th>Soil Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoA- Lowry Silt-loam</td>
<td>Moderately deep, well drained, gently sloping in uplands.</td>
</tr>
</tbody>
</table>
Appendix 3: Plates

Plate 1: Project Area Looking S
Plate 2: Project Area Looking NW

Plate 3: Ditch bastion looking W

Plate 4: Magnetometer survey
Appendix AA: Maps

Map 1: State map showing location

Survey Location
39BF11

Legend
- site_location
- Missouri River
- South Dakota

0 25 50 100 150 200 Miles
Map 2: Topographic showing location
Map 3: 39BF11 site map

Survey Location 39BF11