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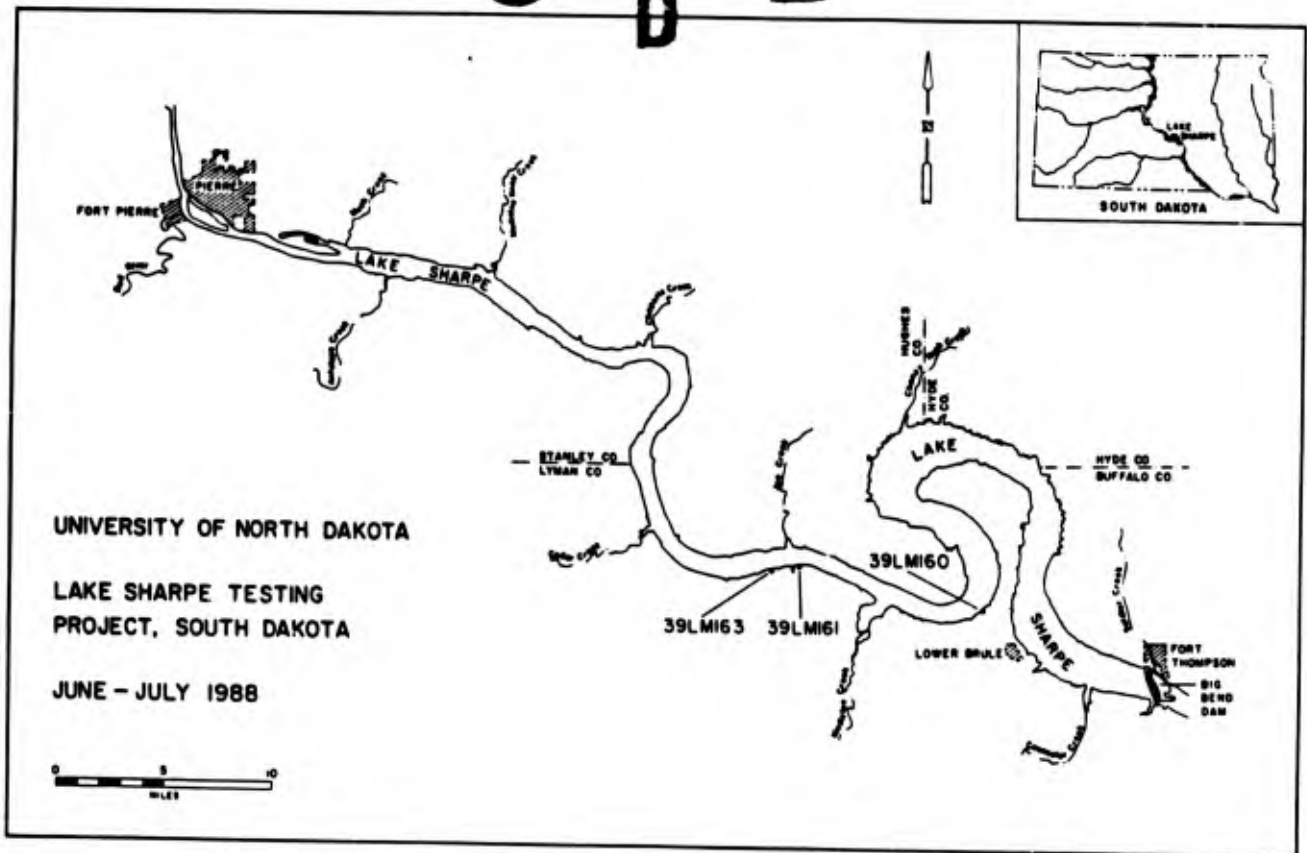


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Archeological Test Excavations At Three Sites In The Lake Sharpe Project Area, Lyman County, South Dakota, 1988

Final Report

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Department of Anthropology
University of North Dakota
Grand Forks, North Dakota

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ARCHEOLOGICAL TEST EXCAVATIONS AT THREE SITES IN THE LAKE SHARPE
PROJECT AREA, LYMAN COUNTY, SOUTH DAKOTA, 1988

by

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submitted by

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ABSTRACT

Test excavations at site 39LM160 revealed three separate components or occupation episodes. Component C is assigned to the Plains Village tradition, Post-Contact Coalescent variant (ca. A.D. 1655-1740). The cultural affiliations of Components A and B are unknown. The site occupations represent specialized activity locations that primarily functioned as animal kill processing loci. Site 39LM160 is eligible for listing on the National Register of Historic Places. The site is being impacted by erosion. A program of salvage excavation including additional testing is recommended.

Test excavations at site 39LM161 identified a single component affiliated with the Plains Woodland tradition, Sonota complex (ca. A.D. 1-600). The site minimally functioned as a Sonota field camp. If structural remains are (or were) present at the site, a residential base camp interpretation may be more appropriate. Site 39LM161 is eligible for listing on the National Register of Historic Places. The site is being actively eroded. A top priority program of salvage excavation incorporating geophysical methods of site surveying and additional testing is recommended.

Investigations at site 39LM163 failed to reveal any evidence of significant, intact archeological deposits. Site 39LM163 is not eligible for listing on the National Register of Historic Places. No further work is recommended for this site.

ABSTRACT

Test excavations at site 39LM160 revealed three separate components or occupation episodes. Component C is assigned to the Plains Village tradition, Post-Contact Coalescent variant (ca. A.D. 1655-1740). The cultural affiliations of Components A and B are unknown. The site occupations represent specialized activity locations that primarily functioned as animal kill processing loci. Site 39LM160 is eligible for listing on the National Register of Historic Places. The site is being impacted by erosion. A program of salvage excavation including additional testing is recommended.

Test excavations at site 39LM161 identified a single component affiliated with the Plains Woodland tradition, Sonota complex (ca. A.D. 1-600). The site minimally functioned as a Sonota field camp. If structural remains are (or were) present at the site, a residential base camp interpretation may be more appropriate. Site 39LM161 is eligible for listing on the National Register of Historic Places. The site is being actively eroded. A top priority program of salvage excavation incorporating geophysical methods of site surveying and additional testing is recommended.

Investigations at site 39LM163 failed to reveal any evidence of significant, intact archeological deposits. Site 39LM163 is not eligible for listing on the National Register of Historic Places. No further work is recommended for this site.

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Certain comments by anonymous reviewers were used to improve the quality of this report. These are presented in full in Appendix K. The principal investigator and the authors accept full responsibility for any and all shortcomings.

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I. MANAGEMENT SUMMARY

Introduction

Archeological test excavations were conducted at sites 39LM160, 39LM161, and 39LM163 in the Lake Sharpe project area, Lyman County, South Dakota during June and July 1988 by personnel from the Department of Anthropology, University of North Dakota, Grand Forks. This work was conducted under contract for the Omaha District Corps of Engineers (Purchase Order No. DACW4588P0534). The primary purpose of the archeological testing project was to evaluate the three sites in terms of their eligibility for listing on the National Register of Historic Places.

The Rattlesnake Keeper Site (39LM160)

Seven 1 X 1 m test units were excavated to varying depths at the Rattlesnake Keeper site (39LM160). Four of the individual tests were combined into two 1 X 2 m excavations because of their extreme depth. In addition, a nominal 1 X 2 m excavation was dug over the location of a feature (a hearth) that was partially exposed in profile in a large slump block. The volume of controlled excavation at the site totaled 9.60 m³. The excavations revealed intact cultural deposits in a very restricted portion of the original site area that covers no more than about 500 m². Three separate components were identified at the site. These were designated Components A, B, and C, with Component A being the uppermost or youngest occupation episode at the site. Component C was positively identified as a Plains Village tradition, Post-Contact Coalescent variant occupation on the basis of radiocarbon dates and associated diagnostic artifacts. The cultural affiliations of Components A and B are unknown, but they, too, may be Post-Contact Coalescent. The Post-Contact Coalescent variant is estimated to have dated from ca. A.D. 1675-1780. Component C at Rattlesnake Keeper is inferred to be an early manifestation of the variant, dating from ca. A.D. 1655-1740. A Talking Crow phase affiliation is suggested. In the project area, the Post-Contact variant is directly linked to the historically known Arikara tribe.

The archeological components at Rattlesnake Keeper are interpreted as specialized activity locations whose primary function was animal kill processing. Secondary functions identified for the Component C occupation include the gathering of wild plant foods and possibly other plant materials, fishing, bird hunting, and perhaps the collection and preparation of pigments. Components A and B appear to have functioned solely as kill processing locations. The site was occupied only briefly on three separate occasions (Components A, B, and C) by small task groups that were probably operating out of nearby village sites. No evidence of the actual kill sites that were serviced by the Rattlesnake Keeper occupations has been found in the immediate site vicinity. The setting of the site in rugged Breaks terrain bordering the Missouri River (Lake Sharpe) would have provided ample opportunity to ambush and kill various species of large game. The primary quarry that was processed at the site was bison. The remains of deer or antelope and perhaps wapiti (elk) were also recovered. Data on the minimum numbers of individuals represented in the faunal aggregate from the site suggest that these kills

were small, involving only a few individual animals. Specimens identified as domestic dog or wolf/coyote, fish, and birds are also represented in the faunal sample.

Component C is the most productive and the best preserved occupation at the Rattlesnake Keeper site. As a specialized activity location affiliated with the Post-Contact Coalescent variant, Component C was determined to have significant research potential. Its primary significance relates to providing additional information on Plains Village settlement-subsistence patterns during the early Post-Contact period. Site 39LM160 is therefore considered to be eligible for listing on the National Register of Historic Places. The site has been and continues to be severely impacted by both shoreline erosion and subsurface tunnel gulying. A program of salvage excavation is recommended to mitigate the impacts of erosion to this significant cultural resource.

The Lost Nation Site (39LM161)

Six 1 X 1 m test units were excavated to varying depths at the Lost Nation Site (39LM161). These individual test units were dug as three 1 X 2 m excavations because of the extreme depth of the cultural deposit at the site (ca. 1.5-2.0 m). In addition, an irregular, horizontal excavation was made into a burned linear feature at the site found exposed in the face of a large slump block. This feature is thought to represent the remains of a structure (house), although such an interpretation is still open to considerable question. The volume of controlled excavation at the site totaled 10.53 m³. It is estimated that anywhere from 25-50% of the original site area has been lost to erosion. The remaining site area is estimated at approximately 6000 m². Only a single cultural component was identified at Lost Nation, Component A, which is identified as a Plains Woodland tradition, Sonota complex occupation. The Sonota complex is estimated to date from ca. A.D. 1-600. The diversity and density of artifacts associated with the Sonota component indicates that it minimally functioned as a field camp. If structural remains are (or were) in fact present at the site, a residential base camp interpretation may be more appropriate.

Under the minimal functional interpretation of a Sonota field camp, the Lost Nation site was determined to have significant research potential. Its primary significance lies in its ability to provide additional information on Sonota complex settlement-subsistence patterns. Furthermore, the association of the Sonota component with a buried soil, referred to herein as the Big Bend paleosol, has significant implications for paleoclimatic research. If the site actually proves to have been a Sonota residential base camp with structural remains, its research potential would be enhanced considerably because such a site type would be virtually unique and very little is known about Sonota architecture. The Lost Nation site is therefore considered to be eligible for listing on the National Register of Historic Places. The site is being actively eroded by wave action from Lake Sharpe. A program of salvage excavation is recommended to mitigate the impacts of erosion to this significant cultural resource. The program of salvage excavation recommended for Lost Nation should be afforded the highest priority.

Site 39LM163

Two 1 X 1 m test units were excavated at site 39LM163. These were dug as a combined 1 X 2 m excavation because of the extreme depth of the reported cultural deposit (ca. 1.5 m). Controlled excavated volume at the site totaled 3.0 m³. In addition, the Lake Sharpe cutbank was carefully inspected for evidence of artifactual materials. The investigations at site 39LM163 failed to reveal any evidence of significant, intact archeological deposits at the site. The materials that were recorded at this location in 1983 appear to have been virtually destroyed by shoreline erosion. Site 39LM163 is not eligible for listing on the National Register of Historic Places. No further work is recommended for the site.

II. INTRODUCTION

Project Description

In February 1988, the Department of Anthropology, University of North Dakota, Grand Forks, received solicitation no. RFQ-DACW4588T1484, dated 9 February 1988, as amended on 17 February, from the Omaha District of the U.S. Army Corps of Engineers (USACE) (Appendix K). The solicitation and accompanying scope of work (SOW) called for a proposal for the testing and evaluation of three archeological sites located in the Lake Sharpe project area, Lyman County, South Dakota (Table 1; Figure 1). Survey work at these sites is reported in Toom and Picha (1984).

In essence, the SOW required that a specified number of 1 X 1 m test units be excavated to a designated maximum depth at each site identified for testing (Table 1). All excavated matrix was to be screened. Radiocarbon samples, flotation samples, and pollen samples were to be collected during the course of the excavations where appropriate. Flotation and pollen samples were to be taken specifically from all excavated features. All recovered artifactual and ecofactual remains were to be retained, processed, cataloged, analyzed, reported, and eventually placed in a South Dakota storage facility that is acceptable to the Corps. Only "diagnostic artifacts" were to be collected from the surfaces of the sites. Any modifications of this basic work plan were to be made in consultation with the USACE technical officer.

Table 1. Summary Information on the Three Sites Scheduled for Testing, Lake Sharpe Testing Project, UND, 1988 (abstracted from the USACE scope of work, Appendix K).

Site Number	Description	Suggested Taxonomic Affiliation	No. of Test Units*	Maximum Depth (cm)
39LM160	Artifact Scatter, Buried Horizons	Plains Village, Extended Coalescent Variant	10	160
39LM161	Buried Horizon	Unknown Prehistoric	5	230
39LM163	Buried Horizon	Unknown Prehistoric	5	150

*Test units are 1 X 1 m excavations.

The primary management goal of the required testing is to determine the eligibility of each site for nomination to the National Register of Historic Places. In this regard, information was to be collected for each site concerning its cultural affiliation, function, horizontal and vertical boundaries, integrity, and research potential. Nomination forms were to be prepared for each site considered to be significant and eligible for listing on the National Register. Scientific research goals to be addressed by the project were to focus on topics raised in Buechler (1984) which are appropriate to this level of investigation and compatible with the acquired data sets. In addition, a journal article suitable for publication was to be prepared on the results of the project, as was a brief public education program.

In response to this solicitation, UND personnel prepared a proposal following specifications outlined in the SOW (Appendix K). The proposal was submitted to the USACE in late February 1988; on 12 March 1988, the project was awarded to UND (Purchase Order No. DACW4588P0534). Work on the literature and records search phase of the project was conducted in early June 1988. Preparations for fieldwork were also made at this time. Fieldwork was begun on 18 June 1988 and terminated on 20 July 1988. All project-related materials and records were then transferred to UND archeological laboratory facilities at Babcock Hall on the Grand Forks campus for processing, analysis, and report preparation activities.

Area Definitions

Three geographic areas are especially relevant to this testing project: (1) the Lake Sharpe project area, (2) the Big Bend study unit, and (3) the Middle Missouri subarea of the Plains, the study region. Each of these areas is described in some detail below to enable the reader to better place the results of the project within the proper cultural-geographic perspective.

Project Area

The Lake Sharpe project area corresponds to the USACE Big Bend Dam and Reservoir (Lake Sharpe) located on the Missouri River between Ft. Thompson and Pierre, South Dakota (Figure 1). The project area includes all federal land administered by the USACE as a result of the construction of Big Bend Dam and the impoundment of Lake Sharpe. The project area is also referred to as Big Bend in certain other reports (e.g., Steinacher 1981; Toom and Picha 1984; Steinacher and Toom 1985) because this is more in keeping with past historical and archeological referents to the area. Delimiting the project area is important since most detailed descriptions and comparisons will be restricted to it. It is also a convenient areal delimitation from the perspective of the Corps because most cultural resource management decisions ultimately relate directly to their individual project areas (i.e., dams and their lakes or reservoirs).

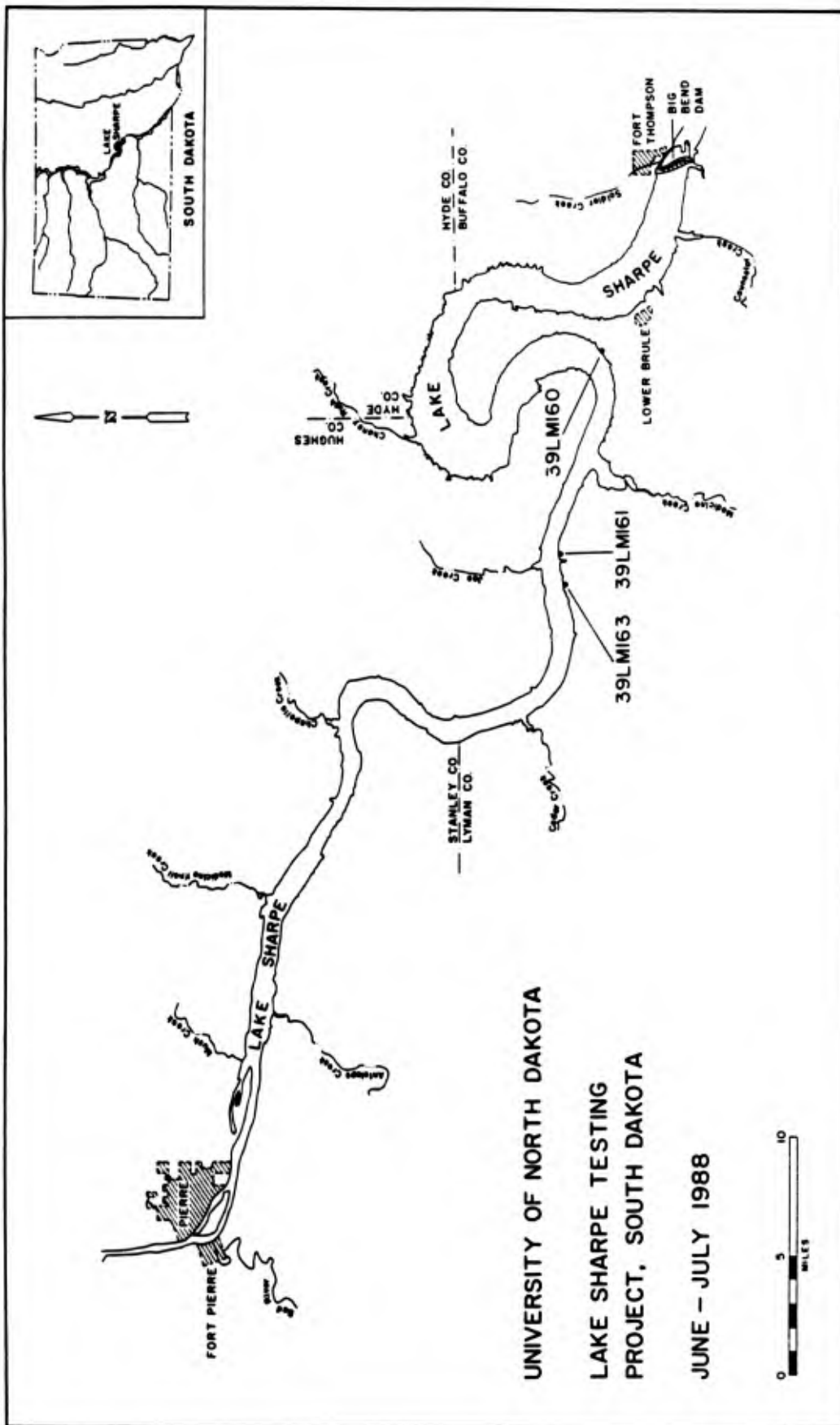


Figure 1. Map of the Lake Sharpe Project Area Showing the Locations of Sites 39LM160 (Rattlesnake Keeper), 39LM161 (Lost Nation), and 39LM163.

Study Unit

Definition of a study unit is important because they are often used as interpretive or management devices that measure and guide the progress of archeological research in areas containing unique or spatially restricted cultural sequences. The project area is contained in two study units defined in the working draft of the Management Plan for Archaeological Resources in South Dakota, Part I: Study Units (Buechler 1984). This plan was developed under the guidelines of the Resources Protection Planning Process (RP3) of the U.S. Department of the Interior. The Lake Sharpe project area straddles the Bad/Cheyenne and Big Bend study units, as delimited in the South Dakota RP3 document (Buechler 1984:3). Upstream portions of the project area in Hughes and Stanley counties are located in the Bad/Cheyenne study unit; downstream portions in Hughes, Hyde, Buffalo, and Lyman counties are situated in the Big Bend study unit (Figure 2). The USACE SOW (Appendix K) states that the Big Bend study unit will be used to guide the general research orientation of the project reported here, which is consistent with the location of the three sites identified for testing in Lyman county.

In recognition of previous areal subdivisions of the archeology of the Missouri River trench in the Dakotas, it is important to note that the Lake Sharpe project area is also contained within the upstream portion of the Big Bend region of the Middle Missouri subarea (Figure 3), as originally defined by Lehmer (1971:29). Lehmer's regions of the Middle Missouri (Figure 3), which are conceptually comparable to the study units of the RP3, have gained wide use and acceptance in the archeological literature. They are characterized by more or less unique archeological sequences of specific relevance to Middle Missouri prehistory and history, especially with regard to the Plains Village tradition, and they are intended to serve as devices for integrating archeological data in the development of a comprehensive culture history for the subarea as a whole. Consequently, the Big Bend region of the Middle Missouri subarea is also germane to archeological research in the Lake Sharpe project area.

Study Region

The study region, the largest area to be considered, is the Middle Missouri subarea of the North American Plains culture area (Lehmer 1971; Scaglione 1980; Wedel 1961) (Figure 4). The Middle Missouri subarea of the Plains contained different cultural groups with distinctive traits at various times in the past, yet this overall cultural diversity was characterized by considerable periods of basic cultural similarity and continuity. These factors make the Middle Missouri a useful areal delimitation for both archeological and ethnographic research, hence, a cultural subarea of the larger Plains culture area. Delimiting the study region is also important because it sets the bounds within which larger descriptions and comparisons will be made. Only rarely will it be necessary to go beyond the Middle Missouri subarea for such purposes.

SOUTH DAKOTA STUDY UNITS

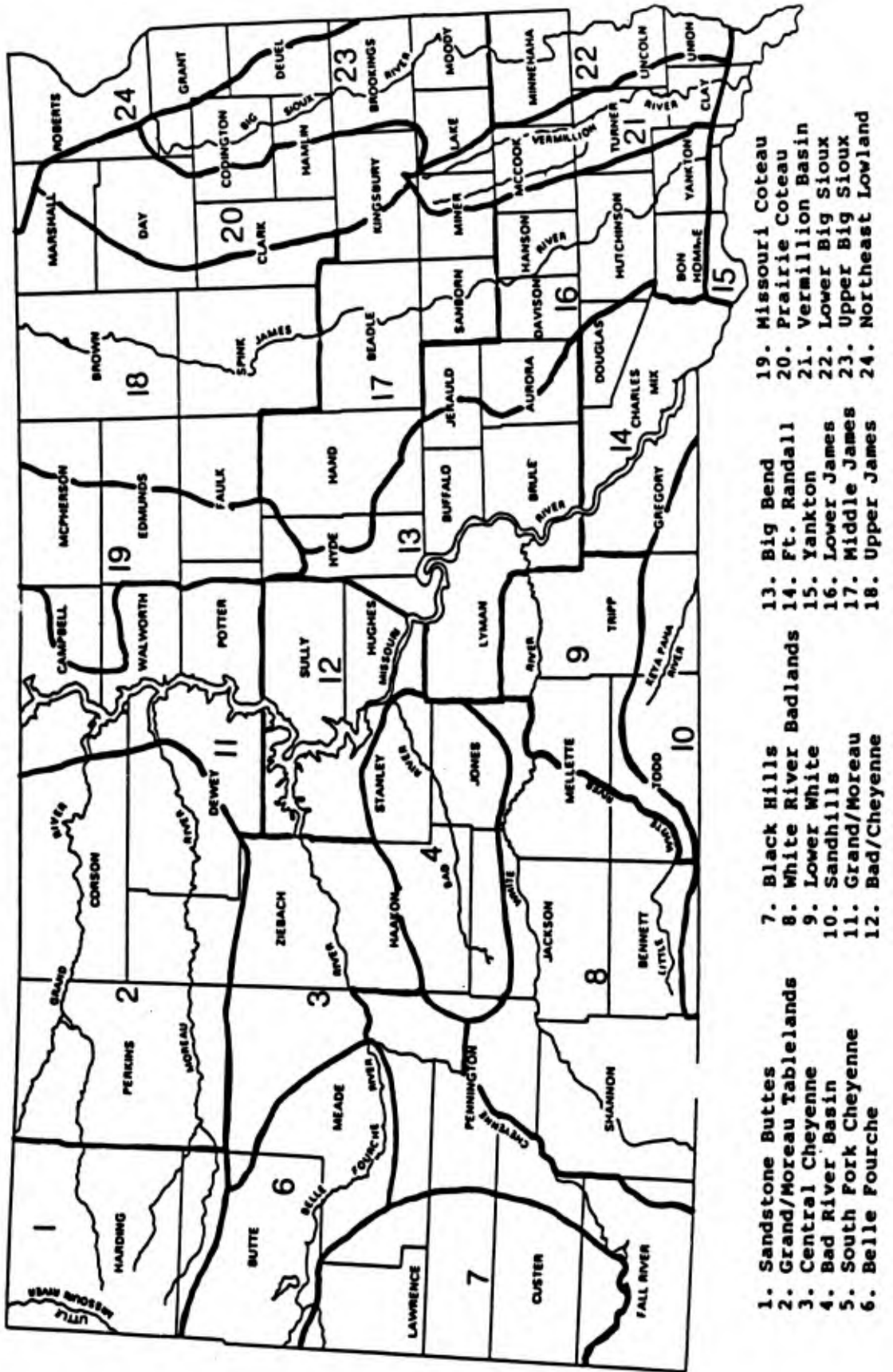


Figure 2. Map of the South Dakota RP3 Study Units (from Buechler 1984:3).

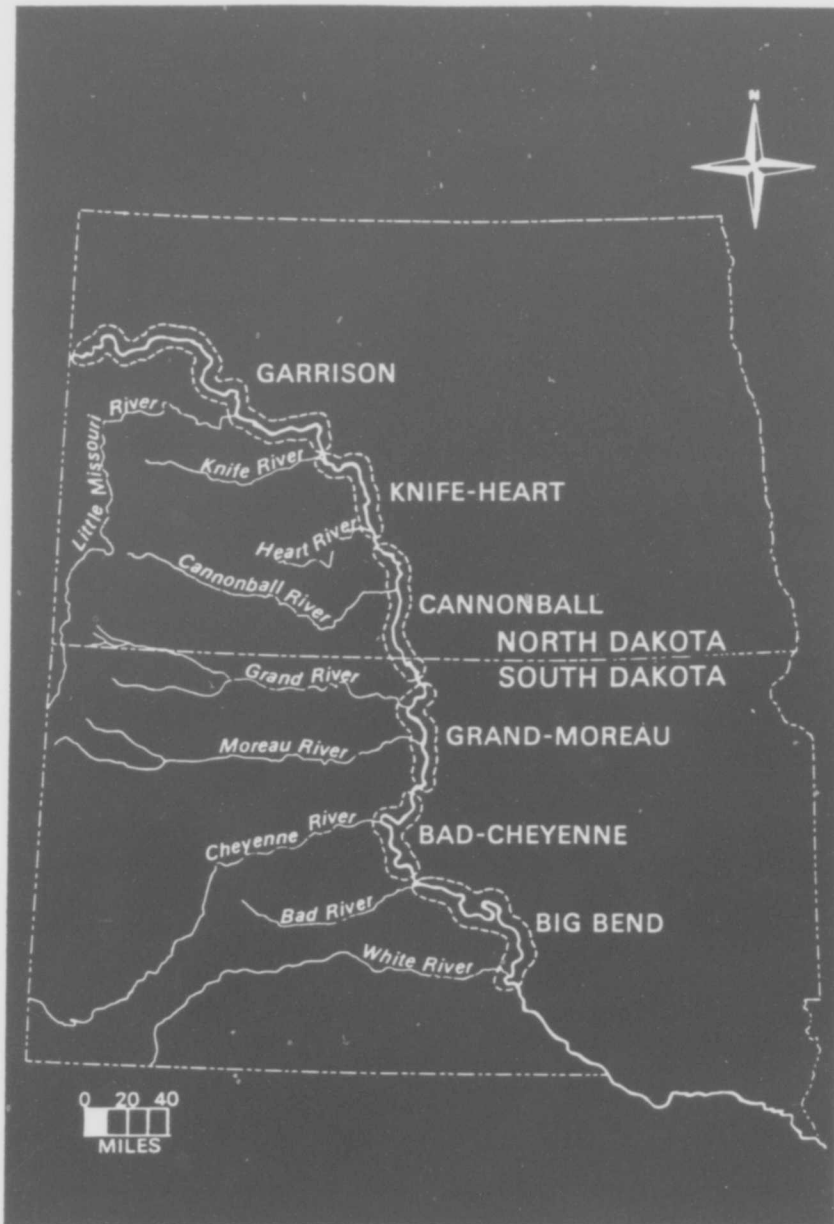


Figure 3. Map of the Regions of the Middle Missouri Subarea (from Lehmer 1971:29).

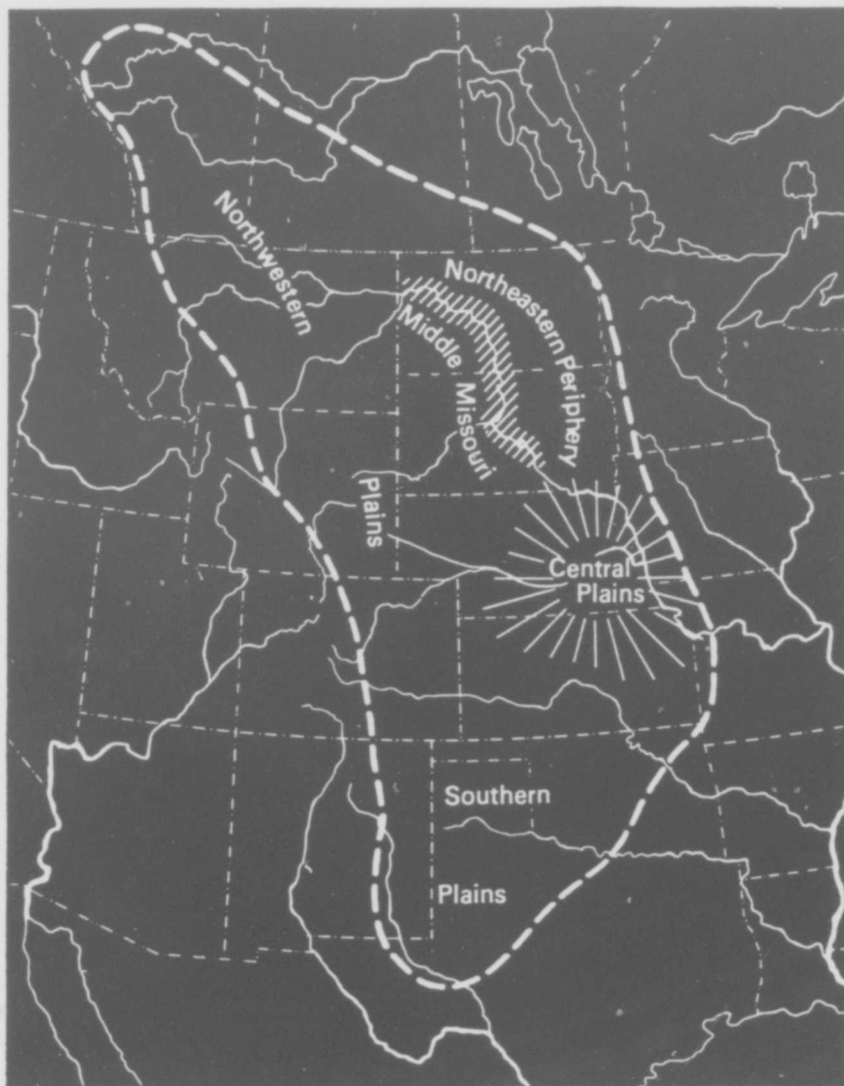


Figure 4. Map of the Subareas of the North American Plains (from Lehmer 1971:29).

Project Personnel and Contributors

Mr. Dennis L. Toom (M.A. anthropology), Associate Research Archeologist at UND, served as the principal investigator and project director during the entire course of the project. Toom is also presently a Ph.D. student in the Department of Anthropology, University of Colorado, Boulder. In addition to his other duties, Toom also served as the project geoaicheologist. Dr. Stanley A. Ahler (Ph.D. anthropology), Associate Professor and Research Archeologist at UND, was the co-principal investigator for the project. Mr. Paul R. Picha (B.A. anthropology), Advanced Archeological Assistant at UND, was the assistant field supervisor. Picha also contributed the shell identifications for site 39LM160. Mr. Dan A. Aird (B.A. anthropology) was the field assistant. All fieldwork was performed under Toom's direct supervision, as was all laboratory and report preparation work. Most routine laboratory operations were performed by Ms. Jane G. Monson-Toom (B.A. anthropology). Both Aird and Monson-Toom are currently Archeological Assistants at UND.

Other persons who contributed to the project and are not affiliated with UND include Ms. Margaret A. Van Ness of Cimarron Environmental Consortium, Golden, Colorado; Mr. John R. Bozell of the Nebraska State Historical Society, Lincoln; and Dr. Craig E. Shuler of the Wood Sciences Laboratory, Colorado State University, Ft. Collins. Van Ness was responsible for processing flotation samples and identifying recovered macrobotanical remains (seeds); Bozell provided the identifications of the vertebrate faunal remains (bone); and Shuler identified selected charcoal and wood samples. Their work is reported in Appendices A, B, and C, respectively. The radiocarbon dates for site 39LM160 were produced under the supervision of Dr. R. E. Taylor of the Radiocarbon Laboratory, Department of Anthropology, University of California, Riverside.

Agency Coordination

During the course of the project, coordination was maintained with USACE personnel at the Omaha District Offices, the Big Bend and Oahe Dam Project Offices, and the Real Estate Office in Pierre. Contacts were also maintained with personnel at the South Dakota Archaeological Research Center (Office of the State Archaeologist), Rapid City, and the South Dakota Historical Preservation Center (Office of the State Historic Preservation Officer), Vermillion. The Lower Brule Sioux Tribe and the Three Affiliated Tribes (Mandans, Hidatsas, and Arikaras) were informed of the project in advance of fieldwork by Corps personnel. The three sites scheduled for testing are all located within the confines of the Lower Brule Reservation. A meeting was held with Lower Brule tribal representatives on 20 June 1988 just prior to the commencement of actual on-site fieldwork.

Fieldwork Effort and Weather

The drought conditions that prevailed during the summer of 1988 had a significant negative impact on the fieldwork that was performed as a part of this project. Unusually high temperatures and strong winds greatly hampered the efficiency of the testing effort. Temperatures were frequently above 90° F and sometimes exceeded 100° F from mid-June to mid-July 1988 while fieldwork was in progress. A new record high of 114° F was reached in Pierre during this period of time. Strong winds in excess of 20-30 mph often accompanied these extreme temperatures. Needless to say, such adverse weather conditions restricted available field time and reduced excavation efficiency. In the interests of safety, it was often necessary to shorten the work day in the afternoons when temperatures approached or exceeded 100° F. The strong winds also resulted in the considerable loss of additional field time because such conditions make boating unsafe and two of the three sites (39LM160 and 39LM163) could be reached easily only by boat. Wind advisories and warnings were issued for Lake Sharpe on several occasions and these were usually heeded as a safety precaution. Rain was not a significant factor this year as it has been in the past, but some delays were caused by the few showers that did occur.

In sum, the adverse weather conditions during the summer of 1988 made it difficult if not impossible to conduct a fully efficient test excavation program. It is estimated that overall efficiency was reduced by a factor of about 25%. This translates into a loss of approximately 9.5 person days. Data on the fieldwork effort for each site and the project as a whole are presented in Table 2. At the average rate of excavation per person per day (0.42 m³), the loss of 9.5 person days due to the weather translates into a minimum of an additional 4.0 m³ of excavated volume that could have been completed under more normal conditions. Furthermore, this figure is probably low because the actual rate of excavation itself would likely have been higher under normal conditions.

These weather-related factors, which were obviously beyond our control, in large part account for the negative differentials between maximum (proposed) and actual excavated volumes for the project (Table 2). Site 39LM160 was the last site tested under our schedule, and the loss of available field time due to the weather throughout the project made it necessary to curtail testing at this site. The level of excavation at site 39LM161 approximates the maximum proposed effort. In fact, one additional test unit beyond the five proposed was excavated at 39LM161; this is not reflected in the data in Table 2 because the depth of the cultural deposits was found to be somewhat less than the stated maximum depth of testing for the site (i.e., ca. 170 cm versus 230 cm). The level of excavation at site 39LM163 is also well below the maximum proposed effort, but this circumstance is mainly a function of the cessation of testing at 39LM163 when it was determined that the site had been virtually destroyed by shoreline erosion. Therefore, the work effort at 39LM160 suffered the most as a consequence of the adverse weather conditions.

Table 2. Fieldwork Effort Data, Lake Sharpe Testing Project, UND, 1988.

Site	Maximum Excavated Volume USACE SOW	Actual Excavated Volume*	Differential	Person-Days Used**	Rate of Excavation Per Person Per Day**
39LM160	16.0 m ³	9.6 m ³	-6.4 m ³	22.75	0.42 m ³
39LM161	11.5 m ³	10.5 m ³	-1.0 m ³	22.50	0.47 m ³
39LM163	7.5 m ³	3.0 m ³	-4.5 m ³	9.75	0.31 m ³
Total	35.0 m ³	23.1 m ³	-11.9 m ³	55.00	0.42 m ³

*Includes only controlled (screened) excavation; major uncontrolled excavation in Test 11 at 39LM160 is excluded; minor controlled excavation in Feature 1 at 39LM161 is also excluded.

**Includes all fieldwork activities at a site in addition to actual excavation: reconnaissance and relocation, mapping, profiling, backfilling, etc.

The relative inefficiency of the testing project is regrettable but it was also clearly unavoidable. Every effort was made to make up lost time by rescheduling days off when it was not possible to work and by working whenever the weather and other factors permitted. Field time was also extended an additional three days beyond the 20 working days that were originally planned. However, even these measures were insufficient to allow the field crew to approach the maximum proposed testing effort. Nonetheless, the project was successful in that sufficient data were acquired for each site to enable most all project goals to be met.

Disposition of Artifacts and Records

Information and materials accumulated during background research and fieldwork were returned to UND laboratories for processing and analysis. All collected artifacts were washed, restored or stabilized if necessary, and cataloged; specimen inventories were compiled. Field notes, excavation forms, and other project documents were organized, finalized, and collated. All artifactual and ecofactual materials collected during the course of the project will be stored at the South Dakota Archaeological Research Center, Rapid City. Pertinent project records will be maintained along with the collection; duplicate sets will be filed with the Omaha District Corps of Engineers, Omaha, Nebraska, and the Department of Anthropology, University of North Dakota, Grand Forks.

Report Organization

Organization of this report is based on the perceived desirability of presenting the results of the testing at each site within a single section. This format obviates the need to consult a number of different analytical sections for information on a particular site, which would have been necessary had the report been organized around separate classes of data (i.e., stratigraphy, features, ceramics, lithics, bone, etc.). The main body of the report begins with a Management Summary. This summary is intended to provide a brief overview of the salient findings and recommendations of the project for federal and state cultural resource management personnel. The Management Summary is followed by Introduction, Research Design, and Background Information sections. The latter contains information on the physical and cultural settings of the project area that is particularly relevant to these investigations. Sections containing reports on the results of the testing at each of the three sites under study are presented next. The main body of the report concludes with a Synthesis and Interpretation section and a section on Management Recommendations.

All of the foregoing material was authored by Dennis L. Toom, the principal investigator. Identifications of macrobotanical remains and vertebrate faunal remains were contributed by other investigators, as was mentioned above. The results of these separate analyses, which are presented in Appendices A, B, and C, are summarized in the individual site reports where appropriate. Detailed soil descriptions, computer coding formats, provenience data, artifact inventories, and other information on the project are also presented in appendix form. Other project documents and materials, such as excavation forms, maps and drawings, photographs and photo records, National Register nomination forms, the paper for publication, and the public slide presentation, were submitted under separate cover to the Omaha District Corps of Engineers following the review and finalization of this report.

III. RESEARCH DESIGN

Research Goals and Strategies

The research goals of this study and the strategies employed in their achievement come from a number of different sources. These sources include the USACE SOW (Appendix K), the South Dakota RP3 (Buechler 1984), previous research relevant to the project area (e.g., Falk 1984; Lehmer 1971; Steinacher 1981; Steinacher and Toom 1985; Toom and Picha 1984), and the specific research interests of key project personnel. These research goals are divisible into two major categories: (1) management concerns and (2) scientific concerns. This division is not meant to imply that management and scientific goals are mutually exclusive, quite the contrary, they compliment each other at a number of key junctures. However, such a division is useful for purposes of discussion.

Management Goals and Strategies

Management research goals are those designed to meet the needs of regulatory agencies, both state and federal, that have been charged with the documentation and preservation of significant cultural resources. In this case, these goals are largely concerned with USACE regulations regarding the identification of significant prehistoric archeological sites and the development of measures appropriate to their proper management in order to meet present and future research and interpretive needs that are in the public interest. The National Register of Historic Places nomination process is central to the achievement of management research goals.

Assessment of National Register Eligibility. Without question, the primary management goal of this study is the assessment of National Register eligibility for the three sites in question. Toward this end, information was generated on the age, cultural-historical affiliation, function, boundaries (horizontal and vertical), integrity, and research potential for each site in so far as is possible given the inherent limitations of the sites themselves and the imposed testing restrictions. These data constitute the basis for evaluating the significance of the sites and making an assessment of their eligibility for inclusion on the National Register of Historic Places (cf. NPS 1986). Standard archeological documentation and analysis techniques were employed in the acquisition of this information, as discussed in subsequent sections. As required in the SOW, appropriate National Register forms and related documentation on all sites that were judged to contain significant archeological components were prepared and submitted to the USACE to facilitate the nomination process.

Development of Management Recommendations. An integral part of the National Register process involves the development of recommendations or management plans that are concerned with the mitigation of present and perceived future impacts to significant cultural resources. Measures directed at the preservation of significant archeological sites are always preferred, but it is recognized that preservation is not always practical or cost

effective. In such instances, it may be necessary to recommend salvage excavation as the only viable management option. Management plans are developed in the present report for each site submitted for nomination to the National Register.

Scientific Goals and Strategies

Scientific research goals revolve around the generation of information on the historical and behavioral aspects of the sites under study, their depositional and environmental contexts, and their relationships to relevant archeological complexes. General topics of primary interest in contemporary archeological research include chronology and culture history, cultural reconstruction, environmental reconstruction, and cultural ecology.

Chronology and Culture History. Reliable culture histories, including both temporal and taxonomic considerations, are essential to the proper ordering of archeological data. Prehistoric cultural sequences form the basis from which higher-level behavioral inferences are made regarding past human behavior and the processes influencing or directing these behaviors. Chronological and cultural assessments of the sites under study are made using three complimentary techniques: (1) radiocarbon (C-14) dates, (2) analysis of temporal-cultural diagnostic artifacts, and (3) stratigraphic correlations (chronostratigraphy). These data are used where possible to place components at the investigated sites within the current cultural-historical framework of the study region (i.e., Lehmer 1971). The temporal parameters and taxonomic relations of the cultural-historical contexts identified for each site component are then evaluated in light of these and other new data.

Cultural Reconstruction. Determining the past lifeways of prehistoric peoples is also a central topic in modern archeology. Of the various aspects of prehistoric lifeways that could be studied, this research focuses on providing data relevant to the reconstruction of settlement-subsistence patterns, technology, territoriality, and cultural interaction.

Subsistence, as defined herein, refers to the acquisition of those resources necessary to the maintenance of life, including both foodstuffs and technological raw materials. Data on subsistence are generated through detailed identifications of the remains of floral and faunal food resources and the raw materials used in the manufacture of tools and facilities. Floral and faunal resource identifications are made to the species level whenever possible. Lithic resources are identified according to established lithic types (e.g., Ahler 1977a).

Identification of pollen in samples from certain features can also be used to provide subsistence data on plant resources. The generation of subsistence data was, presumably, the goal behind the specification in the USACE SOW that pollen samples would be collected from all excavated features. No pollen samples were collected during the course of the testing reported here because features suitable for such sampling (i.e., pits) were not encountered. Only hearths or other burned features were uncovered in the test excavations reported here, and pollen samples taken from burned contexts will probably be highly biased. In consultations with pollen specialists at the

Institute of Arctic and Alpine Research, University of Colorado, Boulder, it was concluded that the intense heat produced by fires would have effectively destroyed any contemporary pollen that might have been present in samples from burned features (Vera Markgraf, personal communication 1987). In view of this, and with the approval of the USACE technical officer (Richard Berg), pollen samples were not taken from hearths or other features subjected to burning. Rather, a greater emphasis is placed in the present report on the identification of macrobotanical remains.

A settlement pattern describes the way a people occupy and distribute themselves across the landscape in order to acquire or produce subsistence goods. The position of site components within a general settlement system is inferred here through considerations of primary function based on artifactual and ecofactual analyses. The components in question are then assigned to recognized settlement types such as those proposed by Binford (1980), which seem to have considerable relevance to the late prehistoric cultures of the study region. For example, the mixed economy of Plains Village peoples, which is based on a combination of hunting, gathering, and horticulture, would require a logistical organizational strategy for the procurement of plant and animal resources. Under a logistical strategy, specific resources are obtained by specially organized task groups.

Logistical strategies are labor accommodations to incongruent distributions of critical resources or conditions which otherwise restrict mobility. Put another way, they are accommodations to the situation where consumers are near one critical resource but far from another equally critical resource. Specially constituted labor units - task groups - therefore leave a residential location, generally moving some distance away to specifically selected locations judged most likely to result in the procurement of specific resources (Binford 1980:10).

It is the horticultural (garden agriculture) practices of Plains Villagers at their permanent villages in the Missouri Valley that would have been the primary factor restricting mobility at various times of the year among these semisedentary peoples. Special task groups dispatched from the villages would have included hunting and gathering parties whose main task was the collection of wild plant and animal resources between periods of maximum horticultural activity (cf. Hurt 1969). The acquisition of other raw materials (e.g., lithics) was probably a secondary concern of these task groups.

The logistical organization of Plains Villagers indicates a collector type of settlement-subsistence system (Binford 1980:10-12). Site types identified for collectors include: (1) residential bases, (2) locations, (3) field camps, (4) stations, and (5) caches. The residential base is "the hub of subsistence activities, the locus out of which foraging [collecting] parties originate and where most processing, manufacturing, and maintenance activities take place" (Binford 1980:9). The permanent villages of Plains Villagers were their residential bases. Locations, which are also often referred to as activity areas, are special-purpose sites devoted exclusively to resource production or acquisition. In the case of Plains Villagers, these would have included garden plots, animal kill and kill processing (butchering) sites, gathering areas, quarries, and similar specialized activity loci. A field camp is a temporary base of operations for a task group while it is away from the main residential base; stations are special-purpose sites used by

task groups to gather information; and caches are sites where bulk subsistence goods are temporarily stored in the field while awaiting transportation to the residential base. Cemeteries or burial sites are another special-purpose site type that can be added to this model for late prehistoric cultures in the study region.

For the purposes of this report, a logistical strategy and a collector settlement system are assumed for both the Plains Village and Plains Woodland traditions. Because of the selective nature of the sites under study and the inherent limitations of testing data, the development of comprehensive settlement-subsistence models for these traditions is not possible within the scope of this research. However, it is possible to relate most of the site components to one or more of the settlement types described above.

Reconstruction of prehistoric technologies proceeds from detailed analyses of recovered artifacts. Major classes of technological elements that are given detailed analytical treatment include lithics, ceramics, bone, and features such as hearths. The reconstruction of territoriality, a term which is synonymous with the utilization of local and regional space in the sense that it is used here, ordinarily presupposes the existence of comprehensive settlement-subsistence models. However, some information on the territorial range of the various archeological cultures under study is provided by considerations of site function and resource exploitation. The identification of exotic (nonlocal) and local resource materials is used toward this end.

An ability to completely characterize cultural interaction is also limited by the restrictive nature of this study. Attempts are made to recognize prehistoric trade and the extent of prehistoric trade networks by identifying exotic materials and their likely sources of origin. A focus on lithic raw material utilization is assumed here because these materials have been studied in some detail with regard to local versus nonlocal availability, and differences in lithic resource utilization patterns among various Middle Missouri archeological taxa have been documented (e.g., Ahler 1977a, 1989a; Johnson 1984, 1989; Toom 1984a). Variability in other classes of artifacts (e.g., ceramics) is also investigated to the extent possible to provide additional insights into the nature of perceived cultural interactions.

Environmental Reconstruction. Reconstruction of paleoenvironmental conditions has gained equal footing with cultural reconstruction in modern archeological research. Information on paleoenvironmental conditions relevant to the cultural components identified at the three tested sites are provided by (1) identifications of selected ecofacts (macrobotanical and faunal remains) and (2) geomorphological (landform) and pedological (soils) descriptions and analyses. Comparisons with existing paleoclimatic models (e.g., Wendland 1978) are also made where appropriate.

Ecofactual analyses are limited to identifications of macrospecimens such as carbonized plant remains and vertebrate faunal materials. The collection of pollen samples from features alone, as specified or at least implied in the SOW, is far too limited to yield meaningful results. Meaningful, comprehensive paleofloral reconstructions based on pollen identifications require complete, incremental sampling of profiles in undisturbed contexts, including surface sampling of the modern pollen rain (Vera Markgraf, personal communication 1987). Such sampling falls beyond the USACE SOW and was not

performed. Small mammal remains (rodents and insectivores) have been used successfully in reconstructing paleofaunas for purposes of environmental reconstruction (e.g., Semken 1983a, 1983b; Semken and Falk 1987). However, in this case, only a very few small mammal bones were recovered, and these limited samples are inadequate for making reliable paleoenvironmental inferences. Consequently, paleofaunal reconstructions focus on the identification of bones from larger-sized mammals.

Geomorphological and pedological characterization of depositional contexts for identified components are used where feasible to provide additional information on paleoenvironmental conditions, particularly paleoclimate. Such considerations fall under the general referent of geoarcheology, which includes techniques that have gained wide use in the characterization of paleoenvironmental conditions for archeological contexts (e.g., Butzer 1971, 1982; Davidson 1985; Gladfelter 1981; Hassan 1985). For example, based on models of sediment yield and climate (Langbein and Schumm 1958; Schumm 1965, 1977), which reflect variability in precipitation, temperature, vegetation, and hillslope stability, stratigraphic correlation of archeological contexts with episodes of deposition, erosion, and/or stability observed in the geological record can be used to infer paleoclimatic conditions (e.g., Clayton et al. 1976; Coogan 1987; Knox 1983). Such an approach is followed here in arriving at limited paleoclimatic inferences based on geomorphological and pedological data.

Cultural Ecology. The theoretical and methodological underpinnings of cultural ecology assume that the interaction of culture and environment is a primary driving force if not a determining factor in cultural evolution (cf. Steward 1955, 1977). Cultural ecological studies are microevolutionary. They attempt to elucidate specific, synchronic patterns of human adaptation relative to key environmental variables, in addition to determining specific, diachronic human adaptive responses to changing environmental conditions. In other words, cultural ecology seeks to explain variability in a particular culture in relation to the variability found in the environment of that culture, at a particular point in time and over extended periods of time. The effective environment, in the sense that this term used here, includes both physical (natural) and cultural factors that influenced a particular culture. Thus, cultural interaction is also a key environmental component of the cultural ecological approach.

Clearly, comprehensive cultural-ecological (microevolutionary) models of prehistoric cultures require reliable data on chronology and culture history, cultural configurations and adaptive strategies, and paleoenvironmental conditions. Toward this end, the research goals and strategies discussed previously are all aimed at providing data for the construction of comprehensive cultural-ecological models for the Lake Sharpe area and beyond. A great deal of progress has been made in establishing a cultural-historical framework for the Lake Sharpe area, although ample opportunity exists for improvement. Cultural and environmental reconstructions are still in their infancy, however, and much additional study is required before these aspects of the prehistory of the Lake Sharpe area are placed on sound footing. While the actual formulation of cultural-ecological models is well beyond the scope of this study, it is anticipated that data derived from it will eventually contribute to this ultimate goal.

Other, Specific Research Topics. In addition to the general research goals just presented, specific research topics pertaining to the Big Bend and Bad/Cheyenne study units can be identified, as discussed in the South Dakota RP3 (Buechler 1984). Many of these topics have been covered in general terms above, and only those of a very specific nature that are relevant to the present study are considered here.

The need to identify Plains Woodland habitation sites that correlate with burial mound sites has been a serious deterrent to continued progress in Plains Woodland tradition research in the Big Bend study unit (cf. Toom 1984b). This problem is addressed to some extent by data from the Lost Nation site (39LM161), which minimally represents a Sonota complex (early Plains Woodland) field camp occupation.

Further examination of the variability within the Post-Contact Coalescent variant (i.e., phase definition), and whether this variability can be used to identify recognized subgroups of the Arikaras, is another somewhat relevant research topic. The Post-Contact component(s) at the Rattlesnake Keeper site (39LM160) most certainly represent a small portion of this variability, but their applicability to the recognition of Arikara subgroups is extremely marginal at best. The Post-Contact occupations at Rattlesnake Keeper are better suited to the study of protohistoric Arikara settlement-subsistence patterns because they represent a site type that has received little attention in past archeological research (i.e., a specialized activity location).

Literature and Records Search

A careful search of all reports, files, and other documents pertaining to the archeology of the Lake Sharpe area, especially those pertinent to the three sites scheduled for testing, was performed in early June 1988. This work was conducted by the principal investigator (Dennis L. Toom) using copies of published reports, manuscripts, files, maps, and aerial photos in his personal possession and on file at UND. Travel to the various repositories housing original materials was not necessary in view of the extensive background research already conducted by Toom and others in conjunction with previous projects in the Lake Sharpe Project Area (e.g., Steinacher 1981; Steinacher and Toom 1984, 1985; Toom and Picha 1984; Toom et al. 1979). Consultations were made with personnel at the Office of the State Archaeologist, South Dakota Archaeological Research Center, Rapid City; the State Historic Preservation Office, South Dakota Historical Preservation Center, Vermillion; the Midwest Archeological Center, U.S. National Park Service, Lincoln, Nebraska; and the Omaha District Corps of Engineers to insure that this information was complete.

The present literature and records search focused on documentation produced by UND personnel in conjunction with an archeological survey of selected federal lands on the west bank of the Lake Sharpe Project Area in 1983 (Toom and Picha 1984; Picha and Toom 1984). The three sites under study here were first identified and recorded as part of this survey project, which was conducted by UND on behalf of the Omaha District Corps of Engineers.

Other, past literature and records searches associated with earlier projects have included all documentation produced on the project area from 1947-1968 by the River Basin Surveys program of the Smithsonian Institution (SIRBS), formerly located in Lincoln, Nebraska. The SIRBS records, which are quite extensive, were maintained at the Midwest Archeological Center up until a few years ago; they have since been transferred in toto to the state of South Dakota and are now housed at the South Dakota Archaeological Research Center in Rapid City, where certain duplicate SIRBS file material had been maintained for some time. Reports and file material at the Division of Archeological Research, Department of Anthropology, University of Nebraska, Lincoln, and the Department of Anthropology, University of North Dakota, Grand Forks, also have been examined for information on major archeological investigations in the project area covering the period from 1978-1984. Additional background research also has been conducted at the South Dakota Archaeological Research Center; the South Dakota Historical Preservation Center; the Archaeology Laboratory and the W. H. Over Museum, University of South Dakota, Vermillion; the Department of Sociology and Anthropology, South Dakota State University, Brookings; the Archaeology Laboratory of the Center for Western Studies, Augustana College, Sioux Falls; the State Historical Society of South Dakota, Pierre; and local historical societies and county courthouses. Relevant National Register documents were also reviewed as a part of this project (e.g., Steinacher and Toom 1985).

Field Procedures

Field procedures employed in this testing project were fairly standard for the three sites in question, with some exceptions. Exceptions include the collection of a few fine recovery (water screen) subsamples from selected excavation units and only limited screening of certain other excavation units. Details of the test excavations performed at each site and any exceptions to standard procedures of a site specific nature are discussed in each site report section under Fieldwork.

Test units were of a uniform 1 X 1 m size. Two separate test units were often placed together, side by side, to comprise a larger 1 X 2 m excavation when particularly deep cultural deposits were involved. This procedure was approved by the USACE technical officer (Richard Berg) when it was recognized that it was inefficient and impractical to attempt to dig 1 X 1 m units much below 50 cm. Test units were excavated entirely by hand using shovels, trowels, brushes, and small hand tools such as dental picks when conditions warranted. Smaller-sized features such as hearths were excavated as separate units following their human-made contours. Vertical excavation generally proceeded in 10 cm arbitrary levels. A shift to "natural" levels that usually varied from the 10 cm standard was made when cultural features were encountered. The term excavation unit is used here to refer to spatially discrete episodes of excavation, such as levels within test units, including both general (arbitrary) levels and feature levels.

With some exceptions, all excavated sediment (soil) matrix was dry screened through 4-per-inch mesh screen (one-quarter inch hardware cloth, ca. 6 mm square opening). A few water screen samples were taken from selected excavation units and were washed through 16-per-inch mesh screen (one-sixteenth inch window screen, ca. 1.5 mm square opening) using a pressurized

flow of water. Water screening facilitates the recovery of microartifacts that are too small to be caught in the standard one-quarter inch hardware cloth screens. Water screen samples were taken from certain highly productive general level excavation units and all excavated cultural features.

It was occasionally necessary to dispense with the complete screening of certain highly intractable excavation units at the Rattlesnake Keeper site (39LM160) to enable the testing to proceed apace. Such instances were limited exclusively to sterile clay deposits that were very hard and dry, and which could be screened completely only with great difficulty and at the expense of considerable time (ca. 1 hour/0.10 m³). A substantial sample (ca. 25%) was first taken and screened from all excavation units that were not completely screened to insure that they did in fact contain no artifactual remains. Excavation units that did contain artifacts were completely screened no matter how difficult and time consuming this proved to be. All materials retained in the screens were returned to the laboratory for processing and analysis. As an afterthought, water screening of clayey levels at the site may have provided increased efficiency, but the point is moot because the field crew was not prepared to undertake this kind of screening on a large-scale basis.

Placement of test units was done judgmentally on the basis of two primary considerations. The first consideration was the need to recover sufficient numbers of artifacts to enable a full evaluation of a site and its artifactual content; the second was the desirability of covering as much of the site area as possible to provide reliable data on vertical and horizontal site boundaries. Compromises between recovery and coverage had to be made at all three sites because of time limitations, the limited extent of the testing, and the need to combine test units in order to effectively reach deeply buried cultural deposits. Such compromises were made in favor of recovery in all cases because site boundaries had already been fairly well established on the basis of survey data reported in Toom and Picha (1984). Even so, attempts were made to diversify sampling as much as possible and as was deemed necessary at each site. Random or systematic strategies of test unit placement had to be rejected in view of low test area to site area ratios (Table 3). Hand-coring using a small diameter Oakfield tube kit (soil probe) was also done to aid in test unit placement and to provide stratigraphic information during excavation.

Table 3. Data on Specified Test Areas Relative to Estimated Maximum Site Areas, Lake Sharpe Testing Project, UND, 1988.

Site Number	Description	Test Area (m ²)	Approximate Site Area (m ²)	Test Area: Site Area Ratio
39LM160	Artifact Scatter, Buried Horizons	10	31,250	0.0003
39LM161	Buried Horizon	5	6,000	0.0008
39LM163	Buried Horizon	5	1,200	0.0042

Test unit excavations were documented using standard excavation unit forms and plan maps. Profiles of at least one wall of each test unit or test unit block (1 X 2 m excavation) were drawn and photographed. Test unit locations were tied into existing site maps using a transit and stadia rod. Existing site datums established by UND were relocated at each site and used to record all map data collected during the course of this project. Without exception, all test unit were oriented on magnetic north.

Field Cataloging and Test Unit and Feature Numbering

A systematic approach to the assignment of catalog numbers to excavation units was adopted in the field. Test units were numbered sequentially from 1 to n, depending on the number of test units excavated at each site. Each level from a test unit (i.e., each excavation unit) was then assigned a number in sequence beginning in the hundreds relative to the test unit number. For example, level 1 of test unit 1 was assigned catalog number 101, level 2 of test unit 1 was assigned catalog number 102, level 8 of test unit 8 was assigned catalog number 808, level 9 of test unit 8 was assigned catalog number 809, and so on.

Features or portions of features within a test unit were also assigned catalog numbers within the test unit numbering sequence, but the need to apply special techniques in feature excavation often necessitated breaking with the logic of the basic catalog numbering system. For example, catalog number 815 could refer to a portion of Feature 1 isolated in test unit 8. In such cases, the catalog number does not necessarily indicate a particular level, but rather, is a unique identification for that portion of a feature removed from a particular test unit. Reference to artifact inventories and excavation unit forms is necessary to sort out these few exceptions to the basic catalog numbering system. The important point to recall is that all excavation units (both general levels and features) have been assigned a catalog number that ties them to a sequence relative to a particular test unit at each site.

Catalog numbers assigned in the field are used to key artifacts recovered from a particular excavation unit to that unit. In other words, field catalog numbers identify a specific provenience unit within a site (i.e., a particular excavation unit), not individual artifacts or classes of related artifacts, as is the case in some other archeological cataloging systems. All artifacts and other materials recovered from an excavation unit are assigned the same catalog number, which, again, identifies their provenience. Field catalog numbers are used in the laboratory to compile artifact inventories, which are also provenience based, as discussed below.

A systematic approach to the numbering of features was also adopted in the field. Feature numbers assigned during previous work at a site (Toom and Picha 1984) are maintained in the present report. Additional feature numbers were assigned in the field according to the established sequence, if any, in the order of their discovery at a particular site. Feature numbers therefore comprise a unique numbering sequence that reflects their order of discovery at a site; they do not link features to test units. The catalog numbers assigned to various features and portions of features are used to key them to particular test units. Assigned field catalog, test unit, and feature numbers for each site are listed in Table 4.

Table 4. Assigned Feature Numbers, Test Unit Numbers, and Field Catalog Numbers, Lake Sharpe Testing Project, UND, 1988.

Site Number	Feature Numbers	Test Unit Number	Field Catalog Numbers		
39LM160	1-3	1	101-108		
		2	201-205		
		3	301-307		
		4	401-416		
		5	501-517		
		6	601-619		
		7	701-719		
		(8-10)*	not used		
		11	1100-1105		
		39LM161	1	1	101-119
				2	201-219
3	301-317				
4	401-417				
5	501-516				
6	601-616				
(none)	1000 (F1)				
39LM163	(none)	1	101-115		
		2	201-215		

*Test units 8-10 at 39LM160 were not excavated.

Provenience Coding

A computerized provenience key was developed to enable better control over the excavation unit data generated for each site. The provenience key is constructed around site and catalog numbers, and includes information on location, recovery, and context for all excavation units. The computer code is presented in Appendix E, along with the provenience data for each excavation unit (catalog number) at each tested site. Provenience data has also been transferred to the artifact inventories produced for each site in order to provide complete information on location, recovery, and context for all collected materials. Components of the provenience code were also used to generate descriptive and analytic artifactual data for the sites under study.

Laboratory and Analysis Procedures

This section outlines the basic laboratory processing and analysis procedures applied to the collections derived from the 1988 Lake Sharpe testing work. For purposes of comparability, the procedures used here are much the same as those used to process and analyze other recently excavated archeological materials from the Lake Sharpe area (i.e., Falk 1984; Toom 1989a), as well as from elsewhere in the study region. The general model for these procedures comes from the Jake White Bull (39C06) site report (Ahler 1977b). In the years since the Jake White Bull report was produced, some modifications have been made to these basic laboratory and analytic schemes. Their most recent, revised, and comprehensive application is described in the Big Hidatsa (32ME12) site report (Ahler and Swenson 1985). This report details laboratory and analysis procedures currently applied by University of North Dakota researchers to all archeological collections from the Knife River Indian Villages National Historic Site (KNRI) and other Plains Village sites in North Dakota. These procedures, which are state-of-the-art for Plains Village collections, were used as models for this study wherever feasible.

Flotation and Light Fraction Separation

The first laboratory processing step was to separate the light and heavy material fractions from all water screened samples by water flotation. Light fraction materials in the dry screen samples were also separated by water flotation or picked from the samples by hand prior to size-grading where necessary. Burned seeds and other identifiable botanical remains were separated from the light fraction aggregate and set aside for species identification. Specially selected samples of wood and wood charcoal (e.g., those with significant feature associations) were submitted for species identification and radiocarbon dating.

Size-Grading

The next step in processing was to separate the heavy fraction debris from each provenience unit (designated by individual field catalog numbers) into size grades. Size-grading segregates materials into samples of uniform size to facilitate subsequent sorting into basic material and artifact classes. It also provides information on the relative degree of fragmentation of the various materials represented, as well as providing consistent, arbitrary cut-off points at which to cease sorting materials too small to be of use in analysis (Ahler and Swenson 1985:69).

Materials recovered from the 1988 Lake Sharpe testing work were passed through U.S. Standard Sieve Cloth screens with the following size designations and openings:

- G1 - Grade 1 = 1.000 inch (25.4 mm)
- G2 - Grade 2 = 0.500 inch (12.7 mm)
- G3 - Grade 3 = 0.223 inch (5.60 mm)
- G4 - Grade 4 = 0.100 inch (2.54 mm)
- G5 - Grade 5 = 0.046 inch (1.18 mm)
- <G5 - Material passing through a 0.046 inch opening.

A commercial mechanical shaker with nested screens was used in size-grading; larger-sized materials were hand manipulated through the G1 and G2 screens; smaller-sized materials were shaken for about 30 seconds through the G3, G4, and G5 screens. Because the G5 screen has approximately the same size mesh as that used for water screening (one-sixteenth inch), <G5 residue represents an unsystematic, fortuitously collected sample of material. Therefore, the <G5 residue is not used as an analytic sample. Only size grades 1-3 are relevant to the processing and analysis of dry screened samples because these materials were passed through one-quarter inch mesh hardware cloth in the field.

Sorting and Quantification

Initial sorting involved the separation of the size-graded, heavy fraction material aggregate from each provenience unit into basic material classes. A second sorting step was used to further divide most material classes into general artifact classes. All excavated dry screen samples were sorted according to the specifications in Table 5; water screen samples were sorted following the specifications in Table 6. The few <G5 fraction samples were searched for glass beads and bead fragments, which can occur in these unsystematic, extremely small-sized samples of debris.

Upon completion of the sorting procedures, basic quantification by count or weight of all material and artifact classes was accomplished. The goal of this process is the production of detailed artifact inventories, as well as the generation of baseline analytic data. The specific quantification procedures and codes used for each artifact class in the inventory process are presented in Appendix F. The resulting artifact inventories with provenience data for each of the three tested sites are presented in Appendices G-I.

Artifact Inventories

Five basic artifact inventories were generated by computer for each of the three tested sites. Data base 1 provides information on native ceramics (pottery), data base 2 contains information on vertebrate faunal remains (bone), data base 3 is concerned with the major classes of lithic artifacts (stone tools, flaking debris, and fire-cracked rock), and data bases 4 and 5, referred to as miscellaneous 1 and 2, provide information on an assortment of other classes of artifacts and materials retained in the collections. The inventory data in each data base is preceded by provenience data concerning the location, recovery, and context of the listed material. All provenience and inventory data are keyed by site and catalog number in the respective files. Artifact inventory codes for data bases 1-5 are listed in Appendix F. Artifact inventories with provenience data for each of the three tested sites can be found in Appendix G (39LM160), Appendix H (39LM161), and Appendix I (39LM163).

Table 5. Sorting Specifications for One-Quarter Inch Dry Screen Samples, Heavy Fraction Materials, Lake Sharpe Testing Project, UND, 1988.

Material Classes in Initial Sort	Material or Artifact Classes in Second Sort	Size Grade Sorted From				
		G1	G2	G3	G4	G5
Modified Stone	Stone Tools	X	X	X	na*	na
	Chipped Stone Flaking Debris	X	X	X	na	na
Native Ceramics	Rim Sherds	X	X	X	na	na
	Body Sherds	X	X	X	na	na
	Other	X	X	X	na	na
Vertebrate Fauna	Modified Bone	X	X	X	na	na
	Unmod. Identifiable Bone	X	X	X	na	na
	Unmod. Unidentifiable Bone	X	X	X	na	na
Shell	Modified Shell	X	X	X	na	na
	Unmod. Identifiable Shell	X	X	X	na	na
	Unmod. Unidentifiable Shell	X	X	X	na	na
Fire-Cracked Rock	Check for Tools	X	X	X	na	na
Natural Clinker	Check for Tools	X	X	X	na	na
Burned Earth/ Fired Clay		X	X	X	na	na
Ash		X	X	X	na	na
Ochre/Pigment		X	X	X	na	na
Miscellaneous Native Material	Glass Trade Beads	X	X	X	na	na
	Other Trade Glass	X	X	X	na	na
	Trade Metal	X	X	X	na	na
	Other	X	X	X	na	na
Miscellaneous Euroamerican (Recent) Material	Glass	X	X	X	na	na
	Ceramics	X	X	X	na	na
	Metal	X	X	X	na	na
	Other	X	X	X	na	na
Natural Rock	Check and Discard	X	X	X	na	na

*Not applicable.

Table 6. Sorting Specifications for One-Sixteenth Inch Water Screen Samples, Heavy Fraction Materials, Lake Sharpe Testing Project, UND, 1988.

Material Classes in Initial Sort	Material or Artifact Classes in Second Sort	Size Grade Sorted From				
		G1	G2	G3	G4	G5
Modified Stone	Stone Tools	X	X	X	X	X
	Chipped Stone Flaking Debris	X	X	X	X	
Native Ceramics	Rim Sherds	X	X	X		
	Body Sherds	X	X	X		
	Other	X	X	X		
Vertebrate Fauna	Modified Bone	X	X	X	X	X
	Unmod. Identifiable Bone	X	X	X	X	X
	Unmod. Unidentifiable Bone	X	X	X		
Shell	Modified Shell	X	X	X	X	X
	Unmod. Identifiable Shell	X	X	X		
	Unmod. Unidentifiable Shell	X	X	X		
Fire-Cracked Rock	Check for Tools	X	X	X		
Natural Clinker	Check for Tools	X	X	X		
Burned Earth/ Fired Clay		X	X	X		
Ash		X	X	X		
Ochre/Pigment		X	X	X		
Miscellaneous Native Material	Glass Trade Beads	X	X	X	X	X
	Other Trade Glass	X	X	X	X	X
	Trade Metal	X	X	X	X	X
	Other	X	X	X	X	X
Miscellaneous Euroamerican (Recent) Material	Glass	X	X	X	X	X
	Ceramics	X	X	X	X	X
	Metal	X	X	X	X	X
	Other	X	X	X	X	X
Natural Rock	Check and Discard	X	X	X		
Unsorted Residue					X	X

Detailed Analyses

Selected artifact classes such as native ceramics, stone tools, flaking debris, modified and identifiable bone, and certain floral remains were subjected to more rigorous, detailed analytic procedures than the simple size-grading and quantification described above. Some of the models for these procedures follow those applied to the Big Hidatsa collection (Ahler and Swenson 1985:73-85), while others do not. Other exceptions include the simplification of certain analytic systems (e.g., stone tools) to better fit the requirements and scope of the 1988 Lake Sharpe testing project. The detailed analytic systems used in the present study are discussed in the following paragraphs.

Native Ceramics

The analysis of native ceramics or pottery began by separating these artifacts into rim sherd and body sherd groups. Body sherds are maintained in their size grade class for further analysis, with the exception of body sherds that can be conjoined with rim sherds. Rim sherds are treated on an individual basis. All individual rim sherds from a component are matched in an attempt to identify rims from the same ceramic vessel. Matches consist of both direct fits between conjoinable rims and unjoined rims that are basically similar in form, decoration, and paste. Matched rims and single rims without a match are then referred to as "ceramic vessels."

Because of small sample sizes, rim sherds representing pottery vessels were not coded for computerized analysis. Rather, rim sherds and vessels are described and classified where possible according to established wares and types. Toward this end, the Middle Missouri ceramic key compiled by Johnson (1980), used in conjunction with relevant site reports, was most useful in the classification of Plains Village period ceramics. Variables used to classify rim sherds and vessels include (1) rim form, (2) area of decoration, (3) decoration technique, (4) decoration motif, (5) exterior rim surface treatment, and (6) lip form. These variables are based on the organization of Johnson's ceramic key. In the descriptive format developed for this report, area of decoration and decoration technique are combined under exterior rim decoration and lip decoration.

Body sherd surface treatments are recorded for size grade 1-3 (G1-3) specimens as part of the inventory process. Grade 3 specimens are often too small for a definite determination of surface treatment, but they are included in the data generated herein in an attempt to increase the generally small sample sizes. Surface treatment data are useful in distinguishing among the various archeological taxa of the ceramic period in the Middle Missouri subarea when viewed in conjunction with vessel ware and type information. Maximum thicknesses of size grade 2 body sherds were recorded so as to arrive at a simple, consistent value (mean maximum thickness) for each ceramic aggregate for purposes of making reliable intercomponent and intersite comparisons. Body sherd thickness has been shown to be a temporally sensitive variable in some cases (e.g., Ahler and Weston 1981:183-185); its systematic measurement here is intended to begin collecting data on the relationship between time and body sherd thickness in the Lake Sharpe area.

Stone Tools

Stone tools were individually computer coded following a simplified version of the coding scheme in Ahler and Swenson (1985:310-313). Along with relevant provenience data, the variables recorded for all stone tools include (1) descriptive category, (2) sequence number (computer number), (3) technological class, (4) morphological class, (5) functional class, (6) use-phase class, (7) raw material type, (8) multipurpose (multifunction), and (9) weight. Detailed information on these variables can be found in Ahler and Swenson (1985:79-84) and appendices and references cited therein. The stone tool code used for this report is presented in Appendix J (Table J1), as is a listing of the data recorded for each specimen in the site collections (Tables J3 and J4). Additional comments on important aspects of the stone tool analysis follow.

The main thrust of the stone tool analysis is the determination and interpretation of tool function(s). Because of this, the number of functional tool occurrences takes precedence over the number of discrete stone tool items. Therefore, the total number of tools stated in this report (i.e., functional tool occurrences) may exceed the actual number of stone tool artifacts. The reader is advised that discrepancies between real numbers of tools recovered and analytically generated tool frequencies are intentional and a by-product of this approach. Multiple edged flake tools, with each edge recorded as a separate functional occurrence, represent the greatest number of multifunctional tools in most typical site samples.

The initial placement of stone tools in various descriptive categories is simply a means of organizing the tools according to general technological and morphological characteristics for purposes of further study (Ahler and Swenson 1985:80). Descriptive categories in and of themselves are not considered to be useful analytic groups. The descriptive categories of relevance to this study are listed in Appendix J (Table J1). A four-digit sequence number is assigned to each tool within the descriptive categories. This number, in combination with the descriptive category code, forms a six-digit number referred to as the "computer number" (Ahler and Swenson 1985:80). Computer numbers are labeled on the surface of each tool to provide a unique identification for individual tools.

Technological classes are a means of describing "a general technological trajectory or suite of technological permutations often applied in a complex fashion to produce a desired end product" (Ahler and Swenson 1985:82). In essence, technological classes provide succinct information on simple as well as complex stone tool manufacture operations and probable manufacture pathways. The ten technological classes used in this report are listed in Appendix J (Table J1). Morphological classes, most of which relate to various projectile point types, are an attempt to succinctly capture the form of various tools and tool fragments (Ahler and Swenson 1985:80). The classes relevant to the present study are also listed in Appendix J (Table J1). Other than projectile point forms, morphological classes receive little attention in this report. Detailed descriptive and classificatory information on the recovered projectile points is provided in text.

The functional classification of stone tools is a complex operation involving macromorphological and micromorphological observations (Ahler and Swenson 1985:83). A total of 65 specific functional classes are currently

recognized for Plains Village period and other collections in the Middle Missouri subarea based on the work of Ahler and colleagues. Specific functional classes provide detailed information on tool use and tool work material. These specific functional classes are collapsed into a number of general functional groups to facilitate summarization and intersite comparisons. Specific functional classes of relevance to this report are listed in Appendix J (Table J1). Relevant general functional groups are identified in tables. Detailed definitive information on the specific functional classes can be found in Ahler and Swenson (1985:329-341); the specific class composition of all general functional groups is listed in Ahler and Swenson (1985:84).

Use-phase classification places each tool in one of four groups which provide information on its probable position in the manufacture-use-discard trajectory. The four use-phase classes, as presented in Ahler and Swenson (1985:81), are:

1. Unbroken, potentially useful; manufacture incomplete.
2. Broken or rejected; manufacture incomplete.
3. Unbroken, potentially useful; manufacture complete.
4. Broken, exhausted, or rejected; manufacture complete.

The number preceding each use-phase class is its code or numerical designation for purposes of tabular presentation of use-phase data.

Several basic lithic raw material types have been defined for the Middle Missouri subarea (e.g., Ahler 1977a). Raw material analyses are primarily concerned with the identification of local and nonlocal (exotic) lithic resources, and the determination of lithic resource utilization patterns for various archeological taxa. It is therefore necessary to approach raw material analyses from a regional or areal perspective in order to distinguish among local and distant resources. The lithic raw material types of relevance to the Lake Sharpe area are listed in Appendix J (Table J2). This listing, grouped according to local and nonlocal lithic resources, is based on the work of Ahler (1989a) and Toom (1984a) in the immediate Lake Sharpe area, supplemented by data from Ahler (1977a) and Ahler and Swenson (1985:343-347). Detailed descriptions of these materials can be found in these sources.

Flaking Debris

Analysis of flaking debris follows procedures referred to as "mass analysis" (Ahler and Swenson 1985:85). Mass analysis emphasizes the generation of data on aggregates of flaking debris by size grade, rather than data on individual flake attributes. It provides information on general stone tool manufacture operations performed at each site, as well as providing data on raw material utilization that compliments that of the stone tool analysis. For purposes of this study, only limited mass analysis data were collected, including flaking debris and raw material type counts by size grade. These data are recorded for size grades 1-3 (G1-3) for dry screen samples (one-quarter inch screens) and for size grades 1-4 (G1-4) for water screen samples (one-sixteenth inch screens).

Other Detailed Analyses

The particulars of the analyses of macrobotanical specimens and vertebrate faunal specimens are discussed in Appendices A, B, and C. Information on selected profile (soil) descriptions and interpretations is presented in Appendix D.

IV. BACKGROUND INFORMATION

Introduction

This section presents background information on the physical (natural) and cultural settings of the Big Bend study unit (region) with particular reference to the Lake Sharpe project area. It includes discussions of physiography, flora and fauna, climate, human geography, culture history, previous archeological research, and National Register sites. Much of this material has been adapted from previous archeological reports (i.e., Steinacher and Toom 1984, 1985; Toom 1989b; Toom and Picha 1984; and Toom and Artz 1985).

Physiography

The physiography of the Middle Missouri subarea is dominated by the valley of the Missouri River. The present-day course of the Missouri represents the integration of three former drainage basins as a result of glacial diversion during the Pleistocene (Thornbury 1965:248-249). In North and South Dakota, the Missouri occupies a deep, narrow, trench-like valley that is cut into the Missouri Plateau, and is often referred to as the "Missouri Trench" (Flint 1955:14-15; Thornbury 1965:290-291).

In the Lake Sharpe project area, the Missouri Trench is approximately 7 km (4.3 mi) wide and ca. 115 m (380 ft) deep. Unquestionably, the most prominent physical feature of the trench in the project area is the "Big Bend" of the upper Missouri, from which the Big Bend region derives its name. In the years following World War II, a series of three dams and reservoirs was constructed by the U.S. Army Corps of Engineers along the Missouri in South Dakota. These are, in ascending order, Fort Randall Dam and Lake Francis Case, Big Bend Dam and Lake Sharpe, and Oahe Dam and Lake Oahe. These dams and their reservoirs have significantly altered the physiography of the Middle Missouri subarea in South Dakota, especially the low-lying features of the Missouri Trench. Lake Francis Case and Lake Sharpe have inundated substantial portions of the Big Bend region, while Lake Oahe covers large areas of the Bad-Cheyenne and Grand-Moreau regions, as they are defined by Lehmer (1971:28-29).

In the Dakotas, the Missouri River has cut its valley into the Missouri Plateau, a major feature of the Great Plains Province (Fenneman 1931; Hunt 1967; Thornbury 1965). The Missouri Plateau is essentially a flat plain into which drainage systems, most notably the Missouri, have carved steep hills, bluffs, and valleys. Relief over the Missouri Plateau is generally greater than in most other sections of the Great Plains.

Throughout much of South Dakota, including the Lake Sharpe area, the Missouri River trench lies at the interface of two distinct divisions of the Missouri Plateau, the Glaciated and Unglaciated Missouri Plateau sections, as was mentioned above. To the east of the trench is the Missouri Hills division of the Glaciated Missouri Plateau, commonly referred to as the "Coteau du Missouri" (Rothrock 1943:8; SDGS 1971a). The gently rolling hills of the

Coteau are mantled with Wisconsinan glacial drift. The numerous streams that dissect the region often cut deeply enough to expose Cretaceous bedrock that underlies the drift. The western margin of the Coteau, overlooking the Missouri River valley, is described as "a tattered fringe of high hills separated by sharp, canyon-like valleys" (Rothrock 1943:36-37).

West of the Missouri River trench lie the Pierre Hills (Rothrock 1943:47-48), a low relief landscape of smooth, rounded hills that is part of the Unglaciated Missouri Plateau. The hills are formed largely on the easily eroded, black shale of the Pierre Formation. Deposited in shallow Cretaceous seas, the shale has a total thickness of over 300 m (1000 ft) (Flint 1955:23). The great thickness and uniformly dark color of the shale impart a distinctive character to the Pierre Hills, which are often described using adjectives such as "somber," "monotonous and rather dismal," and "frowning" (Flint 1955:16; Rothrock 1943:47). The hills were never glaciated, except in a narrow band adjacent the trench, where scattered glacial boulders and isolated pockets of glacial till are found (Crandell 1953; Flint 1955).

At their interface with the Missouri River trench, the Pierre Hills are dissected by a labyrinthine network of steep-sided gullies and knife-edged ridges that descend toward the floor of the valley. The steep, rugged terrains that form the western and eastern margins of the trench are commonly referred to as the "Missouri Breaks" (Rothrock 1943:39).

From a geological perspective, the Missouri Trench is a fairly young feature of the landscape, first formed during the Illinoian stage of the Pleistocene epoch (Crandell 1953; Flint 1955). As the Illinoian ice mass advanced southward and westward across South Dakota, it blocked the predominantly eastward-flowing streams of the region. These streams, along with meltwater from the ice, were diverted southeastward along the ice margin. This event, which Flint (1955) has termed the "great diversion," established the present-day course of the Missouri River.

Following the retreat of the Illinoian glaciers, the Missouri River and its tributaries deepened and enlarged the trench. In the Lake Sharpe area, this process of entrenchment was interrupted at least once by glacial advances. In pre-Wisconsinan (Clayton and Moran 1982:60) or early Wisconsinan (SDGS 1971b) times, glaciers advanced west of the Missouri River throughout the Dakotas. The surviving evidence of this glaciation is largely restricted to a thin scatter of glacial boulders distributed over upland surfaces west of the river (Flint 1955:84-85). In the Lake Sharpe area, this band of scattered boulders extends some 8-32 km (5-20 mi) west of the river (Flint 1955:Plate 1). A later advance, thought to be early Wisconsinan (Clayton and Moran 1982:60; SDGS 1971b), deposited glacial drifts within and along the eastern margins of the trench. Glaciers of this advance failed to cross the trench, but may have entered it in a few places in South Dakota, including the Lake Sharpe area (cf. Crandell 1953:Plate 1).

Wisconsinan glaciers, although largely failing to cross the trench, contributed meltwater and outwash sediment to the Missouri River. Extensive runoff from glacial meltwater and the lower sea levels prevailing at the time resulted in downcutting of the river into underlying strata. This downcutting went through and exposed glacial outwash deposits and underlying bedrock of the Cretaceous period. Glacial outwash deposits can be seen today in the walls of the valley, particularly on the east side of the river. One or more

of these glacially induced episodes of increased fluvial activity are probably responsible for the formation of a high gravel terrace at elevations of about 472 m (1550 ft) above mean sea level (amsl) in the Lake Sharpe area (Crandell 1953; Flint 1955). Deposits of this gravel are often mined commercially. The Cretaceous bedrock exposed in the valley is composed of the Pierre Shale Formation, a highly fossiliferous stratum containing marine fossils. It is visible as black, steeply eroded slopes composed of weathered shale which turns to a slick, sticky clay when wet and a cracked, barren surface essentially devoid of vegetation when dry. No commercial use is presently made of these shale deposits.

In the Lake Sharpe area, the Missouri River trench, as it existed prior to dam construction, can be subdivided into four physiographically distinct zones: (1) tributary streams and valleys; (2) the Missouri Breaks; (3) the Missouri terraces; and (4) the Missouri floodplain and channel. Each of these zones is described in some detail in following paragraphs.

Tributary Streams and Valleys

Because the Missouri River was established against the margin of one of the great Late Pleistocene ice sheets, most of its major tributaries enter from the west. In the Lake Sharpe area, major western tributaries of the Missouri include the Medicine Creek and the Bad River. A number of lesser tributary streams with largely seasonal flows also feed the Missouri River from the west. Tributary streams entering from the east are generally less extensive and primarily intermittent. In addition to streams, numerous springs were once present in the valley, usually at the interface of the underlying shale and overlying glacial gravel deposits. Many of these are no longer flowing or are submerged beneath the reservoir. With the exception of the major tributaries (the Bad River and Medicine Creek), the valleys of the tributary streams in the project area are relatively narrow and short and flanked by steep slopes. The exceptions noted are the only tributaries with relatively wide, extensive valleys of their own that provide a more dependable and continuous flow of water.

The Missouri Breaks

Surface erosion and the downcutting of the Missouri and its tributary streams have created steep and heavily dissected slopes rising some 180 m (600 ft) in elevation above the river, a physiographic feature often referred to as the "Missouri Breaks" (Rothrock 1943:34-41). The Breaks are most evident on the western side of the trench in the Lake Sharpe area, although they are also present on the eastern side, particularly in the vicinity of the Big Bend. The northern side of the Big Bend proper is an area of this heavily dissected and rugged terrain. Hills and ridges in the Missouri Breaks are carved out of the Pierre Shale and often have thin caps of glacial till and/or loess. In some places, the river has cut its channel up against these hills and formed high, steep bluffs of shale. In most areas, the slopes and hills are abutted by a series of low-lying, gently sloping to flat terraces.

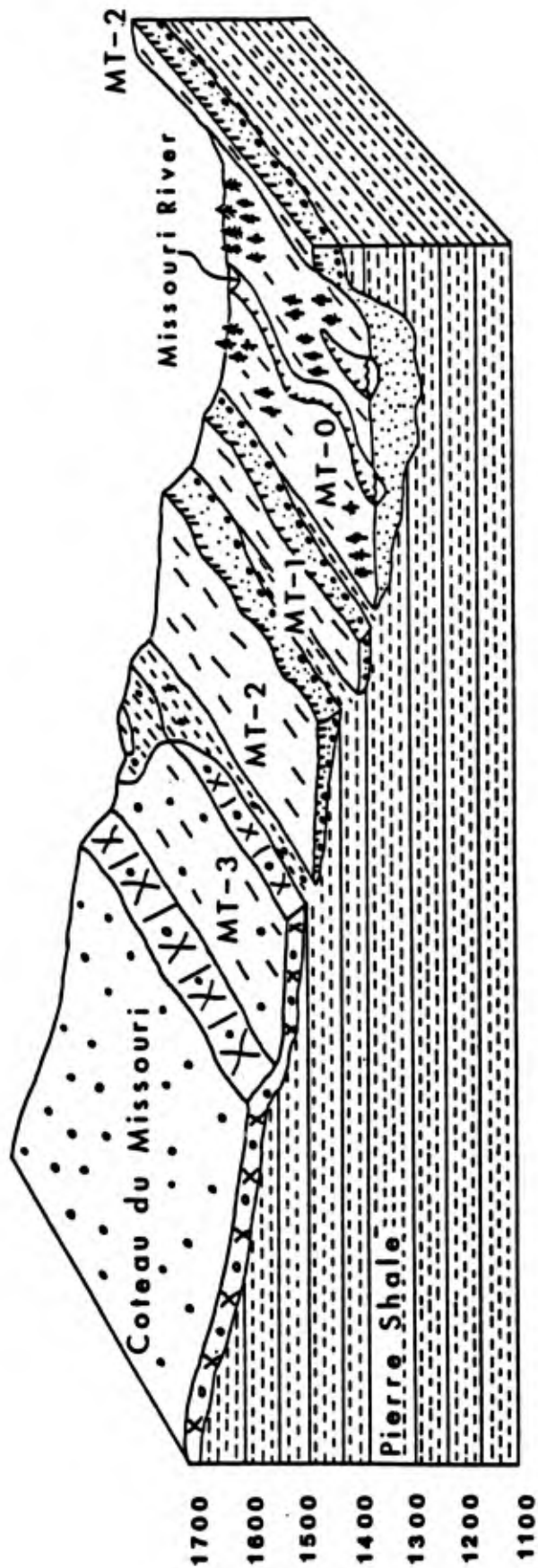
Missouri River Terraces

Terraces of the Missouri River dominated the terrain of the lower portions of the trench prior to dam construction. They comprise a complex series of Late Pleistocene and Holocene-age erosional (strath or rock-cut) and depositional (cut-and-fill) terraces (Coogan 1987). Virtually all of the archeological sites in the Lake Sharpe area are found in or on top of the river terraces. Extensive areas of river terrace are still a common feature along Lake Sharpe, which is a relatively small reservoir. This is generally not the case for the larger reservoirs such as Lake Oahe to the north and Lake Francis Case to the south, where the low-lying terraces have been more or less completely inundated.

Four terraces of the Missouri River have been identified and described in the Lake Sharpe area and beyond (Coogan 1987:53-62). They are labeled on the basis of elevation from the youngest, Missouri Terrace-1 (MT-1), the first terrace above the floodplain; to the oldest, Missouri Terrace-4 (MT-4), the highest upland terrace (Figure 5). The floodplain of the Missouri is designated the MT-0 in this system of nomenclature. The MT-4 is actually the western edge of the Coteau du Missouri, a high bench that flanks the east side of the Missouri River valley. The MT-4 and MT-3 are high-elevation terraces of erosional (strath or rock-cut) origin formed by the downcutting of the river during the Late Pleistocene. Both the MT-4 and the MT-3 are typically covered with glacial erratics; the lower elevation MT-3 is also mantled by loess. The MT-2 and MT-1 are low-elevation terraces thought to be principally of depositional (cut-and-fill) origin. The MT-2 and the MT-1 directly flank the former Missouri River floodplain and both are covered by an eolian silt cap (loess). The MT-2 loess cap can be quite thick, measuring well in excess of 2 m in some places.

Certain discrepancies are apparent in the strict interpretation of the MT-2 and the MT-1 as depositional terraces, and it may be best to view the processes of their formation as uncertain at this time. For example, there are indications in an earlier study that the MT-2 and the MT-1 may be, at least in part, strath terraces cut directly into Pierre Shale bedrock by lateral planation (cf. Coogan and Irving 1959:319-321). This alternative interpretation seems to be most applicable to those portions of the MT-2 and the MT-1 that are mapped downstream from the Big Bend proper. At Medicine Crow, which is just below the Big Bend, the presence of bedrock beneath the MT-2 fill and above the former baselevel of Missouri River channel clearly suggests a strath origin for the MT-2 at this location (Ahler 1989b).

In any event, the terrace in which most of the archeological sites are found, particularly Plains Village period sites, is the Late Pleistocene/Holocene-age MT-2. Coogan (1987:54-58) describes the MT-2 as an alluvial cut-and-fill terrace that is capped by loess. Under the depositional terrace model, the MT-2 was formed by an episode or episodes of backfilling in the Missouri Valley and subsequent downcutting or reentrenchment of the channel. It may, in part, owe its formation to the filling of a lake created by a temporary blockage of the river farther downstream during the Late Pleistocene (Coogan 1987:54-57). The MT-2 is composed of alluvium (gravels, sands, and clays) capped by loess (silt loam). The age of the alluvium is open to some question (Late Pleistocene/Early Holocene), but the loess cap is clearly Holocene in age. The thickness of the loess cap varies considerably from one locale to another; its thickness appears to relate primarily to specific



Terraces of the Missouri River Trench mapped between Fort Thompson and Pierre, South Dakota. Approximate elevations of the terraces are shown from the scale on the left. The Coteau du Missouri and MT-4 (not labelled) grade one into another. The terrace fills are generalized as sand and gravel (dots and circles) and silt cap (short vertical lines). The bedrock Cretaceous Pierre Shale underlies the terrace fills everywhere and may crop out at any level.

Figure 5. Terraces of the Missouri River Trench (from Coogan 1987:5).

physiographic features of the river channel and prevailing local wind patterns. The loess is thought to originate from channel deposits in the river (sandbars and islands). Under this scenario, the finer sediments in exposed channel deposits are entrained by strong winds, creating dust storms (cf. Clayton et al. 1976). This eolian material is then deposited on adjacent terrace surfaces which act as loess traps by reducing wind velocity as the dust clouds pass over these somewhat higher physiographic features.

Where erosion has truncated the MT-2 and exposed it in cross section, a number of dark, humic soil horizons (buried A horizons) marking ancient soils (paleosols) are typically seen in the loess cap. Archeological sites are most often found associated with these buried A horizons as well as with the surface A. Their eventual dating and correlation should provide a valuable aid for chronological assessments of cultural materials found in association with the A horizons (cf. Ahler et al. 1974; Clayton et al. 1976; Coogan 1984, 1987; Coogan and Irving 1959).

The Holocene-age MT-1 is also described by Coogan (1987:58-61) as a loess-capped alluvial cut-and-fill terrace. Like the MT-2, the MT-1 was formed by episodes of backfilling in the Missouri Valley followed by downcutting or reentrenchment of the channel under the depositional terrace model. Generally speaking, it is only visible today along the upper portion of Lake Sharpe, extending from Oahe Dam downstream to the mouth of Medicine Knoll Creek (Rousseau area).

Most of the terrace surfaces are presently dominated by soils of the Pierre-Promise-Lismas associations (Westin et al. 1959). The U.S. Soil Conservation Service (SCS) has assigned soils of the key MT-2 terrace to the Lowry-Sully (Buffalo County), Lowry-Agar (Hughes County), and Lowry (Lyman and Stanley counties) associations (Borchers 1980; Schumacher 1987; Smalley 1975; Vialle 1985). These associations include deep, well-drained, silty soils (silt loams) formed in loess on nearly level to strongly sloping terrace and upland surfaces. Lowry series soils are classified as coarse-silty, mixed, mesic Typic Haplustolls (Schumacher 1987:159).

Missouri River Floodplain and Channel

Inundation of the former floodplain of the Missouri (MT-0) is essentially complete in the Lake Sharpe area. Except in periods of high water, the floodplain stood about 3-4.5 m (10-15 ft) above the former baselevel of the river channel. Today, only small portions of the floodplain are visible from Oahe Dam downstream to just beyond Pierre and immediately below Big Bend Dam at Ft. Thompson. The existing floodplain, as observed just below Oahe Dam, exhibits a hummocky surface topography due to the development of such features as sand dunes and floodplain scrolls. As defined here, the floodplain includes the surfaces of larger islands and sand bars that were once present in the river. Flint (1955:147) states that the Missouri flowed on a floodplain of silt and sand fill throughout South Dakota, and at no point was it flowing on bedrock. Depth to bedrock beneath the floodplain alluvium is variable, but only limited data of this sort are available and the depth of the deepest scour is unknown.

The floodplain was densely vegetated by trees and brush. This stands in marked contrast to the terrace surfaces which are predominantly covered by mixed grassland vegetation in the absence of cultivation. The tributary stream valleys are also wooded to some extent, and wooded draws are present along the terraces and in the more rugged terrain bordering the river.

The final major feature of the Missouri Trench in the Lake Sharpe area was the Missouri River channel itself. Before it was dammed, the Missouri was a fast flowing, turbid stream with an average width of 460 m (1500 ft). The channel contained numerous sandbars and large islands that were comprised of sand with loose silt caps. The flow of the river fluctuated considerably both seasonally and from year-to-year; annual flows varied between 10-37 million acre-feet (USACE 1977:II-2).

In South Dakota, prior to dam construction, the channel form was characterized as variable, with both meandering and straight reaches. Numerous subsidiary channels separated by bars were present, but these were not so common as to yield a braided pattern. The river carried a large suspended load consisting of sands, silts, and clays. The gradient through South Dakota was about one foot/mile. Erosion and deposition were thought to be in equilibrium before the river was dammed (Flint 1955:14-15). Erosion is clearly the dominant process today, as witnessed by the extensive shoreline erosion that is rapidly filling the reservoirs.

Flora and Fauna

The Missouri Valley of the Dakotas has been described as an extension or finger of the Eastern Woodlands (Shelford 1963), providing habitat for woodland communities in the midst of a great expanse of mixed grass prairie (Johnson and Nichols 1970; Kuchler 1964). The valley floor and sheltered slopes provide favorable locations for stands of timber, including eastern red cedar (juniper), cottonwood, willow, American elm, and box elder. Other woody plants found in the valley include common rose, fringed sage, silver sage, buffaloberry, American plum, chokecherry, and yucca. Even though woody species are present in considerable numbers, various grasses are the dominant native plant community covering most of the upland and terrace surfaces in the absence of cultivation. These include species of mixed grass prairie association such as western wheatgrass, blue grama, needleandthread, green needlegrass, sand dropseed, side-oats grama, and buffalograss (Johnson and Nichols 1970; Kuchler 1964; Over 1932).

Changes in the composition, abundance, and distribution of native flora in the Middle Missouri subarea during the past 10,000 years are poorly understood. Paleobiotic studies from nearby areas, including northeastern South Dakota (Watts and Bright 1968) and southeastern North Dakota (Cvancara et al. 1971), indicate that grassland was established as the dominant floral community by 8000 B.C., replacing spruce and hardwood forests (cf. Bernabo and Webb 1977; Wendland 1978; Wright 1970). Since that time, there have undoubtedly been fluctuations in the composition and relative abundance of species, largely in response to climatic change. However, these fluctuations may have been less pronounced in the Missouri River trench because of the more dependable water supply provided by the river. For this reason, the valley

may have served as a refuge for human groups during periods of climatic stress in the Plains (cf. Frison 1975).

Prehistoric people undoubtedly exerted some influence on the natural flora. By at least A.D. 1000, Plains Village groups had introduced cultigens such as corn, beans, squash, sunflower, and tobacco to the trench (Benn 1974; Haberman 1984; Nickel 1974, 1977). Timber stands along the Missouri River were of primary importance to the villagers, not only as construction materials for the building of earthlodge villages, but also as fuel and raw materials for tools (Griffin 1977; Zalucha 1982, 1983). As a consequence of the demand for timber, Plains Village populations may have put considerable pressure on woodlands, perhaps affecting the density and distribution of certain trees in the valley (Weakly 1971). Fawcett (1988) presents a contrary view on potential bottomland timber depletion by Plains Villagers.

The native fauna of the Lake Sharpe area presently includes large mammals such as mule deer, white-tail deer, and pronghorn. In the past, other large mammal species included bison, elk, grizzly bear, and wolves; these species are no longer found in the region. Small mammal species include badger, red fox, mink, weasel, tree squirrel, ground squirrel, rabbit, coyote, raccoon, muskrat, skunk, beaver, prairie dogs, and a variety of rodents and insectivores.

A number of waterfowl currently can be found in the Lake Sharpe area. These include permanent and migratory species such as Canada goose, mallards, pintails, teal, canvasbacks, redheads, white pelican, sandhill crane, and great blue heron. Other large birds found in the area are eagles, owls, and hawks. Songbirds are abundant and include warblers, swallows, sparrows, thrushes, and western meadowlarks. Native game birds include grouse, prairie chicken, and bobwhite quail. Pheasant, now abundant, were introduced in historic times (Whitney 1978).

Reptiles and amphibians are represented by a number of species of lizards and snakes, most notably the bull snake and prairie rattlesnake, and by various turtles, frogs, and toads. Fish such as channel catfish, white bass, suckers, and paddlefish are native to the Missouri River. In historic times, carp, walleye, and northern pike have been introduced. Mussels are also present in the Missouri and its tributary streams (Over and Churchill 1941; USACE 1976, 1977). As with the flora, little has been accomplished in the reconstruction of the past faunal ecology of the area other than the compilation of general lists of species taken by its prehistoric occupants (Falk 1977; Parmalee 1977; Semken and Falk 1987). One can expect that the composition, abundance, and distribution of faunal communities in area varied in response to changes in climate, much like the variability predicted for the flora. There is no question that human predation has also had a very significant impact on certain species of native fauna, particularly the larger game animals.

Climate

Seasonal patterns in the movements of three continental-scale air masses largely determine the climate of the Middle Missouri subarea. In winter, air masses originating in the northern polar regions bring cold, arctic air into the region. In summer, warm air flows northward from the Gulf of Mexico. At any time of year, dry, westerly air masses can sweep eastward, blocking flows of moisture-laden air from the Gulf and the Arctic. If persistent, the westerly flows can induce drought (Borchert 1950).

The modern climate is characterized by drastic seasonal and year-to-year fluctuations in temperature and precipitation. At Pierre, South Dakota, the mean annual temperature is 46.3° F. The average daily temperature in January, the coldest month, is 15.1° F; in July, the warmest month, the average daily temperature is 75.1° F. The highest temperature recorded at Pierre is 113° F; the lowest recorded is -33° F. As an indication of the marked seasonal fluctuations in climate, both of the above extremes in temperature were recorded in the same year, 1966. In five years out of 10, the first and last frosts occur before May 8 and after October 6, respectively, defining a growing season of at least 151 days. Average annual precipitation at Pierre is 45.5 cm (17.90 in), 80% of which falls between April and September. Much of this total is delivered by thunderstorms. Average annual snowfall is 73.7 cm (29.2 in). Two years in ten receive less than 38.1 cm (15 in) of rain; two years in ten receive more than 50.8 cm (20 in) (Borchers 1980:1, 82-83).

Little is actually known of past climatic fluctuations in the Middle Missouri subarea. A chronology of climatic change proposed by Bryson and colleagues (e.g., Baerreis and Bryson 1965a, 1965b; Bryson 1966; Bryson and Wendland 1967; Bryson et al. 1970; Wendland 1978; Wendland and Bryson 1974) has gained some currency in the archeological literature of the region (e.g., Ehrenhard 1972; Lehmer 1970). This chronology is founded on statistical analyses of a global sample of radiocarbon dates (Bryson et al. 1970; Wendland and Bryson 1974). The analyses identify several relatively brief intervals during which significant changes occurred throughout the northern hemisphere in a number of climatically sensitive indicators, including vegetation, sea levels, glaciers, and archeological cultures. Building largely from a meteorological model proposed by Bryson (1966), Bryson and co-workers suggest that the episodes of climatic change reflect transitions in upper atmospheric circulation patterns, affecting the movement of air masses on a global scale.

This model of climatic change, supplemented by palynological evidence from the upper midwest, provides general insights into Holocene (post-8000 B.C.) paleoenvironments of the Lake Sharpe area and beyond (Table 7). At about 10,000 B.C., during the Late Glacial episode, the spruce forests of the Late Pleistocene extended at least as far west as the Nebraska Sandhills (Watts and Wright 1966) and as far south as northeastern Kansas (Gruger 1973). From ca. 9500-8500 B.C., the Lake Sharpe area is mapped as a conifer-hardwood forest (Wendland 1978:276). However, by about 8000 B.C., during the Pre-Boreal episode, these forests had retreated from all but the extreme eastern portion of South Dakota, and a grassland flora, similar to that of today, was established over the rest of the state (Watts and Bright 1968). Replacement of the conifer-hardwood forests by grassland was complete by the beginning of the Boreal episode at ca. 7300 B.C.

Table 7. Postulated Climatic Episodes and Events in the Lake Sharpe Project Area (abstracted from Wendland 1978).

Dates	Episode	Events
10,000 B.C.	Late Glacial	Cooler, wetter than present, conifer-hardwood forest.
8000 B.C.	Pre-Boreal	Warming trend, replacement of conifer-hardwood forests by grassland.
7300 B.C.	Boreal	Increasingly continental climate, grassland predominates.
6500 B.C.	Atlantic	Much drier and warmer climate, more Pacific and less Arctic airflow, maximum expansion of grassland.
3100 B.C.	Sub-Boreal	Increased precipitation, cooler, more Arctic airflow.
800 B.C.	Sub-Atlantic	Climatic deterioration.
A.D. 300	Scandic	Warming trend, transition period.
A.D. 700	Neo-Atlantic	Increased moisture, warming trend peaks.
A.D. 1100	Pacific	Return to drier conditions.
A.D. 1550	Neo-Boreal	Cooler, wetter climate, Little Ice Age.
A.D. 1850	Recent	Present conditions.

Between ca. 6500-3100 B.C., a period of much warmer and drier conditions prevailed, marking the Atlantic or Altithermal episode. A substantial decrease in human occupation of the plains during this interval has been hypothesized (Frison 1975) and possibly demonstrated (Benedict 1979), although others (Reeves 1973) have disputed the hypothesis. During the Atlantic climatic optimum, the Missouri River trench may have provided a refuge for some floral, faunal, and human populations of the Northern Plains.

Following the Atlantic episode, a climate similar to that of the present was established. Basic weather patterns and vegetation communities probably achieved some measure of stability in their present configurations by about 2000 B.C. (Wendland 1978:281). However, within this late Holocene interval, there have been fluctuations both above and below the present-day "norm." The Sub-Boreal episode (ca. 3100-800 B.C.), which succeeds the Atlantic, was typified by cooler, moister conditions. Climatic deterioration set in once

again during the Sub-Atlantic episode at ca. 800 B.C. and persisted until about A.D. 300. The succeeding Scandic episode (ca. A.D. 300-700), essentially a transition period, is characterized as a warming trend. The Neo-Atlantic episode (ca. A.D. 700-1100) witnessed a peak in the warming trend and the establishment of very favorable conditions that were apparently somewhat moister than later episodes. It was during this episode that Plains Village peoples first appear in the Middle Missouri subarea of South Dakota (Lehmer 1970). A return to drier conditions is proposed for the succeeding Pacific episode (ca. A.D. 1100-1550). The Neo-Boreal (ca. A.D. 1550-1850), also known as the "Little Ice Age," was characterized by a shift to a cooler and wetter climate. The Recent episode (ca. A.D. 1850-present) saw the establishment of present day climatic conditions.

Bartlein and Webb (1982) analyzed modern and fossil palynological data to estimate annual precipitation patterns over the upper midwest at 7050 B.C. (Early Holocene), 4050 B.C. (Middle Holocene), and 1050 B.C. (beginning of the Late Holocene). Their estimates for northeastern South Dakota, based on the pollen record from Pickerel Lake (Watts and Bright 1968), provide an impression of the relative magnitude of Holocene climatic changes in the region and are probably generally relevant to the Lake Sharpe area (Toom and Artz 1985:21-22). At 7050 B.C., annual precipitation at Pickerel Lake was ca. 57.7 cm (22.72 in), quite close to the present day average of 53.9 cm (21.22 in). At 4050 B.C., during the warm, dry Atlantic episode, annual precipitation was 43.7 cm (17.20 in), 19% less than at present. By 1050 B.C., during the cool, moist Sub-boreal episode, annual precipitation had risen to ca. 53.4 cm (21.02 in), near the modern average (Bartlein and Webb 1982).

Human Geography

Little impact upon the natural environment of the project area can be demonstrated for the first several millennia of human occupation. Suggested low population densities and simple technologies seem to have kept the inroads of human utilization of the area to a minimum. It is not until the area was occupied by village-dwelling horticulturalists sometime after ca. A.D. 950 that human impacts are potentially manifest. Increased exploitation of timber resources may have affected the density and distribution of certain species of trees during the Plains Village period (Weakly 1971:42). Increased population pressures and horticultural practices may have also had an impact on other native flora species. The native fauna would almost certainly have been affected by increased hunting pressures.

Euroamerican exploitation of the area began a process of drastic change in the valley and elsewhere on the Plains. The establishment of trading posts, military posts, farms, ranches, and towns resulted in deforestation of the floodplains, drastic reductions in local faunal populations, and the breaking of the natural prairie sod cover for agriculture. All of these factors significantly altered the physical environment. The fur trade, with its satellite stations such as Fort George, steamboat traffic, and military occupation initiated these changes (Smith 1968; Smith 1984; Wood 1984). Permanent Euro-American settlement of the area beginning in the late nineteenth century lead to further and more drastic alterations of the landscape. Today, the area contains four population centers: Pierre, the State Capitol (population 9699); Fort Pierre (population 1448); Lower Brule

(population 300); and Fort Thompson (population 264). The first two communities are predominantly occupied by Euroamericans, while the latter two are Indian reservation towns (Lower Brule Sioux and Crow Creek Sioux Reservations, respectively). Numerous small farms and ranches are located between these larger settlements.

Major transportation routes in the project area include State Highway 34, State Highway 1806, and the Chicago and Northwestern Railroad. Most of the area is crisscrossed with secondary roads typically constructed on section lines. Present land use is principally restricted to farming and ranching. Both dryland and irrigation farming are used to grow corn, milo, wheat, alfalfa, and other crops. The principal livestock are cattle, although some pigs and sheep are also raised. The area has little heavy industry and light industry is also uncommon. Government service, both state and federal, provides most employment opportunities. Other employment opportunities originate from the service and agricultural sectors.

The greatest human impact on the physical environment of the area has certainly been the construction of Big Bend Dam at Fort Thompson and the creation of Lake Sharpe (Big Bend Reservoir) by the U.S. Army Corps of Engineers. The lake extends about 80 river miles upstream from Fort Thompson to the vicinity of Pierre. It contains approximately 1,910,000 acre-feet of water and has a mean pool level of 1420 feet amsl, which fluctuates only a few feet throughout the year (USACE 1976:13). On the positive side, the dam and reservoir provide power generation (468,000 kilowatts), flood control, irrigation, and recreation. However, the acquisition of these benefits resulted in the flooding of thousands of acres of fertile bottomland and the destruction of innumerable archeological sites, including extensive earthlodge villages. The continued operation of the dam and reservoir is causing the rapid erosion of the low-lying terraces that once bordered the Missouri, especially the MT-2, resulting in the further destruction of arable land, native prairie, and many archeological sites located in and on these terraces.

Culture History

The Middle Missouri subarea has been a major focal point of human occupation and exploitation of the Northern Plains for several millennia because of its importance as a primary, diverse resource base and natural transportation route (i.e., the Missouri Valley). Identified archeological sites in the subarea represent six major, often overlapping cultural periods: (1) the Paleoindian period (10,000-6000 B.C.), (2) the Plains Archaic or Foraging period (6000 B.C.-A.D. 1), (3) the Plains Woodland period (A.D. 1-950), (4) the Plains Village period (A.D. 950-1862), (5) the Early Historic Period (A.D. 1700-1860), and (6) the Late Historic period (A.D. 1860-present). Documented archeological sites in the Lake Sharpe project area relate to each of these cultural periods, with the exception of the Paleoindian period. The salient characteristics of the archeological taxonomic system developed for the Lake Sharpe project area are summarized in Figure 6.

The archeological components identified at the sites reported here are all associated with the Plains Woodland and Plains Village periods. These two periods are collectively referred to in a generic sense as the ceramic period, because their most characteristic artifacts are native manufactured pottery.

Cultural Pattern	Taxonomic Subdivisions	Technology	Settlement	Subsistence
Euro-american ca. A.D. 1743-present	French English American	Industrial	Permanent posts, forts, homesteads, towns, cities	Mechanized agriculture
Equestrian ca. A.D. 1720-1876	Sioux Cheyenne Arapaho	Chipped & ground stone, bone, antler, wood, shell tools Basket & skin containers Euroamerican trade goods	Impermanent camps, villages Shelter-skin tipi	Nomadic mounted (horse) Hunting (bison) Gathering (wild plants)
Plains Village ca. A.D. 900-1862	<u>Middle Missouri tradition</u> Initial variant Extended variant Terminal variant (various named phases for each variant) <u>Coalescent tradition</u> Initial variant Extended variant Post-Contact variant Disorganized variant (various named phases for each variant) For Late Period Arikara Mandan Hidatsa	Chipped & ground stone, bone, antler, wood, shell tools Basket, skin & ceramic containers Euroamerican trade goods in Late sites	Permanent villages Shelter-earthlodges Impermanent camps Early period shelter-unknown Late period shelter-skin tipi	Early periods Semi-nomadic pedestrian Hunting (bison, deer, antelope) Gathering (wild plants) and horticulture (maize, beans, squash, sunflowers) Late period addition of mounted (horse) hunting to Early period practices
Plains Woodland ca. A.D. 1-900	Sonota Complex & other un-formalized groupings	Chipped & ground stone, bone, antler, shell tools Ceramic containers	Semi-permanent camps(?) Shelter-circular lodges of brush/skin covering Impermanent camps Shelter-unknown Burial mounds	Nomadic pedestrian Hunting (bison, deer, antelope) Gathering (wild plants) and incipient horticulture(?)
Plains Archaic ca. 6000 B.C.-A.D. 1	Various notched & unnotched projectile point style associated complexes	Chipped & ground stone, bone, antler tools	Impermanent camps Shelter-unknown	Nomadic pedestrian Hunting (bison, deer, antelope) Gathering (wild plants)
Paleo-indian ca. 10,000+ B.C.-6000 B.C.	Various lanceolate projectile point style associated complexes (i.e., Clovis, Folsom, Scottsbluff, Alberta, etc.)	Chipped & ground stone, bone, antler tools	Impermanent camps Shelter-unknown	Nomadic pedestrian hunting (mammoth, bison) Gathering(?)

Figure 6. General Cultural Taxonomic System for the Lake Sharpe Project Area (from Steinacher and Toom 1984:26).

An overview of the Plains Woodland and Plains Village periods is given below from the perspective of the study region and the project area. Some of this material has been adapted from Steinacher and Toom (1984, 1985) and Toom and Picha (1984). The Sonota complex report by R. W. Neuman (1975) was heavily drawn on for information on the Plains Woodland period. The La Roche site report also contains an insightful discussion on Plains Woodland manifestations in the subarea and surrounding regions of the Plains (Hoffman 1968:67-69). Information in the seminal work on Middle Missouri Village archeology by D. J. Lehmer (1971) serves as the basis for the Plains Village period discussion. The interested reader is referred to Smith (1984), Steinacher and Toom (1984, 1985), Toom 1989b, and Toom and Picha (1984) for general discussions on those cultural periods not considered in any detail in the present report.

Plains Woodland Period (A.D. 1-950)

Sites assignable to the Plains Woodland period are rather common in the Middle Missouri subarea (e.g., Ahler et al. 1981; Ahler et al. 1982; Gant 1967; Hoffman 1968; Hurt 1952; Neuman 1960, 1961a, 1961b, 1964, 1975; Smith 1975, 1977; Steinacher and Toom 1984; Toom 1989a; Wood 1960; Wood and Johnson 1973), although they are not nearly as numerous as later Plains Village period sites. Known sites of the period include burial mounds and campsites (Neuman 1975:89). Other site types such as activity areas are also undoubtedly represented, and the house remains recorded at the La Roche site are at least suggestive of semipermanent villages (Hoffman 1968:7-8; Neuman 1975:82-83). Mound sites would appear to be the more numerous of the two primary site types, but this is probably a result of their more conspicuous nature. Campsites are typically rather deeply buried in the MT-2 loess cap (anywhere from 50-200 cm) and are not nearly as evident as mounds or later Plains Village period sites.

In reality, our knowledge of the Plains Woodland period is greatly lacking in detail in a number of respects. This is especially true of the Lake Sharpe area where previous Plains Woodland research has focused on mound sites, and little substantive work has been accomplished at the few recorded habitation sites. The period seems to be divisible into early and late time frames in the Middle Missouri subarea on the basis of associated projectile points. Recognizable ceramic variability is also a likely possibility, but this remains to be demonstrated. Early period assemblages typically contain side-notched dart points (Besant/Sonota Side-Notched type) like those associated with the Sonota complex, an early Plains Woodland manifestation that is best known from sites located well to the north of Lake Sharpe (Neuman 1975). Sonota pottery does not differ from that generally associated with the Plains Woodland period. It typically consists of conoidal-shaped vessels exhibiting cord marked surface treatment and rims decorated with finger or stick punctates (Neuman 1975:93). Dentate stamping is also a recognized but minor decorative technique and some vessel surfaces are smoothed or plain. The age of the Sonota complex is estimated at ca. A.D. 1-600 (Neuman 1975:88).

Late period assemblages exhibit small side-notched (and side-to-corner-notched) arrow points (e.g., Toom 1989a) that are similar to the Avonlea, Prairie Side-Notched, and Samantha Side-Notched types of the Northern Plains (Kehoe 1966, 1973; Kehoe and McCorquodale 1961; Reeves 1970, 1983). Nothing

is known for certain about late Plains Woodland pottery in the Lake Sharpe area, but it is possible that it may be most similar to early Plains Village (Initial Middle Missouri) pottery. A few sherds from what appears to have been a globular-shaped vessel were found in the upper fill of a late Plains Woodland burial mound at the Windy Mounds site (39LM149) (Toom 1989a). The direct association of this pottery with the construction of the mound is open to some question, but it does suggest that late period potters may have adopted the vessel form that is most characteristic of the Plains Village period. A somewhat analogous situation has been recognized at late Plains Woodland sites on the Cross Ranch in the Middle Missouri subarea of North Dakota. At these sites, ceramics exhibiting a relatively unique constellation of attributes have been found in association with early arrow point forms that are most like variations of the Prairie Side-Notched type (Ahler et al. 1982:241-258). However, the late Plains Woodland vessels at Cross Ranch were possibly conoidal or subconoidal, which is most consistent with the typical Woodland vessel form. While the available evidence is slim at best and difficult to interpret with any certainty at the present time, one can begin to see changes in material culture late in the Plains Woodland period that trend toward later developments in the Plains Village period. The age of the late Plains Woodland period is estimated at ca. A.D. 600-1000 in the project area, assuming some overlap with the early Plains Village period.

The Plains Woodland period is generally viewed as a time of innovation during which many new technological, economic, and social elements make their appearance in the subarea. Subsistence is reminiscent of the broad spectrum foraging of the preceding Plains Archaic period, although an emphasis on bison hunting is apparent and suggests a return to a more specialized hunting pattern. Incipient horticulture may also have been a component of Plains Woodland subsistence, although direct evidence is lacking or inconclusive (Hoffman 1968:67; Neuman 1975:89). It is generally believed that by the close of the period, horticulture would have been practiced or at least known (cf. Wedel 1961:284-285). Other innovations of importance include ceramics, semipermanent dwellings (and by inference semipermanent camps or villages), the bow and arrow, and mortuary ceremonialism as evidenced by elaborate mound burials. All of these traits suggest a more complex, stable, and sedentary lifeway than was present during the preceding periods (e.g., Hoffman 1968; Neuman 1975; Syms 1977; Wood and Johnson 1973).

Most Plains Woodland innovations are thought to have diffused in some form into the subarea from the Eastern Woodlands (Caldwell and Henning 1978). Their development is seen as either a local one stimulated by outside influences and contacts, the actual movement of Woodland peoples into the subarea, or some combination of both processes. With the apparent exception of mound burials, all of these innovations become more fully developed during the succeeding Plains Village period, representing integral parts of Plains Village lifeways. The population of the subarea also appears to be on the increase during this period, as the greater number of sites would seem to indicate.

Plains Woodland mound sites were at one time rather common in the project area, especially along the higher terraces and benches overlooking the Missouri in the vicinity of Ft. Thompson. The construction of Big Bend Dam and related archeological activities has left only a remnant of this extensive group of mounds intact. Habitation sites were not frequently identified, and most that were once known have been destroyed by dam and reservoir

construction. The Lost Nation site (39LM161) reported herein is interpreted as a Sonota complex habitation site that minimally functioned as a field camp. As such, it represents a virtually unique archeological resource within the project area and a most significant discovery.

Plains Village Period (A.D. 950-1862)

In terms of sheer numbers of archeological sites, the Plains Village period stands out as the preeminent native cultural phenomenon in the Middle Missouri subarea (cf. Lehmer 1971). The period encompasses the late prehistoric and early historic time frames, and a complex taxonomic system has been developed to account for the considerable archeological variability within the period (Lehmer 1971; Lehmer and Caldwell 1966). The Plains Village period includes the prehistoric Middle Missouri tradition and the prehistoric- protohistoric-historic Coalescent tradition. The two traditions, which are actually minor traditions of the major Plains Village cultural tradition or pattern, are divided into seven variants (Table 8). In addition to these variants, several phases and other taxonomic subdivisions have also been named (e.g., Calabrese 1972; Caldwell and Jensen 1969; Lehmer 1971:201-206; Lovick and Ahler 1982; Smith 1977). However, with the exception of the Post-Contact variant, phase definition has lagged considerably and the variant persists as the primary analytic unit for most Middle Missouri Village research. While the major framework of Lehmer's taxonomic system for the Plains Village period is still a very useful research tool, continuing research in the subarea makes it clear that revisions are needed, particularly in regard to definition of taxonomic units and estimated temporal parameters (e.g., Ahler 1975; Falk and Calabrese 1973; A. Johnson 1977, 1979; Lovick and Ahler 1982; Steinacher 1984a; Thiessen 1977; Toom 1987, 1989a; Zimmerman 1981).

Plains Village tradition sites are best known as extensive earthlodge villages, consisting of both fortified and unfortified sites. Other, less well known site types include winter villages, isolated earthlodges, semipermanent hunting camps, other campsites, burial grounds or cemeteries, and activity areas. Outstanding features of the Plains Village tradition include a semisedentary settlement pattern with seasonally occupied, permanent earthlodge villages, and a mixed subsistence strategy based on horticulture (garden agriculture), hunting (especially bison), and gathering. The garden produce of the villagers included corn, beans, squash, sunflower, and tobacco. The innovations noted above during the Plains Woodland period (e.g., increased sedentism, horticulture, ceramic manufacture, the bow and arrow, and domestic architecture) all manifest themselves in more fully developed and complex forms in Plains Village culture. It is also evident that overall social complexity in traditional Amerindian lifeways reached its height in the subarea during the Plains Village period (cf. Lehmer 1971).

While essentially homogeneous in basic settlement-subsistence patterns and technology (Wood 1974), the Plains Village tradition exhibits a wide variety of formal and stylistic diversity, which forms the basis for the detailed taxonomic system outlined above and discussed in some detail in the following paragraphs. This diversity is the result of both time depth and accelerated cultural dynamics during late prehistoric and early historic times in the Middle Missouri subarea.

Table 8. Chronological Model of Plains Village Culture Traditions and Variants in the Middle Missouri Subarea (adapted from Lehmer 1971:33).

Major Cultural Tradition (Pattern)	Tradition	Variant	Estimated Date Range*
Plains Village	Middle Missouri	Initial	A.D. 950-1350
		Extended	A.D. 1000-1500
		Terminal	A.D. 1500-1675
	Coalescent	Initial	A.D. 1300-1500
		Extended	A.D. 1500-1675
		Post-Contact	A.D. 1675-1780
		Disorganized	A.D. 1780-1862

*Some of the date ranges stated by Lehmer have been modified to reflect new information and interpretations in Thiessen (1977) and Toom (1987, 1989a).

The origins of village life in the Middle Missouri are linked rather tenuously to developments in the Eastern Woodlands and the expansion of sedentism and agriculture to the margins of the Northern Plains at about A.D. 900, ostensibly under the distant impetus of Mississippian culture (cf. Anderson 1987; Lehmer 1971:97-100; Tiffany 1983). Fully developed village culture is first seen in the subarea proper with the emergence of the Initial Middle Missouri variant in the Big Bend region of South Dakota. Lehmer (1971:96) dates the first appearance of the Initial Middle Missouri variant in the Big Bend region at ca. A.D. 900, although more recent studies indicate somewhat later beginning dates of A.D. 950 (Thiessen 1977) or even A.D. 1000 (Toom 1987, 1989a). The Extended Middle Missouri variant was established shortly thereafter in both South Dakota and North Dakota.

Some have speculated that Initial and Extended Middle Missouri peoples migrated to the Missouri Valley in the Dakotas from northwestern Iowa and southwestern Minnesota (A. Johnson 1977:16; Lehmer 1970:118, 1971:97-100). Others have more recently argued for an in situ development from a generalized late Woodland (Great Oasis) base largely through processes of diffusion (Anderson 1987; Tiffany 1983). The Initial Coalescent variant, which is most closely related to the Central Plains tradition, is seen as the next major population movement (or development) into the subarea at ca. A.D. 1300. This apparent migration is linked to a prolonged period of drought (Lehmer 1970, 1971).

The establishment of the Initial Coalescent variant in the Big Bend region of South Dakota more or less coincides with the decline of the Initial Middle Missouri variant and the withdrawal of Extended Middle Missouri groups upriver. The original Initial Middle Missouri population appears to have been absorbed by the more vigorous Extended Middle Missouri groups at this time. The succeeding Extended Coalescent variant is interpreted as a direct outgrowth of the Initial Coalescent variant, just as the Terminal Middle Missouri variant is viewed as the direct successor of the Extended Middle Missouri variant and remnants of the original Initial Middle Missouri population. Extended Coalescent variant groups continued to expand upriver to the present-day North Dakota-South Dakota state line. Terminal Middle Missouri villages are essentially restricted to the Missouri Valley in south-central North Dakota.

In Lehmer's view, these movements of various village peoples within the subarea caused culture contacts and exchanges that resulted in a general leveling of differences in material culture. The end product of this process of "coalescence" is the eventual development of the Post-Contact Coalescent variant (ca. A.D. 1675-1780), which is found throughout the Middle Missouri subarea. These contacts were not always peaceful, however, as indicated by the presence of heavily fortified villages (Caldwell 1964; Lehmer 1971), and the recently discovered massacre of what appears to be an entire village population at the Crow Creek site (39BF11) (Zimmerman 1981). The coalescence process becomes fully manifest in the historically known Arikara, Mandan, and Hidatsa village tribes (Lehmer 1971; Meyer 1977). The Arikaras are widely recognized as the village tribe that occupied the subarea in South Dakota, including the Lake Sharpe area. However, after the widespread and devastating small pox epidemic of A.D. 1780-1781, they effectively abandoned the area and moved farther upriver (Krause 1972:14-15; Lehmer 1971:170ff; Smith 1977:156; Wedel 1961:201-203). Depredations by mounted nomadic tribes, particularly the Sioux, are also believed to be responsible for the abandonment of the Big Bend region by the Arikaras during the latter part of the eighteenth century. No known village sites in the project area are thought to post-date ca. A.D. 1780.

The Post-Contact Coalescent variant in South Dakota has been divided into four phases on the basis of ceramic variability and geographic location: (1) the Felicia phase (ca. A.D. 1675-1700), (2) the Talking Crow phase (ca. A.D. 1700-1750), (3) the Bad River phase (ca. A.D. 1675-1795), and (4) the Le Beau phase (ca. A.D. 1675-1780) (Lehmer 1971:133-135, 201-203). Sites assigned to the Felicia phase, the short-lived antecedent to the Talking Crow phase, are sometimes lumped with those of the succeeding Talking Crow phase (cf. Lehmer 1971:133-135, 201). All four Post-Contact phases are or were represented by village sites in the Lake Sharpe project area (Lehmer 1971:135). The Talking Crow phase was centered in the lower portion of the Big Bend region, and most Post-Contact village sites in the project area are assigned to this phase, especially those in the vicinity of the Big Bend and Ft. Thompson. The Talking Crow phase is characterized by ceramic assemblages with a preponderance of Talking Crow ware types (e.g., Johnson and Toom 1989; Smith 1977). Two Talking Crow phase villages have also been recorded on the east (left) bank of the Bad-Cheyenne region. Smith (1977:154) has estimated the age of the Talking Crow phase in the Big Bend region at ca. A.D. 1725-1780, which differs somewhat from Lehmer's assessment of ca. A.D. 1700-1750.

Bad River phase sites are also common to the project area along upper reaches of Lake Sharpe in the vicinity of Pierre. The Bad River phase, which was centered in the Bad-Cheyenne region, is characterized by ceramic assemblages dominated by Stanley ware pottery types (Hoffman and Brown 1967; Lehmer 1954; Lehmer and Jones 1968). In addition, the Bad River phase has been further divided into two subphases, Bad River 1 (ca. A.D. 1675-1740) and Bad River 2 (ca. A.D. 1740-1795) (Lehmer 1971:202; Lehmer and Jones 1968:95-98). Subphase definition is based on the presence (Bad River 2) or absence (Bad River 1) of village fortifications and estimated chronological position. Bad River 2 sites are thought to be later in time due to the presence of horse bones and a more diverse array of European trade goods, including recognizable European manufactures such as gun parts. Ceramic assemblages of the Le Beau phase, situated primarily in the Grand-Moreau region, contain a "hybrid" of Stanley ware and Talking Crow ware types (Lehmer 1971:203). Le Beau phase sites are also present along the east bank of the Missouri in the Bad-Cheyenne region, and two Le Beau phase sites have been recorded in the project area.

During the protohistoric and early historic time frames (ca. A.D. 1675-1860), the development of the fur trade caused fundamental changes in Plains Village lifeways, as well as the lifeways of all other Amerindian groups on the Plains. The acquisition and trade of European manufactured goods became a major aspect of village economies, to the point where such activities caused significant alterations throughout the entire social fabric, particularly in areas related to settlement, subsistence, technology, and, perhaps, social organization (Berry 1978; Deetz 1965; Ewers 1954, 1968; Goulding 1980; Toom 1979; Wood 1972, 1974, 1980). European epidemic diseases were also introduced into the subarea at this time. These had a particularly disastrous impact on traditional village culture, especially the 1780-1781 "smallpox" epidemic, resulting in severe population loss and extreme cultural disruption, and thereby reducing Plains Village peoples to a mere shadow of what they had once been (Lehmer 1971; Meyer 1977). Village sites occupied after the widespread 1780 epidemic are assigned to the Disorganized Coalescent variant (ca. A.D. 1780-1862) (Lehmer 1971). As a result of these historical processes of change, the Plains Village period is brought to a close at A.D. 1862 with the amalgamation of the surviving Arikaras, Mandans, and Hidatsas into a single village at Like-a-Fishhook in North Dakota, their last traditional earthlodge settlement (Smith 1972).

Plains Village sites were once common along both sides of the Missouri throughout much of the Middle Missouri subarea (cf. Lehmer 1971), particularly on and in low-lying terraces at localities adjacent to extensive bottomlands and near tributary streams. The majority of the sites that were once present along the Missouri in South Dakota, especially the permanent villages, have been inundated or otherwise destroyed by dam and reservoir construction. In addition, many remaining sites are undergoing further destruction as a result of shoreline erosion and continued development in the region. The Lake Sharpe project area contains the largest remaining concentration of intact village sites in South Dakota (Steinacher and Toom 1985). As surviving examples of a greatly depleted archeological resource base, these remaining villages represent sites of major significance to continued research into the Plains Village tradition.

The Rattlesnake Keeper site (39LM160), which is of particular concern to this study, is interpreted as a late Plains Village (Post-Contact Coalescent variant) location where specialized activities were performed. Few such sites have been recorded or investigated in the past because most Plains Village research has focused on the more prominent village sites. Thus, Rattlesnake Keeper represents an example of a little known aspect of Plains Village settlement-subsistence practices. As such, it too is a significant discovery and an important addition to the Lake Sharpe cultural resources inventory.

Previous Investigations

The Lake Sharpe project area has had a long history of archeological research, primarily focused on Plains Village period earthlodge villages. The first systematic investigation conducted in the area was carried out by W. H. Over, director of the University of South Dakota Museum (Sigstad and Sigstad 1973). Over identified the locations of a number of sites and collected samples from some of these. Additional work by Alfred W. Bowers (1948) of the Logan Museum, Beloit College, involved a reconnaissance that identified many more site locations. Extensive excavations were first carried out by Elmer E. Meleen (1949) and Wesley R. Hurt (1951). Additional excavations prior to World War II were conducted by Columbia University at the well known Arzberger site (Spaulding 1956).

The initiation of the Smithsonian Institution, River Basin Surveys (SIRBS) program following World War II rapidly accelerated archeological research in the area, stimulated by plans by the U.S. Army Corps of Engineers to construct a number of mainstem dams and reservoirs along the Missouri. Numerous sites, primarily earthlodge villages and burial mounds, were identified, tested, and/or excavated. Caldwell (1984) summarizes and evaluates SIRBS research in the project area, which focused on salvaging materials and information from a number of Plains Village period sites, especially the large and highly visible earthlodge villages. Several Plains Woodland period burial mounds were also excavated in the project area. Additional information on the SIRBS program and more recent archeological research in the project area can be found in Ahler and Toom (1989), Falk (1984), Lehmer (1971), Steinacher (1981), Steinacher and Toom (1984, 1985), and Toom and Picha (1984).

During the past ten years or so, an extensive resurvey and reevaluation of the archeological resources of the project area has been initiated by the Omaha District of the U.S. Army Corps of Engineers. Full coverage of all federal lands administered by the Corps within the Lake Sharpe (Big Bend) project area has been accomplished by archeological survey teams from the University of Nebraska-Lincoln (UNL) and University of North Dakota, Grand Forks (UND). A complete inventory of all extant archeological sites within the project area now exists, within the limits of surface survey techniques, and is contained within three basic reports and related documentation (Steinacher 1981; Steinacher and Toom 1984; Toom and Picha 1984). Some of this work has also included testing of selected sites (Falk 1984; Steinacher 1981; Toom 1989a; this report) and the preparation of a comprehensive National Register nomination statement (Steinacher and Toom 1985). The USACE has also conducted a few small-scale, in-house investigations in the project area (e.g.,

Nowak 1983, 1986). The archeological testing reported here is part of the ongoing effort by the Omaha District to meet its obligations under federal cultural resources legislation and regulations. The results of previous archeological research specific to the three sites under study are discussed in the individual site sections of this report.

National Register Properties

A large number of historic and prehistoric archeological sites in the Lake Sharpe project area have been placed on the National Register of Historic Places in recent years, either as individual properties or as multiple properties within archeological districts. Separate individual nominations include the Langdeau site (39LM209), an Initial Middle Missouri variant earthlodge village reported in Caldwell and Jensen (1969); and the Lower Antelope Creek site (39ST106), a multicomponent site consisting of Post-Contact Coalescent variant and historic Euroamerican components reported in Nowak (1983). Many other sites in the project area, mostly earthlodge villages, were placed on the National Register in 1986 as part of the Big Bend Multiple Resource Area nomination (Steinacher and Toom 1985). The Big Bend Multiple Resource Area includes a number of individual properties as well as four archeological districts that contain many more sites.

Obviously, none of the sites considered in the present report are currently listed on the National Register since the primary goal of this project is to evaluate their National Register eligibility. Two of the three tested sites are considered to be archeologically significant and eligible for listing on the National Register - Rattlesnake Keeper (39LM160) and Lost Nation (39LM161). These sites will be nominated within the existing framework of the Big Bend Multiple Resource Area nomination statement.

V. RATTLESNAKE KEEPER SITE (39LM160)

Site Description and Background

The Rattlesnake Keeper site (39LM160) is located in extremely rugged Missouri Breaks terrain on the southwest side of the Big Bend (Figures 1, 7a). Coogan (1980) has designated this area as "Pierre Shale terrain" because of its extensive exposures of bedrock. The site occupies the lower portion of a complexly configured intermittent stream channel or drainageway that heads in the Breaks and generally trends from southeast to northwest (Figure 7b). Lake Sharpe forms the northwestern boundary of the site. Surface topography is highly variable. The southwestern part of the site consists of an isolated bench in the center of the drainage way; primary stream channels are located on either side of the bench. The northeastern part of the site is a moderately to strongly sloping colluvial footslope that has formed at the base of a high ridge along the drainageway (Figure 8). The footslope has been truncated in places by the stream and it comprises a narrow stream terrace along the northeastern side of the drainageway.

Archeologically, the site is described as containing two buried prehistoric cultural components (Toom and Picha 1984:144-147). A thin scattering of artifacts, largely bone and some ceramics, was observed eroding at various points from the sides of the central bench and the northeastern terrace. Two deeply buried cultural horizons consisting primarily of animal bone debris were observed in the Lake Sharpe cutbank at the extreme northern part of the site in the northeastern terrace. A Plains Village period, Extended Coalescent variant occupation was tentatively identified at the site on the basis of very limited ceramic data.

Much of the site area is unstable and actively eroding. Slumping along the Lake Sharpe shoreline in the northeastern terrace is particularly severe, and gully cutting is rapidly undermining and eroding what remains of the northeastern terrace along the stream channel, where most artifactual remains were observed during survey. The central bench is relatively stable, however, but comparatively few potential artifacts were observed in this part of the site.

As mapped, the total site area includes approximately 3 ha, but most of this area consists of stream bottoms and steep, eroded slopes (Figures 7, 8). A small cattail marsh has formed in the bottom of the northeastern channel complex just to the southeast of the Lake Sharpe shoreline. Intact cultural deposits are most likely restricted to a much smaller portion of the site that covers no more than about 3500 m². Those parts of the site potentially containing intact cultural deposits include the northeastern stream terrace, particularly that portion adjacent to Lake Sharpe, and, to a lesser extent, the lower portion of the central bench. The elevation of the site ranges from about 1430-1450 ft amsl.



a



b

Figure 7. Overview Photos of the Rattlesnake Keeper Site (39LM160).
a: Aerial photo of the site locality (arrow), north view (photo no. 2642, UND 1983). b: Site area from Lake Sharpe, southeast view (photo no. 2508, UND 1983).

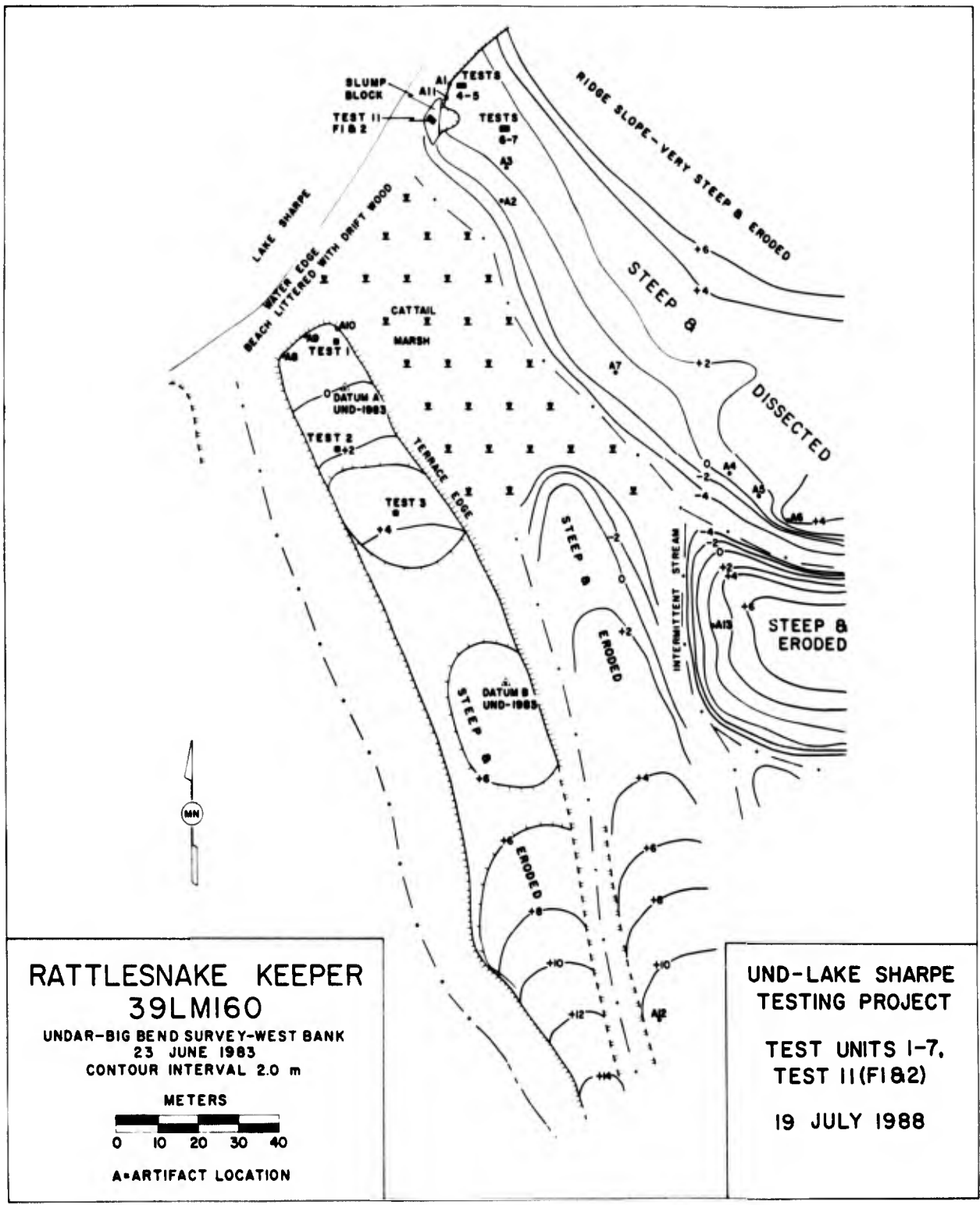


Figure 8. Contour Map of the Rattlesnake Keeper Site (39LM160) (UND 1983 and 1988).

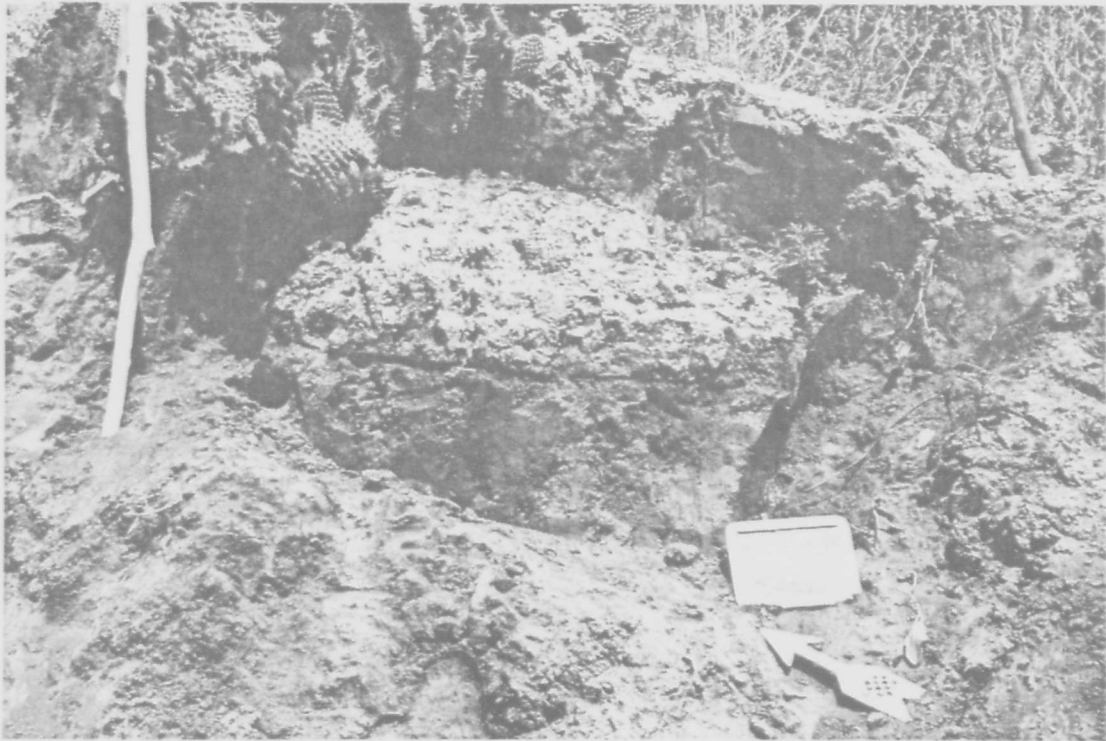
Previous Archeological Research

The Rattlesnake Keeper site was discovered and first recorded in 1983 by an archeological survey team from the University of North Dakota (UND) under the direction of Terry L. Steinacher (Toom and Picha 1984; Picha and Toom 1984). The survey was conducted by UND under a contractual agreement with the Omaha District Corps of Engineers as part of an archeological reconnaissance of selected federal lands along the west (right) bank of the Lake Sharpe project area (Dennis L. Toom, principal investigator; Stanley A. Ahler, co-principal investigator). Work at the site by UND focused on the collection of documentary information, particularly map data and information on exposed artifactual remains. Very few artifacts were actually collected during the survey work. These included a single rim sherd and a charcoal sample from an exposed hearth (Feature 1). Other artifacts were identified in the field and their locations were plotted on the site map but they were not collected.

The only feature recorded at the site by UND consisted of a basin-shaped hearth exposed in profile in a slump block in the extreme northeastern part of the site. This hearth was designated Feature 1 (Figures 8, 9a). Small quantities of bone and a few ceramic sherds were found eroding from the terrace margins at various points throughout the site. Two deeply buried cultural horizons were observed in the Lake Sharpe cutbank at the extreme northeastern part of the site at depths of about 80-130 cm and 100-130 cm sd (Figure 9b). Surface depths for these horizons are variable due to the irregularity of the surface topography. Scattered pieces of bone, charcoal, ash, and burned earth were noted in the buried cultural horizons, but they are best characterized as "bone layers." Feature 1 was not directly correlatable with either of the buried horizons. The few ceramic artifacts were also not directly correlatable with the buried horizons. No lithic artifacts were observed at the site (Toom and Picha 1984:144-147; Picha and Toom 1984).

Unmodified bone was the most common class of remains observed at the site, including elements identified in the field as bison, dog or wolf, and antelope or deer (Toom and Picha 1984:144). Some bird bone and a number of unidentifiable fragments were also noted. Ceramics were sparse and consisted of a few body sherds and one rim sherd that relate to the late Plains Village period. The specimens were tentatively identified as pottery of the Extended Coalescent variant (Toom and Picha 1984:144-147), but the sample was too small for a definite determination. A Post-Contact Coalescent variant interpretation is also possible.

Destruction of the cultural deposits recorded at the site by erosion, particularly those in the northeastern terrace, was active and ongoing at the time of the UND investigations. The site was recommended for immediate testing and evaluation.



a



b

Figure 9. Photos of Exposed Artifactual Materials, Rattlesnake Keeper Site (39LM160). a: Feature 1 (hearth) exposed in slump block, northeast view (photo no. 2505, UND 1983). b: Profile of reverse (east) side of slump block with exposed bone debris, west view (photo no. 2506, UND 1983).

Present Investigations

The purpose of the present investigations is to act on the UND survey recommendations by testing and evaluating the buried cultural deposits at the site with respect to National Register criteria. In keeping with this goal, several test units were excavated at the site in order to generate additional information on the vertical and horizontal extent of the archeological deposits, their cultural affiliation, and their research potential. Additional map data were also collected. The datum established at the site by the UND survey crew in 1983 (Datum A) was relocated and used to record the 1988 map data.

Fieldwork

Seven 1 X 1 m test units were excavated at the site. Tests 1, 2, and 3 were dug as individual 1 X 1 m units to no great depth into the central bench. Tests 4-5 and Tests 6-7 were dug into the northeastern terrace as combined 1 X 2 m excavations because of their much greater depth (Figure 8). For purposes of record keeping, and to maintain horizontal provenience data at a minimum of 1 m², separate 1 X 1 m test unit designations were maintained within the 1 X 2 m excavations. In addition, a nominal 1 X 2 m unit designated Test 11 was excavated over Feature 1, the hearth exposed in the large slump block adjacent to the northeastern terrace (Figure 10a). Most of the Test 11 excavation consisted of the removal of overburden above Feature 1 and slump from the profile face. Once the remainder of Feature 1 was uncovered, it was found that two hearths were actually present, side by side, in the excavation; the second hearth was designated as Feature 2. Test unit specifications are summarized in Table 9.

According to the USACE scope of work (Appendix K), 10 1 X 1 m test units were to be excavated at the site to a maximum depth of 160 cm. It was initially intended to dig three other test units (Tests 8, 9, and 10) along the northeastern terrace. However, it was not possible to excavate these additional units within the available field time for several reasons. First, the cultural deposits in the northeastern terrace proved to be somewhat deeper in certain places than had been originally estimated (e.g., Tests 6-7, 195 cm). The need to dig below the estimated maximum depth of 160 cm in Tests 6-7 used time that had been allotted to other test units. Second, it seemed advisable and potentially productive to dig Test 11, a substantial excavation itself, and salvage the intact portion of Feature 1, a large hearth that was partially exposed in the face of a slump block along the northeastern terrace. This extra excavation, which did prove to be highly informative, also used an appreciable amount of the limited field time that was available. Third, the hard, predominantly clayey soil matrix of the northeastern terrace slowed the pace of excavation considerably; screening was especially slow and took up to one hour or more per test unit level to complete. Fourth, the drought conditions that prevailed during the summer of 1988 (extremely hot and dry weather) made it impossible to maintain a "normal" rate of excavation and further exacerbated the hard soil conditions where clays were present. While this circumstance is unfortunate, it was unavoidable, and every reasonable effort was made to complete as many test units as possible at the site, including a three day extension of field time beyond what was originally planned.



a



b

Figure 10. Excavation Photos at the Rattlesnake Keeper Site (39LM160).
a: Tests 4-5 under excavation (upper center), Test 11 (Feature 1) completed (center, arrow), north-northeast view (photo no. 3246, UND 1988). b: Excavation of Tests 4-5, northwest view (photo no. 3242, UND 1988).

Table 9. Test Unit Specifications and Combined Units, Rattlesnake Keeper Site (39LM160).

Test Unit	Location	Combined Units and Aggregate Size	Excavated Depth (cm)	Excavated Volume (m ³)
1	Central Bench	None, 1 X 1 m	80	0.80
2	Central Bench	None, 1 X 1 m	45	0.45
3	Central Bench	None, 1 X 1 m	70	0.70
Subtotal, Central Bench				1.95
4	NE Terrace	Tests 4-5, 1 X 2 m	160	1.60
5	NE Terrace	Tests 4-5, 1 X 2 m	160	1.60
6	NE Terrace	Tests 6-7, 1 X 2 m	195	1.95
7	NE Terrace	Tests 6-7, 1 X 2 m	195	1.95
11	NE Terrace (slump)	None, 1 X 2 m (nominal)	65*	0.55*
Subtotal, Northeastern Terrace				7.65
Total				9.60

*Includes only controlled, screened excavation into Features 1 and 2; total excavated volume, mostly consisting of slump and overburden removal, was approximately 2 m³.

With some exceptions, all soil matrix removed from the test excavations was dry screened over one-quarter inch mesh hardware cloth (Figure 10b). Exceptions include a few fine recovery water screen and flotation samples that were collected from features as well as water screen samples that were taken from certain relatively productive general levels. Some artifactually sterile general levels in Tests 6-7 were not completely screened: Test 6, levels 8-10 and 13-14; and Test 7, levels 7-10 and 13-14 (see Appendix E, Table E2). A shift to limited screening was made toward the end of fieldwork in order to complete the testing at the site in a timely manner. Incomplete screening was limited exclusively to highly intractable, sterile clay levels in Tests 6-7 which could be screened completely only with great difficulty and at the expense of considerable time (ca. 1 hour/0.10 m³). A substantial sample (ca. 25%) was first taken and screened from all levels that were not completely screened to insure that they did in fact contain no artifacts. Levels in

Tests 6-7 that did contain artifacts were entirely screened, no matter how difficult and time consuming this proved to be.

All materials remaining in the screens were retained for laboratory analysis, with the exception of some sterile levels in Tests 4-5 and Tests 6-7 that were field sorted. Screening with field sorting consisted of the reduction of hard, clayey soils in some levels of Tests 4-5 and Tests 6-7 down to small clay balls which could be passed through the screens only with great difficulty. In artifactually sterile levels these clay balls were discarded in the field. In levels producing artifacts the clay balls were returned to the laboratory where they were reduced completely by water screening.

The measures taken to expedite fieldwork at Rattlesnake Keeper are believed to be fully justified given the adverse working conditions that prevailed at the site. Furthermore, considerable care was taken to ensure that these departures from standard field procedures would have no significant impact on rates of artifact recovery and primary project goals.

Geomorphic Context, Soils, and Stratigraphy

The Breaks terrain surrounding Rattlesnake Keeper is extremely rugged and geomorphologically very active. The surficial deposits at the site are relatively young, geologically speaking, and were apparently laid down within the last 300 years or so. The central bench (southwestern part of the site) is a strath or rock-cut bedrock feature. Where its surface is relatively flat and level, primarily along its lower elevations, the bench is capped by loess (silt loam) to a depth of about 50 cm. At higher elevations, the bench consists principally of weathered exposures of Pierre Shale bedrock. In some places the loess unit was observed directly atop the bedrock. Carbonate-rich clay soils are usually present beneath the loess cap in the bench, overlying consolidated bedrock. These clay soils have formed in colluvial deposits and/or Pierre Shale residuum. The high degree of carbonate accumulation in certain clay horizons (stage II+) indicates that the clays in the central bench are considerably older than the loess, marking a stratigraphic unconformity between the loess and clay units. Intact cultural deposits are expected to be present only in the loess cap of the central bench.

The narrow terrace comprising the northeastern part of the site is a very active and recent feature of the landscape. Its upper deposits to depths of up to at least 150-200 cm are thought to be equivalent in age to the loess cap of the central bench. Archeological evidence and radiocarbon dates indicate that these deposits were undoubtedly laid down within the last 300 years. The bulk of the terrace deposits consist of clayey colluvium that has moved down the high ridge that rises abruptly on the northeast side of the drainageway. As was mentioned above, the northeastern terrace is actually the colluvial footslope of this ridge, which accounts for its primary mode of deposition. Secondary loess (silt loam) deposits, often complexly intermingled with the colluvial clays, are also present in the colluvial footslope/terrace. Very brief episodes of deposition in the northeastern terrace can be clearly seen as a multiplicity of thin bands in the colluvial footslope structure. More or less intact cultural deposits are potentially present in the northeastern terrace throughout its entire depth, but cutbank exposures did not reveal any artifactual remains below a maximum depth of about 200 cm.

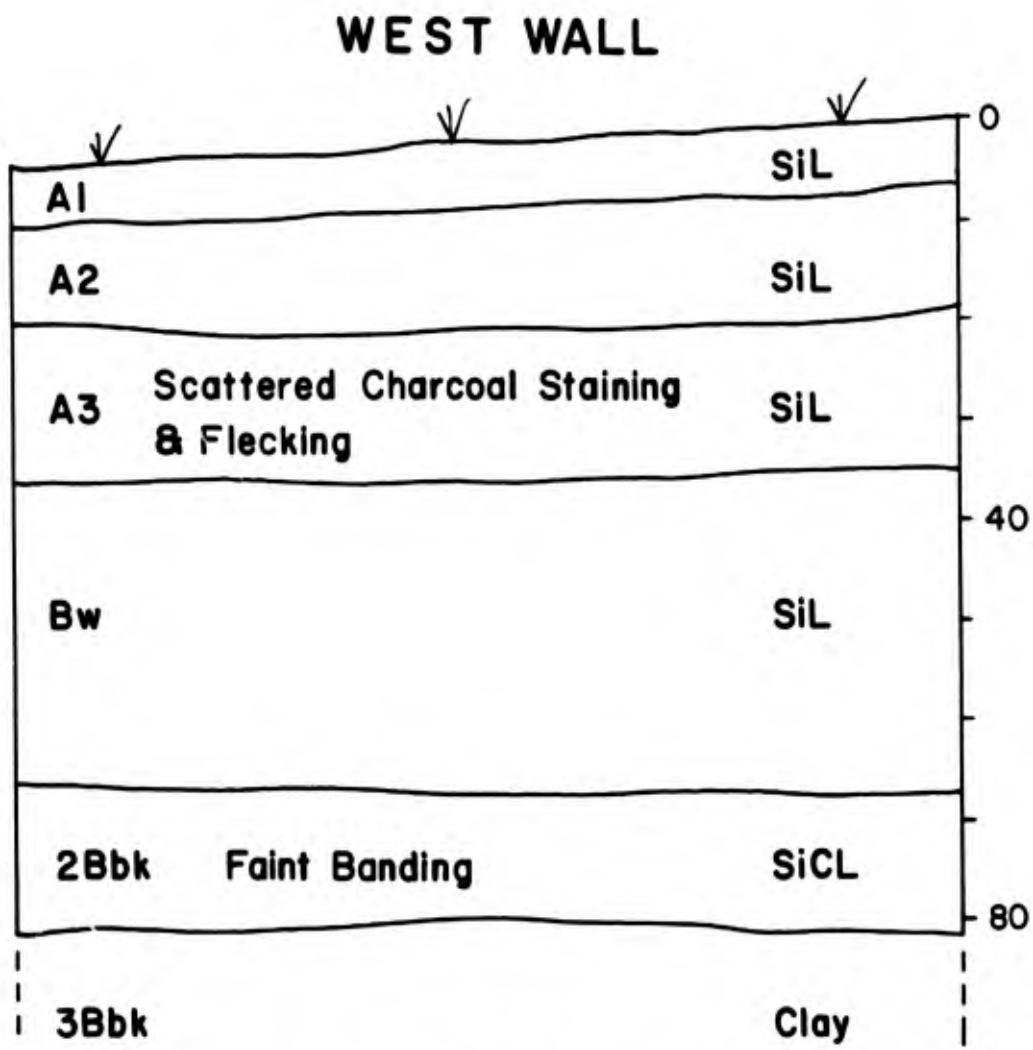
The surface soil at the site is mapped as Rock outcrop-Sansarc complex (RsE) by the U.S. Soil Conservation Service (Schumacher 1987:Sheet 20). In general terms, the complex includes upland areas of Rock outcrop (Pierre Shale bedrock) intermingled with areas of shallow, well drained, strongly sloping to steep Sansarc (clay) soil. Slopes associated with the complex range from 9-40%. The Rock outcrop is generally present on the ridges and the steeper parts of the landscape, while the Sansarc soil occupies the smooth side slopes. Included in the map units of the complex are small areas of Bullcreek (clay) and Chantier (clay) soils. The deeper Bullcreek soils are found on the foot slopes and along narrow drainageways. The shallower Chantier soils occupy the less sloping side slopes, and they exhibit visible salts in the subsoil (Schumacher 1987:39).

The northeastern part of the site may consist principally of a deep Bullcreek clay, however, the slopes in this area are much steeper than those usually associated with this soil (cf. Schumacher 1987:13). The loess cap covering the bench is not identified specifically as part of the Rock outcrop-Sansarc complex; it appears to be a small, isolated area of Lowry-Sully silt loam, which is described in detail below under sites 39LM161 and 39LM163. Bullcreek series soils are classified as very fine, montmorillonitic, mesic Udic Chromusterts (Schumacher 1987:159). This classification does not seem to fit the clayey soils in the northeastern part of the site particularly well, and their designation as Bullcreek clay is also somewhat suspect. However, these are the closest approximations that can be made under the available information.

Profile Descriptions and Soil Horizons

The central bench and the northeastern terrace represent two distinctly different depositional environments, at least superficially, so their profile descriptions and soil horizon sequences are also very different and not directly relatable to one another. However, it is thought that the loess unit in the central bench and the upper deposits of the northeastern terrace do represent equivalent time-stratigraphic units of very recent age. Two profiles, one each in the the different site areas, were described in detail for the Rattlesnake Keeper excavations. Test 1, located in the lower, loess capped portion of the central bench, serves as the stratigraphic control for this part of the site as well as Test 2 and Test 3. Tests 6-7 serve as the stratigraphic control for the surrounding area of the northeastern terrace, including Tests 4-5. The profile of Test 11 is unique unto itself. Detailed soil descriptions for Test 1 and Tests 6-7 are presented in Appendix D. Soil horizon nomenclature generally follows Birkeland (1984).

Test Units 1, 2, and 3. Test 1 exhibits a general A/B sequence in the loess cap (silt loam or SiL) of the central bench. Beneath the silt loam is a 2Bbk horizon consisting of silty clay loam (SiCL) and a 3Bbk horizon of clay (Figures 11, 12a). Tests 2 and 3 contain stratigraphic sequences that are virtually identical to that recorded in Test 1 (Figures 12b, 13, 14). Three A horizons (A1, A2, and A3) were recorded in the upper 35 cm of the loess unit in Test 1. Collectively, these A horizons represent a somewhat overthickened or cumulative A horizon, which are characteristic of a cumulative soil profile (cf. Birkeland 1984:184-185). Cumulative soil profiles are those that receive influxes of parent material while pedogenesis is ongoing; in essence, soil



**TEST UNIT I - PROFILE
39LM160**

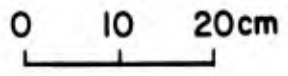
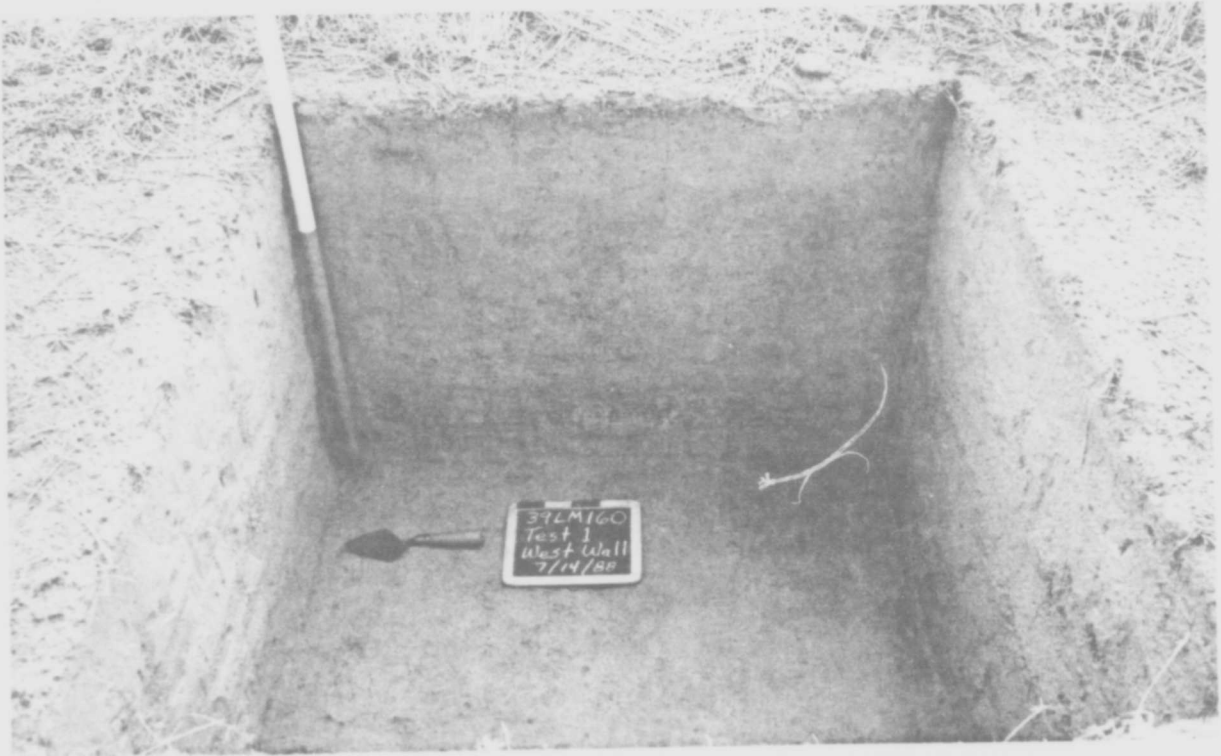
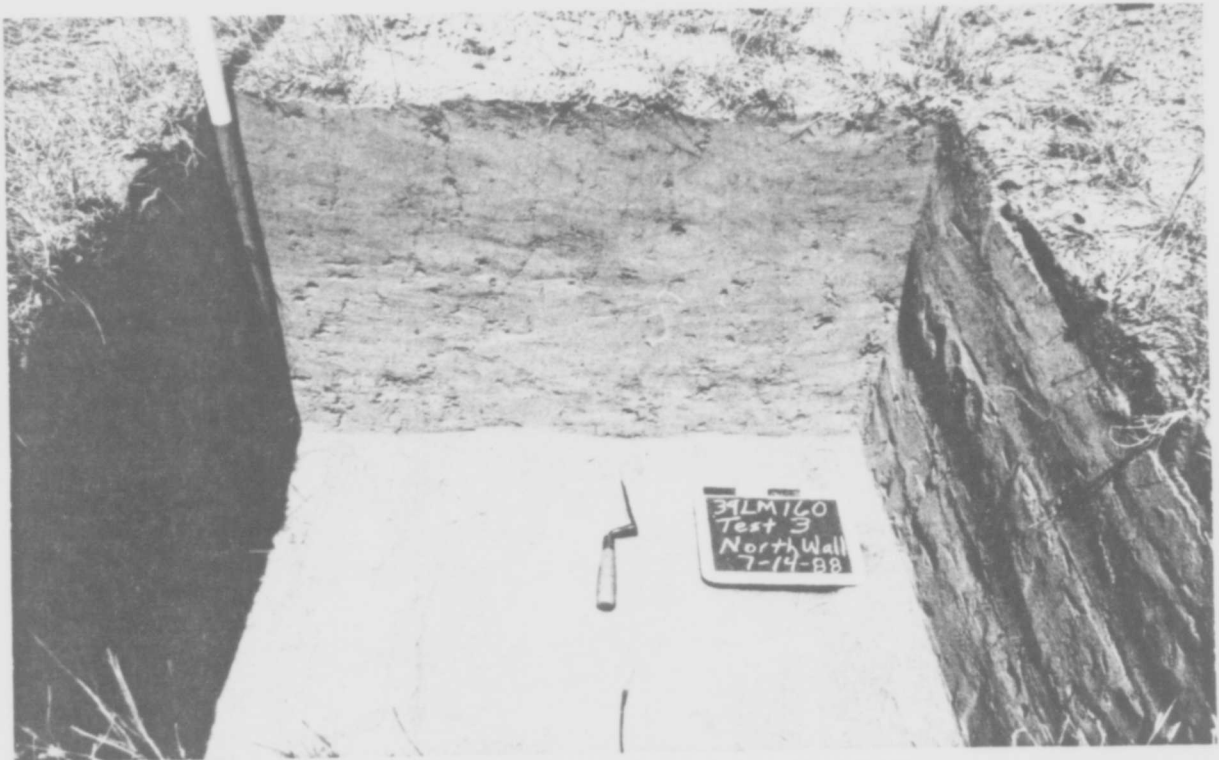


Figure 11. Profile Drawing Test 1, Rattlesnake Keeper Site (39LM160).



a



b

Figure 12. Profile Photos of Test 1 and Test 3, Rattlesnake Keeper Site (39LM160). a: West wall of Test 1 (photo no. 3244, UND 1988). b: North wall of Test 3 (photo no. 3250, UND 1988).

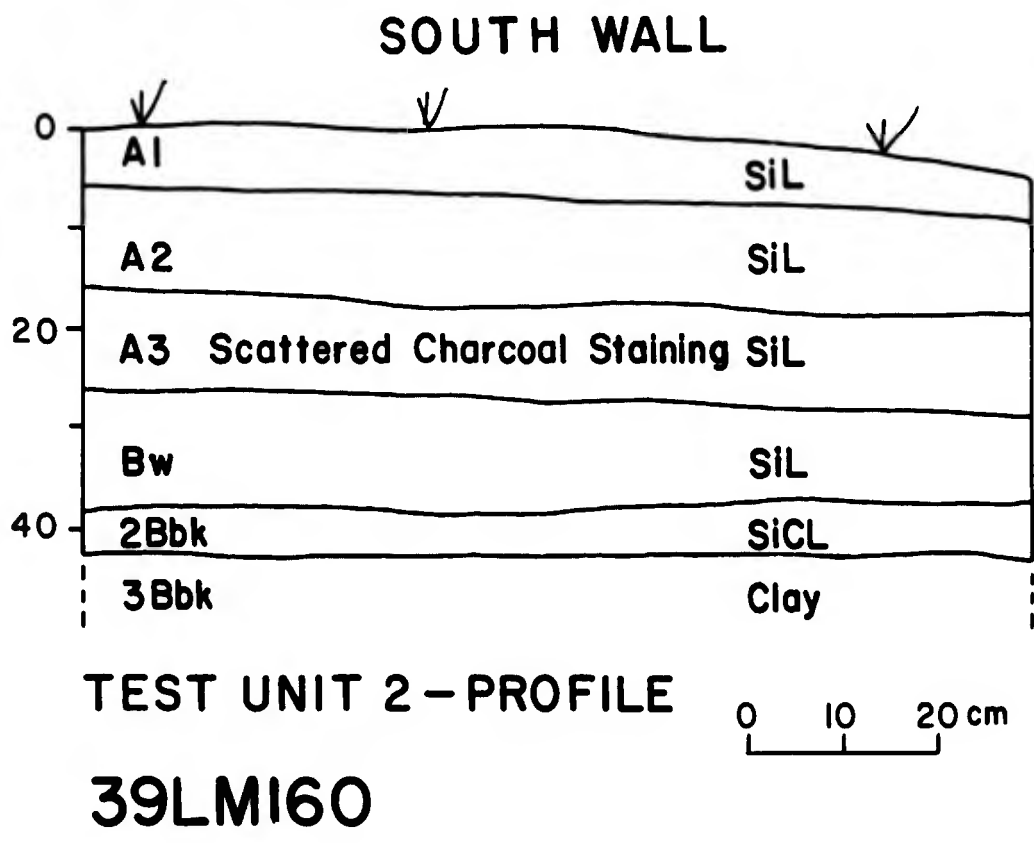
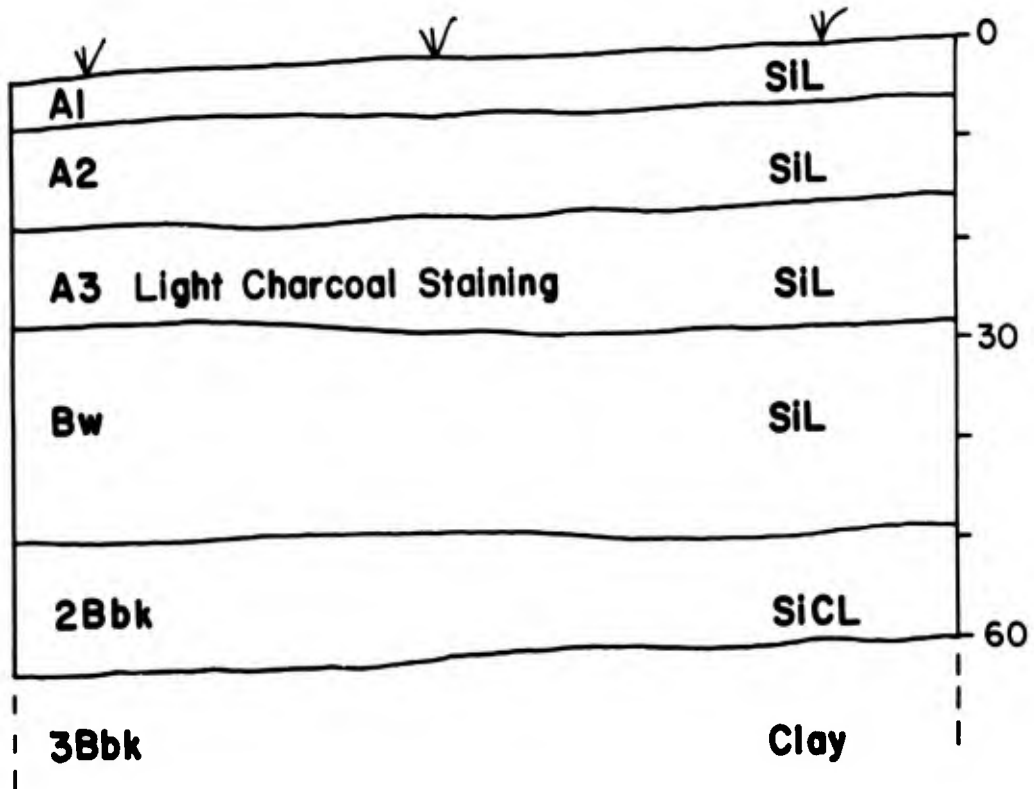


Figure 13. Profile Drawing of Test 2, Rattlesnake Keeper Site (39LM160).

NORTH WALL



TEST UNIT 3—PROFILE 39LM160

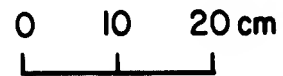


Figure 14. Profile Drawing of Test 3, Rattlesnake Keeper Site (39LM160).

formation and deposition occur simultaneously at the same location. The sequence of three surficial A horizons in the central bench is thought to be the result of a gradual addition of loess parent material over time. The only remarkable characteristic of the A horizons in Test 1 was scattered charcoal staining and flecking that was noted in the A3 (Figure 11). This is thought to be residue from old prairies fires and not necessarily a cultural induced phenomena. A Bw horizon was recorded to a depth of about 65 cm beneath the A3, marking the base of the loess unit. The Bw horizon was only weakly developed and it did not exhibit any visible carbonate accumulations, which are typically seen in soils in similar positions that are older than about 500 years.

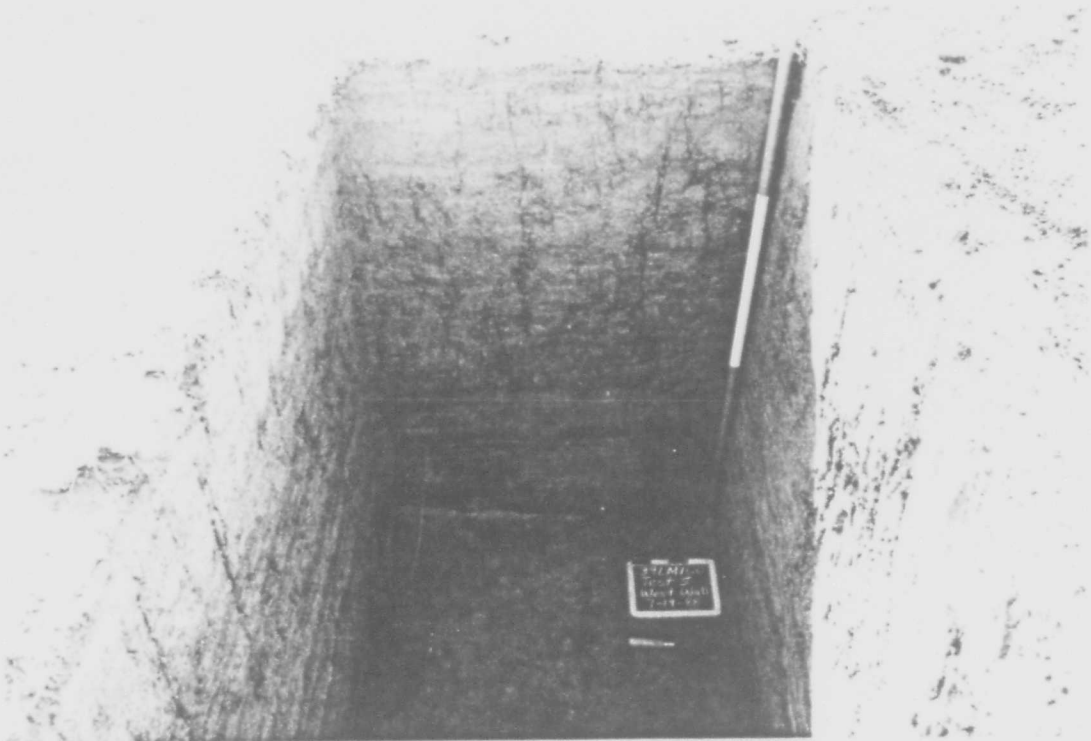
The clayey soils beneath the loess unit consist of a 2Bbk with stage I carbonate accumulation and a 3Bbk with stage II+ carbonate accumulation. The 2Bbk consists of a silty clay loam that has formed at the interface of the silt loam and clay units; it is thought to be the product of parent material mixing between these two different depositional contexts. The 3Bbk horizon exhibits very strong carbonate accumulation near its surface, consisting of a distinctly whitened soil matrix in which carbonate nodules are common and some internodular fillings can be seen. The strong carbonate accumulation in the 3Bbk is thought to be indicative of some antiquity for this horizon (ca. 2000 years plus). Pierre Shale bedrock is likely present at no great depth beneath the 3Bbk.

Test Units 4-5 and 6-7. The profiles exhibited by Tests 4-5 and Tests 6-7 are exceeding complex and difficult to describe succinctly. Parent material deposition is primarily by colluvial action down the ridge slope and secondarily by eolian processes. Thin bands of colluvial clay and/or loess are obvious throughout the entire depth of the profiles, with the exception of the surface A horizon (Figures 15, 16). Clay and loess bands are often complexly interposed and even intermingled, but the clay bands are clearly more numerous in all but one horizon (the 4Bw) which is texturally a silt loam (SiL). These depositional features indicate that the profiles accumulated rapidly with little time for pedogenesis to take place. Clearly, the portion of the northeastern terrace exposed in these test units represents a cumulative soil profile, but one in which parent material was deposited so quickly that overthickened or cumulative A horizons did not have an opportunity to develop.

Except for the surface A, the profiles of Tests 4-5 and Tests 6-7 are described as a series of Bw horizons with varying amounts of parent material admixture (Figures 17, 18). The Bw horizon sequence is tentative and somewhat arbitrary and the actual complexities of the profiles have been simplified considerably for descriptive purposes. The changes in parent material designation largely reflect perceived changes in relative amounts of colluvial clay versus eolian silt loam in the horizons. Soil development throughout the profiles is generally weak and consists almost exclusively of various degrees of structural development in the sediment matrix; if it were not for the presence of soil structure, the majority of these horizons might be best characterized as Cox horizons.



a

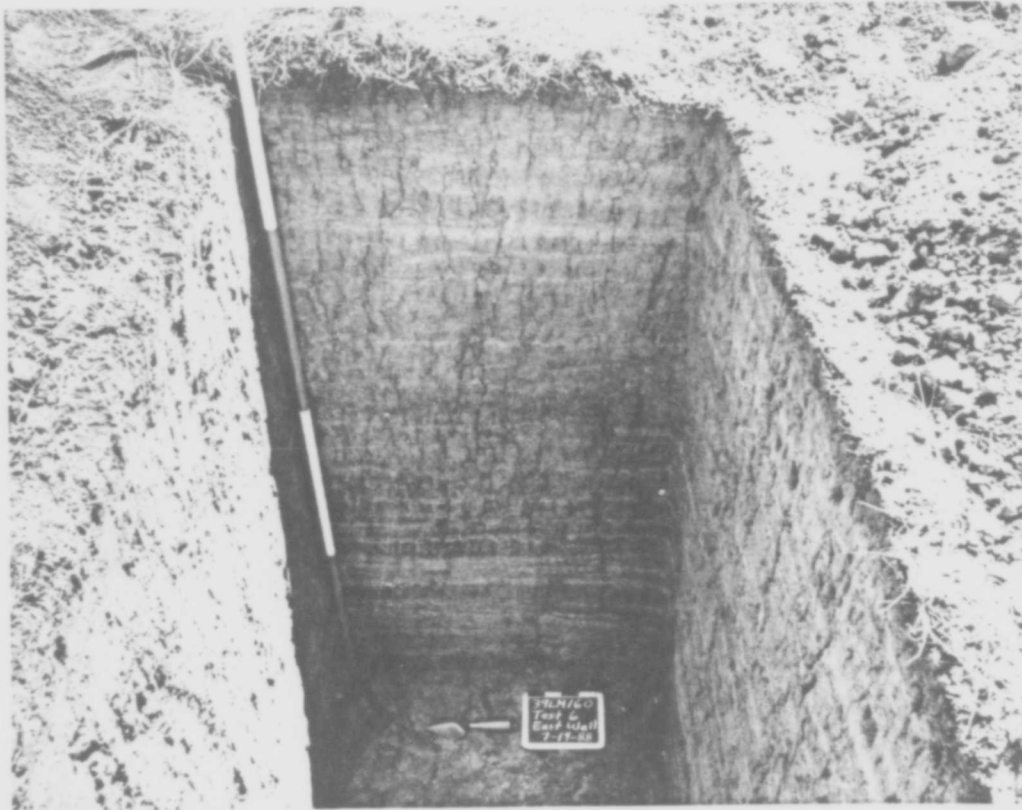


b

Figure 15. Profile Photos of Tests 4-5, Rattlesnake Keeper Site (39LM160). a: North wall of Tests 4-5 (photo no. 3279, UND 1988). b: West wall of Test 5; Feature 3 excavation in the southwest corner of the unit (photo no. 3278, UND 1988).

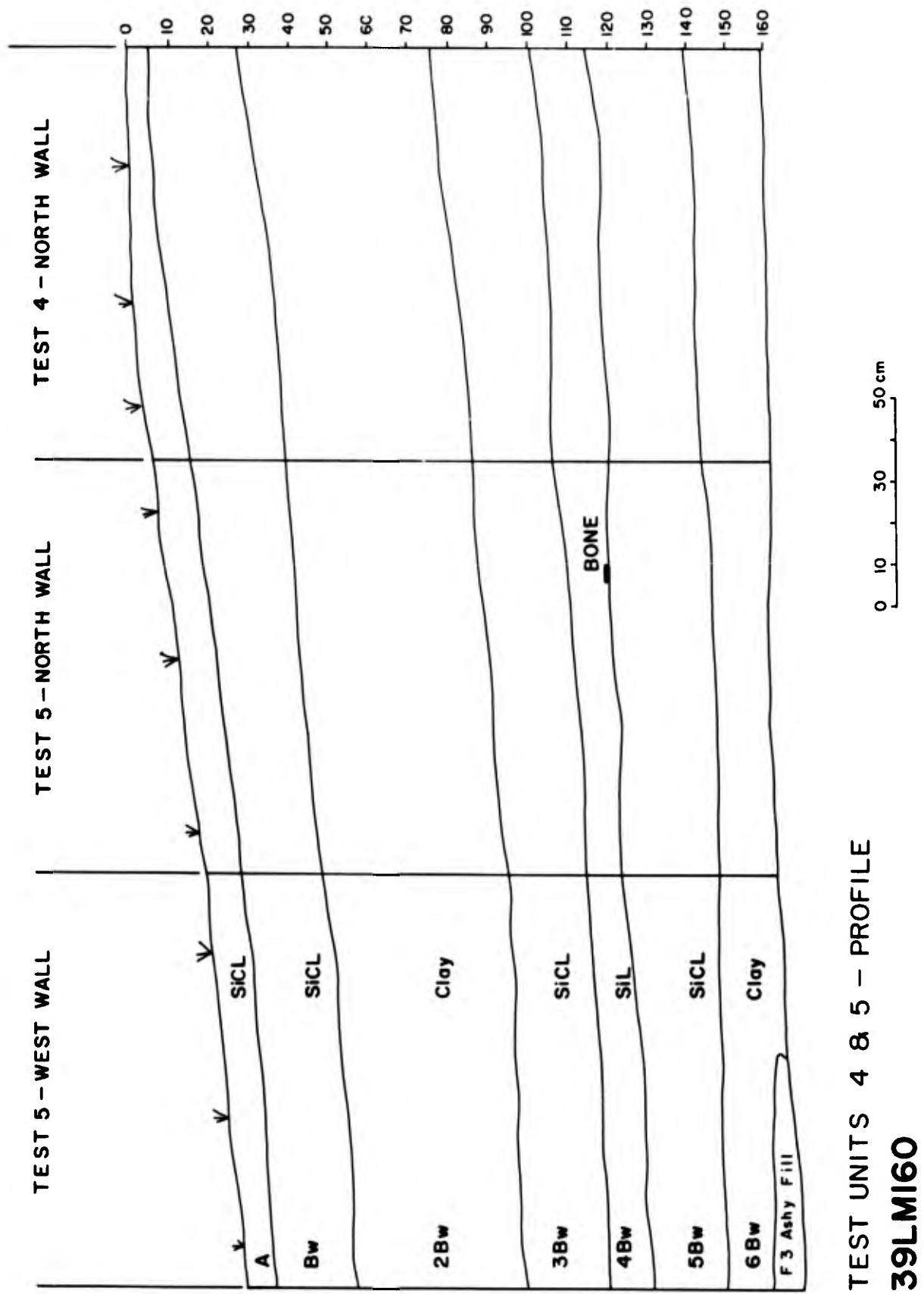


a



b

Figure 16. Profile Photos of Tests 6-7, Rattlesnake Keeper Site (39LM160). a: South wall of Tests 6-7 (photo no. 3271, UND 1988). b: East wall of Test 6 (photo no. 3266, UND 1988).



TEST UNITS 4 & 5 - PROFILE
39LM160

Figure 17. Profile Drawing of Tests 4-5, Rattlesnake Keeper Site (39LM160).

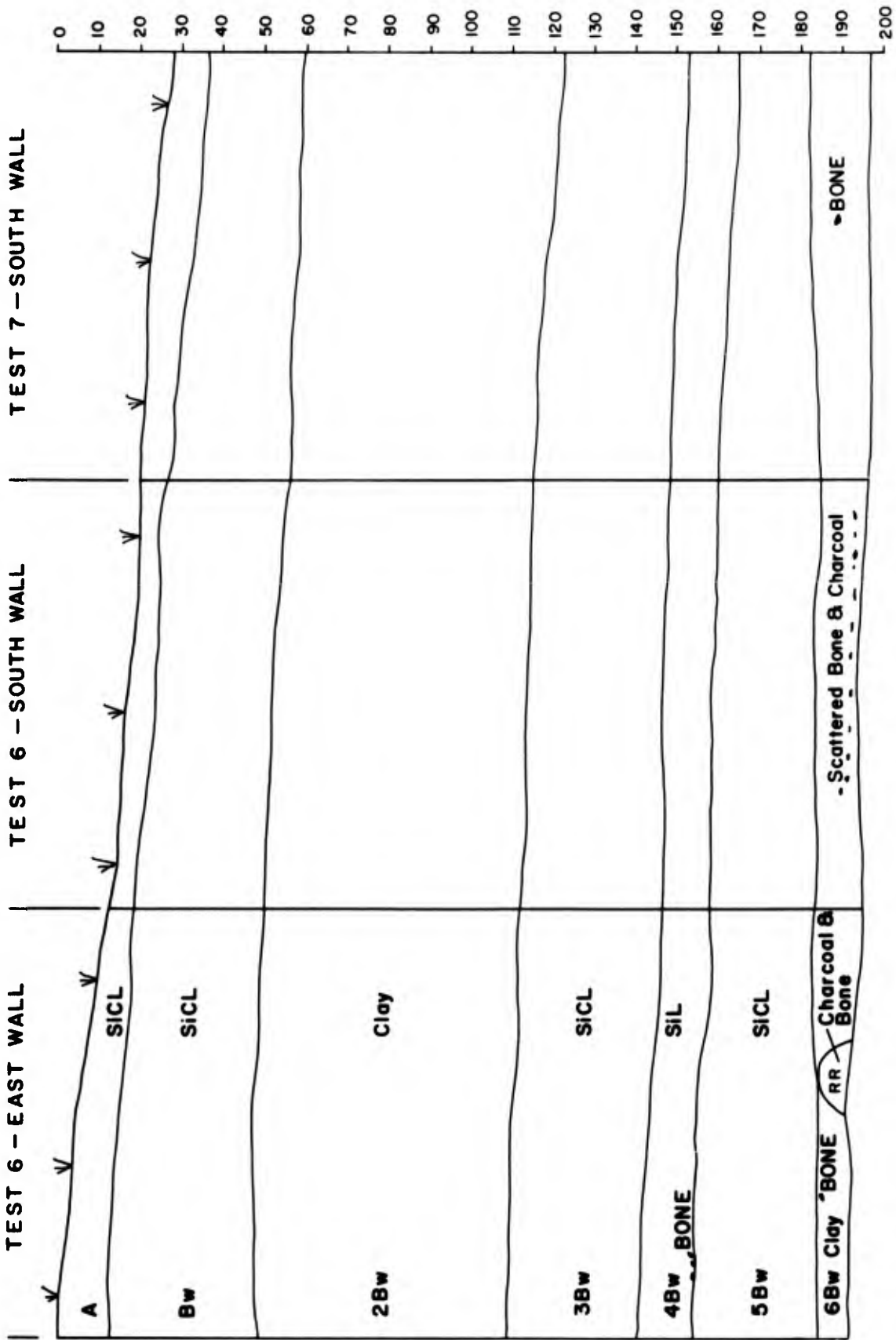


Figure 18. Profile Drawing of Tests 6-7, Rattlesnake Keeper Site (39LM160).

Test 11. Test 11 was situated over Feature 1 in a slump block detached from the northeastern terrace (Figures 8, 10a). The profile of Test 11 prior to the actual excavation of Feature 1 (Figures 19, 20a) cannot be directly related to the stratigraphic sequence recorded in the main body of the northeastern terrace (Tests 4-5 and 6-7). This is because the upper deposits in this portion of the slump block are no longer extant, if any were ever present at this location. The Test 11 profile suggests that Feature 1 was situated in the bottom of an old gully that was cut into the northeastern terrace, therefore, it is possible that the feature was never very deeply buried. The bottom of this apparent gully exhibits a much different stratigraphic sequence than that recorded in Tests 4-5 and 6-7. Of particular note is a carbonate-rich horizon beneath the feature (2Bk), which is indicative of considerably more age than is represented by the relatively young deposits documented in Tests 4-5 and Tests 6-7.

Cultural Associations

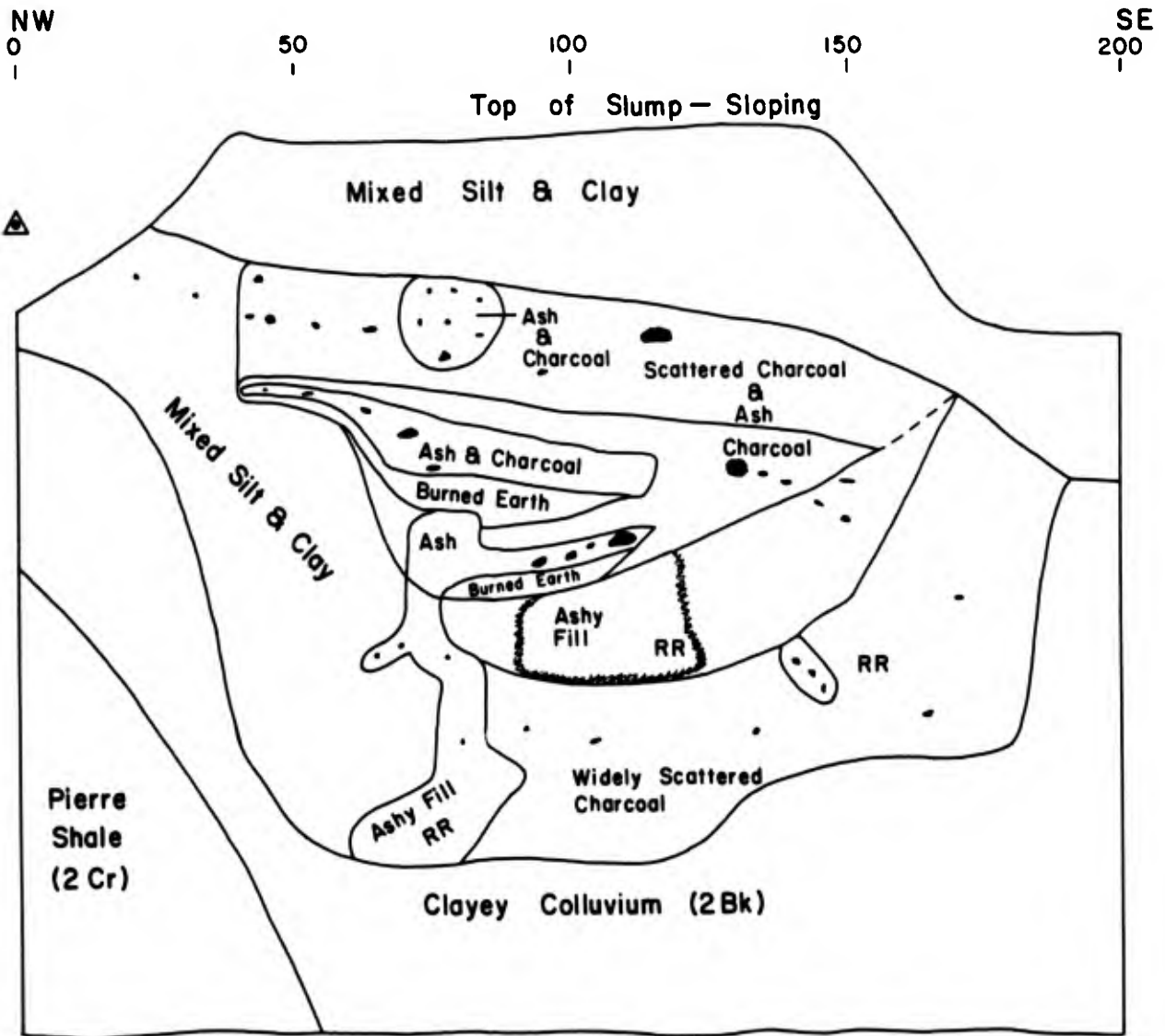
No artifactual remains were recovered from Tests 1, 2, and 3 in the central bench. Identifiable, intact cultural deposits at the site appear to be restricted to the northeastern terrace, particularly in the vicinity of Tests 4-5 and Tests 6-7 near the Lake Sharpe cutbank. Three buried cultural horizons that are best characterized as "bone layers" were observed in the Lake Sharpe cutbank in this part of the site directly opposite the location of Tests 4-5 (Figure 8). These have been designated as Components A, B, and C (see discussion below). Component A, which was found to be very ephemeral in the test excavations, is only generally correlatable with the lower portion the 2Bw horizon or possibly the surface of the 3Bw. The more substantial cultural deposits represented by Components B and C are more clearly isolatable in terms of the horizon sequence: Component B is associated with the surface of the 5Bw (interface of the 4Bw and 5Bw horizons), and Component C is associated with the upper portion (near-surface) of the 6Bw.

Archeological Components, Radiocarbon Dates, and Analytic Units

The Rattlesnake Keeper site is now known to contain at least two and possibly as many as three intact archeological components on the basis of the test excavations reported here and previous survey work. The three components, designated A, B, and C, are restricted to the northeastern part of the site, particularly that area near the Lake Sharpe cutbank. The three components are, in chronological (stratigraphic) order:

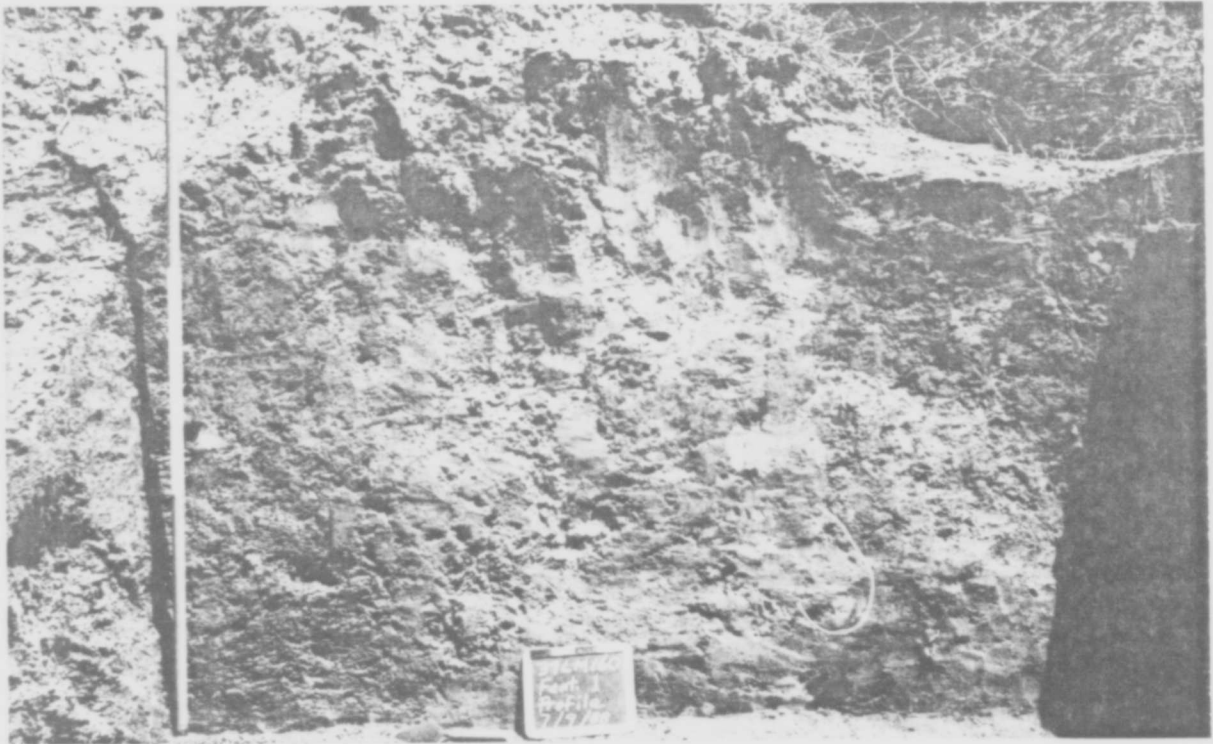
- A. Unknown (Post-Contact Coalescent?);
- B. Unknown (Post-Contact Coalescent?);
- C. Plains Village, Post-Contact Coalescent.

Component A appeared in the Lake Sharpe cutbank of the northeastern terrace as a clearly recognizable bone layer at about 100-110 cm sd directly opposite the location of Tests 4-5. However, Component A was found to be very ephemeral in the test excavations in this part of the site (Tests 4-5 and Tests 6-7) and it is thought that little of it remains intact. Component B

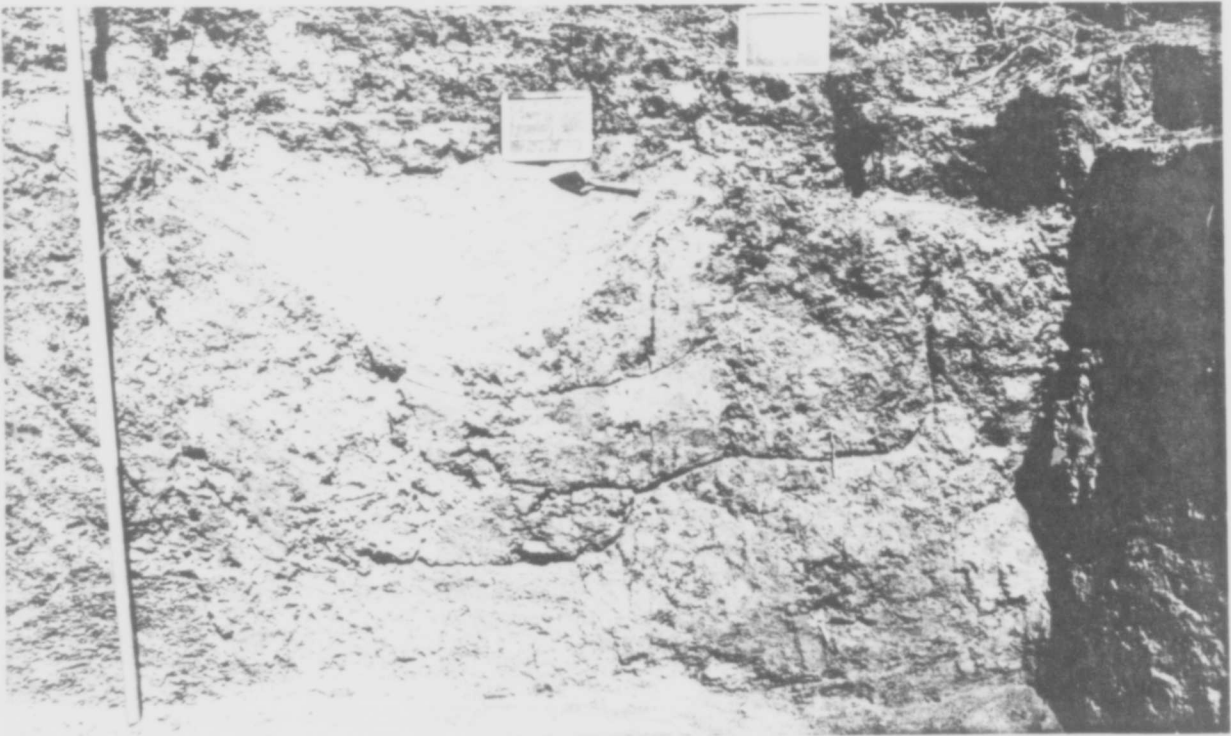


39LM160
TEST UNIT II
FEATURE I PROFILE
BEFORE EXCAVATION
HEARTH IN SLUMP BLOCK

Figure 19. Profile Drawing of Test 11, Feature 1, Before Excavation, Rattlesnake Keeper Site (39LM160).



a



b

Figure 20. Photos of the Feature 1/2 Complex, Rattlesnake Keeper Site (39LM160). a: Profile photo of Test 11, Feature 1, before excavation, northeast view (photo no. 3227, UND 1988). b: Profile photo of Test 11, Features 1 and 2, after excavation, northeast view (photo no. 3255, UND 1988).

Table 10. Sample Data for Radiocarbon Dates from the Rattlesnake Keeper Site (39LM160), Lake Sharpe Testing Project, UND, 1988.

Lab Number	Association	Material (Weight)	Remarks
UCR-2381a	Test 11, Feat. 1, Basin Hearth	Wood Charcoal (15.0 g)	Component C (ctno 1104). Split sample with UCR- 2381b. Species ident.: cottonwood (willow) and willow.
UCR-2381b	Test 11, Feat. 1, Basin Hearth	Wood Charcoal (15.0 g)	Component C (ctno 1104). Split sample with UCR- 2381a. Species ident.: cottonwood (willow) and willow.
UCR-2382	Test 6, Level 19, General Level, 180-195 cm sd	Wood Charcoal (6.3 g)	Component C (ctno 619). Species ident.: cottonwood (willow).

was observed in the cutbank opposite Tests 4-5 at about 120-130 cm sd. While Component B did yield quantities of bone and a some lithic artifacts, no culturally diagnostic remains were found and the affiliation of Component B remains unknown. Component C, the most substantial archeological component at the site, was observed from approximately 150-160 cm sd in the cutbank opposite Tests 4-5. Features 1 and 2 in Test 11 also relate to Component C. Component C contains features (hearths) and a diverse array of artifactual remains, including animal bone, ceramics, lithics, and botanical remains. Diagnostic artifacts and radiocarbon dates indicate that Component C is assignable to the Post-Contact Coalescent variant of the Plains Village tradition.

The close stratigraphic positioning of the three components and some similarity in their artifactual content suggests that they are related to one another both temporally and functionally. This further suggests some degree of cultural affinity, and it is thought that Components A and B represent Post-Contact occupations of the site as well.

Three radiocarbon (C-14) dates were run on composite charcoal samples recovered from Component C contexts at Rattlesnake Keeper (Table 10). No C-14 samples were recovered from Components A and B. All three Component C samples are interpreted as the remains of firewood. Two of the dated samples (UCR-2381a and UCR-2381b) were picked from the same bulk lot of charcoal fragments that was collected from a hearth (Feature 1). The third dated sample (UCR-2382) consisted of several charcoal fragments collected from a general level context. Other, selected pieces of charcoal associated with the C-14 charcoal samples have been identified as cottonwood or willow (Appendix C). These are

not long-lived trees and C-14 samples from such specimens should yield reasonably accurate age estimates for the Component C occupation, even though composite charcoal samples were used to generate the dates.

A C-14 age based on a precise count was obtained for only one sample, UCR-2381a at 210 ± 60 years B.P. The other two samples, UCR-2381b and UCR-2382, did not yield precise counts and both produced C-14 ages of less than 150 years B.P. Nevertheless, the three C-14 ages do exhibit contemporaneous values that may be averaged and that fall within the Post-Contact Coalescent period (ca. A.D. 1675-1780) when calibrated, assuming minimum values of 150 ± 50 B.P. for UCR-2381b and UCR-2382 (Table 11). Such an assumption is justified because it is widely held that Post-Contact Coalescent (Arikara) groups had abandoned the Lake Sharpe area (Big Bend region) by ca. A.D. 1780 and moved farther upriver (Krause 1972:14-15; Lehmer 1971:170ff; Smith 1977:156; Wedel 1961:201-203). Therefore, a date of occupation for Component C that post-dates 150 B.P. (ca. A.D. 1800) can be safely ruled out. Still, it is not possible to more precisely date the Component C occupation within the general limits of the Post-Contact Coalescent period using the C-14 data alone because present C-14 dating techniques lack the precision necessary to effectively segment such a narrow time frame.

The average C-14 age for Component C at Rattlesnake Keeper is 165 ± 30 B.P., which has a maximum calibrated range at the two sigma confidence interval of A.D. 1655-1955 (Table 11). This range can be narrowed considerably to a maximum of A.D. 1655-1780 on the basis of archeological and historical data cited above. The absence of European trade goods in the Component C artifact aggregate and the presence of an apparently robust native technology suggest that Component C is an early manifestation of the Post-Contact variant. Ceramics decorated with incised/trailed lines, which are most typical of the preceding Extended Coalescent variant, also point to an occupation early in the Post-Contact time frame for Component C. A date of occupation for Component C falling somewhere between ca. A.D. 1655-1740 is therefore suggested. Components A and B obviously post-date Component C. There is also some evidence of degeneration in traditional native technology associated Component B, so both Components A and B are interpreted as late manifestations of the Post-Contact variant. Dates of occupation falling somewhere between ca. A.D. 1740-1780 are suggested for Components A and B, with Component B preceding Component A. These suggested date ranges are somewhat speculative, however, because the available information is very slim and difficult to interpret with any confidence. All three components clearly represent short-term episodes of site utilization that probably did not exceed a few days. In addition, the three occupations of the site need not necessarily be viewed as spanning a considerable length of time; closely spaced occupation episodes that occurred within no more than a few years of each other are also a possibility.

The description and analysis of artifactual remains recovered from the test excavations at Rattlesnake Keeper proceeds according to the three identified cultural components. Artifacts are assigned to the component analytic units on the basis of cultural-stratigraphic associations within individual test units. Only Tests 4-5, 6-7, and 11, located in the northeastern terrace, are relevant to the presentation of these data. Tests 1, 2, and 3, placed in the central bench, did not produce any artifactual remains and they are not considered further.

Table 11. Radiocarbon Dates for the Post-Contact Coalescent Component (Component C) at the Rattlesnake Keeper Site (39LM160). Calibration data are from Stuiver and Becker (1986).

Lab Number	Laboratory C-14 Age	Calibrated Age Ranges and Intercepts		
		One Sigma Range	Two Sigma Range	Intercepts
UCR-2381a	210 \pm 60 B.P.	A.D. 1645-1681 1735-1806 1936-1955	A.D. 1520-1591 1620-1890 1910-1955	A.D. 1662
	Maximum Range	A.D. 1645-1955	A.D. 1520-1955	
UCR-2381b	<150 B.P.*	A.D. 1665-1712 1716-1886 1913-1955	A.D. 1650-1955	A.D. 1681 1735 1806 1936 1955
	Maximum Range	A.D. 1665-1955	A.D. 1650-1955	
UCR-2382	<150 B.P.*	A.D. 1665-1712 1716-1886 1913-1955	A.D. 1650-1955	A.D. 1681 1735 1806 1936 1955
	Maximum Range	A.D. 1665-1955	A.D. 1650-1955	
Weighted Average	165 \pm 30 B.P.	A.D. 1666-1689 1725-1783 1790-1810 1926-1949 1952-1955	A.D. 1655-1712 1716-1886 1913-1955	A.D. 1676 1741 1802 1940 1955
Average Maximum Range		A.D. 1666-1955	A.D. 1655-1955	

*Radiocarbon ages of 150 \pm 50 B.P. are assumed for UCR-2381b and UCR-2382 for purposes of calibration and averaging because actual ages of less than 150 years B.P. (ca. A.D. 1800) for the samples are highly unlikely (see text).

Features

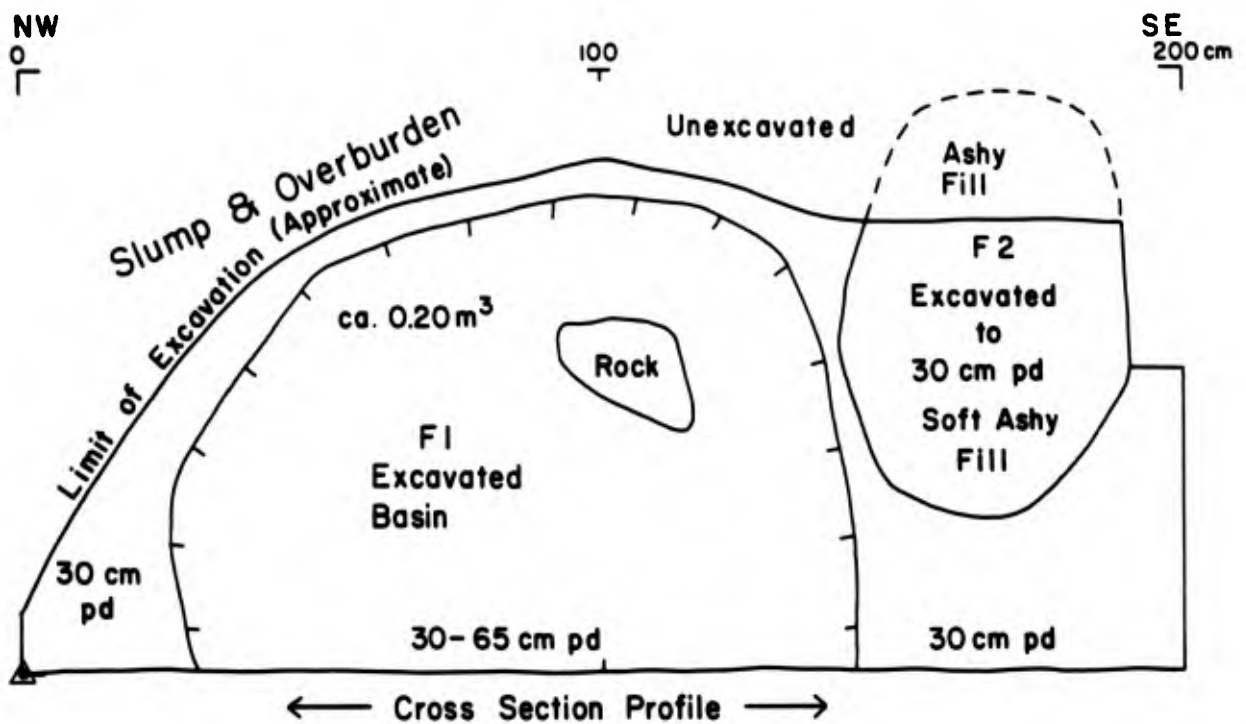
Three features, all consisting of basin-shaped hearths, were partially or completely excavated at Rattlesnake Keeper. Feature 1 was a large, complex basin hearth that was completely excavated in Test 11. In fact, the sole purpose of Test 11 was to uncover and excavate Feature 1, which was first observed and recorded in 1983 by the UND survey crew. Feature 2, a smaller companion hearth to Feature 1, was also discovered in Test 11. Feature 3 was a shallow basin hearth that was partially exposed and excavated in Test 5. All three features are attributable to Component C on the basis of artifactual content, radiocarbon dates, and/or stratigraphic position.

Test 11, Feature 1/2 Complex

Features 1 and 2 were uncovered in Test 11 which was excavated into the steeply sloping face of a large slump block (Figure 8). Most of the surficial deposits in the slump block had eroded away in the vicinity of Test 11. This, as well as the rotation and faulting of the slump block, made it impossible to directly correlate Features 1 and 2 with the natural and cultural stratigraphic units that were recorded in the intact portion of the northeastern terrace. Nevertheless, correlations based on radiocarbon dates and diagnostic artifacts indicate that Features 1 and 2 relate to Component C.

Excavation of Feature 1 (Test 11) began by removing overburden from the face and top of the unit to define the intact portion of the feature. These overburden deposits consisted principally of slopewash material that had moved down the face of the slump block, which had a very steeply sloping face from inward rotation as it slipped from the main terrace body. Unconsolidated materials that had moved down the near-vertical face of the slump had buried much of the feature. This displaced material was not screened and no artifacts were recovered during the cleaning operation. After cleaning and prior to its excavation by controlled techniques, Feature 1 appeared in profile as a large, deep, basin-shaped hearth exhibiting at least two separate episodes of use in the form of two superimposed fire pits (Figure 19). Feature 2 was later discovered just to the southeast of Feature 1 (Figure 21). Feature 2 is situated at a slightly higher elevation relative to Feature 1 (Figures 20b, 22), but it is thought that both features relate to the same cultural-stratigraphic unit and their somewhat different elevations are the result of slumping and faulting. Overall, the impression one gains from the limited stratigraphic exposure surrounding the features is that they were located in an old depression or gully, as was mentioned above.

Controlled excavation into the Feature 1/2 complex began by working downward into Test 11 in 10 cm arbitrary levels. Because no natural surface was present from which to measure depths, a datum point was arbitrarily established in the northwest wall of the test for this purpose. The resultant measurements are referred to as pd (pit depth) rather than sd (surface depth) because they relate only to the excavation of the features and not to a natural surface. Excavation continued to a depth of 30 cm pd until it was possible to clearly discern the outline of Feature 1. The existence of Feature 2 as a separate hearth was not recognized until this point had been reached (Figure 21). Consequently, levels 1-3 (0-30 cm pd) in Test 11 contained materials from a largely disturbed and mixed context that is

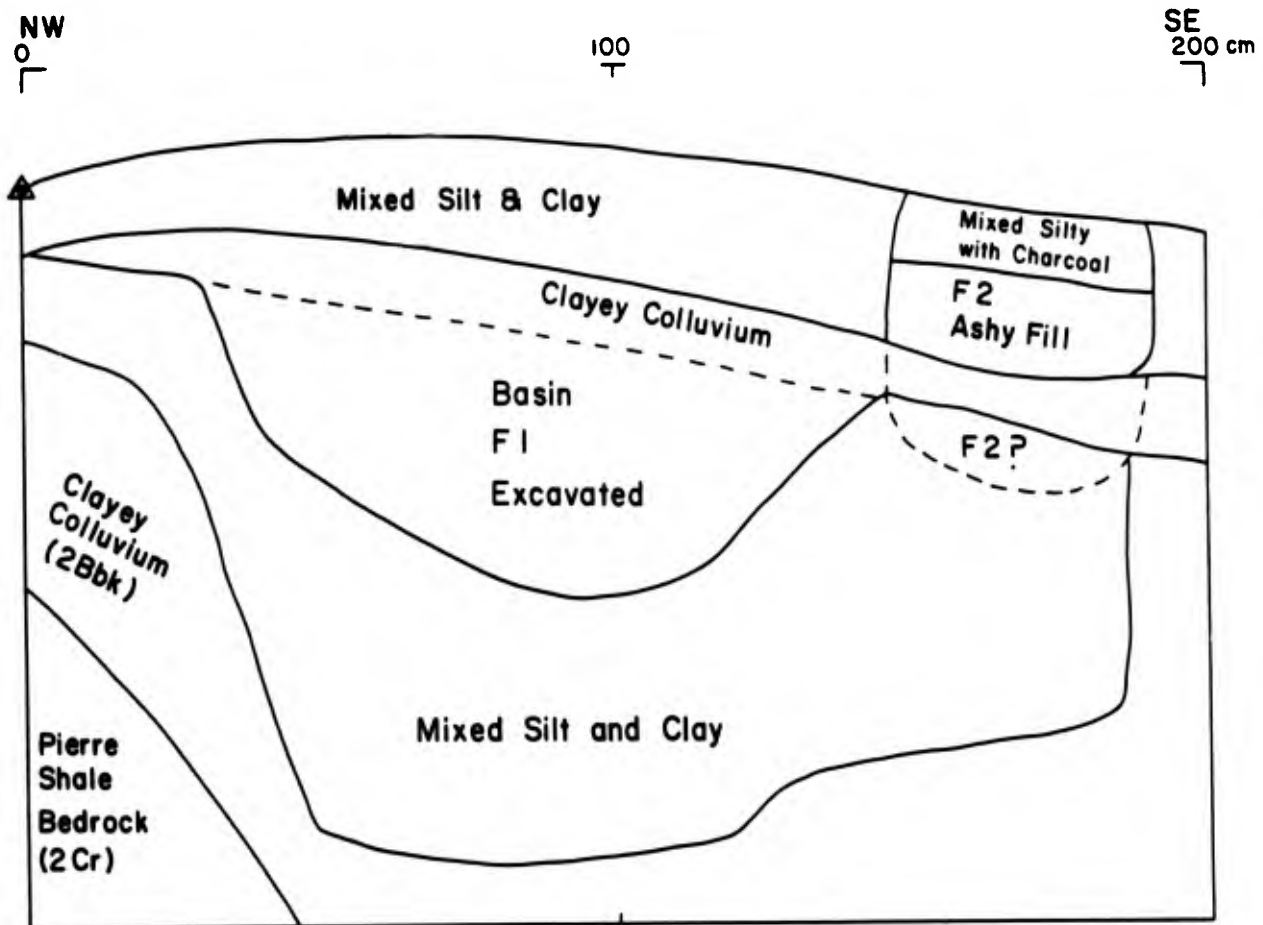


39LM160

TEST UNIT II
FEATURE 1 & 2

PLAN VIEW AFTER EXCAVATION

Figure 21. Plan Map of Test 11, Features 1 and 2, After Excavation, Rattlesnake Keeper Site (39LM160).



39LM160
 TEST UNIT II
 FEATURE 1 & 2
 PROFILE AFTER EXCAVATION

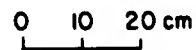


Figure 22. Profile Drawing of Test 11, Features 1 and 2, After Excavation, Rattlesnake Keeper Site (39LM160).

attributable to both features. All soil matrix removed from levels 1-3 was one-quarter inch dry screened. At the 30 cm pd level in Test 11, the remaining portion of Feature 1 was excavated as a single unit to a maximum depth of 65 cm pd (level 4, 30-65 cm pd) (Figures 20b, 21, 22). About 90% of the matrix removed from Feature 1 proper was one-quarter inch dry screened; the remaining 10% was one-sixteenth inch water screened. Two 2 liter flotation samples were also taken from the intact portion of Feature 1, as was a large charcoal sample for C-14 dating.

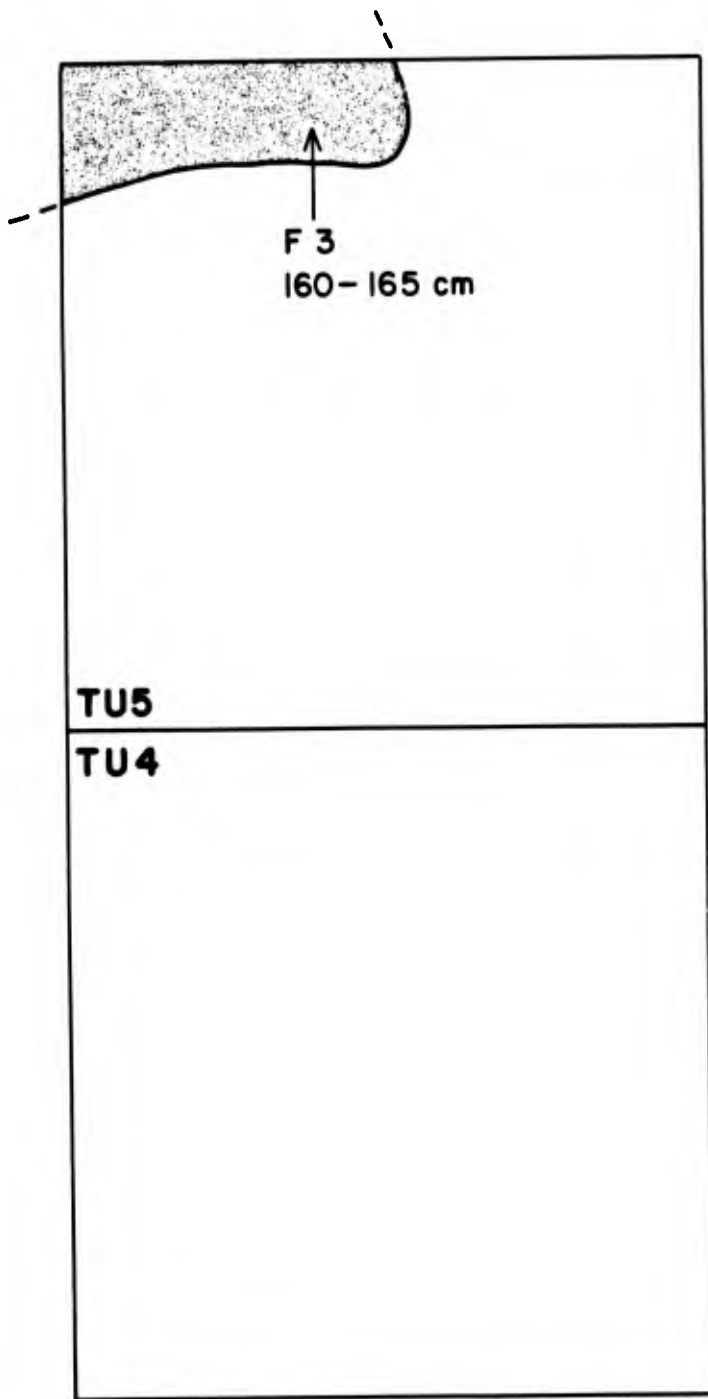
Feature 1 principally contained a fine, grayish-white ashy fill, burned earth, and charcoal. Other recovered artifactual remains include pottery, chipped stone, bone, natural clinker, some wood, and a large rock that had been used as an anvil (Figure 21). The ashy fill was soft and unconsolidated; a large sample of it is maintained in the site collection (one of the 2 liter flotation samples that was not processed). Two distinct episodes of use were apparent in Feature 1 - upper and lower fire basins containing ashy fill that were marked by underlying burned earth rinds. These were not sampled individually during excavation owing to extensive rodent disturbance between the two basins. The two episodes of use for Feature 1 obviously relate to the same occupation and occurred sequentially within a very short span of time, possibly over the course of two days of site occupation for Component C. Feature 2 was not excavated further and no remains solely attributable to it were recovered. It appeared to contain little more than charcoal and wood fragments in a fill of fine, grayish-white ash.

Test 5, Feature 3

Feature 3 was a shallow basin-shaped hearth that was partially uncovered in the extreme southwestern corner of Test 5 (Figure 23). A partial profile of the Feature 3 is illustrated in Figure 17. Test 5 was part of a larger 1 X 2 m excavation (Tests 4-5) that was dug into the northeastern terrace near the Lake Sharpe cutbank (Figure 8). The surface of Feature 3 was encountered at about 160 cm sd. The excavated portion of the feature in Test 5 was no more than 5 cm deep, extending to a maximum of 165 cm sd. The fill of Feature 3 consisted of a fine, grayish-white ash and little else. Other than the ash, only a few charcoal flecks and some small pieces of burned earth were observed during excavation. The entire excavated matrix of Feature 3 was taken as a flotation sample of approximately 2 liters in size.

Native Ceramics

Ceramic artifacts in the site collection total 154 sherds, including 145 G1-3 body sherds and nine G2-3 rim sherds. All of the ceramic sherds were recovered from Component C contexts in the northeastern terrace (Tests 4-5, Tests 6-7, and Test 11). The pottery from the site is highly fragmented. No complete or even partially complete and reconstructable vessels are present in the assemblage. The sherds appear to be from small-sized, globular-shaped jars that are sometimes referred to as miniature vessels. Overall, the pottery from the site is not particularly well made and it seems to exhibit the degeneration in Plains Village ceramic technology that is apparent in most Post-Contact Coalescent assemblages.



PLAN VIEW

TEST UNITS 4 & 5

FEATURE 3

39LM160

0 30 cm

N

Figure 23. Plan map of Tests 4-5, Feature 3, Rattlesnake Keeper Site (39LM160).

The paste of the sherds is moderately compact to slightly porous and only moderately hard. Some exfoliation (splitting) of sherds was observed. Colors range from buff to gray, with buff predominating. The sherds are relatively thin, but this is thought to be primarily a function of small vessel size. Two different kinds of tempering agent were used: grit (crushed granite) and/or crushed bone. Rim sherds from two of the four vessels represented in the collection are tempered with crushed bone; rim sherds from the other two vessels are grit tempered. Body sherds in the collection are tempered as follows: crushed bone (68.1%), grit (22.9%), mixed bone and grit (3.5%), and indeterminate (5.6%). Grit is the typical tempering agent for Plains Village ceramics. The use of bone tempering is very unusual and unique to this assemblage in the Middle Missouri subarea as far as I am aware. The bone temper is white to gray in appearance from burning. The white-colored inclusions often have a dark gray core when broken; the white color is the result of calcination from intense heat. It is unclear whether the bone was burned to some extent prior to its addition to the clay as a tempering agent or whether the burning occurred during vessel firing. Some prior burning of the bone seems likely because burned bone is more easily crushed than green or even dried bone. Obviously, additional burning and calcination would have occurred during vessel firing. Some sherds from the bone tempered vessels have interior surfaces that exhibit traces of what appears to be a red pigment. The red staining is not an intentional slip, rather, it is thought to be a residue from pigment (red ochre or paint) processing in the vessels.

Body Sherds

The body sherd sample from Component C consists of 145 specimens, including 1 G1 sherd, 17 G2 sherds, and 127 G3 sherds (Table 12). Most were recovered from the deepest levels of Tests 6-7. Features 1 and 2 (F1&2) in Test 11 also yielded several body sherds, but only one specimen was found in Tests 4-5.

Surface treatment data were recorded for all body sherds in the site sample (Table 13). Plain/smoothed and simple-stamped surface treatments are about equally represented among the 83 classifiable specimens in the Component C ceramic aggregate. Several decorated sherds were also recorded, with most decoration (13 specimens) consisting of narrow, incised lines made on shoulder sherds with a sharply pointed tool. A few of the decorated sherds (five specimens) also exhibit broadly trailed lines made with a blunt tool around the neck area. The decorated specimens are too fragmentary to suggest any sort of overall pattern. All of the decorated sherds and all but one of the simple-stamped sherds are from Tests 6-7. All of the bone tempered sherds are also from Tests 6-7, with the exception of one specimen with mixed grit and bone temper from Test 5. The classifiable sherds from Test 11 (F1&2) consist entirely of plain/smoothed specimens; all are grit tempered. In addition to the 83 body sherds that were classifiable as to surface treatment, the assemblage also contains 62 sherds of indeterminate surface treatment (Table 13).

The 18 G2 body sherds in the site sample have a mean maximum thickness of 3.9 ± 0.9 mm. This thickness value is comparatively thin for a Post-Contact assemblage, but, as was mentioned above, this is thought to be largely a reflection of small vessel size.

Table 12. Native Ceramic Body Sherd Size Grade Data by Test Unit, Component C, Rattlesnake Keeper Site (39LM160).

Test Unit		Size Grade			Total
		Grade 1	Grade 2	Grade 3	
4	n	-	-	-	-
	%	-	-	-	-
5	n	-	1	-	1
	%	-	100.0	-	100.0
6	n	-	8	91	99
	%	-	8.1	91.9	100.0
7	n	-	6	14	20
	%	-	30.0	70.0	100.0
11-F1/2	n	1	1	18	20
	%	5.0	5.0	90.0	100.0
11-F1	n	-	1	4	5
	%	-	20.0	80.0	100.0
Total	n	1	17	127	145
	%	0.7	11.7	87.6	100.0

Table 13. Native Ceramic Body Sherd Surface Treatment Data by Test Unit, Component C, Rattlesnake Keeper Site (39LM160).

Test Unit		Plain/ Smoothed	Simple- Stamped	Decorated	Total Class.	Indet.	Total
4	n	-	-	-	-	-	-
	%*	-	-	-	-	-	-
5	n	-	1	-	1	-	1
	%	-	100.0	-	100.0	-	-
6	n	15	23	14	52	47	99
	%	28.9	44.2	26.9	100.0	-	-
7	n	4	8	4	16	4	20
	%	25.0	50.0	25.0	100.0	-	-
11-F1/2	n	10	-	-	10	10	20
	%	100.0	-	-	100.0	-	-
11-F1	n	4	-	-	4	1	5
	%	100.0	-	-	100.0	-	-
Total	n	33	32	18	83	62	145
	%	39.8	38.5	21.7	100.0	-	-

*Percentages are calculated based on the total number of classifiable sherds; indeterminate body sherds are excluded from percentage calculations.

Rim Sherds and Vessels

Rim sherds from the test excavations at Rattlesnake Keeper number nine individual specimens, including one G2 rim and eight G3 rims. After matching, the nine rims were found to represent a total of no more than four different vessels. The small size of the rim sherds makes their classification problematic. Furthermore, it is apparent that the vessels represented in the Component C ceramic aggregate were rather small (miniature vessels) and these are not particularly amenable to classification under existing systems (cf. Johnson 1980). Nevertheless, three of the vessels bear some resemblance to Iona ware and La Roche "group" ceramics (e.g., Smith 1977; Smith and Johnson 1968; Hoffman 1968), while the fourth is classifiable as the Talking Crow Brushed type of Talking Crow ware (e.g., Smith 1977:57-58). La Roche ceramics are associated with the Extended Coalescent variant, while Iona ware is related to both the Extended and Post-Contact Coalescent variants, although it is most prevalent in Extended Coalescent assemblages. Talking Crow ware is most often associated with the Post-Contact variant, but the Talking Crow Straight Rim type is also found in Extended and even Initial Coalescent variant assemblages (Johnson 1980:68; Smith 1977:56, 59). The Talking Crow Brushed type identified here is limited to the Post-Contact Coalescent variant according to most interpretations (Johnson 1980:71), particularly the Talking Crow phase (Smith 1977:58). Considering the radiocarbon dates obtained for Component C and the presence of a definite Talking Crow Brushed vessel, a Post-Contact Coalescent interpretation is the most valid. Affiliation with the Talking Crow phase is suggested.

Descriptions of the ceramic vessels identified in the Component C collection are presented below. Selected specimens are illustrated in Figure 24, although they are actually too small for very effective illustration.

Vessel 1 (ctno 619, two matched rim sherds) (Figure 24a).

Ware: indeterminate (cf. Iona/La Roche).

Type: indeterminate (cf. horizontal incised).

Rim form: indeterminate (S-rim?)

Exterior rim decoration: trailed lines.

 Decoration motif: horizontal lines.

Lip decoration: tool impressed.

 Decoration motif: diagonal impressions.

Exterior rim surface treatment: plain/smoothed.

Lip form: unthickened, flat.

Temper: crushed bone (burned and calcined from firing).

Vessel 2 (ctno 619, three matched rim sherds) (Figure 24b).

Ware: indeterminate (cf. Iona/La Roche).

Type: indeterminate (cf. horizontal incised).

Rim form: straight/curved.

Exterior rim decoration: incised lines.

 Decoration motif: horizontal lines.

Lip decoration: tool impressed (incised).

 Decoration motif: diagonal impressions (incisions).

Exterior rim surface treatment: plain/smoothed.

Lip form: unthickened, rounded.

Temper: grit (crushed granite).

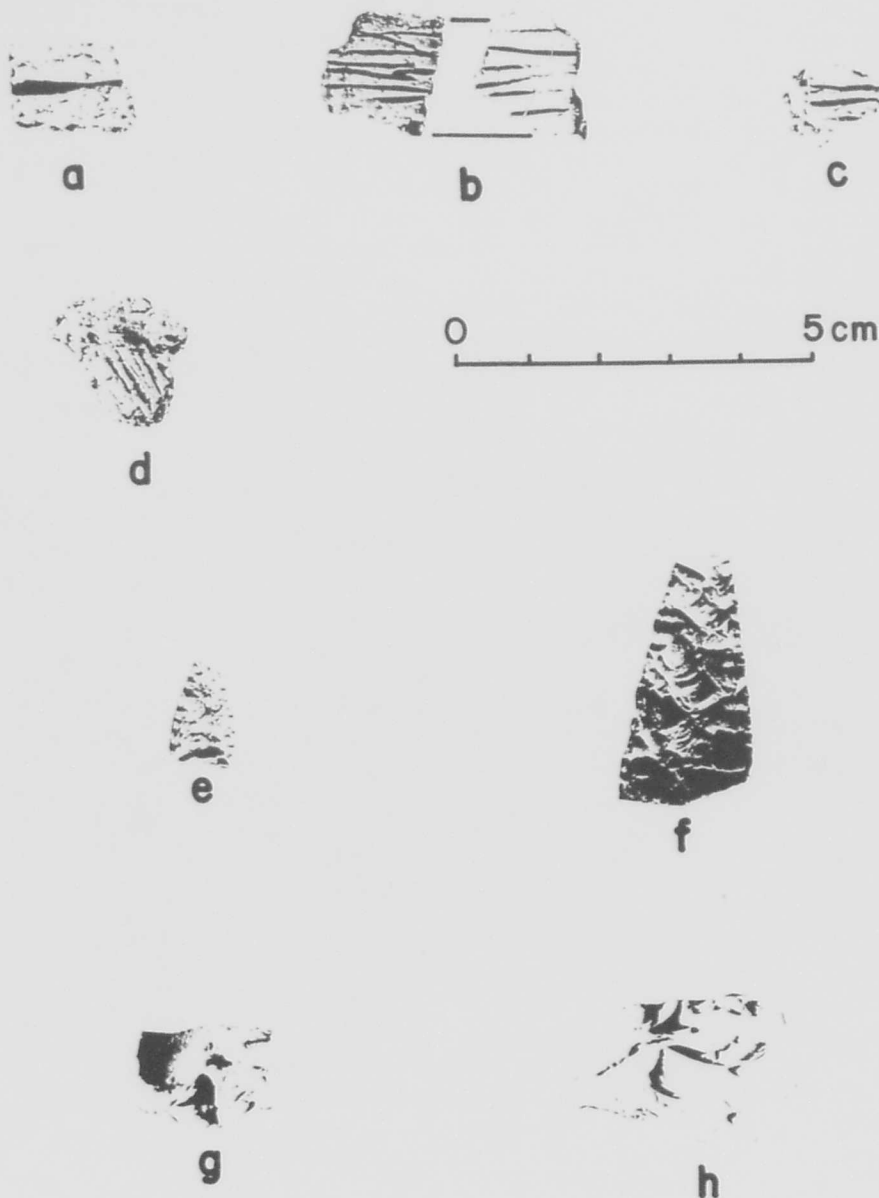


Figure 24. Photos of Selected Artifacts from Component C, Rattlesnake Keeper Site (39LM160). a: Vessel 1 rim sherd (untyped). b: Vessel 2 rim sherds (untyped). c: Vessel 3 rim sherd (untyped). d: Vessel 4 rim sherd (Talking Crow Brushed). e: Unnotched arrow point (functional class 01). f: Bifacial cutting tool (functional class 03). g-h: bipolar core-tools (functional class 25).

Vessel 3 (ctno 619WS, two matched rim sherds) (Figure 24c).

Ware: indeterminate (cf. Iona/La Roche).

Type: indeterminate (cf. horizontal incised).

Rim form: indeterminate (straight/curved?).

Exterior rim decoration: incised lines.

Decoration motif: horizontal lines.

Lip decoration: tool impressed (incised).

Decoration motif: diagonal impressions (incisions).

Exterior rim surface treatment: indeterminate (plain/smoothed?).

Lip form: unthickened, flat to slight inward bevel.

Temper: crushed bone (burned and calcined from firing).

Vessel 4 (ctno 1102 and 1103, two matched rim sherds) (Figure 24d).

Ware: Talking Crow

Type: Talking Crow Brushed (cf. Smith 1977:57-58)

Rim form: straight/curved.

Exterior rim decoration: undecorated.

Lip decoration: finger impressed.

Decoration motif: alternating impressions.

Exterior rim surface treatment: brushed.

Lip form: unthickened, L-shaped (extruded outward).

Temper: grit (crushed granite).

Stone Tools

Twenty-five chipped stone tools were recovered from the test excavations at Rattlesnake Keeper. No pecked/ground stone tools are present in the collection, with the exception of one functional occurrence usually associated with ground stone forms that is present on a massive chipped stone tool. Descriptive categories represented in the tool aggregate include patterned triangular bifaces (n=1), patterned biface fragments (n=2), other retouched and modified flakes (n=11), unpatterned bifaces and nonbipolar cores and core-tools (n=3), and bipolar cores/tools (n=8). Twenty-four tools are single function implements and one is double function, yielding a total of 26 functional occurrences. Stone tools were recovered from both Components B and C; none were found in Component A. Selected specimens are illustrated in Figure 24 (Component C) and Figure 25 (Component B).

Tool Technology

Eleven stone tools were recovered from Component B contexts in the northeastern terrace and 15 were collected from Component C contexts. Only two technological classes are represented in the Component B tool sample - unpatterned flake tools (n=9) and nonbipolar cores-tools (n=2). The Component C tool sample contains a greater diversity of technological forms, including small thin patterned bifaces (n=1), large thin patterned bifaces (n=2), unpatterned flake tools (n=2), thick bifacial core tools (n=2), and bipolar core-tools (n=8). The bipolar core-tools are all small fragments from no less than four larger specimens (Figure 24g-h). All of the Component B tools are from Tests 4-5; most of the Component C tools relate to Features 1 and 2 (Test 11), with the balance coming from Tests 6-7 (Table 14).

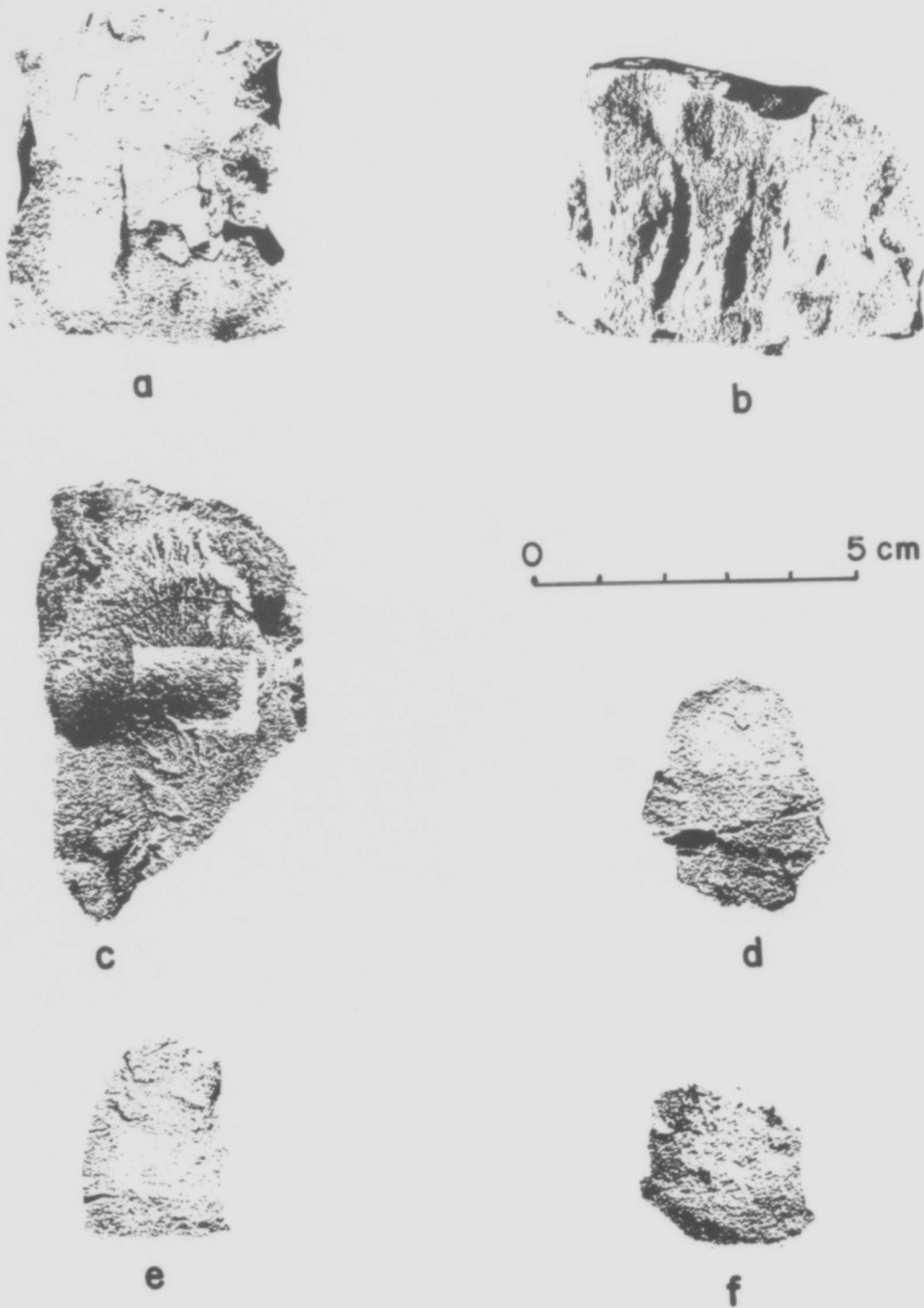


Figure 25. Photos of Selected Artifacts from Component B, Rattlesnake Keeper Site (39LM160). a-b: Pierre Shale cores (functional class 21). c-f: Potential Pierre Shale flake tools (functional class 22).

Table 14. Stone Tool Technological Class Data by Test Unit and Component, Rattlesnake Keeper Site (39LM160).

Technological Class		Component B		Component C			Total
		Tests 4-5	Tests 6-7	Tests 4-5	Tests 6-7	Test 11 (F1&2)	
1 Small Thin Patterned Bifaces	n	-	-	-	1	-	1
	%	-	-	-	25.0	-	3.8
2 Large Thin Patterned Bifaces	n	-	-	-	2	-	2
	%	-	-	-	50.0	-	7.7
3 Irregular Unpatterned Bifaces	n	-	-	-	-	-	-
	%	-	-	-	-	-	-
4 Patterned Flake Tools	n	-	-	-	-	-	-
	%	-	-	-	-	-	-
5 Unpatterned Flake Tools	n	9	-	-	1	1	11
	%	81.8	-	-	25.0	9.1	42.3
6 Thick Bifacial Core-Tools	n	-	-	-	-	2	2
	%	-	-	-	-	18.2	7.7
7 Nonbipolar Cores-Tools	n	2	-	-	-	-	2
	%	18.2	-	-	-	-	7.7
8 Bipolar Core-Tools	n	-	-	-	-	8	8
	%	-	-	-	-	72.7	30.8
9 Unpatterned Pecked/Ground Stone Tools	n	-	-	-	-	-	-
	%	-	-	-	-	-	-
10 Patterned Pecked/Ground Stone Tools	n	-	-	-	-	-	-
	%	-	-	-	-	-	-
Total	n	11	0	0	4	11	26
	%	100.0	0.0	0.0	100.0	100.0	100.0

The stone tools from Component B present a difficult interpretive problem. All are made of Pierre Shale, a relatively soft local bedrock material that is not often used in chipped stone tool manufacture. While there is no doubt that these specimens are artifacts (cf. Figure 25), the interpretation of the unpatterned flake tools as actual implements is open to considerable question because the stone weathers rapidly when exposed and, consequently, evidence of use-wear has been obliterated or is at best unclear. Extensive exposures of Pierre Shale surround the site locality and this tool raw material was in all probability acquired on-site. The use of on-site Pierre Shale for the manufacture of chipped stone tools was clearly an expedient measure because superior lithic materials are available at no great distance from the site (ca. 1-2 miles). Furthermore, this phenomenon may be indicative of a degenerative form of chipped stone technology among the occupants of Component B. There is no doubt that traditional Plains Village chipped stone industries were on the decline during the protohistoric period and became virtually extinct during the historic period as a result of the introduction of metal tools (cf. Lehmer 1971; Toom 1979). Thus, we are faced with the possibility that the Component B tools represent an advanced form of this degenerative process.

All of the Component B tools were recovered from 120-140 cm sd in Tests 4-5, with the majority (n=9) found from 120-130 cm sd in Test 5. The specimens are larger-sized pieces of Pierre Shale that derive from the reduction of a block of this material by freehand percussion (Figure 25). The reduction process left a mass of flakes and two cores in a tight cluster in Test 5. The larger flakes were classified as tools if some suggestion of actual tool use could be detected or at least assumed from the size and shape of the specimens. Other flakes were classified as flaking debris. It is possible, even probable, that these criteria are overly broad and some of the flakes classified as unpatterned flake tools were not actually used as implements but merely represent debris from core reduction. Nevertheless, it is clear that a large block of Pierre Shale was reduced by freehand percussion at this location by the occupants of Component B, and the apparent purpose of this technological operation was the production of large, sharp flake tools. There is every indication that this activity was expedient in nature and not part of some planned routine.

Technology and Lithic Raw Materials

Lithic raw material type frequency data for those technological classes represented in the Component C tool sample are presented in Table 15. As was mentioned above, all of the Component B stone tools are made of Pierre Shale. Seven different lithic raw material types were identified among the Component C tools. Various materials from the local resource group are the most numerous (73.3%). Nonlocal types identified as Flattop chalcedony (western resource group) and Bijou Hills silicified sediment (southern resource group) make up the balance of the assemblage (26.7%). Primary reliance on local lithic materials with secondary use of nonlocal western and southern resources is consistent with lithic resource utilization patterns observed in other Post-Contact Coalescent assemblages in the Lake Sharpe area (e.g., Johnson 1984, 1989; Toom 1984a).

Table 15. Stone Tool Raw Material Type Data by Technological Class, Component C, Rattlesnake Keeper Site (39LM160).

Resource Group and Raw Material Type	Technological Class					Total	
	1	2	5	6	8	n	%
<u>Local Resource Group</u>							
05 Porous Quartzite	1	-	-	-	-	1	6.7
06 Jasper/Chert	-	1	-	-	5	6	40.0
13 Basaltic	-	-	1	-	-	1	6.7
16 Quartz	-	-	-	-	1	1	6.7
19 Granitic	-	-	-	2	-	2	13.3
Subtotal, Local	1	1	1	2	6	11	73.3
<u>Western Resource Group</u>							
07 Flattop Chalcedony	-	1	-	-	2	3	20.0
<u>Southern Resource Group</u>							
15 Bijou Hills Silicified Sediment	-	-	1	-	-	1	6.7
Subtotal, Nonlocal	-	1	1	-	2	4	26.7
Total	n	1	2	2	2	8	15
	%	6.7	13.3	13.3	13.3	53.3	99.9

Function and Use-Phase

Data on the functional classification of stone tools from Components B and C according to use-phase class are contained in Table 16. As an aggregate, the tools from the site exhibit only a limited range of functions, which is a reflection of small sample size as well as the inferred specialized function of the site occupations (i.e., animal kill processing locations). As was mentioned previously, there is some question about the designation of Component B flake tools as actual implements; it is possible that some of these specimens represent flaking debris. The same holds true for the functional classification of the Component B flake tools as utilized flakes used to saw or slice hard material (class 22). Such a classification is largely intuitive because clear evidence of use-wear is lacking. All of the Component B tools and potential tools are assigned to use-phase 3, complete and fully functional items.

Little difficulty was encountered in the functional classification of the Component C tools. Represented among the recovered specimens are a single projectile point (arrow point) (class 01), patterned bifacial cutting tools (classes 03 and 15), unpatterned flake tools (classes 22 and 23), a heavy duty chopping/pounding tool (class 14), bipolar core/punch/wedge/chisels (class 25), and a bipolar hammer or anvil (class 28). The majority of the Component C tools (86.7%) are assigned to use-phase 4, finished specimens that were broken or exhausted during use. The chopping/pounding tool and the bipolar hammer/anvil are the only implements placed in use-phase 3. They occur on the same specimen, which consists of a large spall of granitic rock associated with the Feature 1/2 complex in Test 11 (Figure 21). The more acute edges of this specimen have been crudely bifacially flaked and exhibit evidence of use in heavy duty chopping/pounding tasks. A flat surface on one side of the specimen has a shallow depression that was pecked into the stone by use as bipolar anvil; the specimen is judged to be too large to have been used as a bipolar hammer. The eight bipolar core-tools in the Component C sample, which consist of small bipolar core-tool fragments from four larger specimens, were also recovered from Features 1/2. It is thought that the bipolar anvil was used in the production of the bipolar core-tools at this location. It may have also been used as a platform for crushing bone, but bone debris was not recovered in appreciable quantities from Feature 1/2 contexts.

Two other stone tools from Component C are worthy of special note. The single projectile point is a very small, unnotched, triangular arrow point that has a broken tip (Figure 24e). It appears to be made of porous quartzite, which is also referred to as Swan River chert (Ahler 1977a). The distal portion of a very well made, patterned bifacial cutting tool of Flattop chalcedony is also present in the collection (Figure 24f). Use-wear indicates that this implement was used as a light duty bilateral cutting tool (class 03).

Table 16. Stone Tool Functional Class Data by Use-Phase Class, Components B and C, Rattlesnake Keeper Site (39LM160).

General Functional Group/ Specific Functional Class	Use-Phase Class				Total	
	1	2	3	4		
<u>Component B</u>						
6. Unprepared or Irregularly Modified Unpatterned Flake Tools						
22 Utilized flake used to saw or slice hard material	-	-	9	-	9	
10. Cores and Potential Cores						
21 Core	-	-	2	-	2	
Subtotal, Component B						
	n	-	-	11	-	11
	%	-	-	100.0	-	100.0
<u>Component C</u>						
1. Projectile Points						
01 Projectile point	-	-	-	1	1	
2. Patterned Bifacial Cutting Tools						
03 Light duty bilateral cutting tool	-	-	-	1	1	
15 Generalized patterned bifacial cutting tool	-	-	-	1	1	
Subtotal	-	-	-	(2)	(2)	
5. Prepared or Regularly Modified Unpatterned Flake Tools						
23 Retouched or utilized flake used on variable material	-	-	-	1	1	
6. Unprepared or Irregularly Modified Unpatterned Flake Tools						
22 Utilized flake used to saw or slice hard material	-	-	-	1	1	

Table 16. Stone Tool Functional Class Data by Use-Phase Class, Components B and C, Rattlesnake Keeper Site (39LM160), Continued.

General Functional Group/ Specific Functional Class	Use-Phase Class				Total	
	1	2	3	4		
<u>Component C (continued)</u>						
9. General Core-Tool Group						
14 Heavy duty chopping/pounding tool	-	-	1	-	1	
12. Bipolar Tools or Potential Tools						
25 Core/punch/wedge/chisel	-	-	-	8	8	
14. Hammerstone/Anvils						
28 Bipolar hammer or anvil	-	-	1	-	1	
<hr/>						
Subtotal, Component C	n	-	-	2	13	15
	%	-	-	13.3	86.7	100.0
<hr/>						
Total	n	-	-	13	13	26
	%	-	-	50.0	50.0	100.0

The limited stone tool sample from Component B shows concern with the production of large, sharp flakes in an expedient manner. These implements were probably produced on-site and used (or intended for use) to butcher animals from a nearby kill. The Component C stone tool assemblage reveals a similar functional orientation but it has little of the expedient quality of the Component B tools. The Component C tool sample exhibits a wider range of tool functions that are principally associated with the killing and butchering of large mammals.

Chipped Stone Flaking Debris

A total of 137 G1-4 pieces of chipped stone flaking debris was recovered from test excavations at Rattlesnake Keeper. Of this number, 101 flakes are from Component B contexts in the northeastern terrace and 36 are from Component C contexts. All G4-sized flakes are from water screen samples taken from selected excavation unit levels. Chipped stone flaking debris size grade data by test unit and component are presented in Table 17. The majority of the flaking debris is from Component B and relates to the reduction of a large mass of Pierre Shale in Tests 4-5, particularly Test 5. Component C flaking

Table 17. Chipped Stone Flaking Debris Size Grade Data by Test Unit and Component, Rattlesnake Keeper Site (39LM160).

Component/ Test Unit	Size Grade					Total	Projected Grade 4*
	Grade 1	Grade 2	Grade 3	Grade 4*			
Component B							
4	n	-	1	4	na	5	na
	%	-	20.0	80.0	na	100.0	na
5	n	2	7	87	na	96	na
	%	2.1	7.3	90.6	na	100.0	na
6	n	-	-	-	na	-	na
	%	-	-	-	na	-	na
7	n	-	-	-	na	-	na
	%	-	-	-	na	-	na
Subtotal	n	2	8	91	na	101	na
	%	2.0	7.9	90.1	na	100.0	na
Component C							
4	n	-	-	-	na	-	na
	%	-	-	-	na	-	na
5	n	-	-	-	-	-	-
	%	-	-	-	-	-	-
6	n	-	2	10	4	16	43
	%	-	12.5	62.5	25.0	100.0	78.2
7	n	-	-	1	-	1	-
	%	-	-	100.0	-	100.0	-
11-F1&2	n	-	-	12	7	19	189
	%	-	-	63.2	36.8	100.0	94.0
Subtotal	n	-	2	23	11	36	232
	%	-	5.6	63.9	30.5	100.0	90.3
Total	n	2	10	114	11	137	na
	%	1.5	7.3	83.2	8.0	100.0	na

*Grade 4 debris is recovered from water screen samples only. Projected numbers of grade 4 debris are based on actual numbers in water screen sample fractions.

debris comes from Test 11 (Features 1 and 2) and Tests 6-7. The numbers of G4 flakes in the water screen samples taken from selected Component C contexts are used to estimate or project the actual frequencies of G4 flakes that were present in these contexts (Table 17). These projected amounts of G4 flaking debris can then be compared in correct proportion to the quantities of G1-3 flaking debris for a particular unit.

The flaking debris sample from Component C is amenable to limited mass analysis procedures. The conclusions drawn from this analysis must be viewed as tentative, however, because of the overall small size of the sample. One mass analysis technique involves calculating the ratio of numbers of G4 (small) to G1-3 (large) flakes (cf. Ahler and Swenson 1985:85, 193). This ratio provides a measure of the technological derivation of each flaking debris batch, where adequate samples are represented, based on data derived from Knife River flint knapping experiments. These experiments show that core reduction and heavy percussion flaking of large bifaces yield G4/G1-3 ratios ranging from about 1.63:1 to 4.03:1, while pressure flaking and light percussion flaking of small flake tools (combined final manufacturing and maintenance/resharpening operations) produces a mean ratio of about 13.3:1 (Ahler and Christensen 1983:372-378). Ahler and Swenson (1985:193) note that "village site flake samples typically produce ratios falling between these extremes." They interpret this as indicating that a combination of core reduction and pressure/maintenance flaking operations were performed at village sites, with variation in the ratio from one village context to another indicating changes in emphasis on flaking of large versus small lithic artifacts.

An overall G4/G1-3 flaking debris ratio of 9.28:1 is calculated for the Component C samples based on the data in Table 17. This figure is arrived at by dividing the projected number of G4 flakes (n=232) by the total number of G1-3 flakes (n=25). A G4/G1-3 ratio of 9.28:1 indicates that both core reduction and pressure/maintenance stone tool technological operations were performed at the site. However, the ratio is closest to the experimental pressure/maintenance value (13.3:1), therefore, the sample is dominated by debris from the manufacture and maintenance of smaller sized stone tools. It can be concluded on the basis of these limited data that stone tool technological operations performed by the occupants of Component C emphasized pressure flaking and light percussion flaking of relatively small tool forms during final manufacturing, maintenance, and resharpening procedures. Grosser stone tool technological operations such as core reduction and heavy percussion flaking of relatively large tool forms were performed less frequently. Such a pattern is what one would expect of persons who were primarily using stone tools for various tasks rather than manufacturing them.

As was mentioned previously, the Component B flaking debris is thought to derive exclusively from the reduction of a large block of Pierre Shale for purposes of manufacturing unpatterned flake tools. Reduction of the Pierre Shale mass was by hard-hammer percussion. Small, rounded fragments of Pierre Shale occur as a natural component of the soil matrix in the northeastern terrace (colluvial footslope), so the differentiation of small-sized shale flaking debris from naturally deposited shale was somewhat of a problem. As a consequence, the flaking debris category may contain a few natural pieces of shale and, by the same token, the natural rock category may contain a few pieces of flaking debris. Nevertheless, the categorization of this material is thought to be essentially accurate. One might expect proportionally higher

numbers of G1 and G2 flakes to be represented in the Component B flaking debris aggregate from the core reduction operation than are reflected in Table 17. However, some potential pieces of flaking debris may have been classified as tools, as was discussed previously, and one would also expect most larger flakes to have been removed from the location of core reduction and used as tools elsewhere at the site. These considerations seem to account for any apparent discrepancies in the flaking debris size grade data for Component B.

Flaking debris raw material type data by size grade for the Component C sample are contained in Table 18. All of the Component B flaking debris consists of Pierre Shale. The Component C flaking debris sample shows much the same pattern of local versus nonlocal raw material utilization that is reflected in the stone tools, but the flaking debris does exhibit a somewhat more varied suite of raw materials (cf. Table 15). Of particular note is the presence of smooth gray Tongue River silicified sediment from the northern resource group and plate chalcedony from the western resource group in the flaking debris sample. Plate chalcedony is commonly found as a companion material to Flattop chalcedony, another western resource group type that is represented in both the flaking debris and the tool samples from Component C. The raw materials represented in the Component C flaking debris aggregate are consistent with those identified in other Post-Contact Coalescent assemblages in the Lake Sharpe area (cf. Johnson 1984, 1989; Toom 1984a).

Fire-Cracked Rock

No fire-cracked rock (FCR) was recovered from the test excavations at Rattlesnake Keeper. The absence of this frequently abundant artifact category in the site collection seems unusual and is explainable in terms of activity structure or sampling bias. Most FCR is produced as a by-product of stone boiling and/or pit roasting of foodstuffs using super-heated stones. The apparent lack of FCR at Rattlesnake Keeper suggests that heated stones were not used in food preparation at the site, or that the limited testing did not encounter any locations where such activities were performed. The former alternative seems the most likely, and it is thought that the occupants of the site were not stone boiling or pit roasting food. This phenomenon may not be as unusual as it first appears. Granitic, basaltic, and quartzite rocks are preferred for use as heated stones. These materials are abundant in the local glacial-fluvial gravels in the Lake Sharpe area. However, the Rattlesnake Keeper location proper is stone-poor, except for Pierre Shale, so suitable stones would have to be brought into the site from some distance away (ca. 1-2 miles minimum). Apparently, the limited activities performed at the site did not require such an effort.

Miscellaneous Artifacts

Other artifacts recovered from the test excavations at Rattlesnake Keeper include unmodified natural clinker, shell, burned earth, and charcoal and wood. All of these materials were recovered from Component C contexts, with most found in Test 11 in association with Features 1 and 2 (Table 19).

Table 18. Chipped Stone Flaking Debris Raw Material Type Data by Size Grade, Component C, Rattlesnake Keeper Site (39LM160).

Raw Material Type	Size Grade				Total		
	Grade 1	Grade 2	Grade 3	Grade 4	n	%	
<u>Local Resource Group</u>							
02 Coarse Yellow TRSS	-	-	1	-	1	2.8	
04 Solid Quartzite	-	1	-	-	1	2.8	
06 Jasper/Chert	-	-	10	3	13	36.1	
08/09/10 Various Chalcedonies	-	-	1	1	2	5.6	
13 Basaltic	-	1	-	1	2	5.6	
16 Quartz	-	-	2	-	2	5.6	
37 Pierre Shale	-	-	1	1	2	5.6	
Subtotal, Local	-	2	15	6	23	63.9	
<u>Northern Resource Group</u>							
01 Smooth Gray TRSS	-	-	-	3	3	8.3	
<u>Western Resource Group</u>							
07 Flattop Chalcedony	-	-	1	1	2	5.6	
11 Plate Chalcedony	-	-	2	1	3	8.3	
<u>Southern Resource Group</u>							
15 Bijou Hills SS	-	-	5	-	5	13.9	
Subtotal, Nonlocal	-	-	8	5	13	36.1	
Total	n	-	2	23	11	36	100.0
	%	-	5.6	63.9	30.5	100.0	

Table 19. Data on Miscellaneous Artifacts by Test Unit, Component C, Rattlesnake Keeper Site (39LM160).

Test Unit		Clinker	Shell		Burned Earth (g)	Charcoal/Wood (g)
4	n	-	-	wt	-	-
5	n	-	-	wt	3	-
5-F3	n	-	-	wt	1	-
6	n	-	-	wt	2	7*
7	n	-	-	wt	1	-
11-F1/2	n	27	2	wt	27	35*
11-F1	n	2	-	wt	18	45*
Total	n	29	2	wt	52	87*

*Some charcoal and/or wood removed from samples for radiocarbon dating and/or identification purposes.

Natural Clinker

A total of 29 pieces of unmodified natural clinker are present in the Component C collection; none was recovered from Components A and B. All of the clinker from Component C is associated with the Feature 1/2 complex (Table 19). Included in the sample are 3 G1 specimens, 1 G2 specimen, and 25 G3 specimens. Two of the G1 pieces are fairly large, but none of the clinker specimens exhibit any clear evidence of tool use. It is thought that they are debris from the on-site manufacture of clinker abrading tools. If this interpretation is correct, then the clinker was likely collected in the immediate site vicinity as float material.

Shell

Two small G3 pieces of unmodified bivalve (mussel) shell were recovered from the site. These, too, are both related to Component C and associated with the Feature 1/2 complex (Table 19). The specimens were submitted to Paul R. Picha of the Department of Anthropology, University of North Dakota, Grand Forks, for description and identification. His report is as follows:

The two specimens from 39LM160 represent remains from freshwater mussels or clams. Both appear to be burned. Due to the eroded condition of the beak or umbone segment of one of these valve fragments it is not possible to provide a definitive identification. However, based on the overall shell thickness, relative size, and general morphology two candidates come to mind: Anodonta grandis (floater) or Anodontoides ferussacianus (cylindrical paper shell). This first species is a common river mussel and is probably a slightly more likely possibility only because of its more widespread distribution and frequency of occurrence (cf. Cvancara 1983:34-36). Both mussel species have been reported from other Post-Contact Coalescent sites in the Big Bend region (cf. Smith 1977:139).

The most likely sources of freshwater mussel shell found in archeological sites in the region include the less turbid tributary streams of the Missouri River, sloughs and backwater lakes in the Missouri floodplain, and perhaps also some stable-bottomed reaches of the Missouri River channel itself (cf. Cvancara 1975; Hoke 1983). It is suggested that these shell fragments are from mussels that were collected near the site. They could represent food debris and/or debris from the manufacture of shell artifacts.

Burned Earth

A few pieces of consolidated burned earth weighing a total of 52 g were recovered from Component C contexts at the site (Table 19). Included here are 11 g of G2 burned earth and 41 g of G3 burned earth. The specimens from Test 5 (Feature 3) and Test 11 (Features 1/2) were found in direct association with fire hearths. The specimens from Tests 6-7 are also believed to relate a hearth, but such a feature was not directly encountered in these test units. By all indications, a fourth hearth is present at the site just to the east of Test 6.

Charcoal/Wood

A total of 87 g of G1-3 pieces of wood charcoal and wood was recovered from Component C contexts at the site (Table 19). These, too, are either directly or indirectly related to fire hearths. Most of this material derives from Test 11 and includes both wood charcoal and wood associated with Features 1 and 2. Thirty grams of the charcoal from Feature 1 proper was used for two C-14 dating samples of 15 g each (cf. Table 10). The far lesser amount of material from Test 6 (about 7 g) consisted entirely of wood charcoal and all of it was used for C-14 dating, with the exception of one larger piece that was retained for purposes of identification. The charcoal from Test 6 is not directly relatable to a hearth, but such an association is certainly implied. No charcoal or wood was recovered from Feature 3 in Test 5.

Five larger-sized pieces of charcoal and two pieces of wood were submitted for identification to Craig E. Shuler, Wood Science Laboratory, Colorado State University, Ft. Collins. The charcoal specimens are identified as cottonwood (willow) or willow; the wood specimens are identified as juniper (Table 20). Shuler's full report can be found in Appendix C.

Table 20. Charcoal and Wood Sample Identification Information, Component C, Rattlesnake Keeper Site (39LM160). Identifications provided by Dr. Craig E. Shuler, Wood Science Laboratory, Colorado State University, Ft. Collins (see Appendix C).

Sample/ Catalog No.	Sample Provenience	Identification/Remarks
<u>Charcoal Samples</u>		
619	Test Unit 6, Level 19, 180-195 cm sd, General Level	Cottonwood (willow); associated with C-14 sample UCR-2382.
1104A	Test 11, Feature 1, 30-65 cm pd, Basin Hearth	Willow; associated with C-14 samples UCR-2381a and UCR-2381b; from hearth basin.
1104B	Test 11, Feature 1, 30-65 cm pd, Basin Hearth	Cottonwood (willow); associated with C-14 samples UCR-2381a and UCR-2381b; from hearth basin.
1104C	Test 11, Feature 1, 30-65 cm pd, Basin Hearth	Cottonwood (willow); associated with C-14 samples UCR-2381a and UCR-2381b; from hearth basin.
1104D	Test 11, Feature 1, 30-65 cm pd, Basin Hearth	Cottonwood (willow); associated with C-14 samples UCR-2381a and UCR-2381b; from hearth basin.
<u>Wood Samples</u>		
1101	Test 11, Features 1/2, 0-10 cm pd, Basin Hearths	Juniper; general hearth association.
1104	Test 11, Feature 1, 30-65 cm pd, Basin Hearth	Juniper; from hearth basin.

Vertebrate Faunal Remains

Vertebrate faunal remains represent the most abundant artifact class at Rattlesnake Keeper, totaling 1285 g of unmodified bone debris. Of this amount, 51 g shows evidence of burning. Thirty-six specimens are complete enough for identification to at least the family level. None of the vertebrate faunal specimens exhibit any clear evidence of modification and tool use (i.e., none are bone tools). The majority of the bone debris (793 g) comes from Component C contexts. Component B yielded a total of 489 g of bone, and only 2 g of bone were recovered from Component A (Table 21). The remaining 1 g of bone is from an ephemeral context that could not be directly related to any of the three components; it appears to be the result of vertical displacement from one of the component zones by rodent disturbance. All of the burned bone relates to Component C.

Identifications of vertebrate faunal remains were provided by John R. Bozell of the Nebraska State Historical Society, Lincoln (Appendix B). Summary data on the 36 specimens that were complete enough to be identified to the family level or lower are presented according to component in Table 22. Overall, the aggregate sample from the site is dominated by elements from species of large mammal (artiodactyls), particularly bison (61.1%). Data on minimum numbers of individuals (MNI) for the aggregate sample indicate that elements from only a very few individuals are represented in the collection. Although the sample is small, the low MNI values do suggest that only small-sized kills involving a few individual animals were processed at the site. Only certain salient aspects of the vertebrate faunal identification data are considered here. Bozell's complete report on the identified vertebrate faunal remains from Rattlesnake Keeper as well as the other two tested sites can be found in Appendix B.

Component C yielded the highest number of identifiable specimens (n=26) as well as the greatest taxonomic diversity (n=10). A single fish specimen (sucker) and a single reptile specimen (nonvenomous snake) are represented in the Component C sample. Birds identified among the Component C remains include teal, hawk, chicken or grouse, and magpie. All of the bird and fish elements were associated with the Feature 1/2 complex. The only other identifiable specimen recovered from Features 1 and 2 is a bison or wapiti (elk) digit. Mammals clearly dominate the identifiable remains from Component C. With the exception of the single bison or wapiti element, all of the mammal bone is from general level contexts in Tests 4-5 and Tests 6-7, including a Canis element, a deer or pronghorn element, and 15 bison elements. Bison is by far the single most numerous species among the identifiable remains from Component C, accounting for 57.7% of the sample.

Component B yielded eight identifiable specimens representing only two taxa. The Component B identifications consist of seven bison elements and one bison or wapiti element. Only two specimens from Component A were complete enough for identification and, oddly enough, these are the only two specimens recovered from Component A contexts at the site. The identified Component A specimens include one ground squirrel element and one Canis element.

Table 21. Unmodified Bone Size Grade Data by Test Unit and Component, Rattlesnake Keeper Site (39LM160).

Component/ Test Unit	All Bone (grams)				Burned Bone (grams)				
	G1	G2	G3	Total	G1	G2	G3	Total	
Component A									
4	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
5	wt	-	-	1	1	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
6	wt	-	-	1	1	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
7	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
Subtotal	wt	-	-	2	2	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
Component B									
4	wt	-	7	14	21	-	-	-	-
	%	-	33.3	66.7	100.0	-	-	-	-
5	wt	-	86	53	139	-	-	-	-
	%	-	61.9	38.1	100.0	-	-	-	-
6	wt	19	108	24	151	-	-	-	-
	%	12.6	71.5	15.9	100.0	-	-	-	-
7	wt	120	40	18	178	-	-	-	-
	%	67.4	22.5	10.1	100.0	-	-	-	-
Subtotal	wt	139	241	109	489	-	-	-	-
	%	28.4	49.3	22.3	100.0	-	-	-	-

Table 21. Unmodified Bone Size Grade Data by Test Unit and Component, Rattlesnake Keeper Site (39LM160), Continued.

Component/ Test Unit	All Bone (grams)				Burned Bone (grams)				
	G1	G2	G3	Total	G1	G2	G3	Total	
<u>Component C</u>									
4	wt	-	2	1	3	-	-	-	-
	%	-	33.3	66.7	100.0	-	-	-	-
5	wt	78	-	7	85	-	-	1	1
	%*	91.8	-	8.2	100.0	-	-	14.3	1.2
6	wt	24	191	306	521	-	10	33	43
	%*	4.6	36.7	58.7	100.0	-	5.2	10.8	8.2
7	wt	11	102	37	150	-	-	-	-
	%	7.3	68.0	24.7	100.0	-	-	-	-
11-F1&2	wt	-	10	24	34	-	-	7	7
	%*	-	29.4	70.6	100.0	-	-	29.2	20.6
Subtotal	wt	113	305	375	793	-	10	41	51
	%*	14.2	38.5	47.3	100.0	-	3.3	10.9	6.4
Total	wt	252	546	486	1284	-	10	41	51
	%	19.6	42.5	37.9	100.0	-	1.8	8.4	4.0

*Burned bone percentages are stated as a product of the quantities of "all bone."

Table 22. Summary Data on Identifiable Vertebrate Faunal Remains by Component, Rattlesnake Keeper Site (39LM160). Data from Bozell 1989 (Appendix B, this report).

Taxon	Component A		Component B		Component C		Aggregate Sample		
	n	%	n	%	n	%	n	%	MNI
FISH									
Catostomidae (sucker)	-	-	-	-	1	3.8	1	2.8	1
REPTILE									
Colubridae (nonvenomous snake)	-	-	-	-	1	3.8	1	2.8	1
BIRD									
<u>Anas</u> sp. (teal)	-	-	-	-	3	11.5	3	8.3	1
Accipitridae (hawk)	-	-	-	-	1	3.8	1	2.8	1
Galliformes (chicken/ grouse)	-	-	-	-	1	3.8	1	2.8	1
<u>Pica pica</u> (magpie)	-	-	-	-	1	3.8	1	2.8	1
MAMMAL									
<u>Spermophilis</u> sp. (ground squirrel)	1	50.0	-	-	-	-	1	2.8	1
<u>Canis</u> sp. (dog/wolf/ coyote)	1	50.0	-	-	1	3.8	2	5.6	1
<u>Bison bison</u> (bison)	-	-	7	87.5	15	57.7	22	61.1	3
<u>Bison/Cervus</u> (bison/ wapiti)	-	-	1	12.5	1	3.8	2	5.6	1
<u>Odocoileus/ Antilocapra</u> (deer/ pronghorn)	-	-	-	-	1	3.8	1	2.8	1
Total	2	100.0	8	100.0	26	99.6	36	100.2	13

Macrobotanical Remains

Macrobotanical remains consisting of carbonized and uncarbonized seeds were identified by Margaret A. Van Ness of Cimarron Environmental Consortium, Golden, Colorado. Van Ness' full report can be found in Appendix A. Only the salient aspects of her report are considered here. Charcoal and wood sample identifications made by another individual were discussed previously. The seeds in the site collection all derive from hearths assigned to Component C. Most of the material comes from flotation samples taken from the ashy fill of Features 1 and 3; several additional seeds were picked from the water screen sample from Feature 1. The uncharred seeds are believed to be modern contaminants, but a cultural association cannot be completely ruled out considering the relatively recent age of Component C.

Uncharred seeds of questionable cultural association include goosefoot, mallow family, mustard, prickly pear, grass family, skunkbrush, and wild plum. Charred seeds that are clearly related to the Component C occupation were identified as wild grape, corn, prickly pear, and one unknown specimen. The charred specimens indicate that both domesticated and wild plant foods were used at the site. Corn was typically grown by Plains Villagers in garden plots near their permanent villages (cf. Will and Hyde 1917). The corn from Component C was in all probability transported to Rattlesnake Keeper from the village that the task group originated from, and it was obviously intended for consumption by the members of the task group. The grape and the prickly pear are wild plant foods that could have been collected at or near the site. The presence of the wild plant foods indicates that gathering activities also took place at the site in addition to kill processing. Combined hunting and gathering activities are typical of Plains Village task groups (cf. Hurt 1969).

Artifact Distributions and Densities

Distribution and density data for major artifact classes at the Rattlesnake Keeper site are presented in Table 23. The data are organized according to test unit and component. Because each test unit was a 1 X 1 m square, with the exception of Test 11, the data provided for each test reflects quantities of artifacts per square meter. Test 11 was nominally a 1 X 2 m unit, but its actual excavated area, that portion of the test that covered all of Feature 1 and a part of Feature 2, was closer to 1 m². Totals for each component and for the site as a whole are stated as numbers or weights of artifacts per square meter of excavated area (n/wt/m²). The data in Table 23 are restricted to excavations into the northeastern terrace area of the site. None of the test units in the central bench area (Tests 1, 2, and 3) produced any artifacts, so for all practical purposes the central bench is no longer considered a part of the site proper.

A perusal of the data in Table 23 clearly indicates that Component C contains the most diverse array of artifacts at the site. Ceramics, stone tools, chipped stone flaking debris, and unmodified bone debris are all represented in the Component C assemblage in addition to other minor materials. With the exception of flaking debris, Component C also exhibits the highest artifact densities. Component B shows the highest density of

Table 23. Major Prehistoric Artifact Class Distribution and Density Data by Test Unit and Component, Northeastern Terrace Area, Rattlesnake Keeper Site (39LM160).

Component/ Test Unit	Rim Sherds	Body Sherds	Stone Tools	Flaking Debris (G1-3)	FCR (g)	Unmodified Bone (g)
<u>Component A</u>						
4	-	-	-	-	-	-
5	-	-	-	-	-	1
6	-	-	-	-	-	1
7	-	-	-	-	-	-
Subtotal n/wt/m ²	-	-	-	-	-	2 0.5
<u>Component B</u>						
4	-	-	2	5	-	21
5	-	-	9	96	-	139
6	-	-	-	-	-	151
7	-	-	-	-	-	178
Subtotal n/wt/m ²	-	-	11 2.75	101 25.25	-	489 122.25

Table 23. Major Prehistoric Artifact Class Distribution and Density Data by Test Unit and Component, Northeastern Terrace Area, Rattlesnake Keeper Site (39LM160), Continued.

Component/ Test Unit	Rim Sherds	Body Sherds	Stone Tools	Flaking Debris (G1-3)	FCR (g)	Unmodified Bone (g)
<u>Component C</u>						
4	-	-	-	-	-	3
5	-	1	-	-	-	85
6	7	99	3	12	-	521
7	-	20	1	1	-	150
11-F1&2*	2	25	10	12	-	34
Subtotal n/wt/m ²	9 1.80	145 29.00	14 2.80	25 5.00	- -	793 158.60
Total** n/wt/m ²	9 1.80	145 29.00	25 5.00	126 25.20	- -	1284 256.8

*Actual excavated area estimated at ca. 1 m².

**Total excavated area includes 5 m² in the northeastern terrace only (Tests 4-5, 6-7, and 11); this figure excludes 3 m² of excavation (Tests 1, 2, and 3) in the central bench which did not yield any artifacts.

flaking debris, but this is attributable exclusively to a single episode of core reduction centered around Test 5. Component B also produced appreciable amounts of bone debris and a number of expedient stone tools, but no other major (or minor) artifactual materials are represented in its collection. Only a few pieces of bone debris were recovered from Component A, which gives the impression of an exceedingly ephemeral occupation, at least with regard to the intact portion of the site. Fire-cracked rock, which is normally an abundant artifact class, is noticeably absent from the site collection as a whole, as was noted above.

Discussion and Conclusions

The Rattlesnake Keeper site is inferred to have functioned as a specialized activity location for Plains Village task groups of the Post-Contact Coalescent variant. In the Middle Missouri subarea of South Dakota, the Post-Contact variant is directly linked to the Arikara tribe (Lehmer 1971). The size of these task groups was probably small, perhaps numbering no more than 10-20 individuals, and they were most likely operating out of a nearby village site. More specifically, the available data indicate that the site functioned primarily as an animal kill processing location on three separate occasions. Secondary functions included the gathering of wild plant foods and possibly other plant materials, fishing, bird hunting, and perhaps the collection and preparation of pigments. The actual kill sites that were serviced by the Rattlesnake Keeper occupations were probably located somewhere nearby, either in the stream bottoms that run through the site area itself or at higher elevations in the more rugged Breaks terrain to the southeast of the site. Such locations would have provided excellent ambush opportunities as large herd animals such as bison moved down from the upland Plains to the river bottoms to water. Less gregarious species such as wapiti (elk) and deer also once frequented the Missouri Breaks zone because it provides superior cover; deer are still common today in the Breaks. These animals could also have been hunted effectively in the immediate site vicinity. No evidence of any intact kill sites was found near the site during survey (cf. Toom and Picha 1984). If the actual kill sites themselves were situated in the bottoms of drainageways, it is unlikely that they would have been preserved as part of the archeological record in this geomorphologically active setting.

Three components designated A, B, and C were identified at the site. Each component corresponds to a brief episode of site utilization. The components are stratigraphically distinct and well separated. Intact portions of these components appear to be restricted to a relatively small area of the site in the extreme northern part of the northeastern terrace near the Lake Sharpe shoreline (vicinity of Tests 4-5 and Tests 6-7). In profile in the Lake Sharpe cutbank, the components appear as three rather distinct bone layers. The depth of the components varies according to the surface topography, extending from as little as 80 cm sd (Component A) to as much as 200 cm sd (Component C). A large slump block detached from the main terrace body along the cutbank also exhibits three bone layers in some places.

Component C is clearly the most productive and best preserved component at the site. It yielded the most diverse artifact inventory of the three components, including evidence of features (basin hearths), as well as the most diverse activity structure. Specific activities at the site associated with Component C include animal kill processing, gathering, fishing, bird hunting, and possibly pigment production. Component C could also be interpreted as a field camp, but a location interpretation is preferred here because of the apparent brevity of the occupation. Component B produced quantities of unmodified bone and some lithic artifacts but little else. Component A yielded only a few grams of unmodified bone, which was unexpected because it appears as a much more substantial deposit in the cutbank exposure. These observations would seem to indicate that most of Component A has been destroyed by shoreline erosion and little of it remains intact at any distance back from the cutbank. Only kill processing activities are associated with Components A and B, and both clearly fit a strict location interpretation.

Component C is inferred to be affiliated with the Post-Contact Coalescent variant, most likely the Talking Crow phase. While this interpretation seems reasonably certain, one can see an Extended Coalescent variant affiliation as a more remote possibility. In any event, such a distinction may be purely academic from an archeological standpoint when working near the boundary or interface between these two Plains Village variants, as might be the case with Component C at Rattlesnake Keeper. The cultural affiliations of Components A and B are still in doubt, but it seems reasonable at this juncture to assume that they, too, are Post-Contact Coalescent. Alternatively, Components A and B could be manifestations of equestrian nomadic groups who occupied the area from the late A.D. 1700s into the 1800s. Additional research is required at the site to resolve this problem.

Radiocarbon dates, ceramics decorated with incised/trailed lines, the apparent absence of European trade goods, and the presence of a relatively robust native technology all indicate that Component C dates to the early Post-Contact period (if not the terminal years of the late prehistoric period). A date of occupation for Component C sometime between ca. A.D. 1655-1740 is suggested. Components A and B obviously post-date Component C stratigraphically. There is also some suggestion of a degenerative form of native lithic technology associated with Component B, so both Components A and B are tentatively identified as late manifestations of the Post-Contact variant. Dates of occupation falling somewhere between ca. A.D. 1740-1780 are suggested for Components A and B, with Component B preceding Component A. All three components clearly represent intermittent, short-term episodes of site utilization that probably did not exceed a few days. The three occupations need not necessarily be viewed as spanning a considerable length of time with respect to one another; closely spaced occupation episodes that occurred within no more than a few years of each other are a distinct possibility. The hearths associated with Component C, particularly the superpositioning of two separate fire basins within Feature 1, suggest an occupation span of approximately two days or perhaps slightly longer. The absence of hearths or other features in association with Components A and B suggests extremely brief site occupations of no more than a single day or perhaps even a few hours. The very brief site occupations inferred for Components A and B, as well as their more limited activity structures, may in part explain the lack of diversity in their artifact assemblages by way of comparison to that of Component C.

The native ceramic sherds from the site were all recovered from Component C contexts. All appear to be from small-sized, globular-shaped jars that are sometimes referred to as miniature vessels. Rims from such vessels are not readily classifiable according to existing Middle Missouri ceramic classification systems (cf. Johnson 1980). Three of the four vessels represented in the Component C sample exhibit incised/trailed decoration that is reminiscent of the Iona/La Roche Horizontal Incised types. The fourth vessel is classified as Talking Crow Brushed. Body sherd surface treatments are either plain/smoothed, simple-stamped, or decorated with incised/trailed lines.

There is considerable evidence to suggest that small ceramic vessels are characteristic of Plains Village field camps and locations. Similarly small-sized vessels are reported for the Plains Village ceramic aggregate from the Mondrian Tree site (32MZ58) in North Dakota (Johnson 1983). The Plains Village occupations at Mondrian Tree are largely attributed to mobile task

groups of Scattered Village complex peoples who used the site intermittently for short periods of time as a field camp. Johnson (1983:9.46-9.48) argues that the use of small vessels at Mondrian Tree reflects a basic need for portability among Plains Village task groups that were operating away from their permanent residential bases (i.e., their villages). This interpretation assumes that the vessels were transported to the site and not made on-site or stored there in anticipation of future use. A similar situation can be inferred for the Koehler site in North Dakota. Cooper (1958:26) reports that ceramic sherds from Koehler, a Heart River phase field camp, are markedly thinner than those from Double Ditch, a Heart River phase village. Thinner sherds translate into smaller vessels, so it seems reasonable to infer that small vessels were also used at Koehler. Small-sized vessels can also be inferred on the basis of body sherd thickness for a Plains Village hunting camp occupation at the Slaughterhouse Creek site in western Nebraska (Bozell and Ludwickson 1988).

An unusual characteristic of two of the ceramic vessels from Rattlesnake Keeper and the majority of the body sherds is the use of crushed bone as a tempering agent. In addition, a residue of red ochre was observed on the interior surfaces of some of the bone tempered body sherds. The ochre residue suggests that these vessels were used to process pigments at the site, perhaps by the heating iron oxide compounds collected from nearby Pierre Shale exposures. Alternatively, the vessels could have been used to mix a red paint that was then used for some purpose at the site. Such activities were probably incidental to the primary component function of a kill processing location.

Sherds tempered with crushed, calcined bone are also reported at the Slaughterhouse Creek Site (25DW17) near Crawford, Nebraska in the Central Plains subarea (Bozell and Ludwickson 1988:35). The site occupation is somewhat tentatively attributed to Extended Coalescent variant peoples (ca. A.D. 1550-1700), although a Post-Contact Coalescent occupation like that at Rattlesnake Keeper is also a possibility. No rim sherds were recovered, but body sherds decorated with incised/trailed lines are represented in the collection. Functionally, the site is interpreted as a bison hunting camp (field camp) and/or processing area (location) of short-term use. The ceramic sample from Slaughterhouse Creek is dominated by thin, bone tempered sherds. Bozell and Ludwickson (1988:52) suggest that such ceramic characteristics may be diagnostic of hunting camps. They note that Holen (1982, 1983; cited in Bozell and Ludwickson 1988:53) has argued that bone tempering reflects the on-site manufacture of ceramic vessels where this unusual tempering agent was used in the absence of other, more suitable materials.

The bone tempered vessels from Component C at Rattlesnake Keeper could be on-site manufactures, and this may explain the use of bone tempering. However, it is difficult to envision the circumstances under which a ceramic vessel would have been manufactured on-site at Rattlesnake Keeper considering the short-term nature of the occupation. It is equally possible that the bone tempered vessels were made elsewhere and transported to the site along with the other vessels represented in the collection. Furthermore, the association of bone temper and ochre residue in the same vessels may be indicative of a specialized function, perhaps one related to ceremonial or ritual activities. All speculation aside, the presence of vessels with such unusual attributes is not readily explainable and it certainly deserves special consideration in any future research at the site.

Only Component C yielded evidence of a robust lithic technology at the site. Overall, the Component C stone tools are typical of what one would expect at a kill processing location. The stone tools from Component B consist exclusively unpatterned chipped stone implements of Pierre Shale. Such a technological use of this material is clearly atypical, expedient, and suggestive of a degenerative form of lithic technology. Component A did not yield any stone tools or flaking debris.

The primary quarry processed at the site was clearly bison. Other large mammals are represented in the collection to a far lesser degree, including deer or pronghorn and perhaps wapiti (elk). The two Canis elements could represent either domestic dog or wild species such as wolf or coyote. Component C exhibits the highest species diversity, including fish, reptile, and bird specimens, in addition to those from large mammals. The remains from Component A are far too scant for any sort of definite interpretation. However, it is thought that a larger sample of material from Component A would reveal basic similarities with Component B which exhibited only large mammal remains that were almost exclusively identified as bison.

The test excavations completed at the site, as well as additional reconnaissance work, suggest that substantial, intact archeological deposits are restricted to a relatively small portion of the original site area. The extreme northern portion of the northeastern terrace (colluvial footslope) exhibits a small "flat" near the Lake Sharpe shoreline that seems to have been the focus of the site occupations (Figure 26). Tests 4-5 and 6-7 were excavated into this so-called flat and it is thought that this area, which covers no more than about 500 m², contains the bulk of the archeological deposits that are preserved at the site. Some of this area has been destroyed by shoreline erosion. The extent of the erosion is difficult to estimate precisely, but it is thought to have taken no more than about 100 m² of the original site area along the shoreline, including the slump block that still contains more or less intact cultural deposits pertaining, in places, to all three components. It appears that most of Component A has been lost to erosion, but much of the original areas of Components B and C remain intact. The only obvious opportunity to recover additional materials from Component A is offered by what might still be preserved in the portion of the slump block to the north of Test 11.

Farther to the south and east, just beyond the location of Tests 6-7, the bulk of the northeastern terrace is much steeper and more heavily dissected (Figure 26b), although this is not adequately represented on the site map (Figure 8). It is thought that this part of site has little archeological potential, but this observation has not been confirmed by testing. There are some places in the northeastern terrace away from the Lake Sharpe shoreline where areas of intact archeological deposits could be present, but their lateral extent would probably not be great. Test excavations into the central bench did not yield any artifacts. This area, which was initially thought to have some archeological potential, is now judged to be essentially sterile; it is no longer considered to be part of the site proper. The same statement can be made for the balance of the site area as mapped beyond the northeastern terrace. Back from the Lake Sharpe shoreline, virtually all of the mapped site area is very steep and eroded and it is difficult to envision any archeological potential for these locations.



a



b

Figure 26. Photos of the Northeastern Terrace Area, Rattlesnake Keeper Site (39LM160). a: Extreme northern part of the northeastern terrace (center, right), north-northwest view from the central bench; arrows indicate the estimated extent of the intact area of the site (photo no. 2507, UND 1983). b: Overview of the northeastern terrace from Lake Sharpe, southeast view; arrow indicates the intact area of the site (photo no. 3284, UND 1988).

As a documented Post-Contact Coalescent activity location, the Rattlesnake Keeper site represents a relatively unique archeological resource. Few such sites have been recorded or investigated in the past because most Plains Village research has focused on the more prominent village sites. In addition, the recently completed surveys of the project area were able to document only a few extant Plains Village locations (activity areas) (cf. Steinacher 1981; Steinacher and Toom 1984; Toom and Picha 1984). Thus, known Plains Village locations are a rare site type in the project area. The apparent rarity of such sites is difficult to explain, since a person would expect them to be rather common. It could be that most were situated in geomorphic contexts where their potential for preservation was low, or it could be that most were located along the river bottoms and now lie beneath the waters of Lake Sharpe.

Whatever the explanation, the Rattlesnake Keeper site is clearly of archeological significance. It offers a rare opportunity to study a little known Plains Village site type - the location - which was undoubtedly an important component of Plains Village settlement-subsistence patterns. A program of salvage excavation focusing on the northern portion of the northeastern terrace (vicinity of Tests 4-5 and Tests 6-7) is recommended for the site. In addition, it would also be advisable to conduct additional test excavations at selected locations along the full extent of the northeastern terrace.

VI. LOST NATION SITE (39LM161)

Site Description and Background

Site 39LM161, herein named the Lost Nation site, is located in a high cutbank of the MT-2 terrace opposite the mouth of Joe Creek (Figures 1, 27). The MT-2 tread is relatively narrow at this location. The higher MT-3 terrace rises a short distance to the south of the site. Short draws or gullies cut into the MT-2 tread mark the extreme eastern and western limits of the site area. The mouth of an intermittent stream channel is present some 350 m to the west of the site. The northern boundary of the site is the Lake Sharpe cutbank. The site consists of a deeply buried cultural horizon observed in the Lake Sharpe cutbank at about 175 cm sd (Toom and Picha 1984:147). The Lost Nation site has been and continues to be severely impacted by shoreline erosion. It is estimated that anywhere from 25-50% of the original site area has been lost to erosion by wave action from Lake Sharpe. The remaining site area covers some 6000 m² (Figure 28). The site lies at an elevation of about 1450 ft amsl. It is presently used as pasture (grassland) and does not appear to have been cultivated at any time in the past.

Previous Archeological Research

The Lost Nation site was discovered and first recorded by an archeological survey team from the University of North Dakota (UND) under the direction of T. L. Steinacher (Toom and Picha 1984; Picha and Toom 1984). The survey was conducted by UND under a contractual agreement with the Omaha District Corps of Engineers (USACE) as part of an archeological reconnaissance of selected federal lands along the west bank of the Lake Sharpe project area (D. L. Toom, principal investigator; S. A. Ahler, co-principal investigator). Work at the site by UND focused on the collection of documentary information, particularly map data and information on exposed artifactual remains.

No features were recorded at the site by the UND survey crew. A thin scatter of artifacts consisting of lithics and bone was observed on the narrow beach area opposite the site. This material was apparently eroding from a buried cultural horizon that was observed along a broad front in the cutbank exposure at about 175 cm sd. The cultural horizon is described as well developed and probably associated with a buried soil (paleosol). Artifacts observed in the buried horizon include charcoal, bone, burned earth, and some chipped stone. The only artifact collected at the site was a fully grooved maul. Close inspection of the cutbank by the survey crew was not very feasible due to its height and instability. No definite cultural affiliation could be suggested for the buried horizon. The site was recommended for testing and evaluation.



a



b

Figure 27. Overview Photos of the Lost Nation Site (39LM161). a: MT-2 terrace cutbank from Lake Sharpe, south view (photo no. 3260, UND 1988). b: Site area on the MT-2 terrace tread, north view (photo no. 3191, UND 1988).

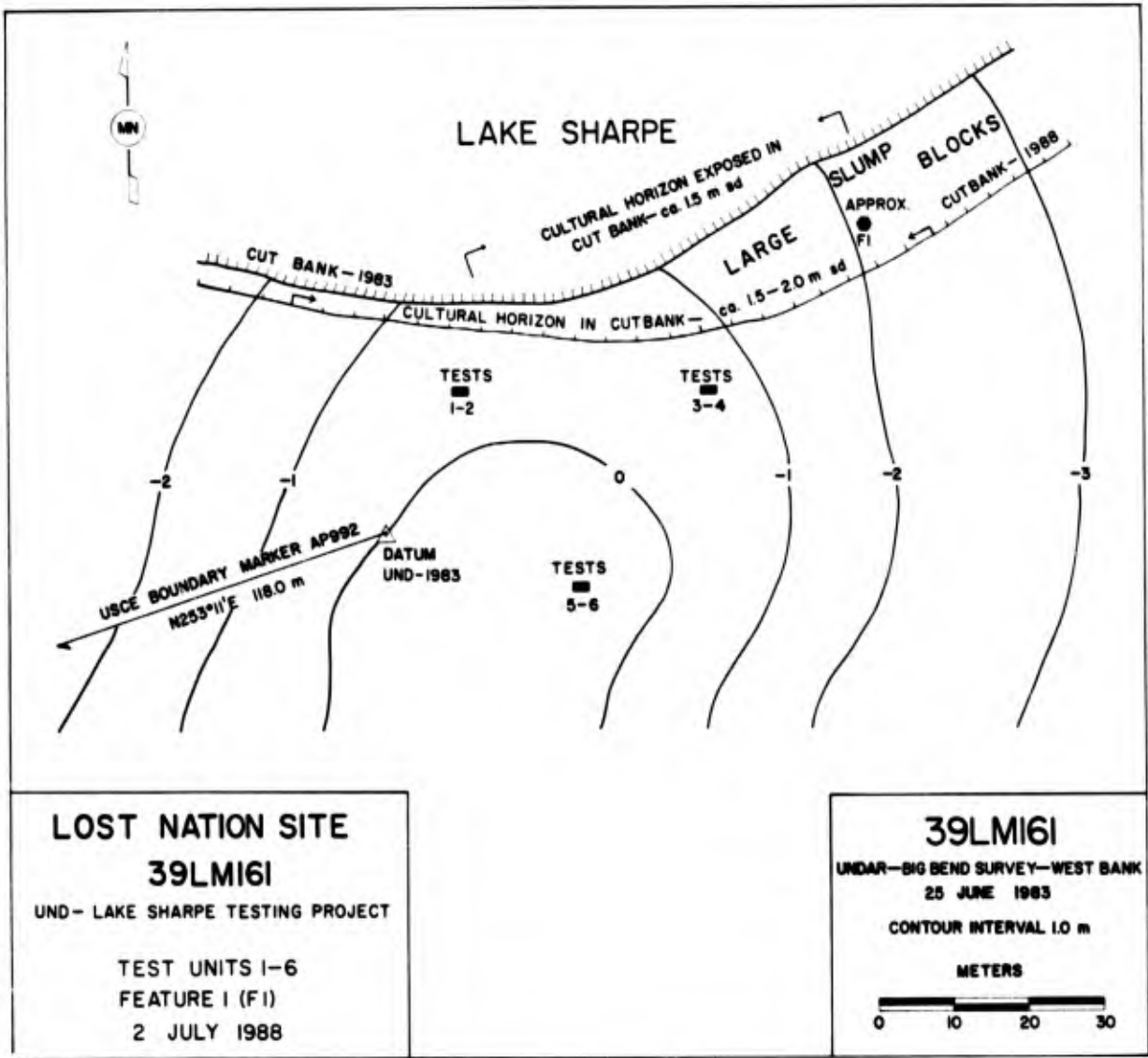


Figure 28. Contour Map of the Lost Nation Site (39LM161) (UND 1983 and 1988).

Present Investigations

The intent of these investigations is to act on the UND survey recommendations by testing and evaluating the buried cultural horizon at Lost Nation with respect to National Register criteria. In keeping with this goal, information was collected on the vertical and horizontal extent of the cultural deposit, its cultural affiliation, and its research potential. The cutbank at the site was thoroughly reexamined and a number of test units were dug by controlled techniques to the depth of the buried cultural horizon. Additional map data were also collected. The datum established at the site by the UND survey crew in 1983 was relocated and used to record the 1988 map data.

During a brief reconnaissance that was undertaken to relocate site 39LM161, it was found that the site location is incorrectly reported in the UND survey documentation (Picha and Toom 1984). 39LM161 is actually located some 180 m (600 ft) to the east of the location represented in the original documentation. Corrected site forms have been submitted to the Omaha District Corps of Engineers and the South Dakota Archaeological Research Center.

Fieldwork

The USACE scope of work calls for the excavation of five 1 X 1 m test units at the Lost Nation site to a maximum depth of 230 cm (Appendix K). Six 1 X 1 m tests were actually excavated at the site into and through the buried cultural horizon, which proved to be no deeper than 200 cm. With the consent of the USACE technical officer (Richard Berg), it was decided to dig the tests at the site as 1 X 2 m excavations due to the extreme depth of the archeological deposit. Thus, the six separate 1 X 1 m test units were combined into three 1 X 2 m excavations. These are labeled Tests 1-2, Tests 3-4, and Tests 5-6 (Figure 28). For purposes of record keeping, and to maintain horizontal provenience data at a minimum of 1 m², separate 1 X 1 m test unit designations were maintained within each 1 X 2 m excavation. Test unit specifications are presented in Table 24. Obviously, the excavation of three 1 X 2 m units necessitated the addition of another 1 X 1 m test to the site excavation plan, which accounts for the decision to dig six rather than five tests at the site. In addition, an irregular, horizontal excavation was made into the face of a large slump block along the Lake Sharpe shoreline in order to recover materials from a burned linear feature (Feature 1) that was exposed in profile (Figure 28). No excavation unit number was assigned to the Feature 1 excavation; it is referred to in the site records simply by the feature number.

The Lake Sharpe cutbank at the site was also thoroughly reexamined for evidence of the reported cultural horizon. The cutbank at the site is very high and unstable, making work in its face difficult and somewhat dangerous. The bank exhibits extensive tension cracks at several points along its front. Recent slumping on a massive scale was also evident, particularly along the eastern portion of the cutbank (Figures 27a, 29a). Remapping of the cutbank in 1988 reveals that anywhere from 5-20 m along the front of the site has been lost to erosion since it was first recorded in 1983 (Figure 28). A deeply

Table 24. Test Unit Specifications and Combined Units, Lost Nation Site (39LM161).

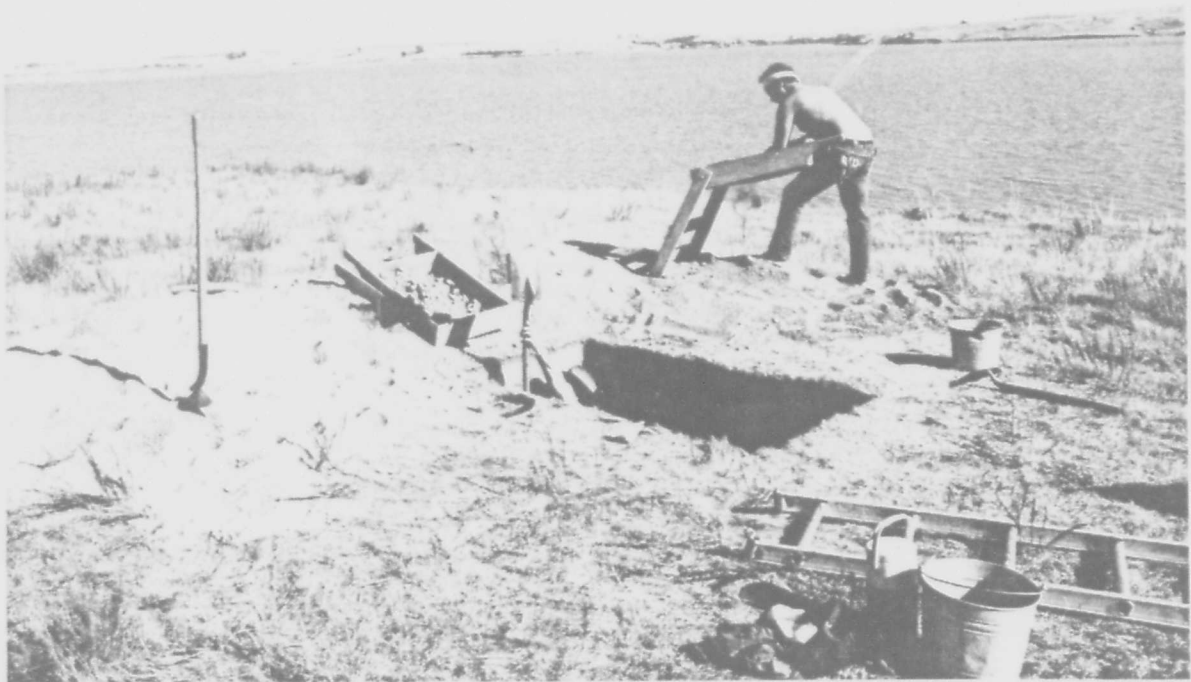
Test Unit	Location	Combined Units and Aggregate Size	Excavated Depth (cm)	Excavated Volume (m ³)
1	MT-2 Tread	Tests 1-2, 1 X 2 m	195	1.95
2	MT-2 Tread	Tests 1-2, 1 X 2 m	195	1.95
3	MT-2 Tread	Tests 3-4, 1 X 2 m	170	1.70
4	MT-2 Tread	Tests 3-4, 1 X 2 m	170	1.70
5	MT-2 Tread	Tests 5-6, 1 X 2 m	160	1.60
6	MT-2 Tread	Tests 5-6, 1 X 2 m	160	1.60
F1	Slump Block Face	Irregular	na	0.03
Total				10.53

buried archeological zone some 10 cm thick was observed along a broad front in the cutbank at depths ranging from ca. 150-200 cm sd, but usually seen at about 175 cm sd. Materials observed in profile in this zone principally consisted of bone and lithic artifacts. Feature 1, the burned linear feature, was discovered in a massive slump block during the cutbank inspection operation. The crew member visible in the photo in Figure 29a is standing over the location of Feature 1.

Test unit placement was judgmental and based on the perceived need to cover as much of the potential site area as possible within the revised scope of work, while at the same time attempting to maximize rates of artifact recovery. Excavation proceeded in basic 10 cm arbitrary levels. All soil matrix removed from the test excavations was screened over one-quarter inch mesh hardware cloth (Figure 29b). Two water screen samples (one-sixteenth inch mesh window screen) were also taken from selected general levels in the buried cultural horizon, one from Test 2 and one from Test 6. All of the soil matrix removed from Feature 1 was water screened. No artifacts were observed on the surface of the site.



a



b

Figure 29. Fieldwork Photos at the Lost Nation Site (39LM161). a: Massive slumping along the eastern side of the cutbank, east-northeast view; crew member is standing above the location of Feature 1 (photo no. 3235, UND 1988). b: Excavation of Tests 1-2, northwest view (photo no. 3193, UND 1988).

Geomorphic Context, Soils, and Stratigraphy

The Lost Nation site is situated in a rather narrow remnant of the tread of the MT-2 terrace. The outer margin of the terrace tread has been truncated by shoreline erosion, leaving a very high, unstable cutbank exposure. The loess deposits (silt loam) capping the MT-2 at this location appear to be excessively deep by way of comparison to other, similar exposures in the Lake Sharpe area. Typically, the MT-2 loess cap is no more than about 2 m thick along the shoreline. However, the maximum depth of the loess cap at the site can only be guessed at because the base of the cutbank exposure is completely covered by slump. Clearly, the loess cap is well in excess of 2 m deep at the site, potentially extending to a maximum depth of about 6 m. The excessive depth of the loess cap at the site is difficult to explain, but it is likely related at least in part to localized eolian depositional events of considerable magnitude. The site locality could also represent a former stream channel that has been largely filled by eolian deposits.

The surface soil at the site is mapped as a Lowry-Sully silt loam (LrD) (Schumacher 1987:Sheet 12). Lowry-Sully silt loams are deep, well drained, strongly sloping to moderately steep soils (9-25% slopes) formed on uplands (Schumacher 1987:23). The Lowry soils are on the less sloping parts of the landscape, while the Sully soils occupy the steeper slopes. The two soils are too intermingled or they occur in areas too small for separate mapping. In the case of 39LM161, the Lowry-Sully association is mapped along a low-lying terrace (MT-2) directly adjacent to Lake Sharpe. The site area proper is level to gently sloping and it is covered by very deep Lowry silt loam. Lowry series soils are classified as coarse-silty, mixed, mesic Typic Haplustolls (Schumacher 1987:159)

Profile Descriptions and Soil Horizons

The upper 2 m of the loess depositional unit at the site are of primary interest to these investigations because they contain the buried archeological horizon. Loess deposition at the site is seen as a more or less continuous process over the last several hundred years. This more or less constant addition of loess (silt loam or Sil) parent material has produced what is referred to as a cumulative soil profile (Birkeland 1984:184-185). Cumulative soil profiles are those that receive influxes of parent material while pedogenesis is ongoing; in essence, soil formation and deposition occur simultaneously at the same location. An overthickened or cumulative A horizon, one that is gradually buried during soil formation, is a common feature of cumulative soils. Cumulative A horizons as much as 60 and 90 cm thick were recorded in the upper solum of the loess mantling the MT-2 at the site. In point of fact, one could interpret the upper 1.5-2 m of the loess cap as a general cumulative A horizon.

The soil horizons described for the upper solum at the site exhibit two general A/B sequences to depths in excess of 2 m. The second A/B sequence recorded at depths below ca. 1-1.3 m is interpreted as a buried soil. All of the test excavations at the site have virtually identical stratigraphic sequences. All of the test units at the site exhibit virtually identical stratigraphic sequences (Figures 30-34). Only the profile of Tests 1-2 is

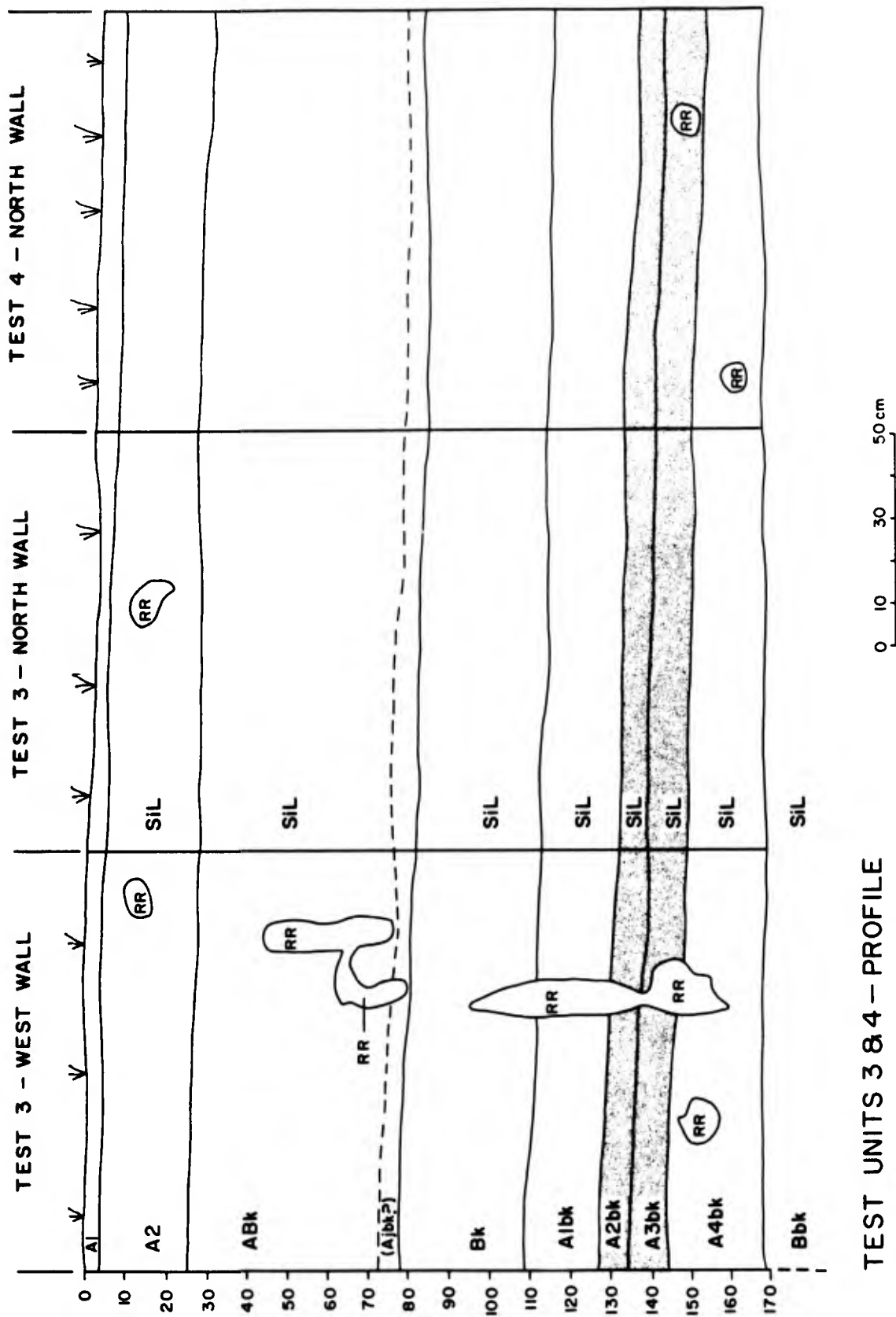
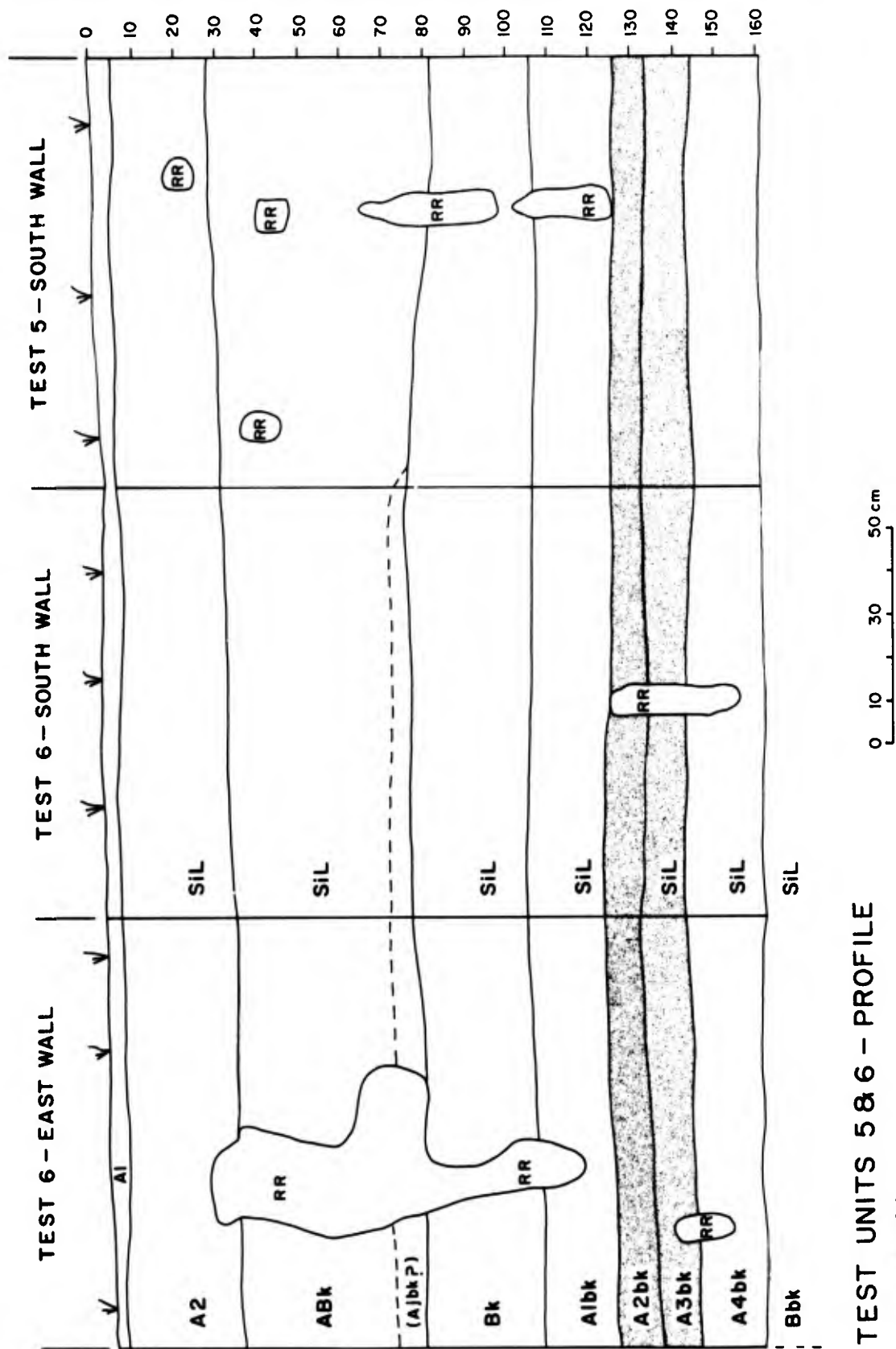


Figure 31. Profile Drawing of Tests 3-4, Lost Nation Site (39LM161).



TEST UNITS 5 & 6 - PROFILE
39LM161

Figure 32. Profile Drawing of Tests 5-6, Lost Nation Site (39LM161).



a



b

Figure 33. Profile Photos of Tests 1-2 and Tests 3-4, Lost Nation Site (39LM161). a: South wall of Tests 1-2 (photo no. 3198, UND 1988). b: North wall of Tests 3-4 (photo no. 3207, UND 1988).



a



b

Figure 34. Profile Photos of Tests 5-6, Lost Nation Site (39LM161). a: South wall of Tests 5-6 (photo no. 3212, UND 1988). b: East wall of Test 6 (photo no. 3208, UND 1988).

considered in any detail here; it serves as the stratigraphic control for Tests 3-4, Tests 5-6, and Feature 1. Detailed soil descriptions for the horizons recorded in Tests 1-2 can be found in Appendix D.

Tests 1-2 were dug near the Lake Sharpe cutbank to a depth of 195 cm sd. The surface soil consists of A1, A2, ABk and Bk horizons to a depth of about 130 cm sd. At the base of the ABk horizon, from about 85-90 cm sd, a thin, grayish-colored band exhibiting charcoal staining and flecking was recorded. This band is thought to be the product of an old prairie fire. One could characterize it as an Ajbk horizon, but its horizontal extent is open to question, and it is viewed here as a local anomaly within the Abk (Figure 30). Scattered, discontinuous charcoal stained bands were also observed throughout the A2 and ABk horizons, and these are also believed to be the result of prairie fires.

Below a depth of about 130 cm sd, and extending to approximately 185 cm sd, a series of four buried A horizons was recorded in Tests 1-2: Albk, A2bk, A3bk and A4bk (Figure 30). These can be seen most clearly in the close-up photo of the east wall of Test 6 (Figure 34b). The A3bk is very dark and prominent; the separation of the A2bk from the A3bk was not always clear and these two horizons are thought to be closely related if not actually one in the same unit. The Albk and the A4bk are much less strongly developed and they may simply represent the "bleeding" or spreading of the more prominent A2bk/A3bk horizons into adjacent B horizons from bioturbation. Disturbance from burrowing animals was found to be ubiquitous in the test excavations and, as a result, some blurring of soil horizon boundaries and mixing of materials between separate horizons has undoubtedly occurred. A Bbk horizon was recorded beneath the A4bk at a depth of about 185 cm sd. Excavation in Tests 1-2 was terminated at 195 cm sd, so the full extent of the Bbk is unknown. However, observations in the cutbank exposure suggest that the Bbk is quite thick.

Cultural Associations

Vertical artifact distributions and a few culturally diagnostic materials indicate that the site contains a single archeological component (Component A) that is attributable to the early Plains Woodland period. Most artifactual debris from the component is directly correlatable with the surface of the A4bk horizon (interface of the A3bk and A4bk horizons). Of particular note is a ground stone tool (a hammerstone) found in south wall of Test 2 directly on the surface of the A4bk (Figure 30). A few artifacts were encountered at depths above and below the surface of the A4bk, but these are thought to represent materials vertically displaced by burrowing animals.

The Big Bend Paleosol

The series of Abk horizons recorded at Lost Nation, particularly the prominent A2bk/A3bk, are interpreted as former surfaces of a buried soil in the loess cap, referred to in the present report as the "Big Bend paleosol." The Big Bend paleosol is the first (uppermost) prominent buried soil in the MT-2 terrace. It is laterally traceable in cutbank exposures of the MT-2 tread for a distance of over thirty river miles along the Lake Sharpe shoreline. The A horizon of the Big Bend paleosol, as it is defined here,

appears as a series of anywhere from three to four Abk horizons in the various MT-2 exposures. The complexity of the A horizons in the Big Bend paleosol is attributed to processes associated with cumulative soil profiles referenced above. In point of fact, the Albk-A4bk sequence recorded at Lost Nation represents a cumulative or overthickened A horizon some 60 cm thick. For purposes of discussion in this report, the cumulative A horizon (Abk series) of the Big Bend paleosol is referred to simply as the "Big Bend A."

In the Lake Sharpe project area, the average depth below the present ground surface for the Big Bend A ranges from as little as 50 cm to as much as 175 cm; its thickness varies from about 30-60 cm. The average depth (ca. 175 cm), thickness (ca. 60 cm), and complexity (Albk-A4bk) of the Big Bend A at Lost Nation represent the most extreme values yet encountered in the project area (Figure 35). Plains Woodland period components, like that at the Lost Nation site, are typically associated with the basal portions of the Big Bend A, thereby predating its period of maximum development or stability. Early Plains Village components are generally associated with the surface or near-surface of the Big Bend A and appear to relate directly, at least in part, to its period of maximum development.

Plains Village components observed in more or less direct association with the Big Bend A in the project area include the Initial and/or Extended variants of the Middle Missouri tradition at the Ketchen (39ST223), Cattle Oiler (39ST224), Eagle Feather (39ST228), and Stony Point (39ST235) sites, and the Initial variant of the Coalescent tradition at the Whistling Elk site (39HU242). These components range in age from ca. A.D. 1000-1300 on the basis of radiocarbon dates, stratigraphic correlations, and artifactual content. Preliminary results from ongoing research directed at the Big Bend A in the Lake Sharpe area indicate a period of maximum development beginning by at least A.D. 1000 and extending no later than about A.D. 1250 on the basis of observed archeological-stratigraphic relationships. While the termination date of this period seems fairly certain, the beginning date is still open to considerable question and could be up to a few hundred years earlier.

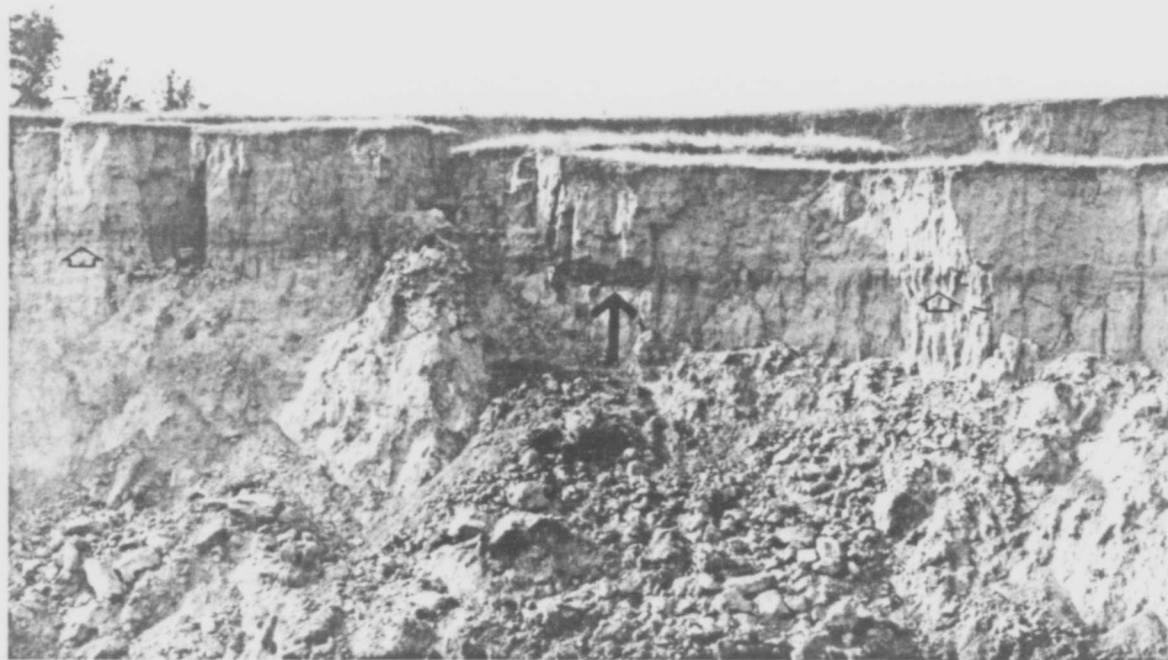
It must be emphasized and understood in no uncertain terms that these and other observations made on the Big Bend paleosol in the present report are preliminary and very tentative. Much additional research is needed to adequately characterize and date this interesting natural phenomenon and determine its relationship to defined archeological taxa in the Lake Sharpe area.

Archeological Components, Radiocarbon Dates, and Analytic Units

The Lost Nation site contains a single component (Component A) that relates to the early Plains Woodland period. Diagnostic artifacts (projectile points and ceramics) indicate an affiliation with the Sonota complex. The Sonota complex is best known from campsites and burial mounds found in the Middle Missouri subarea to the north of the Lake Sharpe project area (Neuman 1975:78). The Sonota complex is dated at ca. A.D. 1-600, largely on the basis of radiocarbon dates (Neuman 1975:88).



a



b

Figure 35. Photos of the MT-2 Cutbank Exposure at the Lost Nation Site (39LM161). a: Close-up of the MT-2 cutbank, west-southwest view; crew member on the slump block is directly above Feature 1; the "Big Bend A" is marked by arrows (photo no. 3239, UND 1988). b: Telephoto shot of Feature 1 (closed arrow) from Lake Sharpe, south view; the "Big Bend A" is marked by open arrows (photo no. 3263, UND 1988).

Unfortunately, no materials suitable for radiocarbon dating were recovered from the test excavations at Lost Nation. A date of occupation somewhere between A.D. 1-600 is suggested on the basis of its affiliation with the Sonota complex. All of the artifactual remains recovered from the site are assigned to Component A, the Sonota occupation. This component serves as the basic analytic unit for the description and analysis of the materials and information collected at Lost Nation.

Features

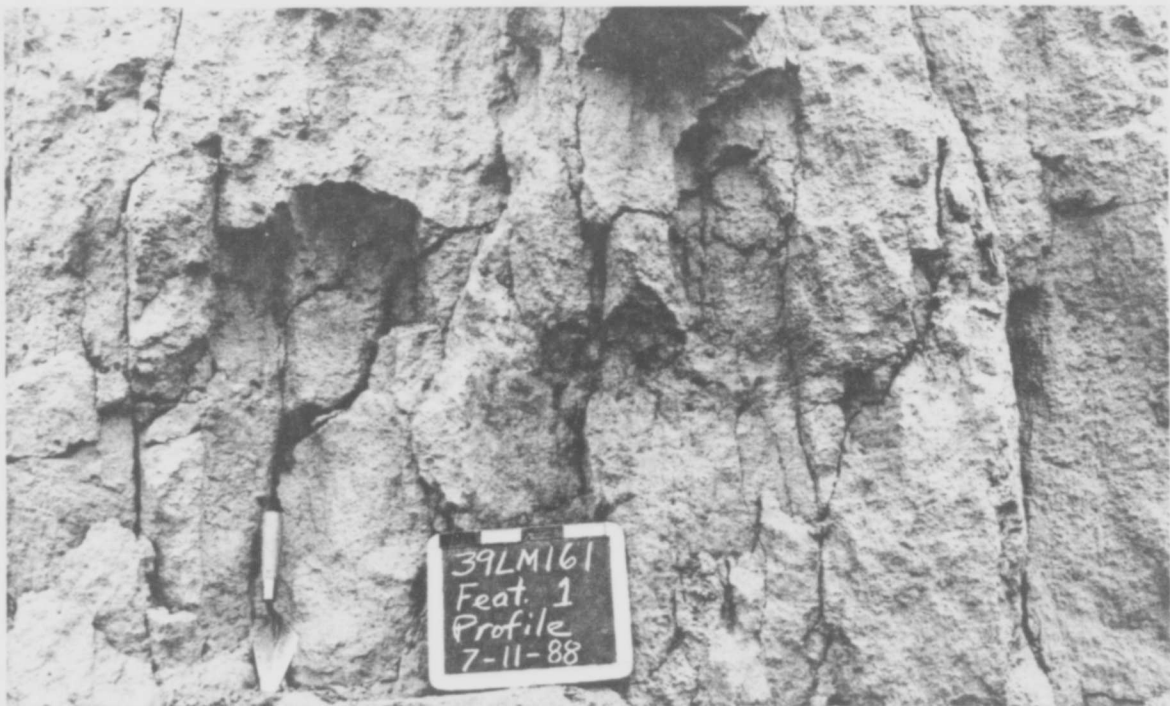
The only cultural feature encountered at the site was Feature 1, a linear construct about 2 m long and some 10-20 cm thick. The partial remains of Feature 1 were found exposed in profile in a large slump block along the Lake Sharp shoreline (Figure 35). It consisted of a darkened area of soil that exhibited scattered bone fragments, chipped stone, charcoal staining and flecking, and burned earth (Figure 36). The lower portion of the feature was a thin lense of burned earth. Stratigraphically, it is associated with the surface of the A4bk horizon, the position of the Sonota occupation zone (Figure 37). Overall, it appears to represent a shallow, flat-bottomed basin that was dug about 10 cm into the A4bk. The base (tang portion) of a dart point was recovered from the feature. The specimen is probably a fragment of a Besant/Sonota point, but it is too incomplete for a definite typological determination. No other diagnostic artifacts were found in the limited excavation into the feature. Still, the association of Feature 1 with the Sonota component at the site is clear.

The discovery of Feature 1 in a large slump block made effective documentation and excavation difficult. Faulting and cracking tended to obscure the extreme eastern portion of the feature, but to the west of the faulting it was clearly visible in profile (Figure 37). The general instability of the slump block and an overhang directly above the feature made a standard approach to excavation unfeasible. A limited horizontal excavation was made into the exposed profile of the feature to obtain a sample of its contents. Artifactual materials recovered include bone, chipped stone, fire-cracked rock, and burned earth. These are considered in greater detail in subsequent sections. The fill of the feature had a distinctly gritty texture from many sand-sized particles. Such a texture is not characteristic of the surrounding natural soil horizons which are exclusively silt loam. The anomalous texture of the feature fill indicates that this material was culturally introduced. Feature 1 did not seem to extend any great distance back into the slump block, and it is thought that most of it has eroded away.

Feature 1 is tentatively identified as the remains of a small domestic structure or house. Too little data are available to offer any definite insights into the characteristics of this potential structure, but some "educated guesses" can be offered. The floor of Feature 1 probably occupied a shallow, flat-bottomed pit or basin. An overall size or shape cannot be suggested, but the structure was probably not large and would likely have had a dome-shaped superstructure. The thin lense of burned earth at the floor level of the structure indicates that it may have been destroyed by fire. However, there was no evidence of charred structural elements in the profile or the excavation. Nothing is known for certain about the superstructure of the house, although a simple post and pole frame covered by matting and a thin

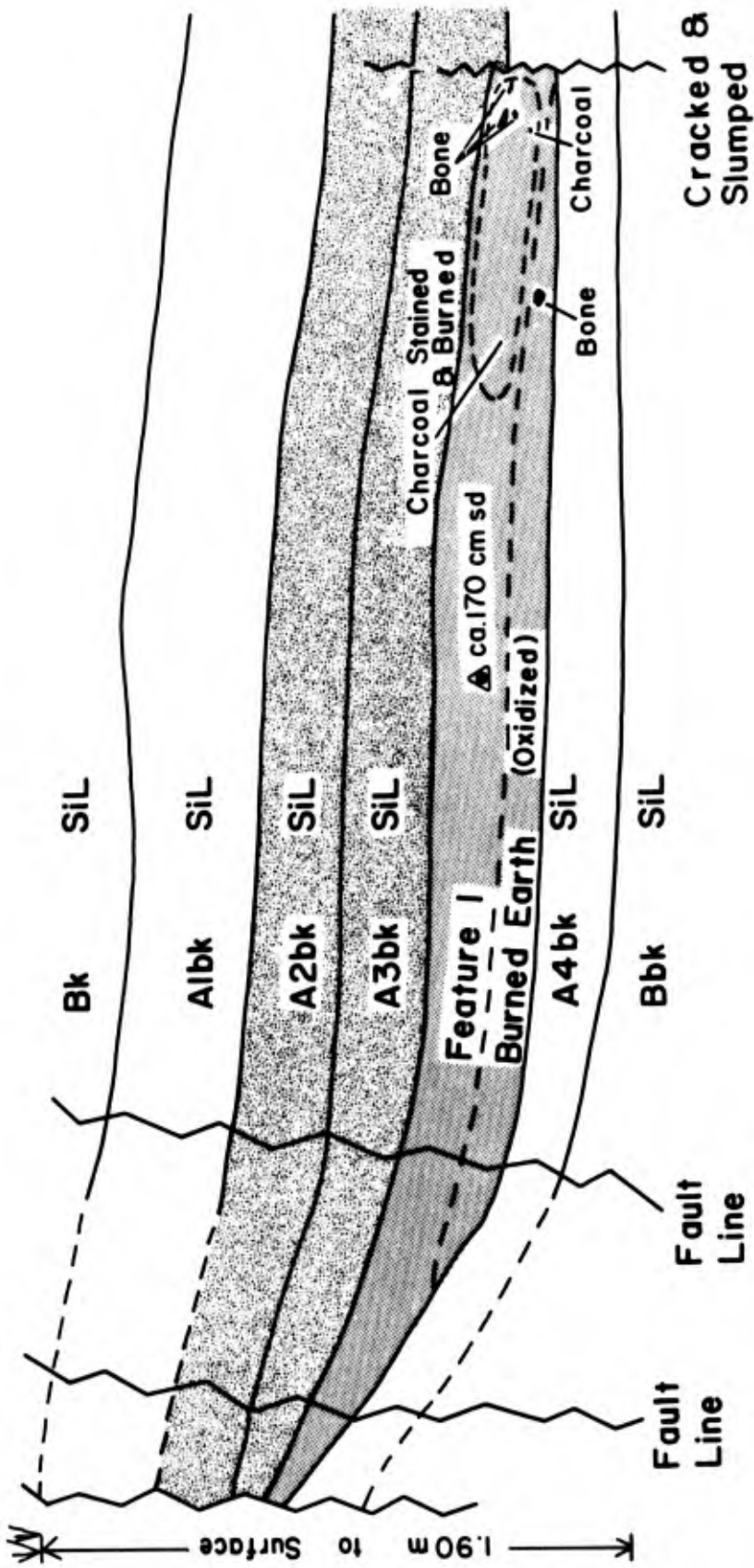


a



b

Figure 36. Photos of the Feature 1 Exposure, Lost Nation Site (39LM161).
a: General profile shot of Feature 1, south view (photo no. 3232, UND 1988). b: Close-up profile shot of Feature 1, south view (photo no. 3229, UND 1988).



39LM161
FEATURE 1
PROFILE IN SLUMP BLOCK
NORTH FACE

Figure 37. Profile Drawing of Feature 1, Lost Nation Site (39LM161).

blanket of earth is suggested. The gritty fill of the feature is probably artificial. It may represent construction material that was brought to the site from the nearby river bottoms, perhaps to prepare the floor of the house or for use as an earth covering over the superstructure. On a much smaller scale, this presumed structure may have been broadly similar in construction to the earthlodges of the succeeding Plains Village period.

All speculation aside, the interpretation of Feature 1 as a Sonota house is still open to considerable question, although one is hard pressed to come up with a plausible alternative explanation for this feature. There is no doubt that Feature 1 is a human-made construct, but whether or not it actually represents the remains of a dwelling can only be proven by additional excavations at the site.

Native Ceramics

The ceramic sample from Component A at the Lost Nation site is very meager but quite informative nonetheless. The mere presence of ceramics in the collection makes it possible to eliminate the possibility that the occupation was Late Plains Archaic. Sixteen G2-3 body sherds were recovered from the test excavations at the site (Table 25). Eight of the 16 specimens are from Test 5. No rims sherds were found.

The pottery is not very well made, but it is not excessively crude either. The paste is somewhat porous, slightly hard to soft, and tempered with grit (crushed granite) and perhaps sand. Very fine sand particles are clearly observable in the paste under low magnification, but it is not known whether the sand was a natural component of the clay or if it was intentionally introduced as a tempering agent. All of the sherds are a dull gray color. Thin, discontinuous calcium carbonate coats cover the undersides (downward depositional) of the sherds. The carbonate coats are pedogenic in origin, the product of burial in a carbonate-rich soil environment.

Most sherds exhibit considerable surface erosion and exfoliation (splitting). Complete (unsplit) sherds are quite thick and probably derive from large-sized vessels. It is not possible to suggest a vessel shape. Only one G2 sherd was complete and measurable; it has a maximum thickness of 10.8 mm. Surface treatment data for the 16 body sherds are presented in Table 26. Only four are definitely classifiable as cord-roughened (e.g., Figure 38a). Surface treatment for the remaining 12 sherds is indeterminate because of surface erosion and exfoliation, but it is thought that all of the sherds were cord-roughened. Generally speaking, the body sherds from the site have all the characteristics of a Plains Woodland assemblage. Even so, these alone are not enough to posit a Sonota complex affiliation.

Table 25. Native Ceramic Body Sherd Size Grade Data by Test Unit, Sonota Component, Lost Nation Site (39LM161).

Test Unit		Size Grade			Total
		Grade 1	Grade 2	Grade 3	
1	n	-	-	3	3
	%	-	-	100.0	100.0
2	n	-	-	2	2
	%	-	-	100.0	100.0
3	n	-	1	2	3
	%	-	33.3	66.7	100.0
4	n	-	-	-	-
	%	-	-	-	-
5	n	-	2	6	8
	%	-	25.0	75.0	100.0
6	n	-	-	-	-
	%	-	-	-	-
F1	n	-	-	-	-
	%	-	-	-	-
Total	n	-	3	13	16
	%	-	18.8	81.2	100.0

Table 26. Native Ceramic Body Sherd Surface Treatment Data by Test Unit, Sonota Component, Lost Nation Site (39LM161).

Test Unit		Plain/ Smoothed	Simple- Stamped	Cord- Roughened	Total Class.	Indet.	Total
1	n	-	-	-	-	3	3
	%*	-	-	-	-	-	-
2	n	-	-	-	-	2	2
	%	-	-	-	-	-	-
3	n	-	-	-	-	3	3
	%	-	-	-	-	-	-
4	n	-	-	-	-	-	-
	%	-	-	-	-	-	-
5	n	-	-	4	4	4	8
	%	-	-	100.0	100.0	-	-
6	n	-	-	-	-	-	-
	%	-	-	-	-	-	-
F1	n	-	-	-	-	-	-
	%	-	-	-	-	-	-
Total	n	-	-	4	4	12	16
	%	-	-	100.0	100.0	-	-

*Percentages are calculated based on the total number of classifiable sherds; indeterminate body sherds are excluded from percentage calculations.

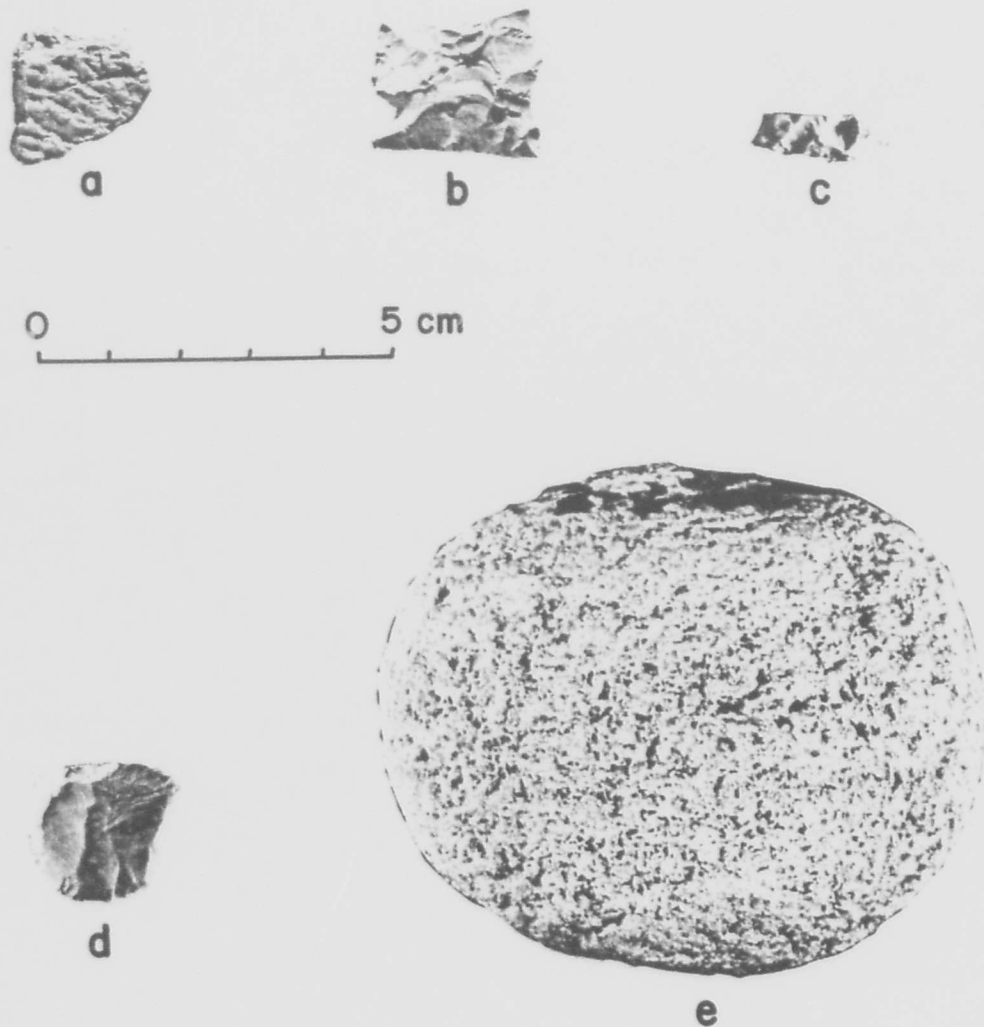


Figure 38. Photos of Selected Artifacts from the Sonota Component, Lost Nation Site (39LM161). a: Cord-roughened body sherd. b: Side-notched Besant/Sonota dart point base (functional class 44). c: Tang from untyped dart point base (functional class 44). d: End scraper (functional class 06). e: Hammerstone or pounder (functional class 29).

Stone Tools

Six stone tools were recovered from the test excavations at Lost Nation. All are attributable to Component A. Descriptive categories represented include patterned notched bifaces (n=2), patterned biface fragments (n=1), end scrapers (n=1), other retouched and modified flakes (n=1), and unpatterned pecked/ground tools (n=1). None of the tools are multifunctional. Selected specimens are illustrated in Figure 38.

Of particular significance is the base from a side-notched dart point recovered from 160-170 cm sd in Test 1 (Figure 38b). The point base compares very favorably with the Besant Side-Notched point type of the Northern Plains (cf. Johnson 1970; Reeves 1970, 1983), which is characteristic of the Sonota complex in the Middle Missouri subarea (cf. Neuman 1975:82). In recent years, Middle Missouri archeologists have actually begun to refer to Besant points as Sonota when they are found in association with ceramics in the subarea. The presence of a Besant/Sonota point, in conjunction with the ceramics, positively identifies Component A at Lost Nation as Sonota. The point is impacted fractured. It has been intentionally ground (dulled) around the base, most likely to facilitate hafting. Functionally, the specimen exhibits combined use as a projectile point and as a light duty bilateral cutting tool. The impact fracture indicates it was last used as a projectile point. Its discard at the site is probably a reflection of retooling activities following a hunting foray. The tang from the base of another dart point was found in Feature 1, as was mentioned above. This specimen is too fragmentary for a positive typological identification, but it, too, may represent a Besant/Sonota point (Figure 38c).

Tool Technology

Technological classification of the Component A stone tools is summarized according to test unit in Table 27. Five of the six tools were recovered from Tests 1-2, with the six coming from Feature 1. The sample is too small for a reliable technological evaluation. Furthermore, one can clearly see that patterned tools outnumber unpatterned tools. Such a finding is atypical and indicative of considerable bias in the collection because unpatterned flake tools alone will usually outnumber all other tool forms combined in assemblages from prehistoric habitation sites.

Technology and Lithic Raw Materials

Lithic raw material type frequency data for those technological classes represented in the Component A assemblage are presented in Table 28. The sample is too small to establish a meaningful pattern of lithic resource utilization. However, the use of Knife River flint from the Northern Resource group for the manufacture of patterned chipped stone tools is expected for a Sonota occupation (cf. Neuman 1975).

Table 27. Stone Tool Technological Class Data by Test Unit, Sonota Component, Lost Nation Site (39LM161).

Technological Class		Tests 1-2	Tests 3-4	Tests 5-6	F1	Total
1	Small Thin Patterned Bifaces	n %	- -	- -	- -	- -
2	Large Thin Patterned Bifaces	n %	2 40.0	- -	1 100.0	3 50.0
3	Irregular Unpatterned Bifaces	n %	- -	- -	- -	- -
4	Patterned Flake Tools	n %	1 20.0	- -	- -	1 16.7
5	Unpatterned Flake Tools	n %	1 20.0	- -	- -	1 16.7
6	Thick Bifacial Core-Tools	n %	- -	- -	- -	- -
7	Nonbipolar Cores-Tools	n %	- -	- -	- -	- -
8	Bipolar Core-Tools	n %	- -	- -	- -	- -
9	Unpatterned Pecked/Ground Stone Tools	n %	1 20.0	- -	- -	1 16.7
10	Patterned Pecked/Ground Stone Tools	n %	- -	- -	- -	- -
Total		n %	5 100.0	- -	1 100.0	6 100.1

Table 28. Stone Tool Raw Material Type Data by Technological Class, Sonota Component, Lost Nation Site (39LM161).

Resource Group and Raw Material Type	Technological Class				Total	
	2	4	5	9	n	%
<u>Local Resource Group</u>						
08 Clear/Gray Chalcedony	-	-	1	-	1	16.7
19 Granitic	-	-	-	1	1	16.7
<u>Northern Resource Group</u>						
28 Knife River Flint	1	1	-	-	2	33.3
<u>Miscellaneous/Unknown Resource Group</u>						
12 Burned Chalcedony (Probable KRF)	2	-	-	-	2	33.3
<hr/>						
Total	n	3	1	1	1	6
	%	50.0	16.7	16.7	16.7	100.1

Function and Use-Phase

Data on the functional classification of the Component A stone tools by use-phase class are contained in Table 29. The six tools from the component represent five individual functional classes. A meaningful functional assessment of the assemblage as a whole is not feasible due to the small numbers, but one can see a certain amount of functional diversity in the sample. The two dart point base fragments are classified as combination projectile points and cutting tools (class 44), which is typical of large point forms. In the case of the Besant/Sonota point base, this functional classification is based on observable use-wear attributes; in the case of the untyped tang, such use is assumed. The generalized patterned bifacial cutting tool (class 15) consists of a biface fragment that could not be more specifically classified in terms of function.

Other tools of interest in the collection include a patterned scraping tool or end scraper (Figure 38d). This specimen was used as a light duty transverse scraper on a soft work material (class 06), most likely to scrap flesh from the undersides of green or wet hides (Ahler 1979:321-322). The hammerstone or pounder (class 29) is a fist-sized granitic cobble with battered edges (Figure 38e). Such implements were used to manufacture other stone tools or to pulverize a worked material such as bone or pigment (Ahler and Swenson 1985:335). Either or both uses could apply to the specimen from Lost Nation.

Table 29. Stone Tool Functional Class Data by Use-Phase Class, Sonota Component, Lost Nation Site (39LM161).

General Functional Group/ Specific Functional Class	Use-Phase Class				Total	
	1	2	3	4		
2. Patterned Bifacial Cutting Tools (and Combination Projectile Point/ Cutting Tools)						
44 Projectile point/cutting tool combination	-	-	-	2	2	
15 Generalized patterned bifacial cutting tool	-	-	-	1	1	
3. Patterned or Heavy Duty Scraping Tools						
06 Light duty transverse scraper used on soft material	-	-	-	1	1	
6. Unprepared or Irregularly Modified Unpatterned Flake Tools						
22 Utilized flake used to saw or slice hard material	-	-	-	1	1	
14. Hammerstone/Anvils						
29 Hammerstone or pounder	-	-	1	-	1	
<hr/>						
Total	n	-	-	1	5	6
	%	-	-	16.7	83.3	100.0

Chipped Stone Flaking Debris

A total of 154 G2-4 pieces of flaking debris was recovered from the test excavations into Component A at Lost Nation (Table 30). The majority of the G2-3 flakes are from Tests 1-2. Flakes of G4 size are only recoverable from water screen samples. The water screen sample from Test 2 yielded 5 G4 flakes, while the water screen sample from Test 6 did not produce any. The matrix from the Feature 1 excavation was completely water screened, and it produced 59 G4 flakes and 5 G3 flakes.

Table 30. Chipped Stone Flaking Debris Size Grade Data by Test Unit, Sonota Component, Lost Nation Site (39LM161).

Test Unit		Size Grade				Total	Projected Grade 4*
		Grade 1	Grade 2	Grade 3	Grade 4*		
1	n	-	1	62	na	63	na
	%	-	1.6	98.4	na	100.0	na
2	n	-	1	18	5	24	50
	%	-	4.2	75.0	20.8	100.0	72.5
3	n	-	-	-	na	-	na
	%	-	-	-	na	-	na
4	n	-	-	-	na	-	na
	%	-	-	-	na	-	na
5	n	-	-	3	na	3	na
	%	-	-	100.0	na	100.0	na
6	n	-	-	-	-	-	-
	%	-	-	-	-	-	-
F1	n	-	-	5	59	64	59
	%	-	-	7.8	92.2	100.0	92.2
Total	n	-	2	88	64	154	na
	%	-	1.3	57.1	41.6	100.0	na

*Grade 4 debris is recovered from water screen samples only. Projected numbers of grade 4 debris are based on actual numbers in water screen sample fractions. Feature 1 (F1) was 100% water screened.

The small size of the flaking debris sample from Component A makes a reliable assessment of chipped stone technological operations problematic. However, the sample is amenable to limited mass analysis procedures like those applied to the Rattlesnake Keeper (39LM160) flaking debris aggregate (Section V). This mass analysis approach involves calculating the ratio of numbers of G4 (small) to G1-3 (large) flakes (cf. Ahler and Swenson 1985:85, 193). The ratio provides a measure of the technological derivation of each flaking debris batch, where adequate samples are represented, based on data derived from Knife River flint knapping experiments. These experiments show that core reduction and heavy percussion flaking of large bifaces yield G4/G1-3 ratios ranging from about 1.63:1 to 4.03:1, while pressure flaking and light percussion flaking of small flake tools (combined final manufacturing and maintenance/resharpening operations) produces a mean ratio of about 13.3:1 (Ahler and Christensen 1983:372-378). Ahler and Swenson (1985:193) note that "village site flake samples typically produce ratios falling between these extremes." They interpret this as indicating that a combination of core reduction and pressure/maintenance flaking operations were performed at village sites, with variation in the ratio from one village context to another indicating changes in emphasis on flaking of large versus small lithic artifacts.

The two flaking debris samples from Lost Nation with actual or estimated numbers of G4 flakes yield G4/G1-3 flaking debris ratios of 2.63:1 (Test 2) and 11.80:1 (Feature 1) based on the data in Table 30. This figure is arrived at by dividing the projected or actual numbers of G4 flakes in a sample by the total number of G1-3 flakes. The G4/G1-3 ratio of 2.63:1 for Test 2 suggests that core reduction and/or heavy percussion biface reduction were performed at this location. The G4/G1-3 ratio of 11.80:1 for Feature 1 is closest to the experimental pressure/maintenance value (13.3:1), therefore, the sample from Feature 1 is dominated by debris from the manufacture and maintenance of smaller sized stone tools. It can be tentatively concluded on the basis of these limited data that chipped stone tool technological operations at Lost Nation consisted of both heavy percussion reduction of larger tools and pressure flaking and light percussion flaking of smaller tools. The latter would have been performed during final manufacturing, maintenance, and resharpening procedures. In addition, it appears that heavier percussion operations were performed outside of structures at the site, while the more delicate operations were performed inside of structures, assuming that Feature 1 was in fact a structure.

Flaking debris raw material type data by size grade are presented in Table 31. The range of raw materials used in the manufacture of chipped stone tools at the site is greater than that identified in the analysis of the stone tools proper, but this is not unexpected considering the relatively small number of tools in the collection. Local lithic materials (29.2%) are represented less frequently than nonlocal materials (52.0%). Burned chalcedony which cannot be more specifically identified makes up the balance of the assemblage (18.8%). It is thought that much of the burned chalcedony is either Knife River flint or Flattop chalcedony, which, if true, would make the percentage of nonlocal materials even greater (ca. 70.8%). The single most numerous raw material type in the aggregate sample is Knife River flint (33.1%) from the northern resource group. A high level of Knife River flint utilization is expected of a Sonota assemblage (cf. Neuman 1975). The

Table 31. Chipped Stone Flaking Debris Raw Material Type Data by Size Grade, Sonota Component, Lost Nation Site (39LM161).

Raw Material Type	Size Grade				Total	
	Grade 1	Grade 2	Grade 3	Grade 4	n	%
<u>Local Resource Group</u>						
05 Porous Quartzite	-	-	-	2	2	1.3
06 Jasper/Chert	-	-	2	8	10	6.5
08/09/10 Various Chalcedonies	-	-	24	6	30	19.5
13 Basaltic	-	1	1	-	2	1.3
35 Other Quartzite	-	-	1	-	1	0.6
Subtotal, Local	-	1	28	16	45	29.2
<u>Northern Resource Group</u>						
01 Smooth Gray TRSS	-	1	-	-	1	0.6
28 Knife River Flint	-	-	44	7	51	33.1
<u>Western Resource Group</u>						
07 Flattop Chalcedony	-	-	1	20	21	13.6
11 Plate Chalcedony	-	-	4	3	7	4.6
Subtotal, Nonlocal	-	1	49	30	80	52.0
<u>Miscellaneous/Unknown Resource Group</u>						
12 Burned Chalcedony	-	-	11	18	29	18.8
Total	n	-	2	88	64	154
	%	-	1.3	57.1	41.6	100.0

presence of Flattop chalcedony and plate chalcedony from the western resource group indicates that Sonota peoples in the Lake Sharpe area did not focus exclusively on Knife River as a source of high quality flakeable stone.

Sources of Flattop chalcedony and plate chalcedony are located in the Big Badlands area (White River drainage) of southwestern South Dakota, some 200 km to the southwest of the Lake Sharpe area. These lithic types are found in Ahler's (1977a) White River group of materials. By way of contrast, primary sources of Knife River flint are found some 400 km to the northwest of the project area (Ahler 1977a; Clayton et al. 1970). It stands to reason that Sonota peoples in the project area would have made some use of the closer, high quality sources of stone such as Flattop and plate chalcedony in addition to Knife River flint. The only other nonlocal lithic type identified in the assemblage consists of a single piece of smooth gray Tongue River silicified sediment, which is part of the northern resource group along with Knife River flint. The apparently low level of use for this raw material type in comparison to Knife River flint is remarkable because primary sources of smooth gray Tongue River are much closer to the Lake Sharpe area (ca. 200 km) (Ahler 1977a). The limited data from the site do indicate a clear preference for Knife River flint among the Sonota peoples who occupied Lost Nation, even to the exclusion of certain other, closer lithic resources.

Fire-Cracked Rock

Only a few pieces of fire-cracked rock (FCR) were found in the test excavation into Component A, weighing a mere total of 151 g (Table 32). The largest quantities of FCR recovered from archeological sites like Lost Nation are usually associated with basin-shaped pits (cf. Toom and Gregg 1983; Gregg 1987). The apparent paucity of FCR at the site is likely a reflection of sample bias because no such features were encountered in the limited excavations completed at the site. Virtually all of the FCR in the site sample consists of local granitic rocks.

Miscellaneous Artifacts

The only miscellaneous artifacts collected from the site include a single piece of shell and 202 g burned earth (Table 33). The shell specimen is a small, fragile fragment from a bivalve. It most likely comes from a freshwater mussel that was collected near the site; it is too fragmentary for a more specific identification. Virtually all of the burned earth in the collection derives from the Feature 1 excavation (201 g), which contained a distinctive lense of burned earth as well as scattered pieces of this material. The remaining 1 g of burned earth was recovered from Test 1.

Table 32. Fire-Cracked Rock Size Grade Data by Test Unit, Sonota Component, Lost Nation Site (39LM161).

Test Unit		Size Grade (grams)			Total
		Grade 1	Grade 2	Grade 3	
1	wt	-	11	3	14
	%	-	78.6	21.4	100.0
2	wt	130	-	-	130
	%	100.0	-	-	100.0
3	wt	-	-	1	1
	%	-	-	100.0	100.0
4	wt	-	-	1	1
	%	-	-	100.0	100.0
5	wt	-	-	-	-
	%	-	-	-	-
6	wt	-	-	4	4
	%	-	-	100.0	100.0
F1	wt	-	-	1	1
	%	-	-	100.0	100.0
Total	wt	130	11	10	151
	%	86.1	7.3	6.6	100.0

Table 33. Data on Miscellaneous Artifacts by Test Unit, Sonota Component, Lost Nation Site (39LM161).

Test Unit		Shell		Burned Earth (g)
1	n	1	wt	1
2	n	-	wt	-
3	n	-	wt	-
4	n	-	wt	-
5	n	-	wt	-
6	n	-	wt	-
F1	n	-	wt	201
Total	n	1	wt	202

Vertebrate Faunal Remains

Vertebrate faunal remains from the test excavations into Component A at Lost Nation total 200 g of unmodified bone debris. Of this amount, 115 g (57.5%) shows evidence of burning. Most of the bone debris (147 g) is from the Feature 1 excavation (Table 34). Only three specimens are identifiable at the family level or lower. No modified bone (bone tools) is represented in the collection.

The three identified specimens are (1) a bison tarsal, (2) a bison rib, and (3) a premolar from a deer or pronghorn (Appendix B). The unidentifiable portion of the assemblage is largely attributed to species of large mammal, such as bison, but several bone fragments from Tests 5-6 may be from medium-sized mammals such as carnivores or deer/pronghorn. The sample is too small to infer any reliable pattern of mammalian faunal exploitation for the Sonota occupation at the site, but an emphasis on bison is to be expected (cf. Neuman 1975), and the available data seem to point to such an interpretation. The complete report on the identified vertebrate faunal remains from Component A at Lost Nation can be found in Appendix B.

Table 34. Unmodified Bone Size Grade Data by Test Unit, Sonota Component, Lost Nation Site (39LM161).

Test Unit		All Bone (grams)				Burned Bone (grams)			
		G1	G2	G3	Total	G1	G2	G3	Total
1	wt	-	12	7	19	-	-	3	3
	%*	-	63.2	36.8	100.0	-	-	42.8	15.8
2	wt	-	3	10	13	-	-	2	2
	%*	-	23.1	76.9	100.0	-	-	20.0	15.4
3	wt	-	7	1	8	-	-	-	-
	%	-	87.5	12.5	100.0	-	-	-	-
4	wt	-	-	8	8	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
5	wt	-	-	4	4	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
6	wt	-	-	1	1	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
F1	wt	-	76	71	147	-	49	61	110
	%*	-	51.7	48.3	100.0	-	64.5	85.9	74.8
Total	wt	-	98	102	200	-	49	66	115
	%*	-	49.0	51.0	100.0	-	50.0	64.7	57.5

*Burned bone percentages are stated as a product of the quantities of "all bone."

Artifact Densities and Distributions

Distribution and density data on the major classes of prehistoric artifacts from Component A at Lost Nation are presented in Table 35. The data are organized according to test unit. Because each test unit is a 1 X 1 m square, the data provided for each test represents quantities of artifacts per square meter. Totals for the site component are stated as numbers or weights of artifacts per square meter (n/wt/m²). For purposes of this analysis, the excavated area of Feature 1 is nominally stated at 1 m², bringing the site total to 7 m². A perusal of the data in Table 35 indicates that the highest densities for most classes of artifacts are represented in Tests 1-2. Test 5 yielded the most ceramic remains, and Feature 1 produced the most unmodified bone. Overall artifact densities for the Sonota component at the site do not seem to be especially high, but little comparative data of this sort are available from other, similar sites.

Table 35. Major Prehistoric Artifact Class Distribution and Density Data by Test Unit, Sonota Component, Lost Nation Site (39LM161).

Test Unit	Rim Sherds	Body Sherds	Stone Tools	Flaking Debris (G1-3)	FCR (g)	Unmodified Bone (g)
1	-	3	3	63	14	19
2	-	2	2	19	130	13
3	-	3	-	-	1	8
4	-	-	-	-	1	8
5	-	8	-	3	-	4
6	-	-	-	-	4	1
F1*	-	-	1	5	1	147
Total	-	16	6	90	151	200
n/wt/m ²	-	2.29	0.86	12.86	21.57	28.57

*Excavated area nominally stated at 1 m².

Table 36. Comparative Artifact Density Data for Selected Components at the Lost Nation Site (39LM161) (this report), the Mondrian Tree Site (32MZ58) (Toom and Gregg 1983), and the Naze Site (32SN246) (Gregg 1987).

Site and Component	Ceramic Sherds	Stone Tools	Flaking Debris (G1-3)	FCR (g)	Unmodified Bone (g)
<u>Lost Nation</u> Component A - Sonota					
n/wt/m ²	2.29	0.86	12.86	21.57	28.57
<u>Mondrian Tree</u> Zone 2 - Pelican Lake					
n/wt/m ²	0*	0.82	15.83	500	30
<u>Naze</u> Zone 2 - Sonota					
n/wt/m ²	6.52	2.44	25.90	2280	400

*The Pelican Lake component at Mondrian Tree is preceramic (or nonceramic).

Data on artifact densities per square meter are available for the Mondrian Tree site (32MZ58) in western North Dakota (Toom and Gregg 1983). The Pelican Lake complex component (Zone 2) at Mondrian Tree is generally comparable to the Sonota complex component at Lost Nation. The Pelican Lake component at Mondrian Tree is assigned to the Late Plains Archaic period, predating the Sonota component at Lost Nation by some 500 years, but Besant points were associated with this component at Mondrian Tree. Furthermore, the Pelican Lake component at Mondrian Tree is interpreted as a short-term field camp occupation, which is the minimal functional assessment for the Sonota component at Lost Nation. Artifact density data are also available for the Sonota component (Zone 2) at the Naze site (32SN246) in eastern North Dakota (Gregg 1987). The Sonota component at Naze is interpreted as a series of intermittently occupied field camps or perhaps a residential base camp.

Comparative artifact density data for the three sites are presented in Table 36. Overall, the density data for the Sonota component at Lost Nation compares favorably with that for the Pelican Lake component at Mondrian Tree. Only FCR exhibits an appreciably higher density value at Mondrian Tree. This discrepancy is explainable in large part as a result of sampling bias. Most FCR from Mondrian Tree was recovered from basin-shaped pits, and features of this kind were not encountered in the far more limited excavations at Lost Nation. The Pelican Lake component at Mondrian Tree is preceramic (or nonceramic), so the number of ceramic sherds is irrelevant for purposes of

comparing artifact densities. It should also be noted that two brief episodes of occupation are inferred for the Pelican Lake field camp in Zone 2 at Mondrian Tree (Horizons 1 and 2), whereas the Sonota component at Lost Nation is thought to represent a single occupation episode (Component A). This indicates that the Sonota occupation at Lost Nation was actually somewhat more intensive than either of the individual Pelican Lake occupations in Zone 2 at Mondrian Tree.

The Sonota component at Naze exhibits much higher artifact densities than either of the components at Lost Nation and Mondrian Tree. This is undoubtedly a reflection of a much more intensive level of occupation. As was noted above, the Sonota component at Naze represents a series of intermittent field camp occupations or possibly a residential base camp that was occupied for some length of time. Consequently, one would expect the Sonota component at Naze to produce considerably higher artifact density values.

Discussion and Conclusions

The available data for the Sonota Component at Lost Nation indicates that it minimally functioned as a field camp occupation for a moderate-sized group (ca. 50 persons?) of nomadic hunter-gatherers. The field camp interpretation is based on the diversity of its artifactual content. Artifact densities suggest that this occupation was not particularly intensive nor was it of very long duration. A single episode of site occupation is inferred on the basis of restricted vertical artifact distributions. There is some indication that the remains of Sonota dwellings are (or were) present at the site. If this is so, the occupation may be more appropriately interpreted as a residential base camp. However, the relatively low artifact densities would seem to argue against a base camp occupation.

The presence of Sonota houses at the Lost Nation site is a tantalizing possibility nonetheless. House 2 at the La Roche site (39ST9) is the only documented Plains Woodland structure in the Middle Missouri subarea (Hoffman 1968:7-8), and it has been specifically linked to the Sonota complex (Neuman 1975:82-83). House 2 at La Roche exhibited an oval-shaped floor plan that measured about 27 X 23 ft (8 X 7 m). It is reconstructed as a small dome-shaped structure with a wood (post and pole) frame that was covered with thatch, bark, and/or brush (cf. Hoffman 1968:8, Figure 5). While such an interpretation is somewhat at odds with that speculated on here for Feature 1 at Lost Nation, additional data are clearly needed before any definite conclusions can be reached about Sonota complex architecture. The Lost Nation site may contain archeological remains that can help fill this gap in our knowledge of Sonota lifeways.

Looking farther afield to the Northeastern Periphery of the Plains, evidence of an Early Woodland (pre-Sonota) structure was recently uncovered at the Naze site (32SN246) on the James River in eastern North Dakota (Gregg 1987). While the estimated age of this structure (ca. 550-410 B.C.) predates the Sonota complex, it does offer some additional insights into the nature of Plains Woodland architecture. The Early Woodland house at Naze is interpreted as a conical wood-framed structure that was covered with bark, matting, hides, and/or earth (Kordecki 1987:97-98). A circular or ovoid floor plan is inferred for the house, with a minimum diameter of about 6 m, covering an area

just under 30 m². The structure was destroyed by fire and quantities of burned daub and earth were associated with it, suggesting that the superstructure was principally covered with earth. The Sonota (Middle Woodland) component at Naze, dated at ca. 40 B.C.-A.D. 70, did not yield any clear evidence of structural remains.

The only other site in the project area containing a component that has been definitely linked to the Sonota complex is the La Roche site (39ST9) (Neuman 1975:82-83). Other than the presence of a Plains Woodland structure at the site, little additional information is available on the Sonota component at La Roche (Hoffman 1968). Unfortunately, the La Roche site has been completely inundated by Lake Sharpe and is no longer available for study. Other potential Sonota complex components in the project area have been recorded at the Diamond-J site (39HU89), the Rousseau site (39HU102), and the Little Elk site (39HU221) (Steinacher 1984b, 1984c; Toom 1984c). Test excavations at the latter three sites were not extensive, yet they did not reveal any clear indications of structural remains. It is suggested that these possible Sonota occupations functioned as field camps and/or locations. Thus, the Sonota component at Lost Nation stands out as a potentially unique archeological resource in the project area proper as well as the Middle Missouri subarea as a whole.

Even though direct evidence of other features was not found at Lost Nation, indirect evidence of hearths was recovered from the test excavations, including scattered charcoal flecks, burned earth, fire-cracked rock, and burned bone. In addition, it is likely that other features such as pits, bone uprights, and post holes are also present at Lost Nation. Features such as these, as well as hearths, are documented for the Sonota field camp occupation at the Stelzer site (39DW242) (Neuman 1975:6-12).

A sequence of four buried A horizons (Albk, A2bk, A3bk, and A4bk) was recorded in the upper solum of the MT-2 loess cap at Lost Nation. The Sonota component is associated with the surface of the A4bk, the deepest and one of the more weakly developed of the Abk horizons in the series. The Abk horizons at Lost Nation, particularly the prominent A2bk/A3bk, are interpreted as former surfaces of a buried soil or paleosol. To facilitate discussion, this buried soil is informally named the "Big Bend paleosol" in this report. The Big Bend paleosol is the first (uppermost) prominent buried soil in the MT-2 terrace. It is laterally traceable in cutbank exposures of the MT-2 tread for a distance of over thirty river miles along the Lake Sharpe shoreline. The complexity of the A horizons in the Big Bend paleosol is attributed to processes associated with cumulative soil profiles. In point of fact, the Albk-A4bk sequence recorded at Lost Nation represents a buried cumulative A horizon some 60 cm thick, which is referred to simply as the "Big Bend A." Plains Woodland period components, like that at the Lost Nation site, are typically found in the basal portions of the Big Bend A, thereby predating its period of maximum development or stability. Early Plains Village components are generally associated with the surface or near-surface of the Big Bend A and appear to relate directly, at least in part, to its period of maximum development.

The association of the Sonota component at Lost Nation with the base of the Big Bend A has significant paleoclimatic implications. Existing depositional models (see Section III) indicate that periods of comparative stability, which are marked by episodes of soil formation, are linked to

relatively mesic (moist) climatic conditions. The period of maximum development for the Big Bend A, which is thought to relate to some extent to the early Plains Village period (ca. A.D. 950-1250), is generally correlatable with the Neo-Atlantic climatic episode. The Neo-Atlantic episode, estimated to date from ca. A.D. 700-1100, is characterized as a period of increased precipitation accompanied by generally warmer (but apparently not excessively hot) temperatures (Table 7). In essence, it represents a period of very favorable (optimal) climatic conditions in the region. The preceding Scandic episode (ca. A.D. 300-700) is described as a transition period between the moister conditions that prevailed during the Neo-Atlantic and the general climatic deterioration that is proposed for the Sub-Atlantic episode (ca. 800 B.C.-A.D. 300). The Pacific episode (ca. A.D. 1100-1550), which succeeded the Neo-Atlantic, witnessed a return to generally drier conditions (Wendland 1978:281).

The age of the Sonota complex, and by association the Sonota component at Lost Nation, is estimated at ca. A.D. 1-600. This would place the Sonota occupation at Lost Nation within the latter part of the Sub-Atlantic episode or the Scandic episode. The stratigraphic correlation of the Sonota component at Lost Nation with the surface of a weakly developed buried A horizon (A4bk) at the base of the Big Bend A suggests an association with the Scandic episode. The development of the A4bk does indicate somewhat improved climatic conditions over those that prevailed during the Sub-Atlantic episode, but nothing approaching the more optimal conditions inferred for the Neo-Atlantic. The more mesic conditions posited for the Neo-Atlantic climatic optimum would correlate stratigraphically with the more prominent A2bk/A3bk horizons recorded in the Big Bend A at Lost Nation. Thus, the Sonota occupation at Lost Nation can be linked to a somewhat improved local climate, but the most marked improvement in local climatic conditions did not take place until well after the Sonota occupation at the site, most likely during the early Plains Village period and perhaps during the terminal phases of the Plains Woodland period.

It is estimated that anywhere from 25-50% of the Lost Nation site has been lost to erosion since the impoundment of Lake Sharpe. Shoreline erosion at the site is severe and continues unabated. Considering the potential uniqueness and significance of the site to Middle Missouri prehistory, a substantial program of salvage excavation should be initiated at the earliest opportunity. Such a program would be best served by focusing on the potential for structural remains at the site, the acquisition of additional subsistence data, and paleoclimatic studies.

VII. SITE 39LM163

Site Description and Background

Site 39LM163 is located in a small, narrow, low-lying terrace remnant immediately adjacent to Lake Sharpe in the midst of an expanse of rugged Breaks terrain (Figure 39). The northern margin of the site is formed by the Lake Sharpe cutbank; the Missouri Breaks rise abruptly just to the south of the site; and a small intermittent stream channel that heads in the Breaks is present just to the west of the site. 39LM163 is reported to consist of a thin, deeply buried cultural horizon observed in a restricted portion of the Lake Sharpe cutbank (Toom and Picha 1984:143; Picha and Toom 1984). The site is subject to shoreline erosion from Lake Sharpe, and it appears that much of it has been destroyed by the ongoing degradation of the terrace remnant. The former extent of the site is unknown but it seems unlikely that it covered much more than a few hundred square meters. Little if any of the site remains intact today. The elevation of the site is about 1430-1440 ft amsl.

Previous Archeological Research

Site 39LM163 was discovered and first recorded in 1983 by an archeological survey team from the University of North Dakota (UND) under the direction of Terry L. Steinacher. The survey was conducted by UND under a contractual agreement with the Omaha District Corps of Engineers as part of an archeological reconnaissance of selected federal lands along the west (right) bank of the Lake Sharpe project area (Dennis L. Toom, principal investigator, Stanley A. Ahler, co-principal investigator). Work at the site by UND focused on the collection of documentary information, particularly map data and information on exposed artifactual remains (Toom and Picha 1984; Picha and Toom 1984). No artifacts were collected by the survey crew.

No features were observed in the site surface or exposed in the Lake Sharpe cutbank by the UND survey crew. However, a single buried cultural horizon was found exposed in the cutbank at approximately 150 cm surface depth (sd). Artifactual remains observed in this horizon included bone, chipped stone, charcoal, ash, and burned earth (Toom and Picha 1984:143; Picha and Toom 1984). No time-diagnostic artifacts were seen and no artifactual remains were collected from the site at this time. The lateral extent of the cultural horizon in the cutbank was not great, and it was mapped at no more than about 10 meters by the UND survey crew (Figure 40). Erosion of the cutbank by wave action from Lake Sharpe was active and ongoing at the time of the UND investigations. The buried horizon was recommended for testing and evaluation.

Present Investigations

The purpose of these investigations is to act on the UND recommendations by testing and evaluating the buried cultural horizon at 39LM163, which is presumed to be prehistoric. Pursuant to this goal, test units were dug to a depth of 150 cm into the surface of the site. The cutbank at the site was also thoroughly reexamined, and additional map data were collected.



a



b

Figure 39. Overview Photos of Site 39LM163. a: Site locality and MT-2 cutbank from Lake Sharpe, south view (photo no. 2522, UND 1983). b: Site area on the MT-2 terrace tread and excavation of Tests 1-2 (center), north-northwest view (photo no. 3216, UND 1988).

There are some obvious discrepancies between the map of site 39LM163 produced by the UND survey crew in 1983 (Figure 40) and the map produced in 1988 as part of these investigations (Figure 41). In addition to plotting the location of the test units, other map data were also collected in 1988 so that the site could be remapped to some extent, especially the limits of the Lake Sharpe cutbank. The 1983 UND datum was relocated and used as the reference point for these new map data. A comparison of the two site maps indicates considerable differences in the representation of the Lake Sharpe cutbank (cf. Figures 40, 41). It can be noted in particular that the cutbank on the 1988 map is plotted somewhat farther to the north and at a somewhat different orientation than the cutbank on the 1983 map. Such a circumstance is precisely the opposite of what one would expect assuming some degree of cutbank erosion between 1983 and 1988, which certainly seems to have occurred. We are at a loss to explain these discrepancies between the 1983 and 1988 site maps. Attempts to reconcile the data on which the two maps are based proved largely to be fruitless. However, it is thought that the 1988 map is the more accurate representation of the two. Apparently, some sort of systematic error was involved in the collection of the 1983 map data.

Fieldwork

The USACE scope of work called for the excavation of five 1 X 1 m test units at the site to a maximum depth of 150 cm (Appendix K). Only two 1 X 1 m test units designated Tests 1 and 2 were actually excavated at 39LM163. These were combined into a single 1 X 2 m unit in view of the reported depth of the buried cultural horizon. For purposes of record keeping, and to maintain horizontal provenience data at a minimum of 1 m², separate 1 X 1 m test unit designations were maintained within the 1 X 2 m excavation. Tests 1-2 were placed near the Lake Sharpe cutbank directly opposite the location of the reported cultural horizon (cf. Figures 40, 41). Controlled excavation in Tests 1-2 extended to 150 cm sd. A small sounding extending from 150-180 cm sd was also dug in the bottom of Test 1 to further explore the natural stratigraphy of the site. Tests 1-2 proved to be essentially devoid of artifactual material, so it was deemed unnecessary to excavate additional units at the site. This reduction in planned excavation activity at 39LM163 was approved by the USACE technical officer (Richard Berg).

Excavation of Tests 1-2 proceeded in 10 cm arbitrary levels. All soil matrix removed from the test excavations to a depth of 150 cm was screened over one-quarter inch mesh hardware cloth (Figure 42a). No water screen samples (one-sixteenth inch mesh window screen) were taken at the site. The soil removed from the small sounding in the bottom of Test 1 was not screened. No artifacts were observed on the remaining surface of the site. The volume of controlled excavation at the site totals 3.0 m³.

The cutbank at the site was also reexamined for evidence of the reported cultural horizon (Figure 42b). With the exception of a single bison metacarpal, no indications of extant cultural deposits were observed in the cutbank during these investigations. The bison metacarpal was collected from the face of the cutbank at a depth of approximately 180 cm, as measured from the surface datum of Tests 1-2. It is complete, unfractured, and shows no signs of human alteration (e.g., cut marks or burning). This specimen could just as likely have been deposited at the site as a result of natural

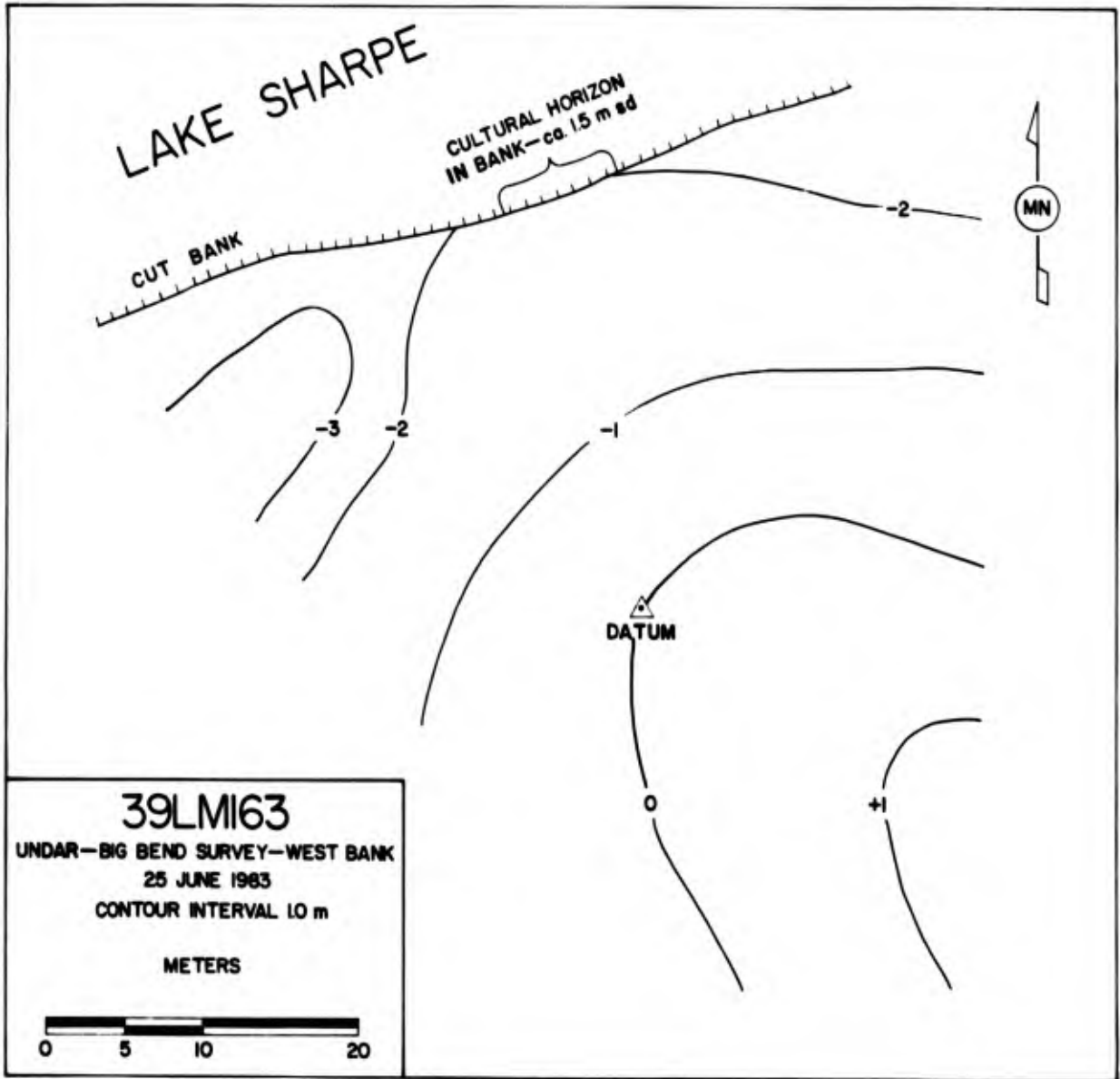


Figure 40. Contour Map of Site 39LM163 (UND 1983).

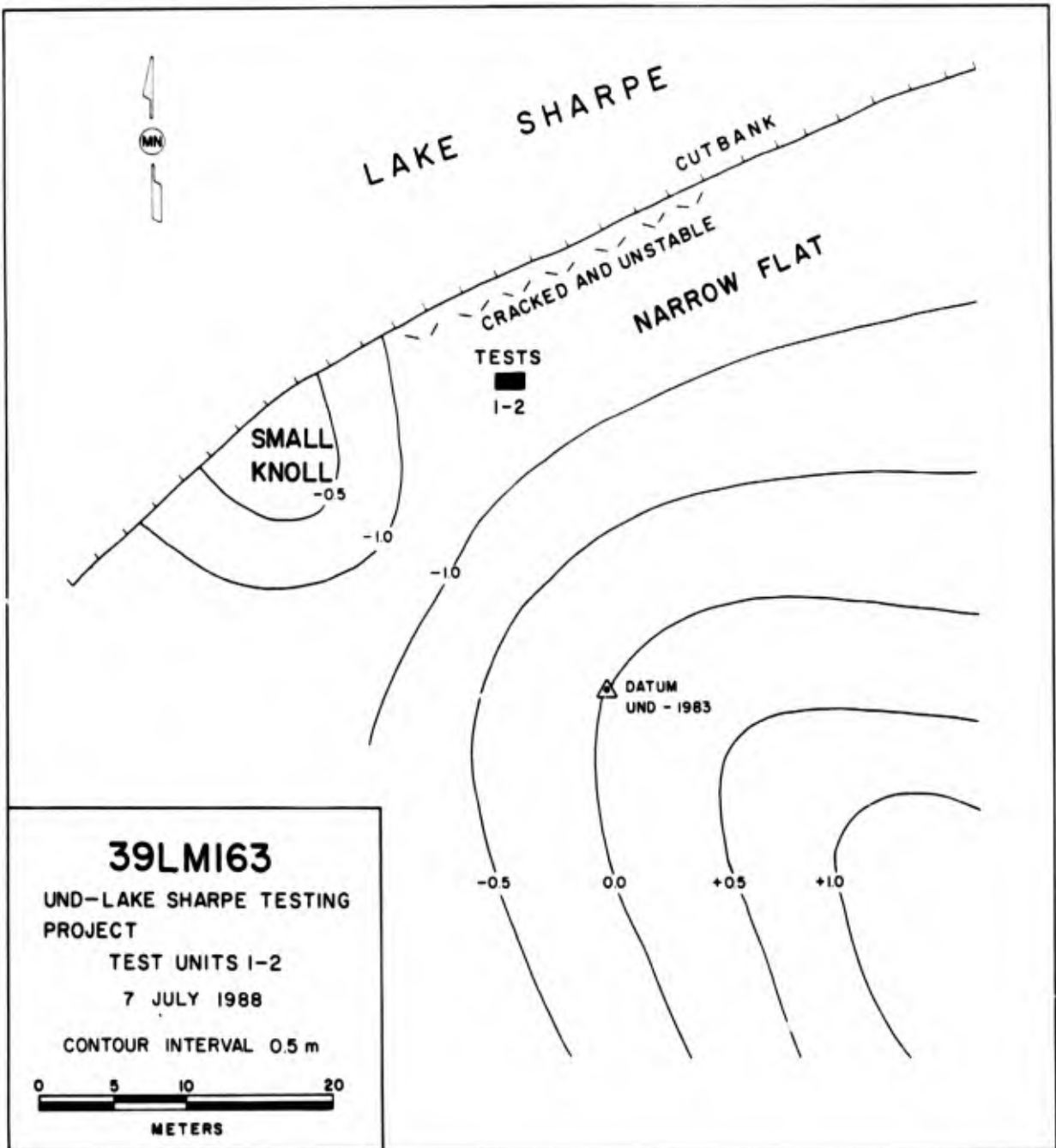
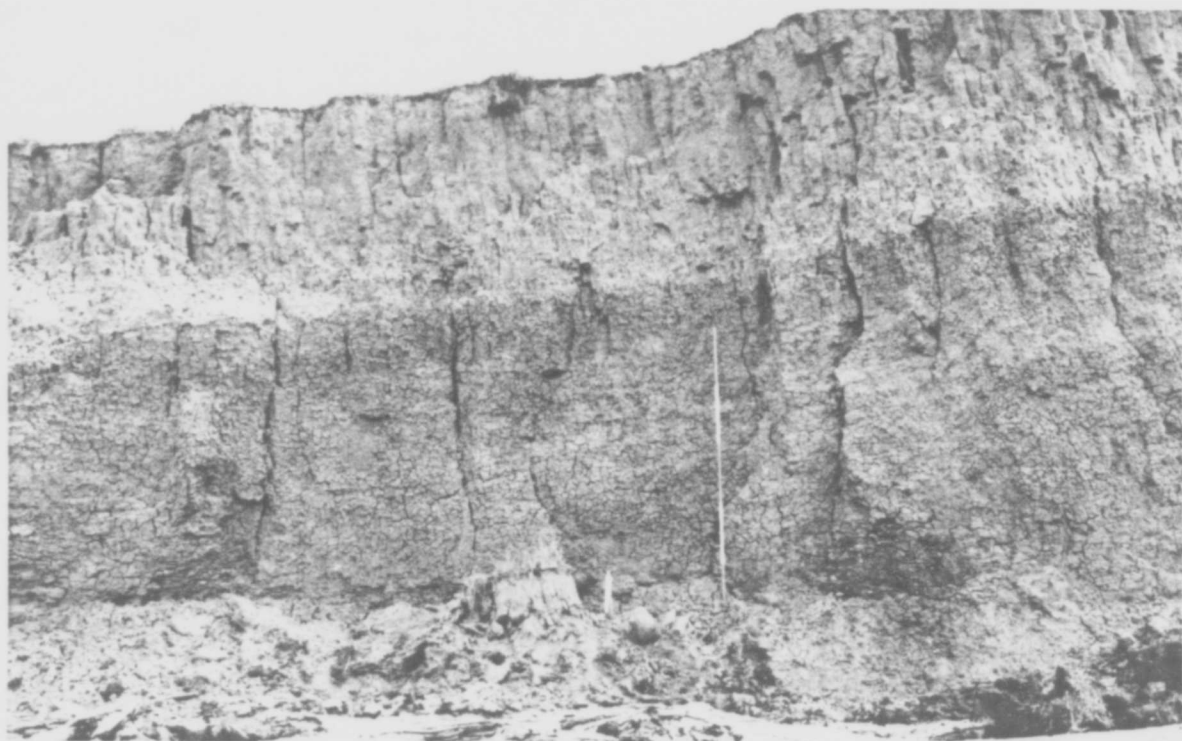


Figure 41. Contour Map of Site 39LM163 (UND 1988).



a



b

Figure 42. Fieldwork Photos at Site 39LM163. a: Excavation of Tests 1-2, north-northwest view (photo no. 3214, UND 1988). b: Close-up of the Lake Sharpe cutbank, south view (photo no. 3223, UND 1988).

processes as opposed to human activities. It was initially thought that numerous scattered bone fragments were present in the cutbank exposure, but upon closer examination these proved to be fragments of Pierre Shale with calcium carbonate coats. The cutbank is high and unstable, making work in its face difficult and somewhat dangerous. The bank exhibits extensive tension cracks along a broad front where the cultural horizon was previously recorded. In addition, recent slumping was also evident in places along the bank.

By all indications, it appears that the remnant of the buried cultural horizon observed in the cutbank in 1983 has been completely destroyed by shoreline erosion. These investigations found no evidence of significant, intact cultural deposits at 39LM163.

Geomorphic Context, Soils, and Stratigraphy

Site 39LM163 was situated in a remnant of the MT-2 terrace or its equivalent. While the MT-2 has not been mapped specifically at this location, the site is at approximately the same elevation as an extensive expanse of the MT-2 tread that is mapped on the opposite (north) side of Lake Sharpe (Coogan 1980). Wave action from Lake Sharpe has truncated the MT-2 at the site forming a high cutbank exposure of the terrace. Erosion of the shoreline at the site is ongoing and active.

The surface soil at the site is mapped as a Lowry-Sully silt loam (LrD) (Schumacher 1987:Sheet 12). Lowry-Sully silt loams are deep, well drained, strongly sloping to moderately steep soils (9-25% slopes) that typically form in upland settings. The Lowry soil is generally deeper and occupies the more level parts of the landscape, while less deep Sully soil is found on the steeper slopes. Small areas of Sansarc (clay) and Schamber (loam) soils are often included in the Lowry-Sully map units (Schumacher 1987:23). In this case, the Lowry-Sully soil is mapped on a low-lying terrace remnant adjacent to Lake Sharpe (Missouri River). The site area proper consists of a less steeply sloping location that is primarily covered by the Lowry silt loam. Lowry series soils are classified as coarse-silty, mixed, mesic Typic Haplustolls (Schumacher 1987:159).

Four primary depositional units are represented in the cutbank exposure: (1) a loess cap extending from ca. 0-150 cm sd; (2) colluvium from ca. 150-225 cm sd; (3) alluvium(?) from ca. 225-450 cm; and (4) Pierre Shale bedrock below ca. 450 cm sd. These observations were made in the cutbank directly opposite the location of Tests 1-2 (cf. Figure 42b), and there is considerable variability among these units throughout the full cutbank exposure at the site. Depth to bedrock and the thicknesses of the overlying strata show particular variation, especially beneath a small knoll (bedrock high-point) located just to the west of Tests 1-2 (Figures 39b, 41). The loess capping the site consists of silt loam of the Lowry soil association. It is in the loess unit where one would expect to find intact cultural deposits. The strata beneath the loess cap are thought to have little archeological potential. The colluvium, which contains angular but tumbled and rounded fragments of Pierre Shale, is predominantly clay. The colluvial unit contains an upper horizon of silty clay loam (2Bbk) from about 150-180 cm and a lower horizon of clay (3Bbk) from approximately 180-225 cm. A thick layer of what is thought to be alluvial clay (overbank deposits) is present between the

colluvial and bedrock units. The bedrock unit consists of consolidated Pierre Shale (Cr horizon).

Profile Descriptions and Soil Horizons

The loess depositional unit is of primary interest to these investigations because it most likely contained the buried cultural horizon that was observed in the cutbank exposure. The more or less constant addition of loess (silt loam) parent material at the site has produced a cumulative soil profile (Birkeland 1984:184-185). This phenomenon appears to be ubiquitous in the loess capping the MT-2 terrace and its equivalents in the Lake Sharpe area. Cumulative soil profiles are those that receive influxes of parent material while pedogenesis is ongoing; in essence, soil formation and deposition occur simultaneously at the same location. An overthickened or cumulative A horizon, one that is gradually buried during soil formation, is a common feature of cumulative soils. Cumulative A horizons are characteristic of the upper solum of the loess mantling the MT-2. A general cumulative A horizon as much as 1 m thick is present in the upper portion of the loess cap at the site. Above the colluvium, the soil horizons in the loess unit at the site exhibit a general A/B sequence. Detailed soil descriptions for the following profile description of Tests 1-2 can be found in Appendix D. Soil horizon nomenclature generally follows Birkeland (1984).

The loess (silt loam or SiL) depositional unit observed in Tests 1-2 exhibits a general cumulative A horizon to a depth of about 100 cm. A Bbk horizon was recorded beneath the cumulative A and extending to a depth of approximately 140 cm where the colluvium begins. From top to bottom, the cumulative A is subdivided into A1, A2, A3, A1bk, A2bk, and A3bk horizons (Figures 43, 44). The sequence of Abk horizons is some 50 cm thick. The Abk horizons are interpreted as former surfaces of a buried soil in the loess cap, which is correlated with the "Big Bend paleosol" defined a short distance downstream at the Lost Nation site (39LM161) (see Section VI). The Abk horizons of the Big Bend paleosol are referred to collectively as the "Big Bend A" in the present report. The period of maximum development for the Big Bend A, believed to be represented here by the A3bk horizon, is thought to correlate to some extent with the early Plains Village period (ca. A.D. 950-1250). The A1bk and A2bk horizons, which are also presently attributed to this buried soil, may have developed at a somewhat later date (ca. A.D. 1250-1500). If these interpretations are correct, the surface soil at the site (collectively, the A1, A2, and A3 horizons) represents relatively recent episodes of loess accumulation over the last 500 years or so that have been gradually transformed into A horizons as a result of the accretional processes of pedogenesis attributed to cumulative soil profiles.

Two soil horizons were also recorded in that portion of the colluvial unit exposed in Tests 1-2. These are an upper 2Bbk horizon and a lower 3Bbk horizon (Figures 43, 44). The 2Bbk horizon consists of silty clay loam (SiCL); it is likely the product of mixing between the silts and clays at the interface of the loess and colluvial depositional units. The 3Bbk horizon consists of a clay that is characterized by a high degree of calcium carbonate accumulation (stage II+; prominent nodules with some internodule fillings). The bison metacarpal collected from the cutbank at about 180 cm sd was associated with the surface of the 3Bbk horizon.

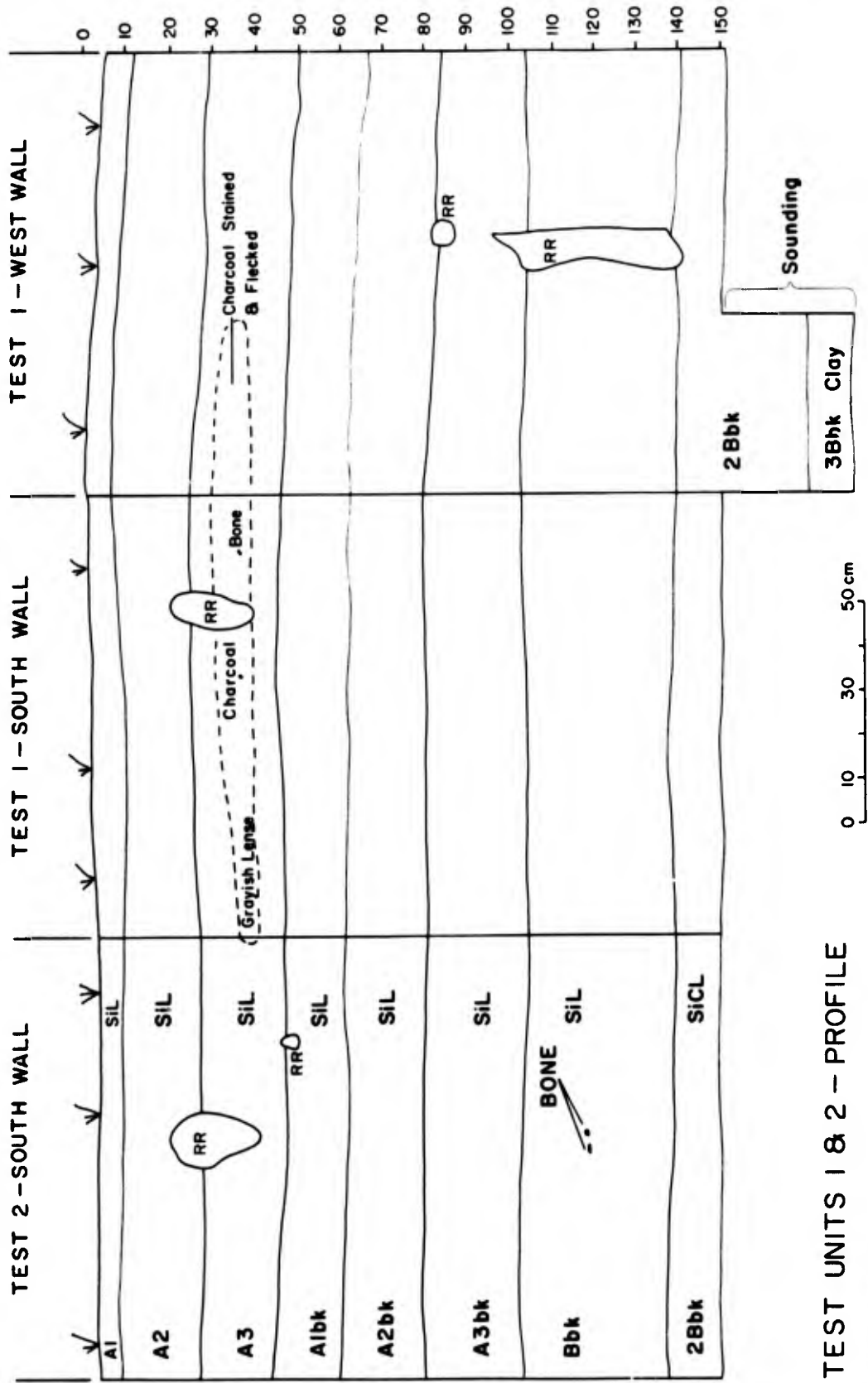


Figure 43. Profile Drawing of Tests 1-2, 39LM163.



a



b

Figure 44. Profile Photos of Tests 1-2, 39LM163. a: South wall of Tests 1-2 (photo no. 3218, UND 1988). b: West wall of Test 1 (photo no. 3219, UND 1988).

Cultural Associations

No indisputable artifacts were recovered from Tests 1-2, nor were any observed in the Lake Sharpe cutbank at the site as it existed in 1988. Thus, we can state with considerable assurance that no intact cultural deposits of any significance are preserved at 39LM163.

Extremely small quantities of fragmented bone and occasional charcoal flecks were found scattered throughout several levels in Tests 1-2 from 30-50 cm sd and from 70-130 cm sd. These remains could be the product of past human activities, or they could just as easily be the result of natural processes (i.e., natural kills and prairie fires). A discontinuous lense of slightly darker, charcoal stained and flecked soil with a few small bone fragments was observed in the A3 horizon in the profile of Tests 1-2 at about 35 cm sd (Figure 43). This lense is thought to be a natural phenomenon resulting from an old prairie fire. Similar lenses or ephemeral horizons have been observed in roughly the same stratigraphic position at other sites and these, too, contained no definite artifactual remains (see 39LM161, Section VI). A few small bone fragments were also observed in the profile of Test 2 at about 120 cm sd near the center of the Bbk horizon (Figure 43). These and a few other bone fragments recovered from Tests 1-2 at approximately the same depth are the only remains that may relate to the cultural horizon observed in the cutbank at the site in 1983.

Archeological Components, Radiocarbon Dates, and Analytic Units

Because site 39LM163 now appears to be devoid of recognizable cultural deposits, it logically follows that no archeological components or analytic units are definable. By the same token, no archeological samples suitable for radiocarbon dating were available for collection, so no radiocarbon dates were produced for the site.

Vertebrate Faunal Remains

Unmodified bone is the only potential artifactual material recovered from 39LM163. The bone collected from Tests 1-2 consists entirely of a total of 18 g of unmodified (nontool) debris found scattered throughout various test unit levels (Table 37). The only identifiable specimen among the test unit debris is an Odocoileus/Antilocapra (deer or pronghorn) metatarsal found from 30-40 cm sd in Test 1 (Appendix B). In addition to the test debris, a bison metacarpal was removed from the Lake Sharpe cutbank at about 180 cm sd, as mentioned previously.

The bone recovered from the site could be the result of past human activities, although it is difficult to discount a noncultural interpretation for much of this material on the basis of available information. The only evidence that strongly points to a cultural origin for at least some of the bone fragments consists of 2 g of burned bone that was found from 70-90 cm sd in Tests 1-2 (Table 37). The bison metacarpal taken from the cutbank is not believed to be an archeological specimen.

Table 37. Unmodified Bone Size Grade Data by Test Level, Tests 1-2 Combined (1 X 2 m Excavation), Site 39LM163.

Tests 1-2 Level (cm sd)		All Bone (grams)				Burned Bone (grams)			
		G1	G2	G3	Total	G1	G2	G3	Total
0-10	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
10-20	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
20-30	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
30-40	wt	-	5	1	6	-	-	-	-
	%	-	83.3	16.7	100.0	-	-	-	-
40-50	wt	-	-	2	2	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
50-60	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
60-70	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
70-80	wt	-	-	1	1	-	-	1	1
	%*	-	-	100.0	100.0	-	-	100.0	100.0
80-90	wt	-	-	1	1	-	-	1	1
	%*	-	-	100.0	100.0	-	-	100.0	100.0
90-100	wt	-	-	3	3	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
100-110	wt	-	-	1	1	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
110-120	wt	-	-	3	3	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-
120-130	wt	-	-	1	1	-	-	-	-
	%	-	-	100.0	100.0	-	-	-	-

*Burned bone percentages are stated as a product of the quantities of "all bone."

Table 37. Unmodified Bone Size Grade Data by Test Level, Tests 1-2 Combined (1 X 2 m Excavation), Site 39LM163, Continued.

Tests 1-2 Level (cm sd)		All Bone (grams)				Burned Bone (grams)			
		G1	G2	G3	Total	G1	G2	G3	Total
130-140	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
140-150	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
Total	wt	-	5	13	18	-	-	2	2
	%*	-	27.8	72.2	100.0	-	-	15.4	11.1

Discussion and Conclusions

There is no evidence to suggest that site 39LM163 contains significant, intact archeological deposits. By all indications, the buried cultural horizon observed in the Lake Sharpe cutbank in 1983 has been essentially destroyed by shoreline erosion. It is not possible to precisely estimate the extent of the erosion at the site from 1983 to 1988 due to problems in reconciling the 1983 map data with that taken in 1988. However, there is little doubt that a portion of the cutbank was lost at the site during the five years since it was first discovered and eventually tested.

Test excavations at the site did not yield any definite artifactual remains. Only a few small bone fragments were recovered from Tests 1-2, and much of this material could be of natural origin. The virtual absence of any artifactual data for the site makes it impossible to objectively evaluate its former archeological content. Nevertheless, tentative stratigraphic correlations suggest that the site potentially contained a component or components of the Late Plains Archaic, Plains Woodland, and/or early Plains Village periods. The buried cultural horizon recorded in the cutbank in 1983 would have probably correlated with the Bbk horizon identified at the site, which suggests a Late Plains Archaic age for this unit. Materials associated with the three Abk horizons would most likely be correlatable with the Plains Woodland and/or early Plains Village periods. One can further speculate that the site functioned as some sort of short-term field camp or location, perhaps related to hunting and gathering activities.

VIII. SYNTHESIS AND INTERPRETATION

Introduction

This section attempts to address in general terms the scientific research goals and topics outlined in Section III to the extent possible by using the data generated from the testing project. Obviously, these data are far too limited in scope to allow anything approaching a comprehensive treatment of the identified topics. Nonetheless, they do reveal some useful insights (or speculations) into the prehistory of the Lake Sharpe area. Only the highlights of the scientific research findings are presented here. The reader is referred to the individual site report sections for more detailed discussions of the data.

Chronology and Culture History

The cultural-historical data generated by the testing project are insufficient to permit any refinements of existing taxonomic models. The positive identification of a Sonota complex component at the Lost Nation site is a significant discovery nevertheless, because this archeological taxon is poorly represented in the cultural resources inventory of the project area. Furthermore, little is actually known about Sonota complex habitation sites in the region because most past research efforts have focused on the more conspicuous mortuary sites (i.e., burial mounds) (cf. Buechler 1984; Neuman 1975; Toom 1984b). The documentation of what is minimally interpreted as a Sonota field camp at Lost Nation is proof positive that Sonota peoples once occupied the project area. There is also some evidence of potential Sonota occupations in the project area at the Diamond-J, Rousseau, and Little Elk sites, but the actual cultural affinities of the Plains Woodland components at these sites remains unclear (cf. Steinacher 1984b, 1984c; Toom 1984c). The only other Sonota component that has been positively identified in the project area was Component D at the La Roche site (Hoffman 1968; Neuman 1975). Unfortunately, the La Roche site has been completely inundated by Lake Sharpe and is no longer available for study.

The identification of at least one and possibly as many as three Post-Contact Coalescent components at the Rattlesnake Keeper site is also of some cultural-historical significance. Several other Post-Contact sites have been documented in the project area, so the discovery of an additional component comes as no surprise. However, the Post-Contact component at Rattlesnake Keeper is interpreted as a specialized activity location whose primary function was the processing of small-scale animal kills, particularly bison. The majority of the other known Post-Contact components in the project area consist of earthlodge village sites, so the Rattlesnake Keeper occupations represent a relatively unique archeological resource in terms of site function. The chronological data produced for the Rattlesnake Keeper components lack the precision necessary to refine our understanding of the temporal parameters of the Post-Contact time frame in the project area. The data are also insufficient to shed additional light on the variability within the Post-Contact Coalescent variant with respect to the identification of Arikara subgroups who once occupied the project area. A Talking Crow phase

affiliation is suggested nonetheless on the basis of ceramic attributes and the known geographical extent of the Talking Crow phase within the study region.

Cultural Reconstruction

The data yielded by the testing project is also insufficient to attempt any sort of detailed cultural reconstructions with respect to the identified archeological components. The Sonota component at the Lost Nation site is minimally interpreted as a field camp occupation on the basis of its diverse artifactual content and the documented or assumed presence of cultural features. The fact that this site type was a part of Sonota settlement-subsistence patterns is not unexpected. However, the potential presence of the remains of Sonota houses at Lost Nation introduces the distinct possibility that the site may have functioned as a residential base camp. The relatively low artifact densities recorded at the site seem to argue against a base camp interpretation, and additional excavations are needed to positively confirm the presence of structural remains. In any event, the evidence does indicate that Lost Nation was occupied by a moderate-sized group (ca. 50 persons?) of hunter-gatherers affiliated with the Sonota complex. No evidence of cultigens was encountered at the site, so a basic foraging (hunting and gathering) economy is suggested.

The investigations at the Rattlesnake Keeper site reveal that Post-Contact Coalescent (Arikara) villagers in the project area made use of small specialized task groups to acquire locally available subsistence resources. Thus, task groups and specialized activity locations were probably important aspects of overall Post-Contact Coalescent settlement-subsistence patterns. We can speculate that the task groups that operated in the project area were primarily concerned with small-scale hunting and gathering activities. The large-scale summer and fall communal hunts proposed for the Arikaras by Hurt (1969) would probably have ranged far beyond the confines of the project area. The task groups used in the project area proper were probably not large, perhaps numbering anywhere from 10-20 individuals. These local task groups would apparently range out from a nearby village site for a period of a few days or perhaps even a few weeks in search of animal and plant foods and raw materials. Once having acquired these subsistence and technological goods, the task groups would have returned to their respective villages. The collection of other materials such as pigments may also have been of secondary concern to the local task groups.

The extent of outside cultural contacts and trade relations for the identified components can only be speculated on. The apparent primary reliance on Knife River flint as a source of high-quality chippable stone by the Sonota inhabitants of Lost Nation is suggestive of some sort of trade network during early Plains Woodland times that extended far to the north of the project area. While it is possible that this distant lithic resource was directly exploited by Sonota peoples in the Lake Sharpe area, it seems more reasonable to propose that the bulk of their Knife River flint was acquired indirectly through trade relations with other Sonota groups in what is now known as North Dakota. The presence of Flattop and plate chalcedonies in the Sonota collection from Lost Nation also indicates some exploitation of distant but more directly accessible resources to the southwest of the project area in

the Big Badlands area of South Dakota. These nonlocal raw materials could have been obtained through trade relations as well, although direct procurement as an embedded strategy incidental to hunting and gathering forays beyond the Missouri Valley is also a definite possibility.

The little that can be inferred about Post-Contact Coalescent lithic resource utilization patterns at the Rattlesnake Keeper site reveals a primary reliance on locally available raw materials. Secondary utilization of nonlocal materials such as Flattop and plate chalcedony, located in the Big Badlands area of southwestern South Dakota, is also in evidence. It is thought that these nonlocal resources were directly acquired by the Post-Contact Coalescent inhabitants of the project area. Historical sources suggest that the Black Hills and Big Badlands areas of southwestern South Dakota were traditionally exploited by the Arikaras. For example, Tabeau, an early Euroamerican trader among the Arikaras, notes that prior to A.D. 1803 the Arikaras would make yearly trips to the Black Hills for purposes of trading with various nomadic groups (Abel 1939:154). It is likely that this trade was an embedded behavior incidental to primary hunting and gathering activities on the upland Plains beyond the Missouri Valley. Under the argument advanced here, direct procurement of lithic raw materials such as Flattop and plate chalcedony was a strategy that was similarly embedded in hunting and gathering forays into this region. Still, it is possible that the Arikaras acquired these distant lithic resources as part of their trade relations with other native peoples local to the Big Badlands area.

Environmental Reconstruction

Species identifications of specimens in the limited ecofactual samples collected from the three sites are consistent with local faunal and floral communities that prevailed in the project area during Late Holocene and recent times. Thus, these identifications only serve to confirm what is already known about paleoenvironmental conditions in the project area during the Late Holocene period; they can offer nothing in the way of information that would lend itself to the refinement of local paleoenvironmental models.

The only piece of evidence that may be of some use in refining our current understanding of local paleoenvironmental conditions is the recognition of a buried soil at the Lost Nation site, which is named herein as the "Big Bend paleosol." The Sonota component at Lost Nation is associated with the base of the "Big Bend A," a very prominent buried A horizon that marks the former surface(s) of the Big Bend paleosol. At Lost Nation, the Big Bend A is recorded as a sequence of cumulative Abk horizons (Abk-A4bk). The association of Sonota occupation at Lost Nation with the base of the Big Bend A (surface of the A4bk) has significant paleoclimatic implications. Existing depositional models (e.g., Clayton et al. 1976; Coogan 1987) indicate that periods of comparative geomorphic stability, which are marked by episodes of soil formation, are linked to relatively mesic (moist) climatic conditions. The period of maximum development or stability for the Big Bend A is estimated at at least 300 years, from ca. A.D. 950-1250 and possibly somewhat earlier, on the basis of radiocarbon dates and stratigraphic correlations with certain early Plains Village components. This time frame is generally equatable with the Neo-Atlantic climatic episode (ca. A.D. 700-1100), a time of very favorable (optimal) climatic conditions in the region. The preceding Scandic

episode (ca. A.D. 300-700) is described as a transition period between the moister conditions that prevailed during the Neo-Atlantic and the general climatic deterioration that is proposed for the Sub-Atlantic episode (ca. 800 B.C.-A.D. 300). The Pacific episode (ca. A.D. 1100-1550), which succeeded the Neo-Atlantic, witnessed a return to generally drier conditions (Wendland 1978:281).

The age of the Sonota complex, and by association the Sonota component at Lost Nation, is estimated at ca. A.D. 1-600. This would place the Sonota occupation at Lost Nation within the latter part of the Sub-Atlantic episode or the Scandic episode. The stratigraphic correlation of the Sonota component at Lost Nation with the surface of a weakly developed buried A horizon (A4bk) at the base of the Big Bend A suggests an actual association with the Scandic episode. The development of the A4bk does indicate somewhat improved climatic conditions over those that prevailed during the Sub-Atlantic episode, but nothing approaching the more optimal conditions inferred for the Neo-Atlantic. The more mesic conditions posited for the Neo-Atlantic climatic optimum would correlate stratigraphically with the more prominent A2bk/A3bk horizons recorded in the Big Bend A at Lost Nation.

The Sonota occupation at Lost Nation can be tentatively linked to a somewhat improved local climate on the basis of these observations, but not to the really marked improvement in local conditions that most likely occurred well after the Sonota occupation at the site during the Neo-Atlantic episode. The Neo-Atlantic climatic optimum is probably best correlated with the early Plains Village tradition, and possibly the terminal phases of the Plains Woodland tradition. By the same token, it is also possible to relate the evolution of the Plains Woodland tradition as a whole in the region to a somewhat improved local climate, and improved climatic conditions may in part account for the transition from Plains Archaic to Plains Woodland lifeways in the region that began at about the time of Christ or perhaps slightly earlier.

IX. NATIONAL REGISTER EVALUATIONS AND MANAGEMENT RECOMMENDATIONS

Introduction

In this section of the report, the significance of the three tested sites is specifically evaluated according to National Register criteria. In addition, management recommendations are made for those sites considered to be eligible for listing on the National Register of Historic Places. The development of detailed impact mitigation plans is not possible within the scope of this research because such planning requires more information than is ordinarily obtainable from testing projects whose sole purpose is an evaluation of National Register eligibility. However, some recommendations are made regarding the mitigation of adverse impacts at significant archeological sites.

Under present guidelines, an evaluation of the significance of a cultural resource centers on considerations of historic context (NPS 1986). As of this writing, a comprehensive statement on historic contexts for archeological sites in the state of South Dakota is not yet available (John Rau, SDHPC, personal communication 1989). Therefore, the sites under study here will be evaluated according to research domains and topics discussed in the Big Bend Multiple Resource Area nomination report (Steinacher and Toom 1985). The Big Bend Multiple Resource Area is equivalent to the Lake Sharpe project area. The research domains that are identified in the Big Bend Multiple Resource Area nomination are similar in concept and intent to historic contexts, and they serve as the basis for the site evaluations that follow.

Rattlesnake Keeper (39LM160)

Component C at the Rattlesnake Keeper site has been positively identified as a special activity location affiliated with the Post-Contact Coalescent variant (ca. A.D. 1675-1780) of the Plains Village tradition. Components A and B have not been definitely linked to an archeological taxonomic unit, although a Post-Contact affiliation is assumed for these components as well. However, because the actual cultural affiliations of Components A and B are still in doubt, the discussion on the Rattlesnake Keeper site will be limited specifically to Component C. Component C primarily functioned as an animal kill processing location. Secondary functions included the gathering of wild plant materials and perhaps the production of pigment. Components A and B appear to have functioned exclusively as kill processing locations.

National Register Evaluation

Component C at Rattlesnake Keeper is eligible for listing on the National Register under criterion D - archeological sites "that have yielded, or may be likely to yield, information important in prehistory or history" (NPS 1986:1). In terms of historic context, Component C at Rattlesnake Keeper relates to the Plains Village period/tradition, as it was manifest in that portion of the Middle Missouri subarea of the Plains in South Dakota. The scientific research value of Plains Village tradition sites is highly significant and

quite varied (Steinacher and Toom 1985:1-47-50). The significance and variability of Plains Village archeology is a direct reflection of the complexities of Plains Village culture in the the study region (cf. Lehmer 1971). Recorded site types include: earthlodge villages, isolated earthlodges, campsites, various specialized activity areas, and cemeteries. General research topics of regional importance identified for the Plains Village tradition include: (1) refinements of culture history, (2) more detailed reconstructions of past lifeways, and (3) the study of the cultural evolutionary processes (Steinacher and Toom 1985:1-61-64). More specifically, Plains Village sites have a demonstrated potential to increase our knowledge of cultural chronology and variability, cultural interaction and trade, social organization, settlement-subsistence patterns, paleoenvironmental conditions, and cultural ecology within the project area from ca. A.D. 950-1780.

Steinacher and Toom (1985:1-50-51) use a blanket approach in assessing the significance of Plains Village sites in the Big Bend Multiple Resource Area. This approach is based on the fact that dam and reservoir construction by the U.S. Army Corps of Engineers after World War II has resulted in the wholesale destruction of Plains Village archeological sites. They estimate that only about 25% of the original Plains Village resource base remains intact and available for study today in that portion of the Middle Missouri subarea in South Dakota. Therefore, all remaining Plains Village sites in the project area are considered to be significant archeological resources, regardless of their type or age, because of this unprecedented level of site destruction.

As a specialized activity location, Component C at Rattlesnake Keeper has a demonstrated potential to generate information of importance to the reconstruction of Plains Village lifeways. It offers a rare opportunity to study a little known Plains Village site type - the location - which was undoubtedly an important component of Plains Village settlement-subsistence patterns. Most recorded and extant Plains Village sites in the project area are earthlodge villages. Specialized activity locations like Rattlesnake Keeper are comparatively rare in the cultural resources inventory of the project area, and few have received much attention in past research efforts. The apparent rarity of Plains Village location sites in the project area is difficult to explain, but it is thought to relate principally to past survey biases, the relatively low archeological visibility of such sites, and the inundation of the Missouri River bottoms where most of these sites may have been located. In any event, Component C at Rattlesnake Keeper represents a rather unique archeological resource with significant scientific research potential. On this basis, the site is considered to be eligible for listing on the National Register of Historic Places.

Management Recommendations

The Rattlesnake Keeper site has been and continues to be severely impacted by erosion, including both shoreline erosion along Lake Sharpe and tunnel gulying beneath the surface of the northeastern terrace. The northern portion of the northeastern terrace near the Lake Sharpe shore is thought to contain the bulk of the significant cultural deposits. A program of salvage excavation focusing on this most productive, intact portion of the site, estimated to cover no more than about 500 m², is recommended to mitigate the negative impacts of continued erosion (see Section V). It is further

recommended here that the salvage excavations include no less than 10% of this area, or a total of at least 50 m². This minimum of 50 m² of excavation could be most productively split between two 5 X 5 m block units. Stabilization of the site area is not a feasible impact mitigation option because subsurface erosion of this kind is impossible to control. Furthermore, salvage excavation would probably be more cost-effective than any substantial stabilization measures that might be undertaken.

The data generated by the present testing project should be of considerable use in planning optimum placement of block excavation units at the site. However, additional testing would be advisable prior any substantial commitment of excavation effort to a particular location. It would also be advisable to conduct additional test excavations at selected locations along the full extent of the northeastern terrace at the site beyond the units completed as a part of these investigations. Intact cultural deposits might also be present to a limited extent to the southeast of the locations of Tests 4-5 and Tests 6-7 (see Section V).

It should also be noted that the remote setting of the site will make an effective program of salvage excavation problematic. The site is surrounded by very rugged Missouri Breaks terrain and it can be reached easily only by boat. The archeological deposits at the site are extremely deep, especially Component C (ca. 1.5-2.0 m), and they are principally contained in a rather intractable clay matrix that is difficult to screen with any efficiency. While mechanical equipment could be used to considerable advantage at the site in stripping off sterile overburden deposits, just getting such equipment in place would be a difficult undertaking itself, likely requiring the use of some sort of barge. These factors should be kept in mind in the development of a comprehensive impact mitigation plan for the site.

Lost Nation (39LM161)

Component A, the only archeological component discovered at the Lost Nation site, has been positively identified as a Sonota complex (ca. A.D. 1-600) occupation of the Plains Woodland tradition. The Sonota component at Lost Nation minimally functioned as a field camp. There is also some evidence to suggest that structural remains are (or were) present at the site. If this is in fact the case, the site may have served as a residential base camp. However, relatively low artifact densities tend to discount a residential base camp function. Additional research is required to resolve these interpretive problems. Nevertheless, the field camp interpretation is sufficient to assess the minimal archeological research potential and significance of the site.

National Register Evaluation

The Sonota component at Lost Nation is eligible for listing on the National Register under criterion D - archeological sites "that have yielded, or may be likely to yield, information important in prehistory or history" (NPS 1986:1). In addition, the site is also potentially eligible under criterion C - archeological sites "that embody the distinctive characteristics of a type, period, or method of construction" (NPS 1986:1). Criterion C would be applicable if the presence of the remains of Sonota architecture (houses)

is confirmed at the site. In terms of historic context, the Sonota component at Lost Nation relates to the Plains Woodland period/tradition, as it was manifest in that portion of the Middle Missouri subarea of the Plains in South Dakota. The scientific research value of Plains Woodland tradition sites is also highly significant and varied, but its archeology is not as diverse as that of the succeeding Plains Village tradition (Steinacher and Toom 1985:1-43-46). The most commonly known Plains Woodland site types include both mound (tumuli) and habitation (campsites) (e.g., Neuman 1975). A few specialized activity locations and/or field camps have also been recently recorded in the Lake Sharpe project area (e.g., Steinacher 1984b, 1984c; Toom 1984c, 1989a).

The significance of Plains Woodland archeology relates in large part to the concept of the Plains Woodland period as a time of cultural innovation in study region. By all indications, many new technological, economic, and social elements were added to the adaptive strategies of regional prehistoric peoples at this time. These included such innovations as ceramics, semipermanent dwellings (and by inference semipermanent camps), the bow and arrow, elaborate mortuary practices, and perhaps horticulture (garden agriculture) (cf. Hoffman 1968; Neuman 1975). These innovations suggest a more complex and sedentary lifeway than was present during the preceding Plains Archaic period. Furthermore, all of these innovations, with the exception of mound burials, appear in more fully elaborated and developed forms during the Plains Village period, constituting integral parts of Plains Village lifeways. The development of these innovations and their placement within a regional evolutionary context, particularly with respect to the Plains Village tradition, is a primary concern of Plains Woodland tradition research in the Middle Missouri subarea. General research topics of regional importance identified for the Plains Woodland tradition are the same as those of the Plains Village tradition: (1) the refinement of culture history, (2) more detailed reconstructions of past lifeways, and (3) the study of the cultural evolutionary processes (Steinacher and Toom 1985:1-61-64). More specifically, Plains Woodland sites have a demonstrated potential to increase our understanding of cultural chronology and variability, cultural interaction and trade, social organization, settlement-subsistence patterns, paleoenvironmental conditions, and cultural ecology within the project area from ca. A.D. 1-950.

Steinacher and Toom (1985:1-45-46) use a blanket approach in assessing the significance of Plains Woodland sites in the Big Bend Multiple Resource Area like that applied to Plains Village sites. The rationale for this approach is also the same and is based on the fact that many of the Plains Woodland sites that were once present in the region have been destroyed or were otherwise impacted by dam and reservoir construction activities following World War II. This massive destruction of Plains Woodland sites in the Middle Missouri subarea of South Dakota has left little of the original resource base intact and available for study today. It is estimated that only about 25% of the mound sites remain in a condition that is amenable to scientific study; the less well known habitation sites have experienced an even greater rate of destruction. Thus, all existing Plains Woodland sites in the project area are considered to be significant archeological resources, regardless of their type or age, because of these high levels of site destruction.

As a Sonota field camp occupation, Component A at Lost Nation has a demonstrated potential to generate information of importance to the reconstruction of Plains Woodland lifeways. It offers a rare opportunity to

study little known aspects of Plains Woodland culture, including settlement-subsistence patterns and paleoenvironmental conditions. If Sonota structural remains are indeed present at the site, such a finding would make the Sonota occupation at Lost Nation all the more significant and unique. In any event, the Sonota component at the Lost Nation site represents an uncommon archeological resource with significant scientific research potential. On this basis, the site is considered to be eligible for listing on the National Register of Historic Places.

Management Recommendations

It is estimated that a anywhere from 25-50% of the Lost Nation site has been lost to erosion since the impoundment of Lake Sharpe. Shoreline erosion at the site is severe and continues unabated. At the present rate of loss, minimally estimated at ca. 2.5 m per year, the entire site will be gone in no more than about 20 years. Long before this, the research potential of the site will be greatly reduced by continued degradation. Considering the potential uniqueness and significance of the site to Middle Missouri prehistory, a substantial program of salvage excavation should be initiated at the earliest opportunity. Stabilization of the Lake Sharpe shoreline line at the site does not seem to be a viable impact mitigation option because of the extreme height and instability of the cutbank and the relative narrowness of the remaining site area. Although others may disagree with this view, it is the opinion of the principal investigator that in this case excavation would be a more cost-effective impact mitigation measure in the long-term than attempted stabilization. At the very least, a much more ambitious testing and evaluation program should be initiated and completed prior to deciding on any one course of action. It is also the opinion of the principal investigator that further investigations at Lost Nation should receive the highest priority of any other archeological project that is currently being planned by the Omaha District Corps of Engineers.

The remaining site area is estimated at no more than about 6000 m². It is recommended that 10% of this area, or or about 600 m², be subjected to controlled excavation as a part of the salvage program. While the extent of the proposed salvage effort may seem somewhat excessive at first glance, mechanical stripping could be used very effectively at this site to reduce the actual volume of controlled excavation. For example, the overburden above the Sonota occupation zone could be stripped off down to the surface of the Big Bend A (prominent A2bk horizon) without any loss of significant archeological materials. This would leave an archeologically sensitive zone about 30 cm thick that would have to be excavated by controlled techniques. Thus, the volume of controlled excavation for the site would total about 180 m³ under this plan (600 m² X 0.30 m). Such a level of excavation for a site with the research potential of Lost Nation is not excessive, provided that structural remains are actually present in the intact portion of the site. If evidence of structural remains is not found, the excavated area could be reduced considerably to say about 5% (300 m²) of the remaining site area.

A program of salvage excavation at Lost Nation would be best served by focusing on the potential for structural remains, the discovery of other features such as hearths and pits, the acquisition of additional subsistence data, and paleoclimatic studies. Additional investigations are required to plan the actual extent of the excavations and to optimize the placement of

large block units. The available data suggest that the portion of the site adjacent to the Lake Sharpe cutbank may be the most productive, especially in the vicinity of Tests 1-2 (see Section VI). However, other areas farther back from the shoreline might also contain important archeological materials. Appropriate methods of geophysical surveying (prospecting) in archeological sites could be used to great advantage at Lost Nation in the location of buried cultural features, particularly any potential houses (e.g., Weymouth 1986). The extreme depth of the Sonota occupation zone (ca. 1.5-2.0 m) is probably beyond the effective range of the proton magnetometer, the most commonly used instrument for archeological site surveys, but alkali metal (cesium or rubidium) magnetometers or ground-penetrating radar would probably prove to be very effective. It is further recommended that a geophysical survey of the site be undertaken prior to any extensive salvage excavations. Additional deep testing at the site would also be a prerequisite for an efficient program of salvage excavation at Lost Nation.

Site 39LM163

The archeological investigations conducted at site 39LM163 failed to reveal any evidence of substantial, intact archeological remains. By all indications, the cultural deposit observed in the Lake Sharpe cutbank during the 1983 survey has been essentially destroyed by shoreline erosion. Site 39LM163 is not eligible for listing on the National Register of Historic Places. No further archeological work is recommended for this site.

X. REFERENCES CITED

Abel, A. H. (editor)

- 1939 Tabeau's Narrative of Loisel's Expedition to the Upper Missouri. University of Oklahoma Press, Norman.

Ahler, S. A.

- 1975 Pattern and Variety in Extended Coalescent Lithic Technology. Ph.D. dissertation, University of Missouri, Columbia. University Microfilms, Ann Arbor.

- 1977a Lithic Resource Utilization Patterns in the Middle Missouri Subarea. Plains Anthropologist, Memoir 13:132-150.

- 1977b Archeological Reconnaissance and Test Excavation at the Jake White Bull Site, 30C06, Oahe Reservoir, South Dakota. Contribution No. 61. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

- 1979 Functional Analysis of Nonobsidian Chipped Stone Artifacts: Terms, Variables, and Quantification. In Lithic Use-Wear Analysis, edited by B. Hayden, pp. 301-328. Academic Press, New York.

- 1989a Area B Artifacts and Artifact Analysis. In Archeology of the Medicine Crow Site Complex (39BF2), Buffalo County, South Dakota, chp. 4, edited by S. A. Ahler and D. L. Toom. Illinois State Museum Society, Springfield, in cooperation with the Department of Anthropology, University of North Dakota, Grand Forks. Submitted to Interagency Archeological Services, U.S. National Park Service, Denver.

- 1989b Structure of Area B. In Archeology of the Medicine Crow Site Complex (39BF2), Buffalo County, South Dakota, chp. 5, edited by S. A. Ahler and D. L. Toom. Illinois State Museum Society, Springfield, in cooperation with the Department of Anthropology, University of North Dakota, Grand Forks. Submitted to Interagency Archeological Services, U.S. National Park Service, Denver.

Ahler, S. A., and R. C. Christensen

- 1983 A Pilot Study of Knife River Flint Procurement and Reduction at Site 32DU508, a Quarry and Workshop Location in Dunn County, North Dakota. Contribution No. 186. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the State Historical Society of North Dakota, Bismarck.

Ahler, S. A., and A. A. Swenson

- 1985 Test Excavations at Big Hidatsa Village (32ME12), Knife River Indian Villages National Historic Site. Contribution No. 218. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Midwest Archeological Center, U.S. National Park Service, Lincoln.

- Ahler, S. A., and D. L. Toom (editors)
 1989 Archeology of the Medicine Crow Site Complex (39BF2), Buffalo County, South Dakota. Illinois State Museum Society, Springfield, in cooperation with the Department of Anthropology, University of North Dakota, Grand Forks. Submitted to Interagency Archeological Services, U.S. National Park Service, Denver.
- Ahler, S. A., and T. Weston
 1981 Test Excavations at Lower Hidatsa Village (32ME10), Knife River Indian Villages National Historic Site. Contribution No. 145. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Midwest Archeological Center, U.S. National Park Service, Lincoln.
- Ahler, S. A., D. K. Davies, C. R. Falk, and D. B. Madsen
 1974 Holocene Stratigraphy and Archeology in the Middle Missouri River Trench, South Dakota. Science 185:905-908.
- Ahler, S. A., C. H. Lee, and C. R. Falk
 1981 Cross Ranch Archeology: Test Excavations at Eight Sites in the Breaks Zone, 1980-81 Program. Contribution No. 154. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the State Historical Society of North Dakota, Bismarck.
- Ahler, S. A., C. R. Falk, and P. R. Picha
 1982 Cross Ranch Archeology: Test Excavations at Twelve Sites in the Breaks and Uplands Zones, 1981-82 Program. Contribution No. 174. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the State Historical Society of North Dakota, Bismarck.
- Anderson, D. C.
 1987 Toward a Processual Understanding of the Initial Variant of the Middle Missouri Tradition: The Case of the Mill Creek Culture of Iowa. American Antiquity 52:522-537.
- Baerreis, D. A., and R. A. Bryson
 1965a Historical Climatology and the Southern Plains: a Preliminary Statement. Bulletin of the Oklahoma Anthropological Society 13:69-75.
- 1965b Climatic Episodes and the Dating of Mississippian Cultures. Wisconsin Archaeologist 46(4):203-220.
- Bartlein, P. J., and T. Webb III
 1982 Holocene Climatic Changes Estimated from Fossil Pollen Data from the Northern Midwest. In Quaternary History of the Driftless Area, with Special Papers, edited by J. C. Knox, pp. 67-82. Field Trip Guide Book No. 5. Geological and Natural History Survey, University of Wisconsin, Madison.
- Benedict, J. B.
 1979 Getting Away from It All: A Study of Man, Mountains, and the Two-Drought Altithermal. Southwestern Lore 45(3):1-12.

- Benn, D. W.
1974 Seed Analysis and Its Implications for an Initial Middle Missouri Site in South Dakota. Plains Anthropologist 19:55-72.
- Bernabo, J. C., and T. Webb, III
1977 Changing Patterns in the Holocene Pollen Record of Northeastern North America: A Mapped Summary. Quaternary Research 8:64-96.
- Berry, J. J.
1978 Arikara Middlemen: The Effects of the Fur Trade on an Upper Missouri Society. Ph.D. dissertation, Indiana University. University Microfilms, Ann Arbor.
- Binford, L. R.
1980 Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. American Antiquity 45:4-20.
- Birkeland, P. W.
1984 Soils and Geomorphology. Oxford University Press, New York.
- Borchers, G. A.
1980 Soil Survey of Stanley County, South Dakota. Soil Conservation Service, U.S. Department of Agriculture, Washington.
- Borchert, J. R.
1950 The Climate of the Central North American Grasslands. Annals of the Association of American Geographers 40:1-39.
- Bowers, A. W.
1948 A History of the Mandan and Hidatsa. Unpublished Ph.D. dissertation, Department of Anthropology, University of Chicago.
- Bozell, J. R., and J. Ludwickson
1988 Highway Archeological Investigations at the Slaughterhouse Creek Site and Other Cultural Resources in the Pine Ridge Area. Nebraska State Historical Society, Lincoln. Submitted to the Nebraska Department of Roads, Lincoln.
- Bryson, R. A.
1966 Air Masses, Streamlines, and the Boreal Forest. Geographical Bulletin 8:228-269.
- Bryson, R. A., and W. M. Wendland
1967 Tentative Climatic Patterns for Some Late Glacial and Post-Glacial Episodes in Central North America. In Life, Land, and Water, edited by W. J. Mayer-Oakes, pp. 271-298. University of Manitoba Press, Winnipeg.
- Bryson, R. A., D. A. Baerreis, and W. M. Wendland
1970 The Character of Late Glacial and Post-Glacial Climatic Changes. In Pleistocene and Recent Environments of the Central Great Plains, edited by W. Dort, Jr., and J. K. Jones, Jr., pp. 53-73. University of Kansas Press, Lawrence.

- Buechler, J.
 1984 Management Plan for Archaeological Resources in South Dakota, Part I: Study Units. Working Draft. Dakota Research Services, Rapid City. Submitted to the South Dakota Archaeological Research Center, Rapid City.
- Butzer, K. W.
 1971 Environment and Archeology. Aldine Publishing Company, Hawthorne, New York.
 1982 Archaeology as Human Ecology: Method and Theory for a Contextual Approach. Cambridge University Press, Cambridge.
- Calabrese, F. A.
 1972 Cross Ranch: a Study of Variability in a Stable Cultural Tradition. Plains Anthropologist, Memoir 9.
- Caldwell, W. W.
 1964 Fortified Villages in the Northern Plains. Plains Anthropologist 9:1-7.
 1984 Archeological Investigations in the Big Bend Reservoir: A Review. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 3, sec. L, edited by C. R. Falk. Technical Report 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.
- Caldwell, W. W., and D. R. Henning
 1978 North American Plains. In Chronologies in New World Archeology, edited by R. E. Taylor, pp. 113-145. Academic Press, New York.
- Caldwell, W. W., and R. E. Jensen
 1969 The Grand Detour Phase. Publications in Salvage Archeology No. 13. River Basin Surveys, Smithsonian Institution, Lincoln.
- Clayton, L., and S. R. Moran
 1982 Chronology of Late Wisconsinan Glaciation in Middle North America. Quaternary Science Reviews 1:55-82.
- Clayton, L., W. B. Bickley, Jr., and W. J. Stone
 1970 Knife River Flint. Plains Anthropologist 15:282-290.
- Clayton, L., S. R. Moran, and W. B. Bickley, Jr.
 1976 Stratigraphy, Origin, and Climatic Implications of Late Quaternary Upland Silt in North Dakota. Miscellaneous Series No. 54. North Dakota Geological Survey, Grand Forks.
- Coogan, A. H.
 1980 A Series of Maps Depicting the Missouri River Terraces in the Lake Sharpe Project Area, South Dakota. Department of Geology, Kent State University, Kent, Ohio.

Coogan, A. H. (continued)

1984 Geological Site Reports, Lake Sharpe, South Dakota. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 3, sec. K, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

1987 Holocene Geomorphic and Stratigraphic Framework of Archeological Sites Along the Missouri River, Central South Dakota. Department of Geology, Kent State University, Kent, Ohio. Submitted to the Omaha District Corps of Engineers, U.S. Department of Army, Omaha.

Coogan, A. H., and W. N. Irving

1959 Late Pleistocene and Recent Missouri River Terraces in the Big Bend Reservoir, South Dakota. Proceedings of the Iowa Academy of Science 66:317-327.

Cooper, P. L.

1958 Archeological Investigations in the Heart Butte Reservoir Area, North Dakota. River Basins Surveys Papers No. 9. Bulletin No. 169. Bureau of American Ethnology, Smithsonian Institution, Washington.

Crandell, D. R.

1953 Pleistocene Geology of Part of Central South Dakota. Bulletin of the Geological Society of America 64:581-598.

Cvancara, A. M.

1975 Aquatic Malacogeography of North Dakota. Proceedings of the North Dakota Academy of Science 27(2):68-82.

1983 Aquatic Mollusks of North Dakota. Report of Investigation No. 78. North Dakota Geological Survey, Grand Forks.

Cvancara, A. M., L. Clayton, W. B. Bickley, Jr., A. F. Jacob, A. C. Ashworth, J. A. Brophy, C. T. Shay, L. D. Delorme, and G. E. Lammers

1971 Paleolimnology of Late Quaternary Deposits, Seibold Site, North Dakota. Science 171:172-174.

Davidson, D. A.

1985 Geomorphology and Archaeology. In Archaeological Geology, edited by G. Rapp, Jr., and J. A. Gifford, pp. 25-55. Yale University Press, New Haven.

Deetz, J. F.

1965 The Dynamics of Stylistic Change in Arikara Ceramics. Studies in Anthropology No. 4. Illinois State Museum, Springfield.

Ehrenhard, J. E.

1972 Time, Space, and Climate in the Middle Missouri. Transactions of the Nebraska Academy of Sciences 1:11-19.

- Ewers, J. C.
 1954 Indian Trade of the Upper Missouri Before Lewis and Clark. Bulletin of the Missouri Historical Society 10:429-446.
- 1968 Indian Life on the Upper Missouri. University of Oklahoma Press, Norman.
- Falk, C. R.
 1977 Analyses of Unmodified Vertebrate Fauna from Sites in the Middle Missouri Subarea: A Review. Plains Anthropologist, Memoir 13:151-161.
- Falk, C. R. (editor)
 1984 Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.
- Falk, C. R., and F. A. Calabrese
 1973 Helb: A Preliminary Statement. Plains Anthropologist 18:336-343.
- Fawcett, W. B., Jr.
 1988 Changing Prehistoric Settlement Along the Middle Missouri River: Timber Depletion and the Historic Context. Plains Anthropologist 33:67-94.
- Fenneman, N. M.
 1931 Physiography of the Western United States. McGraw-Hill, New York.
- Flint, R. F.
 1955 Pleistocene Geology of Eastern South Dakota. Professional Papers No. 262. U.S. Geological Survey, Washington.
- Frison, G. C.
 1975 Man's Interaction with Holocene Environments on the Plains. Quaternary Research 5:289-300.
- Gant, R. D.
 1967 Report of the Archeological Investigations at the Arp Site (39BR101), Brule County, South Dakota, 1961. Archeological Studies Circular No. 12. W. H. Over Museum, University of South Dakota, Vermillion.
- Gladfelter, B. G.
 1981 Developments and Directions in Geoarchaeology. In Advances in Archaeological Method and Theory, vol. 4, edited by M. B. Schiffer, pp. 343-364. Academic Press, New York.

- Goulding, D. A.
 1980 Post-Contact Chipped Stone Technology at the Lower Hidatsa Site and Sakakawea Site, Knife River Indian Villages National Historic Site. Contribution No. 119. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Midwest Archeological Center, U.S. National Park Service, Lincoln. Unpublished M.A. thesis, Department of Anthropology, University of Colorado, Boulder.
- Gregg, M. L. (editor)
 1987 Archeological Excavation at the Naze Site (32SN246). Submitted to the Bureau of Reclamation, U.S. Department of the Interior, Billings, Montana. Department of Anthropology, University of North Dakota, Grand Forks.
- Griffin, D. E.
 1977 Timber Procurement and Village Location in the Middle Missouri Subarea. Plains Anthropologist, Memoir 13:177-185.
- Gruger, J.
 1973 Studies on the Late Quaternary Vegetation History of Northeastern Kansas. Bulletin of the Geological Society of American 84:239-250.
- Hassan, F. A.
 1985 Paleoenvironments and Contemporary Archaeology: A Geoarchaeological Approach. In Archaeological Geology, edited by G. Rapp, Jr., and J. A. Gifford, pp. 85-102. Yale University Press, New Haven.
- Graham, R. W., H. A. Semken, Jr., and M. A. Graham (editors)
 1987 Late Quaternary Mammalian Biogeography and Environment of the Great Plains and Prairies. Scientific Papers Vol. 22. Illinois State Museum, Springfield.
- Haberman, T. W.
 1984 Evidence for Aboriginal Tobaccos in Eastern North America. American Antiquity 49:269-287.
- Hoffman, J. J.
 1968 The La Roche Site. Publications in Salvage Archeology No. 11. River Basin Surveys, Smithsonian Institution, Lincoln.
- Hoffman, J. J., and L. A. Brown
 1967 The Bad River Phase. Plains Anthropologist 12:323-339.
- Hoke, E.
 1983 Unionid Mollusks of the Missouri River on the Nebraska Border. American Malacological Bulletin 1:71-74.
- Holen, S. R.
 1982 Pawnee Bison Hunting Ranges and an Assessment of the "Birdwood Culture." Paper presented at the 1982 meeting of the Nebraska Academy of Sciences, Lincoln.
 1983 Lower Loup Lithic Procurement Strategy at the Gray Site, 25CX1. Unpublished Master's thesis, Department of Anthropology, University of Nebraska-Lincoln.

- Hunt, C. B.
1967 Physiography of the United States. W. H. Freeman, San Francisco.
- Hurt, W. R., Jr.
1951 The Sommers Site. Museum News 12(4):1-8. W. H. Over Museum, University of South Dakota, Vermillion.
- Hurt, W. R., Jr. (continued)
1952 Report of the Investigation of the Scalp Creek Site, 39GR1, and the Ellis Creek Site, 39GR2, Gregory County, South Dakota, 1941, 1951. Archaeological Studies Circular No. 4. South Dakota Archaeological Commission, Pierre.
- 1969 Seasonal Economic and Settlement Patterns of the Arikara. Plains Anthropologist 14:32-37.
- Johnson, A. M.
1970 Montana Projectile Point Types: Besant. Archaeology in Montana 11(4):55-70.
- 1977 Testing the Modified Initial Middle Missouri Variant. Plains Anthropologist, Memoir 13:14-20.
- 1979 Extended Middle Missouri Components in the Big Bend Region, South Dakota. Special Publications No. 1. South Dakota Archaeological Society and the Archaeological Laboratory, University of South Dakota, Vermillion.
- Johnson, C. M.
1980 Ceramic Classification in the Middle Missouri Subarea of the Plains. Technical Report No. 80-01. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln.
- 1983 Native Ceramics. In The Archeology of the Mondrian Tree Site (32MZ58), McKenzie County, North Dakota, vol. 1, chp. 9, edited by D. L. Toom and M. L. Gregg. Contribution No. 193. Department of Anthropology, University of North Dakota, Grand Forks.
- 1984 Time, Space, and Cultural Tradition as Factors in Lithic Resource Exploitation in the Middle Missouri Subarea. Plains Anthropologist 29:289-302.
- 1989 Plains Village Stone Tools. In Archeology of the Medicine Crow Site Complex (39BF2), Buffalo County, South Dakota, chp. 12, edited by S. A. Ahler and D. L. Toom. Illinois State Museum Society, Springfield, in cooperation with the Department of Anthropology, University of North Dakota, Grand Forks. Submitted to Interagency Archeological Services, U.S. National Park Service, Denver.

- Johnson, C. M., and D. L. Toom
 1989 Plains Village Ceramics. In Archeology of the Medicine Crow Site Complex (39BF2), Buffalo County, South Dakota, chp. 11, edited by S. A. Ahler and D. L. Toom. Illinois State Museum Society, Springfield, in cooperation with the Department of Anthropology, University of North Dakota, Grand Forks. Submitted to Interagency Archeological Services, U.S. National Park Service, Denver.
- Johnson, J. R., and J. T. Nichols
 1970 Plants of South Dakota Grasslands: A Photographic Study. Bulletin No. 566. Agricultural Experiment Station, South Dakota State University, Brookings.
- Kehoe, T. F.
 1966 The Small Side-Notched Point System of the Northern Plains. American Antiquity 31:827-841.
- 1973 The Gull Lake Site: A Prehistoric Bison Drive in Southwestern Saskatchewan. Publications in Anthropology and History No. 1. Milwaukee Public Museum, Milwaukee.
- Kehoe, T. F., and B. A. McCorquodale
 1961 The Avonlea Point: Horizon Marker for the Northwestern Plains. Plains Anthropologist 6:179-188.
- Knox, J. C.
 1983 Responses of River Systems to Holocene Climates. In Late-Quaternary Environments of the United States, vol. 2, The Holocene, edited by H. E. Wright, Jr., pp. 26-41. University of Minnesota Press, Minneapolis.
- Kordecki, C.
 1987 Features from the Naze Site. In Archeological Excavation at the Naze Site (32SN246), edited by M. L. Gregg, pp. 89-122. Submitted to the Bureau of Reclamation, U.S. Department of the Interior, Billings, Montana. Department of Anthropology, University of North Dakota, Grand Forks.
- Krause, R. A.
 1972 The Leavenworth Site: Archaeology of an Historic Arikara Community. Publications in Anthropology No. 3. University of Kansas, Lawrence.
- Kuchler, A. W.
 1964 Potential Natural Vegetation of the Coterminous United States. Special Publication No. 36. American Geographical Society.
- Langbein, W. B., and S. A. Schumm
 1958 Yield of Sediment in Relation to Mean Annual Precipitation. Transactions of the American Geophysical Union 39:1076-1084.
- Lehmer, D. J.
 1954 Archeological Investigations in the Oahe Dam Area, South Dakota, 1950-51. River Basin Surveys Papers No. 7. Bulletin No. 158. Bureau of American Ethnology, Smithsonian Institution, Washington.

Lehmer, D. J. (continued)

1970 Climate and Culture History in the Middle Missouri Valley. In Pleistocene and Recent Environments of the Central Great Plains, edited by W. Dort, Jr., and J. K. Jones, Jr., pp. 117-129. University of Kansas Press, Lawrence.

1971 Introduction to Middle Missouri Archeology. Anthropological Papers No. 1. U.S. National Park Service, Washington.

Lehmer, D. J., and W. W. Caldwell

1966 Horizon and Tradition in the Northern Plains. American Antiquity 31:511-516.

Lehmer, D. J., and D. T. Jones

1968 Arikara Archeology: The Bad River Phase. Publications in Salvage Archeology No. 7. River Basin Surveys, Smithsonian Institution, Lincoln.

Lovick, S. K., and S. A. Ahler

1982 Cultural Resource Reconnaissance in the Knife River Indian Villages National Historic Site. Contribution No. 159. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Midwest Archeological Center, U.S. National Park Service, Lincoln.

Meleen, E. E.

1949 Summary and Report of Field Work in South Dakota, 1940-1947. Proceedings of the Fifth Plains Conference for Archaeology. Notebook No. 1. Laboratory of Anthropology, University of Nebraska-Lincoln.

Meyer, R. W.

1977 The Village Indians of the Upper Missouri River. University of Nebraska Press, Lincoln.

Neuman, R. W.

1960 The Truman Mound Site, Big Bend Reservoir Area, South Dakota. American Antiquity 26:78-92.

1961a Excavations at Four Mound Sites in the Oahe Reservoir. Plains Anthropologist 6:57-58.

1961b The Olson Mound (39BF223) in Buffalo County, South Dakota. Plains Anthropologist 6:189-200.

1964 The Good Soldier Site (39LM238), Big Bend Reservoir, Lyman County, South Dakota. River Basin Surveys Paper No. 37. Bulletin No. 189. Bureau of American Ethnology, Smithsonian Institution, Washington.

1975 The Sonota Complex and Associated Sites on the Northern Great Plains. Publications in Anthropology No. 6. Nebraska State Historical Society, Lincoln.

- Nickel, R. K.
 1974 Plant Resource Utilization at a Late Prehistoric Site in North-Central South Dakota. Unpublished M.A. thesis, Department of Anthropology, University of Nebraska-Lincoln.
- 1977 The Study of Archaeologically Derived Plant Materials from the Middle Missouri Subarea. Plains Anthropologist, Memoir 13:53-58.
- Nowak, T. R.
 1983 Lower Antelope Creek (39ST106): An Examination of a Prehistoric Arikara Village Excavated Under the Avocational Archeological Assistance Program of the U.S. Army Corps of Engineers. Journal of the South Dakota Archaeological Society 7:1-34.
- 1986 Lake Sharpe Project - Cultural Resource Testing at Site 39HU83, West Bend Recreation Area. Disposition Form (MRORE-O). Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.
- NPS
 1986 Guidelines for Completing National Register of Historic Places Forms. National Register Bulletin No. 16. Interagency Resources Division, U.S. National Park Service, Washington.
- Over, W. H.
 1932 Flora of South Dakota. University of South Dakota, Vermillion.
- Over, W. H., and E. P. Churchill
 1941 Mammals of South Dakota. Museum and Department of Zoology, University of South Dakota, Vermillion.
- Parmalee, P. W.
 1977 The Avifauna from Prehistoric Arikara Sites in South Dakota. Plains Anthropologist 22:189-222.
- Picha, P. R., and D. L. Toom
 1984 An Archeological Survey of Selected Federal Lands on the West Bank of the Lake Sharpe/Big Bend Project Area, South Dakota, 1983: Supporting Documentation. Contribution No. 199. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.
- Reeves, B. O. K.
 1970 Culture Change in the Northern Plains: 1000 B.C.-A.D. 1000. Unpublished Ph.D. dissertation, Department of Archaeology, University of Calgary, Alberta.
- 1973 The Concept of an Altithermal Cultural Hiatus in Northern Plains Prehistory. American Anthropologist 75:1221-1253.
- 1983 Culture Change in the Northern Plains: 1000 B.C.-A.D. 1000. Occasional Paper No. 20. Archaeological Survey of Alberta.

- Rothrock, E. P.
 1943 A Geology of South Dakota: Part I, the Surface. Bulletin No. 13. South Dakota Geological Survey, Rapid City.
- Scaglione, R.
 1980 The Plains Culture Area Concept. In Anthropology on the Great Plains, edited by W. R. Wood and M. Liberty, pp. 23-34. University of Nebraska Press, Lincoln.
- Schumacher, T. M.
 1987 Soil Survey of Lyman County, South Dakota. Soil Conservation Service, U.S. Department of Agriculture, Washington.
- Schumm, S. A.
 1965 Quaternary Paleohydrology. In The Quaternary of the United States, edited by H. E. Wright, Jr., and D. G. Frey, pp. 783-794. Princeton University Press, Princeton, New Jersey.
 1977 The Fluvial System. John Wiley and Sons, New York.
- SDGS
 1971a Major Physiographic Divisions of South Dakota. Educational Series Map No. 4. South Dakota Geological Survey, Rapid City.
 1971b Generalized Glacial Map of South Dakota. Educational Series Map No. 2. South Dakota Geological Survey, Rapid City.
- Semken, H. A., Jr.
 1983a Rodent and Insectivore Remains. In The Archeology of the Mondrian Tree Site (32MZ58), McKenzie County, North Dakota, vol. 2, edited by D. L. Toom and M. L. Gregg. Contribution No. 193. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Northern Border Pipeline Company, Omaha.
 1983b Holocene Mammalian Biogeography and Climatic Change in the Eastern and Central United States. In Late Quaternary Environments of the United States: The Holocene, vol. 2, edited by H. E. Wright, Jr., pp. 182-207. University of Minnesota Press, Minneapolis.
- Semken, H. A., Jr., and C. R. Falk
 1987 Late Pleistocene/Holocene Mammalian Faunas and Environmental Changes on the Northern Plains of the United States. In Late Quaternary Mammalian Biogeography and Environments of the Great Plains and Prairies, edited by R. W. Graham, H. A. Semken, Jr., and M. A. Graham, pp. 176-313. Scientific Papers Vol. 22. Illinois State Museum, Springfield.
- Shelford, V. E.
 1963 The Ecology of North America. University of Illinois Press, Urbana.
- Sigstad, J. S., and J. K. Sigstad (editors)
 1973 Archaeological Field Notes of W. H. Over. Research Bulletin No. 1. Office of the South Dakota State Archaeologist, Ft. Meade.

Smalley, M. W.

- 1975 Soil Survey of Hughes County, South Dakota. Soil Conservation Service, U.S. Department of Agriculture, Washington.

Smith, C. S.

- 1975 The Stricker Site. Plains Anthropologist 20:1-25.
- 1977 The Talking Crow Site. Publications in Anthropology No. 1. University of Kansas, Lawrence.

Smith, C. S., and A. E. Johnson

- 1968 The Two Teeth Site. Publications in Salvage Archeology No. 8. River Basin Surveys, Smithsonian Institution, Lincoln.

Smith, G. H.

- 1968 Big Bend Historic Sites. Publications in Salvage Archeology No. 9. River Basin Surveys, Smithsonian Institution, Lincoln.
- 1972 Like-A-Fishhook Village and Fort Berthold, Garrison Reservoir, North Dakota. Anthropological Papers No. 2. U.S. National Park Service, Washington.

Smith, J. S.

- 1984 Historical Background, Lake Sharpe Area, South Dakota. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 3, sec. N, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Spaulding, A. C.

- 1956 The Arzberger Site, Hughes County, South Dakota. Occasional Contributions No. 16. Museum of Anthropology, University of Michigan, Ann Arbor.

Steinacher, T. L.

- 1981 Archeological Survey and Investigations of Selected Federal Lands on the West Bank of the Lake Sharpe/Big Bend Project Area, South Dakota: 1980. Technical Report No. 81-07. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.
- 1984a Archeological Investigations at the Whistling Elk Site (39HU242), 1978-1979. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 2, sec. A, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Steinacher, T. L. (continued)

1984b Archeological Investigations at the Diamond-J Site (39HU89), 1978-1979. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 2, sec. B, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

1984c Archeological Investigations at the Rousseau Site (39HU102), 1978-1979. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 2, sec. C, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Steinacher, T. L., and D. L. Toom

1984 Covering Report. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 1, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

1985 A Proposed National Register of Historic Places, Multiple Resource Nomination, for the Historic Resources of the Big Bend Area, South Dakota (Partial Inventory: Prehistoric and Historic Archeological Sites). Revised 1980 nomination report. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Steward, J. H.

1955 Theory of Culture Change: the Methodology of Multilinear Evolution. University of Illinois Press, Urbana.

1977 Evolution and Ecology: Essays on Social Transformation, edited by J. C. Steward and R. F. Murphy. University of Illinois Press, Urbana.

Stuiver, M., and B. Becker

1987 High-Precision Decadal Calibration of the Radiocarbon Time Scale, A.D. 1950-2500 B.C. Radiocarbon 28:863-910.

Syms, E. L.

1977 Cultural Ecology and Ecological Dynamics of the Ceramic Period in Southwestern Manitoba. Plains Anthropologist, Memoir 12.

Thiessen, T. D.

1977 A Tentative Radiocarbon Chronology for the Middle Missouri Tradition. Plains Anthropologist, Memoir 13:59-82.

- Thornbury, W. D.
 1965 Regional Geomorphology of the United States. John Wiley and Sons, New York.
- Tiffany, J. A.
 1983 An Overview of the Middle Missouri Tradition. In Prairie Archaeology: Papers in Honor of David A. Baerreis, edited by G. E. Gibbon, pp. 87-108. Publications in Anthropology No. 3. University of Minnesota, Minneapolis
- Toom, D. L.
 1979 The Middle Missouri Villagers and the Early Fur Trade: Implications for Archeological Interpretation. A Case Study of Post-Contact Technological Change. Unpublished Master's thesis, Department of Anthropology, University of Nebraska-Lincoln.
- 1984a Notes on Prehistoric Lithic Resource Utilization in the Lake Sharpe Area. In Archeological Investigations Within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 3, sec. I, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.
- 1984b Plains Woodland Period Mound Sites in the Lake Sharpe Area: East Bank. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 2, sec. E, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.
- 1984c Archeological Investigations at the Little Elk Site (39HU221), 1978-1979. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 2, sec. D, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.
- 1987 Chronological Analysis of the Whistling Elk Site and Early Plains Village Archeological Taxa in the Big Bend Region of the Middle Missouri Subarea. Ms. in possession of the author. Department of Anthropology, University of North Dakota, Grand Forks.
- 1989a Archeological Test Excavations at Eight Sites in the Lake Sharpe Project Area, Hughes, Lyman, and Stanley Counties, South Dakota, 1987. Western Cultural Resource Management, Inc., Boulder, Colorado. In preparation for the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Toom, D. L. (continued)

1989b Site Setting and Background. In Archeology of the Medicine Crow Site Complex (39BF2), Buffalo County, South Dakota, chp. 2, edited by S. A. Ahler and D. L. Toom. Illinois State Museum Society, Springfield, in cooperation with the Department of Anthropology, University of North Dakota, Grand Forks. Submitted to Interagency Archeological Services, U.S. National Park Service, Denver.

Toom, D. L., and J. A. Artz

1985 An Archeological Survey of Selected Federal Lands on the West Bank of Lake Oahe, Oahe Dam Vicinity, Stanley County, South Dakota, 1984: Main Report. Contribution No. 215. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Toom, D. L., and M. L. Gregg (editors)

1983 The Archeology of the Mondrian Tree Site (32MZ58), McKenzie County, North Dakota. Contribution No. 193. Department of Anthropology, University of North Dakota, Grand Forks.

Toom, D. L., and P. R. Picha

1984 An Archeological Survey of Selected Federal Lands on the West Bank of the Lake Sharpe/Big Bend Project Area, South Dakota, 1983: Main Report. Contribution No. 198. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Toom, D. L., T. L. Steinacher, and C. R. Falk

1979 Archeological Investigations of Selected Sites Located along the West Shore of the Big Bend-Lake Sharpe Project Area, South Dakota: 1978-1979. Technical Report No. 79-10 (draft). Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln.

USACE

1976 The Missouri River Main Stem System, Operation and Maintenance: Draft Environmental Statement. U.S. Army Engineer District, Omaha.

1977 Review Report, Missouri River, South Dakota, Nebraska, North Dakota, Montana: Draft Environmental Statement. U.S. Army Engineer District, Omaha.

Vialle, R. L.

1985 Soil Survey of Brule and Buffalo Counties, South Dakota. Soil Conservation Service, U.S. Department of Agriculture, Washington.

Watts, W. A., and H. E. Bright

1968 Pollen, Seed and Mollusk Analysis of a Sediment Core from Pickerel Lake, Northeastern South Dakota. Bulletin of the Geological Society of America 77:1339-1360.

Watts, W. A., and H. E. Wright, Jr.

1966 Late Wisconsin Pollen and Seed Analysis from the Nebraska Sand Hills. Ecology 47:202-210.

- Weakly, W. F.
1971 Tree-ring Dating and Archaeology in South Dakota. Plains Anthropologist, Memoir 8.
- Wedel, W. R.
1961 Prehistoric Man on the Great Plains. University of Oklahoma Press, Norman.
- Wendland, W. M.
1978 Holocene Man in North America: the Ecological Setting and Climatic Background. Plains Anthropologist 23:273-287.
- Wendland, W. M., and R. A. Bryson
1974 Dating Climatic Episodes of the Holocene. Quaternary Research 4:9-24.
- Westin, F. C., L. F. Puhr, and G. J. Buntley
1959 Soils of South Dakota. Soil Survey Series No. 3. Agricultural Experiment Station, South Dakota State University, Brookings.
- Weymouth, J. W.
1986 Geophysical Methods of Archaeological Site Surveying. In Advances in Archaeological Method and Theory, vol. 9, edited by M. B. Schiffer, pp. 311-395. Academic Press, New York.
- Whitney, N. R.
1978 The Birds of South Dakota. South Dakota Ornithologist's Union, Vermillion.
- Will, G. F., and G. E. Hyde
1917 Corn Among the Indians of the Upper Missouri. University of Nebraska Press, Lincoln.
- Wood, W. R.
1960 The Boundary Mound Group (32SI1): an Eastern Woodland Complex in North Dakota. Plains Anthropologist 5:71-78.
- 1972 Contrastive Features of Native North American Trade Systems. In For the Chief: Essays in Honor of Luther S. Cressman, edited by F. W. Voget and R. L. Stephenson, pp. 153-169. Anthropological Papers No. 4. University of Oregon, Eugene.
- 1974 Northern Plains Village Cultures: Internal Stability and External Relationships. Journal of Anthropological Research 30:1-6.
- 1980 Plains Trade in Prehistoric and Protohistoric Intertribal Relations. In Anthropology on the Great Plains, edited by W. R. Wood and M. Liberty, pp. 98-109. University of Nebraska Press, Lincoln.

Wood, W. R. (continued)

- 1984 Notes on the Historical Cartography of the Lake Sharpe Area, 1795-1892. In Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report, vol. 3, sec. M, edited by C. R. Falk. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska-Lincoln. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Wood, W. R., and A. M. Johnson

- 1973 High Butte, 32ME13: A Missouri Valley Woodland-Besant Site. Archaeology in Montana 14:35-83.

Wright, H. E., Jr.

- 1970 Vegetational History of the Central Plains. In Pleistocene and Recent Environments of the Central Great Plains, edited by W. Dort, Jr., and J. K. Jones, Jr., pp. 157-172. University of Kansas Press, Lawrence.

Zalucha, L. A.

- 1982 Methodology in Paleoethnobotany: A Study in Vegetational Reconstruction Dealing with the Mill Creek Culture of Northwestern Iowa. Ph.D. dissertation, University of Wisconsin-Madison. University Microfilms, Ann Arbor.
- 1983 An Analysis of Charcoal from the Helb Site (39CA208), South Dakota. In Prairie Archaeology: Papers in Honor of David A. Baerreis, edited by G. E. Gibbon, pp. 109-129. Publications in Anthropology No. 3. University of Minnesota, Minneapolis.

Zimmerman, L. J. (editor)

- 1981 The Crow Creek Site (39BF11) Massacre: A Preliminary Report. Archaeology Laboratory, University of South Dakota, Vermillion. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

APPENDIX A

MACROBOTANICAL REMAINS FROM SITE 39LM160 IN CENTRAL SOUTH DAKOTA

by

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February 1989

Report submitted to the Department of Anthropology, University of North Dakota,
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Macrobotanical Remains from Site 39LM160 in Central South Dakota

Margaret A. Van Ness

Introduction

Two flotation samples from archeological site 39LM160 (Rattlesnake Keeper) in central South Dakota were processed and analyzed. Several seeds recovered from dry or water screening were also analyzed. The site is located on Lake Sharpe in Lyman County and dates to the late Plains Village period. The the flotation samples and seeds are from two basin hearths, Features 1 and 3 (Table A1). The purpose of this investigation is to recover and identify culturally significant macrobotanical remains to aid in the understanding of prehistoric plant use. Macrobotanical remains are defined as all possibly identifiable noncharcoal vegetable parts visible through a 10x binocular scope.

Processing and Identification

The flotation samples were processed using a water flotation technique. This process is based on the principle that organic remains float on the surface when a soil sample is submerged and agitated in water. Both samples were 2.00 liters prior to processing (Table A2). Processing involved pouring a sample into a five gallon plastic bucket which was then filled with water and agitated. The floated remains (light fraction) were poured onto a 0.5 mm screen. The bucket was then refilled with water and the floated remains again poured onto the screen. This processes was repeated, usually five to seven times, until little or no debris floated. The light fraction was then air dried on newspaper-lined cardboard flats. The part of the sample which did not float or pass through the 0.5 mm screen was gently water screened in a 2.0 mm screen. All debris which does not pass through this screen (heavy fraction) was also air dried. Both the light and heavy fractions of each sample were examined under a binocular scope at 10x. All possible cultural remains, except charcoal, were separated from each sample (Table A3).

The seeds recovered from screening are from Feature 1. Sample 1101 is from a 1/4" dry screen and Sample 1105ws is from a 1/16" water screen. Seed identification is based on the author's comparative collection.

Table A1
Sample Provenience

Cat. #	Horizontal Location	Vertical Location	Feature	Comment
517	Test Unit 5	160-165 cm BS	3	shallow basin hearth
1101			1	deep basin hearth
1105	Test Unit 11	in soil slump	1	deep basin hearth
1105ws			1	deep basin hearth

Table A2
Flotation Sample Size and Charcoal Amounts
(volume amounts in liters)

Catalogue Number	Original Volume	Light Fraction Volume	Heavy Fraction Volume	Light Fraction Charcoal*	Heavy Fraction Charcoal*
517	2.0	.034	.006	approx. 45%	none
1105	2.0	.082	.048	approx. 40%	less than 1%
TOTAL	4.0	.116	.054		

Table A3
Macrobotanical Results

Cat. #	Identification	Common Name	Part	Charred whole frag.	Uncharred whole frag.
517	<u>Chenopodium</u>	Goosefoot	seed		3
	cf <u>Malvaceae</u>	Mallow Family	seed	24	1
1101	<u>Prunus americana</u>	wild plum	seed		1
1105	<u>Brassica</u>	Mustard	seed		1
	<u>Chenopodium</u>	Goosefoot	seed		1
	<u>Malvaceae</u>	Mallow Family	seed		1
	<u>Opuntia</u>	Prickly Pear	seed		2
	<u>Poaceae</u>	Grass Family	seed		2
	<u>Vitis</u>	Grape	seed	1	
	cf <u>Zea</u>	Corn	kernal		8
1105ws	<u>Opuntia</u>	Prickly Pear	seed	1	5
	<u>Rhus trilobata</u>	Skunkbrush	seed		6
	<u>Zea maize</u>	corn	kernal	1	
	Unknown	Unknown	seed?	1	
TOTAL				4	22

Results

The results of the analysis are presented in Table A3. One hundred seven identifiable macrobotanical remains were recovered from the flotation samples, with 28 of these from Feature 3 (Sample 517) and 79 associated with Feature 1 (Sample 1105). All of the remains are seeds or probable corn kernals and 12 of them are charred.

Charcoal was noted in both of the flotation samples (Table A2). The charcoal remains consist of moderate amounts of very small pieces which are too fragmentary to be identified.

Bone fragments were also observed in both flotation samples. An uncharred fragment was recovered from Feature 3, and two charred fragments are associated with Feature 1. Thousands of minute bone splinters are also associated with Feature 1. These fragments are ashy-white and appear to have been heat altered at a high temperature. No other cultural remains (lithics, pottery, etc.) are associated with the samples.

Interpretation and Conclusions

As mentioned above, 12 of the macrobotanical remains are charred. The 95 uncharred seeds are probably contaminants in the archaeological record. This concept is based on the modern condition of the seeds, the unlikelihood that uncharred seeds preserve through time under these conditions, and the availability of the seeds in the present local environment. Fifty-four of these uncharred remains are goosefoot seeds, with 27 seeds from Feature 3 and 27 seeds from Feature 1. It is possible these seeds represent prehistoric plant use and have preserved in their uncharred condition. The seeds represent a plant with numerous ethnographically documented uses (Bye 1972:97; 1979; Castetter 1935:21; Gilmore 1913b:361; 1977:26; Harrington 1967:71; Johnson 1970:311; Kindscher 1987:79-83; Palmer 1871:419; Rogers 1980:66; Yanovsky 1936:22), and they are commonly found in similar archaeological contexts (Benn 1974:56; Haberman 1982:510-511, 526; Miller 1964:232; Van Ness 1989; Will and Spinden 1906:179). Although it is unlikely these goosefoot seeds are culturally significant, it is possible, and future analysis of uncharred seeds in archaeological contexts may aid in their interpretation.

The wild grape (*Vitis* sp.) seed and charred prickly pear (*Opuntia*) seed from Feature 1 probably represent prehistoric use of these species. The wild grape seed is possibly from the riverbank grape (*Vitis riparia*), which currently grows in the region (McGregor 1986:560; Stephens 1973:390-391). The consumption of grapes is mentioned in several ethnographic accounts (Bye 1972:96; Castetter 1935:53; Gilmore 1913a:326; 1977:50; Harrington 1967:295-297; Palmer 1878:599-600; Rogers 1980:100; Yanovsky 1936:42-43), and in connection with historical Indian groups along the upper Missouri River (Meyer 1977:2). Grape seeds or probable grape seeds were recovered from other sites in the general region (Haug 1986:265; Haberman 1982:515; Van Ness 1989).

Prickly pears grow throughout the region and prickly pear consumption is noted in many ethnographic reports (Bye 1972:97; Castetter 1935:35-36; Gilmore 1977:52; Harrington 1967:248-249; Palmer 1871:418; Yanovsky 1936:45-46). The pads, fruits, flowers, and seeds were all eaten.

The nine probable corn kernels and kernel fragments are not an unexpected component of this site. Corn is often associated with the historic tribes of the Middle Missouri subarea, and is a common component in many of the archaeological sites of the area. The expansive flood plains of the region offered the soil and moisture necessary for successful agriculture. Corn was probably introduced to

the region near the end of the Plains Woodland Period (A.D. 1-900), and was a major food source for the regional populations during the Plains Village Period between A.D. 900- 1862 (Toom and Piche 1984:22-23). Corn is associated with the Mandans (Meyer 1977:1-3,15, 63; Will and Spinden 1906:117-119), the Hidatsas (Wilson 1917), and the Arikaras (Will and Hyde 1964), and was an important trade item (Ewers 1968:20; Meyer 1977:15; Wood 1980:100). Corn, often identified as the Northern Flint variety, is probably the most common vegetable remain recovered from comparable sites (Benn 1974; Caldwell 1966:100; Haberman 1982; Haug 1986:266; Hurt 1951; Smith and Grange 1958:115; Spaulding 1956; Van Ness 1989; Will and Spinden 1906:179-180; Wood and Woolworth 1964:50).

References Cited

Benn, David W.

- 1974 Seed Analysis and Its Implications for an Initial Middle Missouri Site in South Dakota. Plains Anthropologist 19(63):55-72.

Bye, Robert

- 1972 Ethnobotany of the Southern Paiute Indians in the 1870's: with a note on the Early Ethnobotanical Contributions of Dr. Edward Palmer. In: Great Basin Cultural Ecology: A Symposium, edited by Don D. Fowler. Desert Research Institute Publications in the Social Sciences No.8., Reno.
- 1979 Quelites-Ethnoecology of Edible Greens-Past, Present and Future. Paper presented at the Second Annual Conference on Ethnobiology, Flagstaff, Arizona.

Caldwell, Warren W.

- 1966 The Black Partizan Site. Smithsonian Institution River Basin Surveys, Publications in Salvage Archaeology, Number 2, Lincoln, Nebraska.

Castetter, Edward F.

- 1935 Uncultivated Native Plants Used as Sources of Food. Ethnobiological Studies in the American Southwest. The University of New Mexico Bulletin, Whole Number 266, Biological Series Vol. 4, No. 1, University of New Mexico Press, Albuquerque.

Ewers, John C.

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

Gilmore, Melvin R.

- 1913a A Study in the Ethnobotany of the Omaha Indians. Collections of the Nebraska State Historical Society, Volume XVII, pp. 314-357. The Nebraska State Historical Society, Lincoln.
- 1913b Some Native Nebraska Plants With Their Uses by the Dakota. Collections of the Nebraska State Historical Society, Volume XVII, pp. 358-370. The Nebraska State Historical Society, Lincoln.
- 1977 Uses of Plants by the Indians of the Missouri River Region. University of Nebraska Press, Lincoln. (Reprint of 1919 report).

Habberman, Thomas W.

- 1982 Identified Plant Remains from the Travis I Site. In Archaeological Excavations at the Travis I Site, Corson County, South Dakota, edited by Thomas W. Haberman, South Dakota Archaeological Research Center, Contract Investigation Series No. 37, pp. 502-543, Rapid City, South Dakota.

Harrington, H. D.

- 1967 Edible Plants of the Rocky Mountains. The University of New Mexico Press, Albuquerque.

Haug, James K.

- 1986 Floral Remains From Crow Creek. In Report of a 1981 Archeological Salvage Excavation at the Crow Creek Site, 39BF 11, Buffalo County, South Dakota, edited by James K. Haug, pp. 265-270, Archaeological Research Center, Contract Investigations Series No. 109, Rapid City, South Dakota.

Hurt, Wesley R., Jr.,

- 1951 Report of Investigations of the Swanson Site, 39BR 16, Brule County, South Dakota, 1950. South Dakota Archaeological Commission, Archaeological Studies, Circular No. 3, Pierre.

Johnston, Alexander

- 1970 Blackfoot Utilization of the Flora of the Northwestern Plains. Economic Botany 24(3):301-324.

Kindscher, Kelly

- 1987 Edible Wild Plants of the Prairie. University Press of Kansas, Lawrence.

McGregor, Ronald L. (Coordinator)

- 1986 Flora of the Great Plains. University Press of Kansas, Lawrence.

Meyer, Roy W.

- 1977 The Village Indians of the Upper Missouri: the Mandans, Hidatsas, and Arikaras. University of Nebraska Press, Lincoln.

Miller, Carl F.

- 1964 Archaeological Investigations at the Hosterman Site (39P07), Oahe Reservoir Area, Potter County, South Dakota, 1956. Smithsonian Institution Bureau of American Ethnology, Bulletin 189, River Basin Surveys Papers, No. 35, pp. 139-266, Washington, D.C.

Palmer, Edward

- 1871 Food Products of the North American Indians. Report to the Commissioner of Agriculture for 1870, pp. 404-428. United States Government Printing Office, Washington, D.C.
- 1878 Plants Used by the Indians of the United States. American Naturalist, Vol. 12:593-606.

Rogers, Dilwyn

- 1980 Edible, Medicinal, Useful, and Poisonous Wild Plants of the Northern Great Plains-South Dakota Region. Biology Department, Augustana College, Sioux Falls, South Dakota.

Smith, Carlyle S., and Roger T. Grange, Jr.

- 1958 The Spain Site (39LM301), A Winter Village In Fort Randall Reservoir, South Dakota. Smithsonian Institution Bureau of American Ethnology, Bulletin 169, River Basin Surveys Papers, No. 11, pp. 79-128, Washington, D.C.

Spaulding, Albert C.

- 1956 The Arzberger Site, Hughes County, South Dakota. Occasional Contributions from the Museum of Anthropology of the University of Michigan, No. 16, Ann Arbor.

Stephens, H. A.

- 1973 Woody Plants of the North Central Plains. The University Press of Kansas, Lawrence.

Toom, Dennis, and Paul R. Piche

- 1984 An Archaeological Survey of Select Federal Lands on the West Bank of the Big Bend/Lake Sharpe Project Area, Lyman and Stanley Counties, South Dakota, 1983: Main Report. Contribution Number 198, Department of Anthropology and Archaeology, University of North Dakota, Grand Forks. submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Van Ness, Margaret A.

- 1989 Macrobotanical Remains from Five Sites in the Lake Sharpe Area, Central South Dakota. In Archaeological Testing of Eight Sites in the Lake Sharpe Project Area, Hughes, Lyman, and Stanley Counties, South Dakota, 1987. Report to Western Cultural Resource Management, Inc., Boulder, Colorado. submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha, in preparation.

APPENDIX B

IDENTIFIED VERTEBRATE REMAINS FROM SITES 39LM160, 39LM161, AND 39LM163
LAKE SHARPE PROJECT AREA, SOUTH DAKOTA

by

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March 1989

Report submitted to the Department of Anthropology, University of North
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INTRODUCTION

Vertebrate faunal remains recovered during a testing program at three archeological sites along the West Bank of Lake Sharpe in Lyman County, South Dakota, are considered in this report. Fieldwork was performed during the 1988 field season by personnel from the Department of Anthropology, University of North Dakota (UND), Grand Forks, under a contract with the the Omaha District Corps of Engineers. The three sites under consideration (39LM160, 39LM161, and 39LM163) were discovered and first recorded in 1983 by a UND survey team also under contract with the Corps (Toom and Picha 1984).

Bone debris had been counted and weighed by UND staff with potentially identifiable specimens segregated prior to submission to the author in Lincoln, Nebraska. Upon receipt, all lots were reexamined for identifiable pieces which are defined as those for which the element and portion could be determined and assigned to a taxonomic grouping at the family level or below. Identifications were made using reference material curated by the Nebraska State Historical Society, the Midwest Archeological Center (U.S. National Park Service), and the University of Nebraska State Museum, all located in Lincoln.

RESULTS

The identified portion of the sample is comprised of 41 specimens representing 11 taxonomic groups (Table B1). Site-specific comments regarding the identified remains are provided below, in addition to general observations on the unidentified portion.

Rattlesnake Keeper Site (39LM160)

The unidentified portion consists primarily of large mammal (cf. bison, deer, pronghorn, wapiti) bone slivers originating predominantly from long bones. The debris is generally comprised of small (less than 1/2 inch) pieces which appear to be by-products of butchering or intentional bone reduction for extraction of marrow or grease. Small amounts of bird and fish debris are included in the Test 11 (Features 1 and 2) sample. Several unidentified bird long bone slivers were also noted in the sample from Test 6 and Test 7. With the exception of one prairie dog bone, the Test 4 and Test 5 collection is large mammal.

The identified sample includes 36 elements representing 11 taxa. Seventeen catalog numbers are included (Table B2). Components A-C are represented, however, most elements (n=24) are associated with Component C, which is specifically identified as a Post-Contact Coalescent kill processing location. Taxon-specific comments are provided below.

Table B1. Summary of Identified Vertebrates, Sites 39LM160, 39LM161, and 39LM163, Lake Sharpe Testing Project, South Dakota, 1988.

Taxon	39LM160	39LM161	39LM163	Total
FISH				
Catostomidae (sucker)	1 (1)	0	0	1 (1)
REPTILE				
Colubridae (non-venomous snake)	1 (1)	0	0	1 (1)
BIRD				
<u>Anas</u> sp. (teal)	3 (1)	0	0	3 (1)
Accipitridae (hawk)	1 (1)	0	0	1 (1)
Galliformes (chicken/grouse)	1 (1)	0	0	1 (1)
<u>Pica pica</u> (magpie)	1 (1)	0	0	1 (1)
MAMMAL				
<u>Spermophilus</u> sp. (ground squirrel)	1 (1)	0	0	1 (1)
<u>Canis</u> sp. (dog/wolf/coyote)	2 (1)	0	0	2 (1)
<u>Bison bison</u> (bison)	22 (3)	2 (1)	1 (1)	25 (5)
<u>Bison/Cervus</u> (bison/wapiti)	2 (1)	0	0	2 (1)
<u>Odocoileus/Antilocapra</u> (deer/pronghorn)	1 (1)	1 (1)	1 (1)	3 (3)
Total	36 (13)	3 (2)	2 (2)	41 (17)

NOTE: Values represent number of identified specimens. Minimum number of individuals are noted in parentheses.

Table B2. Inventory of Identified Vertebrate Remains Recovered from the Rattlesnake Keeper Site (39LM160), Lake Sharpe Testing Project, South Dakota, 1988.

Cat. No.	Component (Feature)	Taxon	Element	Portion	Comment
509	A	<u>Spermophilus</u> sp.	humerus	right proximal	immature
513	B	<u>Bison bison</u>	petrous temporal premolar 2/ nonspecific thoracic vertebra	left (?) anterior right complete left complete axial anterior	immature
516	C	<u>Bison bison</u>	mandible	left superior (vertical ramus)	
611	A	<u>Canis</u> sp.	2nd digit	indeterminate proximal	
615	B	<u>Bison/Cervus</u>	premolar /2	right complete	
616	B	<u>Bison bison</u>	nonspecific thoracic vertebra	axial superior (spine)	cut marks
618	C	<u>Bison bison</u>	hyoid ulna	right posterior left diaphysis	cut marks, burned (possibly modified)
		<u>Odocoileus/ Antilocapra</u>	nonspecific rib	left lateral	cut marks, burned
619	C	<u>Canis</u> sp.	femur	left distal medial	burned
		<u>Bison bison</u>	radial carpal intermediate carpal accessory carpal proximal sesamoid 2nd digit 3rd digit	left posterior right anterior left complete indeterminate complete indeterminate distal indeterminate complete	cut marks ? immature
716	B	<u>Bison bison</u>	radius ulnar carpal metacarpal	right diaphysis, posterior right complete right proximal	cut marks immature, carnivore gnawing immature
718	C	<u>Colubridae</u>	nonspecific vertebra	axial complete	

Table B2. Inventory of Identified Vertebrate Remains Recovered from the Rattlesnake Keeper Site (39UM160), Lake Sharpe Testing Project, South Dakota, 1988, Concluded.

Cat. No.	Component (Feature)	Taxon	Element	Portion	Comment
719	C	<u>Bison bison</u>	frontal carpal 2+3 metacarpal tibial tarsal	right anterior right complete right anterior right proximal medial right anterior lateral	3+ fragments
1101	C (F1/2)	Galliformes	nonspecific vertebra	axial complete	carnivore gnawing ?
1102	C (F1/2)	<u>Anas sp.</u>	tibiotarsus	left diaphysis	
1103	C (F1/2)	<u>Anas sp.</u>	coracoid	left complete	
		<u>Pica pica</u>	humerus	left diaphysis	
		<u>Bison/Cervus</u>	2nd digit	Indeterminate proximal	Immature
1104	C (F1)	<u>Anas sp.</u>	humerus	left distal	Immature
1105	C (F1)	cf. Catostomidae	nonspecific vertebra	axial medial	burned
		Accipitridae	tibiotarsus	right distal	burned

Fish

Catostomidae (sucker)

This taxon is represented by a charred vertebra recovered from Feature 1, a basin hearth associated with Component C. Five members of this family inhabit the Missouri River in the general vicinity (Bailey and Allum 1962:78-86), and at least three have been identified archeologically in the region (Peterson 1980:58-60; Falk et al. 1984:274-275).

Reptile

Colubridae (non-venomous snake)

One Colubridae vertebra was recovered from Test 7 at the level of Component C although its association with human subsistence activity is uncertain.

Bird

Anas sp. (teal)

Three small surface-feeding duck elements were recovered from Component C (Features 1 and 2) and all appear to be teal based on size and morphology. A distinction could not be made between A. crecca (green-winged teal) or A. discors (blue-winged teal) although both have been recovered from Plains Village sites in the Middle Missouri subarea (Parmalee 1977:195, 1979:194; Falk et al. 1984:269). The 39LM160 remains are likely associated with human subsistence activities.

Accipitridae (hawks and allies)

One charred distal tibiotarsus was recovered from Component C (Feature 1). The element compares most favorably with the genus Buteo (buzzard hawks) although a positive assignment could not be accomplished. Hawk remains are frequently recovered in abundance from Middle Missouri subarea villages (Parmalee 1977:195). In addition to use as food items, hawk elements have been documented as contents of Arikara sacred bundles (Ubelaker and Wedel 1975:446-447).

Galliformes (chicken, grouse, prairie chicken)

A nonspecific vertebra of a large gallinaceous bird was recovered from Features 1 and 2, Component C. The specimen bears evidence of gnawing by carnivores. Birds of this order commonly recovered from villages in the subarea include grouse and turkey (Parmalee 1977:196).

Pica pica (magpie)

A left humerus diaphysis of a corvid identified as a black-billed magpie was removed during excavation of Features 1 and 2, Component C. Other members of the Corvidae family such as jays and crows were eliminated on the basis of size, morphology, and modern distribution. Corvid remains, particularly crows and ravens, have been associated with Native American bundles on the Northern Plains (Ubelaker and Wedel 1975). Magpie remains have also been recovered archeologically (Parmalee 1977:197; Falk et al. 1984:270).

Mammal

Spermophilus sp. (ground squirrel)

A humerus of an immature ground squirrel was removed during excavation of Test 5 (80-90 cm sd), Component A. All Northern Plains species of Spermophilus have been recovered from late prehistoric village contexts in the subarea (Semken 1976:12-14; Parmalee 1979:194). The origin of the 39LM160 specimen is uncertain.

Canis sp. (dog/wolf/coyote)

Two Canis elements were recovered during excavation of Test 6. One is a proximal 2nd digit from 100-110 cm (Component A), and the other is a left distal femur fragment from 180-190 cm (Component C). The femur is charred. Canis materials are quite common from Plains Village contexts in the Middle

Missouri subarea and reflect use of the genus for food, a source of tool raw material, and as a beast of burden in the case of domestic dog (Parmalee 1979:205-211; Falk et al. 1980:Table 12-35; Falk et al. 1984:270, 279; Morey 1986).

Bison bison (bison)

Bison remains represent 61% of the Rattlesnake Keeper identified fauna and were recovered from Tests 5, 6, and 7 within Component B (n=8) and Component C (n=14). A "minimum number of individual" value (MNI) of three (3) was tabulated based on the presence of two adult right 2+3 carpals and scattered immature remains (Chaplin 1971:69-75).

Culturally related modifications observed on sample elements include cut marks (n=4) and burning (n=1). One specimen has been gnawed by carnivores and two are from immature animals. A hyoid bears numerous cut marks and exhibits smoothing, polish, and striations. However, with the exception of the cut marks, these characteristics are likely a function of natural alteration and burning; they do not appear to be a product of tool manufacture or use.

Bison are without exception the dominant species recovered from Middle Missouri subarea villages and their economic and social importance can not be over stated (White 1956; Gilbert 1969; Chomko 1976; Falk 1977). This situation clearly applies to the 39LM160 deposits.

Bison/Cervus (bison or wapiti)

A premolar recovered from Test 6 (Component B) and an immature 2nd digit from Features 1 and 2 (Component C) represent either bison or wapiti. The latter occurs with some regularity in Middle Missouri subarea sites but normally in low frequencies (Chomko 1976:38; Parmalee 1979:195; Falk and Ahler 1988:175).

Odocoileus/Antilocapra (deer or pronghorn antelope)

A charred left rib fragment, displaying cut marks and charring, is either deer or antelope. Both species are frequently represented in Middle Missouri subarea faunas but their economic and social importance is overshadowed by bison (Falk et al. 1984:271). Pronghorn have however been identified in relatively large numbers from the Mobridge site (Parmalee 1979:201).

Lost Nation Site (39LM161)

Unmodified bone debris recovered from the Lost Nation site is associated predominantly with large mammal species, but several unidentifiable elements from Tests 5 and 6 may reflect medium-sized mammals such as carnivores or deer/pronghorn. In addition, several small mammal long bone splinters were recovered from Feature 1.

The identified portion of the sample is restricted to: a Bison bison tarsal from Test 1, 160-170cm; a Bison bison rib from Feature 1; and an Odocoileus/Antilocapra premolar from Test 2, 170-180cm (Table B3). The bison rib is charred and exhibits cut marks. All specimens are associated with

Component A, an early Plains Woodland (Sonota complex) occupation. Previously considered Plains Woodland components in the Middle Missouri subarea have produced bison and deer (Falk and Morey 1986), and possibly antelope (Neuman 1975:99-104)

Site 39LM163

All unmodified bone debris recovered from site 39LM163 derives from large mammals. The only identified specimen from the test units at the site is an Odocoileus/Antilocapra (deer or pronghorn) right metatarsal diaphysis (Table B4). The specimen was recovered from Test 1, 30-40 cm sd. In addition, a Bison bison left metacarpal was collected from the face of the cutbank at the site at a depth of about 180 cm sd. A cultural association for these specimens is uncertain; they may have been deposited as a result of natural processes.

Table B3. Inventory of Identified Vertebrate Remains Recovered from the Lost Nation Site (39LM161), Lake Sharpe Testing Project, South Dakota, 1988.

Cat. No.	Component (Feature)	Taxon	Element	Portion	Comment
117	A	<u>Bison bison</u>	tarsal 2+3	right complete	
218	A	<u>Odocoileus/Antilocapra</u>	premolar /2	left anterior	
1000	A (F1)	<u>Bison bison</u>	nonspecific rib	left diaphysis	burned, cut marks

Table B4. Inventory of Identified Vertebrate Remains Recovered from Site 39LM163, Lake Sharpe Testing Project, South Dakota, 1988.

Cat. No.	Component (Feature)	Taxon	Element	Portion	Comment
104	na	<u>Odocoileus/Antilocapra</u>	metatarsal	right anterior diaphysis	
0000	na	<u>Bison bison</u>	metacarpal	left complete	from cutbank exposure, ca. 180 cm sd

SUMMARY AND COMMENTS

This report provides a brief descriptive treatment of identified vertebrate remains collected during controlled testing of three archeological sites along the west bank of Lake Sharpe in central South Dakota during the 1988 field season. Forty-one individual elements were identified representing 11 taxa. The identified taxa include: sucker, snake, teal, hawk, chicken/grouse, magpie, ground squirrel, dog/wolf/coyote, bison, bison/wapiti, and deer/pronghorn. The majority of remains were recovered from the Rattlesnake Keeper site (39LM160).

The recovered samples are quite small and offer little potential for evaluation of vertebrate procurement systems in operation at the three sites. In the case of 39LM160, and to a lesser extent 39LM161, the material is in a good state of preservation, indicating that more extensive excavations may yield faunal data sufficient for more detailed assessments of subsistence practices and paleoenvironmental conditions. Site 39LM163 is not likely to produce a substantial fauna.

The identified portions represented in the collectins are comprised of forms which have previously been documented in various archeological sites in the Middle Missouri subarea. The samples under consideration likely represent faunal deposits which are generally consistent with the results of prior regional studies in that large mammals, chiefly bison and to a lesser extent deer or pronghorn, were the primary quarry.

REFERENCES CITED

- Bailey R. M., and M. O. Allum
1962 Fishes of South Dakota. Miscellaneous Publications No. 119. Museum of Zoology, University of Michigan, Ann Arbor.
- Chaplin, R. E.
1972 The Study of Animal Bones from Archeological Sites. Seminar Press, London and New York.
- Chomko, S. A.
1976 Faunal Exploitation in the Initial Middle Missouri Variant. In Fay Tolton and the Initial Middle Missouri Variant, edited by W. R. Wood. Missouri Archeological Society Research Series No. 13.
- Falk, C. R.
1977 Analysis of Unmodified Vertebrate Fauna from Sites in the Middle Missouri Subarea: A Review. In Trends in Middle Missouri Prehistory: A Festschrift Honoring the Contributions of Donald J. Lehmer, edited by W. R. Wood. Plains Anthropologist, Memoir 13.
- Falk, C. R. and S. A. Ahler
1988 Archeological Investigations in the Mobridge Area, South Dakota, 1969-1970: Lower Grand (Davis), 39C014, Walth Bay, 39WW203 and Helb, 39CA208. Report submitted to the Rocky Mountain Regional Office, U.S. National Park Service, Denver.

- Falk, C. R., C. A. Angus, and A. Matsui
 1984 Unmodified Bone and Antler. In South Cannonball (32SI19): An Extended Middle Missouri Village in Southern North Dakota, edited by D. E. Griffin. Report submitted to the Rocky Mountain Regional Office, U.S. National Park Service, Denver.
- Falk, C. R., and D. F. Morey
 1986 Unmodified Vertebrate Remains. In Jamestown Mounds Project, edited by J. S. Snortland-Coles and G. L. Fox. Ms on file, State Historical Society of North Dakota, Bismarck.
- Falk, C. R., D. F. Morey, and C. A. Angus
 1980 Large Mammal and Other Vertebrate Remains. In The Archeology of the White Buffalo Robe Site, edited by C. H. Lee. Contribution No. 122. Department of Anthropology, University of North Dakota, Grand Forks.
- Gilbert, B. M.
 1969 Some Aspects of Diet and Butchering Techniques among Prehistoric Indians of South Dakota. Plains Anthropologist 14:277-294.
- Morey, D. F.
 1986 Studies on Amerindian Dogs: Taxonomic Analysis of Canid Crania from the Northern Plains. Journal of Archeological Science 13:119-145.
- Neuman, R. W.
 1975 The Sonota Complex and Associated Sites on the Northern Great Plains. Publications in Anthropology No. 6. Nebraska State Historical Society, Lincoln.
- Parmalee, P. W.
 1977 The Avifauna from Prehistoric Arikara Sites in South Dakota. Plains Anthropologist 22:189-222.
- 1979 Inferred Arikara Subsistence Patterns Based on a Selected Faunal Assemblage from the Mobridge Site, South Dakota. The Kiva 44(2-3):191-218.
- Peterson, J. E., II
 1980 Seasonal Exploitation of Fish Resources in the Middle Missouri Subarea. Unpublished Master's thesis, Department of Anthropology, University of Nebraska-Lincoln.
- Semken, H. A., Jr.
 1976 Descriptive Analysis of the Rodent and Insectivore Cranial Elements Collected from the Helb, Lower Grand, and Walth Bay Sites, Oahe Reservoir, South Dakota. Report submitted to the Midwest Archeological Center, U.S. National Park Service, Lincoln.

Toom, D. L., and P. R. Picha

1984 An Archeological Survey of Selected Federal Lands on the West Bank of the Big Bend/Lake Sharpe Project Area, Lyman and Stanley Counties, South Dakota, 1983: Main Report. Contribution No. 198. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha.

Ubelaker, D. H., and W. R. Wedel

1975 Bird Bones, Burials, and Bundles in Plains Archeology. American Antiquity 40:444-452.

White, T. E.

1956 The Study of Osteological Materials in the Plains. American Antiquity 21:401-404.

APPENDIX C

IDENTIFICATIONS OF SELECTED CHARCOAL AND WOOD SAMPLES FROM
SITE 39LM160, LAKE SHARPE PROJECT AREA, SOUTH DAKOTA

by

Craig E. Shuler

Wood Science Laboratory
Colorado State University
Ft. Collins, Colorado

February 1989

Report submitted to the Department of Anthropology, University of North
Dakota, Grand Forks.

FEB 10 1989

Forest and Wood Sciences
Fort Collins, Colorado 80523
(303) 491-6911

February 6, 1989

Dr. Dennis L. Toom
University of North Dakota
Department of Anthropology
Box 8254, University Station
Grand Forks, ND 58202

Dear Dr. Toom:

The results of my examination of the charcoal and wood samples you sent me are as follows:

39LM160

<u>Charcoal</u>	
No. 619	cottonwood (willow)
No. 1104	
A	willow
B	cottonwood (willow)
C	cottonwood (willow)
D	cottonwood (willow)
<u>Wood</u>	
No. 1101	juniper
No. 1104	juniper

There are a few notes I would like to make about these identifications. It is possible that the charcoal samples are from a shrub for which we have no identification keys. The distinguishable anatomical features do fit cottonwood or willow quite well, however; so I feel very comfortable with those identifications. Cottonwood and willow are nearly identical anatomically. About the only distinguishing feature is a difference in their rays. However, it is very difficult to obtain a suitable thin section for viewing after the wood has become so friable from the heat. This possibly could be overcome by embedding the sample in plastic before cutting sections, but that is an expensive process. Therefore, I have listed the species first that best fit the features I was able to observe; and the species in parentheses should be considered highly probable.

Since many species of the same genus have the same anatomical features, I looked up what species of cottonwood, willow, and juniper occur naturally in central South Dakota.

Eastern cottonwood (Populus deltoides) is widespread throughout the Great Plains and would be the most common cottonwood encountered. Plains cottonwood (Populus sargentii) may be a variety of the eastern cottonwood which has hybridized with other poplars.

Peachleaf willow (Salix amygdaloides) is widespread in this region and would be the most likely willow species encountered.

Toom, Page 2
Feb. 6, 1989

Missouri willow (Salix eriocephala) is widespread but not as common.
Sandbar willow (Salix interior) is fairly common but may be a variety
of peachleaf willow.
Heart-leaved willow (Salix rigida) is not too common and is most likely
a variety of peachleaf willow.

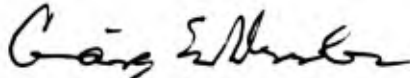
Common juniper (Juniperus communis) is a widespread, common low-lying
shrub. These samples are of a size that could come from such a shrub
or from a small branch of a tree.

Eastern redcedar (Juniperus virginiana) does grow into the eastern
two-thirds of South Dakota.

Rocky Mountain juniper (Juniperus scopulorum) grows into the western
one-third of South Dakota, but this would be the least likely species.

I hope this is helpful and adequate for your project. Please let me know if
there are any particular problems or questions.

Sincerely,



Craig E. Shuler
Associate Professor of
Wood Science and Technology

P.S. My direct office phone number is 303/491-7780.

APPENDIX D

SOIL DESCRIPTIONS FOR SELECTED TEST UNIT PROFILES FROM SITES
39LM160, 39LM161, AND 39LM163

by

Dennis L. Toom

Department of Anthropology
University of North Dakota
Grand Forks, North Dakota

March 1989

INTRODUCTION

Soil descriptions for the three tested sites generally follow the format used by the Soil Conservation Service, U.S. Department of Agriculture (e.g., Soil Survey Staff 1975). Classification of the soils was not attempted in the absence of necessary laboratory data. Soil horizon designations and descriptions are based on nomenclature presented in Birkeland (1984). All descriptions are based solely on field observations; laboratory analysis of soil samples would likely require the modification of some properties and horizon designations presented here.

All of the sites under study are located along Lake Sharpe (Missouri River) in central South Dakota. The climate of this area is characterized as dry subhumid, with a P-E index of 16-31 (Ruhe 1970:38; after Thornwaite 1941). Mean annual precipitation at Pierre, South Dakota, located at the upper end of Lake Sharpe, is 17.9 inches; the mean annual temperature is 46.3° F (Borchers 1980:82). Additional climatic and physiographic information can be found in Section IV of this report.

RATTLESNAKE KEEPER SITE (39LM160)

Two profiles were described in detail for 39LM160. Test 1, located on a loess capped stream terrace or bench in the center of a complex intermittent drainageway, serves as the control for Tests 1-3. Tests 1-3 were all located on this isolated bench and exhibit the nearly identical stratigraphic sequences. Tests 6-7 (a 1 X 2 m excavation) serve as the stratigraphic control for the northeastern part of the site, including Tests 4-5 and, to a lesser extent, Test 11. Test 6-7 were located in a narrow, steeply sloping terrace surface along the eastern side of the stream channel. This so-called terrace is perhaps more aptly characterized as a colluvial footslope found at the base of a high northwest-southeast trending ridge which flanks the drainageway on its northeast side.

The surface soil at 39LM160 is mapped as Rock outcrop-Sansarc complex (RsE) by the U.S. Soil Conservation Service (SCS) (Schumacher 1987:Sheet 20). In general terms, the complex includes upland areas of Rock outcrop (Pierre Shale bedrock) intermingled with areas of shallow, well drained, strongly sloping to steep Sansarc (clay) soil. Slopes associated with the complex range from 9-40%. The Rock outcrop is generally present on the ridges and the steeper parts of the landscape, while the Sansarc soil occupies the smooth side slopes. Included in the map units of the complex are small areas of Bullcreek (clay) and Chantier (clay) soils. The deeper Bullcreek soils are found on the foot slopes and along narrow drainageways. The shallower Chantier soils occupy the less sloping side slopes, and they exhibit visible salts in the subsoil (Schumacher 1987:39).

The northeastern part of 39LM160 (vicinity of Tests 6-7) may consist principally of a deep Bullcreek clay, however, the slopes in this area are much steeper than those usually associated with this soil (cf. Schumacher 1987:13). The loess cap covering the bench is not identified specifically as part of the Rock outcrop-Sansarc complex; it appears to be a small, isolated area of Lowry-Sully silt loam, which is described in detail below under sites 39LM161 and

39LM163. Bullcreek series soils are classified as very fine, montmorillonitic, mesic Udic Chromusterts (Schumacher 1987:159). This classification does not seem to fit the clayey soils in the northeastern part of the site particularly well, and their designation as Bullcreek clay is also somewhat suspect. However, these are the closest approximations that can be made under the available information.

TEST UNIT 1, 39LM160, PROFILE SOIL DESCRIPTION

Physiographic position: isolated bench in the center of an intermittent stream channel.

Topography: gently sloping surface.

Vegetation: mixed grass prairie, some yucca and prickly pear cactus.

Drainage: well drained.

Parent material: loess over colluvium/bedrock.

Bedrock: Pierre Shale.

Sampled by: D. L. Toom.

Remarks: Collectively, the A horizons of Tests 1 represent an overthickened A of a cumulative soil profile (see Birkeland 1984:184-185). Depth were taken from the surface at the northeast corner of Test 1.

Horizon Description

- A1 0-6 cm (sod layer). Silt loam; dark grayish brown (10YR4/2) dry and very dark brown-very dark grayish brown (10YR2.5/2) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft-slightly hard; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; non-effervescent; no visible carbonate accumulation.
- A2 6-19 cm. Silt loam; grayish brown-brown (10YR5/2.5) dry and very dark grayish brown (10YR3/2) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft-slightly hard; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; non-effervescent; no visible carbonate accumulation.
- A3 19-35 cm. Silt loam; grayish brown-brown (10YR5/2.5) dry and very dark grayish brown (10YR3/2) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft; pH 8.0 (alkaline); no clay films; clear, smooth boundary; non-effervescent; no visible carbonate accumulation; scattered charcoal staining and flecking (prairie fires?).

TEST UNIT 1, 39LM160, PROFILE SOIL DESCRIPTION, CONTINUED

Horizon Description

- Bw 35-64 cm. Silt loam; brown (10YR5/3) dry and very dark grayish brown-dark grayish brown-dark brown (10YR3.5/2.5) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft-slightly hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; effervescent; no visible carbonate accumulation.
- 2Bbk 64-81 cm. Silty clay loam; grayish brown (10YR5/2) dry and dark grayish brown (10YR4/2) moist; weak-moderate, subangular block structure; <10% estimated gravel (Pierre Shale fragments); consistence wet sticky and plastic, moist friable, and dry slightly hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; strongly effervescent; stage I carbonate accumulation; faint banding, silt loam/clay; mixed parent material.
- 3Bbk 81+ cm. Clay; grayish brown (10YR5/2) dry and dark grayish brown (10YR4/2) moist; strong, coarse, angular blocky structure; <10% estimated gravel (Pierre Shale fragments); consistence wet sticky and very plastic, moist very firm, and dry very hard; pH 8.0 (alkaline); no clay films; violently effervescent; stage II+ carbonate accumulation; colluvium or bedrock (Pierre Shale) residuum.

TEST UNITS 6-7, 39LM160, PROFILE SOIL DESCRIPTION

Physiographic position: terrace along the east side of an intermittent stream channel; colluvial footslope at the base of a high north-south trending ridge.

Topography: moderately to strongly sloping surface.

Vegetation: mixed grass prairie, some yucca and prickly pear.

Drainage: well drained.

Parent material: primarily colluvium (clay) with some loess (silt loam).

Bedrock: Pierre Shale.

Sampled by: D. L. Toom and P. R. Picha.

Remarks: Parent material deposition is primarily by colluvial action down the ridge slope and secondarily by eolian deposition. Thin bands of colluvial clay and/or loess are obvious throughout the entire depth of the profile, with the exception of the surface A horizon. Clay and loess bands are often complexly interposed, but the clay bands are clearly more numerous in all but one horizon (the 4Bw). Soil horizonization is tentative and has been simplified to some degree for descriptive purposes. Changes in parent material designation reflect changes in relative amounts of colluvial clay versus eolian silt loam in the horizon sequence. Depths were taken from the surface at the northeast corner of Test 6.

TEST UNITS 6-7, 39LM160, PROFILE SOIL DESCRIPTION, CONTINUED

<u>Horizon</u>	<u>Description</u>
A	0-9 cm (sod layer). Silty clay loam; brown-dark brown (7.5YR4.5/2) dry and dark brown (7.5YR3/2) moist; moderate, fine-medium, angular blocky structure; <10% estimated gravel (Pierre Shale fragments); consistence wet sticky and plastic, moist firm, and dry hard; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; strongly effervescent; no visible carbonate accumulation; mainly colluvial clay, little or no banding apparent.
Bw	9-45 cm. Silty clay loam; grayish brown (10YR5/2) dry and dark brown (10YR3/3) moist; moderate, medium, angular blocky structure; <10% estimated gravel (Pierre Shale fragments); consistence wet sticky and plastic, moist friable, and dry hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; no visible carbonate accumulation; obvious banding, mixed colluvium (clay) and loess (silt loam).
2Bw	45-105 cm. Clay; dark grayish brown-grayish brown-brown (10YR4.5/2.5) dry and very dark grayish brown-dark brown (10YR3/2.5) moist; moderate, medium, angular blocky structure; 10% estimated gravel (Pierre Shale fragments); consistence wet very sticky and plastic, moist firm, and dry very hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; no visible carbonate accumulation; obvious banding, colluvial clay.
3Bw	105-138 cm. Silty clay loam; grayish brown-brown (10YR5/2.5) dry and dark brown (10YR3/3) moist; moderate, medium, subangular blocky structure; <10% estimated gravel (Pierre Shale fragments); consistence wet sticky and plastic, moist friable, and dry hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; no visible carbonate accumulation; obvious banding, mixed colluvium (clay) and loess (silt loam).
4Bw	138-150 cm. Silt loam; pale brown-brown (10YR5.5/3) dry and dark brown-brown (10YR4/3) moist; weak, medium, subangular blocky structure; <10% estimated gravel (Pierre Shale fragments); consistence wet slightly sticky and slightly plastic, moist very friable, and dry slightly hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; no visible carbonate accumulation; obvious banding, mainly loess (silt loam).
5Bw	150-178 cm. Silty clay loam; brown (10YR5/3) dry and dark brown (10YR3/3) moist; weak, medium, subangular blocky structure; <10% estimated gravel (Pierre Shale fragments); consistence wet sticky and plastic, moist friable, and dry hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; no visible carbonate accumulation; obvious banding, mixed colluvium (clay) and loess (silt loam).

TEST UNITS 6-7, 39LM160, PROFILE SOIL DESCRIPTION, CONTINUED

<u>Horizon</u>	<u>Description</u>
6Bw	178-189+ cm. Clay; brown (10YR5/3) dry and very dark grayish brown-dark brown (10YR3/2.5) moist; moderate, medium, angular blocky structure; <10% estimated gravel (Pierre Shale fragments); consistence wet very sticky and plastic, moist firm, and dry very hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; no visible carbonate accumulation; obvious banding, colluvial clay.

LOST NATION SITE (39LM161)

All of the test excavations at the site exhibit nearly identical stratigraphic sequences. Detailed profile descriptions are provided only for Tests 1-2 (a 1 X 2 m excavation), which serve as the control for Tests 3-4, Tests 5-6, and Feature 1. The profiles at the site exhibit overthickened A horizons formed in loess (silt loam) in the upper portion of a relatively narrow remnant of the MT-2 terrace or its equivalent. Such horizons are characteristic of cumulative soil profiles (see Birkeland 1984:184-185).

The surface soil at the site is mapped as a Lowry-Sully silt loam (LrD) (Schumacher 1987:Sheet 12). Lowry-Sully silt loams are deep, well drained, strongly sloping to moderately steep soils (9-25% slopes) formed on uplands (Schumacher 1987:23). The Lowry soils are on the less sloping parts of the landscape, while the Sully soils occupy the steeper slopes. The two soils are too intermingled or they occur in areas too small for separate mapping. In the case of 39LM161, the Lowry-Sully association is mapped along a low-lying terrace (MT-2) directly adjacent to Lake Sharpe. The site area proper is level to gently sloping and it is covered by very deep Lowry silt loam. Lowry series soils are classified as coarse-silty, mixed, mesic Typic Haplustolls (Schumacher 1987:159)

TEST UNITS 1-2, 39LM161, PROFILE SOIL DESCRIPTION

Physiographic position: MT-2 terrace tread (or equivalent).

Topography: level to gently sloping surface.

Vegetation: mixed grass prairie.

Drainage: well drained.

Parent material: loess.

Bedrock: Pierre Shale.

Sampled by: D. L. Toom

TEST UNITS 1-2, 39LM161, PROFILE SOIL DESCRIPTION, CONTINUED

Remarks: Collectively, the A horizons of Tests 1-2 represent an overthickened A of a cumulative soil profile (see Birkeland 1984:184-185). Depths were taken from the surface at the southwest corner of Test 2.

Horizon Description

- A1 0-8 cm (sod layer). Silt loam; grayish brown-brown (10YR5/2.5) dry and very dark grayish brown (10YR3/2) moist; weak, fine-medium, granular structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; non-effervescent; no visible carbonate accumulation; discontinuous, thin charcoal stained bands (prairie fires?).
- A2 8-40 cm. Silt loam; grayish brown-light brownish gray (10YR5.5/2) dry and dark-very dark grayish brown (10YR3.5/2) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft; pH 8.0 (alkaline); no clay films; clear, smooth boundary; strongly effervescent; no visible carbonate accumulation; discontinuous, thin charcoal stained bands (prairie fires?).
- ABk 40-88 cm. Silt loam; light brownish gray-pale brown (10YR6/2.5) dry and dark-very dark grayish brown (10YR3.5/2) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft; pH 8.0 (alkaline); no clay films; clear, smooth boundary; strongly effervescent; weak stage I carbonate accumulation; discontinuous, thin charcoal stained bands (prairie fires?).
- (Ajbk?) (83-88 cm.) Silt loam; grayish brown (10YR5/2) dry and dark-very dark grayish brown (10YR3.5/2) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft; pH 8.0 (alkaline); no clay films; clear, smooth boundary; strongly effervescent; weak stage I carbonate accumulation; thin, continuous, band with charcoal staining and flecking (prairie fires?); questionable as separate horizon and may be best considered as a localized anomaly in the ABk.
- Bk 88-123 cm. Silt loam; light brownish gray-pale brown (10YR6/2.5) dry and dark grayish brown (10YR4/2) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft-slightly hard; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; violently effervescent; stage I carbonate accumulation.

TEST UNITS 1-2, 39LM161, PROFILE SOIL DESCRIPTION, CONTINUED

Horizon Description

- Albk 123-143 cm. Silt loam; grayish brown-brown (10YR5/2.5) dry and very dark grayish brown-dark brown (10YR3/2.5) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft-slightly hard; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; violently effervescent; stage I carbonate accumulation; faint banding observable.
- A2bk 143-152 cm. Silt loam; dark grayish brown-grayish brown-brown (10YR4.5/2.5) dry and very dark grayish brown (10YR3/2) moist; weak, medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist friable, and dry slightly hard; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; strongly effervescent; stage I carbonate accumulation; faint banding observable; closely related to the A3bk and not readily differentiated from it.
- A3bk 152-165 cm. Silt loam; dark grayish brown (10YR4/2) dry and very dark grayish brown-very dark brown (10YR2.5/2) moist; weak, medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist friable, and dry slightly hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; strongly effervescent; stage I carbonate accumulation; very dark and prominent; Sonota occupation at base of horizon (interface with the A4bk).
- A4bk 165-184 cm. Silt loam; grayish brown-brown (10YR5/2.5) dry and very dark grayish brown (10YR3/2) moist; weak, medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist friable, and dry slightly hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; stage I+ carbonate accumulation; faint banding observable; Sonota occupation at surface of horizon (interface with the A3bk).
- Bbk 184-190+ cm. Silt loam; light brownish gray-pale brown (10YR6/2.5) dry and dark grayish brown (10YR4/2) moist; weak, medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist friable, and dry slightly hard; pH 8.0 (alkaline); no clay films; violently effervescent; stage I+ carbonate accumulation.

SITE 39LM163

Detailed profile descriptions are provided for Tests 1-2, a 1 X 2 m excavation placed near the Lake Sharpe cutbank. Tests 1-2 represent the only units excavated at the site. The upper portion of the loess depositional unit that covers the site consists of a general overthickened or cumulative A horizon as much as one meter thick. Overthickened A horizons are characteristic of cumulative soil profiles (see Birkeland 1984:184-185).

The present surface soil at the site is mapped as a Lowry-Sully silt loam (LrD) (Schumacher 1987:Sheet 12). Lowry-Sully silt loams are deep, well drained, strongly sloping to moderately steep soils (9-25% slopes) formed on uplands (Schumacher 1987:23). The Lowry soils are on the less sloping parts of the landscape, while the Sully soils occupy the steeper slopes. The two soils are too intermingled or they occur in areas too small for separate mapping. At 39LM163, the Lowry-Sully association is mapped on a small, narrow remnant of the MT-2 terrace or its equivalent, which is immediately adjacent to Lake Sharpe. The site area proper is a less steeply sloping locality that is principally covered by the deeper Lowry silt loam. Lowry series soils are classified as coarse-silty, mixed, mesic Typic Haplustolls (Schumacher 1987:159).

TEST UNITS 1-2, 39LM163, PROFILE SOIL DESCRIPTION

Physiographic position: MT-2 terrace or equivalent.

Topography: level to moderately sloping surface near the Lake Sharpe cutbank.

Vegetation: mixed grass prairie.

Drainage: well drained.

Parent material: loess over colluvium.

Bedrock: Pierre Shale.

Sampled by: D. L. Toom, P. R. Picha, and D. A. Aird

Remarks: Collectively, the A horizons of Tests 1-2 represent an overthickened A of a cumulative soil profile (see Birkeland 1984:184-185).

Horizon Description

A1	0-6 cm (sod layer). Silt loam; dark grayish brown-grayish brown-brown (10YR4.5/2.5) dry and very dark grayish brown-very dark brown (10YR2.5/2) moist; weak, fine, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; non-effervescent; no visible carbonate accumulation.
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TEST UNITS 1-2, 39LM163, PROFILE SOIL DESCRIPTION, CONTINUED

<u>Horizon</u>	<u>Description</u>
A2	6-23 cm. Silt loam; grayish brown-brown (10YR5/2.5) dry and dark-very dark grayish brown (10YR3.5/2) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft-slightly hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; effervescent; no visible carbonate accumulation.
A3	23-46 cm. Silt loam; grayish brown (10YR5/2) dry and dark-very dark grayish brown (10YR3.5/2) moist; weak, fine-medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist very friable, and dry soft-slightly hard; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; strongly effervescent; faint banding observable; grayish-colored lense with charcoal staining and flecking (prairie fire?) observed in profile near center of horizon.
Albk	46-61 cm. Silt loam; dark grayish brown-grayish brown (10YR4.5/2) dry and very dark grayish brown (10YR3/2) moist; weak, medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist friable, and dry slightly hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; strongly effervescent; stage I carbonate accumulation; faint banding observable; scattered charcoal staining and flecking (prairie fires?).
A2bk	61-78 cm. Silt loam; dark grayish brown-grayish brown (10YR4.5/2) dry and very dark grayish brown (10YR3/2) moist; weak, medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist friable, and dry slightly hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; stage I carbonate accumulation; faint banding observable.
A3bk	78-101 cm. Silt loam; dark grayish brown-grayish brown (10YR4.5/2) dry and very dark grayish brown (10YR3/2) moist; weak, medium, subangular blocky structure; 0% estimated gravel; consistence wet slightly sticky and slightly plastic, moist friable, and dry slightly hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; stage I+ carbonate accumulation; faint banding observable.
Bbk	101-138 cm. Silt loam; grayish brown-brown (10YR5/2.5) dry and dark grayish brown (10YR4/2) moist; weak-moderate, medium, subangular blocky structure; <5% estimated gravel (Pierre Shale fragments); consistence wet slightly sticky and slightly plastic, moist friable, and dry hard; pH 8.0 (alkaline); no clay films; abrupt, smooth boundary; violently effervescent; stage II carbonate accumulation.

TEST UNITS 1-2, 39LM163, PROFILE SOIL DESCRIPTION, CONTINUED

Horizon Description

2Bbk 138-170 cm. Silty clay loam; light brownish gray (10YR6/2) dry and dark brown-brown (10YR4/3) moist; moderate, medium-coarse, subangular blocky structure; <5% estimated gravel (Pierre Shale fragments); consistence wet sticky and plastic, moist friable, and dry hard; pH 8.0 (alkaline); no clay films; clear, smooth boundary; violently effervescent; stage IIf carbonate accumulation; likely mixed colluvium (clay) and loess (silt loam) parent material.

3Bbk 170-180+ cm. Silty clay-clay; light brownish gray-grayish brown (10YR5.5/2) dry and dark grayish brown (10YR4/2) moist; strong, coarse, angular blocky structure; <5% estimated gravel (Pierre Shale fragments); consistence wet sticky and very plastic, moist firm, and dry very hard; pH 8.0 (alkaline); few, thin clay films on ped faces; violently effervescent; stage II+ carbonate accumulation.

APPENDIX E

EXCAVATION UNIT PROVENIENCE CODE AND SITE PROVENIENCE DATA

- Table E1. Excavation Unit Provenience Code, Sites 39LM160, 39LM161, and 39LM163, Lake Sharpe Testing Project, UND, 1988.
- Table E2. Provenience Data for Test Excavations at the Rattlesnake Keeper Site (39LM160), Lake Sharpe Testing Project, South Dakota, UND, 1988.
- Table E3. Provenience Data for Test Excavations at the Lost Nation Site (39LM161), Lake Sharpe Testing Project, South Dakota, UND, 1988.
- Table E4. Provenience Data for Test Excavations at Site 39LM163, Lake Sharpe Testing Project, South Dakota, UND, 1988.

Table E1. Excavation Unit Provenience Code, Sites 39LM160, 39LM161, and 39LM163, Lake Sharpe Testing Project, UND, 1988. Designed for use with PC-File/R data base program. Field labels and code values used to compile Tables E2-E4.

Field Label	Length	Code	Field/Code Value
SNO	3	***	SITE NUMBER (last digits only)
		160	39LM160 - Rattlesnake Keeper
		161	39LM161 - Lost Nation
		163	39LM163 (unnamed)
CTNO	4	****	CATALOG NUMBER
TN	2	**	TEST UNIT NUMBER
LN	2	**	LEVEL NUMBER
SD PD	7	*****	SURFACE DEPTH (cm) (e.g., 100-110) or PIT DEPTH (Features 1&2, 39LM160 only)
RT	2	**	RECOVERY TYPE
		DS	one-quarter inch dry screen
		WS	one-sixteenth inch water screen
		SS	subsample screened - 25% DS sample of excavation unit, 39LM160 only
		NS	not screened
		UF	unexcavated feature
		AL	above surface level relative to datum (air level), no excavation
PES	3	***	PERCENT OF EXCAVATION UNIT SAMPLE
		100	100% of sample
		25	25% DS subsample (SS recovery type above)
		89	89% of sample (dry screen fraction)
		11	11% of sample (water screen fraction)
		**	other values are nonstandard fractions
NA	not applicable		
FNO	3	***	FEATURE NUMBER
FT	2	**	FEATURE TYPE
		BH	basin hearth
		PT	pit
		AC	artifact concentration
		OR	other, unknown, indeterminate
		RR	rodent run

Table E1. Excavation Unit Provenience Code, Sites 39LM160, 39LM161, and 39LM163, Lake Sharpe Testing Project, UND, 1988 (Continued).
 Designed for use with PC-File/R data base program. Field labels and code values used to compile Tables E2-E4.

Field Label	Length	Code	Field/Code Value
ACU	3	***	ARCHEOLOGICAL CONTEXT UNIT
		GLV	general level
		HTF	hearth fill, extramural
		PTF	pit fill, extramural
		OTR	other, unknown, indeterminate
CHU	3	***	CULTURAL-HISTORICAL UNIT
		EPW	Early Plains Woodland (Sonota complex)
		LPW	Late Plains Woodland
		EC	Extended Coalescent
		PCC	Post-Contact Coalescent
		LPV	Late Plains Village (EC/PCC)
		REC	recent, historic
		MIX	mixed association
		UKN	unknown, indeterminate
		NC	noncultural, sterile
		EPM	ephemeral, no analytical value
		NA	not applicable
C	1	*	COMPONENT
		A	component A (latest, uppermost)
		B	component B
		C	component C
		N	none, not applicable

Tabl E2. Provenience Data for Test Excavations at the Rattlesnake Keeper Site (39LM160), Lake Sharpe Testing Project, South Dakota, UND, 1988. See Table E1 for an explanation of the column headings and data values.

SNO	CTNO	TN	LN	SD(PD)	RT	PES	FNO	FT	ACU	CHU	C
160	101	1	1	0-10	DS	100			GLV	NC	N
160	102	1	2	10-20	DS	100			GLV	NC	N
160	103	1	3	20-30	DS	100			GLV	NC	N
160	104	1	4	30-40	DS	100			GLV	NC	N
160	105	1	5	40-50	DS	100			GLV	NC	N
160	106	1	6	50-60	DS	100			GLV	NC	N
160	107	1	7	60-70	DS	100			GLV	NC	N
160	108	1	8	70-80	DS	100			GLV	NC	N
160	201	2	1	0-10	DS	100			GLV	NC	N
160	202	2	2	10-20	DS	100			GLV	NC	N
160	203	2	3	20-30	DS	100			GLV	NC	N
160	204	2	4	30-40	DS	100			GLV	NC	N
160	205	2	5	40-45	DS	100			GLV	NC	N
160	301	3	1	0-10	DS	100			GLV	NC	N
160	302	3	2	10-20	DS	100			GLV	NC	N
150	303	3	3	20-30	DS	100			GLV	NC	N
160	304	3	4	30-40	DS	100			GLV	NC	N
160	305	3	5	40-50	DS	100			GLV	NC	N
160	306	3	6	50-60	DS	100			GLV	NC	N
160	307	3	7	60-70	DS	100			GLV	NC	N
160	401	4	1	0-10	DS	100			GLV	NC	N
160	402	4	2	10-20	DS	100			GLV	NC	N
160	403	4	3	20-30	DS	100			GLV	NC	N
160	404	4	4	30-40	DS	100			GLV	NC	N
160	405	4	5	40-50	DS	100			GLV	NC	N
160	406	4	6	50-60	DS	100			GLV	NC	N
160	407	4	7	60-70	DS	100			GLV	NC	N
160	408	4	8	70-80	DS	100			GLV	NC	N
160	409	4	9	80-90	DS	100			GLV	NC	N
160	410	4	10	90-100	DS	100			GLV	NC	N
160	411	4	11	100-110	DS	100			GLV	NC	N
160	412	4	12	110-120	DS	100			GLV	UKN	B
160	413	4	13	120-130	DS	100			GLV	UKN	B
160	414	4	14	130-140	DS	100			GLV	UKN	B
160	415	4	15	140-150	DS	100			GLV	NC	N
160	416	4	16	150-160	DS	100			GLV	PCC	C
160	501	5	1	0-10	DS	100			GLV	NC	N
160	502	5	2	10-20	DS	100			GLV	NC	N
160	503	5	3	20-30	DS	100			GLV	NC	N
160	504	5	4	30-40	DS	100			GLV	NC	N
160	505	5	5	40-50	DS	100			GLV	NC	N

Table E2. Provenience Data for Test Excavations at the Rattlesnake Keeper Site (39LM160), Lake Sharpe Testing Project, South Dakota, UND, 1988 (Continued). See Table E1 for an explanation of the column headings and data values.

SNO	CTNO	TN	LN	SD(PD)	RT	PES	FNO	FT	ACU	CHU	C
160	506	5	6	50-60	DS	100			GLV	NC	N
160	507	5	7	60-70	DS	100			GLV	NC	N
160	508	5	8	70-80	DS	100			GLV	NC	N
160	509	5	9	80-90	DS	100			GLV	UKN	A
160	510	5	10	90-100	DS	100			GLV	NC	N
160	511	5	11	100-110	DS	100			GLV	NC	N
160	512	5	12	110-120	DS	100			GLV	NC	N
160	513	5	13	120-130	DS	100			GLV	UKN	B
160	514	5	14	130-140	DS	100			GLV	UKN	B
160	515	5	15	140-150	DS	100			GLV	NC	N
160	516	5	16	150-160	DS	100			GLV	PCC	C
160	517(WS)	5	17	160-165	WS	100	3	BH	HTF	PCC	C
160	601	6	1	0-10	DS	100			GLV	NC	N
160	602	6	2	10-20	DS	100			GLV	NC	N
160	603	6	3	20-30	DS	100			GLV	NC	N
160	604	6	4	30-40	DS	100			GLV	NC	N
160	605	6	5	40-50	DS	100			GLV	NC	N
160	606	6	6	50-60	DS	100			GLV	NC	N
160	607	6	7	60-70	DS	100			GLV	NC	N
160	608	6	8	70-80	SS	25			GLV	NC	N
160	609	6	9	80-90	SS	25			GLV	NC	N
160	610	6	10	90-100	SS	25			GLV	NC	N
160	611	6	11	100-110	DS	100			GLV	UKN	A
160	612	6	12	110-120	DS	100			GLV	NC	N
160	613	6	13	120-130	SS	25			GLV	NC	N
160	614	6	14	130-140	SS	25			GLV	NC	N
160	615	6	15	140-150	DS	100			GLV	UKN	B
160	616	6	16	150-160	DS	100			GLV	UKN	B
160	617	6	17	160-170	DS	100			GLV	UKN	B
160	618	6	18	170-180	DS	100			GLV	PCC	C
160	619	6	19	180-195	DS	89			GLV	PCC	C
160	619(WS)	6	19	180-195	WS	11			GLV	PCC	C
160	701	7	1	0-10	DS	100			GLV	NC	N
160	702	7	2	10-20	DS	100			GLV	NC	N
160	703	7	3	20-30	DS	100			GLV	NC	N
160	704	7	4	30-40	DS	100			GLV	NC	N
160	705	7	5	40-50	DS	100			GLV	NC	N
160	706	7	6	50-60	DS	100			GLV	NC	N
160	707	7	7	60-70	SS	25			GLV	NC	N
160	708	7	8	70-80	SS	25			GLV	NC	N
160	709	7	9	80-90	SS	25			GLV	NC	N
160	710	7	10	90-100	SS	25			GLV	NC	N

Table E2. Provenience Data for Test Excavations at the Rattlesnake Keeper Site (39LM160), Lake Sharpe Testing Project, South Dakota, UND, 1988 (Concluded). See Table E1 for an explanation of the column headings and data values.

SNO	CTNO	TN	LN	SD(PD)	RT	PES	FNO	FT	ACU	CHU	C
160	711	7	11	100-110	DS	100			GLV	NC	N
160	712	7	12	110-120	DS	100			GLV	NC	N
160	713	7	13	120-130	SS	25			GLV	NC	N
160	714	7	14	130-140	SS	25			GLV	EPM	N
160	715	7	15	140-150	DS	100			GLV	NC	N
160	716	7	16	150-160	DS	100			GLV	UKN	B
160	717	7	17	160-170	DS	100			GLV	UKN	B
160	718	7	18	170-180	DS	100			GLV	PCC	C
160	719	7	19	180-195	DS	89			GLV	PCC	C
160	719(W.S)	7	19	180-195	WS	11			GLV	PCC	C
160	1100	11			NS	NA	1	BH	HTF	PCC	C
160	1101	11	1	0-10(PD)	DS	100	1/2	BH	HTF	PCC	C
160	1102	11	2	10-20(PD)	DS	100	1/2	BH	HTF	PCC	C
160	1103	11	3	20-30(PD)	DS	100	1/2	BH	HTF	PCC	C
160	1104	11	4	30-65(PD)	DS	90	1	BH	HTF	PCC	C
160	1105	11	4	30-65(PD)	WS	10	1	BH	HTF	PCC	C

Table E3. Provenience Data for Test Excavations at the Lost Nation Site (39LM161), Lake Sharpe Testing Project, South Dakota, UND, 1988. See Table E1 for an explanation of the column headings and data values.

SNO	CTNO	TN	LN	SD	RT	PES	FNO	FT	ACU	CHU	C
161	101	1	1	0-10	DS	100			GLV	NC	N
161	102	1	2	10-20	DS	100			GLV	NC	N
161	103	1	3	20-30	DS	100			GLV	NC	N
161	104	1	4	30-40	DS	100			GLV	NC	N
161	105	1	5	40-50	DS	100			GLV	NC	N
161	106	1	6	50-60	DS	100			GLV	NC	N
161	106	1	6	50-60	DS	100			GLV	NC	N
161	107	1	7	60-70	DS	100			GLV	NC	N
161	108	1	8	70-80	DS	100			GLV	NC	N
161	109	1	9	80-90	DS	100			GLV	NC	N
161	110	1	10	90-100	DS	100			GLV	NC	N
161	111	1	11	100-110	DS	100			GLV	NC	N
161	112	1	12	110-120	DS	100			GLV	NC	N
161	113	1	13	120-130	DS	100			GLV	NC	N
161	114	1	14	130-140	DS	100			GLV	NC	N
161	115	1	15	140-150	DS	100			GLV	EPM	A
161	116	1	16	150-160	DS	100			GLV	EPM	A
161	117	1	17	160-170	DS	100			GLV	EPW	A
161	118	1	18	170-180	DS	100			GLV	EPW	A
161	119	1	19	180-195	DS	100			GLV	EPM	A
161	201	2	1	0-10	DS	100			GLV	NC	N
161	202	2	2	10-20	DS	100			GLV	NC	N
161	203	2	3	20-30	DS	100			GLV	NC	N
161	204	2	4	30-40	DS	100			GLV	NC	N
161	205	2	5	40-50	DS	100			GLV	NC	N
161	206	2	6	50-60	DS	100			GLV	NC	N
161	207	2	7	60-70	DS	100			GLV	NC	N
161	208	2	8	70-80	DS	100			GLV	NC	N
161	209	2	9	80-90	DS	100			GLV	NC	N
161	210	2	10	90-100	DS	100			GLV	NC	N
161	211	2	11	100-110	DS	100			GLV	NC	N
161	212	2	12	110-120	DS	100			GLV	NC	N
161	213	2	13	120-130	DS	100			GLV	NC	N
161	214	2	14	130-140	DS	100			GLV	NC	N
161	215	2	15	140-150	DS	100			GLV	EPM	A
161	216	2	16	150-160	DS	100			GLV	NC	N
161	217	2	17	160-170	DS	89			GLV	EPW	A
161	217(W.S)	2	17	160-170	WS	11			GLV	EPW	A
161	218	2	18	170-180	DS	100			GLV	EPW	A
161	219	2	19	180-195	DS	100			GLV	NC	N

Table E3. Provenience Data for Test Excavations at the Lost Nation Site (39LM161), Lake Sharpe Testing Project, South Dakota, UND, 1988 (Continued). See Table E1 for an explanation of the column headings and data values.

SNO	CTNO	TN	LN	SD	RT	PES	FNO	FT	ACU	CHU	C
161	301	3	1	0-10	DS	100			GLV	NC	N
161	302	3	2	10-20	DS	100			GLV	NC	N
161	303	3	3	20-30	DS	100			GLV	NC	N
161	304	3	4	30-40	DS	100			GLV	NC	N
161	305	3	5	40-50	DS	100			GLV	NC	N
161	306	3	6	50-60	DS	100			GLV	NC	N
161	307	3	7	60-70	DS	100			GLV	NC	N
161	308	3	8	70-80	DS	100			GLV	NC	N
161	309	3	9	80-90	DS	100			GLV	NC	N
161	310	3	10	90-100	DS	100			GLV	NC	N
161	311	3	11	100-110	DS	100			GLV	NC	N
161	312	3	12	110-120	DS	100			GLV	NC	N
161	313	3	13	120-130	DS	100			GLV	EPM	A
161	314	3	14	130-140	DS	100			GLV	NC	N
161	315	3	15	140-150	DS	100			GLV	EPW	A
161	316	3	16	150-160	DS	100			GLV	NC	N
161	317	3	17	160-170	DS	100			GLV	NC	N
161	401	4	1	0-10	DS	100			GLV	NC	N
161	402	4	2	10-20	DS	100			GLV	NC	N
161	403	4	3	20-30	DS	100			GLV	NC	N
161	404	4	4	30-40	DS	100			GLV	NC	N
161	405	4	5	40-50	DS	100			GLV	NC	N
161	406	4	6	50-60	DS	100			GLV	NC	N
161	407	4	7	60-70	DS	100			GLV	NC	N
161	408	4	8	70-80	DS	100			GLV	NC	N
161	409	4	9	80-90	DS	100			GLV	NC	N
161	410	4	10	90-100	DS	100			GLV	NC	N
161	411	4	11	100-110	DS	100			GLV	NC	N
161	412	4	12	110-120	DS	100			GLV	NC	N
161	413	4	13	120-130	DS	100			GLV	EPM	A
161	414	4	14	130-140	DS	100			GLV	EPM	A
161	415	4	15	140-150	DS	100			GLV	NC	N
161	416	4	16	150-160	DS	100			GLV	EPW	A
161	417	4	17	160-170	DS	100			GLV	NC	N

Table E3. Provenience Data for Test Excavations at the Lost Nation Site (39LM161), Lake Sharpe Testing Project, South Dakota, UND, 1988 (Concluded). See Table E1 for an explanation of the column headings and data values.

SNO	CTNO	TN	LN	SD	RT	PES	FNO	FT	ACU	CHU	C
161	501	5	1	0-10	DS	100			GLV	NC	N
161	502	5	2	10-20	DS	100			GLV	NC	N
161	503	5	3	20-30	DS	100			GLV	NC	N
161	504	5	4	30-40	DS	100			GLV	NC	N
161	505	5	5	40-50	DS	100			GLV	NC	N
161	506	5	6	50-60	DS	100			GLV	NC	N
161	507	5	7	60-70	DS	100			GLV	NC	N
161	508	5	8	70-80	DS	100			GLV	NC	N
161	509	5	9	80-90	DS	100			GLV	NC	N
161	510	5	10	90-100	DS	100			GLV	NC	N
161	511	5	11	100-110	DS	100			GLV	NC	N
161	512	5	12	110-120	DS	100			GLV	NC	N
161	513	5	13	120-130	DS	100			GLV	EPM	A
161	514	5	14	140-150	DS	100			GLV	NC	N
161	515	5	15	140-150	DS	100			GLV	EPW	A
161	516	5	16	150-160	DS	100			GLV	NC	N
161	601	6	1	0-10	DS	100			GLV	NC	N
161	602	6	2	10-20	DS	100			GLV	NC	N
161	603	6	3	20-30	DS	100			GLV	NC	N
161	604	6	4	30-40	DS	100			GLV	NC	N
161	605	6	5	40-50	DS	100			GLV	NC	N
161	606	6	6	50-60	DS	100			GLV	NC	N
161	607	6	7	60-70	DS	100			GLV	NC	N
161	608	6	8	70-80	DS	100			GLV	NC	N
161	609	6	9	80-90	DS	100			GLV	NC	N
161	610	6	10	90-100	DS	100			GLV	NC	N
161	611	6	11	100-110	DS	100			GLV	NC	N
161	612	6	12	110-120	DS	100			GLV	NC	N
161	613	6	13	120-130	DS	100			GLV	NC	N
161	614	6	14	140-150	DS	100			GLV	NC	N
161	615	6	15	140-150	DS	89			GLV	EPW	A
161	615(WS)	6	15	140-150	WS	11			GLV	EPW	A
161	616	6	16	150-160	DS	100			GLV	NC	N
161	1000			ca. 170	WS	100	1	OR	OTR	EPW	A

Table E4. Provenience Data for Test Excavations at Site 39LM163, Lake Sharpe Testing Project, South Dakota, UND, 1988. See Table E1 for an explanation of the column headings and data values.

SNO	CTNO	TN	LN	SD	RT	PES	FNO	FT	ACU	CHU	C
163	101	1	1	0-10	DS	100			GLV	NC	N
163	102	1	2	10-20	DS	100			GLV	NC	N
163	103	1	3	20-30	DS	100			GLV	NC	N
163	104	1	4	30-40	DS	100			GLV	EPM	N
163	105	1	5	40-50	DS	100			GLV	EPM	N
163	106	1	6	50-60	DS	100			GLV	NC	N
163	107	1	7	60-70	DS	100			GLV	NC	N
163	108	1	8	70-80	DS	100			GLV	EPM	N
163	109	1	9	80-90	DS	100			GLV	EPM	N
163	110	1	10	90-100	DS	100			GLV	NC	N
163	111	1	11	100-110	DS	100			GLV	EPM	N
163	112	1	12	110-120	DS	100			GLV	EPM	N
163	113	1	13	120-130	DS	100			GLV	EPM	N
163	114	1	14	130-140	DS	100			GLV	NC	N
163	115	1	15	140-150	DS	100			GLV	NC	N
163	201	2	1	0-10	DS	100			GLV	NC	N
163	202	2	2	10-20	DS	100			GLV	NC	N
163	203	2	3	20-30	DS	100			GLV	NC	N
163	204	2	4	30-40	DS	100			GLV	NC	N
163	205	2	5	40-50	DS	100			GLV	EPM	N
163	206	2	6	50-60	DS	100			GLV	NC	N
163	207	2	7	60-70	DS	100			GLV	NC	N
163	208	2	8	70-80	DS	100			GLV	NC	N
163	209	2	9	80-90	DS	100			GLV	NC	N
163	210	2	10	90-100	DS	100			GLV	EPM	N
163	211	2	11	100-110	DS	100			GLV	NC	N
163	212	2	12	110-120	DS	100			GLV	EPM	N
163	213	2	13	120-130	DS	100			GLV	NC	N
163	214	2	14	130-140	DS	100			GLV	NC	N
163	215	2	15	140-150	DS	100			GLV	NC	N
163	0000			ca. 180	NS	NA			OTR	NC	N

APPENDIX F

ARTIFACT (AND OTHER MATERIAL) INVENTORY CODES, DATA BASES 1-5

Native Ceramics Inventory Code (Data Base 1), Lake Sharpe Testing Project, South Dakota, UND, 1988.

Bone Inventory Code (Data Base 2), Lake Sharpe Testing Project, South Dakota, UND, 1988.

Lithic Inventory Code (Data Base 3), Lake Sharpe Testing Project, South Dakota, UND, 1988.

Miscellaneous 1 Inventory Code (Data Base 4), Lake Sharpe Testing Project, South Dakota, UND, 1988.

Miscellaneous 2 Inventory Code (Data Base 5), Lake Sharpe Testing Project, South Dakota, UND, 1988.

Note: All weights are stated to the nearest whole gram.

ARTIFACT INVENTORY CODE
 LAKE SHARPE TESTING PROJECT, SOUTH DAKOTA, 1988
 UNIVERSITY OF NORTH DAKOTA, GRAND FORKS
 (for use with PC-File/R)

Data Base	Field Label	Field Length	Variable
-----------	-------------	--------------	----------

Data Base 1 - Native Ceramics (Pottery)

1	SITE AND PROVENIENCE DATA - SEE PROVENIENCE CODE		
	G1BS#	4	Number of Grade 1 Body Sherds
	G2BS#	4	Number of Grade 2 Body Sherds
	G3BS#	4	Number of Grade 3 Body Sherds
	G1RM#	4	Number of Grade 1 Rim Sherds
	G2RM#	4	Number of Grade 2 Rim Sherds
	G3RM#	4	Number of Grade 3 Rim Sherds
	PLAINBS#	3	Number of Plain or Smoothed Body Sherds in Grade 1-3
	SIMPLBS#	3	Number of Simple-Stamped Body Sherds in Grade 1-3
	CORDRBS#	3	Number of Cord-Roughened Body Sherds in Grade 1-3
	CHECKBS#	3	Number of Check-Stamped Body Sherds in Grade 1-3
	BRUSHBS#	3	Number of Brushed Body Sherds in Grade 1-3
	DECORBS#	3	Number of Decorated Body Sherds in Grade 1-3
	INDETBS#	3	Number of Indeterminate Body Sherds in Grade 1-3

Data Base 2 - Bone (Vertebrate Fauna) (weights are to the nearest whole gram)

2	SITE AND PROVENIENCE DATA - SEE PROVENIENCE CODE		
	G1BN#	4	Total Weight of Grade 1 Bone
	G2BN#	4	Total Weight of Grade 2 Bone
	G3BN#	4	Total Weight of Grade 3 Bone
	G1BB#	4	Weight of Grade 1 Burned Bone
	G2BB#	4	Weight of Grade 2 Burned Bone
	G3BB#	4	Weight of Grade 3 Burned Bone
	G13IB#	5	Total Count Grade 1-3 Identifiable Bone
	G45IB#	5	Total Count Grade 4-5 Identifiable Bone
	G15MB#	5	Total Count Grade 1-5 Modified Bone

ARTIFACT INVENTORY CODE
 LAKE SHARPE TESTING PROJECT, SOUTH DAKOTA, 1988
 UNIVERSITY OF NORTH DAKOTA, GRAND FORKS
 (for use with PC-File/R)

Data Base	Field Label	Field Length	Variable
-----------	-------------	--------------	----------

Data Base 3 - Lithics (Stone Tools, Flaking Debris, Fire-Cracked Rock)
 (weights are to the nearest whole gram)

3 SITE AND PROVENIENCE DATA - SEE PROVENIENCE CODE

STL#	3	Total Count of Grade 1-5 Stone Tools
G1FK#	4	Number of Grade 1 Flaking Debris
G2FK#	4	Number of Grade 2 Flaking Debris
G3FK#	4	Number of Grade 3 Flaking Debris
G4FK#	4	Number of Grade 4 Flaking Debris
G1FCR#	5	Weight of Grade 1 Fire-Cracked Rock
G2FCR#	5	Weight of Grade 2 Fire-Cracked Rock
G3FCR#	5	Weight of Grade 3 Fire-Cracked Rock

Data Base 4 - Miscellaneous 1 (Clinker, Shell, Ochre, Burned Earth/Fired Clay)
 (weights are to the nearest whole gram)

4 SITE AND PROVENIENCE DATA - SEE PROVENIENCE CODE

G1CR#	4	Number of Grade 1 Natural Clinker
G2CR#	4	Number of Grade 2 Natural Clinker
G3CR#	4	Number of Grade 3 Natural Clinker
G1SL#	4	Number of Grade 1 Unmodified Shell
G2SL#	4	Number of Grade 2 Unmodified Shell
G3SL#	4	Number of Grade 3 Unmodified Shell
ISL#	3	Total Count of Grade 1-3 Identifiable Shell
MSL#	3	Total Count of Grade 1-3 Modified Shell
G1OR#	4	Weight of Grade 1 Ochre/Pigment
G2OR#	4	Weight of Grade 2 Ochre/Pigment
G3OR#	4	Weight of Grade 3 Ochre/Pigment
G1BE#	4	Weight of Grade 1 Burned Earth/Fired Clay
G2BE#	4	Weight of Grade 2 Burned Earth/Fired Clay
G3BE#	4	Weight of Grade 3 Burned Earth/Fired Clay

ARTIFACT INVENTORY CODE
 LAKE SHARPE TESTING PROJECT, SOUTH DAKOTA, 1988
 UNIVERSITY OF NORTH DAKOTA, GRAND FORKS
 (for use with PC-File/R)

Data Base	Field Label	Format/ Length	Variable
Data Base 5 - Miscellaneous 2 (Ash, Charcoal/Wood, Miscellaneous Native Material, Miscellaneous Euroamerican Material, Heavy Fraction Residue, Light Fraction Residue) (weights are to the nearest whole gram)			
5	SITE AND PROVENIENCE DATA - SEE PROVENIENCE CODE		
	G1AH#	4	Weight of Grade 1 Ash
	G2AH#	4	Weight of Grade 2 Ash
	G3AH#	4	Weight of Grade 3 Ash
	CLW#	3	Total Weight of Grade 1-3 Charcoal/Wood
	GTB#	3	Number of Grade 1-5 Glass Trade Beads
	OTG#	3	Number of Grade 1-5 Other Trade Glass
	TML#	3	Number of Grade 1-5 Trade Metal
	ONM#	3	Number of Grade 1-5 Other Native Material
	EGL#	3	Number of Grade 1-5 Euroamerican Glass
	ECR#	3	Number of Grade 1-5 Euroamerican Ceramics
	EML#	3	Number of Grade 1-5 Euroamerican Metal
	OREM#	4	Number of Grade 1-5 Other Euroamerican Material
	HFR#	3	Total Weight of Grade 4-5 Unsorted Heavy Fraction Residue
	LFR#	3	Total Weight of Unsorted Light Fraction Residue (not size graded)

APPENDIX G

ARTIFACT INVENTORY DATA FOR THE RATTLESNAKE KEEPER SITE (39LM160)

39LM160 -- NATIVE CERAMIC ARTIFACT INVENTORY (DATA BASE 1) -- UND/USACE 1988

39LM160 -- BONE ARTIFACT INVENTORY (DATA BASE 2) -- UND/USACE 1988

39LM160 -- LITHIC ARTIFACT INVENTORY (DATA BASE 3) -- UND/USACE 1988

39LM160 -- MISCELLANEOUS 1 ARTIFACT INVENTORY (DATA BASE 4) -- UND/USACE 1988

39LM160 -- MISCELLANEOUS 2 ARTIFACT INVENTORY (DATA BASE 5) -- UND/USACE 1988

Note: Column headings and data values are explained in Appendices E and F.

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SND	CTND	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1BS	G2BS	G3BS	G1RM	G2RM	G3RM	PLA	SIM	COR	CHE	BRU	DEC	IND	
160	101	1	1	0-10		DS	100				GLV	NC	N													
160	102	1	2	10-20		DS	100				GLV	NC	N													
160	103	1	3	20-30		DS	100				GLV	NC	N													
160	104	1	4	30-40		DS	100				GLV	NC	N													
160	105	1	5	40-50		DS	100				GLV	NC	N													
160	106	1	6	50-60		DS	100				GLV	NC	N													
160	107	1	7	60-70		DS	100				GLV	NC	N													
160	108	1	8	70-80		DS	100				GLV	NC	N													
160	201	2	1	0-10		DS	100				GLV	NC	N													
160	202	2	2	10-20		DS	100				GLV	NC	N													
160	203	2	3	20-30		DS	100				GLV	NC	N													
160	204	2	4	30-40		DS	100				GLV	NC	N													
160	205	2	5	40-45		DS	100				GLV	NC	N													
160	301	3	1	0-10		DS	100				GLV	NC	N													
160	302	3	2	10-20		DS	100				GLV	NC	N													
160	303	3	3	20-30		DS	100				GLV	NC	N													
160	304	3	4	30-40		DS	100				GLV	NC	N													
160	305	3	5	40-50		DS	100				GLV	NC	N													
160	306	3	6	50-60		DS	100				GLV	NC	N													
160	307	3	7	60-70		DS	100				GLV	NC	N													
160	401	4	1	0-10		DS	100				GLV	NC	N													
160	402	4	2	10-20		DS	100				GLV	NC	N													
160	403	4	3	20-30		DS	100				GLV	NC	N													
160	404	4	4	30-40		DS	100				GLV	NC	N													
160	405	4	5	40-50		DS	100				GLV	NC	N													
160	406	4	6	50-60		DS	100				GLV	NC	N													
160	407	4	7	60-70		DS	100				GLV	NC	N													
160	408	4	8	70-80		DS	100				GLV	NC	N													
160	409	4	9	80-90		DS	100				GLV	NC	N													
160	410	4	10	90-100		DS	100				GLV	NC	N													
160	411	4	11	100-110		DS	100				GLV	NC	N													
160	412	4	12	110-120		DS	100				GLV	UKN	B													
160	413	4	13	120-130		DS	100				GLV	UKN	B													
160	414	4	14	130-140		DS	100				GLV	UKN	B													
160	415	4	15	140-150		DS	100				GLV	NC	N													
160	416	4	16	150-160		DS	100				GLV	PCC	C													
160	501	5	1	0-10		DS	100				GLV	NC	N													
160	502	5	2	10-20		DS	100				GLV	NC	N													
160	503	5	3	20-30		DS	100				GLV	NC	N													
160	504	5	4	30-40		DS	100				GLV	NC	N													
160	505	5	5	40-50		DS	100				GLV	NC	N													
160	506	5	6	50-60		DS	100				GLV	NC	N													
160	507	5	7	60-70		DS	100				GLV	NC	N													
160	508	5	8	70-80		DS	100				GLV	NC	N													
160	509	5	9	80-90		DS	100				GLV	UKN	A													
160	510	5	10	90-100		DS	100				GLV	NC	N													

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SND	CTND	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1BS	G2BS	G3BS	G1RM	G2RM	G3RM	PLA	SIM	COR	CHE	BRU	DEC	IND	
160	511	5	11	100-110	DS	100				GLV	NC	N														
160	512	5	12	110-120	DS	100				GLV	NC	N														
160	513	5	13	120-130	DS	100				GLV	UKN	B														
160	514	5	14	130-140	DS	100				GLV	UKN	B														
160	515	5	15	140-150	DS	100				GLV	NC	N														
160	516	5	16	150-160	DS	100				GLV	PCC	C		1							1					
160	517	5	17	160-165	WS	100	3	BH	HTF	PCC	C															
160	601	6	1	0-10	DS	100				GLV	NC	N														
160	602	6	2	10-20	DS	100				GLV	NC	N														
160	603	6	3	20-30	DS	100				GLV	NC	N														
160	604	6	4	30-40	DS	100				GLV	NC	N														
160	605	6	5	40-50	DS	100				GLV	NC	N														
160	606	6	6	50-60	DS	100				GLV	NC	N														
160	607	6	7	60-70	DS	100				GLV	NC	N														
160	608	6	8	70-80	SS	25				GLV	NC	N														
160	609	6	9	80-90	SS	25				GLV	NC	N														
160	610	6	10	90-100	SS	25				GLV	NC	N														
160	611	6	11	100-110	DS	100				GLV	UKN	A														
160	612	6	12	110-120	DS	100				GLV	NC	N														
160	613	6	13	120-130	SS	25				GLV	NC	N														
160	614	6	14	130-140	SS	25				GLV	NC	N														
160	615	6	15	140-150	DS	100				GLV	UKN	B														
160	616	6	16	150-160	DS	100				GLV	UKN	B														
160	617	6	17	160-170	DS	100				GLV	UKN	B														
160	618	6	18	170-180	DS	100				GLV	PCC	C			25				5	3				1	16	
160	619	6	19	180-195	DS	89				GLV	PCC	C		8	29				5	4	13			11	9	
160	619	6	19	180-195	WS	11				GLV	PCC	C			37				2	6	7			2	22	
160	701	7	1	0-10	DS	100				GLV	NC	N														
160	702	7	2	10-20	DS	100				GLV	NC	N														
160	703	7	3	20-30	DS	100				GLV	NC	N														
160	704	7	4	30-40	DS	100				GLV	NC	N														
160	705	7	5	40-50	DS	100				GLV	NC	N														
160	706	7	6	50-60	DS	100				GLV	NC	N														
160	707	7	7	60-70	SS	25				GLV	NC	N														
160	708	7	8	70-80	SS	25				GLV	NC	N														
160	709	7	9	80-90	SS	25				GLV	NC	N														
160	710	7	10	90-100	SS	25				GLV	NC	N														
160	711	7	11	100-110	DS	100				GLV	NC	N														
160	712	7	12	110-120	DS	100				GLV	NC	N														
160	713	7	13	120-130	SS	25				GLV	NC	N														
160	714	7	14	130-140	SS	25				GLV	EPH	N														
160	715	7	15	140-150	DS	100				GLV	NC	N														
160	716	7	16	150-160	DS	100				GLV	UKN	B														
160	717	7	17	160-170	DS	100				GLV	UKN	B														
160	718	7	18	170-180	DS	100				GLV	PCC	C														
160	719	7	19	180-195	DS	89				GLV	PCC	C		6	8				2	5				4	3	
160	719	7	19	180-195	WS	11				GLV	PCC	C			6				2	3					1	

SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	61BS	62BS	63BS	61RM	62RM	63RM	PLA	SIM	CDR	CHE	BRU	DEC	IND
160	1100	11				NS	NA	1	BH	HTF	PCC	C													
160	1101	11	1	0-10		DS	100	1/2	BH	HTF	PCC	C			1										1
160	1102	11	2	10-20		DS	100	1/2	BH	HTF	PCC	C			11			1	5						6
160	1103	11	3	20-30		DS	100	1/2	BH	HTF	PCC	C	1	1	6		1		5						3
160	1104	11	4	30-65		DS	90	1	BH	HTF	PCC	C		1	4				4						1
160	1105	11	4	30-65		WS	10	1	BH	HTF	PCC	C													

TOTALS

61BS	1.00
62BS	17.00
63BS	127.00
61RM	0.00
62RM	1.00
63RM	8.00
PLAINBS	33.00
SIMPLEBS	32.00
CDRDRBS	0.00
CHECKBS	0.00
BRUSHBS	0.00
DECORBS	18.00
INDETBS	62.00

SNO	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	G1BN	G2BN	G3BN	G1BB	G2BB	G3BB	G131B	G451B	G15MB		
160	101	1	1	0-10		DS	100				GLV	NC	N										
160	102	1	2	10-20		DS	100				GLV	NC	N										
160	103	1	3	20-30		DS	100				GLV	NC	N										
160	104	1	4	30-40		DS	100				GLV	NC	N										
160	105	1	5	40-50		DS	100				GLV	NC	N										
160	106	1	6	50-60		DS	100				GLV	NC	N										
160	107	1	7	60-70		DS	100				GLV	NC	N										
160	108	1	8	70-80		DS	100				GLV	NC	N										
160	201	2	1	0-10		DS	100				GLV	NC	N										
160	202	2	2	10-20		DS	100				GLV	NC	N										
160	203	2	3	20-30		DS	100				GLV	NC	N										
160	204	2	4	30-40		DS	100				GLV	NC	N										
160	205	2	5	40-45		DS	100				GLV	NC	N										
160	301	3	1	0-10		DS	100				GLV	NC	N										
160	302	3	2	10-20		DS	100				GLV	NC	N										
160	303	3	3	20-30		DS	100				GLV	NC	N										
160	304	3	4	30-40		DS	100				GLV	NC	N										
160	305	3	5	40-50		DS	100				GLV	NC	N										
160	306	3	6	50-60		DS	100				GLV	NC	N										
160	307	3	7	60-70		DS	100				GLV	NC	N										
160	401	4	1	0-10		DS	100				GLV	NC	N										
160	402	4	2	10-20		DS	100				GLV	NC	N										
160	403	4	3	20-30		DS	100				GLV	NC	N										
160	404	4	4	30-40		DS	100				GLV	NC	N										
160	405	4	5	40-50		DS	100				GLV	NC	N										
160	406	4	6	50-60		DS	100				GLV	NC	N										
160	407	4	7	60-70		DS	100				GLV	NC	N										
160	408	4	8	70-80		DS	100				GLV	NC	N										
160	409	4	9	80-90		DS	100				GLV	NC	N										
160	410	4	10	90-100		DS	100				GLV	NC	N										
160	411	4	11	100-110		DS	100				GLV	NC	N										
160	412	4	12	110-120		DS	100				GLV	UKN	B			1		5					
160	413	4	13	120-130		DS	100				GLV	UKN	B			6		8					
160	414	4	14	130-140		DS	100				GLV	UKN	B					1					
160	415	4	15	140-150		DS	100				GLV	NC	N										
160	416	4	16	150-160		DS	100				GLV	PCC	C			2		1					
160	501	5	1	0-10		DS	100				GLV	NC	N										
160	502	5	2	10-20		DS	100				GLV	NC	N										
160	503	5	3	20-30		DS	100				GLV	NC	N										
160	504	5	4	30-40		DS	100				GLV	NC	N										
160	505	5	5	40-50		DS	100				GLV	NC	N										
160	506	5	6	50-60		DS	100				GLV	NC	N										
160	507	5	7	60-70		DS	100				GLV	NC	N										
160	508	5	8	70-80		DS	100				GLV	NC	N										
160	509	5	9	80-90		DS	100				GLV	UKN	A								1		
160	510	5	10	90-100		DS	100				GLV	NC	N										

SND	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	G1BN	G2BN	G3BN	G1BB	G2BB	G3BB	G131B	G451B	G15MB	
160	511	5	11	100-110	DS	100				GLV	NC	N										
160	512	5	12	110-120	DS	100				GLV	NC	N										
160	513	5	13	120-130	DS	100				GLV	UKN	B		86	53					4		
160	514	5	14	130-140	DS	100				GLV	UKN	B										
160	515	5	15	140-150	DS	100				GLV	NC	N										
160	516	5	16	150-160	DS	100				GLV	PCC	C	78		7				1		1	
160	517	5	17	160-165	WS	100	3	BH	HTF	PCC	C											
160	601	6	1	0-10	DS	100				GLV	NC	N										
160	602	6	2	10-20	DS	100				GLV	NC	N										
160	603	6	3	20-30	DS	100				GLV	NC	N										
160	604	6	4	30-40	DS	100				GLV	NC	N										
160	605	6	5	40-50	DS	100				GLV	NC	N										
160	606	6	6	50-60	DS	100				GLV	NC	N										
160	607	6	7	60-70	DS	100				GLV	NC	N										
160	608	6	8	70-80	SS	25				GLV	NC	N										
160	609	6	9	80-90	SS	25				GLV	NC	N										
160	610	6	10	90-100	SS	25				GLV	NC	N										
160	611	6	11	100-110	DS	100				GLV	UKN	A			1						1	
160	612	6	12	110-120	DS	100				GLV	NC	N										
160	613	6	13	120-130	SS	25				GLV	NC	N										
160	614	6	14	130-140	SS	25				GLV	NC	N										
160	615	6	15	140-150	DS	100				GLV	UKN	B		13	3						1	
160	616	6	16	150-160	DS	100				GLV	UKN	B	19	74	18							1
160	617	6	17	160-170	DS	100				GLV	UKN	B		21	3							
160	618	6	18	170-180	DS	100				GLV	PCC	C		7	32			1	18		3	
160	619	6	19	180-195	DS	89				GLV	PCC	C	24	184	186			9	8		6	
160	619	6	19	180-195	WS	11				GLV	PCC	C			88				7		1	
160	701	7	1	0-10	DS	100				GLV	NC	N										
160	702	7	2	10-20	DS	100				GLV	NC	N										
160	703	7	3	20-30	DS	100				GLV	NC	N										
160	704	7	4	30-40	DS	100				GLV	NC	N										
160	705	7	5	40-50	DS	100				GLV	NC	N										
160	706	7	6	50-60	DS	100				GLV	NC	N										
160	707	7	7	60-70	SS	25				GLV	NC	N										
160	708	7	8	70-80	SS	25				GLV	NC	N										
160	709	7	9	80-90	SS	25				GLV	NC	N										
160	710	7	10	90-100	SS	25				GLV	NC	N										
160	711	7	11	100-110	DS	100				GLV	NC	N										
160	712	7	12	110-120	DS	100				GLV	NC	N										
160	713	7	13	120-130	SS	25				GLV	NC	N										
160	714	7	14	130-140	SS	25				GLV	EPH	N			1							
160	715	7	15	140-150	DS	100				GLV	NC	N										
160	716	7	16	150-160	DS	100				GLV	UKN	B	120	16	12						4	
160	717	7	17	160-170	DS	100				GLV	UKN	B		24	6							
160	718	7	18	170-180	DS	100				GLV	PCC	C			1						1	
160	719	7	19	180-195	DS	89				GLV	PCC	C	11	102	27							9
160	719	7	19	180-195	WS	11				GLV	PCC	C			9							

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	61BN	62BN	63BN	61BB	62BB	63BB	6131B	6451B	615MB	
160	1100	11				NS	NA	1	BH	HTF	PCC	C										
160	1101	11	1	0-10		DS	100	1/2	BH	HTF	PCC	C	1	1					1			
160	1102	11	2	10-20		DS	100	1/2	BH	HTF	PCC	C	9	8				1	2			
160	1103	11	3	20-30		DS	100	1/2	BH	HTF	PCC	C		8				5	3			
160	1104	11	4	30-65		DS	90	1	BH	HTF	PCC	C		3					1			
160	1105	11	4	30-65		WS	10	1	BH	HTF	PCC	C		4				1	2	3		

TOTALS

61BN	252.00
62BN	546.00
63BN	487.00
61BB	0.00
62BB	10.00
63BB	41.00
6131B	42.00
6451B	3.00
615MB	0.00

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SND	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	STL	61FK	62FK	63FK	64FK	61FCR	62FCR	63FCR	
160	101	1	1	0-10		DS	100			GLV	NC	N									
160	102	1	2	10-20		DS	100			GLV	NC	N									
160	103	1	3	20-30		DS	100			GLV	NC	N									
160	104	1	4	30-40		DS	100			GLV	NC	N									
160	105	1	5	40-50		DS	100			GLV	NC	N									
160	106	1	6	50-60		DS	100			GLV	NC	N									
160	107	1	7	60-70		DS	100			GLV	NC	N									
160	108	1	8	70-80		DS	100			GLV	NC	N									
160	201	2	1	0-10		DS	100			GLV	NC	N									
160	202	2	2	10-20		DS	100			GLV	NC	N									
160	203	2	3	20-30		DS	100			GLV	NC	N									
160	204	2	4	30-40		DS	100			GLV	NC	N									
160	205	2	5	40-45		DS	100			GLV	NC	N									
160	301	3	1	0-10		DS	100			GLV	NC	N									
160	302	3	2	10-20		DS	100			GLV	NC	N									
160	303	3	3	20-30		DS	100			GLV	NC	N									
160	304	3	4	30-40		DS	100			GLV	NC	N									
160	305	3	5	40-50		DS	100			GLV	NC	N									
160	306	3	6	50-60		DS	100			GLV	NC	N									
160	307	3	7	60-70		DS	100			GLV	NC	N									
160	401	4	1	0-10		DS	100			GLV	NC	N									
160	402	4	2	10-20		DS	100			GLV	NC	N									
160	403	4	3	20-30		DS	100			GLV	NC	N									
160	404	4	4	30-40		DS	100			GLV	NC	N									
160	405	4	5	40-50		DS	100			GLV	NC	N									
160	406	4	6	50-60		DS	100			GLV	NC	N									
160	407	4	7	60-70		DS	100			GLV	NC	N									
160	408	4	8	70-80		DS	100			GLV	NC	N									
160	409	4	9	80-90		DS	100			GLV	NC	N									
160	410	4	10	90-100		DS	100			GLV	NC	N									
160	411	4	11	100-110		DS	100			GLV	NC	N									
160	412	4	12	110-120		DS	100			GLV	UKN	B									
160	413	4	13	120-130		DS	100			GLV	UKN	B	1								1
160	414	4	14	130-140		DS	100			GLV	UKN	B	1		1						3
160	415	4	15	140-150		DS	100			GLV	NC	N									
160	416	4	16	150-160		DS	100			GLV	PCC	C									
160	501	5	1	0-10		DS	100			GLV	NC	N									
160	502	5	2	10-20		DS	100			GLV	NC	N									
160	503	5	3	20-30		DS	100			GLV	NC	N									
160	504	5	4	30-40		DS	100			GLV	NC	N									
160	505	5	5	40-50		DS	100			GLV	NC	N									
160	506	5	6	50-60		DS	100			GLV	NC	N									
160	507	5	7	60-70		DS	100			GLV	NC	N									
160	508	5	8	70-80		DS	100			GLV	NC	N									
160	509	5	9	80-90		DS	100			GLV	UKN	A									
160	510	5	10	90-100		DS	100			GLV	NC	N									

SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	STL	61FK	62FK	63FK	64FK	61FCR	62FCR	63FCR	
160	511	5	11	100-110	DS	100					GLV	NC	N								
160	512	5	12	110-120	DS	100					GLV	NC	N								
160	513	5	13	120-130	DS	100					GLV	UKN	B	9	2	7	84				
160	514	5	14	130-140	DS	100					GLV	UKN	B				3				
160	515	5	15	140-150	DS	100					GLV	NC	N								
160	516	5	16	150-160	DS	100					GLV	PCC	C								
160	517	5	17	160-165	WS	100	3			BH	HTF	PCC	C								
160	601	6	1	0-10	DS	100					GLV	NC	N								
160	602	6	2	10-20	DS	100					GLV	NC	N								
160	603	6	3	20-30	DS	100					GLV	NC	N								
160	604	6	4	30-40	DS	100					GLV	NC	N								
160	605	6	5	40-50	DS	100					GLV	NC	N								
160	606	6	6	50-60	DS	100					GLV	NC	N								
160	607	6	7	60-70	DS	100					GLV	NC	N								
160	608	6	8	70-80	SS	25					GLV	NC	N								
160	609	6	9	80-90	SS	25					GLV	NC	N								
160	610	6	10	90-100	SS	25					GLV	NC	N								
160	611	6	11	100-110	DS	100					GLV	UKN	A								
160	612	6	12	110-120	DS	100					GLV	NC	N								
160	613	6	13	120-130	SS	25					GLV	NC	N								
160	614	6	14	130-140	SS	25					GLV	NC	N								
160	615	6	15	140-150	DS	100					GLV	UKN	B								
160	616	6	16	150-160	DS	100					GLV	UKN	B								
160	617	6	17	160-170	DS	100					GLV	UKN	B								
160	618	6	18	170-180	DS	100					GLV	PCC	C							1	
160	619	6	19	180-195	DS	89					GLV	PCC	C	3		2				4	
160	619	6	19	180-195	WS	11					GLV	PCC	C							5	4
160	701	7	1	0-10	DS	100					GLV	NC	N								
160	702	7	2	10-20	DS	100					GLV	NC	N								
160	703	7	3	20-30	DS	100					GLV	NC	N								
160	704	7	4	30-40	DS	100					GLV	NC	N								
160	705	7	5	40-50	DS	100					GLV	NC	N								
160	706	7	6	50-60	DS	100					GLV	NC	N								
160	707	7	7	60-70	SS	25					GLV	NC	N								
160	708	7	8	70-80	SS	25					GLV	NC	N								
160	709	7	9	80-90	SS	25					GLV	NC	N								
160	710	7	10	90-100	SS	25					GLV	NC	N								
160	711	7	11	100-110	DS	100					GLV	NC	N								
160	712	7	12	110-120	DS	100					GLV	NC	N								
160	713	7	13	120-130	SS	25					GLV	NC	N								
160	714	7	14	130-140	SS	25					GLV	EPM	N								
160	715	7	15	140-150	DS	100					GLV	NC	N								
160	716	7	16	150-160	DS	100					GLV	UKN	B								
160	717	7	17	160-170	DS	100					GLV	UKN	B								
160	718	7	18	170-180	DS	100					GLV	PCC	C								
160	719	7	19	180-195	DS	89					GLV	PCC	C	1							
160	719	7	19	180-195	WS	11					GLV	PCC	C								1

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SND	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	STL	G1FK	G2FK	G3FK	G4FK	G1FCR	G2FCR	G3FCR	
160	1100	11				NS	NA	1	BH	HTF	PCC	C									
160	1101	11	1	0-10		DS	100	1/2	BH	HTF	PCC	C									
160	1102	11	2	10-20		DS	100	1/2	BH	HTF	PCC	C	2				3				
160	1103	11	3	20-30		DS	100	1/2	BH	HTF	PCC	C	5				5				
160	1104	11	4	30-65		DS	90	1	BH	HTF	PCC	C	2				3				
160	1105	11	4	30-65		MS	10	1	BH	HTF	PCC	C	1				1			7	

TOTALS

STL	25.00
G1FK	2.00
G2FK	10.00
G3FK	114.00
G4FK	11.00
G1FCR	0.00
G2FCR	0.00
G3FCR	0.00

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1CR	G2CR	G3CR	G1SL	G2SL	G3SL	ISL	MSL	G1OR	G2OR	G3OR	G1BE	G2BE	G3BE	
160	101	1	1	0-10		DS	100				GLV	NC	N														
160	102	1	2	10-20		DS	100				GLV	NC	N														
160	103	1	3	20-30		DS	100				GLV	NC	N														
160	104	1	4	30-40		DS	100				GLV	NC	N														
160	105	1	5	40-50		DS	100				GLV	NC	N														
160	106	1	6	50-60		DS	100				GLV	NC	N														
160	107	1	7	60-70		DS	100				GLV	NC	N														
160	108	1	8	70-80		DS	100				GLV	NC	N														
160	201	2	1	0-10		DS	100				GLV	NC	N														
160	202	2	2	10-20		DS	100				GLV	NC	N														
160	203	2	3	20-30		DS	100				GLV	NC	N														
160	204	2	4	30-40		DS	100				GLV	NC	N														
160	205	2	5	40-45		DS	100				GLV	NC	N														
160	301	3	1	0-10		DS	100				GLV	NC	N														
160	302	3	2	10-20		DS	100				GLV	NC	N														
160	303	3	3	20-30		DS	100				GLV	NC	N														
160	304	3	4	30-40		DS	100				GLV	NC	N														
160	305	3	5	40-50		DS	100				GLV	NC	N														
160	306	3	6	50-60		DS	100				GLV	NC	N														
160	307	3	7	60-70		DS	100				GLV	NC	N														
160	401	4	1	0-10		DS	100				GLV	NC	N														
160	402	4	2	10-20		DS	100				GLV	NC	N														
160	403	4	3	20-30		DS	100				GLV	NC	N														
160	404	4	4	30-40		DS	100				GLV	NC	N														
160	405	4	5	40-50		DS	100				GLV	NC	N														
160	406	4	6	50-60		DS	100				GLV	NC	N														
160	407	4	7	60-70		DS	100				GLV	NC	N														
160	408	4	8	70-80		DS	100				GLV	NC	N														
160	409	4	9	80-90		DS	100				GLV	NC	N														
160	410	4	10	90-100		DS	100				GLV	NC	N														
160	411	4	11	100-110		DS	100				GLV	NC	N														
160	412	4	12	110-120		DS	100				GLV	UKN	B														
160	413	4	13	120-130		DS	100				GLV	UKN	B														
160	414	4	14	130-140		DS	100				GLV	UKN	B														
160	415	4	15	140-150		DS	100				GLV	NC	N														
160	416	4	16	150-160		DS	100				GLV	PCC	C														
160	501	5	1	0-10		DS	100				GLV	NC	N														
160	502	5	2	10-20		DS	100				GLV	NC	N														
160	503	5	3	20-30		DS	100				GLV	NC	N														
160	504	5	4	30-40		DS	100				GLV	NC	N														
160	505	5	5	40-50		DS	100				GLV	NC	N														
160	506	5	6	50-60		DS	100				GLV	NC	N														
160	507	5	7	60-70		DS	100				GLV	NC	N														
160	508	5	8	70-80		DS	100				GLV	NC	N														
160	509	5	9	80-90		DS	100				GLV	UKN	A														
160	510	5	10	90-100		DS	100				GLV	NC	N														

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SND	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1CR	G2CR	G3CR	G1SL	G2SL	G3SL	ISL	MSL	G1OR	G2OR	G3OR	G1BE	G2BE	G3BE	
160	511	5	11	100-110	DS	100					GLV	NC	N														
160	512	5	12	110-120	DS	100					GLV	NC	N														
160	513	5	13	120-130	DS	100					GLV	UKN	B														
160	514	5	14	130-140	DS	100					GLV	UKN	B														
160	515	5	15	140-150	DS	100					GLV	NC	N														
160	516	5	16	150-160	DS	100					GLV	PCC	C													3	
160	517	5	17	160-165	WS	100	3	BH	HTF	PCC	C															1	
160	601	6	1	0-10	DS	100					GLV	NC	N														
160	602	6	2	10-20	DS	100					GLV	NC	N														
160	603	6	3	20-30	DS	100					GLV	NC	N														
160	604	6	4	30-40	DS	100					GLV	NC	N														
160	605	6	5	40-50	DS	100					GLV	NC	N														
160	606	6	6	50-60	DS	100					GLV	NC	N														
160	607	6	7	60-70	DS	100					GLV	NC	N														
160	608	6	8	70-80	SS	25					GLV	NC	N														
160	609	6	9	80-90	SS	25					GLV	NC	N														
160	610	6	10	90-100	SS	25					GLV	NC	N														
160	611	6	11	100-110	DS	100					GLV	UKN	A														
160	612	6	12	110-120	DS	100					GLV	NC	N														
160	613	6	13	120-130	SS	25					GLV	NC	N														
160	614	6	14	130-140	SS	25					GLV	NC	N														
160	615	6	15	140-150	DS	100					GLV	UKN	B														
160	616	6	16	150-160	DS	100					GLV	UKN	B														
160	617	6	17	160-170	DS	100					GLV	UKN	B														
160	618	6	18	170-180	DS	100					GLV	PCC	C														
160	619	6	19	180-195	DS	89					GLV	PCC	C														1
160	619	6	19	180-195	WS	11					GLV	PCC	C														1
160	701	7	1	0-10	DS	100					GLV	NC	N														
160	702	7	2	10-20	DS	100					GLV	NC	N														
160	703	7	3	20-30	DS	100					GLV	NC	N														
160	704	7	4	30-40	DS	100					GLV	NC	N														
160	705	7	5	40-50	DS	100					GLV	NC	N														
160	706	7	6	50-60	DS	100					GLV	NC	N														
160	707	7	7	60-70	SS	25					GLV	NC	N														
160	708	7	8	70-80	SS	25					GLV	NC	N														
160	709	7	9	80-90	SS	25					GLV	NC	N														
160	710	7	10	90-100	SS	25					GLV	NC	N														
160	711	7	11	100-110	DS	100					GLV	NC	N														
160	712	7	12	110-120	DS	100					GLV	NC	N														
160	713	7	13	120-130	SS	25					GLV	NC	N														
160	714	7	14	130-140	SS	25					GLV	EPH	N														
160	715	7	15	140-150	DS	100					GLV	NC	N														
160	716	7	16	150-160	DS	100					GLV	UKN	B														
160	717	7	17	160-170	DS	100					GLV	UKN	B														
160	718	7	18	170-180	DS	100					GLV	PCC	C														
160	719	7	19	180-195	DS	89					GLV	PCC	C														
160	719	7	19	180-195	WS	11					GLV	PCC	C														1

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	G1CR	G2CR	G3CR	G1SL	G2SL	G3SL	ISL	MSL	G1OR	G2OR	G3OR	G1BE	G2BE	G3BE
160	1100	11				NS	NA	1	BH	HTF	PCC	C														
160	1101	11	1	0-10		DS	100	1/2	BH	HTF	PCC	C							2	1						2
160	1102	11	2	10-20		DS	100	1/2	BH	HTF	PCC	C			1	14									1	5
160	1103	11	3	20-30		DS	100	1/2	BH	HTF	PCC	C	2			10									10	9
160	1104	11	4	30-65		DS	90	1	BH	HTF	PCC	C	1			1										2
160	1105	11	4	30-65		WS	10	1	BH	HTF	PCC	C														16

TOTALS

G1CR	3.00
G2CR	1.00
G3CR	25.00
G1SL	0.00
G2SL	0.00
G3SL	2.00
ISL	1.00
MSL	0.00
G1OR	0.00
G2OR	0.00
G3OR	0.00
G1BE	0.00
G2BE	11.00
G3BE	41.00

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SND	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	61AH	62AH	63AH	CLW	GTB	OTG	TML	QNM	EGL	ECR	EML	OREM	HFR	LFR	
160	101	1	1	0-10		DS	100				GLV	NC	N														
160	102	1	2	10-20		DS	100				GLV	NC	N														
160	103	1	3	20-30		DS	100				GLV	NC	N														
160	104	1	4	30-40		DS	100				GLV	NC	N														
160	105	1	5	40-50		DS	100				GLV	NC	N														
160	106	1	6	50-60		DS	100				GLV	NC	N														
160	107	1	7	60-70		DS	100				GLV	NC	N														
160	108	1	8	70-80		DS	100				GLV	NC	N														
160	201	2	1	0-10		DS	100				GLV	NC	N														
160	202	2	2	10-20		DS	100				GLV	NC	N														
160	203	2	3	20-30		DS	100				GLV	NC	N														
160	204	2	4	30-40		DS	100				GLV	NC	N														
160	205	2	5	40-45		DS	100				GLV	NC	N														
160	301	3	1	0-10		DS	100				GLV	NC	N														
160	302	3	2	10-20		DS	100				GLV	NC	N														
160	303	3	3	20-30		DS	100				GLV	NC	N														
160	304	3	4	30-40		DS	100				GLV	NC	N														
160	305	3	5	40-50		DS	100				GLV	NC	N														
160	306	3	6	50-60		DS	100				GLV	NC	N														
160	307	3	7	60-70		DS	100				GLV	NC	N														
160	401	4	1	0-10		DS	100				GLV	NC	N														
160	402	4	2	10-20		DS	100				GLV	NC	N														
160	403	4	3	20-30		DS	100				GLV	NC	N														
160	404	4	4	30-40		DS	100				GLV	NC	N														
160	405	4	5	40-50		DS	100				GLV	NC	N														
160	406	4	6	50-60		DS	100				GLV	NC	N														
160	407	4	7	60-70		DS	100				GLV	NC	N														
160	408	4	8	70-80		DS	100				GLV	NC	N														
160	409	4	9	80-90		DS	100				GLV	NC	N														
160	410	4	10	90-100		DS	100				GLV	NC	N														
160	411	4	11	100-110		DS	100				GLV	NC	N														
160	412	4	12	110-120		DS	100				GLV	UKN	B														
160	413	4	13	120-130		DS	100				GLV	UKN	B														
160	414	4	14	130-140		DS	100				GLV	UKN	B														
160	415	4	15	140-150		DS	100				GLV	NC	N														
160	416	4	16	150-160		DS	100				GLV	PCC	C														
160	501	5	1	0-10		DS	100				GLV	NC	N														
160	502	5	2	10-20		DS	100				GLV	NC	N														
160	503	5	3	20-30		DS	100				GLV	NC	N														
160	504	5	4	30-40		DS	100				GLV	NC	N														
160	505	5	5	40-50		DS	100				GLV	NC	N														
160	506	5	6	50-60		DS	100				GLV	NC	N														
160	507	5	7	60-70		DS	100				GLV	NC	N														
160	508	5	8	70-80		DS	100				GLV	NC	N														
160	509	5	9	80-90		DS	100				GLV	UKN	A														
160	510	5	10	90-100		DS	100				GLV	NC	N														

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SND	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	61AH	62AH	63AH	CLW	6TB	OT6	TML	ONM	EGL	ECR	EML	OREM	HFR	LFH	
160	511	5	11	100-110	DS	100					GLV	NC	N														
160	512	5	12	110-120	DS	100					GLV	NC	N														
160	513	5	13	120-130	DS	100					GLV	UKN	B														
160	514	5	14	130-140	DS	100					GLV	UKN	B														
160	515	5	15	140-150	DS	100					GLV	NC	N														
160	516	5	16	150-160	DS	100					GLV	PCC	C														
160	517	5	17	160-165	WS	100	3			BH	HTF	PCC	C														3
160	601	6	1	0-10	DS	100					GLV	NC	N														
160	602	6	2	10-20	DS	100					GLV	NC	N														
160	603	6	3	20-30	DS	100					GLV	NC	N														
160	604	6	4	30-40	DS	100					GLV	NC	N														
160	605	6	5	40-50	DS	100					GLV	NC	N														
160	606	6	6	50-60	DS	100					GLV	NC	N														
160	607	6	7	60-70	DS	100					GLV	NC	N														
160	608	6	8	70-80	SS	25					GLV	NC	N														
160	609	6	9	80-90	SS	25					GLV	NC	N														
160	610	6	10	90-100	SS	25					GLV	NC	N														
160	611	6	11	100-110	DS	100					GLV	UKN	A														
160	612	6	12	110-120	DS	100					GLV	NC	N														
160	613	6	13	120-130	SS	25					GLV	NC	N														
160	614	6	14	130-140	SS	25					GLV	NC	N														
160	615	6	15	140-150	DS	100					GLV	UKN	B														
160	616	6	16	150-160	DS	100					GLV	UKN	B														
160	617	6	17	160-170	DS	100					GLV	UKN	B														
160	618	6	18	170-180	DS	100					GLV	PCC	C														
160	619	6	19	180-195	DS	89					GLV	PCC	C														
160	619	6	19	180-195	WS	11					GLV	PCC	C														16
160	701	7	1	0-10	DS	100					GLV	NC	N														
160	702	7	2	10-20	DS	100					GLV	NC	N														
160	703	7	3	20-30	DS	100					GLV	NC	N														
160	704	7	4	30-40	DS	100					GLV	NC	N														
160	705	7	5	40-50	DS	100					GLV	NC	N														
160	706	7	6	50-60	DS	100					GLV	NC	N														
160	707	7	7	60-70	SS	25					GLV	NC	N														
160	708	7	8	70-80	SS	25					GLV	NC	N														
160	709	7	9	80-90	SS	25					GLV	NC	N														
160	710	7	10	90-100	SS	25					GLV	NC	N														
160	711	7	11	100-110	DS	100					GLV	NC	N														
160	712	7	12	110-120	DS	100					GLV	NC	N														
160	713	7	13	120-130	SS	25					GLV	NC	N														
160	714	7	14	130-140	SS	25					GLV	EPH	N														
160	715	7	15	140-150	DS	100					GLV	NC	N														
160	716	7	16	150-160	DS	100					GLV	UKN	B														
160	717	7	17	160-170	DS	100					GLV	UKN	B														
160	718	7	18	170-180	DS	100					GLV	PCC	C														
160	719	7	19	180-195	DS	89					GLV	PCC	C														
160	719	7	19	180-195	WS	11					GLV	PCC	C														21

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	61AH	62AH	63AH	CLW	GTB	OTG	TML	DNM	EGL	ECR	EML	OREM	HFR	LFR
160	1100	11				NS	NA	1	BH	HTF	PCC	C														
160	1101	11	1	0-10		DS	100	1/2	BH	HTF	PCC	C					21									
160	1102	11	2	10-20		DS	100	1/2	BH	HTF	PCC	C					12									
160	1103	11	3	20-30		DS	100	1/2	BH	HTF	PCC	C					2									
160	1104	11	4	30-65		DS	90	1	BH	HTF	PCC	C					4									
160	1105	11	4	30-65		WS	10	1	BH	HTF	PCC	C					1							287		

TOTALS

61AH	0.00
62AH	0.00
63AH	0.00
CLW	41.00
GTB	0.00
OTG	0.00
TML	0.00
DNM	0.00
EGL	0.00
ECR	0.00
EML	0.00
OREM	0.00
HFR	327.00
LFR	0.00

APPENDIX H

ARTIFACT INVENTORY DATA FOR THE LOST NATION SITE (39LM161)

39LM161 -- NATIVE CERAMIC ARTIFACT INVENTORY (DATA BASE 1) -- UND/USACE 1988
39LM161 -- BONE ARTIFACT INVENTORY (DATA BASE 2) -- UND/USACE 1988
39LM161 -- LITHIC ARTIFACT INVENTORY (DATA BASE 3) -- UND/USACE 1988
39LM161 -- MISCELLANEOUS 1 ARTIFACT INVENTORY (DATA BASE 4) -- UND/USACE 1988
39LM161 -- MISCELLANEOUS 2 ARTIFACT INVENTORY (DATA BASE 5) -- UND/USACE 1988

Note: Column headings and data values are explained in Appendices E and F.

39LM161 -- NATIVE CERAMIC ARTIFACT INVENTORY (DATA BASE 1) -- UND/USACE 1988

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SND	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1BS	G2BS	G3BS	G1RM	G2RM	G3RM	PLA	SIM	COR	CHE	BRU	DEC	IND	
161	101	1	1	0-10		DS	100			GLV	NC	N														
161	102	1	2	10-20		DS	100			GLV	NC	N														
161	103	1	3	20-30		DS	100			GLV	NC	N														
161	104	1	4	30-40		DS	100			GLV	NC	N														
161	105	1	5	40-50		DS	100			GLV	NC	N														
161	106	1	6	50-60		DS	100			GLV	NC	N														
161	106	1	6	50-60		DS	100			GLV	NC	N														
161	107	1	7	60-70		DS	100			GLV	NC	N														
161	108	1	8	70-80		DS	100			GLV	NC	N														
161	109	1	9	80-90		DS	100			GLV	NC	N														
161	110	1	10	90-100		DS	100			GLV	NC	N														
161	111	1	11	100-110		DS	100			GLV	NC	N														
161	112	1	12	110-120		DS	100			GLV	NC	N														
161	113	1	13	120-130		DS	100			GLV	NC	N														
161	114	1	14	130-140		DS	100			GLV	NC	N														
161	115	1	15	140-150		DS	100			GLV	EPW	A														
161	116	1	16	150-160		DS	100			GLV	EPW	A														
161	117	1	17	160-170		DS	100			GLV	EPW	A													3	
161	118	1	18	170-180		DS	100			GLV	EPW	A														
161	119	1	19	180-195		DS	100			GLV	EPW	A														
161	201	2	1	0-10		DS	100			GLV	NC	N														
161	202	2	2	10-20		DS	100			GLV	NC	N														
161	203	2	3	20-30		DS	100			GLV	NC	N														
161	204	2	4	30-40		DS	100			GLV	NC	N														
161	205	2	5	40-50		DS	100			GLV	NC	N														
161	206	2	6	50-60		DS	100			GLV	NC	N														
161	207	2	7	60-70		DS	100			GLV	NC	N														
161	208	2	8	70-80		DS	100			GLV	NC	N														
161	209	2	9	80-90		DS	100			GLV	NC	N														
161	210	2	10	90-100		DS	100			GLV	NC	N														
161	211	2	11	100-110		DS	100			GLV	NC	N														
161	212	2	12	110-120		DS	100			GLV	NC	N														
161	213	2	13	120-130		DS	100			GLV	NC	N														
161	214	2	14	130-140		DS	100			GLV	NC	N														
161	215	2	15	140-150		DS	100			GLV	EPW	A														
161	216	2	16	150-160		DS	100			GLV	NC	N														
161	217	2	17	160-170		DS	89			GLV	EPW	A													2	
161	217	2	17	160-170		MS	11			GLV	EPW	A														
161	218	2	18	170-180		DS	100			GLV	EPW	A														
161	219	2	19	180-195		DS	100			GLV	NC	N														
161	301	3	1	0-10		DS	100			GLV	NC	N														
161	302	3	2	10-20		DS	100			GLV	NC	N														
161	303	3	3	20-30		DS	100			GLV	NC	N														
161	304	3	4	30-40		DS	100			GLV	NC	N														
161	305	3	5	40-50		DS	100			GLV	NC	N														
161	306	3	6	50-60		DS	100			GLV	NC	N														
161	307	3	7	60-70		DS	100			GLV	NC	N														
161	308	3	8	70-80		DS	100			GLV	NC	N														

39LM161 -- NATIVE CERAMIC ARTIFACT INVENTORY (DATA BASE 1) -- UND/USACE 1988

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SND	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	G1BS	G2BS	G3BS	G1RM	G2RM	G3RM	PLA	SIM	COR	CHE	BRU	DEC	IND	
161	309	3	9	80-90		DS	100				GLV	NC	N													
161	310	3	10	90-100		DS	100				GLV	NC	N													
161	311	3	11	100-110		DS	100				GLV	NC	N													
161	312	3	12	110-120		DS	100				GLV	NC	N													
161	313	3	13	120-130		DS	100				GLV	EPM	A													
161	314	3	14	130-140		DS	100				GLV	NC	N													
161	315	3	15	140-150		DS	100				GLV	EPW	A	1	2									3		
161	316	3	16	150-160		DS	100				GLV	NC	N													
161	317	3	17	160-170		DS	100				GLV	NC	N													
161	401	4	1	0-10		DS	100				GLV	NC	N													
161	402	4	2	10-20		DS	100				GLV	NC	N													
161	403	4	3	20-30		DS	100				GLV	NC	N													
161	404	4	4	30-40		DS	100				GLV	NC	N													
161	405	4	5	40-50		DS	100				GLV	NC	N													
161	406	4	6	50-60		DS	100				GLV	NC	N													
161	407	4	7	60-70		DS	100				GLV	NC	N													
161	408	4	8	70-80		DS	100				GLV	NC	N													
161	409	4	9	80-90		DS	100				GLV	NC	N													
161	410	4	10	90-100		DS	100				GLV	NC	N													
161	411	4	11	100-110		DS	100				GLV	NC	N													
161	412	4	12	110-120		DS	100				GLV	NC	N													
161	413	4	13	120-130		DS	100				GLV	EPM	A													
161	414	4	14	130-140		DS	100				GLV	EPM	A													
161	415	4	15	140-150		DS	100				GLV	NC	N													
161	416	4	16	150-160		DS	100				GLV	EPW	A													
161	417	4	17	160-170		DS	100				GLV	NC	N													
161	501	5	1	0-10		DS	100				GLV	NC	N													
161	502	5	2	10-20		DS	100				GLV	NC	N													
161	503	5	3	20-30		DS	100				GLV	NC	N													
161	504	5	4	30-40		DS	100				GLV	NC	N													
161	505	5	5	40-50		DS	100				GLV	NC	N													
161	506	5	6	50-60		DS	100				GLV	NC	N													
161	507	5	7	60-70		DS	100				GLV	NC	N													
161	508	5	8	70-80		DS	100				GLV	NC	N													
161	509	5	9	80-90		DS	100				GLV	NC	N													
161	510	5	10	90-100		DS	100				GLV	NC	N													
161	511	5	11	100-110		DS	100				GLV	NC	N													
161	512	5	12	110-120		DS	100				GLV	NC	N													
161	513	5	13	120-130		DS	100				GLV	EPM	A													
161	514	5	14	140-150		DS	100				GLV	NC	N													
161	515	5	15	140-150		DS	100				GLV	EPW	A	2	6					4				4		
161	516	5	16	150-160		DS	100				GLV	NC	N													
161	601	6	1	0-10		DS	100				GLV	NC	N													
161	602	6	2	10-20		DS	100				GLV	NC	N													
161	603	6	3	20-30		DS	100				GLV	NC	N													
161	604	6	4	30-40		DS	100				GLV	NC	N													
161	605	6	5	40-50		DS	100				GLV	NC	N													

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SND	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1BS	G2BS	G3BS	G1RM	G2RM	G3RM	PLA	SIM	COR	CHE	BRU	DEC	IND
161	606	6	6	50-60		DS	100			GLV	NC	N													
161	607	6	7	60-70		DS	100			GLV	NC	N													
161	608	6	8	70-80		DS	100			GLV	NC	N													
161	609	6	9	80-90		DS	100			GLV	NC	N													
161	610	6	10	90-100		DS	100			GLV	NC	N													
161	611	6	11	100-110		DS	100			GLV	NC	N													
161	612	6	12	110-120		DS	100			GLV	NC	N													
161	613	6	13	120-130		DS	100			GLV	NC	N													
161	614	6	14	140-150		DS	100			GLV	NC	N													
161	615	6	15	140-150		DS	89			GLV	EPW	A													
161	615	6	15	140-150		MS	11			GLV	EPW	A													
161	616	6	16	150-160		DS	100			GLV	NC	N													
161	1000			ca. 170		MS	100	1		OR	OTR	EPW	A												

TOTALS

G1BS	0.00
G2BS	3.00
G3BS	13.00
G1RM	0.00
G2RM	0.00
G3RM	0.00
PLAINBS	0.00
SIMPLEBS	0.00
CORRBS	4.00
CHEKBS	0.00
BRUSHBS	0.00
DECORBS	0.00
INDETBS	12.00

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	G1BN	G2BN	G3BN	G1BB	G2BB	G3BB	G13IB	G45IB	G15MB	
161	101	1	1	0-10		DS	100				GLV	NC	N									
161	102	1	2	10-20		DS	100				GLV	NC	N									
161	103	1	3	20-30		DS	100				GLV	NC	N									
161	104	1	4	30-40		DS	100				GLV	NC	N									
161	105	1	5	40-50		DS	100				GLV	NC	N									
161	106	1	6	50-60		DS	100				GLV	NC	N									
161	106	1	6	50-60		DS	100				GLV	NC	N									
161	107	1	7	60-70		DS	100				GLV	NC	N									
161	108	1	8	70-80		DS	100				GLV	NC	N									
161	109	1	9	80-90		DS	100				GLV	NC	N									
161	110	1	10	90-100		DS	100				GLV	NC	N									
161	111	1	11	100-110		DS	100				GLV	NC	N									
161	112	1	12	110-120		DS	100				GLV	NC	N									
161	113	1	13	120-130		DS	100				GLV	NC	N									
161	114	1	14	130-140		DS	100				GLV	NC	N									
161	115	1	15	140-150		DS	100				GLV	EPW	A									
161	116	1	16	150-160		DS	100				GLV	EPW	A									
161	117	1	17	160-170		DS	100				GLV	EPW	A	12	5		2		1			
161	118	1	18	170-180		DS	100				GLV	EPW	A		1							
161	119	1	19	180-195		DS	100				GLV	EPW	A		1			1				
161	201	2	1	0-10		DS	100				GLV	NC	N									
161	202	2	2	10-20		DS	100				GLV	NC	N									
161	203	2	3	20-30		DS	100				GLV	NC	N									
161	204	2	4	30-40		DS	100				GLV	NC	N									
161	205	2	5	40-50		DS	100				GLV	NC	N									
161	206	2	6	50-60		DS	100				GLV	NC	N									
161	207	2	7	60-70		DS	100				GLV	NC	N									
161	208	2	8	70-80		DS	100				GLV	NC	N									
161	209	2	9	80-90		DS	100				GLV	NC	N									
161	210	2	10	90-100		DS	100				GLV	NC	N									
161	211	2	11	100-110		DS	100				GLV	NC	N									
161	212	2	12	110-120		DS	100				GLV	NC	N									
161	213	2	13	120-130		DS	100				GLV	NC	N									
161	214	2	14	130-140		DS	100				GLV	NC	N									
161	215	2	15	140-150		DS	100				GLV	EPW	A									
161	216	2	16	150-160		DS	100				GLV	NC	N									
161	217	2	17	160-170		DS	89				GLV	EPW	A	3	7		1					
161	217	2	17	160-170		WS	11				GLV	EPW	A		1							
161	218	2	18	170-180		DS	100				GLV	EPW	A		2		1		1			
161	219	2	19	180-195		DS	100				GLV	NC	N									
161	301	3	1	0-10		DS	100				GLV	NC	N									
161	302	3	2	10-20		DS	100				GLV	NC	N									
161	303	3	3	20-30		DS	100				GLV	NC	N									
161	304	3	4	30-40		DS	100				GLV	NC	N									
161	305	3	5	40-50		DS	100				GLV	NC	N									
161	306	3	6	50-60		DS	100				GLV	NC	N									
161	307	3	7	60-70		DS	100				GLV	NC	N									
161	308	3	8	70-80		DS	100				GLV	NC	N									

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1BN	G2BN	G3BN	G1BB	G2BB	G3BB	G131B	G451B	G15MB	
161	309	3	9	80-90		DS	100				GLV	NC	N									
161	310	3	10	90-100		DS	100				GLV	NC	N									
161	311	3	11	100-110		DS	100				GLV	NC	N									
161	312	3	12	110-120		DS	100				GLV	NC	N									
161	313	3	13	120-130		DS	100				GLV	EPW	A		7		1					
161	314	3	14	130-140		DS	100				GLV	NC	N									
161	315	3	15	140-150		DS	100				GLV	EPW	A									
161	316	3	16	150-160		DS	100				GLV	NC	N									
161	317	3	17	160-170		DS	100				GLV	NC	N									
161	401	4	1	0-10		DS	100				GLV	NC	N									
161	402	4	2	10-20		DS	100				GLV	NC	N									
161	403	4	3	20-30		DS	100				GLV	NC	N									
161	404	4	4	30-40		DS	100				GLV	NC	N									
161	405	4	5	40-50		DS	100				GLV	NC	N									
161	406	4	6	50-60		DS	100				GLV	NC	N									
161	407	4	7	60-70		DS	100				GLV	NC	N									
161	408	4	8	70-80		DS	100				GLV	NC	N									
161	409	4	9	80-90		DS	100				GLV	NC	N									
161	410	4	10	90-100		DS	100				GLV	NC	N									
161	411	4	11	100-110		DS	100				GLV	NC	N									
161	412	4	12	110-120		DS	100				GLV	NC	N									
161	413	4	13	120-130		DS	100				GLV	EPW	A								3	
161	414	4	14	130-140		DS	100				GLV	EPW	A								1	
161	415	4	15	140-150		DS	100				GLV	NC	N									
161	416	4	16	150-160		DS	100				GLV	EPW	A								4	
161	417	4	17	160-170		DS	100				GLV	NC	N									
161	501	5	1	0-10		DS	100				GLV	NC	N									
161	502	5	2	10-20		DS	100				GLV	NC	N									
161	503	5	3	20-30		DS	100				GLV	NC	N									
161	504	5	4	30-40		DS	100				GLV	NC	N									
161	505	5	5	40-50		DS	100				GLV	NC	N									
161	506	5	6	50-60		DS	100				GLV	NC	N									
161	507	5	7	60-70		DS	100				GLV	NC	N									
161	508	5	8	70-80		DS	100				GLV	NC	N									
161	509	5	9	80-90		DS	100				GLV	NC	N									
161	510	5	10	90-100		DS	100				GLV	NC	N									
161	511	5	11	100-110		DS	100				GLV	NC	N									
161	512	5	12	110-120		DS	100				GLV	NC	N									
161	513	5	13	120-130		DS	100				GLV	EPW	A								3	
161	514	5	14	140-150		DS	100				GLV	NC	N									
161	515	5	15	140-150		DS	100				GLV	EPW	A								1	
161	516	5	16	150-160		DS	100				GLV	NC	N									
161	601	6	1	0-10		DS	100				GLV	NC	N									
161	602	6	2	10-20		DS	100				GLV	NC	N									
161	603	6	3	20-30		DS	100				GLV	NC	N									
161	604	6	4	30-40		DS	100				GLV	NC	N									
161	605	6	5	40-50		DS	100				GLV	NC	N									

SND	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1BN	G2BN	G3BN	G1BB	G2BB	G3BB	G131B	G451B	G15MB		
161	606	6	6	50-60		DS	100			GLV	NC	N											
161	607	6	7	60-70		DS	100			GLV	NC	N											
161	608	6	8	70-80		DS	100			GLV	NC	N											
161	609	6	9	80-90		DS	100			GLV	NC	N											
161	610	6	10	90-100		DS	100			GLV	NC	N											
161	611	6	11	100-110		DS	100			GLV	NC	N											
161	612	6	12	110-120		DS	100			GLV	NC	N											
161	613	6	13	120-130		DS	100			GLV	NC	N											
161	614	6	14	140-150		DS	100			GLV	NC	N											
161	615	6	15	140-150		DS	89			GLV	EPW	A				1							
161	615	6	15	140-150		WS	11			GLV	EPW	A											
161	616	6	16	150-160		DS	100			GLV	NC	N											
161	1000			ca. 170		WS	100	1	OR	OTR	EPW	A		76	71		49	61	3		5		

TOTALS

G1BN	0.00
G2BN	98.00
G3BN	102.00
G1BB	0.00
G2BB	49.00
G3BB	66.00
G131B	5.00
G451B	5.00
G15MB	0.00

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	STL	61FK	62FK	63FK	64FK	61FCR	62FCR	63FCR	
161	101	1	1	0-10		DS	100				GLV	NC	N								
161	102	1	2	10-20		DS	100				GLV	NC	N								
161	103	1	3	20-30		DS	100				GLV	NC	N								
161	104	1	4	30-40		DS	100				GLV	NC	N								
161	105	1	5	40-50		DS	100				GLV	NC	N								
161	106	1	6	50-60		DS	100				GLV	NC	N								
161	106	1	6	50-60		DS	100				GLV	NC	N								
161	107	1	7	60-70		DS	100				GLV	NC	N								
161	108	1	8	70-80		DS	100				GLV	NC	N								
161	109	1	9	80-90		DS	100				GLV	NC	N								
161	110	1	10	90-100		DS	100				GLV	NC	N								
161	111	1	11	100-110		DS	100				GLV	NC	N								
161	112	1	12	110-120		DS	100				GLV	NC	N								
161	113	1	13	120-130		DS	100				GLV	NC	N								
161	114	1	14	130-140		DS	100				GLV	NC	N								
161	115	1	15	140-150		DS	100				GLV	EPW	A								2
161	116	1	16	150-160		DS	100				GLV	EPW	A						11		
161	117	1	17	160-170		DS	100				GLV	EPW	A	3		1	58				1
161	118	1	18	170-180		DS	100				GLV	EPW	A				4				
161	119	1	19	180-195		DS	100				GLV	EPW	A								
161	201	2	1	0-10		DS	100				GLV	NC	N								
161	202	2	2	10-20		DS	100				GLV	NC	N								
161	203	2	3	20-30		DS	100				GLV	NC	N								
161	204	2	4	30-40		DS	100				GLV	NC	N								
161	205	2	5	40-50		DS	100				GLV	NC	N								
161	206	2	6	50-60		DS	100				GLV	NC	N								
161	207	2	7	60-70		DS	100				GLV	NC	N								
161	208	2	8	70-80		DS	100				GLV	NC	N								
161	209	2	9	80-90		DS	100				GLV	NC	N								
161	210	2	10	90-100		DS	100				GLV	NC	N								
161	211	2	11	100-110		DS	100				GLV	NC	N								
161	212	2	12	110-120		DS	100				GLV	NC	N								
161	213	2	13	120-130		DS	100				GLV	NC	N								
161	214	2	14	130-140		DS	100				GLV	NC	N								
161	215	2	15	140-150		DS	100				GLV	EPW	A				1				
161	216	2	16	150-160		DS	100				GLV	NC	N								
161	217	2	17	160-170		DS	89				GLV	EPW	A	1		1	16			130	
161	217	2	17	160-170		WS	11				GLV	EPW	A							5	
161	218	2	18	170-180		DS	100				GLV	EPW	A	1			1				
161	219	2	19	180-195		DS	100				GLV	NC	N								
161	301	3	1	0-10		DS	100				GLV	NC	N								
161	302	3	2	10-20		DS	100				GLV	NC	N								
161	303	3	3	20-30		DS	100				GLV	NC	N								
161	304	3	4	30-40		DS	100				GLV	NC	N								
161	305	3	5	40-50		DS	100				GLV	NC	N								
161	306	3	6	50-60		DS	100				GLV	NC	N								
161	307	3	7	60-70		DS	100				GLV	NC	N								
161	308	3	8	70-80		DS	100				GLV	NC	N								

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	STL	G1FK	G2FK	G3FK	G4FK	G1FCR	G2FCR	G3FCR	
161	309	3	9	80-90	DS	100				GLV	NC	N									
161	310	3	10	90-100	DS	100				GLV	NC	N									
161	311	3	11	100-110	DS	100				GLV	NC	N									
161	312	3	12	110-120	DS	100				GLV	NC	N									
161	313	3	13	120-130	DS	100				GLV	EPH	A									
161	314	3	14	130-140	DS	100				GLV	NC	N									
161	315	3	15	140-150	DS	100				GLV	EPW	A									1
161	316	3	16	150-160	DS	100				GLV	NC	N									
161	317	3	17	160-170	DS	100				GLV	NC	N									
161	401	4	1	0-10	DS	100				GLV	NC	N									
161	402	4	2	10-20	DS	100				GLV	NC	N									
161	403	4	3	20-30	DS	100				GLV	NC	N									
161	404	4	4	30-40	DS	100				GLV	NC	N									
161	405	4	5	40-50	DS	100				GLV	NC	N									
161	406	4	6	50-60	DS	100				GLV	NC	N									
161	407	4	7	60-70	DS	100				GLV	NC	N									
161	408	4	8	70-80	DS	100				GLV	NC	N									
161	409	4	9	80-90	DS	100				GLV	NC	N									
161	410	4	10	90-100	DS	100				GLV	NC	N									
161	411	4	11	100-110	DS	100				GLV	NC	N									
161	412	4	12	110-120	DS	100				GLV	NC	N									
161	413	4	13	120-130	DS	100				GLV	EPH	A									
161	414	4	14	130-140	DS	100				GLV	EPH	A									
161	415	4	15	140-150	DS	100				GLV	NC	N									
161	416	4	16	150-160	DS	100				GLV	EPW	A									1
161	417	4	17	160-170	DS	100				GLV	NC	N									
161	501	5	1	0-10	DS	100				GLV	NC	N									
161	502	5	2	10-20	DS	100				GLV	NC	N									
161	503	5	3	20-30	DS	100				GLV	NC	N									
161	504	5	4	30-40	DS	100				GLV	NC	N									
161	505	5	5	40-50	DS	100				GLV	NC	N									
161	506	5	6	50-60	DS	100				GLV	NC	N									
161	507	5	7	60-70	DS	100				GLV	NC	N									
161	508	5	8	70-80	DS	100				GLV	NC	N									
161	509	5	9	80-90	DS	100				GLV	NC	N									
161	510	5	10	90-100	DS	100				GLV	NC	N									
161	511	5	11	100-110	DS	100				GLV	NC	N									
161	512	5	12	110-120	DS	100				GLV	NC	N									
161	513	5	13	120-130	DS	100				GLV	EPH	A									
161	514	5	14	140-150	DS	100				GLV	NC	N									
161	515	5	15	140-150	DS	100				GLV	EPW	A									3
161	516	5	16	150-160	DS	100				GLV	NC	N									
161	601	6	1	0-10	DS	100				GLV	NC	N									
161	602	6	2	10-20	DS	100				GLV	NC	N									
161	603	6	3	20-30	DS	100				GLV	NC	N									
161	604	6	4	30-40	DS	100				GLV	NC	N									
161	605	6	5	40-50	DS	100				GLV	NC	N									

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	STL	G1FK	G2FK	G3FK	G4FK	G1FCR	G2FCR	G3FCR	
161	606	6	6	50-60		DS	100				GLV	NC	N								
161	607	6	7	60-70		DS	100				GLV	NC	N								
161	608	6	8	70-80		DS	100				GLV	NC	N								
161	609	6	9	80-90		DS	100				GLV	NC	N								
161	610	6	10	90-100		DS	100				GLV	NC	N								
161	611	6	11	100-110		DS	100				GLV	NC	N								
161	612	6	12	110-120		DS	100				GLV	NC	N								
161	613	6	13	120-130		DS	100				GLV	NC	N								
161	614	6	14	140-150		DS	100				GLV	NC	N								
161	615	6	15	140-150		DS	89				GLV	EPW	A								
161	615	6	15	140-150		WS	11				GLV	EPW	A								4
161	616	6	16	150-160		DS	100				GLV	NC	N								
161	1000			ca. 170		WS	100	1		OR	OTR	EPW	A	1		5	59				1

TOTALS

STL	6.00
G1FK	0.00
G2FK	2.00
G3FK	88.00
G4FK	64.00
G1FCR	130.00
G2FCR	11.00
G3FCR	10.00

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	61CR	62CR	63CR	61SL	62SL	63SL	1SL	MSL	61OR	62OR	63OR	61BE	62BE	63BE
161	101	1	1	0-10		DS	100			GLV	NC	N														
161	102	1	2	10-20		DS	100			GLV	NC	N														
161	103	1	3	20-30		DS	100			GLV	NC	N														
161	104	1	4	30-40		DS	100			GLV	NC	N														
161	105	1	5	40-50		DS	100			GLV	NC	N														
161	106	1	6	50-60		DS	100			GLV	NC	N														
161	106	1	6	50-60		DS	100			GLV	NC	N														
161	107	1	7	60-70		DS	100			GLV	NC	N														
161	108	1	8	70-80		DS	100			GLV	NC	N														
161	109	1	9	80-90		DS	100			GLV	NC	N														
161	110	1	10	90-100		DS	100			GLV	NC	N														
161	111	1	11	100-110		DS	100			GLV	NC	N														
161	112	1	12	110-120		DS	100			GLV	NC	N														
161	113	1	13	120-130		DS	100			GLV	NC	N														
161	114	1	14	130-140		DS	100			GLV	NC	N														
161	115	1	15	140-150		DS	100			GLV	EPW	A														
161	116	1	16	150-160		DS	100			GLV	EPW	A														
161	117	1	17	160-170		DS	100			GLV	EPW	A								1						1
161	118	1	18	170-180		DS	100			GLV	EPW	A														
161	119	1	19	180-195		DS	100			GLV	EPW	A														
161	201	2	1	0-10		DS	100			GLV	NC	N														
161	202	2	2	10-20		DS	100			GLV	NC	N														
161	203	2	3	20-30		DS	100			GLV	NC	N														
161	204	2	4	30-40		DS	100			GLV	NC	N														
161	205	2	5	40-50		DS	100			GLV	NC	N														
161	206	2	6	50-60		DS	100			GLV	NC	N														
161	207	2	7	60-70		DS	100			GLV	NC	N														
161	208	2	8	70-80		DS	100			GLV	NC	N														
161	209	2	9	80-90		DS	100			GLV	NC	N														
161	210	2	10	90-100		DS	100			GLV	NC	N														
161	211	2	11	100-110		DS	100			GLV	NC	N														
161	212	2	12	110-120		DS	100			GLV	NC	N														
161	213	2	13	120-130		DS	100			GLV	NC	N														
161	214	2	14	130-140		DS	100			GLV	NC	N														
161	215	2	15	140-150		DS	100			GLV	EPW	A														
161	216	2	16	150-160		DS	100			GLV	NC	N														
161	217	2	17	160-170		DS	89			GLV	EPW	A														
161	217	2	17	160-170		MS	11			GLV	EPW	A														
161	218	2	18	170-180		DS	100			GLV	EPW	A														
161	219	2	19	180-195		DS	100			GLV	NC	N														
161	301	3	1	0-10		DS	100			GLV	NC	N														
161	302	3	2	10-20		DS	100			GLV	NC	N														
161	303	3	3	20-30		DS	100			GLV	NC	N														
161	304	3	4	30-40		DS	100			GLV	NC	N														
161	305	3	5	40-50		DS	100			GLV	NC	N														
161	306	3	6	50-60		DS	100			GLV	NC	N														
161	307	3	7	60-70		DS	100			GLV	NC	N														
161	308	3	8	70-80		DS	100			GLV	NC	N														

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	G1CR	G2CR	G3CR	G1SL	G2SL	G3SL	ISL	MSL	G1OR	G2OR	G3OR	G1BE	G2BE	G3BE
161	309	3	9	80-90	DS	100					GLV	NC	N													
161	310	3	10	90-100	DS	100					GLV	NC	N													
161	311	3	11	100-110	DS	100					GLV	NC	N													
161	312	3	12	110-120	DS	100					GLV	NC	N													
161	313	3	13	120-130	DS	100					GLV	EPM	A													
161	314	3	14	130-140	DS	100					GLV	NC	N													
161	315	3	15	140-150	DS	100					GLV	EPW	A													
161	316	3	16	150-160	DS	100					GLV	NC	N													
161	317	3	17	160-170	DS	100					GLV	NC	N													
161	401	4	1	0-10	DS	100					GLV	NC	N													
161	402	4	2	10-20	DS	100					GLV	NC	N													
161	403	4	3	20-30	DS	100					GLV	NC	N													
161	404	4	4	30-40	75	100					GLV	NC	N													
161	405	4	5	40-50	DS	100					GLV	NC	N													
161	406	4	6	50-60	DS	100					GLV	NC	N													
161	407	4	7	60-70	DS	100					GLV	NC	N													
161	408	4	8	70-80	DS	100					GLV	NC	N													
161	409	4	9	80-90	DS	100					GLV	NC	N													
161	410	4	10	90-100	DS	100					GLV	NC	N													
161	411	4	11	100-110	DS	100					GLV	NC	N													
161	412	4	12	110-120	DS	100					GLV	NC	N													
161	413	4	13	120-130	DS	100					GLV	EPM	A													
161	414	4	14	130-140	DS	100					GLV	EPM	A													
161	415	4	15	140-150	DS	100					GLV	NC	N													
161	416	4	16	150-160	DS	100					GLV	EPW	A													
161	417	4	17	160-170	DS	100					GLV	NC	N													
161	501	5	1	0-10	DS	100					GLV	NC	N													
161	502	5	2	10-20	DS	100					GLV	NC	N													
161	503	5	3	20-30	DS	100					GLV	NC	N													
161	504	5	4	30-40	DS	100					GLV	NC	N													
161	505	5	5	40-50	DS	100					GLV	NC	N													
161	506	5	6	50-60	DS	100					GLV	NC	N													
161	507	5	7	60-70	DS	100					GLV	NC	N													
161	508	5	8	70-80	DS	100					GLV	NC	N													
161	509	5	9	80-90	DS	100					GLV	NC	N													
161	510	5	10	90-100	DS	100					GLV	NC	N													
161	511	5	11	100-110	DS	100					GLV	NC	N													
161	512	5	12	110-120	DS	100					GLV	NC	N													
161	513	5	13	120-130	DS	100					GLV	EPM	A													
161	514	5	14	140-150	DS	100					GLV	NC	N													
161	515	5	15	140-150	DS	100					GLV	EPW	A													
161	516	5	16	150-160	DS	100					GLV	NC	N													
161	601	6	1	0-10	DS	100					GLV	NC	N													
161	602	6	2	10-20	DS	100					GLV	NC	N													
161	603	6	3	20-30	DS	100					GLV	NC	N													
161	604	6	4	30-40	DS	100					GLV	NC	N													
161	605	6	5	40-50	DS	100					GLV	NC	N													

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FNO	FT	ACU	CHU	C	G1CR	G2CR	G3CR	G1SL	G2SL	G3SL	ISL	MSL	G1OR	G2OR	G3OR	G1BE	G2BE	G3BE
161	606	6	6	50-60		DS	100				GLV	NC	N													
161	607	6	7	60-70		DS	100				GLV	NC	N													
161	608	6	8	70-80		DS	100				GLV	NC	N													
161	609	6	9	80-90		DS	100				GLV	NC	N													
161	610	6	10	90-100		DS	100				GLV	NC	N													
161	611	6	11	100-110		DS	100				GLV	NC	N													
161	612	6	12	110-120		DS	100				GLV	NC	N													
161	613	6	13	120-130		DS	100				GLV	NC	N													
161	614	6	14	140-150		DS	100				GLV	NC	N													
161	615	6	15	140-150		DS	89				GLV	EPW	A													
161	615	6	15	140-150		MS	11				GLV	EPW	A													
161	616	6	16	150-160		DS	100				GLV	NC	N													
161	1000			ca. 170		MS	100	1		OR	OTR	EPW	A													

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TOTALS

G1CR	0.00
G2CR	0.00
G3CR	0.00
G1SL	0.00
G2SL	0.00
G3SL	1.00
ISL	0.00
MSL	0.00
G1OR	0.00
G2OR	0.00
G3OR	0.00
G1BE	0.00
G2BE	34.00
G3BE	168.00

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	61AH	62AH	63AH	CLW	GTB	DTG	TML	DNM	EGL	ECR	EML	OREM	HFR	LFR	
161	101	1	1	0-10		DS	100				GLV	NC	N														
161	102	1	2	10-20		DS	100				GLV	NC	N														
161	103	1	3	20-30		DS	100				GLV	NC	N														
161	104	1	4	30-40		DS	100				GLV	NC	N														
161	105	1	5	40-50		DS	100				GLV	NC	N														
161	106	1	6	50-60		DS	100				GLV	NC	N														
161	106	1	6	50-60		DS	100				GLV	NC	N														
161	107	1	7	60-70		DS	100				GLV	NC	N														
161	108	1	8	70-80		DS	100				GLV	NC	N														
161	109	1	9	80-90		DS	100				GLV	NC	N														
161	110	1	10	90-100		DS	100				GLV	NC	N														
161	111	1	11	100-110		DS	100				GLV	NC	N														
161	112	1	12	110-120		DS	100				GLV	NC	N														
161	113	1	13	120-130		DS	100				GLV	NC	N														
161	114	1	14	130-140		DS	100				GLV	NC	N														
161	115	1	15	140-150		DS	100				GLV	EPM	A														
161	116	1	16	150-160		DS	100				GLV	EPM	A														
161	117	1	17	160-170		DS	100				GLV	EPW	A														
161	118	1	18	170-180		DS	100				GLV	EPW	A														
161	119	1	19	180-195		DS	100				GLV	EPM	A														
161	201	2	1	0-10		DS	100				GLV	NC	N														
161	202	2	2	10-20		DS	100				GLV	NC	N														
161	203	2	3	20-30		DS	100				GLV	NC	N														
161	204	2	4	30-40		DS	100				GLV	NC	N														
161	205	2	5	40-50		DS	100				GLV	NC	N														
161	206	2	6	50-60		DS	100				GLV	NC	N														
161	207	2	7	60-70		DS	100				GLV	NC	N														
161	208	2	8	70-80		DS	100				GLV	NC	N														
161	209	2	9	80-90		DS	100				GLV	NC	N														
161	210	2	10	90-100		DS	100				GLV	NC	N														
161	211	2	11	100-110		DS	100				GLV	NC	N														
161	212	2	12	110-120		DS	100				GLV	NC	N														
161	213	2	13	120-130		DS	100				GLV	NC	N														
161	214	2	14	130-140		DS	100				GLV	NC	N														
161	215	2	15	140-150		DS	100				GLV	EPM	A														
161	216	2	16	150-160		DS	100				GLV	NC	N														
161	217	2	17	160-170		DS	89				GLV	EPW	A														
161	217	2	17	160-170		WS	11				GLV	EPW	A														2
161	218	2	18	170-180		DS	100				GLV	EPW	A														
161	219	2	19	180-195		DS	100				GLV	NC	N														
161	301	3	1	0-10		DS	100				GLV	NC	N														
161	302	3	2	10-20		DS	100				GLV	NC	N														
161	303	3	3	20-30		DS	100				GLV	NC	N														
161	304	3	4	30-40		DS	100				GLV	NC	N														
161	305	3	5	40-50		DS	100				GLV	NC	N														
161	306	3	6	50-60		DS	100				GLV	NC	N														
161	307	3	7	60-70		DS	100				GLV	NC	N														
161	308	3	8	70-80		DS	100				GLV	NC	N														

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SND	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	61AH	62AH	63AH	CLW	6TB	DT6	TML	ONM	EGL	ECR	EML	OREM	HFR	LFR	
161	309	3	9	80-90		DS	100			GLV	NC	N															
161	310	3	10	90-100		DS	100			GLV	NC	N															
161	311	3	11	100-110		DS	100			GLV	NC	N															
161	312	3	12	110-120		DS	100			GLV	NC	N															
161	313	3	13	120-130		DS	100			GLV	EPM	A															
161	314	3	14	130-140		DS	100			GLV	NC	N															
161	315	3	15	140-150		DS	100			GLV	EPW	A															
161	316	3	16	150-160		DS	100			GLV	NC	N															
161	317	3	17	160-170		DS	100			GLV	NC	N															
161	401	4	1	0-10		DS	100			GLV	NC	N															
161	402	4	2	10-20		DS	100			GLV	NC	N															
161	403	4	3	20-30		DS	100			GLV	NC	N															
161	404	4	4	30-40		DS	100			GLV	NC	N															
161	405	4	5	40-50		DS	100			GLV	NC	N															
161	406	4	6	50-60		DS	100			GLV	NC	N															
161	407	4	7	60-70		DS	100			GLV	NC	N															
161	408	4	8	70-80		DS	100			GLV	NC	N															
161	409	4	9	80-90		DS	100			GLV	NC	N															
161	410	4	10	90-100		DS	100			GLV	NC	N															
161	411	4	11	100-110		DS	100			GLV	NC	N															
161	412	4	12	110-120		DS	100			GLV	NC	N															
161	413	4	13	120-130		DS	100			GLV	EPM	A															
161	414	4	14	130-140		DS	100			GLV	EPM	A															
161	415	4	15	140-150		DS	100			GLV	NC	N															
161	416	4	16	150-160		DS	100			GLV	EPW	A															
161	417	4	17	160-170		DS	100			GLV	NC	N															
161	501	5	1	0-10		DS	100			GLV	NC	N															
161	502	5	2	10-20		DS	100			GLV	NC	N															
161	503	5	3	20-30		DS	100			GLV	NC	N															
161	504	5	4	30-40		DS	100			GLV	NC	N															
161	505	5	5	40-50		DS	100			GLV	NC	N															
161	506	5	6	50-60		DS	100			GLV	NC	N															
161	507	5	7	60-70		DS	100			GLV	NC	N															
161	508	5	8	70-80		DS	100			GLV	NC	N															
161	509	5	9	80-90		DS	100			GLV	NC	N															
161	510	5	10	90-100		DS	100			GLV	NC	N															
161	511	5	11	100-110		DS	100			GLV	NC	N															
161	512	5	12	110-120		DS	100			GLV	NC	N															
161	513	5	13	120-130		DS	100			GLV	EPM	A															
161	514	5	14	140-150		DS	100			GLV	NC	N															
161	515	5	15	140-150		DS	100			GLV	EPW	A															
161	516	5	16	150-160		DS	100			GLV	NC	N															
161	601	6	1	0-10		DS	100			GLV	NC	N															
161	602	6	2	10-20		DS	100			GLV	NC	N															
161	603	6	3	20-30		DS	100			GLV	NC	N															
161	604	6	4	30-40		DS	100			GLV	NC	N															
161	605	6	5	40-50		DS	100			GLV	NC	N															

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SNO	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1AH	G2AH	G3AH	CLW	GTB	OTG	TML	ONM	EGL	ECR	EML	OREM	HFR	LFR
161	606	6	6	50-60		DS	100				GLV	NC	N													
161	607	6	7	60-70		DS	100				GLV	NC	N													
161	608	6	8	70-80		DS	100				GLV	NC	N													
161	609	6	9	80-90		DS	100				GLV	NC	N													
161	610	6	10	90-100		DS	100				GLV	NC	N													
161	611	6	11	100-110		DS	100				GLV	NC	N													
161	612	6	12	110-120		DS	100				GLV	NC	N													
161	613	6	13	120-130		DS	100				GLV	NC	N													
161	614	6	14	140-150		DS	100				GLV	NC	N													
161	615	6	15	140-150		DS	89				GLV	EPW	A													
161	615	6	15	140-150		WS	11				GLV	EPW	A												2	
161	616	6	16	150-160		DS	100				GLV	NC	N													
161	1000			ca. 170		WS	100	1		OR	OTR	EPW	A												735	

TOTALS

G1AH	0.00
G2AH	0.00
G3AH	0.00
CLW	0.00
GTB	0.00
OTG	0.00
TML	0.00
ONM	0.00
EGL	0.00
ECR	0.00
EML	0.00
OREM	0.00
HFR	739.00
LFR	0.00

APPENDIX I

ARTIFACT INVENTORY DATA FOR SITE 39LM163

39LM163 -- BONE ARTIFACT INVENTORY (DATA BASE 2) -- UND/USACE 1988

Note: Column headings and data values are explained in Appendices E and F.

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SND	CTNO	TN	LN	SD	PD	RT	PES	FND	FT	ACU	CHU	C	G1BN	G2BN	G3BN	G1BB	G2BB	G3BB	G131B	G451B	G15MB	
163	101	1	1	0-10		DS	100				GLV	NC	N									
163	102	1	2	10-20		DS	100				GLV	NC	N									
163	103	1	3	20-30		DS	100				GLV	NC	N									
163	104	1	4	30-40		DS	100				GLV	EPM	N	5	1					1		
163	105	1	5	40-50		DS	100				GLV	EPM	N		1							
163	106	1	6	50-60		DS	100				GLV	NC	N									
163	107	1	7	60-70		DS	100				GLV	NC	N									
163	108	1	8	70-80		DS	100				GLV	EPM	N			1				1		
163	109	1	9	80-90		DS	100				GLV	EPM	N			1				1		
163	110	1	10	90-100		DS	100				GLV	NC	N									
163	111	1	11	100-110		DS	100				GLV	EPM	N			1						
163	112	1	12	110-120		DS	100				GLV	EPM	N			1						
163	113	1	13	120-130		DS	100				GLV	EPM	N			1						
163	114	1	14	130-140		DS	100				GLV	NC	N									
163	115	1	15	140-150		DS	100				GLV	NC	N									
163	201	2	1	0-10		DS	100				GLV	NC	N									
163	202	2	2	10-20		DS	100				GLV	NC	N									
163	203	2	3	20-30		DS	100				GLV	NC	N									
163	204	2	4	30-40		DS	100				GLV	NC	N									
163	205	2	5	40-50		DS	100				GLV	EPM	N			1						
163	206	2	6	50-60		DS	100				GLV	NC	N									
163	207	2	7	60-70		DS	100				GLV	NC	N									
163	208	2	8	70-80		DS	100				GLV	NC	N									
163	209	2	9	80-90		DS	100				GLV	NC	N									
163	210	2	10	90-100		DS	100				GLV	EPM	N			3						
163	211	2	11	100-110		DS	100				GLV	NC	N									
163	212	2	12	110-120		DS	100				GLV	EPM	N			2						
163	213	2	13	120-130		DS	100				GLV	NC	N									
163	214	2	14	130-140		DS	100				GLV	NC	N									
163	215	2	15	140-150		DS	100				GLV	NC	N									
163	0000			ca. 180	NS	NA					OTR	NC	N	262							1	

TOTALS

G1BN	262.00
G2BN	5.00
G3BN	13.00
G1BB	0.00
G2BB	0.00
G3BB	2.00
G131B	2.00
G451B	0.00
G15MB	0.00

APPENDIX J

STONE TOOL CODING FORMAT, LIST OF LOCAL AND NONLOCAL
LITHIC RESOURCES, AND LISTS OF STONE TOOL DATA

- Table J1. Stone Tool Coding Format, Lake Sharpe Testing Project, South Dakota, UND, 1988.
- Table J2. List of Local and Nonlocal Lithic Resources for the Lake Sharpe Project Area, South Dakota.
- Table J3. List of Stone Tool Data, Rattlesnake Keeper Site (39LM160), Lake Sharpe Testing Project, South Dakota, UND, 1988.
- Table J4. List of Stone Tool Data, Lost Nation Site (39LM161), Lake Sharpe Testing Project, South Dakota, UND, 1988.

Table J1. Stone Tool Coding Format, Lake Sharpe Testing Project, South Dakota
UND, 1988 (abstracted from Ahler and Swenson 1985).

Field Label	Field Length	Field Code	Variable and Field Code Value
SITE AND PROVENIENCE DATA - SEE PROVENIENCE CODE (Appendix E, Table E1)			
DC	2.0	**	DESCRIPTIVE CATEGORY
		01	patterned triangular biface
		03	patterned notched biface
		09	patterned biface fragments
		14	unpatterned bifaces and nonbipolar cores and core-tools
		15	end scraper
		24	acutely pointed flake tool
		29	other retouched and modified flakes
		30	bipolar cores/tools
		34	unpatterned pecked/ground tools
		37	linearly grooved tools
		39	patterned complex ground stone tools
CPNO	4.0	****	COMPUTER NUMBER (SEQUENCE NUMBER) sequential from 0001 in each descriptive category for each site.
TC	2.0	**	TECHNOLOGICAL CLASS
		1	small thin patterned biface
		2	large thin patterned biface
		3	irregular unpatterned biface
		4	patterned flake tool
		5	unpatterned flake tool
		6	thick bifacial core-tool
		7	nonbipolar core or core-tool
		8	bipolar core/tool
		9	unpatterned pecked/ground tool
		0	patterned pecked/ground tool
MC	2.0	**	MORPHOLOGICAL CLASS
		01	late prehistoric triangular (arrow point)
		02	late prehistoric side-notched (arrow point)
		03	Besant/Sonota Side-Notched (dart point)
		04	dart point base fragment (type indeterminate)
		31	ovoid unpointed
		32	ovoid pointed
		36	pointed fragment
		37	irregular
		38	edge fragment or segment
		39	ovoid fragment
		44	flake with one edge
		45	flake with two edges
		50	complex pecked or ground tool

Table J1. Stone Tool Coding Format, Lake Sharpe Testing Project, South Dakota UND, 1988 (abstracted from Ahler and Swenson 1985) (Continued).

Field Label	Field Length	Field Code	Variable and Field Code Value
FC	2.0	**	FUNCTIONAL CLASS
		00	unknown/indeterminate
		01	projectile point
		03	light duty bilateral cutting tool
		06	light duty transverse scraper used on soft material
		07	bilateral heavy duty 1 bifacial cutting tool
		08	expedient general purpose cutting tool
		12	bifacial cutting tool used on hard material
		13	lateral scraper used on soft material
		14	heavy duty chopping/pounding tool
		15	generalized patterned bifacial cutting tool
		17	transverse scraper used on hard materials
		18	denticulated flake tool
		19	slotting/grooving tool (beak)
		20	generalized transverse scraping tool
		21	core
		22	utilized flake used to saw/slice hard material
		23	retouched or utilized flake used on variable material
		25	core/punch/wedge/chisel
		26	punch/wedge/chisel
		28	bipolar hammer or anvil
		29	hammerstone or pounder
		33	simple hand-held abrading tool
34	simple hand-held grooved abrading tool		
35	complex hand-held grinding/crushing tool (mono)		
36	complex anvil used in grinding/crushing (metate/mortar)		
44	projectile point/cutting tool combination		
UP	2.0	**	USE-PHASE CLASS
		1	unfinished, unbroken, usable
		2	unfinished, broken or rejected
		3	finished, unbroken, usable
4	finished, broken or rejected		
RM	2.0	**	RAW MATERIAL TYPE - see Table F2
MP	2.0	**	MULTIPURPOSE
		0	single function tool
		1	double function tool
2	triple function tool		
WT	6.1	*****	WEIGHT to the nearest 0.1 g

Table J2. List of Local and Nonlocal Lithic Resources for the Lake Sharpe Project Area, South Dakota (abstracted from Ahler 1989; Toom 1984a; supplemented from Ahler 1977a; Ahler and Swenson 1985).

Resource Group and Lithic Raw Material Type*	Source/Location Relative to Lake Sharpe
<u>Local Resource Group</u>	
02 Coarse Yellow Tongue River Silicified Sediment (TRSS)	Local glacial-fluvial gravels.
03 Coarse Red Tongue River Silicified Sediment (TRSS)	Local glacial-fluvial gravels; likely a thermally altered version of coarse yellow TRSS (Ahler 1989).
04 Solid Quartzite	Local glacial-fluvial gravels.
05 Porous Quartzite (Swan River Chert)	Local glacial-fluvial gravels.
06 Jasper/Chert	Local glacial-fluvial gravels; includes Chadron chert.
08 Clear/Gray Chalcedony	Local glacial-fluvial gravels.
09 Yellow or Light Brown Chalcedony	Local glacial-fluvial gravels.
10 Dark Brown Chalcedony	Local glacial-fluvial gravels.
13 Basaltic	Local glacial-fluvial gravels.
16 Quartz	Local glacial-fluvial gravels.
19 Granitic	Local glacial-fluvial gravels.
21 Compact Sandstone	Local glacial-fluvial gravels.
23 Natural Clinker	Local "float" material or alternatively from the nonlocal northern resource group (cf. Porcellanite).
27 Gypsum	Local Pierre Shale bedrock exposures.
35 Other Quartzite	Local glacial-fluvial gravels.
37 Siltstone/Limestone/Mudstone/Pierre Shale	Local glacial-fluvial gravels; local Pierre Shale bedrock exposures.

*Numbers indicate computer code value.

Table J2. List of Local and Nonlocal Lithic Resources for the Lake Sharpe Project Area, South Dakota (abstracted from Ahler 1989; Toom 1984a; supplemented from Ahler 1977a; Ahler and Swenson 1985) (Continued).

Resource Group and Lithic Raw Material Type*	Source/Location Relative to Lake Sharpe
<u>Nonlocal - Northern Resource Group</u>	
01 Smooth Gray Tongue River Silicified Sediment (TRSS)	Northwest South Dakota and southwest North Dakota; may be locally available in small quantities.
15 Bijou Hill Silicified Sediment (BHSS)	North-central South Dakota; also occurs to the south in the southern resource group. Materials in the Lake Sharpe area likely derive from the southern sources.
17 Porcellanite	Western North Dakota, northwestern South Dakota, eastern Montana, northeastern Wyoming.
28 Knife River Flint (KRF)	Mercer and Dunn counties, North Dakota; may be locally available in small quantities.
29 Waxy Brown Chert (Rainy Butte Silicified Wood)	Southwestern North Dakota.
36 Scoria	Occurs with Porcellanite as a by-product of naturally burned lignite or coal.
40 Non-Volcanic Natural Glass	Occurs with Porcellanite as a by-product of naturally burned lignite or coal.
<u>Nonlocal - Western Resource Group</u>	
07 Flattop Chalcedony	Southwestern South Dakota (Big Badlands area), northeastern Colorado, western Nebraska.
11 Plate Chalcedony	Southwestern South Dakota (Big Badlands area).
<u>Nonlocal - Southern Resource Group</u>	
15 Bijou Hills Silicified Sediment (BHSS)	Bijou Hills of south-central South Dakota; also occurs to the north in the northern resource group. Materials in the Lake Sharpe area likely derive from the nearby southern sources.

*Numbers indicate computer code value.

Table J2. List of Local and Nonlocal Lithic Resources for the Lake Sharpe Project Area, South Dakota (abstracted from Ahler 1989; Toom 1984a; supplemented from Ahler 1977a; Ahler and Swenson 1985) (Continued).

Resource Group and Lithic Raw Material Type*	Source/Location Relative to Lake Sharpe
<u>Nonlocal - Eastern Group</u>	
24 Catlinite (Red Pipe Stone)	Southwestern Minnesota and adjacent areas.
<u>Nonlocal - Far Western Group</u>	
18 Obsidian	Rocky Mountains (Yellowstone National Park, Wyoming); possible Black Hills sources as well (western resource group).
38 Steatite	Rocky Mountains.
<u>Miscellaneous/Unknown Resource Group</u>	
12 Burnt Chalcedony	Catch-all for chalcedony-like stone that cannot be more specifically identified because of burning.
14 Other	Unclassifiable.
20 Coarse Porous Sandstone	Source unknown; presumed nonlocal.
22 Fossil or Concretion	Local Pierre Shale bedrock or nonlocal.
25 Hematite	Source unknown; presumed nonlocal.
26 Limonite	Source unknown; presumed nonlocal.
30 Gray-Green Chert	Source unknown; presumed local gravels.
31 Blonde French Flint	European, historic period gunflints.
32 Thames River (Dover) Flint	European, historic period gunflints.
33 Light Yellow Pigment	Source unknown; presumed nonlocal.
34 Glass	Euroamerican dervied, historic period.

*Numbers indicate computer code value.

Table J3. List of Stone Tool Data, Rattlesnake Keeper Site (39LM160), Lake Sharpe Testing Project, South Dakota, UND, 1988. See Table J1 for an explanation of column headings and data values.

Provenience Data												Tool Data								
CTNO	TN	LN	SD	PD	RT	PES	FTN	FT	ACU	CHU	C	DC	CPNO	TC	MC	FC	UP	RM	MP	WT
719	7	19	180-195	DS	89				GLV	PCC	C	01	0001	1	01	01	4	05	0	0.4
619	6	19	180-195	DS	89				GLV	PCC	C	09	0001	2	36	03	4	07	0	4.1
619	6	19	180-195	DS	89				GLV	PCC	C	09	0002	2	38	15	4	06	0	0.6
513	5	13	120-130	DS	100				GLV	UKN	B	14	0001	7	37	21	3	37	0	215.5
513	5	13	120-130	DS	100				GLV	UKN	B	14	0002	7	37	21	3	37	0	133.7
1102	11	2	10-20	DS	100	1/2	BH	HTF	PCC	C		14	0003	6	37	14	3	19	1	2266.0
1102	11	2	10-20	DS	100	1/2	BH	HTF	PCC	C		14	0003	6	37	28	3	19	1	2266.0
413	4	13	120-130	DS	100				GLV	UKN	B	29	0001	5	44	22	3	37	0	32.3
414	4	14	130-140	DS	100				GLV	UKN	B	29	0002	5	44	22	3	37	0	8.8
513	5	13	120-130	DS	100				GLV	UKN	B	29	0003	5	44	22	3	37	0	4.6
513	5	13	120-130	DS	100				GLV	UKN	B	29	0004	5	44	22	3	37	0	4.7
513	5	13	120-130	DS	100				GLV	UKN	B	29	0005	5	44	22	3	37	0	6.5
513	5	13	120-130	DS	100				GLV	UKN	B	29	0006	5	44	22	3	37	0	6.4
513	5	13	120-130	DS	100				GLV	UKN	B	29	0007	5	44	22	3	37	0	65.0
513	5	13	120-130	DS	100				GLV	UKN	B	29	0008	5	44	22	3	37	0	49.5
513	5	13	120-130	DS	100				GLV	UKN	B	29	0009	5	44	22	3	37	0	3.6
619	6	19	180-195	DS	89				GLV	PCC	C	29	0010	5	44	22	4	15	0	1.4
1104	11	4	30-65	DS	90	1	BH	HTF	PCC	C		29	0011	5	44	23	4	13	0	3.8
1102	11	2	10-20	DS	100	1/2	BH	HTF	PCC	C		30	0001	8	37	25	4	06	0	1.0
1103	11	3	20-30	DS	100	1/2	BH	HTF	PCC	C		30	0002	8	37	25	4	07	0	5.4
1103	11	3	20-30	DS	100	1/2	BH	HTF	PCC	C		30	0003	8	37	25	4	07	0	4.7
1103	11	3	20-30	DS	100	1/2	BH	HTF	PCC	C		30	0004	8	37	25	4	16	0	1.4
1103	11	3	20-30	DS	100	1/2	BH	HTF	PCC	C		30	0005	8	37	25	4	06	0	1.0
1103	11	3	20-30	DS	100	1/2	BH	HTF	PCC	C		30	0006	8	37	25	4	06	0	2.6
1104	11	4	30-65	DS	90	1	BH	HTF	PCC	C		30	0007	8	37	25	4	06	0	0.8
1105	11	4	30-65	WS	10	1	BH	HTF	PCC	C		30	0008	8	37	25	4	06	0	0.8

Table J4. List of Stone Tool Data, Lost Nation Site (39LM161), Lake Sharpe Testing Project, South Dakota, UND, 1988. See Table J1 for an explanation of column headings and data values.

Provenience Data												Tool Data								
CTNO	TN	LN	SD	PD	RT	PES	FTN	FT	ACU	CHU	C	DC	CPNO	TC	MC	FC	UP	RM	MP	WT
117	1	17	160-170	DS	100				GLV	EPW	A	03	0001	2	03	44	4	28	0	3.0
1000			ca. 170	WS	100	1	OR	OTR	EPW	A		03	0002	2	04	44	4	12	0	0.5
117	1	17	160-170	DS	100				GLV	EPW	A	09	0001	2	38	15	4	12	0	0.9
218	2	18	170-180	DS	100				GLV	EPW	A	15	0001	4	31	06	4	28	0	2.3
117	1	17	160-170	DS	100				GLV	EPW	A	29	0001	5	37	22	4	08	0	1.0
217	2	17	160-170	DS	89				GLV	EPW	A	34	0001	9	31	29	3	19	0	571.8

APPENDIX K

PERTINENT PROJECT DOCUMENTS AND CORRESPONDENCE

Omaha District Corps of Engineers Scope of Work.

University of North Dakota Proposal.

Cover Letter and Review Comments.

OMAHA DISTRICT CORPS OF ENGRS
OMAHA NE
REQUEST FOR QUOTATION
DAC#4553T1434

ISSUED: 9 FEB 88

SUPPLIES/SERVICES CONTAINED IN THIS QUOTATION ARE FOR DELIVERY
FOR DESTINATION TO:

OMAHA NE

00102-4978

SUPPLIES ARE OF DOMESTIC ORIGIN UNLESS OTHERWISE INDICATED BY
QUOTER. IF YOU ARE UNABLE TO QUOTE, PLEASE ADVISE.

DESIRED DELIVERY IS 396 DAYS AFTER RECEIPT OF ORDER.

TR NOTE: ANY TECHNICAL QUESTIONS SHOULD BE REFERRED TO: RICHARD BERG,
402/221-4603

AMENDMENT NO. 1, dated 17 FEB 88 - See Page 2

If interested in submitting a quotation, please respond with this amended document.

DOCUMENT REFERENCE NO: DACW456BT1464

NAME OF QUOTER:

RETURN 1 COPY TO CONTRACTING DIVISION BY 5: FEB 24 -----NO CHANGE

OMAHA DISTRICT CORPS OF ENGRS
 JAN LOCK TEL NO (402) 221-4105
 215 NORTH 17TH STREET
 OMAHA NE 68102-4973

ITEM	SUPPLIES/SERVICES	QTY	UNIT	EXTENDED PRICE	AMOUNT
	STOCK NUMBER PUR REQ NUMBER				
0001	R407PARC4SITES AWJOPD50220027 SERVICE: PERFORM NATIONAL REGISTER EVALUATION OF 3 ARCHEOLOGICAL SITES IN LYMAN COUNTY ON LAKE SHARPE, SD, IN ACCORDANCE WITH THE ATTACHED SCOPE OF WORK. NOTE: IN ORDER TO BE CONSIDERED FOR AWARD, THE ITEMS LISTED IN THE SCOPE OF WORK, PART IV - SECTION M EVALUATION FACTORS FOR AWARD, MUST BE SUBMITTED WITH THE QUOTATION.	1	LUMP SUM	\$.....	\$.....

PROPOSED COMPLETION DATE: JULY 1989

PROPOSED DELIVERY IS DAYS AFTER RECEIPT OF ORDER.

PROMPT PAYMENT DISCOUNT TERMS

QUOTED BY: NAME TITLE

Company Name _____
 Address _____
 Phone _____ Date _____
 (include Area Code)

AMENDMENT NO. 1, dated 17 FEB 88

1. Page 1, Paragraph 3, Site 39LM161. Delete reference to "mounds".
2. Page 9, Method of Payment. Change: "The remaining twenty (20) percent..." to read "The remaining ten (10) percent..."
3. If interested in submitting a quote, please respond on this amended sheet by 24 FEB 88.

SCOPE OF WORK
 NATIONAL REGISTER EVALUATIONS OF
 OF THREE ARCHEOLOGICAL SITES
 IN LYMAN COUNTY ON LAKE SHARPE, SOUTH DAKOTA

ARTICLE I. PURPOSE AND SCOPE

1. The purpose of this work is to meet the Omaha District's obligations to Federal preservation legislation and associated implementing regulations. The most pertinent for this investigation are: Public Law 74-292, Historic Sites Act of 1935, as amended by Public Law 94-458; Public Law 86-523, Reservoir Salvage Act of 1960 as amended by Public Law 93-291; Public Law 89-665, National Historic Preservation Act of 1966 as amended by Public Law 96-515; Public Law 91-190, National Environmental Policy Act of 1969 as amended by Public Law 94-52; Public Law 95-341, American Indian Religious Freedom Act; Executive Order 11593; implementing regulations 36 CFR Parts 60 and 61 Appendix A and 36 CFR Part 800. The cultural resources investigation shall be conducted in a professional manner. Cultural resources are defined as any site, building, district, structure, object, data, or material significant in history, architecture, archeology, or culture.

2. The work will consist of (1) an exhaustive search of all background literature on the Lake Sharpe area and the sites identified for testing; (2) field work to recover information contained in the sites; (3) analysis of sufficient intensity to clearly establish the eligibility of each site to the National Register of Historic Places; (4) report preparation; (5) completion of National Register nomination forms; (6) a completed journal article; and (7) public education program.

3. There are three (3) sites involved in the study. They are located on Lake Sharpe in Lyman County, South Dakota. The following list summarizes some of the information available regarding these sites. They are further described in Toom and Picha (1984) which are provided as exhibits to this scope.

Site	Description	Cultural Period	Approximate Area (m2)	Depth (cm)
39LM160	Artifact scatter, 2 Buried Horizons	Plains Village- Extended Coalescent	31,250	130
39LM161	1 Buried Horizon Mounds	Unknown Prehistoric	Unknown	150-200
39LM163	Buried Horizon	Unknown Prehistoric	Unknown	150

a. Literature and Records Search. Information for the literature and records search shall be obtained from site forms, published and unpublished reports, theses, dissertations and manuscripts available for each site. Sources that must be checked are the South Dakota Archaeological Research Center, Ft. Meade; University of South Dakota, Vermillion; University of Nebraska, Lincoln; University of North Dakota, Grand Forks; U.S. Army Corps of Engineers, Omaha District; and

the National Park Service, Midwest Archeological Center. Individuals known to have knowledge concerning the sites being evaluated should be consulted to obtain information which may not be available in the written sources.

The background research will be considered the starting point for all work. This research should establish a broad evaluating framework, based on a set of regional concerns and site specific topics. The "Management Plan for Archaeological Resources in South Dakota, Part I: Study Units" (Buechler, n.d.) should be used to develop regional or site specific research questions and goals achievable for this level of investigation.

b. Field Investigation. This investigation shall be of an sufficient detail and intensity to clearly establish the culture-historical framework, function, horizontal and vertical boundary, and integrity for each site. Test excavations will be done on all sites listed above. Excavation of the test units shall proceed according to accepted methodology for recovery of archeological data. The Contractor will use the established datums. Permanent datums will be made if these cannot be located.

The field examination shall be conducted in close coordination with the Contract Administrator, South Dakota Field Archeologist, Lake Sharpe Project Manager, Technical Officer, and the Lower Brule Indian Reservation. Field crews shall be subject to periodic onsite inspection by Corps representatives, without prior notice. The Contractor shall not enter upon private property without prior knowledge of the Lake Sharpe Project Manager. Arrangements for securing rights-of-entry upon privately-owned or leased lands are the responsibility of the Contractor. These arrangements shall be coordinated with the Lake Sharpe Project Manager. All vehicular traffic within the project area shall be restricted to existing roads, if at all possible.

The Contractor shall keep clear, legible, standard field records available and current for periodic review by the Technical Officer. These records shall include, but shall not necessarily be limited to: field notebooks, excavation forms, field maps, and photographs.

The Contractor shall pick up and retain those surface artifacts necessary to determine the cultural component(s), site function, subsistence and lithic technology. All cultural material recovered from subsurface testing will be retained. All artifacts retained shall be carefully recorded and stored during the field investigation.

At least one wall of each test unit (including backhoe excavations) displaying stratigraphic breaks and/or from which cultural materials have been retrieved shall be profiled. The elevation of stratigraphic breaks and cultural features shall be indicated on these profiles; all excavated fill shall be dry or wet screened by stratigraphic or arbitrary levels for recovery of artifacts, faunal and floral material.

If features are found, samples will be collected for flotation,

pollen, and radiocarbon analysis. The size and selection of these samples shall be at the discretion of the Principal Investigator. However, the size of the samples shall remain constant so that comparisons can be made. Any cultural features excavated (e.g., postholes, hearths, burials) shall be recorded in terms of the test unit in which they were encountered, the stratigraphic or arbitrary level(s) in which they occur, and elevation. All features should be photographed and drawn. Few features should be completely excavated since the aim of the research is to test the subject sites. All material should be processed, cataloged, and curated in such a manner that they may be used if future mitigation is planned, or additional research is possible. All excavation units will be backfilled.

The District will provide the original site maps for use by the Contractor. The maps will be revised as necessary to show the present size and topography of the site, the location of surface-collected artifacts and all excavation units including shovel tests.

The recommended number of excavation units and their depth for each site is provided below to assist potential Contractors in developing research strategies, logistical needs and costs. These recommendations are based on the information provided in Toom and Picha (1984). Actual field situations may dictate a change. The testing program may be altered only after consultation with the Technical Officer managing this contract.

Site	1 X 1 m Excavation Units	Maximum Depth for Each Unit (cm)	C14 Samples	Comment
39LM160	10	160	4	Two C14 samples from each buried horizon
39LM161	5	230	3	
39LM163	5	150	3	

c. Analysis. All material and information that is recovered will be processed and analyzed in such a manner that it provides answers to research topics in the proposal and is used to determine significance. Analysis of materials recovered from earlier research on the project area will be integrated with the present investigation. The proposal must detail the methods used for all analyses done for this contract.

Analysis of artifacts and data shall be conducted by or under the direct supervision of a qualified professional of the appropriate discipline (prehistoric archeologist for prehistoric artifacts and historic archeologist for historic artifacts). All diagnostic artifacts shall be documented with good quality black and white photographs which include a size scale or technical scaled line drawings.

All artifacts shall be permanently stored at a repository located within the boundaries of South Dakota mutually agreed to by the Contractor and the Government. The Contractor is responsible for shipping all collected artifacts and records. If the artifacts are stored with

the South Dakota Archaeological Research Center, the Contractor must complete all work involved with accessioning before the material is turned in. The archeological data and records must be made accessible to future researchers. All artifacts and data will be stored in containers clearly marked "Property of U.S. Army Corps of Engineers, Omaha District."

d. Investigation Report. The Contractor shall prepare a comprehensive investigation report which details the work done, the study rationale, the investigation results, recommendations for additional work, and management recommendations. The report shall include, but shall not be limited to, the following actions:

(1) Report Documentation Page, DD Form 1473. Complete all but sections 2 and 3. This form will be supplied by the Corps of Engineers.

(2) Title Page. This will contain the title, study type, location, project name and counties, report date, name of Contractor, author/Principal Investigator, and Corps of Engineers contract number.

(3) Abstract. A brief synopsis of the work conducted, number and types of cultural resources identified and overall significance, and a summary of the management recommendations, which shall not exceed 150 words.

(4) Introduction. Identify the sponsor and Contractor, the purpose for the investigation, discuss the type of investigation performed and location, indicate the disposition of the artifacts, and original records or other data. Discuss the report organization.

(5) Regional Location and Environment. A detailed description of the site locations including physical features and terrain, past and present vegetation and fauna, field conditions, past and present land uses, weather conditions during field work. The study area must be discussed within the larger framework of the physical region defined by the Big Bend Study Unit outlined in the "Management Plan for Archeological Resources in South Dakota, Part I: Study Units."

(6) Previous Work. An enumeration and description of all previous cultural resources investigations conducted at each site, names of principal investigators, dates of the studies, study results, and an overview of the general adequacy and deficiencies of the past work. This section can be combined with the Results section.

(7) Overview. Detail the relationship of the cultural history of each site investigated to the regional cultural history of the study area.

(8) Research Orientation. Develop and present theoretical and/or substantive goals and the methods to be used in achieving them. Address problems and testable hypotheses that are realistic for this level of study. Research orientation should initially address the Research Questions and Goals for the Big Bend Study Unit outlined in

the "Management Plan for Archeological Resources in South Dakota, Part I: Study Units."

(9) Methods. Present the procedures used to accomplish the research design. Discuss how the field work was organized, scheduled, and undertaken. Detail the laboratory procedures and methods used to analyze artifacts and other data recovered from the field.

(10) Results. The information provided in this section shall include, but shall not be limited to: site name (if any), site number, site type (lithic scatter, farmstead, mound, etc.), component(s) or probably component(s), elevation, site size (or presumed size, strata and depth); discussion of the artifact and other analyses; describe features and their distribution by component; display site and important feature maps, artifacts in drawings and photographs. The maps shall be clear and professional quality. The submission of sketch maps is not acceptable for use in the report. Present the results of the research conducted for this contract. The discussion should clearly explain the outcome of the procedures used to address research topics. Successes and failures should be discussed in the same detail.

(11) Recommendations. The results of the analyses will be used to determine the eligibility of the sites to meet the National Register criteria for evaluation in 36 CFR 60.4. Recommendations for nomination to the National Register will be presented accordingly. If sites are being impacted, land management alternatives will be presented to stop, prevent, or reduce further impacts.

(12) References. Use the American Antiquity format for every publication, work, or interview cited in the report.

(13) Appendices. Completed forms used during the investigation, maps, photographs, and artifact catalogs.

(14) Completion of National Register nomination forms for those sites that appear to qualify for the National Register of Historic Places.

(e) Article. The Contractor shall submit a suitable article for submission to Plains Anthropologist, American Antiquity, other professional or popular journal on the results of this investigation. This article shall include the following information: name of sponsor, contract number, and brief discussion of the importance of this contract for our District responsibilities. The draft of the article shall be submitted no later than 30 calendar days after the draft copy of the report is sent for review. The article may focus on any facet of the research. The purpose of the article is to ensure a wider dissemination of the information derived from the study. The Contractor is encouraged to communicate with the local people, especially Native Americans, to inform them of the purpose of the investigation specifically and archeology in general.

(f) Public Education. The Contractor shall prepare and submit either a slide program with script or an edited video program, not to

exceed 20 minutes in presentation, describing in terms understandable to the general public, the methods, purpose and results of the investigation. An edited draft of the program shall be submitted no later than 30 days after the draft review comments to the report are returned to the Contractor. The draft will not be returned for revision if it is acceptable to the Government.

ARTICLE II. CONTRACTOR, INSTITUTIONAL, OR CORPORATION QUALIFICATIONS

1. The minimum professional qualification for the Principal Investigator, prehistoric and historical archeologists, and key consultants (e.g., architectural historian) are those given in 36 CFR Part 61, Appendix A - Professional Qualifications. Consultants and supervisory personnel not covered in this CFR who are hired or subcontracted for their special knowledge and expertise must carry academic and experiential qualifications in their own fields of competence. The guidelines in paragraph (b) of this regulation will apply. Such qualifications are to be documented by means of vitae or resume attachments submitted with the proposal or at a later time if the consultant has not been retained at the time of proposal.

2. Principal Investigator must periodically check on the progress of the work each week and be available to advise or instruct personnel should any problems develop. The Government may send a representative to inspect the various phases of the operations and review project records without prior notification. All aspects of the field examination shall be conducted by or under the direct supervision of a qualified archeologist.

3. Any change in personnel after the award of contract must be approved by the Contracting Officer. A person replacing a vacated position must have a comparable background and knowledge of the study area to maintain the same level of expertise and quality of performance. Failure to make an acceptable replacement could result in cancellation of the contract.

4. The Contractor must provide or demonstrate access to the following capabilities:

a. Adequate permanent field and laboratory equipment necessary to conduct operations defined in the scope of work. However, this qualification may be waived under circumstances of extreme need through negotiation.

b. Adequate laboratory and office space and facilities for proper treatment, analysis, and storage of specimens and records likely to be obtained from the project. This does not necessarily include such specialized facilities as pollen, geochemical, or radiological laboratories, but does include facilities sufficient to properly preserve or stabilize specimens for any subsequent specialized analysis.

3. Persons working under this contract are considered to be carrying out official agency duties under the Federal land manager's direction.

associated with the management of archeological resources and therefore are exempt from obtaining an Antiquities Permit per Section 5(c) of 32 CFR Part 229 - Protection of Archaeological Resources Uniform Regulations. The District shall ensure that Sections 5 and 8 are met through qualifications submitted in the proposal and contract documents respectively. Section 7 is applicable, Indian sites and Indian religious sites may be harmed under this contract. The District will notify the Indian tribes before the contract is awarded. The tribes which can be identified as having ties to these sites will be contacted.

ARTICLE III. REPORT SPECIFICATIONS

1. Ten (10) copies of the completed draft report shall be submitted to the Omaha District Office. The draft will be edited for major spelling and grammatical errors prior to submittal for review and comment or it will be returned for correction. The draft report will be submitted 306 calendar days after the Contractor is notified to proceed. The Government shall have a maximum of 45 calendar days to review and comment. The Contractor shall have 45 calendar days to include the review comments into the final report and submit the final original report with all negatives, photographs, maps, charts, tables, and standard drawings to the Government. The final edited text shall be prepared on 8-1/2 X 11-inch bond paper, single spaced, and be "camera ready." The Government will reproduce the final report for distribution to appropriate State and Federal agencies per ER 1105-2-50 and interested parties. The Contractor will receive 25 copies for personal use.

2. Neither the Contractor nor his representatives will release or publish any sketch, photograph, report, or other material of any nature obtained or prepared under this contract without specific written approval of the Contracting Officer's Representative.

ARTICLE IV. GENERAL SAFETY REQUIREMENTS

The Service Contract General Provisions Section 41, Service Contract Act of 1965, as amended, subparagraph (g) requires the Contractor not to permit work under this contract in unsanitary or dangerous locations. Proper health and safety standards (29CFR1925) are to be followed for the duration of the contract. These standards are to be used in conjunction with the "U.S. Army Corps of Engineers. Safety and Health Requirements Manual," (EM 385-1-1, April 1981). The Contractor will use the above to control or report hazards and injuries associated with equipment usage, surveying, and excavation methodologies.

REFERENCES CITED

Buechler, Jeff

- n.d. Management Plan for Archaeological Resources in South Dakota, Part I: Study Units. Dakota Research Services. Submitted to South Dakota Archaeological Research Center, Fort Meade. Contract No. 120401-405-004-(85)

Toom, Dennis L. and Paul R. Picha

- 1984 An Archeological Survey of Selected Federal Lands on the West Bank of the Big Bend/Lake Sharpe Project Area, Lyman and Stanley Counties, South Dakota, 1983: Main Report, Supporting Documentation. Two volumes. Department of Anthropology and Archaeology, University of North Dakota, Grand Forks. Submitted to the U.S. Army Corps of Engineers, Omaha District. Contract No. DACW45-83-C-0142.

PART I - SECTION E

INSPECTION AND ACCEPTANCE

1. The Government may, at any reasonable time, inspect the progress of the work. Such inspection, however, shall not be performed in such a way as to unduly affect the progress of the work. Final acceptance of the work will be made upon successful completion of the work required under the contract.
2. Several coordination meetings with the Contractor and the Technical Officer shall be scheduled as necessary. At least two meetings shall take place with representatives from the South Dakota State Historic Preservation Office. These meetings need not require additional travel by the Contractor.

PART I - SECTION F

DELIVERIES AND PERFORMANCE

1. Performance Period. The Contractor shall complete the entire work and service, to the Government's satisfaction, not later than 396 calendar days from the contract award date. The proposal shall indicate the need for additional or fewer calendar days.
2. Deliveries. The Contractor shall deliver all reports at no additional cost to the Government to the following address:

U.S. Army Corps of Engineers
Omaha District
ATTN: CEMRO-PD
215 North 17th Street
Omaha, NE 68102-4910

The archeological data and records must be made accessible to future researchers. All artifacts and data will be stored in containers clearly marked "Property of U.S. Army Corps of Engineers, Omaha

District." They will be curated at the South Dakota Archaeological Research Center, Rapid City.

3. Method of Payment. Fifteen (15) percent of the contract shall be paid upon completion of the literature and records search. Fifty (50) percent of the contract shall be paid upon completion of the field work. Fifteen (15) percent shall be paid upon completion of analysis. Ten (10) percent shall be paid upon the receipt and acceptance of the draft report. The remaining ~~ten (10)~~ ^{twenty (20)} percent of the contract will be paid upon receipt and acceptance of the final report.

PART IV - SECTION M

EVALUATION FACTORS FOR AWARD

1. The offeror shall submit with their study outline a detailed statement of the method proposed for accomplishing the work, as well as the number and type of personnel proposed. This statement will become a part of any contract awarded and will be adhered to during performance unless changed by mutual agreement after award of the contract.

2. The offeror shall submit with their study outline a work sequence diagram that clearly illustrates the sequence of events that will be followed in the expected implementation of the project goals in the form of the flow chart. The information provided in the chart sheet includes a realistic schedule.

3. The offeror shall also submit with the study outline a breakdown of costs in sufficient detail to allow evaluation of the cost of each area of the work.

4. An evaluation of each study outline will be made to determine if the methods proposed for accomplishing the work and personnel to be employed are considered adequate and in conformance with the purchase order specifications. In order to be considered in the evaluation, qualification information, including vitae on key personnel to be assigned to the project, must be submitted with the study outline. The study outline must also demonstrate that prior work of a similar nature and scope has been successfully accomplished.

5. After evaluation of these and other factors, all study outlines meeting the basic requirements will be further considered as to price. The Government, however, reserves the right to reject any and all study outlines or to award a contract to other than the low offeror.

6. The following factors listed in descending order of importance shall be evaluated and rated. Price will be considered as important as Methodology.

A. Methodology

1. Research Design
2. Procedure for Field Investigation

3. Analysis Procedure
 4. Procedure for Literature and Records Search
 5. Work and Expenditure Schedules
- B. Personnel
1. Professional Qualifications
 2. Knowledge of the Study Area
 3. Sufficient Number
- C. Institution or Company
1. Facilities
 2. Prior Experience
- D. Price

NOTE: CONTINUING CONTRACT. Funds are not available at the inception of this contract to cover the entire contract price. The sum of \$18,000.00 has been reserved for this contract and is available for payment to the Contractor during the current fiscal year. The above stated amount represents the total funds presently available for expenditure in FY 88.

A STUDY OUTLINE AND BUDGET TO TEST THREE ARCHEOLOGICAL SITES
IN THE LAKE SHARPE PROJECT AREA, LYMAN COUNTY, SOUTH DAKOTA

submitted to

THE U.S. DEPARTMENT OF THE ARMY, OMAHA DISTRICT CORPS OF ENGINEERS
IN RESPONSE TO RFQ-DACW4588T1484, DATED 9 FEBRUARY 1988

submitted by

THE DEPARTMENT OF ANTHROPOLOGY
UNIVERSITY OF NORTH DAKOTA
GRAND FORKS

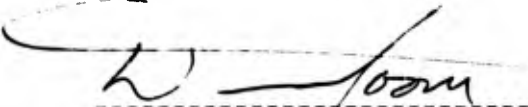
Proposed Starting Date: 15 June 1988

Proposed Completion Date: 31 July 1989

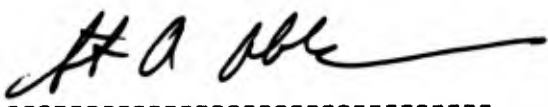
Proposed Delivery: 487 Days After Receipt of Order

Total Estimated Cost: \$24,163.94

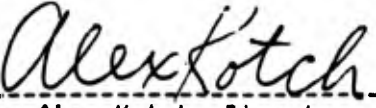
Endorsements:



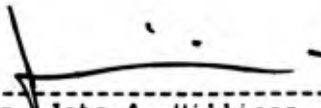
Mr. Dennis L. Toom
Principal Investigator
Telephone: (303) 772-0118



Dr. Stanley A. Ahler
Co-Principal Investigator
Anthropology/Archaeology
University of North Dakota
Telephone: (701) 777-3008



Dr. Alex Kotch, Director
Office of Research and
Program Development
University of North Dakota
Telephone: (701) 777-4278



Dr. John A. Williams, Chair
Anthropology/Archaeology
University of North Dakota
Telephone: (701) 777-3008

PART I

STUDY OUTLINE

1. Contractor

Department of Anthropology
University of North Dakota
Box 8254, University Station
Grand Forks, ND 58202-8254
(701) 777-3008

2. Principal Investigators

Mr. Dennis L. Toom (M.A. Anthropology), Principal Investigator

Dr. Stanley A. Ahler (Ph.D. Anthropology), Co-Principal Investigator

3. Introduction

This study outline and budget have been prepared in response to Request for Quotation DACW4588T1484, which calls for the subsurface testing of three archeological sites in the Lake Sharpe Project Area, Lyman County, South Dakota. These sites are (1) 39LM160 (Rattlesnake Keeper), (2) 39LM161, and (3) 39LM163. The purpose of this testing is to better define these sites and their content, determine their research potential, and assess their eligibility for listing on the National Register of Historic Places. These objectives are consistent with the obligations of the Omaha District Corps of Engineers, U.S. Department of the Army (USCE), to manage and preserve significant cultural resources under existing Federal legislation and various implementing regulations.

4. Research Methods and Procedures

4.1. Literature and Records Search

An exhaustive review of all existing literature and records pertaining to the three sites under study will be made after receiving notification to proceed. The literature and records search will focus on materials housed at the South Dakota Archaeological Research Center, Rapid City. Relevant materials at the University of South Dakota, Vermillion, the University of Nebraska, Lincoln, the University of North Dakota, Grand Forks, the Omaha District Corps of Engineers, Omaha, and the Midwest Archeological Center, Lincoln, will also be consulted.

4.2. Fieldwork

Fieldwork will be conducted during the 1988 field season after all background research tasks have been completed. The primary goal of the field investigations will be to obtain sufficient data on the cultural-historical affiliation, function, extent, integrity, and research potential of each site to enable their evaluation relative to National Register criteria. Fieldwork will consist primarily of the excavation of a number of 1 X 1 m test units to a specified maximum depth at each of the three sites identified for testing.

Ten test units will be excavated to a maximum depth of 160 cm at 39LM160; five test units will be excavated to a maximum depth of 230 cm at 39LM161; and five test units will be excavated to a maximum depth of 150 cm at 39LM163. All test excavations will be performed by hand using such tools as shovels, trowels, brushes, and other small hand tools. Excavation will ordinarily proceed in 10 cm arbitrary levels, unless conditions necessitate a shift to natural or cultural levels. All of the sedimentary matrix removed from each test unit will be passed through one-quarter inch hardware cloth screens. All artifacts and other materials remaining in the screens will be retained for laboratory analysis. Surface collection will be limited to classes of artifacts considered to be of substantive analytical value.

Excavation data will be recorded on standard excavation unit forms, which will be completed for each test unit level. Supervisory personnel will maintain general notes on the progress and finds of the excavations. A scaled profile drawing will be made of at least one wall of each test unit. Profile photographs of each test unit will also be taken. Plan view drawings and photographs will also be made of significant findings. If any cultural features are encountered during the course of the excavations, samples suitable for flotation, pollen, and radiocarbon analysis will be collected from the fill of these features. Established site datums will be used to place all test units on existing base maps through the use of a transit and stadia rod or a compass and tape. If these cannot be relocated, permanent datums will be established for the collection of map data. All test units will be backfilled upon completion. These basic field procedures will not be altered without the consent of the USCE Technical Officer.

4.3. Analysis and Report Preparation

Analysis and report preparation will begin after all fieldwork has been completed. This phase of the project will be conducted at University of North Dakota (UND) archaeology laboratories and offices maintained in Babcock Hall on the Grand Forks campus. Initial laboratory tasks will include the processing, cleaning, and cataloging of all recovered artifactual and ecofactual materials. Specimens requiring stabilization or restoration will be so treated. Computer based inventories of all artifactual and ecofactual remains will be compiled.

Classes of materials which will receive detailed analytical treatment include lithics, ceramics, bone, shell, botanical remains, and historic materials. While not inclusive, this list represents the primary potential artifactual and ecofactual content of the sites to be investigated. Analytical procedures for other classes of material will be developed as the need to do so becomes apparent. The analytical systems used will be compatible with other recent archaeological excavations in the Middle Missouri subarea (e.g., Ahler 1977; Ahler and Swenson 1985; Falk 1984; Toom 1988). In particular, the analytical techniques and reporting standards set by Ahler (1977) and others for the test excavations at the Jake White Bull site will be approximately as closely as possible. All analyses will be directed at determinations of site chronology, cultural affiliation, function, and inferred position within appropriate settlement-subsistence patterns in order to fully evaluate each site in terms of National Register criteria. Research problems appropriate to this level of study that are of regional or local interest (e.g., Buechler 1984) will also be addressed whenever possible.

Lithic artifacts will be analyzed according to techniques developed by Ahler (1975a, 1975b), as modified according to Ahler and Swenson (1985). The lithic analysis will be primarily concerned with the characterization of technology, form, function, and raw material utilization. Native ceramics will receive a similar level of analytical treatment. Rim sherds will be classified according to recognized types (e.g., Johnson 1980) for purposes of cultural-historical assessment. Body sherd analyses will focus on surface treatment (manufacture) attributes, which are also of some utility in assessing cultural affiliation. An assessment of the technology and function of all recovered bone tools will also be made. Identifiable bone elements will be classified according to anatomical position and species where possible in order to provide data on subsistence hunting. Unmodified bone will be quantified by weight according to size grade and burned and unburned bone groups. Shell artifacts, both modified and unmodified, will receive a level of analysis comparable to that of the bone artifacts. Carbonized plant remains will be identified as to species where possible to provide subsistence data on wild plants and cultigens. Pollen analyses will provide a similar level of identification. While not anticipated to be a major class of material, historic artifacts will receive analytical treatment adequate to permit assessments of chronology, cultural affiliation, technology, and function.

Preparation of a comprehensive investigation report will proceed concurrently with the analyses. This report will follow specifications outlined in the Scope of Work, including sections on relevant background information, research goals, methods, results, and recommendations. National Register forms will be completed for all sites considered to be eligible for listing on the National Register of Historic Places. An article suitable for publication in a professional or popular journal will also be prepared on some significant aspect of this research, as will a public education program on the overall conduct of the study. Upon acceptance of the investigation report, all artifacts and related materials derived from this project will be transferred for permanent curation to the South Dakota Archaeological Research Center, Rapid City.

5. Work and Cost Schedule

A starting date of 15 June 1988 is proposed for this research. An earlier date cannot be considered if key project personnel are to meet previous commitments. All background research and fieldwork will be completed during fiscal year (FY) 1988. Laboratory processing, analysis, and report preparation activities will be deferred until FY 1989. Deferment of these activities to FY 1989 is necessary so that key project personnel can meet other obligations. Assuming a contract award date and notice to proceed of 1 April 1988, and a proposed completion date of 31 July 1989 as specified by the government, it is estimated that a maximum of 487 days will be required to complete the project under the schedule presented below and in Figure 1. A later contract award date will of course reduce the number of days required for project completion.

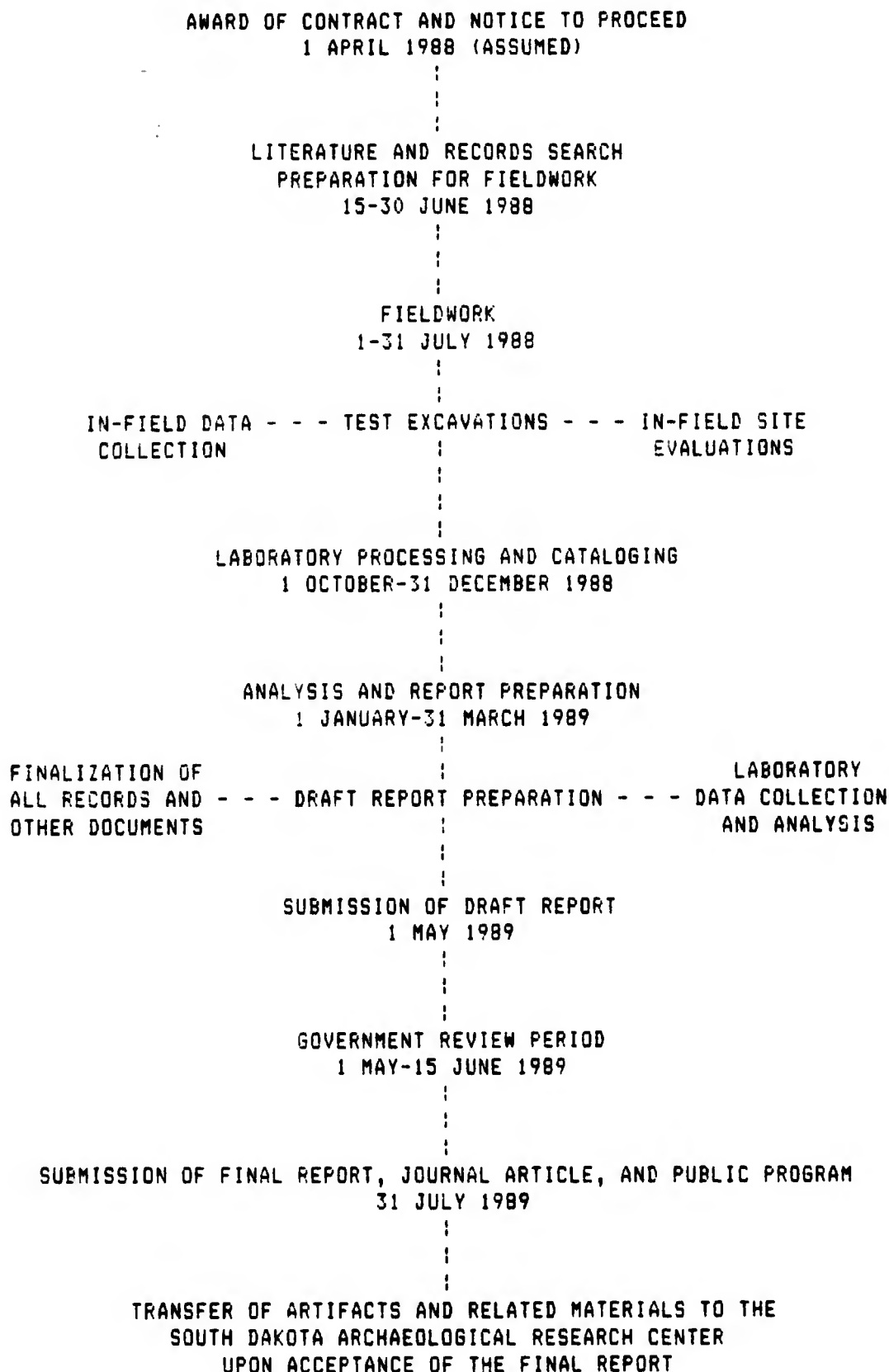


Figure 1. Flow Chart of the Proposed Project Schedule and Major Activities.

5.1. Fiscal Year 1988

The literature and records search and preparations for fieldwork will be completed from 15-30 June 1988. Fieldwork will be conducted during July 1988. It is estimated that \$9,337.88 will be expended in FY 1988 under this schedule (see Part II).

5.2. Fiscal Year 1989

Laboratory processing and cataloging of all collected materials and information will begin in October 1988. Submission of radiocarbon, flotation, and pollen samples for specialized analyses will also be done at this time. It is anticipated that all laboratory processing and inventory activities will be completed by December 1988. Analysis and report preparation will be conducted from January-April 1989. Submission of the draft investigation report is scheduled for no later than 1 May 1989. A 45 day review period will be allowed for the government. Receipt of all draft review comments is scheduled for 15 June 1989. The contractor will have an additional 45 days to respond to the review comments. Submission of the final investigation report will occur no later than 31 July 1989. The journal article and public education program will also be submitted at this time. It is estimated that \$14,826.06 will be expended in FY 1989 under this schedule (see Part II).

6. Personnel

6.1. Principal Investigator and Project Director

Mr. Dennis L. Toom will be the Principal Investigator and Project Director for the proposed study. In this capacity, Toom will directly supervise all aspects of the field and laboratory work. He will also serve as the primary project archaeologist (prehistoric and historic); it will be Toom's responsibility to perform most all artifactual analyses and prepare the investigation report. Toom holds a M.A. degree in anthropology from the University of Nebraska-Lincoln (UNL). He is currently a Ph.D. student in the Department of Anthropology, University of Colorado, Boulder (CU). Toom has over 15 years of experience as a student of anthropology and a professional archaeologist (see attached vita). His primary interest for the past 10 years has been in the Middle Missouri subarea of the northern Plains, specializing in Plains Village tradition archaeology. Toom has had direct experience in archaeological survey, excavation, and reporting work in the Lake Sharpe area of central South Dakota with the University of Nebraska, Lincoln (1978-1980), the University of North Dakota, Grand Forks (1983-1984), and Western Cultural Resource Management (WCRM), Inc., Boulder, Colorado (1987-1988). He is presently serving as principal investigator for WCRM under a contractual agreement with the Omaha District Corps of Engineers for the archaeological testing and evaluation of eight sites in the Lake Sharpe area. This project is scheduled for completion in May 1988.

Major research efforts have centered on the investigation of late prehistoric and protohistoric Plains Village tradition components within the Missouri River trench in both North and South Dakota, in addition to extensive experience with Plains Woodland and Plains Archaic tradition components. Recently, as a Ph.D. student at CU, he has developed additional skills in the area of geoarchaeology (geological archaeology). Course work taken in the Department of Geological Sciences at CU that is relevant to geoarchaeology has

included geomorphology, pedology (soils), and quaternary stratigraphy. A course in environmental archaeology taken in the Department of Anthropology at CU is also relevant to this field of study. This course work has prepared Toom to undertake credible geoarchaeological research. In addition to his research and educational experience, Toom has considerable background in the management of research grants and contracts, including several previous positions as project director and principal investigator on various archaeological projects. His record of timely and satisfactory completion of archaeological research endeavors is exemplary.

6.2. Co-Principal Investigator

Dr. Stanley A. Ahler will serve as Co-Principal Investigator in a solely advisory capacity. His participation in the proposed project will be at no cost to the government. Ahler holds a Ph.D. in anthropology from the University of Missouri-Columbia. Ahler has some 25 years of experience as a professional archeologist, with the last 18 years focused on the archeology of the Middle Missouri subarea in both North and South Dakota (see attached vita). He is the author of numerous archaeological reports, professional papers, and publications. The addition of Ahler's experience to that of Toom will insure a sound approach to the conduct and management of the proposed project.

6.3. Field Personnel

The field crew will consist three persons. Mr. Dennis L. Toom will serve as the supervisory archeologist for the entire duration of the fieldwork. Toom will be assisted in the field by one Advanced Archeological Assistant and one Field Assistant. These individuals are presently unidentified. The Advanced Archeological Assistant will hold at least a Bachelors degree in anthropology, specializing in prehistoric archeology, with extensive field experience in the Middle Missouri subarea. This person will have the capability to take on supervisory duties if need be. The Field Assistant will hold a Bachelors degree in anthropology, specializing in prehistoric archeology, with some archeological field experience that may or may not be directly relevant to the Middle Missouri subarea. This person will not be employed in a supervisory capacity.

6.4. Laboratory Personnel

The basic laboratory staff will consist of two persons. Mr. Dennis L. Toom will serve as the supervisory archeologist for all laboratory work. He will be assisted by one Laboratory Assistant who will perform all routine tasks. Additional personnel of a specialized nature (e.g., faunal, floral, and pollen specialists) will be brought into the project at key junctures during analysis and report preparation activities. These specialists will most likely be employed as consultants. All laboratory personnel with the exception of Toom are presently unidentified. The archeological staff at UND and members of other university departments will be able to provide most of the specialized expertise that is required.

7. Facilities and Institutional Qualifications

The University of North Dakota maintains permanent archeological research facilities on its Grand Forks campus. These include ample laboratory and office space at Babcock Hall and at the Mariman Research Center. All necessary items of field, laboratory, photographic, and cartographic equipment are also maintained by UND and are available for use by this project. Important comparative collections and extensive library and archival resources are also available, many of which are directly relevant to the archeology of the Lake Sharpe project area. Other facilities and services available for use by the project include a complete motor pool for transportation needs, computer word and data processing equipment, and professional-quality graphics and printing departments.

The University of North Dakota has a long and successful history of archeological research. Numerous projects of a nature and scope similar to that proposed here have been completed by UND archeological research staff throughout the northern Plains, including several projects in the Middle Missouri subarea of North and South Dakota. Toom and Ahler have participated on many of these projects. A review of their vitae (attached) will give a general impression of the institutional qualifications of UND in the conduct of archeological research.

8. References Cited

Ahler, S. A.

1975a Pattern and Variety in Extended Coalescent Lithic Technology. Ph.D. dissertation, University of Missouri, Columbia. University Microfilms, Ann Arbor.

1975b Extended Coalescent Lithic Technology: Supporting Data, 3 vols. Ms. on file, Midwest Archeological Center, National Park Service, Lincoln.

1977 Archeological Reconnaissance and Test Excavation at the Jake White Bull Site, 39C06, Oahe Reservoir, South Dakota. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha. Department of Anthropology, University of North Dakota, Grand Forks.

Ahler, S. A., and A. A. Swenson

1985 Test Excavations at Big Hidatsa Village (32ME12), Knife River Indian Villages National Historic Site. Submitted to the Midwest Archeological Center, National Park Service, Lincoln. Department of Anthropology, University of North Dakota, Grand Forks.

Buechler, J.

1984 Management Plan for Archaeological Resources in South Dakota. Part I: Study Units. Working Draft. Submitted to the South Dakota Archaeological Research Center, Rapid City. Dakota Research Services, Rapid City, South Dakota.

Falk, C. R. (editor)

1984 Archeological Investigations within Federal Lands on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979 Final Report. Submitted to the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha. Technical Report No. 83-04. Division of Archeological Research, Department of Anthropology, University of Nebraska, Lincoln.

Johnson, C. M.

1980 Ceramic Classification in the Middle Missouri Subarea of the Plains. Technical Report No. 80-01. Division of Archeological Research, Department of Anthropology, University of Nebraska, Lincoln.

Toom, D. L.

1988 Archeological Test Excavations at Eight Sites in the Lake Sharpe Project Area, Hughes, Lyman, and Stanley Counties, South Dakota. Report in preparation for the Omaha District Corps of Engineers, U.S. Department of the Army, Omaha. Western Cultural Resource Management, Inc., Boulder, Colorado. Expected completion date May 1988.



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO
ATTENTION OF

July 10, 1989

Planning Division

Mr. Dennis L. Toom
University of North Dakota
Dept. of Anthropology & Archeology
P.O. Box 8242
Grand Forks, North Dakota 58202

Dear Mr. Toom:

Our office has completed review of your draft of "Archeological Test Excavations at Three Sites in the Lake Sharpe Project Area, Lyman County, South Dakota, 1988." This report was prepared under purchase order contract No. DACW45-88-P-0534.

All of the reviewers have indicated that this work was well done, professional, and an excellent study. The authors present strong cases for the research potentials and National Register eligibilities of 39LM160 component C, and 39LM161. Research goals, strategies, historic contexts, and excellent knowledge of regional archeology support the recommendations for significance and management of resources.

General and Specific Comments are enclosed to assist in your preparation of the final report. Any questions concerning the comments may be directed to Mr. Richard E. Berg, 402-221-4603.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard P. Miner", is written over a large, stylized oval shape.

Richard P. Miner
Authorized Representative of
the Contracting Officer

Enclosure

GENERAL COMMENTS

Research Design

In the last partial paragraph on page 16, it is implied that the only reason to collect pollen samples is to determine subsistence. Since pollen samples may also provide climatological information, there are other reasons for their collection.

Contrary to the statement at the bottom of page 18, the scope-of-work does not state that pollen samples will be collected from features alone. It is just that the only explicit mention of pollen samples is in regard to feature samples in paragraph 3b. If the contractor felt that full pollen columns were required, it should have been included in the proposal or in a request for contract modification.

Why was only maximum thickness of sherds recorded and why only for size grade two body sherds? This does not seem like it would provide a true mean for a ceramic component. Maximum and minimum measurements of all non-rim sherds with both surfaces present would provide a truer picture of vessel thickness. Some studies have shown that thinner pieces or pieces left on the surface longer, or in the walking area break into smaller pieces. Measuring only larger sherds will skew the results.

On page 30 and elsewhere in this section on the stone tool analysis, it would be nice if the text contained one or two examples of technological classes, functional classes or descriptive categories, etc.

Rattlesnake Keeper Site (39LM160)

At 39LM160, while two units were deeper than called for in the scope-of-work, three were considerably shallower as was warranted by what was found. Therefore, the increased depth of the two units is not a valid reason for not digging the other 3 units required by the scope-of-work as implied on page 59. Since less work was also required at 39LM163, the lack of further work at 39LM160 is disappointing.

The author should list which levels were not entirely screened at site 39LM160.

How hard is Pierre shale? Are you certain that these lithics were tools? Maybe someone was idling away their time.

Could components A and B at 39LM160 be associated with horse nomads instead of Plains Village peoples, as stated on page 112? Most survey reports mention a paucity of sites directly related to the Sioux or other horse nomads in this area. If no diagnostic artifacts are found in these components, the optional interpretation should not be ruled out.

What season was Rattlesnake Keeper occupied?

On page 82, there is noted a "... degeneration in Plains Village ceramic technology that is apparent in most Post-Contract Coalescent assemblages." I am not aware of any studies that support this observation. On page 87 it should be noted that there is no such taxon as "LaRoche Ware." Neither is Talking Crow Ware associated exclusively with the Post-Contract Coalescent variant. I urge the authors to examine any excavated Extended Coalescent assemblage for Talking Crow Ware. The authors' arguments for identification of 39LM160 component C as Post-Contract Coalescent are not fully persuasive. Ceramic descriptions, illustrations, and the usable 14C date can be interpreted as an Extended Coalescent component. While the ceramic evidence is very limited, the authors assign Extended Coalescent types to the pottery. If the 14C date is read at the 95% confidence level, the case for Extended Coalescent is strengthened. Distributional evidence (Lehmer 1971) indicates that the upper Big Bend locale has a high density of Extended Coalescent sites as opposed to Post-Contract Coalescent sites. The authors state (page 99) that the raw lithic materials represented in component C are consistent with those identified in other Post-Contract Coalescent assemblages of the Lake Sharpe area. It also can be said that these identifications are consistent with Extended Coalescent assemblages of the area.

SPECIFIC COMMENTS

Abstract

Pages iv-v - use the 150 word abstract on DD1473.

Management Summary

Page 1, para 2, last sentence - move sentence to follow sentence 7.
" para 3, line 8 - "tasks" should be singular. Also see page 111, para 1, line 2.

Introduction

Page 4, para 1, line 4 - change "(USCE)" to "(USACE)" when referencing the Corps. Also see page 4, para 2; page 5, paras 2 and 4; page 7, para 2; page 11, para 3; page 15, paras 1 and 2; page 16, last para; page 17, para 1; page 18, para 6; page 39, para 2; page 40, para 5; page 44, para 3; page 52, last sentence; page 59, para 3; page 117, para 2; page 120, para 3; page 157, para 2; page 193, 5th reference.

Page 7, para 2 - why did the author believe Lehmer's definition of regions had more validity than the ones in the States' draft management plan (Buechler 1984)? While Lehmer's work is the basis for understanding Middle Missouri prehistory, recent reports have indicated that revisions are necessary. The current Lake Sharpe project area does not necessarily relate to prehistoric use areas. Either the paragraph should be eliminated or the author should show how using Lehmer's definitions would have changed the interpretations of the three sites tested.

Page 11, para 1, line 7 - delete "as".

" para 3, line 4 - place a and "a" in "Archaeological".

Page 12, para 3, line 11 - change "is" to "was".

Page 14, para 2, last sentence - change to past tense.

Page 15, para 3, use past tense in this paragraph.

Research Design

Page 16, para 6, line 5 - delete "not".

Page 17, para 2, line 5 - "questions" should be singular.

Page 22 - it is stated that some deposits were not screened. Since this was approved by the contracting officer's technical representative, this is not a problem. However, was any consideration given to water screening using lake water? If so, why was this method not chosen?

Page 23, para 2 - should Feature 100 be Feature 1? If not, more explanation of the numbering system for features is required.

Page 29, para 1 - it is mentioned that not all of the procedures followed those applied to the Big Hidatsa collection. The author should state which ones did and which did not use these models? All simplified analytic systems should be noted. Why did the original systems conflict with the scope and requirements of this study?

Page 31, para 2, #4 - should this be "incomplete"?

Background Information

- Page 33, para 3, line 5 - replace "was" with "were".
Page 34, para 2, line 3 - use lower case "unglaciaded".
Page 38, para 5 - the flood plain is also visible below Ft. Randall Dam to upstream of Lake Lewis and Clark.
Page 45, para 3 - check William Fawcett's 1988 article on timber depletion in the Plains Anthropologist.
Page 44, page 2, line 2 - 1806" should be "1804".
Page 48, para 1 - the first two sentences at the top of this page are good indications of why the Lost Nation site is important. However, this will need to be expanded in the National Register nomination.

Rattlesnake Keeper Site (39LM160)

- Page 62, para 4, line 2 - insert "to" after "up".
" " line 7 - insert "the" after "on".
Page 63, para 2, line 11 - change "under" to "will".
Page 77, para 1 - is a calibrated date the same as a date that has been corrected for the fluctuations in the atmospheric C14?
Page 79, para 1, line 6 - replace "the" with "in".
" para 2, line 2 - begin sentence 2 with "Most".
Page 101, para 1, line 3 - "clinker" should be plural.
Page 110, only para, line 8 - change "absence" to "absent".
Page 111, para 1, line 21 - insert "the" after "near".
Page 112, para 3, line 12 - change "situate" with "situation".

Lost Nation Site (39LM161)

- Page 117, para 3, line 2 - change "scattered" to present tense.
Page 120, para 2 - the legal description should be removed from the paragraph. This information should be on updated site forms. Just state that the location was off by "x" amount whatever it was.
Page 120, para 4, line 3 - change "in" to "on".
Page 148, Table 33 - the table is not necessary since it contains little information not discussed in the text.
Page 154, para 1, line 4 - "precipitation" is misspelled.
" para 3, line 1 - delete "a".
Page 157, para 2, line 13 - change "excavated" to present tense.
Page 165, para 4, line 7 - delete second "was".
Page 167, para 2, line 10 - insert "least" after "at".

Synthesis and Interpretation

- Page 169, para 3, line 15 - delete second "the".
" para 4, line 6 - change "distance" to "distant".
Page 171, last para, line 7 - change "an" to "a".

National Register Evaluation and Management Recommendations

- Page 172, para 2 - why was only Steinacher and Toom 1985 used? Does not Buechler (1984) have research questions and domains for each subarea?
- Page 174, para 2 - this paragraph contains helpful information. When this site is tested/mitigated should components A and B be ignored as you go for C or should they be excavated carefully? The recommendation to use mechanical stripping, if possible, indicates that levels A and B are expendable.
- Page 174, para 3, line 10 - change "keep" to "kept".
- Page 176, para 2 - bank stabilization is possible at this site.
" " , last line - insert a comma after "District". Also see page 206, para 1, line 6.
- Page 176, para 2, line 4 - change "Addition" to "Additional".
- Page 177, last para, line 4 - change "has been" to "was".

Appendix B

- Page 209 - what three Catostomidae have been found in the region? This problem crops up a couple of times in this appendix.

Appendix D

- Page 221 - in the description of the A1 horizon, "consistence" is used instead of "consistency". This occurs throughout this appendix.

Appendix E

- Page 232, Table E1 - the title should be "Table E1 continued". How does the author know that the hearths and pits are extramural?
- Page 233, Table E2 - should the column heading be FTN like on page 231 instead of FND?

Appendix F

- Pages 241-243 - why do the entries in the format/length column have decimals? It was stated that all the entries for weight would be whole grams. The decimal gives the data a level of precision they may not have.