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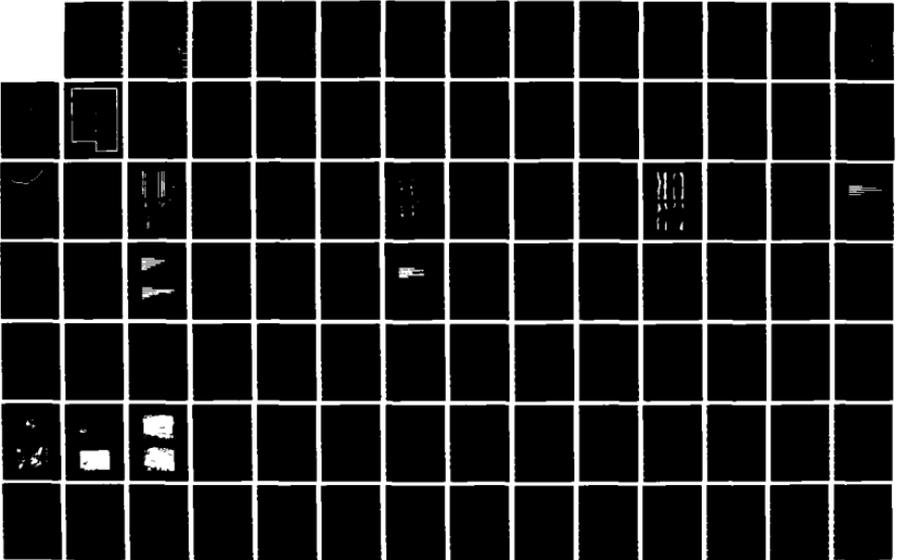
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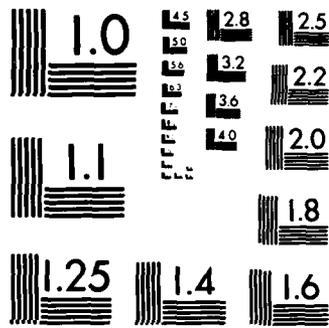
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ARCHAEOLOGICAL TESTING AND SURVEY:
TESTING OF THREE SITES AND SURVEY OF A ROAD DETOUR
WITHIN PROPOSED PROJECT CONSTRUCTION ZONES,
BURLINGTON DAM FLOOD CONTROL PROJECT AREA,
UPPER SOURIS RIVER, NORTH DAKOTA

by

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Prepared for:

United States Army Corps of Engineers
St. Paul District
St. Paul, Minnesota 55101

Prepared under Contract DACW 37-77-C-0128

January, 1980

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 This cultural resource survey is of lands to be affected by the proposed Burlington Flood Control Project. The study area is located in north-central North Dakota along the Souris River from approximately two mile north of Burlington to the Canadian border. Survey of the area produced 48 archaeological localities including 18 tipi ring or stone circle sites and 30 occupation sites. Analysis of the cultural remains and other archaeological features indicates Plains Archaic, Plains Woodland, and Plains Nomadic manifestations. Further testing was done at the Herzig site, Washak site and Big Critter site. These sites are in immediate danger of destruction by the Des Lacs Diversion Tunnel outfall, construction and borrow area activities, respectively. Only the Washak site produced an array of cultural materials including lithic tools and debitage, fire-cracked rock, and fragmented and identifiable bone, indicating the site was a specialized area for meat processing.
 Recommendations for mitigation are offered as well as National Register eligibility evaluations.

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ABSTRACT

In 1977 the U.S. Army Corps of Engineers, St. Paul District, contracted with University of North Dakota Archaeological Research to conduct a cultural resource inventory of lands to be affected by the proposed Burlington Flood Control Project. The study area is located in north-central North Dakota along the Souris River from approximately two miles north of Burlington, North Dakota, to the Canadian border. Survey of this area produced 48 archaeological localities including 18 tipi ring or stone circle sites and 30 occupation sites. Analysis of the cultural remains and other archaeological features indicates Plains Archaic, Plains Woodland, and Plains Nomadic manifestations within the valley.

Under contract agreement the University conducted test excavations at three of the 48 aforementioned sites and also surveyed a road detour route for further sites in the fall of 1978. The three sites tested are the Herzig site (32WD401), the Washek site (32WD407), and the Big Critter site (32WD408). These sites are in immediate danger of destruction by Des Lacs Diversion Tunnel outfall, Burlington Dam construction, and borrow area activities, respectively.

In conjunction with the testing, a detour route was also surveyed for possible archaeological sites. The detour route consists of widening and other improvements of the present roadway of Ward County Road 10 from County Road 15 to County Road 17 and of County Road 17 from County Road 10 to County Road 8.

An insignificant amount of cultural material was recovered from both the Herzig and Big Critter sites. Survey of the detour route revealed no surface indications of sites existing along this route. The Washek site, however, produced an array of cultural materials including lithic tools and debitage, fire-cracked rock, and fragmented and identifiable bone.

Analysis of the materials from the Washek site indicates a specialized camp site or activity area associated with meat processing, particularly the extraction of bone grease.

Recommendations for mitigation are offered as well as National Register eligibility evaluations.



Acquisition For	
Project	
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Site	
State/	
County	
Section	
Range	
Availability Codes	
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We gratefully acknowledge the U.S. Army Corps of Engineers, St. Paul District, for the contract and monies necessary to do follow-up work in the Souris River Valley.

Thanks go to the landowners for the access and permission to excavate at sites on their land. Thanks also to the personnel at the Upper Souris National Wildlife Refuge for allowing us to travel on the private roads of the Refuge and for their interest in the project.

We owe special thanks to the merchants of Mohall for their cooperation and helpfulness. Also, thanks to all residents of the area that we had the pleasure of meeting and conversing with as well as for their acceptance of our crew.

Mr. and Mrs. Sid Olson provided rental housing for our crew and to them we owe a special thank you.

Michele Schreiner typed and edited the draft final report. Sue McCullough illustrated all of the artifacts.

Last, but certainly not least, goes the thanks to the crew without whose interest and persistence the project would not have been possible.

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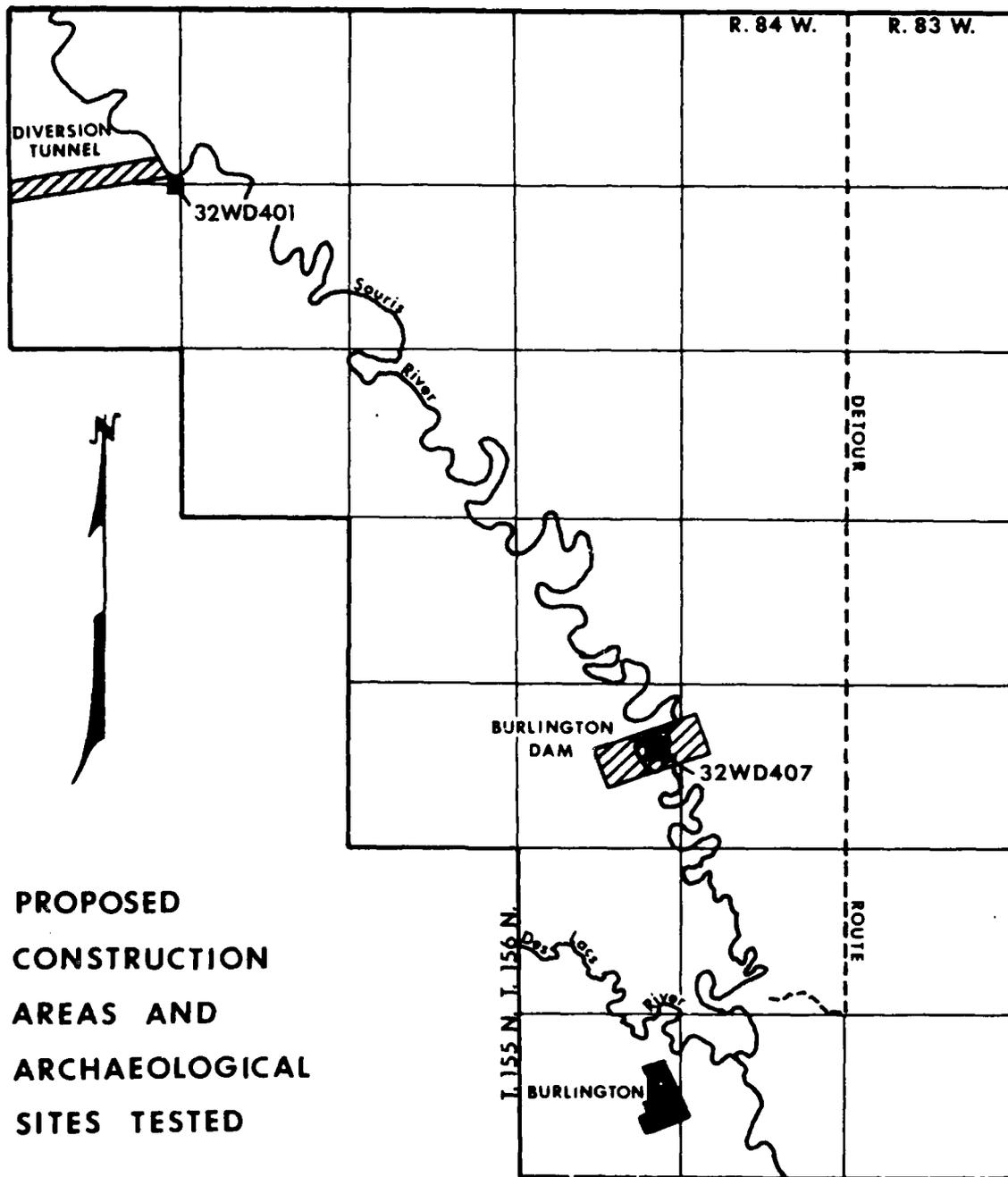
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INTRODUCTION

During the fall of 1977, the University of North Dakota contracted with the U.S. Army Corps of Engineers, St. Paul District, for a cultural resource study of the proposed Burlington Dam acreage within the Souris River ("Mouse River") Valley, Ward and Renville Counties, North Dakota. The work was conducted under the terms of contract number DACW 37-77-C-0128. As a continuing part of this research, in October, 1978, a University of North Dakota Archaeological Research team received permission from landowners to conduct test excavations at three archaeological sites in immediate danger of destruction by the proposed Burlington Dam Flood Control Project construction areas and activities. A survey of a proposed road detour route within the Flood Control Project was also completed. Funds and specifications were provided under U.S. Army Corps of Engineers, St. Paul District contract no. DACW 37-77-C-0128, Supplemental Agreement No. P00001 (Appendix A).

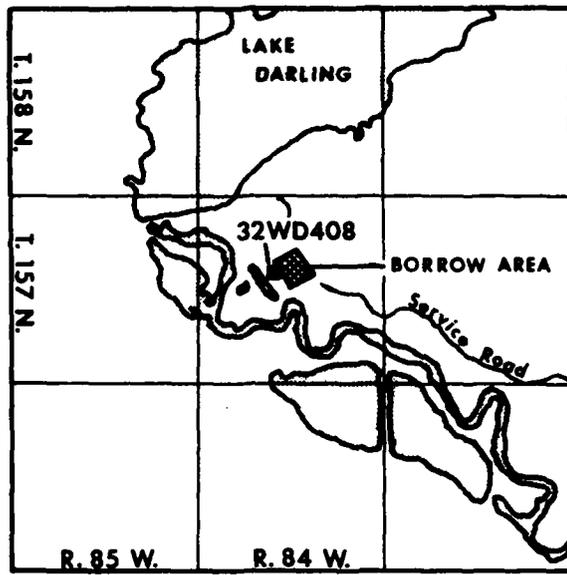
The proposed Burlington Dam Flood Control includes the placement of a dam upstream from Burlington, North Dakota, raising of the Lake Darling Dam, a diversion tunnel to carry floodwaters from the Des Lacs River to a point above the Burlington Dam on the Souris River, road improvements and other modifications of the waterway and areas near it. This would in turn raise the water level above the Burlington Dam to 1620 ft msl (Mean Sea Level) at full pool capacity, inundating approximately 25,500 acres of land (U.S. Army Corps of Engineers 1978). The main objective of the project is to control runoff resulting from spring thaw and rains and to prevent the flooding of lowland areas in and around Minot, North Dakota and adjacent areas (Good and Fox 1978).

Three archaeological sites were designated by the Corps for intensive testing. These include the Herzig site (32WD401), the Big Critter site (32WD408) (both privately owned), and the Washek site (32WD407) which is partly owned by the State of North Dakota, and part privately owned. These sites were all discovered in the 1977 survey of the project area conducted by University of North Dakota Archaeological Research (Good and Fox 1978) and are in immediate danger of destruction by Diversion Tunnel outfall, the construction of the Burlington Dam, and a borrow area adjacent to the Lake Darling Dam, respectively (Figures 1 and 2). The purpose of the tests was to determine if subsurface cultural materials did exist, determine the condition of the remains, and to delineate their spatial extent and probable cultural affiliation. The testing phase was also conducted to help determine if the sites meet the National Register of Historic Places (NR) eligibility criteria. If sites exist which are NR eligible, estimates are to be included for time and costs involved for any necessary mitigation. The survey of the detour route Ward County Road (C.R.) 10 from C.R. 15 to C.R. 17; C.R. 17 from C.R. 10 to C.R. 8 (Figure 3) was accomplished for location and identification of any archaeological sites that may be affected by road construction activities.



**PROPOSED
CONSTRUCTION
AREAS AND
ARCHAEOLOGICAL
SITES TESTED**

Figure 1. Proposed Construction Areas and Archaeological Sites Tested.



**PROPOSED
BORROW AREA
AND
ARCHAEOLOGICAL
SITE TESTED**

Figure 2. Proposed Borrow Area and Archaeological Site Tested.

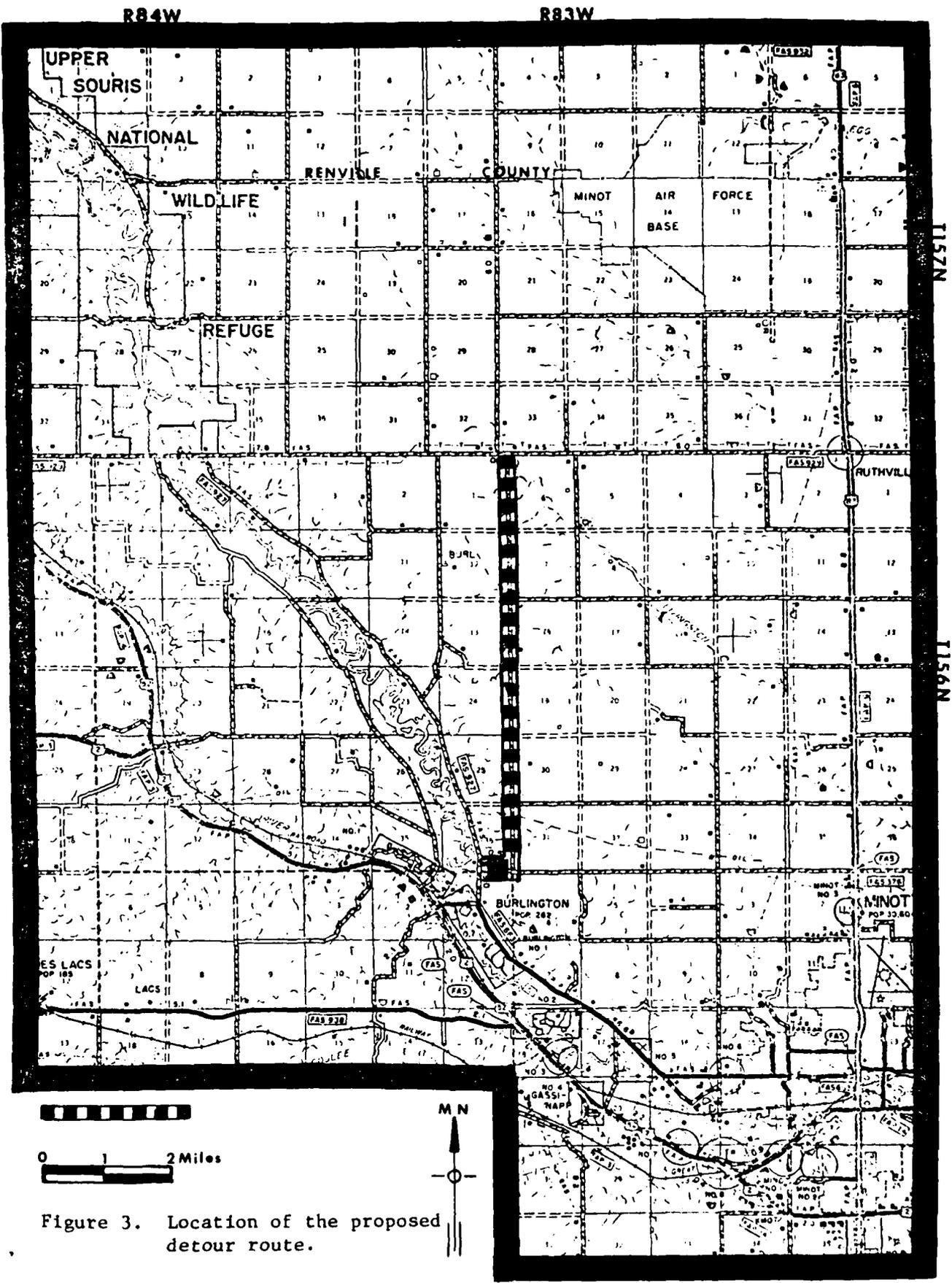


Figure 3. Location of the proposed detour route.

Study Area

Topography

The study area is situated along or near the Souris River in north-central North Dakota upstream from the city of Minor in Ward County (Figure 1). This area is included within the Central Lowlands physiographic province, and topography is characterized by gently undulating ground moraine plain and the Souris River drainage system. During Pleistocene times the Wisconsin glacial advances covered the region; with their retreat, the meltwaters created ancient glacial Lake Souris. As the lake and meltwaters drained, erosion occurred which cut into the bed of the plain and formed the present Souris River Valley. Elevation ranges from 1520 ft on the floor of the valley to over 2300 ft in the morainic hills southwest of Hartland (USDA 1974). A series of glacially deposited hills traverse central Ward County northwest to southeast dividing the county into two, separate, watershed districts. One flows into the Missouri and Mississippi River drainage systems, the other includes the Souris River drainage pattern and flows eventually into Hudson's Bay. On the west this area is bounded by the Coteau du Missouri (see Good and Fox 1978 for a more detailed description).

Climate

Climate is a factor of the highest priority in determination of floral and faunal assemblage within a given region. Complex, interacting ecosystems are developed from the symbiotic relationships of fauna, flora, and micro-organisms in a given physical context. Seasonal variations in climate cause migrations and other modifications of behavior. Prehistoric man was directly and strongly affected by seasonal change in his environment. Particularly, his subsistence activities, need for shelter and clothing, and mobility were directly affected by climate.

A cool, dry-subhumid continental climate with long, cold winters and a short growing season is characteristic of this region. January is the coldest month with a mean maximum daily temperature of 18° F and mean minimum daily temperature of -4° F; July is the warmest with average daily maximum and minimum temperatures of 83° F and 50° F respectively. The average annual maximum and minimum daily temperatures are 52° F and 28° F respectively. Precipitation comes mainly in the form of rain in the spring and summer months for an annual average of 15.62 in. The

prevailing winds blow from the northwest at an average velocity of 15.9 mph, while the mean, yearly, wind velocity is 12.4 cph (USDA 1974*).

Flora

The flora of the Upper Souris Valley is an extension of the eastern deciduous forest (Rudd 1951). From Lautenschlager's (1964:31) observations of the Upper Souris in Ward County, North Dakota, it appears that the dominant vegetation unit within the study area corresponds closely to Kuchler's (1964:98) Northern Floodplain Forest (Populus - Salix - Ulmus). Burgess et al. (1973:19) agree and characterize this broadleaf deciduous forest type as low to tall, open to dense and often with lianas. In an earlier study, Bailey (1926:13) identified Souris Valley vegetation communities as the eastern (humid) division of the Transition Life Zone.

Elements of the Oak Savanna (Quercus - Andropogon) vegetation unit (Kuchler 1964:81) are also present in the floodplain forest. Lautenschlager (1964:31) did not encounter bur oak (Q. macrocarpa), a dominant in the Oak Savanna unit, throughout the study area north of Burlington, North Dakota; however, his observations were confined to the river valley within Ward County. It is suspected that this species does occur in and near the study area, particularly in the wooded coulees. Other Oak Savanna dominants (e.g., big and little bluestem; Andropogon gerardi and A. scoparius) do occur frequently, interspersed throughout the forested areas.

Valley floor vegetation can be analysed in terms of low bottom and high bottom flora, much in the same manner as reported in Burgess et al. (1973:19). Low bottom species in the study area include American elm (Ulmus americanus), green ash (Fraxinus pennsylvanica), box elder (Acer negundo) and Populus spp. (Lautenschlager 1964:31). Other components of Kuchler's Northern Floodplain Forest or Oak Savanna identified by Lautenschlager (1964:31) as occurring along the river bottom are black willow (Salix lutea) and western wild rose (Rosa woodsii). High bottom species are recognized by Lautenschlager (1964:26) as occurring in the coulees along river valleys. They also occur along the terraces and midslopes of the Souris Valley. High bottom areas, unlike lower bottoms, are not flooded or eroded by the river. Dominant high bottom species include Agropyron spp., Andropogon spp., and Bouteloua spp.

Some soils in the study area floodplain, particularly in Ward County, are not conducive to cultivation (see Soil section). These low bottom

*Weather conditions recorded at Minot, North Dakota.

areas, usually in or near oxbows and interspered throughout forest stands, are dominated by reed grasses (Calamagrostis inexplansa, Calamovilfa longifolia), blue grama (Bouteloua gracilis), prairie cordgrass (Spartina pectinata) and sedges (Carex spp.) (Corps of Engineers 1978:50, scientific names from Stevens 1963). Other areas have been converted to tame and wild hay (Corps of Engineers 1978:50). Most of the acreage is used as pastureland or harvested for livestock feed.

Creation of the Upper Souris National Wildlife Refuge resulted in the formation of extensive wetland and marsh acreage along the low bottoms in the study area. A variety of floral species peculiar to these habitats flourish. However, since they are for the most part not representative of former conditions, they are not discussed herein. The high bottoms in the refuge are maintained in the vegetation approximating former natural conditions. These include the tall and mixed grass prairie grasses.

The surrounding upland prairie, which often grades imperceptibly into the river valley, maintains a wheatgrass - bluestem - needlegrass community (Agropyron - Andropogon - Stipa) (Küchler 1964:67). Other upland prairie genera identified by Lautenschlager (1964:28) and characteristic of Küchler's prairie community include Echinacea, Psoralea and Solidago.

Many plants found in the study area were utilized regularly for various purposes by prehistoric human occupants.

Fauna

In an ecological sense, the terrain, climate, soils and biota of the Upper Souris and surrounding area are continuously interacting and mutually dependent. Vegetation throughout the area serves as browse for ungulate species. Wooded coulees and floodplain forests provide shelter from the often severe climate and a sanctuary from predators. In turn, animal life is a significant contributor to the soils that support floral communities (USDA 1974:82). Micro-organisms convert organic matter to humus; earthworms and rodents tend to mix the soil. Insects and other animals help maintain a vegetation density complimentary to the land's carrying capacity.

Shelford (1963:118) has characterized this ecological relationship as the floodplain forest biotic community of the grassland biome. Earlier, Bailey (1926:11) assigned the Souris River Valley biota to the Eastern (humid) Transition life zone. Vegetation characteristics of this life zone (and Shelford's forest community) closely resemble the floral communities noted by Küchler (1964) and outlined in the Floral section. This floral assemblage helps provide a suitable habitat for a variety of animals.

Animal influents include a number of smaller mammals. The ground squirrel (Citellus richardsoni) and jack rabbit (Lepus townsendii) often frequent the river bottoms. A variety of rodents (Peromyscus, Microtis) inhabit the area. Predators include the red fox (Vulpes vulpes), the longtailed weasel (Mustela frevata) and coyote (Canis latrans) (Bailey 1926:11, 12).

Larger animal dominants that presently inhabit the valley are limited to white-tail deer (Odocoileus virginianus) and pronghorn antelope (Antilocapra americana). Formerly, mule deer (Odocoileus hemionus), elk (Cervus canadensis) and grizzly bear (Ursus horribiles) were common throughout the area (Bailey 1926:33, 41, 194). Other mammals may have included bighorn sheep (Ovis canadensis), moose (Alces americanus) and caribou (Rangifer caribou) (Bailey 1926:25, 31, 32). Archaeological remains in the valley indicate that bison (Bison bison) flourished in the past.

In addition to coyote, fox, antelope, white-tail deer and weasels, we encountered numerous other species during our survey. Perhaps the most common were semi-aquatic species such as mink (Mustela vison), beaver (Castor canadensis) and muskrat (Ondatra zibethicus). Wheeler and Wheeler (1966:32, 42, 70) have identified numerous Amphibia and Reptilia common to Ward and Renville Counties. Selected species include toads (Bufo spp.), the plains garter snake (Thamnophis radix) and the tiger salamander (Ambystoma tigrinum).

Prior to the construction of the Upper Souris Wildlife Refuge, some aquatic avian species frequented the natural ponds and marshes along the Souris River. These wetland habitats, developed as oxbow remnants, were formed by the river's complex meander system. Bailey (1926:12) does not list species of goose, but ducks (Aristonetta valisineria, Perisoreus collaris) occur with some frequency. Today, the extensive refuge wetlands provide a habitat for geese and other migratory birds. Predators seem to be limited to a variety of hawks (Buteo jamaicensis, Circus cyaneus), although we did spot one golden eagle (Aquila chrysaetos). Other birds, including sparrows (Melospiza georgiana, Passerculus gramineus), are numerous.

Individual sites and the detour route discussed in the following pages will be dealt with in physical perspective; that is, micro-environments (such as ecozones) will be identified along with the cultural materials and conditions encountered.

PREVIOUS ARCHAEOLOGY

The most extensive reconnaissance of the study area was conducted in the fall of 1977 (Good and Fox 1978). During this survey 48 archaeological localities were identified in an area from the proposed Burlington Dam site upstream nearly to the Canadian border (Figure 4). Testing of three of these sites, an additional survey of a roadway, and analysis of the cultural remains recovered are the scope of this report. Preliminary research involving a records and literature search were accomplished prior to the 1977 survey and resulted in 50 possible site leads (Schneider 1977). Thadeus Hecker recorded these sites during work for the W.P.A. in 1937 and 1938. The State Historical Society of North Dakota conducted a limited survey of certain portions of the Burlington Dam project area in 1974 and 1975 and recorded eight archaeological sites. No other recorded reconnaissance has been done in the study area; north of the border, Canadian archaeologists are involved in research of past cultures of the Souris Valley (Syms 1971).

PROJECT GOALS AND TECHNIQUES

Test excavations were conducted at the Herzig site (32WD401), the Big Critter site (32WD408), and the Washek site (32WD407). Investigations of these sites were implemented to determine site boundaries, existence and conditions of subsurface remains, probable cultural affiliation, and site significance pursuant to National Register of Historic Places criteria. Cultural material was found in significant amounts at the Washek site; however it was found in very small quantities at the other sites.

Standard archaeological procedures began with mapping of the sites. This was accomplished by use of a plane table and alidade. Contour intervals and natural boundaries, such as the river, were plotted on the maps.

In conjunction with mapping, a north-south/east-west baseline was established and staked with lath. The interval between stakes at the Washek site was 20 m, at the Herzig and Big Critter sites 30 m. These baselines were established both for auger boring and the placement of excavation units. The intersection of the baselines was given the coordinates 0.0 to serve as a point of reference for the grid system. When this was completed the sites were photographed.

An 8 in (20.3 cm) diameter power auger was used to take samples at designated intervals along baselines in an attempt to determine the horizontal boundaries and vertical depth of the sites.

A tarp with a hole in the center corresponding to the size of the auger bit circumference was placed over each auger hole co-ordinate. The matrix sample brought to the surface by the action of the auger was caught on the tarp. It was then removed and screened through $\frac{1}{2}$ in (6.3 mm) hardware mesh to recover cultural material. Any cultural material was then catalogued and bagged with the auger hole coordinates.

The use of a power auger enabled sampling to a depth of 60 cm on the Washek and Herzig sites. The Big Critter site exists on a glacial outwash plain; during augering a layer of rock was hit uniformly over the entire site. It was impossible to penetrate with an auger.

Auger bore samples aided in the placement of excavation units which would have normally been arbitrarily located or located on the basis of surface debris. Locations of the excavation units were selected on the basis of three considerations: 1) the quantity of cultural material recovered from an auger boring, 2) the quality of the remains, and 3) interpretation by the investigators. One 2 x 2 m test unit was excavated at each site.

Coordinates of the units were designated according to the location of the southwest corner of the unit. Datum depths were calculated by means of a line level at ground surface from the southwest corner stake.

The Herzig site was excavated in arbitrary 10 cm levels to a depth of 60 cm. The unit was then divided in half and the north portion was excavated to a depth of 70 cm. Trowels and shovels were used in the upper levels. Soils of the Ludden series, an alluvial deposit which has a high clay content and is poorly drained, was encountered in the lower levels making excavation with a pick necessary.

The Big Critter site exists on a glacial outwash plain. The test unit here was excavated in 10 cm levels to a depth of 20 cm. Half of the unit, the west portion, was continued to a depth of 30 cm before a uniform layer of rock discouraged further excavation.

The Washek site was excavated in 10 cm levels to a depth of 80 cm. The floor of the unit was then shovel tested to explore for potentially deeper deposits. The upper levels were troweled and shoveled. In the lower levels, the Ludden series soil with high amounts of clay and high water capacity was again encountered making the use of a pick necessary.

Matrix from all units was screened through $\frac{1}{2}$ in (6.3 mm) hardware mesh to recover cultural material. All cultural material was catalogued, bagged by level, and given appropriate coordinates.

Standard field notes were kept throughout the project. Photographs were taken of the floor of each excavation level. Maps of the floor were made when warranted, and any soil changes were noted. Profiles of the natural stratigraphy of the units were drawn when the units were finished. All test units were completely backfilled when the investigation was completed.

A survey of the proposed detour route of Ward County Road (C.R.) 10 from C.R. 15 to C.R. 17 (approximately 3,500 ft), and C.R. 17 from C.R. 10 to C.R. 8 (approximately 6 mi) was undertaken for one work day by a crew of six persons. The goal of the survey was the location and identification of archaeological sites that would be disturbed by proposed road improvement activities. The entire detour route survey followed existing county roads. The roads are to be widened approximately 20 ft. The road right-of-way will also be widened from the current 90 ft to 150 ft.

The detour route lies in the Upland Prairie ecozone above the valley. Vegetation is primarily prairie grasses. A pedestrian survey was conducted at 10 m intervals to a total width of 30 m on both sides of the existing centerline. Ground cover varied from cultivated fields to pasture.

DEFINITION OF TERMS

Before proceeding with a discussion of tested sites, we believe a "definition of terms" section is not only beneficial to the reader, but essential in understanding the analysis of the recovered material. The majority of material recovered consists of chipped stone tools, waste flakes, and faunal remains. The following section pertains to terms used in the analysis of these two categories of cultural remains.

Where specific artifacts from the project are referred to in the report, the reference is followed by a letter-numeral designation such as "L3-1." The letter and first numeral refer to the level in which the artifact was found (L3 for level 3). The second numeral refers to the sequence in which the artifact was numbered in the laboratory. The site number also appears on each artifact.

Chipped Stone Terminology

The chipped stone assemblage of archaeological sites is represented by two distinct, yet integrated cultural traditions -- the chipped stone tradition (tools themselves) and the lithic manufacturing tradition (techniques and knowledge applied in the process of manufacturing the chipped stone tools). The chipped stone tool tradition is involved with tool types and their interpretative and speculative function. The lithic manufacturing tradition is concerned with flaking techniques and production sequences employed in the modification of cryptocrystalline silicates for use as tools (Geier 1973).

In place of "type," the term "group" has been substituted with the intent that group is a more general classification based on a smaller number of attributes. (The paucity of artifacts recovered is, in part, responsible for this substitution of terminology as it would seem irrelevant to establish a typology for only three or four tools within a particular functional category.) Since any artifact has an infinite number of attributes, it is of importance to list those relevant for inclusion within this report. Overall shape, symmetry, placement of scars, presence or absence of notches, presence or absence of particular wear patterns, and breakage patterns are considered those important in establishing artifact groups.

In the artifact analysis the bulb of percussion is used as the point of reference. The surface on which the bulb is located is designated the ventral surface or face, while the opposite surface or face is

referred to as the dorsal surface. The tip or end away from the bulb of percussion is the distal end, while the end on which the bulb is located or where it was originally located (if determinable) is the proximal end. Right and left margins or edges are determined by positioning the bulb, or proximal end nearest the describer with the ventral side down. Longitudinal axis refers to an imaginary line drawn perpendicular from the point of impact on the bulb of percussion across the surface of the artifact to the opposite, distal end. Longitudinal cross-section is parallel to this axis; transverse cross-section is perpendicular to it. Measurements such as length, width and thickness are maximum dimensions and are usually measured in relation to the longitudinal axis. Maximum length is a measure taken from the distal to the proximal end. Maximum width is a measure taken at right angles to maximum length and is a measure of the maximum distance between lateral margins of the artifact. Maximum thickness is a measure between the dorsal and ventral surface which may coincide with striking platform width.

Lithic debitage, which is one segment of the chipped stone manufacturing tradition, is comprised of waste flakes and other tool manufacture debris. We assume that variances in the lithic debitage reflect variances within flaking techniques and production sequences. Analysis of the lithic debitage or, in terms of Deetz's (1967) concept, "negative evidence," may reveal preferred methods of flake removal in the process of achieving the mental template or, perhaps, the introduction of a new template.

Our research is based on the identification and analysis of the lithic debitage; however, it should be stressed that the amount of lithic debitage recovered through test excavation is meager and as such, an understanding of the manufacturing and flaking techniques is limited. Our purpose is to offer descriptions which may suggest directions for future study in the area.

"Raw material" selected for the process of tool manufacture is affected by the texture, workability and availability of the material and personal preference of the craftsman. Knife River flint, the most common raw material, was quarried mainly in west-central North Dakota and is present in gravels along the Missouri River.

Waste Flake Terminology

Flake class is concerned with the identification and association of lithic debitage with various stages of modification of the parent material and has been referred to within this report as stages of decortication. The terminology for flake analysis has been obtained

from White (1963) and from Schneider (1974). Those flakes which are detached first from nodule or pebble are termed Primary Decortication Flakes. Cortex covers the entire outer surface of these flakes (dorsal surface). Secondary Decortication Flakes are flakes which have cortex on part of the outer surface. The entire striking platform may be covered with cortex but only part of the dorsal surface may be covered with cortex. Secondary flakes were removed from the source after the removal of primary decortication flakes and unlike the primary flakes, secondary flakes were, in many instances, selected to be used as a naturally backed tool (White 1963). Flakes having no cortex on the dorsal surface or striking platform are called Tertiary Flakes. Tertiary flakes include retouch or resharpening flakes.

ARCHAEOLOGICAL SITES TESTED

Herzig site - 32WD401

The Herzig site (32WD401) is located on the southwest bank of the Souris River, approximately 3.5 mi southeast of Foxholm, North Dakota. Survey in 1977 identified the presence of sparsely scattered bison bone and fire-cracked rock, along with three flakes in a cultivated field 1/8 - 1/4 mi west of the river. The locality barely qualified as a "site" on the basis of surface-visible remains. It was suspected that cultural materials may continue to the banks of the river to the east, but vegetation obscured the surface and no cultural remains were found. The site is endangered by construction and outfall of the diversion tunnel designed to reroute floodwaters from the Des Lacs River to the Souris upstream from the Burlington Dam (Figure 1).

Site Area

The area of the site is located within the Northern Floodplain Forest ecozone, characterized by forested areas and interspersed grassland meadows adjacent to the meanders of the river (Good and Fox 1978). Vegetation includes trees of Populus, Salix, and Ulmus species and grasses of Carex spp. and Bouteloua gracilis, among others. The meadows provide excellent summer and winter habitat for grazing and browsing animals, which in turn draw predatory species into the area. Close proximity of water is also an important factor in habitat utilization. Cattle currently graze the pasture extending west and south from the river.

The locale was mapped to include portions of the cultivated field in which cultural remains had been initially recovered the previous year, as well as the pasture northward to the banks of the Souris River (Figure 5). Universal transverse mercator (UTM) references of boundaries may be found in Appendix C. North-south and east-west baselines were established extending from the river bank south to the plowed field and adjacent to the river bank. Auger boring samples were taken at 20 m intervals along these baselines. Twenty-five auger samples were taken, investigating an area stretching from the river to 300 m south of the river and some 180 m near the river bank. One auger sample produced a minute amount of charcoal (coordinate 20N), hence a 2x2 m excavation unit (coordinates 18N-0; SW stake) was positioned at this location.

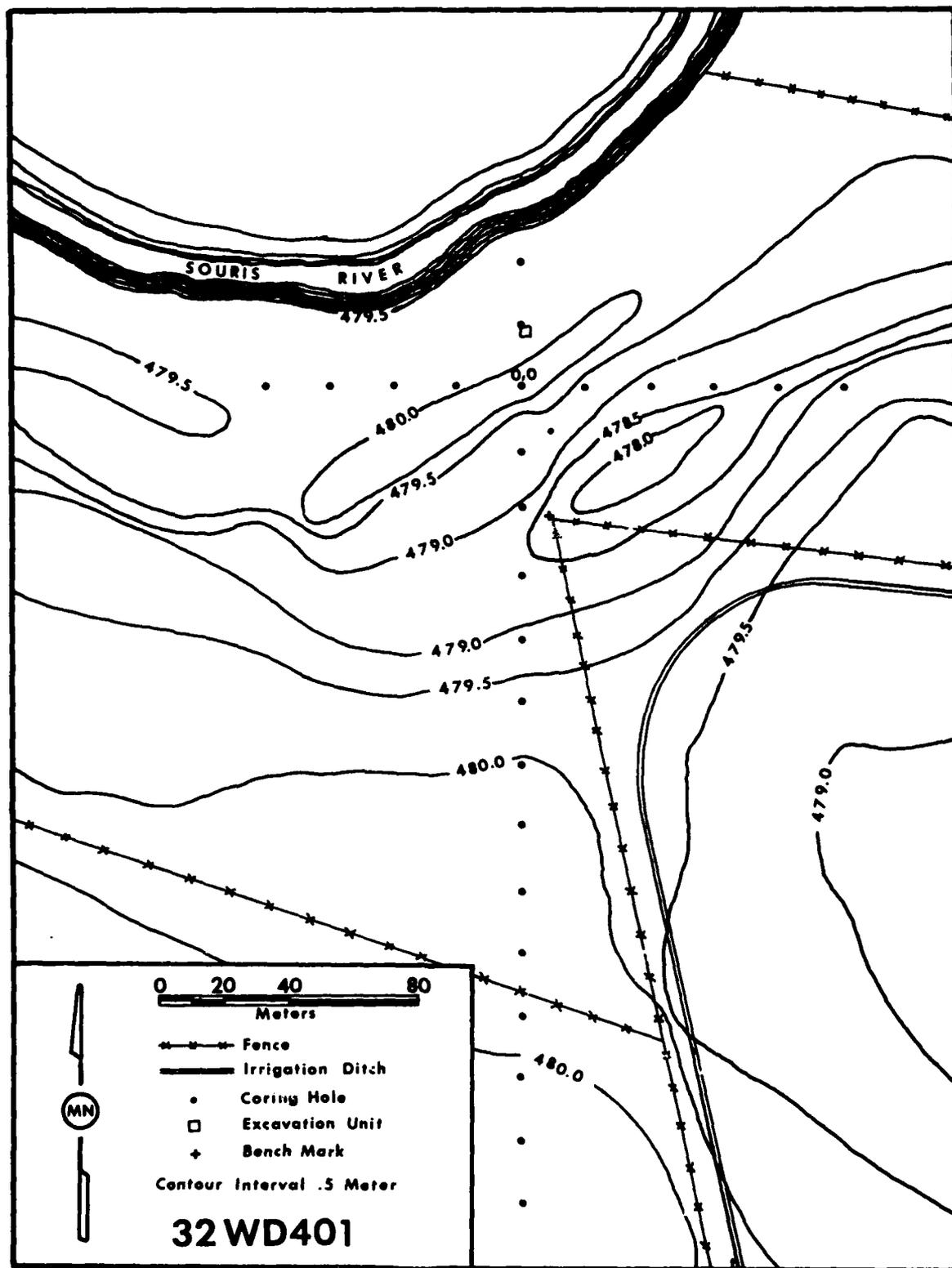


Figure 5. Herzig site: 32WD401 (debris too sparse to suggest site limits).

Excavation Procedures

Excavation proceeded in 10 cm arbitrary levels to a depth of 50 cm where the unit was halved and the northern portion excavated to 70 cm. Trowel and skimming shovel were used in the upper levels, while picks were necessary to remove the matrix in the lower 20 cm. The fill removed was screened through $\frac{1}{4}$ in hardware mesh to recover cultural remains. A very limited amount of bone and a few flecks of charcoal were obtained from Levels 2 and 3 (10-20 cm and 20-30 cm, respectively). These materials may or may not be part of a cultural deposit. No other indications of cultural activity existed within the unit and excavation ceased at the 70 cm level.

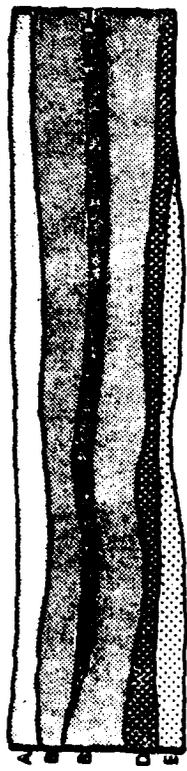
Stratigraphy

When excavation was completed, soil profiles of all four walls of the unit were drawn (Figure 6). The depositional sequence appears to be typified by alluvial silts deposited alternatively during years of flooding. Soil color and texture range from a grayish-brown, loosely compacted, silty topsoil to a medium-to-dark-gray, highly compacted, silty clay with carbonate streaks in the bottom levels. At approximately 20 cm below the surface a very thin lens of charcoal was revealed in the north wall. The necessity to use picks and the presence of numerous cracks in the floor in the lower levels of the unit are indicative of the extreme compaction of the soil.

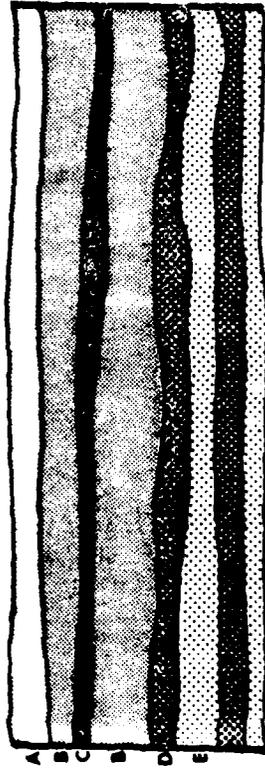
The soils are classed in the Ludden series, characterized as deep, poorly drained level soils with slow permeability and high water capacity. The A horizon ranges in thickness from 8-14 in, the B horizon is lacking, and the C horizon contains accumulations of lime. Color ranges from medium to dark gray (USDA 1974).

Possible Cultural Remains

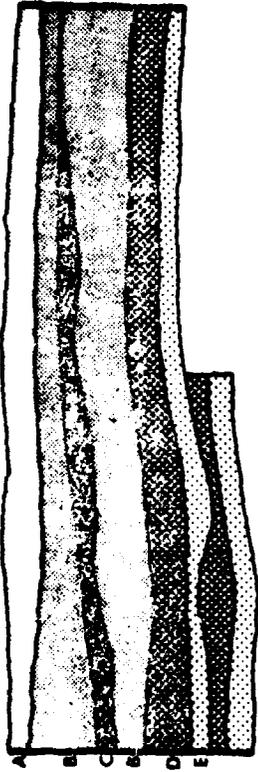
The bone from the unit consisted of a fourth carpal, a second phalanx, and fragmented, unidentified elements weighing 15.5 g from Level 2, and 6.9 g of unidentified bone from Level 3.



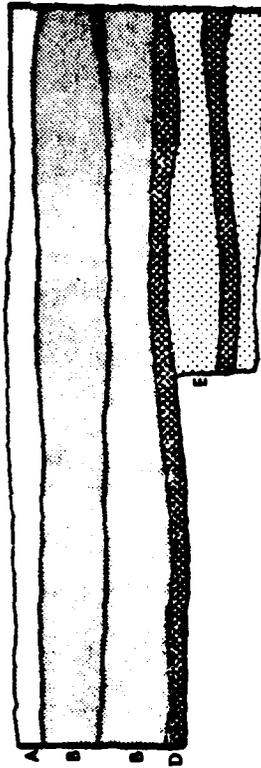
SOUTH WALL



NORTH WALL



EAST WALL



WEST WALL

- A Grayish brown silt
- B Gray clayey silt
- C Dark gray clayey silt
- D Dark gray silty clay with CaCO₃
- E Gray silty clay with CaCO₃



**HERZIG SITE - 32WD401
XU 18N-0 PROFILES**

Figure 6. Herzig site, 32WD401: soil profiles.

Discussion

Very little was recovered at 32WD401, both in the 1977 survey and the test excavation of 1978. The bone unearthed in the excavation unit is of Bison bison or Bos sp.; its specific category is impossible to discern because of the similarity between the two species in the elements found. The depth and condition of the bone would not be an indication of any great age, as the bone is well preserved and near the surface. The charcoal lens found in the north wall is very thin (4 mm) and near the surface and may represent a prairie fire or localized burn. The sparsity of cultural material may be the result of erosional activity from another site area or as a result of very limited cultural activity. The site is evaluated as not NR eligible and no further work is recommended.

Big Critter Site - 32WD408

The Big Critter site is located on an east terrace of the Souris River approximately $\frac{1}{2}$ mi (0.8 km) below the Lake Darling Dam. Three flakes and numerous bones of Equus caballus (horse) were discovered in this area in the fall of 1977 survey. The site is in a borrow area and would be destroyed early in the project by construction activities (Figure 2). Like the Herzig site, Big Critter barely qualified for "site" status on the basis of surface-visible remains.

Site Area

The locale is included within the Terrace Grasslands ecozone, which is characterized by mixed prairie grasses and a few shrubs growing on kame terraces formed by glacial runoff (Good and Fox 1978). This ecozone is a transitional margin between the Northern Floodplain Forest ecozone located adjacent to the river and the Upland Prairie ecozone which overlooks the river valley. Small mammals such as rabbit, badger, and fox generally inhabit this gently sloping or flat area.

A relatively large area was mapped (Figure 7) to include portions of both areas that produced cultural materials in 1977, although no remains were observed on the surface during the 1978 season. Baselines were established in the cardinal directions and auger borings taken at 30 m intervals along these intersecting lines. A total of 15 borings were made in an area measuring 180 x 240 m. Longitude and latitude of

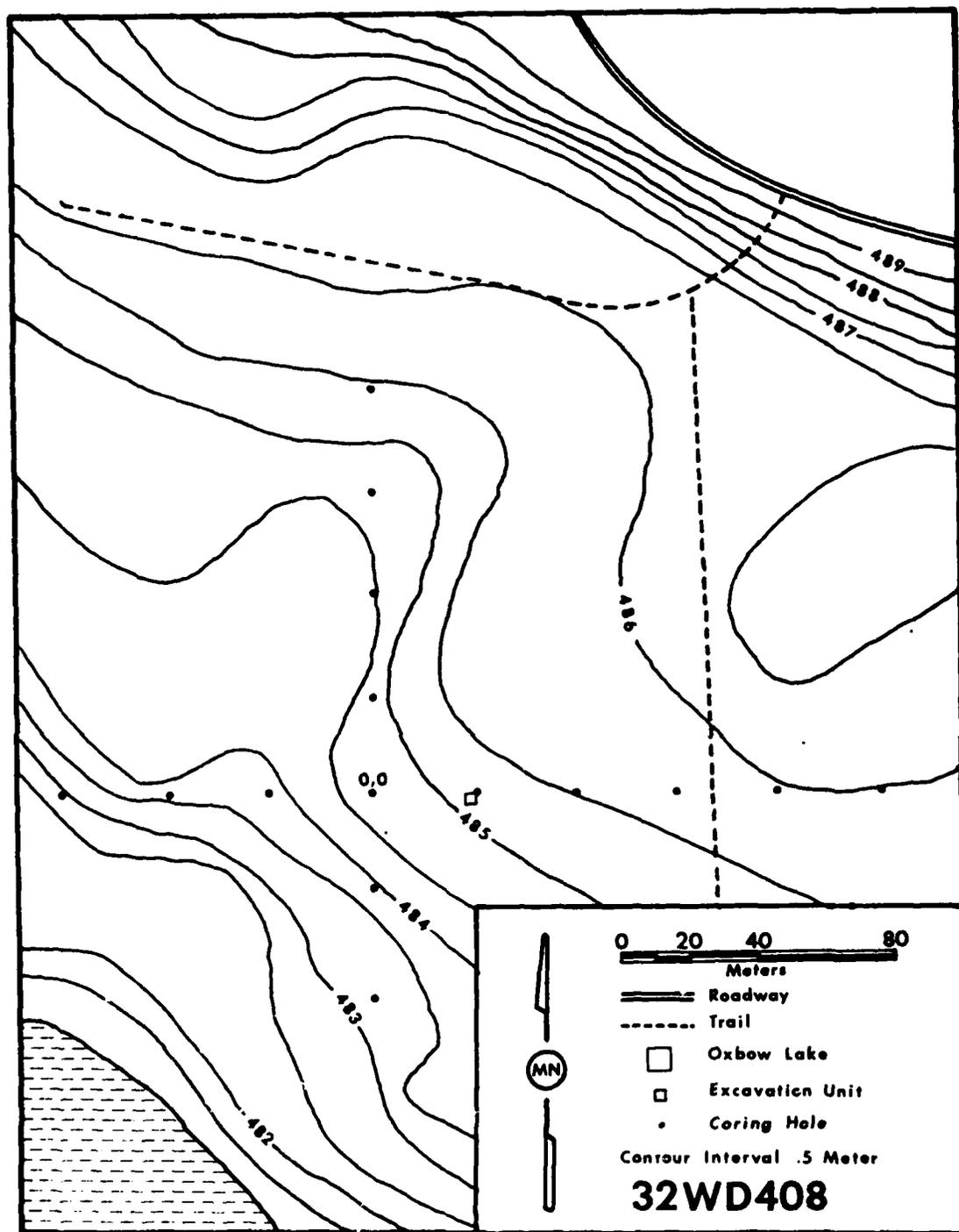


Figure 7. Big Critter site: 32WD408 (debris too sparse to suggest site limits).

the area augered are given in Appendix C. No UTM coordinates were calculated at this time because of the unavailability of updated U.S. Geological Survey maps. Only one auger sample produced cultural remains (a flake of Knife River flint) at 30 m east (30E) of the 0,0 intersection point. A 2x2 m excavation unit was placed at this location (coordinates 2S - 28E; SW stake).

Excavation Procedure

With trowel and skimming shovel, 10 cm arbitrary levels were removed to a depth of 20 cm where the unit was halved and the west portion excavated another 10 cm to a depth of 30 cm. All fill was screened, resulting in the recovery of one flake from Level 1. No other cultural materials were observed or recovered from the unit.

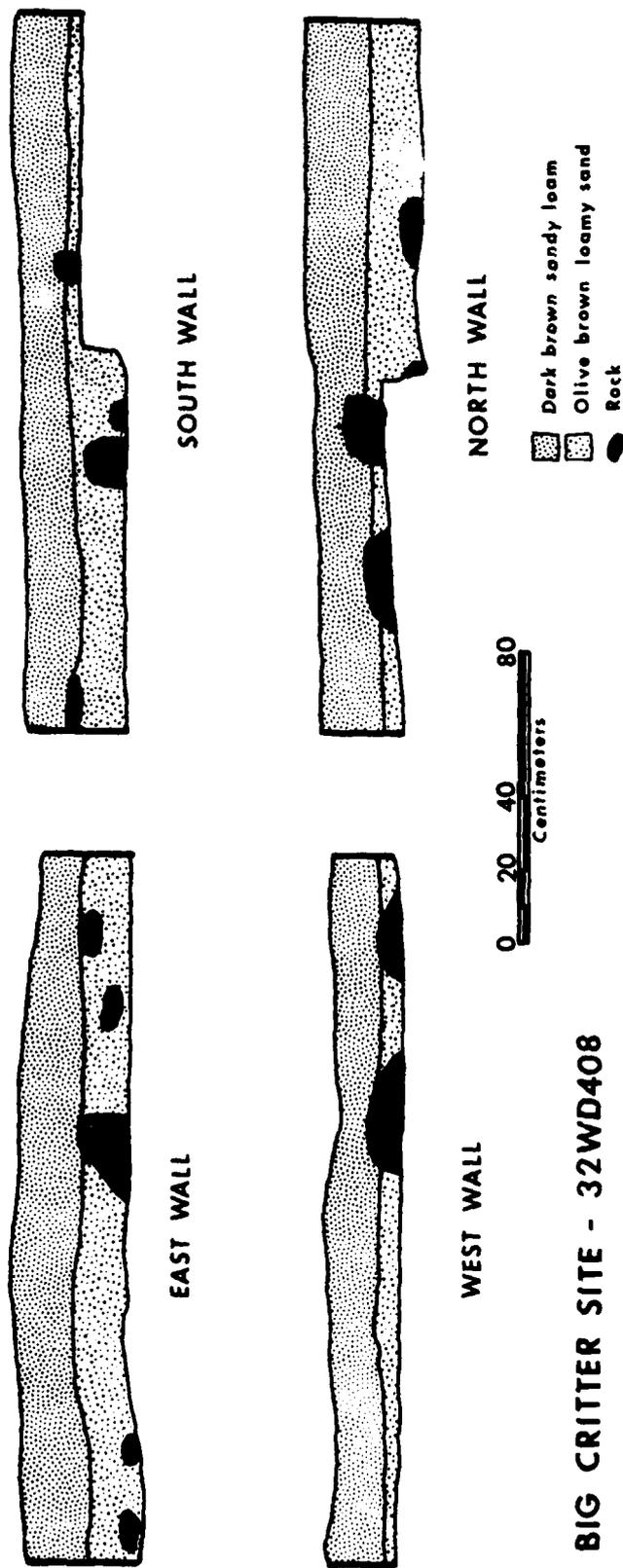
Stratigraphy

Figure 8 offers a map of soil profiles encountered in the excavation unit. The first soil layer or the A horizon, consists of a dark brown sandy loam of wind deposited origin approximately 15 cm in depth. The second stratum is an olive-brown, loamy sand and gravel with fist size and larger rocks interspersed within it. This layer is apparently of glacial origin as the site exists on a glacial outwash plain. During the auger boring operation this layer of rocky soil was hit uniformly over the entire area and was impossible to penetrate with the auger. A gravel pit nearby indicates that this soil horizon extends to quite a depth and, therefore, would most assuredly be of glacial origin. Due to its antiquity, it is concluded this layer is devoid of cultural debris.

Soils of this locality have been previously determined by the Soil Conservation Service as belonging to the Renshaw and Wabek soil series. These soils are well drained soils with relatively thin top-soil underlain by sand and gravels and found on glacial outwash plains (USDA 1974).

Cultural Remains

One flake of Knife River flint was discovered during auger boring operations which comprised the sum total of cultural material recovered



BIG CRITTER SITE - 32WD408
XU 2S-28E PROFILES

Figure 8. Big Critter site, 32WD408: soil profiles.

using this method. Similarly, one flake of yellow jasper was recovered from Level 1 (0-10 cm) of the excavation unit. No other cultural remains or features were unearthed.

Discussion

The paucity of cultural materials may reflect erosional remnants from the upland prairie above or a very brief occupation of the "site" locale.

The site is evaluated as not NR eligible and no further work is recommended.

Washek Site - 32WD407

The Washek site is located on the east bank of the Souris River, approximately 1½ mi upstream from Burlington, North Dakota. Cultural materials noted in the cultivated field southeast of the river bank during the 1977 survey include one Knife River flint core, one Knife River flint modified flake, five miscellaneous flakes, river cobbles, and broken bone. Construction of the Burlington Dam will completely destroy the site (Figure 1).

Site Area

Like the Herzig site (32WD401), the Washek site lies within the Northern Floodplain Forest ecozone. The major portion of the site, which is currently used as hayland, is naturally bounded by a westward meander of the river. The land here is generally level with sharp cutbanks dropping off to the river. The area east of this enclosed floodplain hayland has been cultivated. It is from this area that cultural remains were recovered in 1977. Here the surface is rolling and gently slopes to the river. A shallow seasonal drainage coulee transects the northeastern corner of the site and flows west to the Souris.

A relatively large area was mapped to include both the cultivated field where cultural materials were found in the previous survey and the floodplain adjacent to the river (Figure 9). Baselines were plotted and

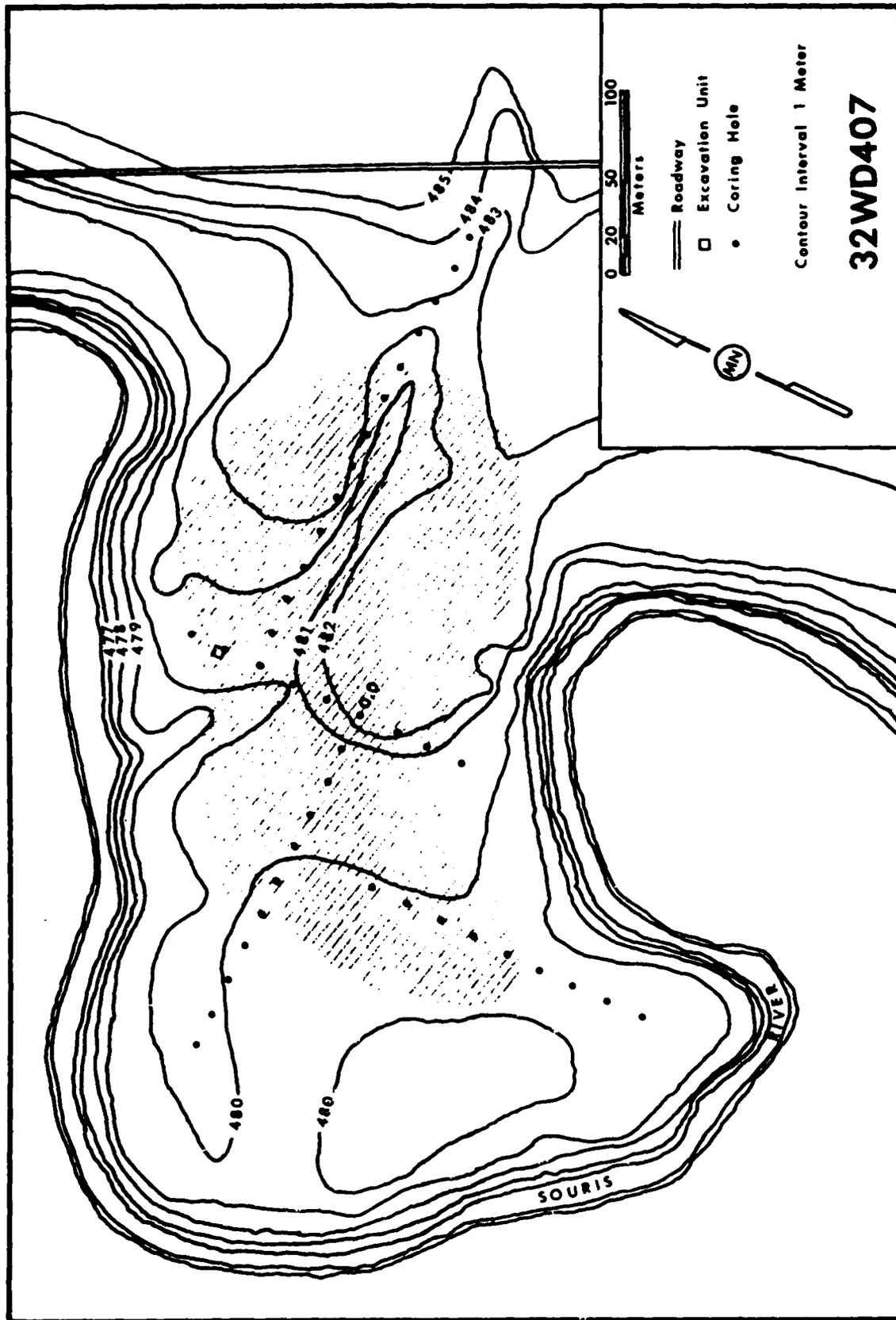


Figure 9. Washek site: 32WD407.

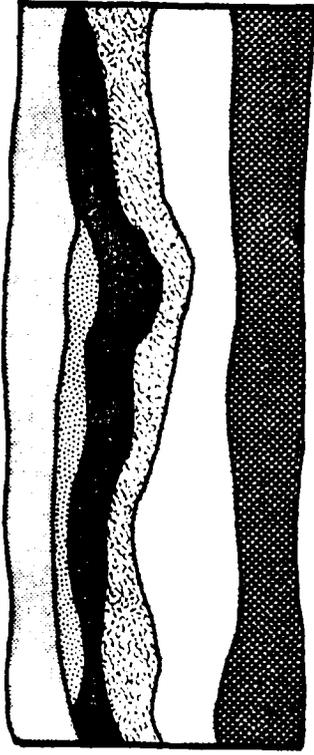
auger boring samples were taken at 20 m intervals. Seven of the 41 auger holes produced bits of fragmented bone and burned bone at coordinates 40S, 60N, 80N, 60N - 20E, 100W, 120W, and 100S - 80W. With this information the site boundaries were established to include most of the area bounded by the meander (UTM references Appendix C, and Figure 9). No subsurface remains were unearthed from the cultivated field where cultural materials had been noted on the surface the previous year. A 2x2 m excavation unit was placed at coordinate 80N and given coordinates 80N - 2W at the southwest stake.

Excavation Procedures

With the test unit established, excavation proceeded in 10 cm arbitrary levels to a final depth of 80 cm. Skimming shovel and trowel were used to remove the fill, which was screened through $\frac{1}{2}$ in hardware mesh to recover cultural remains. The presence of cultural deposits included fire-cracked rock, bone, burned bone, flakes and chipped stone tools. The compacted condition of the soil slowed excavation. No features were observed and the unit was terminated at 80 cm where subsequent shovel tests in the excavation floor confirmed that no further cultural deposits existed.

Stratigraphy

Upon completion of excavation the unit was photographed and soil profiles were drawn (Figure 10). Six geological strata were exposed in this unit. The first layer (or topsoil) is composed of dark gray clayey loam varying in thickness from 12-20 cm. Underlying this is a stratum of black clayey loam 6-18 cm thick. In the south wall of the unit a lens of dark brown sandy clay of 6-9 cm is interposed between these two layers. These upper strata have been disturbed by agricultural activity as the area was plowed for two years in the early 1950's (tenant, personal communication). Since that time no further cultivation has occurred. The third stratum is a yellowish-brown sandy clay of approximately 8-15 cm. A dark gray silty clay 15-20 cm thick forms the fourth layer, underlain in all walls except the south by a olive-gray silty clay with calcium carbonate streaks and varying in thickness from 15-35 cm. The last stratum encountered in the unit is a dark gray silty clay the same consistency and color as the fourth layer with the exception that it contains carbonate streaks. This layer is found at surface depths of 55-65 cm.



SOUTH WALL



NORTH WALL



EAST WALL



WEST WALL



- Dark gray clayey loam
- Black clayey loam
- Dark brown sandy clay
- Yellowish brown sandy clay
- Dark gray silty clay
- Olive gray silty clay with CaCO₃
- Dark gray silty clay with CaCO₃
- Rodent burrow
- Bone

**WASHEK SITE - 32WD407
XU 80N-2W PROFILES**

Figure 10. Washek site, 32WD407: soil profiles.

Cultural materials were recovered in all levels; however, most were found beneath 20 cm surface depth in the yellowish-brown sandy clay and the dark gray silty clay strata.

The soils of the site are classed in the Ludden series of dark gray clayey alluvial deposits found on floodplains. The soils are deep and usually level, with slow permeability and high water capacity (USDA 1974).

Material Culture Analysis

Introduction

Extensive cultural deposits were uncovered from the Washek site auger borings and test unit including fire-cracked rock, identifiable and unidentifiable, fragmented bone and teeth, burned bone, and lithic debitage and tools. Separate descriptions of each category are given including discussion and interpretations.

Fire-Cracked Rock

Fire-cracked rock is a common cultural remain found in most campsites excavated on the Northern Plains. It is easily identified by its discolored appearance, sharp angular breakage patterns and the fact that it is usually quite friable. This material is formed from alternate heating and cooling cycles in fire hearths and/or from sudden cooling and cracking of red hot rocks used on stone boiling (Iloff 1954:195 from Vehik 1977).

One hundred thirty-three elements of fire-cracked rock weighing 6.041 kg were recovered from Levels 3 through 8 of the excavation unit (Table 1 and Figure 11). An unusual condition exists in that the fire-cracked rock grades from elements of the greatest weight near the surface to elements of the lowest weight in the bottom level (Table 1).

Frost-heaving may account for this gradation. Frost-heaving refers to the mixing and upward displacement of objects and soils in regions where seasonal freezing and thawing cycles occur. Although few controlled experiments have been done regarding frost-heaving on archaeological materials, it appears that this process does have an effect on these materials. Frost-heaving is greatest in moist or wet

Table 1. Fire-cracked rock, Washek site (32WD407).

Level	Number	Weight (in g)	Average Weight (in g)
1	-	-	-
2	-	-	-
3	6	823	137.2
4	23	1628	70.8
5	35	1944	55.5
6	19	925	48.7
7	46	695	15.1
8	4	26	6.5
Total	133	6041	41.7

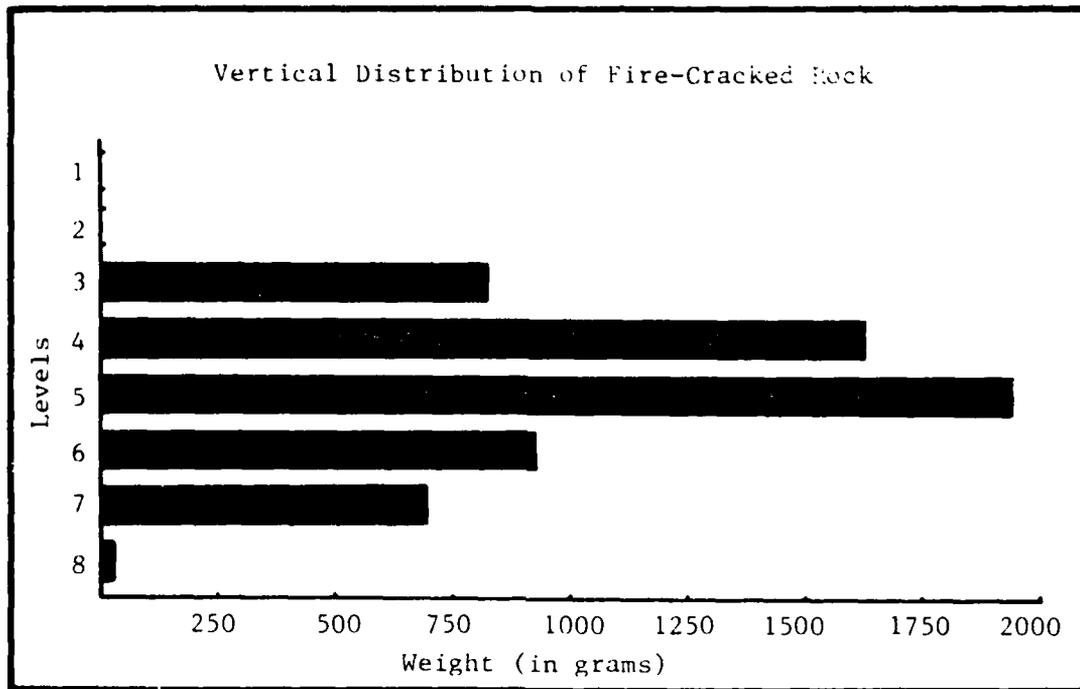


Figure 11. Washak site, 32WD407: vertical distribution of fire-cracked rock.

soils that are imperfectly drained and silty in texture and where frost penetration is relatively slow (Johnson and Hansen 1974). The effective height or vertical dimension of the buried object is also an important factor: the greater this dimension, the greater the potential for vertical movement (Johnson et al. 1977). With objects such as stone that conduct heat better than the surrounding medium, ice tends to form under the object and exert an upward "push" on that object (Johnson et al. 1977). In this way the object is forced toward the surface.

The average weight of each individual element of fire-cracked rock was calculated for each level and the gradation relationship was found. Elements with a higher average weight would naturally have greater dimensions (the composition of the elements remaining constant) hence, the larger elements would be displaced a greater distance vertically towards the surface than would their smaller counterparts. This could account for the sorting observed. There is at present no suggestion of a cultural explanation for this sorting.

The presence of the drainage coulee very near the excavation unit may be another factor effecting the wide vertical extent of fire-cracked rock and other cultural remains found in the excavation unit. Periodic flooding would provide additional disturbance as would the attempts to cultivate the area. The agricultural activity would only account for disturbance near the surface, but it may affect other erosional processes by disturbing the composition of the soil.

Faunal Remains

A total of 1458.75 g of unidentified bone and tooth fragments were found in Levels 1 through 8 of the test unit (Table 2 and Figure 12). Of the bone material approximately 3% (by weight) was charred. Tooth fragments represent approximately 7% by weight of the unidentified faunal remains removed from the excavation unit. The teeth are fragmented, broken along the annuli of growth, and are of large fauna. Since numerous identified (Bison bison or Bos) teeth were recovered from the unit and many of the fragmented elements resemble portions of the identified remains, it is assumed that most of the fragments are of either of the two aforementioned species.

The bone has been fractured into very small pieces with an average weight of 1.24 g. Burned bone is smaller yet with an average weight of 0.38 g while teeth fall between the burned and unburned bone at an average weight of 0.91 g.

Most of the bone fragments appear to be from portions of long bones and mandibles, as well as a few rib fragments. Judging from the amount of fragmented bone it is possible that bone grease extraction was a major

Table 2. Unidentified bone and teeth, Washek site (32WD407).

Level	Bone		Burnt Bone		Teeth		Total	
	#	Weight (in g)						
1	9	5.1	-	-	2	1.4	11	6.5
2	-	-	1	0.3	-	-	1	0.3
3	184	146.8	9	3.5	1	0.	194	150.3
4	296	434.4	28	9.6	20	30.5	344	474.5
5	243	404.6	13	4.6	26	17.9	282	427.1
6	155	198.1	22	7.2	29	38.7	206	244.0
7	111	109.0	11	6.6	16	4.5	138	120.1
8	69	29.0	10	3.8	11	3.1	90	35.9
Total	1067	1327.0	94	35.6	106	96.1	1266	1458.7
Average weight/element (in g)	1.24		0.38		0.91		1.15	

Percent by Level

Level	Bone		Burnt Bone		Teeth		Total	
	#	Wt.	#	Wt.	#	Wt.	#	Wt.
1	1%	1%	-	-	2%	1%	1%	<1%
2	-	-	1%	1%	-	-	<1%	<1%
3	17%	11%	10%	10%	1%	<1%	15%	10%
4	28%	33%	30%	27%	19%	32%	27%	33%
5	23%	30%	14%	13%	25%	19%	22%	29%
6	15%	15%	23%	20%	28%	40%	16%	17%
7	10%	8%	12%	19%	15%	5%	11%	8%
8	6%	2%	11%	11%	10%	3%	7%	2%

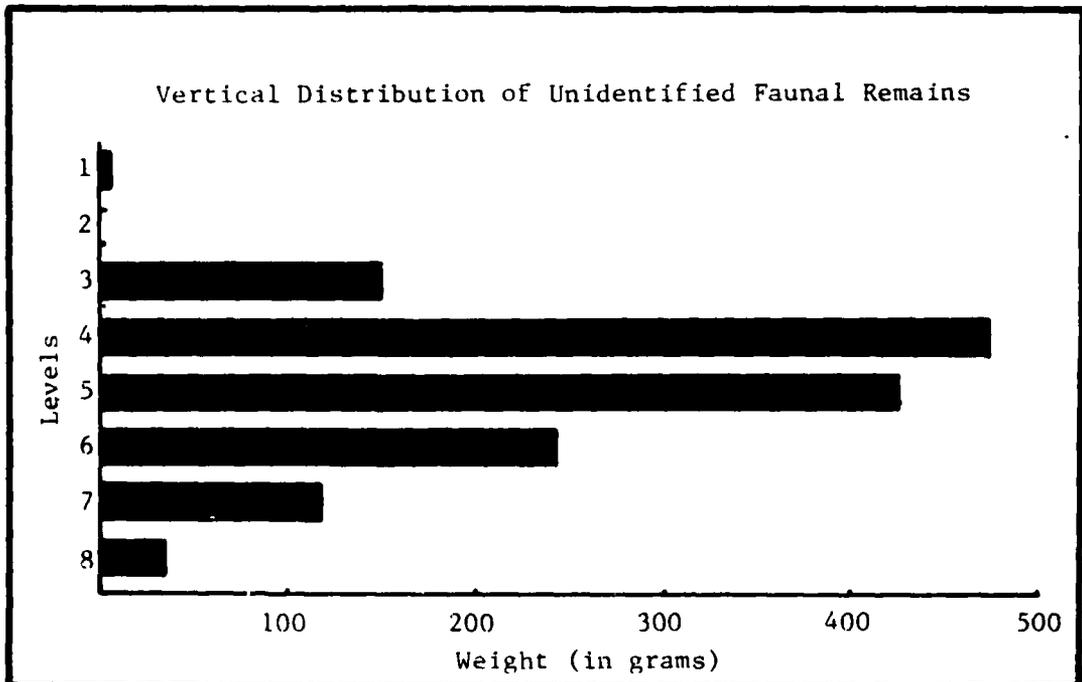
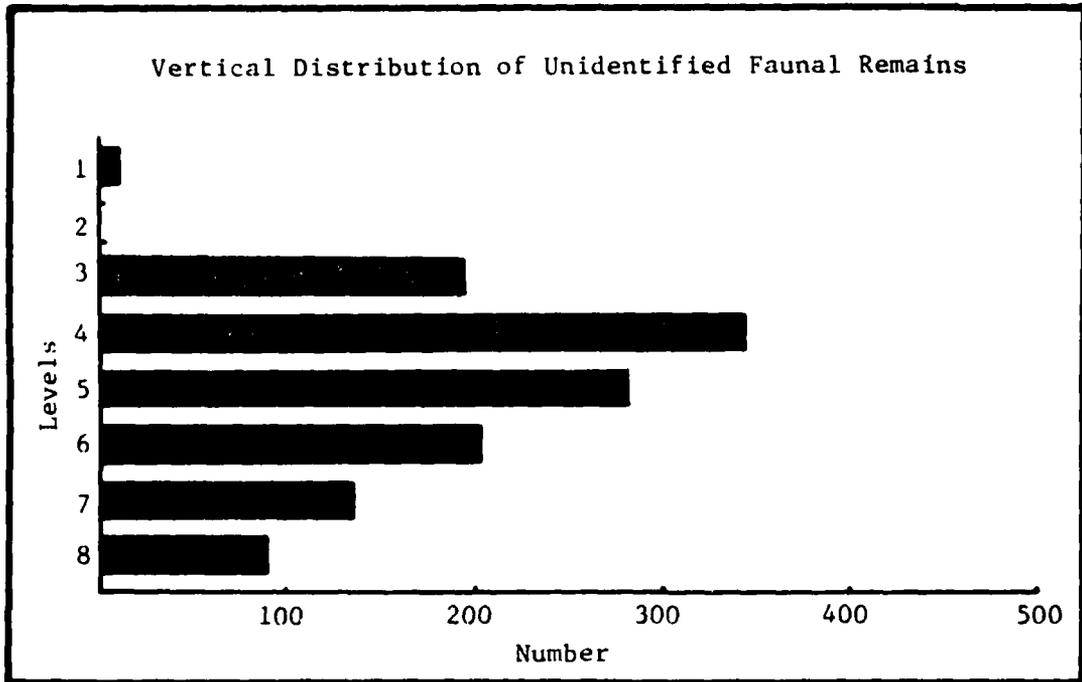


Figure 12. Washek site, 32WD407: vertical distribution of unidentified faunal remains.

site activity. Bone grease is extracted by first breaking the bones up using stone or metal tools and then placing them in a pottery or skin vessel and boiling (Catlin 1857:111 from Vehik 1977). The latter container would require stone boiling, a process of placing heated stones into the water within the skin vessel rather than direct heating by flame. The vertebrae, rib, leg and foot bones are bones which contain large amounts of grease and were often selected for processing (Dorsey 1884:303 and Jenness 1922:102-103). The mandible also has a large pulp cavity beneath the dentition from which material could be extracted (Good et al. 1977). The grease would melt from the bones and rise to the surface of the hot water where it could be skimmed off. Bone grease was utilized as a concentrated energy source (as a staple or mixed with dried meat) and was also used in the tanning of hides (Vehik 1977).

Levels 1 and 3 through 7 produced several identified elements of bone and teeth (Table 3). All of these represent Bison or Bos species although no age determinations or numbers of individuals were calculated. Since sample size used in the investigation of the site is extremely small compared to the horizontal extent of the site, it is felt that it is more important to describe the elements found and to determine what portions of the animal were utilized.

The identified faunal remains represent leg and foot bones and teeth from either Bison bison or Bos sp. None of the long bones are complete but instead reflect the articular ends. This may be due to the hypothesized bone grease extraction activity where the long bones were broken up. Long bones are said to have produced the best quality grease (Wilson 1924:174; Vehik 1977). The foot bones for the most part are still in complete form and may have been articulated with the long bones until after processing. One left patella from Level 4 is missing the medial and lateral angle and apex, indicating the lateral, middle and medial patellar ligaments were severed, freeing the patella (Good et al. 1977). In this way the lower leg may have been removed from the carcass. Manibles were apparently removed at the kill locale and processed in the tested area as evidenced by numerous teeth. Although no identifiable mandibles were found in the test, fragments of unidentified bone appear to be of mandible sections as shown by rounded tooth root cavities.

Lithic Debitage Analysis

Thirty-nine flakes were recovered during excavation of Levels 3 through 7 (Table 4 and Figure 13). Twenty-eight flakes (72%) are of Knife River flint (KRF). Knife River flint is characterized by its dark brown color and mottled or laminated internal structure (Clayton et al. 1970). Burnt chalcedony is another lithic type found

Table 3. Identified bone and teeth, Washek site (32WD407).

Level	Number	Description
1	1	Right ulnar carpal
2	0	
3	1	Left fused second and third carpal
	1	Phalange
	1	Third premolar
4	1	Left fourth carpal
	1	Left ulnar carpal
	1	Left radial carpal
	1	Left intermediate carpal
	1	Left patella
	1	First premolar
	1	Second premolar
	1	Third premolar
	1	First molar
	2	Second molars
5	1	Second molar
	1	Third molar
6	1	Left tibular tarsal
	1	Left distal portion of a humerus
7	2	Left proximal portions of a radius
	1	First molar
8	0	

Table 4. Lithic raw materials and decortication stage,
Washak site, 32WD407.

Level	Raw Material	P	S	T	Total	% by Level
1		-	-	-	-	-
2		-	-	-	-	-
3	Brown Chalcedony	1	-	-	1	
	Knife River flint	2	1	3	6	
		3	1	3	7	18%
4	Burnt Chalcedony	-	1	-	1	
	Knife River flint	2	1	7	10	
		2	2	7	11	28%
5	Burnt Chalcedony	-	-	1	1	
	Knife River flint	-	-	5	5	
		0	0	6	6	15%
6	Brown Chalcedony	3	-	1	4	
	Burnt Chalcedony	-	-	1	1	
	Lt. Brown Chalcedony	-	-	1	1	
	Knife River flint	-	1	4	5	
		3	1	7	11	28%
7	Burnt Chalcedony	-	-	2	2	
	Knife River flint	-	-	2	2	
		0	0	4	4	10%
8		-	-	-	-	-
Total		8	4	27	39	
%		21%	10%	69%		100%

P = Primary
S = Secondary
T = Tertiary

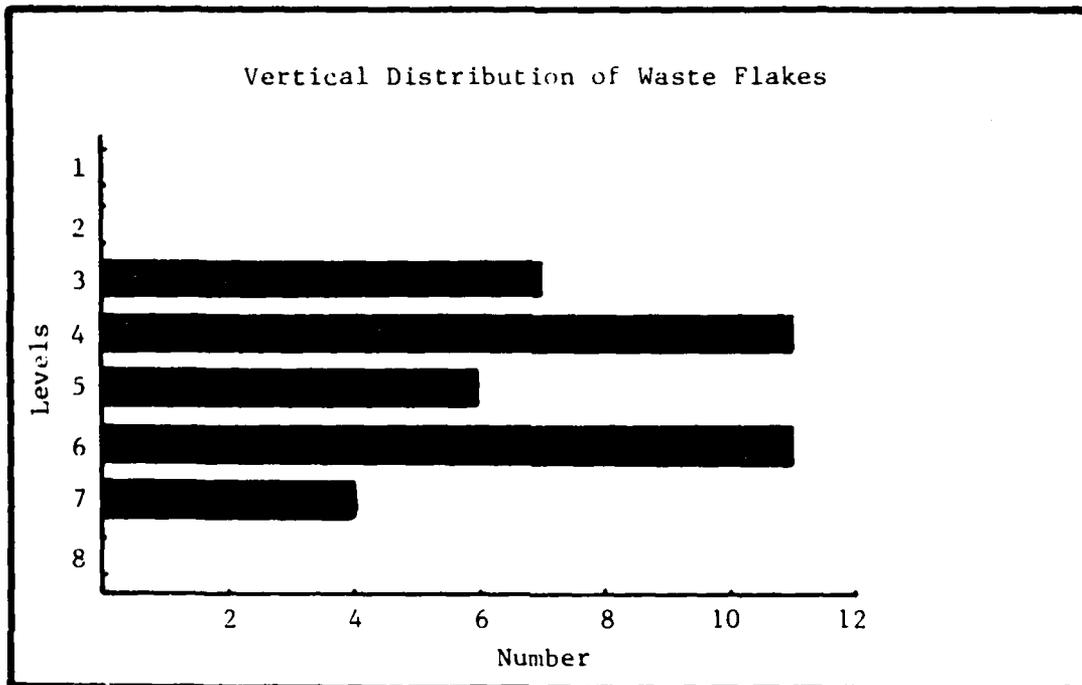


Figure 13. Washak site, 32WD407: vertical distribution of waste flakes.

within the excavation unit; it accounts for 13% of the waste flake sample. Experiments with the heat treating of KRF indicate that burnt chalcedony is a direct end-product of firing KRF. Burnt chalcedony also has the mottled or laminated appearance; its color is gray. With this in mind, we can say that KRF accounts for 85% of the waste flake inventory.

Light brown chalcedony and brown chalcedony make up the remaining 15% of the flake category. Light brown and brown chalcedony may be classified by some researchers as KRF although they do not have the mottled or laminated appearance characteristic of KRF. Thus, some researchers would contend that 100% of the waste flake inventory is KRF. Primary decortication flakes account for 21% of the lithic debitage. Approximately 20% represent secondary decortication flakes and 69% of the flakes are of the tertiary stage.

Artifact Analysis

The artifact inventory, although limited, is both unique and informative. The majority of the recovered chipped stone artifacts are evaluated by the authors as specialized butchering tools used in the processing of meat and probably the extraction of bone marrow after the bone was crushed.

In the following discussion, categories or groups of chipped stone tools have been established on the basis of general attributes (see Definition of Terms). This method of classification is partly due to the paucity of artifacts which is due to the sample size and not to the density of the artifacts. Four artifacts were recovered from every cubic meter of fill removed (13 artifacts to 3.2 m³ of fill).

Biface (Group 1)

The term biface is used here to denote the class of artifacts modified or flaked over the majority of both surfaces. In many instances these tools have a characteristic ovoid or ovoid/straight base shape. The one biface recovered shows no use-wear; broken in an early stage in the fabrication process, it is a reject.

N = 1 (Artifact Number 32WD407-L4-7)

Material - Knife River flint

Length - 40.0 mm

Width - 24.3 mm

Thickness - 7.6 mm

Weight - 7.0 g

Provenience - Level 4 (30-40 cm)



Description: This fairly complete specimen appears to have been discarded when a "lump" of matrix could not be dislodged from near one lateral edge. From experience with flint-knapping and observation of similar artifacts, this "build up" of material during thinning of the artifact results in a thick area which makes it difficult to further modify the artifact. In most instances, as in this case, edge crushing along the lateral edge attests to repeated efforts to remove the "lump." The tool has been bifacially worked both by percussion and pressure flaking.

Scrapers (Group 2)

Scrapers, as the term implies, are a functional category of tools used in smoothing, regularizing, or cleaning a number of surfaces and materials. Scrapers are commonly manufactured from primary, secondary, and tertiary decortication flakes and may be formed by either percussion or pressure flaking or a combination of both. Scrapers are usually unifacially flaked, but may be bifacially worked. Many times, broken tools of other functional categories may be reworked for scrapers.

Though there are a number of scraper groups, only two are represented in the inventory from the Washek site: a) end scrapers, and b) side scrapers.

End scrapers (Sub-group 2a) are usually manufactured from secondary or tertiary decortication flakes and are unifacially flaked along two lateral edges and along the distal or working

edge. In outline, the end scraper is usually pyriform but can exist in a variety of other shapes. In transverse cross-section, end scrapers are most often plano-convex, bi-plano, or plano-triangular. More often than not the bulb of percussion is visible on the vertical surface of the proximal end with the striking platform often being visible at the same end. Many times an effort has been made to thin the proximal end resulting in the removal of the bulb of percussion.

N = 2 (Artifact Numbers: 1) 32WD407-L6-9)
2) 32WD407-L4-4)

1) Material - Knife River flint

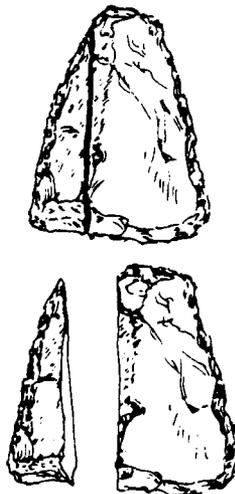
Length - 30.5 mm

Width - 24.4 mm

Thickness - 4.6 mm

Weight - 3.6 g

Provenience - Level 6 (50-60 cm) and
Level 4 (30-40 cm)



Description: This artifact was initially recovered in two segments. Split longitudinally, one portion was recovered from Level 4 (30-40 cm) while the remaining portion was recovered from Level 6 (50-60 cm). When reassembled, the artifact is roughly triangular in outline and bi-plano in transverse cross-section. Modification consists of unifacial pressure flaking around the edges of the dorsal surface. The bulb of percussion and striking platform are observable on the ventral surface and proximal end, respectively. The break which resulted in the two portions appears to have occurred during a resharpening stage.

2) Material - Knife River flint

Length - 23.4 mm

Width - 16.9 mm

Thickness - 4.5 mm

Weight - 2.0 g

Provenience - Level 4 (30-40 cm)



Description: This end scraper has been resharpened and used to such an extent that it is small and obviously in an exhaustive

state. Roughly triangular in outline, the specimen is worked uniaxially around the perimeter of the dorsal surface. The distal or working edge is smooth and faceted due to use with the working edge angle approaching 90°. In transverse cross-section the tool is flatly plano-triangular. The bulb of percussion and striking platform are observable at the proximal end.

Side scrapers (Sub-group 2b), unlike end scrapers, have a characteristic shape. Sidescrapers are manufactured from any decortication flake stage and modification is uniaxial and usually appears along one lateral edge.

N = 1 (Artifact Number 32WD407-L4-3)

Material - Knife River flint

Length - 39.9 mm

Width - 28.3 mm

Thickness - 6.5 mm

Weight - 6.0 g

Provenience - Level 4 (30-40 cm)



Description: Manufactured from a secondary flake, this side scraper has been uniaxially flaked along one lateral edge. Indications of use are in the form of faceted areas and edge crushing along the working surface. The flake itself is slightly curved as is the working surface. The tool would have been well adapted to scraping curved surfaces such as bone.

Drills (Group 3)

This group of artifacts is differentiated from awls and perforated by several attributes. Awls are usually of bone, perforators are of chipped stone; perforators are usually random flaked and are not usually hafted. Drills are usually hafted, are diamond-shaped or plano-triangular in cross-section and are well made. The attribute which is most indicative of drills is the alternate flaking pattern occurring on one surface of each lateral edge.

N = 1 (Artifact Number 32WD407-L6-13)

Material - Knife River flint

Length - 18.0 mm (Broken)

Width - 10.1 mm

Thickness - 4.0 mm

Weight - 0.6 g

Provenience - Level 6 (50-60 cm)



Description: This specimen is represented by the point or tip of the drill bit. Plano-triangular in transverse cross-section, modification occurs only along the lateral edges alternatively on each face. The distal end is worn to a "nub" and is dull from use. A straight fracture, perpendicular to the lateral edge has terminated the majority of the specimen.

Unifacial Knife (Group 4)

This unique group of artifacts resembles "beaked graters," however, unifacially modified knives are considerably larger and have wear patterns in the form of faceted areas along a greater distance of the working edge than do graters. The overall largeness and the amount of wear leads us to hypothesize that these artifacts were used as knives, perhaps in the processing of meat.

N = 2 (Artifact Numbers: 1) 32WD407-L7-8
2) 32WD407-L3-1)

1) Material - Knife River flint

Length - 43.0 mm

Width - 24.4 mm

Thickness - 6.4 mm

Weight - 5.0 g

Provenience - Level 7 (60-70 cm)



Description: Manufactured from a tertiary flake, this specimen has been worked by pressure flaking along one lateral edge. The one edge is composed of two intersecting straight sides both flaked unifacially. It is interesting to note that one converging edge has wear patterns while the other does not. It is probable that the tool was highly specialized.

- 2) Material - Knife River flint
Length - 57.7 mm
Width - 30.1 mm
Thickness - 7.2 mm
Weight - 10.0 g
Provenience - Level 3 (20-30 cm)



Description: This fairly large blade has been modified unifacially along the dorsal surface of two lateral edges. Two "beaks" are visible, one at the distal end of one lateral edge and the other approximately 14 mm from the proximal end along the opposing lateral edge. Both edges have wear patterns indicative of a cutting tool. In overall appearance, the specimen is reflective of a modern linoleum knife.

Tools, Function Unknown (Group 5)

Often these are flake tools which lack characteristic wear patterns which may indicate they were used for a brief period and functioned for a special task. The group also includes biface fragments and other tools, function unknown. To describe each tool would be redundant as little can be observed regarding the modification and little can be offered as to probable function.

- N = 5 (Artifact Numbers: 1) 32WD407-L3-2
2) 32WD407-L4-5
3) 32WD407-L3-11
4) 32WD407-L3-10
5) 32WD407-L6-12)

- 1) Material - Knife River flint
Length - 39.7 mm (Broken)
Width - 26.3 mm (Broken)
Thickness - 9.2 mm



Weight - 10.5 g

Provenience - Level 3 (20-30 cm)

2) Material - Knife River flint

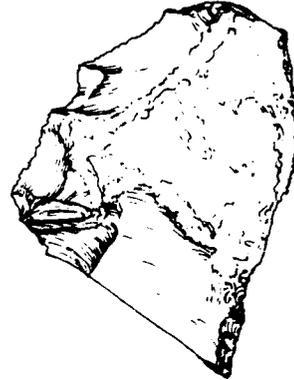
Length - 49.6 mm

Width - 38.9 mm

Thickness - 9.3 mm

Weight - 11.5 g

Provenience - Level 4 (30-40 cm)



3) Material - Knife River flint

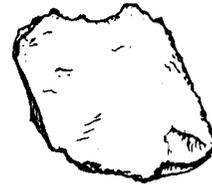
Length - 30.4 mm

Width - 21.6 mm

Thickness - 4.7 mm

Weight - 2.5 g

Provenience - Level 3 (20-30 cm)



4) Material - Knife River flint

Length - 24.5 mm

Width - 17.0 mm

Thickness - 3.6 mm

Weight - 1.0 g

Provenience - Level 3 (20-30 cm)



5) Material - Moss agate

Length - 24.6 mm

Width - 14.2 mm

Thickness - 3.0 mm



Weight - 1.1 g

Provenience - Level 6 (50-60 cm)

Artifact Summary

The artifact inventory recovered during the archaeological testing of the Washek site is unique and informative. With the exception of one modified flake all artifacts have been manufactured from Knife River flint. Another striking aspect of the artifact assemblage is the lack of projectile points. It is likely the tools recovered at the Washek site are associated with a particular activity; the test unit may have hit a task-specific activity area.

With particular categories of artifacts missing (e.g., hammerstones, grooved mauls, projectile points) we can eliminate a number of activities. It must be emphasized that this negative information is tenuous due to the limited size of the test area. Assuming the site is associated with bison processing we are suggesting that the tools we did recover are those being fabricated for and used in the "bone grease extraction phase" of processing. This hypothesis is supported by the appearance of fire-cracked rock and the crushed condition of the faunal remains. Although somewhat speculative, we are suggesting that the unifacially worked knives and small modified flakes may have been used to remove any meat which adhered to the bones after initial butchering had taken place. It is interesting to note that the majority of tools were manufactured from large decortication flakes which may have been waste flakes discarded from the initial tool manufacturing stage of other artifact categories.

Site Summary

As a whole the cultural material recovered from the Washek site appears to be the result of a particular activity, that of bison processing. The site remains may be from a single or multiple activity episodes. In this instance the final stage of processing involved bone grease extraction. To reiterate a portion of what was discussed in the faunal analysis section of this report, bone was broken up into small bits and was placed in a pottery or skin vessel filled with water. Heated stones were placed in the water to heat it and then the crushed bone was placed in the water, boiled, and the fat rendered off (Catlin 1857:111). This process of retrieving the fat was an essential part of the production of pemmican (Good 1975). Not only is the grease high in

calories, it is very nutritious, being a source of amino acids (Vehik 1977). The Washek bone has been crushed to bits and a fairly large amount of fire-cracked rock has been recovered in association with the crushed bone.

Since our sample size is quite small and because no other sites yielding cultural material have been excavated along the Souris River, it is difficult to project our test excavation findings to the site as a whole. We can, however, compare our investigative results with similar sites in Wyoming and along the James River valley in southern North Dakota. Frison (1971) suggests that particular categories of artifacts will be recovered at specialized processing sites. Particularly in evidence are plano-convex end scrapers, side scrapers, and modified flakes with a variety of cutting or scraping angles. Projectile points are rare. Bone tools are represented as is a vast amount of crushed bone. Tool manufacturing is represented by re-sharpening flakes. Features include fire pits and boiling pits.

Comparing this data with that recovered during the test of the Washek site reveals a number of similarities. Although relatively few in number, plano-convex end scrapers as a category of tools were represented by two specimens. The other five categories, with the exception of modified flakes and unifacial knives, were represented by one specimen. No projectile points were recovered. Evidence of tool manufacturing at the Washek site was comparable to that of a meat processing site in Wyoming (48CA302) (Frison 1971) in that lithic detritus from the Washek site was largely composed of tertiary decortication flakes as a result of resharpening the tools. Fire-cracked rock and crushed bone appears at both sites. Although fire pits were not discovered at the Washek site, the recovery of small amounts of charcoal and burned bone leads us to believe that they probably exist at the site.

Another site which we feel is comparable to the Washek site was tested in 1976 along the James River valley in southern North Dakota. The Quast site, 32LM234, appears to be a camp composed of several activity areas. Although permanency may or may not be a criterion associated with meat processing, one of the activities at the Quast site, bone grease extraction, is comparable (Good et al. 1976). Again, the data recovered from the site suggests the method of extraction was similar to that used at 48CA302 and at the Washek site, 32WD407. The material culture recovered from the Quast site is also comparable, with the exception of the appearance of ceramics and projectile points. Both classes of artifacts were represented by several specimens. It is important to note that the existence of other classes of artifacts may be one criteria by which we can differentiate between a permanent site and a briefly occupied, specialized campsite. Vehik (1977) has suggested that the more permanent a settlement, the more likely that tools and waste from a particular activity will become disassociated from that activity. Not only will the tools and waste become disassociated from the activity itself, but also from the area that the

activity took place. She further states that at a specialized camp (i.e., bison kill, pound, etc.) evidence of the entire procurement process, that is, from the kill to complete processing should be found. Although this may be true in particular instances, such as small kill sites, we feel that there may be a separation of activities at a procurement site into particular processing areas. This may be merely the result of available area or perhaps of division of labor. Thus, if activity areas do exist over a large area, not all tools associated with the procurement of the meat would be found in a particular locus.

As a result of our analysis of the material culture recovered from the test excavation, we feel that the Washek site represents a meat processing site, specifically, the phase of processing in which bone marrow or bone grease was extracted from bone. Since our sample of the site area is quite small and limited, we can only speculate at the interaction of the activity with that of the remainder of the site area: 1) the activity area may be part of a larger, more permanent camp, and 2) the activity area may be representative of a large, specialized activity area. Animals may have been impounded by means of driving them down the coulee leading to the site, using the peninsula as a natural corral. Animals could have been slaughtered and processed at the site, with particular activities being performed at different locations over the site area.

The vertical size-grading of fire-cracked rock coupled with the find of two pieces of the same scraping tool in different excavation levels (one from Level 4, one from Level 6) gives strong indication that Washek site depositional and associational integrity is poor. Cultural remains were recovered from all of the arbitrary, 10 cm levels down to 80 cm below surface, yet it is possible that all materials were deposited at one point in time. This problem of associational integrity must be considered carefully in any plans for additional archaeological work at Washek.

RESULTS OF THE SURVEY OF THE DETOUR ROUTE

A proposed detour route (Ward County Road 10 from County Road 15 to County Road 17 and County Road 17 from County Road 10 to County Road 8 (Figure 1) was surveyed. The detour route lies in the Upland Prairie ecozone which is located above the valley blending into the surrounding prairie. Vegetation is primarily prairie grasses.

No cultural materials were observed during the survey; no sites were located or recorded.

PROJECT SUMMARY

As a result of the proposed Burlington Dam Project, the U.S. Army Corps of Engineers, St. Paul District, contracted with University of North Dakota in 1977 to conduct a cultural resource inventory of the areas to be affected by the project. The study area encompassed the banks and floodplain of the Souris River to an elevation of 1620 ft above sea level, from the proposed Burlington Dam site to the Canadian border. Areas above 1620 ft which appeared in danger of erosion from the higher water levels subsequent to dam construction were inspected. The Diversion Tunnel route from the Des Lacs River to the Souris River was also surveyed for possible sites. The time element of late fall allowed only spot checking of the area from the head of Lake Darling to the Canadian border.

Forty-eight archaeological localities were identified and recorded by the archaeological field team from the University utilizing an intensive pedestrian survey technique. Localities included tipi ring or stone circle sites on the high terraces and upland prairie overlooking the valley and occupation sites on the floodplain of or adjacent to the Souris River.

Consequent analysis of cultural remains and archaeological features indicated Plains Archaic, Plains Woodland, and Plains Nomadic influences within the study area. Numerous sites were recommended for further testing and research of historical resources was also begun. It was decided by the investigators that emphasis should be placed on recording sites, thus we did not complete the testing phase of the contract in 1977. This decision was based upon the limited time brought on by the winter months. As a result a supplemental contract from the Corps in the fall of 1978 provided for the testing of three archaeological sites located during the 1977 survey. Also included in the supplemental contract was a survey of a proposed detour route to locate possible sites. The three archaeological sites include the Herzig site (32WD401), the Washek site (32WD407), and the Big Critter site (32WD408), endangered by Diversion Tunnel outfall, Burlington Dam construction, and borrow area excavation, respectively. The detour route (Ward County Road 10 from County Road 15 to County Road 17; County Road 17 from County Road 10 to County Road 8) consists of widening and other improvements of the roadway.

The Herzig site (32WD401) lies adjacent to the Souris River and is in the Northern Floodplain Forest ecozone (see 1978 report). Found during the 1977 survey were two Knife River flint (KRF) bifaces, one KRF flake, scattered bison bone, and fire-cracked rock. A 2x2 m excavation unit was placed near the bank in 1978. Recovered from this test square was a fourth carpal and second phalanx of either Bison or Bos sp. and 22.4 g of fragmented bone. No other cultural remains were recovered from the site.

The Washek site (32WD407) is located within a meander of the Souris and is in the Northern Floodplain Forest ecozone (Good and Fox 1978). Noted in the 1977 survey were five flakes, a KRF core, a KRF modified flake, river cobbles, and broken bone. A 2x2 m test square was established near the river bank at the neck of the meander. Cultural remains were recovered in all levels to a depth of 80 cm and include fragmented and identifiable bone, lithics, fire-cracked rock, and some charcoal. Auger boring also produced fragmented bone in several locations throughout the site.

The Big Critter site (32WD408) is located within the Terrace Grasslands ecozone (Good and Fox 1978) approximately 1½ mi south of the Lake Darling Dam. Three flakes and numerous bones of Equus were collected during the 1977 survey. A 2x2 m test unit in 1978 unearthed one flake. This and the flake recovered from the auger operation provided the entire cultural inventory of the site.

The detour route is located predominantly in the Upland Prairie ecozone (Good and Fox 1978). No materials were found during the survey.

Little was recovered in the form of cultural materials from the Herzig and Big Critter sites, certainly not enough to warrant further excavation. The detour route was entirely void of cultural remains, and testing was not recommended.

The Washek site produced an abundance of cultural material. Analysis of the material indicates a food processing site. Further work is necessary since dam construction will entirely destroy the site. Further excavation will also help substantiate the food processing hypothesis and provide further knowledge of the prehistoric peoples utilizing the Souris River Valley area.

An evaluation of the auger boring procedure suggests the procedure has advantages as well as limitations, but should become part of the repertoire of techniques available to archaeologists doing site evaluation work. An auger used as a method of investigation on an archaeological site can be an inexpensive, labor saving tool. Augering can be the fastest way to define the horizontal site boundaries. The portable power auger permits it to be carried into any area, but the tractor mounted auger is more suited to the large, easily accessible areas.

The limitation of the auger is that it cannot always tell the nature and depth of subsurface deposits. That is best done by the excavation unit. The auger can provide valuable information on the placement of excavation units by bringing to the surface cultural material that would be missed in a surface collection. Soils unsuitable for auger boring include rocky soils and heavily compacted clays.

Clay is a most difficult medium in which to apply archaeological excavation techniques. It requires greater expenditure of physical effort by laborers and it slows excavation time. Compact clay

deposits usually make excavation with a pick necessary. Clay adheres to tools and screens adding time to cleanup activities. The stickiness of clay prevents it from screening well. It balls up when shaken in a shaker screen, and soon clogs the $\frac{1}{2}$ in hardware mesh which causes work to stop while the reverse side of the clogged screen is scraped clean. Screens can be damaged from the weight of the clay and from the force that is applied to grind the clay through the screen with trowels and screening blocks (hand held wooden blocks). Heavier or specially made screens are recommended.

Cultural material can be damaged by the methods necessary to dry screen clay. Exposure to the sun and wind dries the clay quickly in the screen making it impossible to force through the mesh. Clay does not water screen well even when a hose is directed on it at full force. It has to be manipulated in order to dissolve. One technique with some potential is soaking the clay matrix with cultural deposits with "Calgon" before water screening. Because of slow permeability clay is very slippery when it becomes wet and can be hazardous to workers.

The Ludden clay at the Washek site is a difficult soil to work archaeologically. This factor should be weighed with the questionable associational integrity of cultural deposits in making final decisions for possible mitigation.

RECOMMENDATIONS FOR NATIONAL REGISTER NOMINATION

As part of the contract with the Corps of Engineers, unequivocal statements of nonsignificance or significance of the site(s) pursuant to the National Register of Historic Places criteria are to be offered. To this end the following considerations are included:

- 1) considerations of all known and/or expected data categories and cultural features of the properties in terms of the information they may yield;
- 2) consideration of any research topics that might form a basis for study of the properties, including topics currently addressed in the area and topics suggested by one's professional training as future possibilities; and,
- 3) consideration of how study of the data categories and features represented by the properties may (or may not) contribute to study of the research topics.

In light of previous research accomplished along the Souris River, the Washek site is the only archaeological site thus far investigated which has yielded information which we feel is indisputably important to the interpretation of the study area and of Northern Plains prehistory. From our initial test excavation at the Washek site it is apparent that cultural material is fairly abundant and, as offered in the body of the report, consists of chipped stone artifacts, lithic debitage, fire-cracked rock, and crushed bone.

We are interpreting the site as being a meat processing site. Whether the placement of our test unit was such that we encountered a particular activity area within a larger, more complex, permanent village or whether the site is a specialized, briefly occupied camp can not be determined from our limited sample. We do know, however, that the cultural material recovered is that associated with meat processing, probably including the extracting bone grease.

Washek is the only site thus far investigated within the immediate study area which has yielded valuable information and the information bears on a particular subsistence activity related to bison processing.

As stated in the initial survey report, a use of the valley by two different groups of people who may or may not have been contemporary was hypothesized (Good and Fox 1978). This hypothesis was based upon the existence of two types of raw materials used in the manufacturing of chipped stone tools and the existence or nonexistence of ceramics. From our investigations of Plains Nomadic sites in North Dakota (i.e., tipi ring sites) the use of Knife River flint for the manufacturing of

chipped stone tools and the existence of little or no ceramics at these sites has become a predictable cultural phenomenon. Although tipi ring sites exist along the upper terraces of the Souris Valley, none have been investigated to date. Thus, it is information from tipi ring sites excavated elsewhere in North Dakota that we are using to support the hypothesis that there is a relationship between tipi rings along the terraces of the Souris Valley and particular sites within the valley.

Although much research has been conducted at sites associated with early farming groups in the Northern Plains, very little has been conducted or is known regarding Plains Nomadic peoples. Since these people played an integral part in the existence of the farming communities, it is essential that we understand not only what this role was, but also how it was organized. Primarily involved in bison procurement, these nomadic hunters must have had a complex system of procurement and processing. The methods of procurement, be they bison pounds or bison jumps, are well known throughout the Plains, particularly in Montana and Wyoming; however, less is known concerning the processing, storing, and trading of the end product. What knowledge we do have has been obtained from other parts of the Plains where opportunities to trade for garden produce did not exist to the extent that it did near our study area (i.e., the Middle Missouri Sub-area).

At the end of the survey report (Good and Fox 1978) we listed the Washek site as being a "questionable" National Register quality site. Now that the testing phase has been completed we feel that we are better qualified to make statements as to significance of the Washek site as well as the other sites we investigated. The Herzig site (32WD401) and the Big Critter site (32WD408) could contribute little to the archaeological knowledge of the study area or the Northwestern Plains; neither site should be considered NR eligible. From the investigation of the Washek site (32WD407), however, cultural material was recovered which is important to the interpretation of the Souris Valley, the Northwestern Plains, and the Plains in general. It is our opinion that Washek is NR eligible.

The Washek site is associated with the processing of animal foodstuffs. Further research at the site will help to determine the relationship between the area we tested and the remainder of the site. Increased samples of particular data categories will provide us with information as to the organization needed to process the meat (i.e., butchering techniques, tools used for particular phases of processing, area of activities, and possible division of labor).

A total recovery technique (waterscreening) should be used in processing a portion of the fill from excavation units in hopes of gaining further information concerning preferential raw materials used for the manufacturing of certain chipped stone tool categories or classes. In conjunction with the waterscreening, information

concerning environment and seasonality may be recovered. The analysis of all material will hopefully help to determine whether or not the site is associated with activities of Plains Nomadic peoples such as those who possibly occupied the nearby tipi ring sites.

CULTURAL RESOURCE MANAGEMENT RECOMMENDATIONS

This section presents recommendations for cultural resource management decisions to be made by the Corps if proposed development plans are operationalized.

No further cultural resource work is recommended within the proposed detour route right-of-way.

No further cultural resource work is recommended for the Big Critter site (32WD408).

No further cultural resource work is recommended for the Herzig site (32WD401).

Mitigation of impact is recommended for the Washek site (32WD407).

The remainder of this section relates to the Washek site (32WD407) where further cultural resource management attention should be required if landscape modifying plans are put into action. The site is situated in a proposed borrow area near the Lake Darling dam. The preferred mitigation alternative is avoidance; modify the borrow pit placement so as to avoid the site area depicted in Figure 9.

If direct, adverse impact to the Washek site cannot be avoided, an archaeological information recovery program should be implemented. The site is evaluated as NR eligible under "criteria d" for the potentially important information it holds on the prehistory of the local area and the Northern Plains.

The size of the Washek site is indefinitely fixed in the range of 20-30 acres. Information recovered from the 2x2 m excavation unit suggests a severe integrity problem in at least one part of the site. The specific problem is that all cultural materials recovered from the unit -- distributed vertically through 80 cm of site deposit -- are interpreted as being associated with a single, prehistoric, cultural activity; bone grease processing. While it is possible that bone grease processing activities took place repeatedly over time at the location of the test unit, the authors suggest the 80 cm of vertical distribution of cultural deposits may be the result of the long-term action of "frost heaving" upon what once was a single, thinner, cultural stratum. Vertical displacement on cultural items might be as great as 80 cm, or even greater.

The vast extent of site combined with test results mandate a flexible information recovery plan. Information recovery options must be kept open for adjusting to cultural deposits of a different nature than suggested by the initial testing. The first stage in the

recovery action might be backhoe trenching. Trenching could proceed toward several complete transects of the site. The purpose of the trenching would be to test the proposition that a definable cultural stratum (or strata) and intact cultural features no longer exist within the site deposit because of gross vertical displacement caused by frost heaving. On-site inspection and study by a qualified, professional soil scientist is called for during trenching operations. If intact cultural strata or features were encountered, the trenching would be halted and hand excavation implemented to expand exposure and information recovery from the intact deposits. If such intact deposits were found to characterize large areas of the site, it would be difficult to place a limit on the area that would deserve further attention. Such a limit would, of necessity, need to be arbitrarily fixed.

If the gross, vertical displacement proposition is confirmed by the trenching results (as concluded by the soil scientist and the archaeologist), and site-wide cultural material densities parallel those recovered in the test excavation, then the spatial integrity of cultural materials ought to be investigated; variability of lateral relationships should be examined. The test unit results reported above indicate a specific activity area may have been encountered. The area of the test unit could be expanded to a 10x10 m area and recovered information compared and contrasted with some other 10x10 m intra-site area. Excavation could proceed in gross, vertical levels (e.g., 40 cm in depth) with 1x1 m horizontal control.

If backhoe trenching shows cultural material density to be high only in the area explored by the test unit reported above, then excavation in that area should be expanded with the goal of recovering all remains associated with the hypothesized, bone grease extraction activity. The excavation area could be arbitrarily set at 200 m². The information recovery project proposed here should be conducted under a "cost reimbursable, not to exceed" contract. Further site evaluation work during trenching could show either a minimum or maximum amount of data recovery work to be required. A "not to exceed" budget estimate is calculated for a project which requires two weeks' backhoe time and excavation of a 200 m² area.

Eighty hours of backhoe time, with an operator, may be required. Two, 10x10 m areas (200 m²) with 80 cm of cultural deposit amounts to 160 m³ of cultural fill to be excavated. Limited variety of cultural remains (i.e., no ceramics or features) balanced against the poor excavation medium (i.e., Ludden clay) should result in "moderate" archaeological excavation costs. The attached budget estimate is calculated on a two-person excavation team being able to remove and screen 1/2 m³ of cultural deposit per work day.

The preferred mitigation alternative is avoidance: modify the borrow pit placement so as to avoid the site.

BUDGET ESTIMATE

LABOR COSTS (estimated)

Off-Campus

Principal Investigator 1/5 time for 3 mo @ \$1850/mo	1110.00
Project Director (Associate Research Archeologist) full time for 4 mo @ \$1600/mo	6400.00
Assistant Field Supervisor full time for 3 mo @ \$1050/mo	3150.00
Field Assistants full time for 3 mo @ \$700/mo for 6	12,600.00
Total off-campus labor costs	23,260.00
Benefits off-campus (16%)	3721.60
Indirect costs off-campus (26.2% of labor + benefits)	7069.18

On-Campus

Principal Investigator ½ time for 12 mo @ \$1850/mo	5500.00
Project Director full time for 12 mo @ \$1600/mo	19,200.00
Assistant Research Archeologist full time for 12 mo @ \$1100/mo	13,200.00
Archeological Assistants full time for 12 mo @ \$700/mo for 2	16,800.00
Total on-campus labor costs	54,750.00
Benefits on-campus (16%)	8760.00
Indirect costs on-campus (52% of labor + benefits)	33,025.20

TRAVEL

Vehicles

Two vehicles for 3 mo ea @ \$200/mo
+ 8000 mi @ 30¢/mi 3600.00

Lodging

\$20/day for 90 days for 8 14,400.00

Food

\$13/day for 90 days for 8 9360.00

EXPENDABLES AND OPERATING EXPENSES

(photographic film and paper, drafting film
and paper, pencils, pens, markers, bags, tabs,
telephone, postage) 2000.00

REPORT PREPARATION (drafting, typing,
photography, data processing, printing) 3000.00

OTHER

Pumps, hose, and screen apparatus for
waterscreen processing of Ludden clays
tanks, barrels, chemicals for clay
breakdown 1000.00

Backhoe and operator (80 hrs @ \$35/hr) 2800.00

TOTAL ESTIMATE \$166,745.98



Plate 1. Coring operation. Big Critter Site, 32WD408.

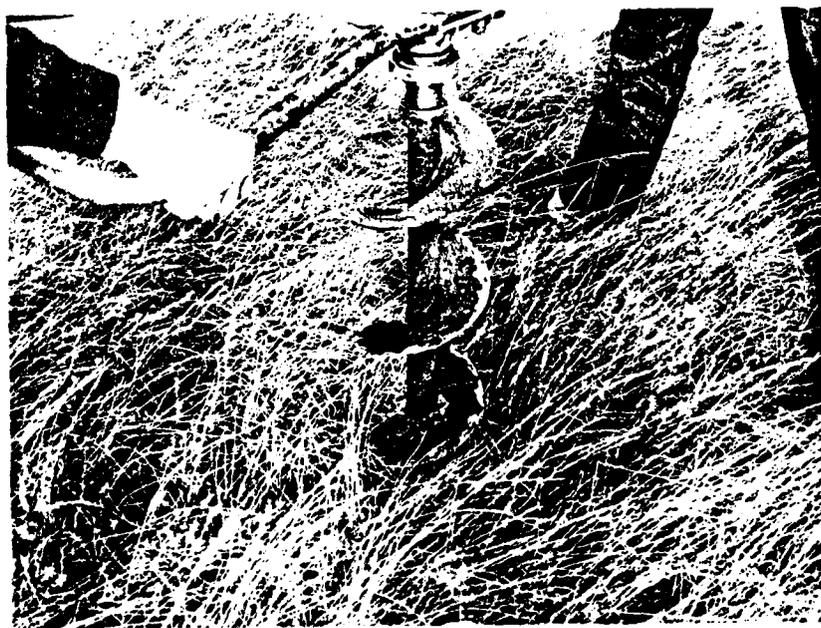


Plate 2. Close up of coring tool.



Plate 3. Washek Site, 32WD407. Sod removed. Unit 80N - 2W.



Plate 4. Washek Site, 32WD407. East wall, 80 centimeters depth.

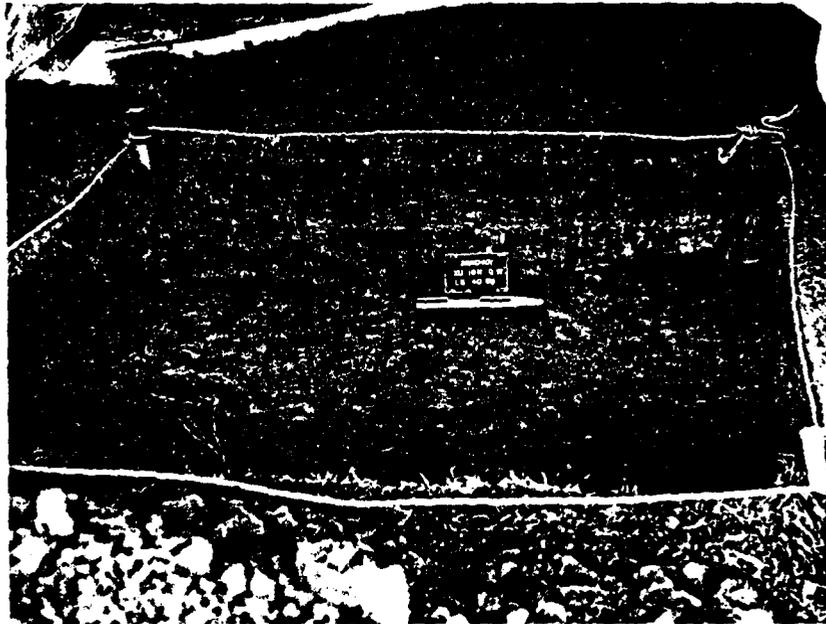


Plate 5. Herzig Site, 32WD401. Unit 18N - 0, Level 5.

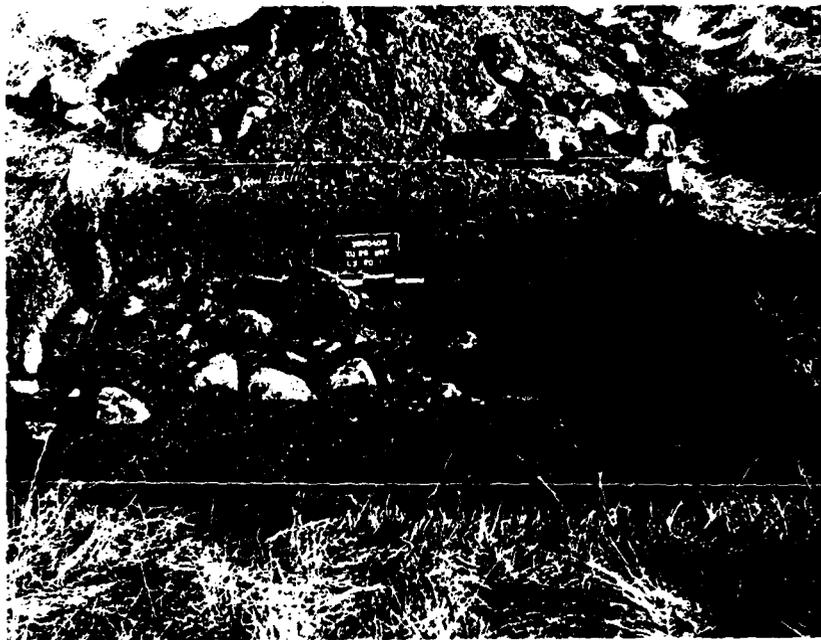


Plate 6. Big Critter Site, 32WD408. Unit 2S - 28E, Level 3.

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APPENDIX A

Contract

WORK ORDER FOR INTENSIVE SURVEY
AND TESTING OF DETOUR ROUTE AND THREE
ARCHAEOLOGICAL SITES WITHIN PROPOSED CONSTRUCTION ZONES
UNDER CONTRACT NUMBER DACW 37-77-C-0128

1. INTRODUCTION

1.01 The cultural resources investigation to be completed under this work order includes survey and testing of the Detour Route required for access to the proposed Burlington Dam. Also included is intensive testing of three archaeological sites (32WD401, 32WD407, 32WD408) located within designated construction zones, in order to obtain an unequivocal statement of their significance according to National Register criteria and requirements for mitigation, if appropriate. Alternate sites will be selected for the Contractor in the event that landowner permission is not obtained.

1.02 This cultural resources investigation is partial fulfillment of the obligations of the St. Paul District regarding cultural resources, set forth in the Historic Preservation Act of 1966 (P.L. 89-665), the National Environmental Policy Act of 1969 (P.L. 91-190), Executive Order 11593 for the Protection and Enhancement of the Cultural Environment (13 May 1971, 36 F.R. 8921), The Archaeological Conservation Act of 1974 (P.L. 93-291), the Advisory Council on Historic Preservation's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R., Part 800), the Department of the Interior's guidelines concerning cultural resources (36 C.F.R., Part 60, and Interim Regulations Parts 32, 60, 61, 62, 63, 64, 65, 66) and the Corps of Engineers Regulations (ER 1105-2-460) "Identification and Administration of Cultural Resources" (Federal Register 3 April 1978).

1.03 The Contractor will utilize a systematic, interdisciplinary approach in conducting the study. The report will be a comprehensive, scholarly document that not only fulfills mandated, legal requirements but also serves as a scientific reference for future professional studies and for public interpretation. The Contractor will provide expertise in the disciplines of archaeology, history, and natural sciences as required. Personnel involved with the work under this contract will meet the minimum professional qualifications outlined below. Methods and techniques used for the study will be consistent with the current state of professional knowledge and development.

1.04 The person in charge of this project will be responsible for the content and accuracy of the final report. The minimum qualifications of the person in charge are: a) graduate degree in archaeology, anthropology, or closely related field, or equivalent training accepted for accreditation purposes by the Society of Professional Archaeologists, b) demonstrated ability to carry research to completion, usually evidenced by timely completion of theses, research reports, or similar documents, and c) at least 16 months of professional experience and/or specialized training in archaeological field, laboratory, or library research, administration, or management, including at least 4 months experience in archaeological field research and at least one year of experience and/or specialized training in the methods of research proposed for this project.

1.05 The Contractor will furnish the labor, supplies, and equipment needed to complete the study and to produce the report on the investigation as outlined in this Scope of Work.

1.06 Upon completion of the report, all artifacts and other information related directly or indirectly to completion of the contract, will be curated at the University of North Dakota, but will remain the property of the United States and shall be available for research purposes and public display.

1.07 The extent and character of the work to be accomplished by the Contractor will be subject to the general supervision, direction, control, and approval of the Contracting Officer. Checkpoint meetings will be arranged, if necessary, upon the request of the Contracting Officer or the Contractor.

2. PROJECT DESCRIPTION

2.01 The Detour Route consists of relocating and upgrading Ward County Road (C.R.) 10 from C.R. 15 to C.R. 17, approximately 3,500 feet; and upgrading C.R. 17 from C.R. 10 to C.R. 8, approximately 6 miles. The improvements will include widening the roadbed 20 feet and removing hazardous grades, and minor curvature modifications in C.R. 10. The right-of-way will be extended from 90 feet to 150 feet. Fill material will be obtained from within the raised areas in the right-of-way. The design specifications will not be available until mid-October.

2.02 The survey of the Road Detour will include a surface examination of the route, which may be accomplished in part by a windshield survey if the right-of-way has obviously been disturbed by construction of the road originally. Subsurface testing of borrow areas and curve modification alignments will be completed as needed. The exact limits of any sites should be determined. The Contracting Officer should be immediately notified of any cultural remains located in these areas.

2.03 Three sites have been selected for intensive testing because of their proximity to proposed construction zones (32WD407, 32WD408, 32WD401). As two of the sites are not on Federal lands, right of access for testing and/or Federal ownership of the artifacts is not a certainty. In view of this, alternative sites will be selected for the Contractor if necessary so that the contract can be completed. As these three sites were selected on the basis of immediate agency needs, rather than on an overall research strategy, it may be appropriate for the Contractor to conduct limited testing on other nearby sites in order to predict relevant questions and evaluate the significance of the sites in question. This will be up to the professional judgment of the Contractor and is not a requirement of the contract.

2.04 Selected Sites (Alternate sites will be selected later).

Site Type	Est. Size	Condition	Threatened by
32WD407 Occupation - Lithics, bison bone	100x200m	Fair to poor under culti- vation	Burlington Dam
32WS401 Occupation - Lithics, bison	?	Fair to poor	Des Lacs Diversion Tunnel Outfall
32WD408 Butchering -	Large flat	Undisturbed obscured by prairie grasses	Borrow site adjacent Lake Darling Dam

2.05 The intensive testing of the three selected sites (shovel tests, excavation units) will be sufficient to determine the boundaries of each site, the condition of subsurface remains, probable cultural affiliation, the significance of the site, and the time and costs involved for any necessary mitigation.

2.06 The Contractor will keep standard field records, to include but not necessarily to be limited to field notebooks, site survey forms, field maps and photographs.

2.07 The Contractor will obtain written permission from the appropriate landowners to enter their property for the purpose of conducting the field work.

3. GENERAL REPORT REQUIREMENTS

3.01 The Contractor will prepare a report detailing the study rationale, work done, the results of the entire investigation, and recommendations. The report will include, but not necessarily be limited to the following sections: an abstract, an introduction, a section on the research design and methodology employed, a comprehensive site description, analysis of recovered materials, evaluation of significance, and recommendations for further Corps action, a concise definitive summary and references. The above items need not necessarily be discrete units but must be readily discernible to the reader.

3.02 The abstract will be a synopsis of the report, where the reader may find the general nature of the investigation and recommendations resulting from the study. A cultural resource profile form will also be provided to the Contractor to complete for purposes of our record keeping.

3.03 The introduction will include, but will not necessarily be limited to, the following: the purpose of the investigation, delineation of the study boundaries, and a general statement on the nature of the study conducted.

3.04 The research design and theoretical orientation of the principal investigator and his/her research bias and assumptions will be explicitly stated as they pertain to this investigation.

3.05 The methodology used for data collection and analysis will be described in sufficient detail so that a reviewer may understand what was done and why.

3.06 The body of the report will include:

a. A discussion of the environmental context including pertinent elements of the surrounding natural environment, biological and geological features, and microenvironments.

b. A determination of the boundaries of each site and description of the boundaries by Universal Transverse Mercator coordinates and prepare suitable maps showing the location of the sites in relation to the surrounding physical and cultural environment at a sufficient scale and level of detail which may allow for avoidance of the site in final project designs.

c. A comprehensive description of the sites, including site features, and site materials and their proveniences, accompanied by illustrative maps, drawings, and photographs.

d. A description of other cultural resources in the approximate area of the project site, and their possible relationship to the sites investigated.

e. An unequivocal statement of nonsignificance or significance of the sites pursuant to the National Register of Historic Places. To this end the following considerations must appear in the statement of significance to be contained in the final report of these investigations.

- 1) consideration of all known and/or expected data categories and cultural features of the properties in terms of the information they may yield or have yielded,
- 2) consideration of any research topics that might form a basis for study of the properties, including topics currently addressed in the area and topics suggested by one's professional training as future possibilities, and
- 3) consideration of how study of the data categories and features represented by the properties may (or may not) contribute to study of the research topics.

f. If warranted, a recommended data recovery program for the individual sites, including methodology and research objectives. This will include a discussion of the time and costs involved.

g. A discussion of any sites or materials illustrating distinctive cultural processes which are potentially suitable for on-site interpretation or public display.

3.07 There will be a brief summary of the study findings and recommendations.

3.08 The report will include the vitae of the principal investigator, field team, and any consulting professionals.

4. FORMAT SPECIFICATIONS

4.01 Text materials will be typed on bond paper, 8.5 inches by 11.0 inches, with a 1.5-inch binding margin on the left side, 1-inch margins on the top and right, and 1.5-inch margin at the bottom.

4.02 Information will be presented in textual, tabular, and graphic forms, whichever is most appropriate, effective, and advantageous to communicate the necessary information.

4.03 The title page of the report will carry an appropriate inscription indicating the source of funds used to conduct the work, the contract number, the name of the principal investigator, and the date.

4.04 All references cited and/or utilized will be presented in standard American Anthropological Association format. Contacts with individuals will also be cited.

4.05 The report must include references to accession numbers used for all collections, photographs, and field notes obtained during the course of the study.

4.06 All figures must be readily reproducible by standard xerographic equipment. Negatives of all black and white photographs included in the final report must be included so that copies for distribution can be made.

5. REPORT SUBMITTALS

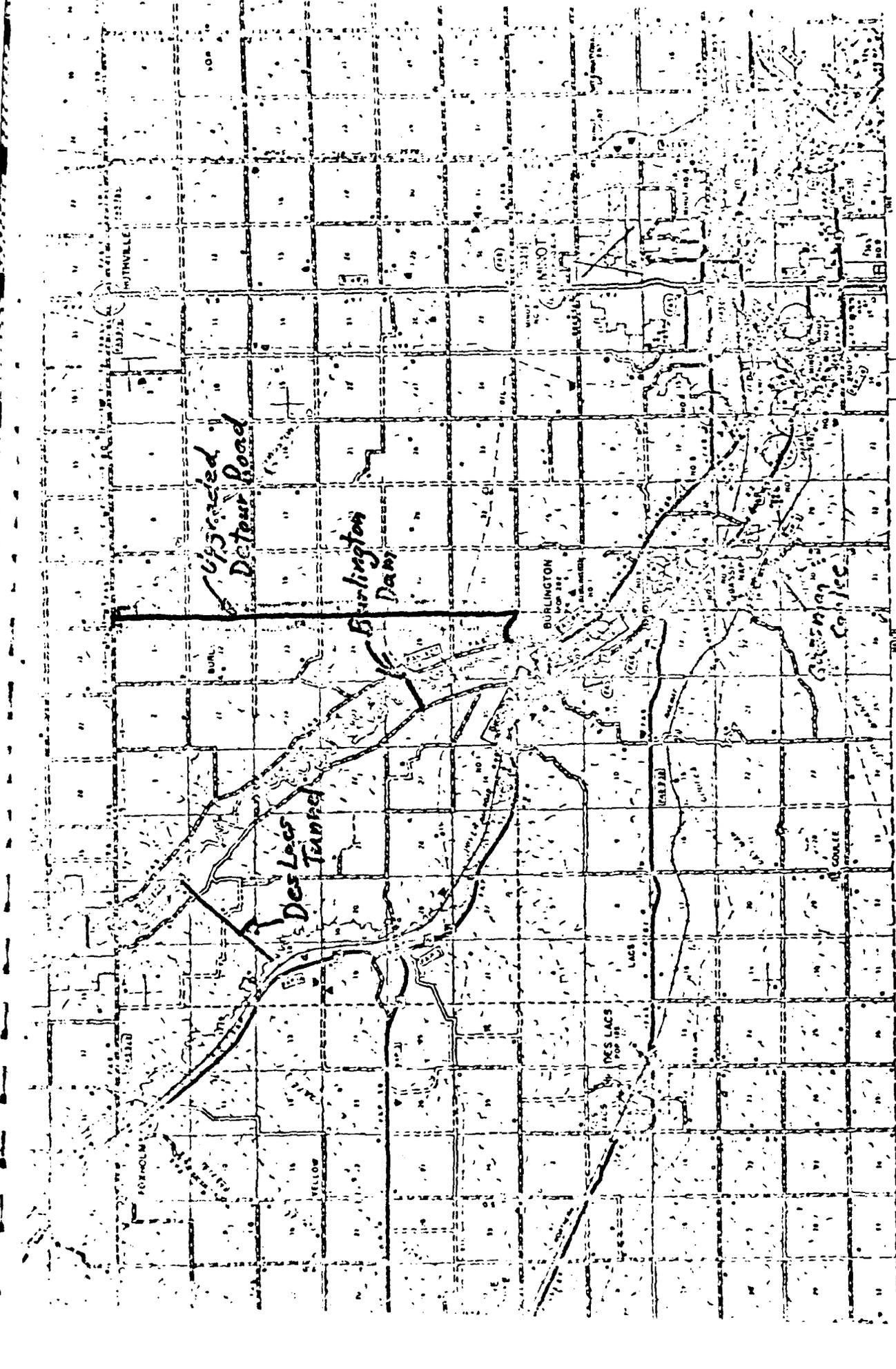
5.04 The Contractor will submit two copies of a field report within 30 days of completion of the actual field work.

5.05 The Contractor will submit 6 copies of a draft final report by
The draft report will be reviewed by the Contracting Officer and the official review agencies for Corps contracts. All comments will be consolidated and transmitted to the Contractor by

5.06 The Contractor will submit the original (including original photos and drawings) and 8 copies of the final report which will include appropriate revisions in response to the Contracting Officer's comments by

5.07 The Contracting Officer will send copies of the draft report to the appropriate offices of the Heritage Conservation and Recreation Service and to the appropriate State Historic Preservation Officer and State Archaeologist for review. Copies of the revised final report will be provided to the above mentioned agencies and to the Library of Congress, Smithsonian Institution and, at the discretion of the Contracting Officer, to other State and local archaeological and historical societies, public interest groups, and any other State and Federal agencies, institutions, foundations or individuals with special interest or expertise in cultural resources.

5.08 Prior to completion of the contract, neither the Contractor nor his/her 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.



R 87

101 20

R 83 W

R. 84 W NOTE: INSERTS NO. 1, 7, 9, 10 & BURLINGTON NO. 1 ARE SHOWN ON SHEET 1 OF 2

101 30

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R 85 W

Copy available to DTIC does not permit fully legible reproduction

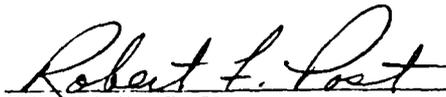
Estimated Itemized Budget for Conducting Intensive Survey and Testing of Detour Route and Three Archaeological Sites Within Proposed Construction Zones.

<u>Salaries and Wages</u>	<u>Off Campus</u>	<u>On Campus</u>
A. Principal Investigator (1) 4 months @ \$1300 per month (Including lab time)	\$ 1,300.00	\$ 3,900.00
B. Field Supervisor (1) 4 months @ \$700 per month (Including lab time)	700.00	2,800.00
C. Field Assistants (2) 1 month @ \$650 per month	1,300.00	----
D. Field Worker (1) 1 month @ \$600	600.00	----
E. Lab Supervisor (1) 3 months @ \$850 per month	----	2,550.00
	<u>3,900.00</u>	<u>8,550.00</u>
<u>Total Wages</u>	<u>\$12,450.00</u>	
Fringe Benefits @ 15% of Salaries and Wages of Items A through E	585.00	1,283.00
Overhead Cost @ 32% of Salaries and Wages and Fringe for off campus; 51% of Salaries, Wages and Fringe for on campus	<u>1,435.00</u>	<u>5,015.00</u>
	5,920.00	14,848.00
Subtotal (Wages, Fringe, and Overhead)	<u>\$20,768.00</u>	
Consultant Fees (Biologist, Geologist)		300.00
 <u>Operating Expenses</u>		
Field Vehicle Rental 3500 Miles @ \$0.15 per mile		525.00
Food (30 days) 6 people @ \$8.00 per day		1,440.00
Housing (1 month)		300.00
Supplies Maps, Mapping Material, Film, Developing, C-14 Analysis		1,000.00
Report Preparation Typing, Printing, Editing, Collating, Drafting, Photo Plate Preparation		800.00
Vehicle Rental (Boring tool) @ \$100 per day (4 days)		400.00
Travel (On site data comparison in surrounding areas)		400.00
Subtotal		<u>5,165.00</u>
<u>GRAND TOTAL</u>		<u>\$26,333.00</u>

CONTRACTOR DATA	<input type="checkbox"/> CHANGE ORDER <input checked="" type="checkbox"/> SUPPL. AGREEMENT P00001	1. CONTRACT NR. DACW37-77-C-0128
CONTRACT FOR <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> ARCHITECT-ENGINEER <input type="checkbox"/> AECM	3. NAME AND LOCATION OF PROJECT Cultural Resources Investigation-Burlington Dam	
} <input checked="" type="checkbox"/> SERVICES } Other	5. BUSINESS ADDRESS & TELEPHONE NR.* Department of Anthropology and Archaeology, Grand Forks, ND 58201 Tel No. 701-777-3009	
FIRM NAME THE UNIVERSITY OF NORTH DAKOTA		
6. TYPE OF FIRM* <input type="checkbox"/> INDIVIDUALLY OWNED <input type="checkbox"/> PARTNERSHIP <input type="checkbox"/> JOINT VENTURE X Educational organization <input type="checkbox"/> CORPORATION (INC. IN STATE OF _____)		
7. EXACT NAMES OF OWNERS, PARTNERS AND/OR OFFICERS*		8. QUALIFIES AS SMALL BUSINESS* <input type="checkbox"/> YES <input type="checkbox"/> NO
9. TYPE PAYMENT PROVISION PREFERRED* <input checked="" type="checkbox"/> MONTHLY PARTIAL PAYMENTS <input type="checkbox"/> OTHER-SPECIFY <input type="checkbox"/> LUMP SUM UPON COMPLETION		
10. NAME OF ASSOCIATE FIRM OR FIRMS OR CONSULTANTS PERFORMING ANY SERVICES UNDER THIS A-E CONTRACT. (For each firm or consultant indicate the services to be provided, . . . e.g., Architectural, Structural, Mechanical, Electrical, Drafting, etc. Any change in the following requires prior approval of the Contracting Officer.)		
<p>The negotiation and proposed award are based upon, among other things, an understanding:</p> <ol style="list-style-type: none"> That no member of the firm, owner or part owner, executive officer or director, and no employee of this organization receiving compensation therefrom is employed by the Government on construction work under the jurisdiction of the Corps of Engineers. That the contract cost, mutually agreed to in the amount of \$ 20,594.33 (options, if any included) is fair and reasonable compensation for the services to be rendered under the proposed contract and as indicated in the attached scope of work upon which the negotiations were based. That neither I, nor any member of this organization, employed any person, either directly or indirectly to solicit or secure a contract for the (construction-A-E services), regarding which negotiations have just been concluded, upon any agreement for a commission, percentage, brokerage or contingent fee; that all information and data submitted by me to the United States, incident to these negotiations are accurate and true to the best of my knowledge and belief. Furthermore, that in the event the contract is awarded to my firm, no part of the contract price shall be paid to any person, firm or corporation for soliciting or assisting in any manner whatsoever in securing this contract. 		
<u>Nov 6 1978</u> <small>(Date)</small>	<u>DIRECTOR ORPD</u> <small>(Title)</small>	<u>Earl J. Freise</u> <small>(Contractor Signature)</small>
<small>(The contractor's negotiator may sign if there is evidence that the contractor has granted the negotiator that authority)</small>		
<small>When the type of contract involved requires such information the Contractor will provide as attachments, applicable data on organization, present and proposed salaries, contractor owned construction equipment, facility and/or security clearances and other pertinent items in accordance with understandings reached during the negotiations. The Government will provide, as an attachment a resume of the actual negotiation proceedings which were attended by the Contractor or his representative. Particular attention will be directed toward including matters of record which constitute areas of mutual understanding and will include project data, contract appendices, forms, schedules, design or other criteria, materials, and equipment furnished by the contractor by the Government. Provision will be made at the end of the resume for the signature of both the principal Contractor representative and the principal Government representative. A copy of the scope of work upon which negotiations were based MUST also be attached as part of the official contract file.</small>		
<small>A statement of Not Applicable (N/A) may, where appropriate, be substituted for information required by items 5, 6, 7, 8, 9 and 10 when change orders are involved.</small>		

SCOPE OF WORK

The work to be accomplished consists of surveying and testing the Detour Route required for access to the proposed Burlington Dam. Also required is intensive testing of three archaeological sites (32WD40, 32WD407, 32WD408) located within designated construction zones for the Burlington Dam Project in order to obtain an unequivocal statement of their significance according to National Register criteria and requirements for mitigation, if appropriate. The work will include preparation of a report presenting the results of the investigation.



ROBERT F. POST

Chief, Environmental Resources Branch
Authorized Representative of the
Contracting Officer

APPENDIX B

Landowner Permissions

THE
UNIVERSITY
OF
NORTH
DAKOTA

ANTHROPOLOGY - ARCHAEOLOGY
Box 8242, University Station
Grand Forks, North Dakota 58202
(701) 777-3009

October 25, 1978

Dear Landowner:

The University of North Dakota Archaeological Research Program has contracted with the U.S. Army Corps of Engineers, St. Paul District, to excavate archaeological sites in the Burlington Project Area. In order to fulfill this contract, written permission must be obtained from those individuals on whose land the sites to be excavated are located.

This letter, after your signature has been placed in the space provided below, is to serve as written permission to conduct archaeological excavations on the archaeological site(s) located on your land.

Thank you.

Sincerely,

Kent N. Good
Research Associate
University of North Dakota
Archaeological Research

SITE NAME/NUMBER _____

Landowner's Signature John Chase Date _____

THE
UNIVERSITY
OF
NORTH
DAKOTA

ANTHROPOLOGY - ARCHAEOLOGY
Box 8242, University Station
Grand Forks, North Dakota 58202
(701) 777-3009

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Thank you.

Sincerely,

Kent N. Good
Research Associate
University of North Dakota
Archaeological Research

SITE NAME/NUMBER _____

Landowner's Signature

Minnie B. Wright

Date 10 21-78

STATE OF NORTH DAKOTA

University and School
Lands

State Land Department

Telephone 224-2301

Sixth Floor State Capitol
Bismarck, North Dakota 58505

October 20, 1978

Secretary and Information - 224-2800
Land Sales - 224-2802
Title Clerk - 224-2802
Dep. and Leasing Mgr. - 224-2803
Loan Mgr. - 224-2804
Accountant - 224-2805
Collection Mgr. - 224-2806
Dept. Attorney - 224-2807

Kent N. Good
Research Archeologist
University of North Dakota
Box 8242
Grand Forks, N. D. 58202

Dear Mr. Good:

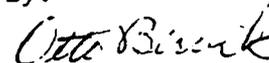
This is in reply to your letter of Oct. 19, 1978, in regard to obtaining permission to conduct testing of archeological sites on the following state land: ~~SE 1/4 NE 1/4~~ of Sec. 26-156-84, Ward County.

Permission is hereby granted to do the necessary testing that is required. We would also suggest that you make contact with our tenant Mr. Clarence Cogdill, Burlington, N. Dak. and also to restore any surface that has been disrupted.

Yours very truly,

R. E. Lommen
STATE LAND COMMISSIONER

By:



Otto Bervik
Deputy & Lease Commissioner

OB/rl

ARCHEOLOGICAL PERMIT

Kent H. Good of the University of North Dakota, Grand Forks, North Dakota, who received his MA in Anthropology from the University of Montana, having demonstrated his credentials as Archeologist is granted permission to conduct, in accordance with Chapter 55-03 of the North Dakota Century Code, archeological investigations, explorations, or excavations on land owned by an entity of the State of North Dakota being the:

32WD407, located in the SW $\frac{1}{4}$, SE $\frac{1}{4}$, NE $\frac{1}{4}$ of Sec. 26, T156N, R34W, Ward County. This permit is issued subject to the following conditions:

1. Receipt of a filing fee of \$5.00 which is hereby acknowledged.
2. Written permission of the governing body administering said land.
3. All archeological materials found and removed from such land and copies of all maps, notes, photographs, and other records pertinent to the explorations as well as a copy of the final report shall be delivered to the State Historical Society following a reasonable time for analysis in accordance with Section 55-03-02.
4. This permit shall terminate on December 31, 1978, subject to renewal within thirty days after expiration upon payment of a fee of two dollars as required by Section 55-03-03.

STATE HISTORICAL SOCIETY

James E. Sperry
 James E. Sperry, Superintendent
10/18/78
 Date

STATE OF NORTH DAKOTA)
) SS
 COUNTY OF BURLEIGH)

On this 18th day of October in the year of 1978 before me personally appeared James E. Sperry known to me to be the person who is described in and who executed the within instrument and acknowledged to me that the State Historical Society executed the same.

Robert J. Schlobohm
 Notary Public
 County Burleigh

(SEAL)

My Commission expires _____
 ROBERT J. SCHLOBOHM
 Notary Public, Burleigh Co., N. Dak.
 My Commission Expires 04 APRIL 18, 1984

APPENDIX C

Legal Locations of Sites Tested

APPENDIX C

Legal Locations of Sites Tested

Washek Site (32WD407)

Zone 14

Easting	3 19 840	3 20 110	3 20 140	3 19 700
Northing	53 52 790	53 52 920	53 53 160	53 53 080

Herzig Site (32WD401)

Zone 14

Easting	3 15 330	3 15 350	3 15 600	3 15 140
Northing	53 58 560	53 58 760	53 58 780	53 58 560

Big Critter Site (32WD408)

North Latitude:	48° 27' 12"
	48° 27' 32"
West Longitude:	101° 34' 15"
	101° 34' 30"

APPENDIX D

Vitae

CIRRICULUM VITAE

Name: Kent N. Good

Date and Place of Birth: June 29, 1946, Great Falls, Montana

Present Position: Associate Research Archaeologist, Department of Anthropology and Archaeology, University of North Dakota, Grand Forks, ND, 58202

Education: University of Montana, 1964 - 1969 B.A.
University of Montana, 1969 - 1974 M.A.

Teaching Experience: 1970 - 1972 Graduate Assistant, University of Montana
1972 - 1973 Instructor, University of North Dakota

Research: 1970, Archaeological Survey of the Pryor Mountain - Bighorn Canyon Recreation Area, June - September.

1971, Field Supervisor, Archaeological Excavation in the Pryor Mountain - Bighorn Canyon Recreation Area, June - September.

1972, Field Supervisor, National Park Service, Archaeological Salvage of the Pryor Mountain - Bighorn Canyon National Recreation Area Road - Phase II.

1972, Field Supervisor, National Park Service, Crow Tribal Land Archaeological Survey.

1973, Field Supervisor, National Park Service, Archaeological Excavation of the Moe Site, (32MN101), Lake Sakakawea, North Dakota.

1973, Field Supervisor, Corps of Engineers, Archaeological Survey of the Warroad - Roseau Rivers, Minnesota.

1973, Field Supervisor, Bureau of Reclamation, Archaeological Survey of the Patterson Lake and Versippi Reservoir, North Dakota.

1974, Field Supervisor, Archaeological Survey of the Turtle River Watershed, Forest River Watershed, North Dakota, Soil Conservation Service.

1974, Field Supervisor, Archaeological Survey of the route of the Proposed Dome Pipeline, North Dakota State Historical Society.

1974, Field Supervisor, Archaeological Survey of the Shoreline of Lake Homme, North Dakota.

1974, Field Supervisor, Archaeological Excavation at the Pretty Creek Archaeological Site, Pryor Mountains, Montana, National Park Service.

1975, Field Supervisor, Archaeological Survey of the Warwick-McVille Proposed Canal Routes, Garrison Diversion, and Proposed Recreation Areas, North Dakota Bureau of Reclamation.

1976, Field Supervisor, Archaeological Investigations in the LaMoure-Oakes and Wild Rice River Project Areas, LaMoure-Oakes Project Area, Garrison Diversion Unit, North Dakota. Bureau of Reclamation.

1977, Principal Investigator, Archaeological Test Excavation of the Highway 8 Site, 32DU2, Garrison Reservoir, North Dakota, U.S. Army Corps of Engineers, Omaha District.

1977, Field Supervisor, Archaeological Survey of Burlington Dam/Lake Darling, North Dakota, U.S. Army Corps of Engineers, St. Paul District.

1978, Principal Investigator, Archaeological Test Excavation of the Anderson Tipi Ring Site (32ML111) for the Falkirk Mining Company, Bismarck, North Dakota.

1978, Principal Investigator, Archaeological Test Excavations of three sites within affected areas of the Proposed Burlington Dam, Souris River Basin, North Dakota. U.S. Army Corps of Engineers, St. Paul District.

1979, Principal Investigator, An Archaeological Survey of a coal mine development for the Falkirk Mining Company, Bismarck, North Dakota.

Publications: 1973, Preliminary Land Use, Environmental and Socio-Economic Assessment of the Warroad River and Bull Creek Drainage Area, Minnesota. Richard Bares, Paul B. Kannowski, Ralph D. Kingsbury, Phyllis E. Moen, John R. Reid, Nikki R. Seabloom, co-authors. Institute for Ecological Studies, University of North Dakota. Research Report #4.

1973, Environmental Impact Assessment of the Roseau River, Minnesota. John R. Reid, Ronald J. Hall, Richard Bares, Donald L. Rubbelke, Phyllis Moen, Larry J. Dobesh, co-authors. Institute for Ecological Studies, University of North Dakota. Research Report #5.

1974, A Survey and Synthesis of Archaeological Sites Within the Sub-Alpine Ecological Zone, Pryor Mountains, Montana, (M.A. Thesis on file at the University of Montana, not submitted for publication.)

1974, The Results of the Archaeological Survey in the Grapevine Creek Area, Bighorn Canyon National Recreation Area -- 1972 Field Season. On file with the National Park Service. Co-authored with Lawrence L. Loendorf.

1975, The Results of the Archaeological Survey of Crow Tribal Lands, Bighorn Canyon National Recreation Area -- 1972 Field Season. On file with the National Park Service.

1976, Preliminary Report of Cultural Resource Inventory of Portions of the Central North Dakota Section, Garrison Diversion Unit, North Dakota. On file with the National Park Service. Co-authored with Frederick Schneider and Kurt Schweigert.

1976, Archaeology Investigations in the LaMoure-Oakes Project Area, Garrison Diversion, North Dakota. On file with the National Park Service. Co-authored with James Dahlberg, William Tibesar, and Susan Vehik.

1976, The Commissary Ridge Bison Kill (24LB863), Archaeology in Montana, Vol. 17, Nos. 1 & 2, 1976. Co-authored with Lawrence L. Loendorf.

1977, Archaeological Investigations of the Hendrickson III Site - 32SN403, LaMoure-Oakes Project Area, Garrison Diversion Unit, North Dakota. On file with the Bureau of Reclamation. Co-authored with James Dahlberg, Thomas Larson, Bruce Benz, and Frederick Schneider.

1977, Archaeological Investigations in the LaMoure-Oakes and Wild Rice River Project Areas, LaMoure-Oakes Project Area, Garrison Diversion Unit, North Dakota. On file with the Bureau of Reclamation. Co-authored with Willard Kinney, Carmen Greenshields, and Bruce Benz.

1977, Archaeological Test Excavation of the Highway 8 Site, 32DU2, Garrison Reservoir, North Dakota. On file with the U.S. Army Corps of Engineers, Omaha District. Co-authored with Jeffrey L. Hauff.

1977, "Fortification Sites in the Bighorn Canyon Area," in Archaeology in Montana, Vol. 18, Nos. 2 & 3, Co-authored with Lawrence L. Loendorf.

AD-A171 852

ARCHAEOLOGICAL TESTING AND SURVEY: TESTING OF THREE
SITES AND SURVEY OF A. (U) NORTH DAKOTA UNIV GRAND
FORKS DEPT OF ANTHROPOLOGY AND ARCHAEO.
K N GOOD ET AL. JAN 80 DACW37-77-C-0128

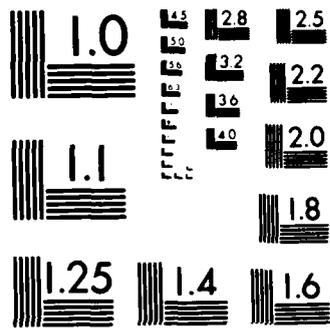
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

1978, An Archaeological Survey: Shoreline of Lake Darling and proposed Burlington Dam, Flood Control Project Area, Upper Souris River, North Dakota. On file with the U.S. Army Corps of Engineers, St. Paul District. Co-authored with Richard A. Fox.

1978, Archaeological Test Excavation at the Anderson Tipi Ring Site (32ML111), McLean County, North Dakota: A Cultural Resource Study in Central North Dakota. On file with the Falkirk Mining Company, Bismarck, North Dakota. Co-authored with Jeffrey L. Hauff.

Papers Read at Professional Meetings: 1975, "The Lisbon Burial - A Possible Middle Missouri Burial", read at the Plains Anthropological Conference, Lincoln, Nebraska, November.

1978, "Results of the Archaeology Survey of the Proposed Burlington Dam Project", read at the Association of Manitoba Archaeologists Conference, Winnipeg, Manitoba, May.

1979, "The Archaeology of the Anderson Tipi Ring Site, North Dakota", read at the Joint Plains - Midwest Archaeological Conference, Grand Forks, North Dakota, April.

Foreign Language: French

Research Interests: North American Prehistory, Early Hunters and Their Lithic Technology, Nomadic Peoples of the Plains

Memberships: Sigma Xi
Plains Anthropological Conference
Plains Anthropologist

VITA

Name: Jeffrey Lynn Hauff

Date and Place of Birth: January 28, 1956
Moorhead, Minnesota

Education: University of North Dakota, 1974-1978 B.A. (Anthropology)

Research: 1977, Lab Assistant, University of North Dakota Archaeological Research, Feb. - May.

1977, Archaeology Field School, University of North Dakota, Knife River Indian Villages, June.

1977, Research Assistant, Test Excavation, University of North Dakota Archaeological Research, July.

1978, Research Assistant and Field Supervisor, Excavation of Tipi Ring Site in Central North Dakota, University of North Dakota Archaeological Research, June - Sept.

1978, Field Supervisor, Burlington Dam Project, University of North Dakota Archaeological Research, October.

1978-1979, Research Assistant, Burlington Dam Project, University of North Dakota Archaeological Research, Nov. - Feb.

Publications:

1977 Archaeological Test Excavation of the Highway 8 Site, 32DU2, Garrison Reservoir, North Dakota. Kent Good co-author. Report submitted to the U.S. Army Corps of Engineers, Omaha District.

1978 Archaeological Test Excavation at the Anderson Tipi Ring Site (32ML111), McLean County, North Dakota: A Cultural Resource Study in Central North Dakota. Kent Good co-author. Report submitted to the Falkirk Mining Company, Bismarck, North Dakota.

Professional Papers:

1977 Test Excavation at the Highway 8 Site (32DU2). Presented at the 35th Annual Plains Anthropological Conference, Lincoln, Nebraska.

Research Interests: Prehistoric North American trade patterns, seasonal subsistence activities and utilizations, Ecological Archaeology.

END

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