

1987 AND 1988 ARCHEOLOGICAL INVESTIGATIONS RELATED TO VISITOR CENTER
CONSTRUCTION IN AREA B AT THE KNIFE RIVER INDIAN VILLAGES
NATIONAL HISTORIC SITE

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and Stanley A. Ahler

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

Contribution No. 249

June 1989

A report submitted to the Midwest Archeological Center, U.S. National
Park Service, Lincoln, Nebraska, in partial fulfillment of Supplemental
Cooperative Agreement No. CA-6115-7-8023 and Master Cooperative Agreement
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ABSTRACT

Archeological testing was conducted during the 1987 field season by University of North Dakota and National Park Service personnel in the expanded Visitor Center Area B construction site at the Knife River Indian Villages National Historic Site (KNRI). The Visitor Center construction area overlaps parts of two significant archeological sites, Lower Hidatsa West (32ME499) and Hotrok (32ME412). Testing work involved a combination of hand dug plowzone test plots, deep excavation units, and mechanically dug strip trenches. Two substantial subplowzone features were discovered during testing, and minor adjustments were recommended by UND for the Visitor Center construction zone boundary. Impact mitigation work was conducted by UND in the construction zone during the 1988 field season using a combination of removal of the plowzone with mechanical equipment and hand excavation of exposed subplowzone features. Altogether, twelve subplowzone features were excavated in the two archeological sites. The most substantive of these were a single basin-shaped refuse-filled pit of Plains Village origin within the Lower Hidatsa West site, two basin-shaped pits of Plains Village origin containing primarily fire-cracked rock in the Hotrok site, and a single large, rectangular refuse-filled pit of recent historic age in the Hotrok site. Three radiocarbon dates from previous (1979) excavations in the Lower Hidatsa West site are also reported. These indicate a postcontact age sometime within the period from about AD 1650 to 1780 for some of the large undercut pits in the northern part of that site. A proposed water line route from the Area B construction zone to the northwestern corner of Stanton was also intensively surveyed during the 1988 field program; no significant cultural resources were found within the designated water line corridor.

ACKNOWLEDGMENTS

The authors are particularly grateful to the staff of the Midwest Archeological Center for the administrative assistance provided throughout the duration of this archeological program. Special thanks are due to Dr. F. A. Calabrese for assuring that adequate funding was available for the program and to Mr. Thomas D. Thiessen for coordination and communication regarding planning decisions and all other administrative aspects of the program. Mr. Steve Devore of the Midwest Archeological Center filled in ably, on short notice, as supervisor for the 1987 field program. We are also grateful to Mr. Michael O. Holm, Mr. William Haviland, and the remainder of the staff at the KNRI for their coordination and cooperation during the two seasons of fieldwork for the program.

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I. INTRODUCTION

Project Description

During the 1987 and 1988 field seasons, the Department of Anthropology, University of North Dakota, Grand Forks (UND) conducted archeological investigations in the Knife River Indian Villages National Historic Site (KNRI) near Stanton, North Dakota (Figure 1). This work was performed in conjunction with the planned construction of a visitor/administrative facility by the U.S. National Park Service (NPS), referred to hereafter as the Visitor Center. Archeological investigations related to planned Visitor Center construction activities included: (1) additional test excavations at the preferred construction site, referred to as Area B; (2) a surface survey of a proposed water line corridor from Stanton to Area B; and (3) impact mitigation work within Area B. This work was conducted in accordance with Supplemental Cooperative Agreement No. CA-6115-7-8023, as amended, under Master Cooperative Agreement No. CA-6000-7-8015 between UND and the NPS.

Previous archeological work related to Visitor Center construction at the KNRI is reported in Ahler (1979) and Toom et al. (1985). On the basis of these investigations as well as other considerations, Area B was selected as the preferred construction site for the KNRI Visitor Center (NPS 1984). However, NPS planning personnel subsequently determined that Area B, as originally delimited (NPS 1984), was too small to accommodate the final facility design. A decision was made to expand the Area B construction site to the east, as shown in Figure 2. The eastern expansion of Area B encroached on previously uninvestigated portions of the Lower Hidatsa West (32ME499) and Hotrok (32ME412) archeological sites (Figure 2). Both sites had been evaluated (but not specifically in the expanded construction area) and found to contain significant archeological deposits (Ahler 1979; Ahler and Mehrer 1984:45-72; Toom et al. 1985). Thus, the decision to expand Area B to the east necessitated additional archeological evaluation, particularly in the affected areas of the Lower Hidatsa West and Hotrok sites.

Additional archeological work in the revised Area B construction site was conducted in two phases. Phase 1, implemented in 1987, consisted of evaluative test excavations in the eastern expansion of Area B that encompassed parts of the Lower Hidatsa West and Hotrok sites (see the initial 1987 project proposal, Appendix A). Preliminary results of the Phase 1 findings and pertinent recommendations were presented by letter report (Appendix A). It was recommended that a small part of the eastern expansion area within the Lower Hidatsa West site containing high artifact densities in the plowzone be avoided if possible during construction. A preferred construction zone was identified which excluded this small part of the the Lower Hidatsa West site and which included an expanded part of the nonsite area to the northwest of the original Area B visitor center tract.

The results of the phase 1 investigations were used to plan the scope of the phase 2 activities (see proposal for phase 2 studies, Appendix A). Phase 2, implemented in 1988, consisted of the complete mitigation of construction impacts to archeological remains that were potentially located throughout the expanded Area B construction site designated as the preferred construction zone. The discovery and proper treatment of any subplowzone features including

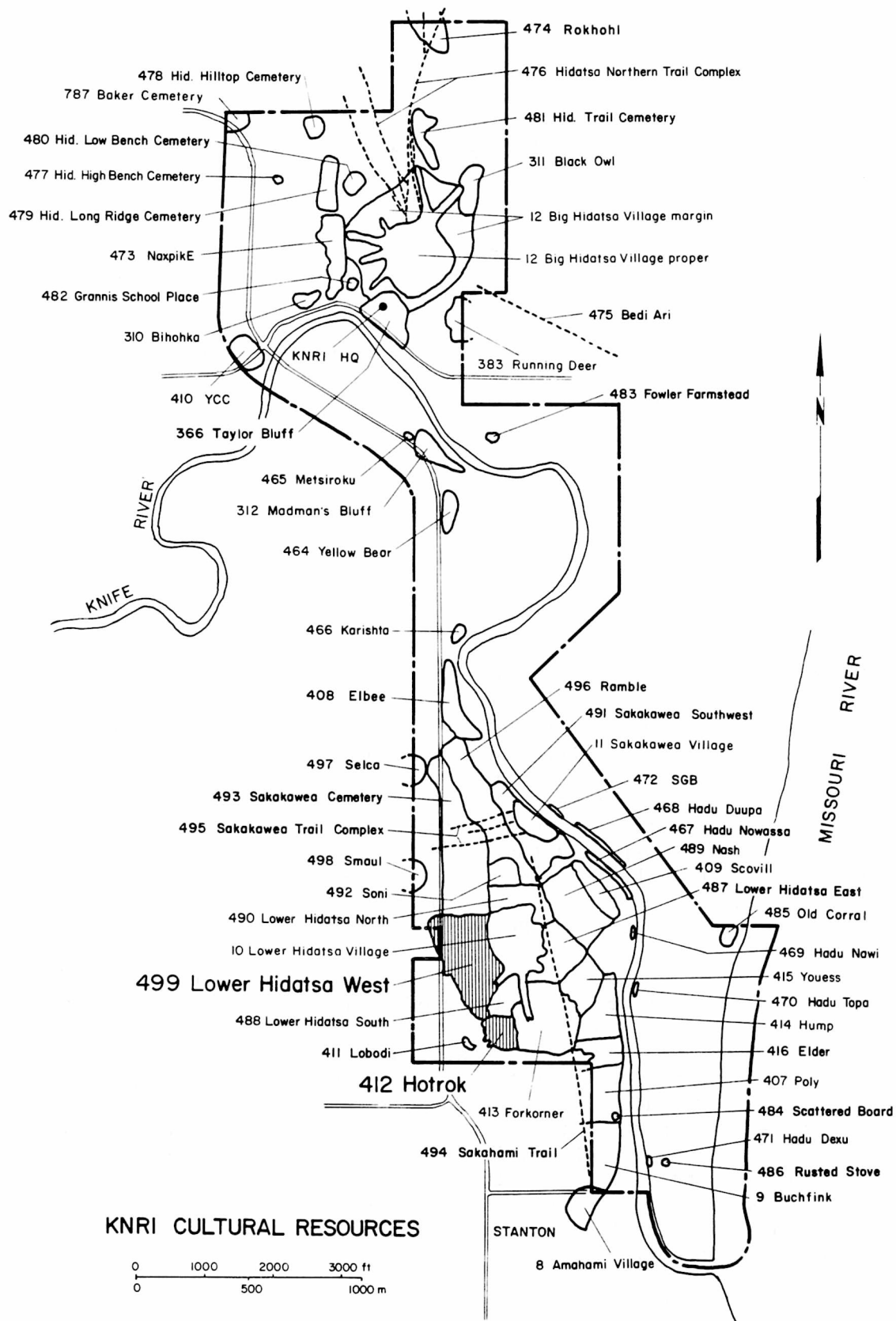


Figure 1. Map of the Knife River Indian Villages National Historic Site showing the location of Hotrok (32ME412), Lower Hidatsa West (32ME499), and other archeological sites.

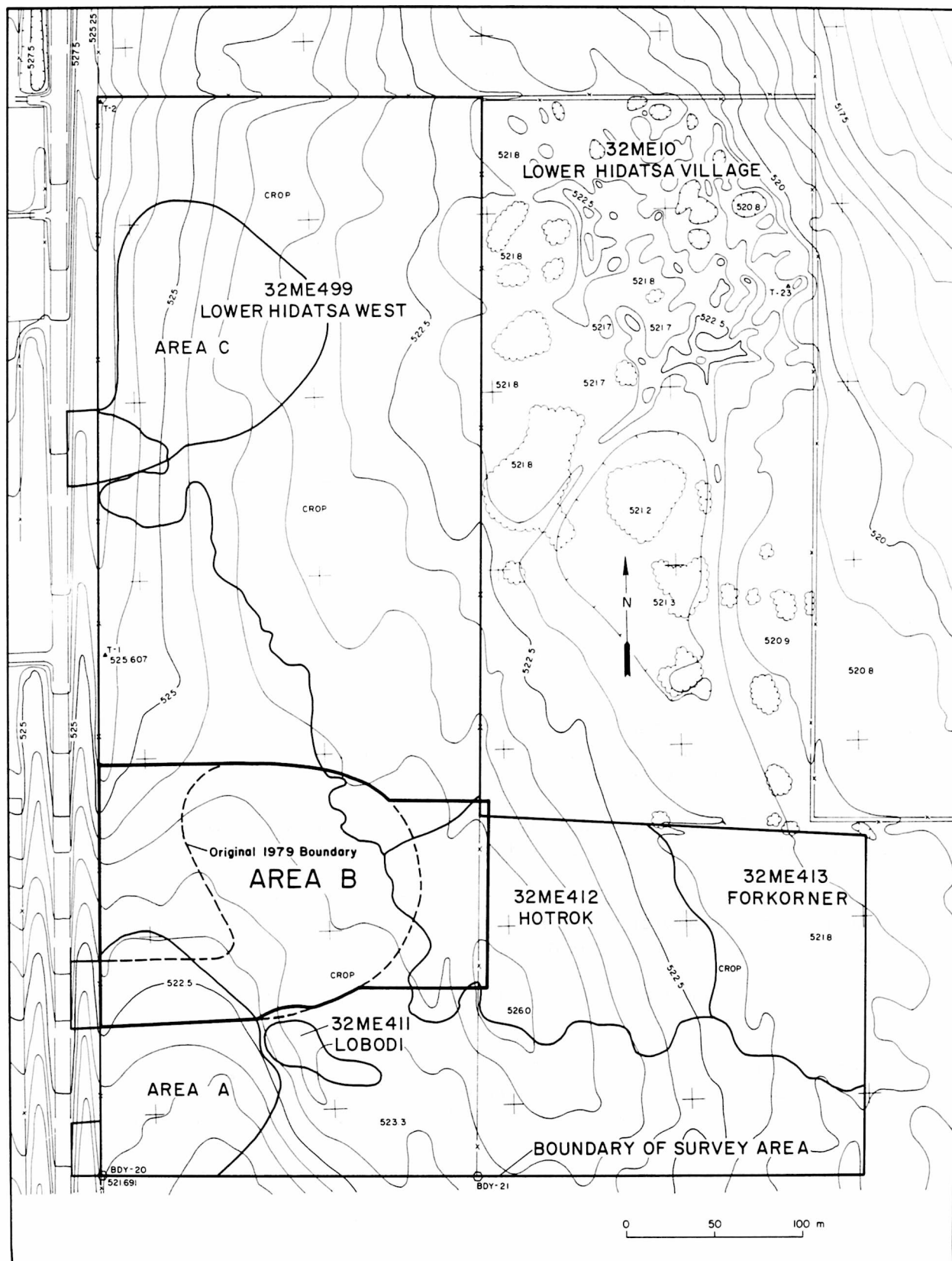


Figure 2. Contour map of the southwestern part of the KNRI showing Hotrok (32ME412), Lower Hidatsa West (32ME499), other nearby archeological sites, and Visitor Center Areas A, B (as revised), and C.

human burials that might be present in Area B was of primary concern to the phase 2 investigations. The general research objective underlying these activities was to collect information to enhance the functional interpretation of sites such as Lower Hidatsa West and Hotrok which were peripheral to major village sites such as Lower Hidatsa (32ME10), and to elucidate the functional and chronological relationships among such localities. In addition to these activities, a proposed water line corridor from Stanton to Area B was surveyed for significant archeological resources during the 1988 impact mitigation work.

Correspondence, proposals, and preliminary reports concerning both phases of work related to planned KNRI Visitor Center construction activities in Area B, as revised, can be found in Appendix A.

Project Objectives

Phase 1 work in the revised Area B Visitor Center construction site at the KNRI was to meet three basic objectives:

1. Execution of a systematic test excavation program in the expanded eastern portion of Area B.
2. Limited analysis of artifactual data sufficient to evaluate potential archeological impacts within this area to the Lower Hidatsa West and Hotrok archeological sites.
3. Communication of the findings of the test excavations to the NPS and the development of a final archeological impact mitigation plan for Visitor Center construction activities in Area B.

Based principally on the findings of the phase 1 evaluative testing, the specific objectives of the phase 2 mitigation work included:

1. Execution of an archeological impact mitigation program for all of the Area B construction site with an emphasis on the discovery and excavation of intact (subplowzone) cultural features.
2. Survey and evaluation of the proposed water line corridor from Stanton to the Visitor Center site.
3. Completion of detailed artifact analyses and the preparation of a comprehensive report of investigations covering all aspects of the 1987-1988 testing, survey, and the mitigation work related to Visitor Center construction in Area B.

Archeological Sites in Area B

Parts of two archeological sites are located in the eastern portion of the revised Area B construction site -- Lower Hidatsa West (32ME499) and Hotrok (32ME412). Previous test excavations at Lower Hidatsa West are reported in Toom et al. (1985); those at Hotrok are reported in Ahler and Mehrer (1984). An analysis of surface artifact data pertaining to both sites is presented in

Ahler et al. (1979). The following discussions of the two sites in question are drawn largely from these reports.

Lower Hidatsa West

The Lower Hidatsa West site is located in the Buchfink Cultivated Tract immediately to the west of Lower Hidatsa Village (32ME10) (Figures 1 and 2). Situated in the gently sloping Stanton and Hensler terraces (Reiten 1983), the site area was under cultivation for many years in the recent past. At the time of the fieldwork reported here the site area was covered by a heavy stand of reestablished native prairie.

The site area was originally defined on the basis of surface artifact density data generated by the point-quarter survey of the Buchfink Cultivated Tract (Ahler et al. 1979). These boundaries were later refined as additional data became available, resulting in a formally defined site area covering some 7.5 ha (18.75 acres) (Lovick and Ahler 1982:268). Only the extreme southeastern part of the site covering no more than about 2500 m² is included in the expanded Area B construction site.

On the surface, the site consists of light to moderate scatters of aboriginal artifactual debris, which has been disturbed and somewhat dispersed by cultivation. Scattered surface artifacts of Euroamerican origin are also present. Such surface debris is nearly continuous across the Buchfink Cultivated Tract, with site boundaries and nonsite areas defined on the basis of variations in surface artifact density and relationships to other site boundaries, as was mentioned above. Much of the artifactual content of the site is thought to be related directly or indirectly to the Lower Hidatsa Village occupation because of the close spatial proximity of the two sites (cf. Figures 1 and 2). This observation is supported by the findings of subsequent test excavations.

Lower Hidatsa West was test excavated in 1979 by UND personnel (Toom et al. 1985). The primary objective of the testing program was to provide input to the NPS regarding the location of the KNRI Visitor Center at one of three locations, Areas A, B, or C. Area C is located wholly within the defined limits of Lower Hidatsa West; only a small portion of the site was contained in Area B, as originally defined; and Area A is essentially in a nonsite locality (Figure 2). The test excavations revealed that the primary native component at the site is affiliated with the Heart River phase of the Plains Village tradition (AD 1400-1710) and that later, postcontact age components probably occur there as well (Toom et al. 1985:146). In Area C, artifacts from Plains Village components were found to be concentrated in the plowzone. Intact portions of a number of subplowzone features, including several undercut storage pits thought to be principally attributable to the Heart River phase, were also found in Area C. The Heart River phase component at Lower Hidatsa West is tentatively interpreted as a complex of specialized activity areas associated with contemporaneous, intensive habitation at the nearby Lower Hidatsa Village. Evidence of other, more ephemeral occupations affiliated with the preceramic, Plains Village, and historic periods was also found at the site.

Area C at Lower Hidatsa West was judged to have significant research potential regarding the study of peripheral village activity areas within the KNRI. Areas A and B were evaluated as having much less no research potential relative to the Lower Hidatsa West occupations because of very low artifact and feature densities. It was therefore concluded, from a cultural resource management perspective, that the preferred location for the proposed KNRI Visitor Center would be in either Area A or the Area B, as originally defined (Toom et al. 1985:147). This same conclusion was arrived at in an earlier report (Ahler 1979).

Hotrok

The Hotrok site is located approximately 400 m to the south-southwest of Lower Hidatsa Village. It is abutted by Lower Hidatsa West on the northwest, Lower Hidatsa South (32ME488) on the north, and Forkorner (32ME413) on the east (Figure 1). The site was discovered and first defined on the basis of artifact density data generated by point-quarter survey work in the Buchfink Cultivated Tract (Ahler et al. 1979). It is further described in the KNRI surface reconnaissance report (Lovick and Ahler 1982:240). The site occupies an area of about 1.88 ha covering a relatively flat crest of a minor ridge in the Stanton terrace (Reiten 1983). Virtually all of the site was under cultivation in the recent past. At the time of the fieldwork reported here the site exhibited a heavy cover of reestablished native prairie. The western one-third of Hotrok is contained in the expanded Area B construction site, covering an area of some 3800 m².

Point-quarter data revealed two broad areas of relatively high artifact density, one in the western half of the site, and one in the northwest. The western artifact concentration exhibits at least three dense, localized concentrations of fire-cracked rock (FCR) which are clearly visible on the ground surface. Two of these localized FCR concentrations were the focus of test excavations conducted in 1979 (Ahler and Mehrer 1984:45-72). These were designated Areas A and B, and should not be confused with Visitor Center construction Areas A and B which were part of the Lower Hidatsa West investigations. As its name implies, the artifactual content of Hotrok is dominated by FCR, although approximately equal frequencies of FCR, bone, pottery, and chipped stone were recorded over the site as a whole beyond the FCR concentrations.

Cultural activities are thought to have varied between Areas A and B at Hotrok. Area B yielded quantities of FCR and some burned bone. This contrasts with the relatively low numbers of stone tools and flaking debris. In addition, ceramic artifacts suggest the possibility of two chronologically distinct periods of use for the two tested site areas. A very meager sample of pottery from Area A may reveal an episode of use by Plains Village tradition, Scattered Village complex peoples (ca. AD 1400-1700). On the other hand, the pottery from Area B indicates site utilization by Plains Village tradition, Heart River phase peoples (AD. 1400-1710), most likely from the Heart River phase component at the nearby Lower Hidatsa village site (cf. Figures 1 and 2). Two of the six classifiable pottery vessels (rim sherds) from Area B are Knife River Fine ware. This is a distinctive pottery type that has persisted for hundreds of years in KNRI village components. It is thought to represent special-function vessels used for restricted purposes (Ahler and Mehrer 1984:71). Although the pottery sample from Area B at Hotrok is quite small,

the presence of a relatively high proportion of Knife River Fine does suggest a specialized function of an unusual nature for this part of the site.

At this juncture, one can only speculate as to the actual function or functions of the Hotrok site, and the only meaningful data on this subject come from the Area B test excavations (Ahler and Mehrer 1984:71-72). The best present interpretation for Area B is that it functioned as a dump site for debris from ritual activities, and that these rituals appear to have involved some combination of the use of sweatlodges (FCR), Knife River Fine ware, and meat consumption (burned bone). The rather large accumulation of FCR in Area B and limited ethnographic analogy are the sole basis for the sweatlodge rationalization. The affiliation of this supposed ritual debris with the Heart River phase makes it possible to infer a direct connection to the nearby Lower Hidatsa village site. In sum, then, Area B at Hotrok could represent an accumulation of debris generated by certain ritual activities at Lower Hidatsa village, especially sweatlodge ceremonies at Lower Hidatsa which would produce large quantities of FCR that may have been disposed of at some off-village location like the Hotrok site.

Environmental and Cultural Setting

Detailed discussions on the environmental and cultural setting of the KNRI are presented in Lovick and Ahler (1982:34-47) and need not be repeated here. This section will focus on the immediate setting of the Lower Hidatsa West and Hotrok sites, as abstracted from Lovick and Ahler (1982) and other sources.

Lower Hidatsa West and its immediate surroundings are situated in the gently sloping to level Stanton and Hensler terraces (Reiten 1983). Hotrok is located on a slight rise in the Stanton terrace. These terraces are largely Pleistocene in age, with a deep structure composed of fluvial and glaciofluvial sand and gravel deposits of the Coleharbor Formation. The Coleharbor Formation materials are capped by late Wisconsinan to Holocene-age Oahe Formation deposits consisting of diffusely bedded, windblown sandy silt. All archeological deposits within the KNRI are expected to occur within Oahe Formation deposits, either of eolian or alluvial origin.

The recent climate of the KNRI is semi-arid and continental; it is characterized by seasonal temperature extremes and rapidly changing weather patterns. Nearby, permanent sources of water include the Knife and Missouri Rivers. The Knife River, a western tributary of the Missouri, flows through the KNRI and empties into the Missouri at the extreme southeastern boundary of the park. The Missouri flows from north to south just to the east of the KNRI (Figure 1).

The recent climate and topography of the KNRI has produced a mixed grass prairie over much of the area in the absence of cultivation. Gallery forests are present on the bottomlands along the permanent stream channels. Prior to the introduction of mechanized agriculture by Euroamericans, both site areas were covered by mixed grass prairie vegetation. Native prairie species have been reestablished in several previously cultivated tracts within the park. This grassland setting and the nearby gallery forests of the Knife and Missouri Rivers once supported a wide diversity of native fauna, including many species of large and small game. Deer are still present in the area, and bison were

once common prior to their near extirpation during the late 1800s. Aquatic resources such as fish and mollusks are also present in the rivers.

Generally speaking, the KNRI once provided a nearly ideal setting for native Amerindian peoples, offering an abundance of water, fuel, building materials, food resources, suitable settlement sites, and arable bottomland. This is especially true of village-dwelling horticulturalists, referred to collectively as the Plains Village tradition, who made extensive use of the river bottoms for their garden plots of corn, beans, squash, and tobacco. Plains Villagers also hunted game animals and gathered wild plant foods on the upland Plains and in the gallery forests to fill their subsistence needs.

Prehistorically and historically, most of the archeology in the KNRI pertains to the Plains Village tradition (ca. A.D. 1000-1861). Plains Villagers were the most conspicuous inhabitants of the area, especially groups of the Hidatsa tribe and to a lesser extent the Mandan tribe. Situated in the Knife-Heart region of the Middle Missouri subarea (Lehmer 1971), the KNRI supported, over a considerable period of time, a number of permanent villages attributable to various archeological taxa (Lovick and Ahler 1982:54-78). The culture-historic units relevant to the Plains Village tradition offered by Lovick and Ahler can be listed here to provide a general framework for the discussion of cultural components in later sections of the report: Clark's Creek phase (AD 1000-1200); Nailati phase (AD 1200-1400); Heart River phase (AD 1400-1710); the Scattered Village complex (AD 1400-1700); an unnamed protohistoric or "transitional" phase (AD 1710-1750); and the Knife River phase (AD 1750-1861). The Euroamerican period begins at about AD 1861, the date when native peoples abandoned permanent settlements in the Knife River region. Wood (1986) offers a similar culture-historic scheme for the region. Plains Village cultural taxonomy/chronology for the region is currently undergoing drastic revision as a result of detailed analysis of recent archeological work at the KNRI. For the time being, the units listed above from Lovick and Ahler (1982) will suffice for structuring the present analysis.

Several prominent village settlement occur within the KNRI. Most notable among these are Lower Hidatsa Village (32ME10) (Ahler and Weston 1981), Sakakawea Village (32ME11) (Ahler et al. 1980), and Big Hidatsa Village (32ME12) (Ahler and Swenson 1985) (see also Lehmer et al. 1978). Many other smaller Plains Village habitation sites such as Elbee (32ME408) (Ahler 1984), Taylor Bluff (32ME366) (Ahler 1988), and Forkorner (32ME413) (Ahler and Mehrer 1984) are also present, as are other Plains Village site types such as activity areas, trails, and cemeteries (Lovick and Ahler 1982).

Very little is presently known about the previllage (Paleoindian, Plains Archaic, and Plains Woodland) inhabitants of the KNRI. The ordinarily deep burial depth of such components makes their identification and investigation problematic, and only a very few sites in the KNRI are known to potentially contain information on previllage occupations. Lovick and Ahler (1982) further discuss the paucity of available data on previllage peoples and the potential for the archeological resources of the KNRI to fill this gap in our knowledge of local prehistory.

Personnel and Scheduling

The 1987-1988 archeological investigations related to planned KNRI Visitor Center construction in Area B were conducted under the overall supervision of Stanley A. Ahler (UND), the project principal investigator. Fieldwork for 1987 test excavations in the expanded Area B construction zone was begun on 27 July and completed on 18 August. The field director for this phase of the project was Steve Devore of the Midwest Archeological Center (MWAC), U.S. National Park Service, Lincoln, Nebraska. The 1987 field crew consisted of Robert Ackre, Dan Aird, Stewart Deats, Kerry Hackett, Andrea Kulevsky, and Debbie Roach, archeological assistants at UND.

The 1988 impact mitigation fieldwork was carried out from 25 July to 12 August under the direction of Dennis L. Toom (UND). Toom was assisted in the field by Dan Aird, Duane Klinner, and Andrea Kulevsky, all of UND. The water line corridor survey was conducted from 28-29 July 1988 by Ahler, Toom, and Aird. Services and equipment related to mechanical earthmoving activities in Area B during the 1988 mitigation work were provided by Schlosser Excavating, Mandan, North Dakota. The road grader used in the mechanical stripping operation was operated by Nathan Schlosser.

Routine laboratory work was performed by Dan Aird and Paul R. Picha under Ahler's supervision. Analysis and report preparation tasks were conducted jointly by Picha, Toom, and Ahler. Jane G. Monson-Toom prepared the final line drawings.

II. FIELDWORK

Strategies and Goals

Different field strategies were employed during the 1987 and 1988 investigations in Area B because the goals of these two phases of the project were also different. The primary goal of the 1987 test excavation program was the collection of additional information on the artifactual content of the eastern expanded construction area in order to better evaluate its research potential and to plan appropriate impact mitigation activities. The sole purpose of the 1988 mitigation program was the location and excavation of intact portions of cultural features preserved beneath the plowzone throughout the Area B construction site.

One focus of the 1987 test excavations was on close-interval, systematic sampling of the plowzone deposits in the eastern expansion of the Area B construction site. Sampling was designed to acquire information on artifact densities and content within potentially impacted portions of the Lower Hidatsa West and Hotrok sites. In addition, two deep test units were excavated, one in the Lower Hidatsa West area and one in the Hotrok area, to explore the potential for deeply buried cultural deposits. A third activity in was the excavation of a series of systematically spaced, sample strip trenches. Stripping was designed to remove surficial plowzone deposits so that an efficient search could be made for intact, subplowzone cultural features.

The 1988 mitigation fieldwork concentrated on stripping the plowzone from virtually all of Area B in order to expose the subplowzone surface. This intact surface was then thoroughly searched for signs of cultural features, especially those related to the native occupations at Lower Hidatsa West and Hotrok. All prehistoric cultural features identified in this manner were excavated using controlled techniques. Certain historic cultural features of Euroamerican origin were also identified and excavated.

1987 Excavation Units and Procedures

The 1987 test excavations in the expanded Area B construction site, referred to hereafter as the 1987 study area, were of a standard design that utilized four basic excavation or sampling units: (1) shallow test plots, (2) deep test units, (3) strip trenches, and (4) subplowzone features. These units were excavated within the impact areas of the Hotrok and Lower Hidatsa West archeological sites (Table 1; Figure 3). The same basic units were also used during the evaluative testing at the Lower Hidatsa West site in 1979, although the shallow tests and strip trenches that were dug in 1979 were of somewhat different sizes than the 1987 units reported here (cf. Toom et al. 1985).

Excavation/sample units were dug by hand using shovels, trowels, and other small tools where necessary, with the exception of the strip trenches which were dug by machine for the most part (Figure 4). Artifact recovery procedures (i.e., screened versus unscreened units) varied according to excavation technique. The sediment matrix from all hand-excavated units was waterscreened. Waterscreening consisted of passing the excavated matrix

Table 1. Summary data on the 1987 test excavations in the revised Vistor Center Area B construction site, Hotrok (32ME412) and Lower Hidatsa West (32ME499) archeological sites.

Site and Excavation Unit Type	Number of Units	Excavated Area (m ²)	Volume of Controlled Excavation (m ³)
<u>Hotrok</u>			
Deep Test Units	1	1.00	1.140
Shallow Test Plots	46	29.90	6.194
Strip Trenches	58	443.70	NA
Subplowzone Features	1	NA	0.015
Subtotal, Hotrock Site	106	474.60	7.349
<u>Lower Hidatsa West</u>			
Deep Tests Units	1	1.00	0.990
Shallow Test Plots	20	13.00	2.496
Strip Trenches	20	153.00	NA
Subplowzone Features	1	NA	0.054
Subtotal, Lower Hidatsa West Site	42	167.00	3.540
Total	148	641.60	10.889

through screen boxes lined with one-sixteenth-inch mesh window screen using a pressurized flow of water. All materials remaining in the screen boxes were retained and returned to the laboratory for processing and analysis. The sediments from the mechanically excavated strip trenches were not screened, although a few artifacts were haphazardly collected from these units. An arbitrary horizontal grid system applied to the entire Buchfink Cultivated Tract (see Ahler and Mehrer 1984:47) was used to place the tests and strip trenches in a systematic pattern and to maintain provenience for all excavation units (Figure 3).

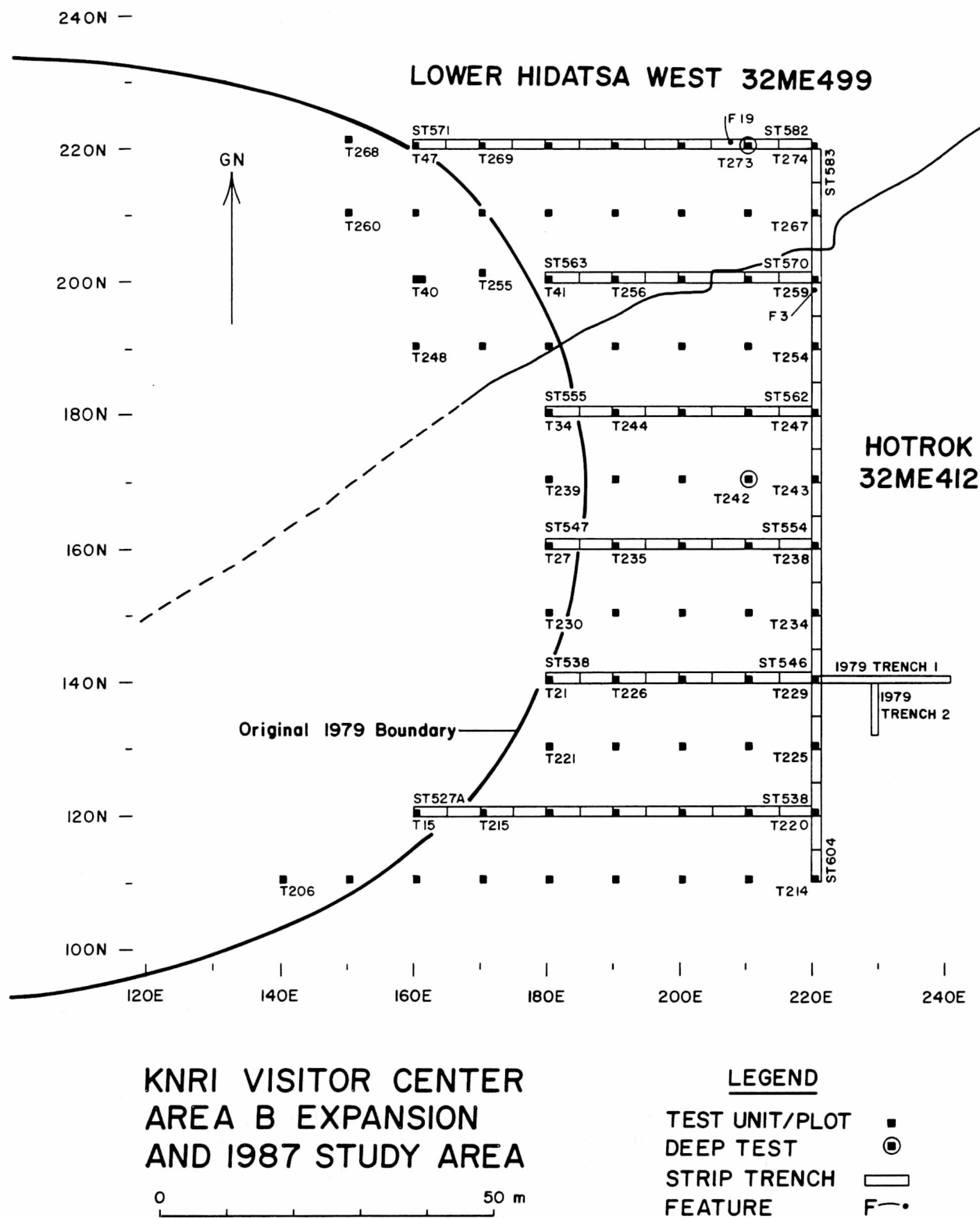


Figure 3. Map of the 1987 excavation units and the impact areas of Hotrok (32ME412) and Lower Hidatsa West (32ME499) relative to the expanded Visitor Center Area B construction site.



a



b

Figure 4. 1987 excavation photos. a: Excavation of a deep test unit (T242) in the Hotrok (32ME412) area (north view). b: Excavation of a strip trench in the Lower Hidatsa West (32ME499) area (north view).

A field catalog was maintained to record basic provenience information for all excavation/sample units and to track the progress of the excavations. An individual catalog number was assigned to each new excavated provenience unit or to any excavated artifact or sample having a distinct and meaningful location within the investigated site areas. These numbers were assigned sequentially from 61-119 for the Hotrok site and from 648-677 for the Lower Hidatsa West site. Antecedent catalog numbers in these sequences were assigned during the 1979 field investigations at the two sites (Ahler and Mehrer 1984; Toom et al. 1985). The catalog numbers were entered in a field catalog book along with certain locational data as excavation progressed. These numbers were also placed on all excavation forms and artifact or sample bags as a means of cross-checking the provenience of all collected materials. Features were numbered relative to each site following sequences established during previous investigations. During the 1987 fieldwork, feature number 3 was assigned at the Hotrok site and feature number 19 was assigned at Lower Hidatsa West.

A combination excavation level form/feature excavation form was filled out by the excavators after the completion of each general excavation level or feature excavation level. The front side of the form contains data on unit/sample type, location, soils, recovery type, observed artifacts and other materials, date of excavation, and the excavator's name(s). A plan drawing of the floor of the excavation level or feature level was made on the reverse side of each form when appropriate. Features were generally excavated without physical cross-sectioning, and cross-sectional drawings of features were made upon completion of excavation when appropriate. Features were photographed before, during, and after excavation in most cases. Selected or representative profiles of deep test units were drawn and photographed after completion of excavation; profiles of the shallow test plots were not recorded.

Shallow Test Plots

Sixty-six shallow test plots were excavated in the 1987 study area, including 20 in Lower Hidatsa West and 46 in Hotrok (Table 1). These units were systematically placed at 10 m grid intervals in both site areas, except where excavation units pertaining to the 1979 Lower Hidatsa West testing program were located (Figure 3). The shallow test plots dug in 1987 are numbered consecutively from 206-274 (T206-T274), regardless of site, to retain proper sequencing with respect to previous investigations at Lower Hidatsa West. Two exceptions in the numbering sequence are T242 and T273 which pertain to the deep test units discussed below. The 1987 testing work overlapped somewhat with that completed in 1979 along the western edge of the 1987 study area. A few of the 1987 test plots (e.g., T255) were shifted 1 m to the north, off the 10 m grid points, because these locations were strip trenched in 1979. In addition, 1 X 1 m test excavations were dug at some of the 10 m grid points in 1979 so it was not necessary to place duplicate units at or near these locations (e.g., 200N/180E) in 1987. The test units that were dug in 1979 are indicated by two-digit test numbers in Figure 3 (e.g., T34). Test 229 was plotted but not dug because it fell within the extreme western limit of the 1979 Trench 1 excavation at Hotrok. Artifact data from the 1979 excavation unit are used for the T229 location for certain analytical purposes in the present report.

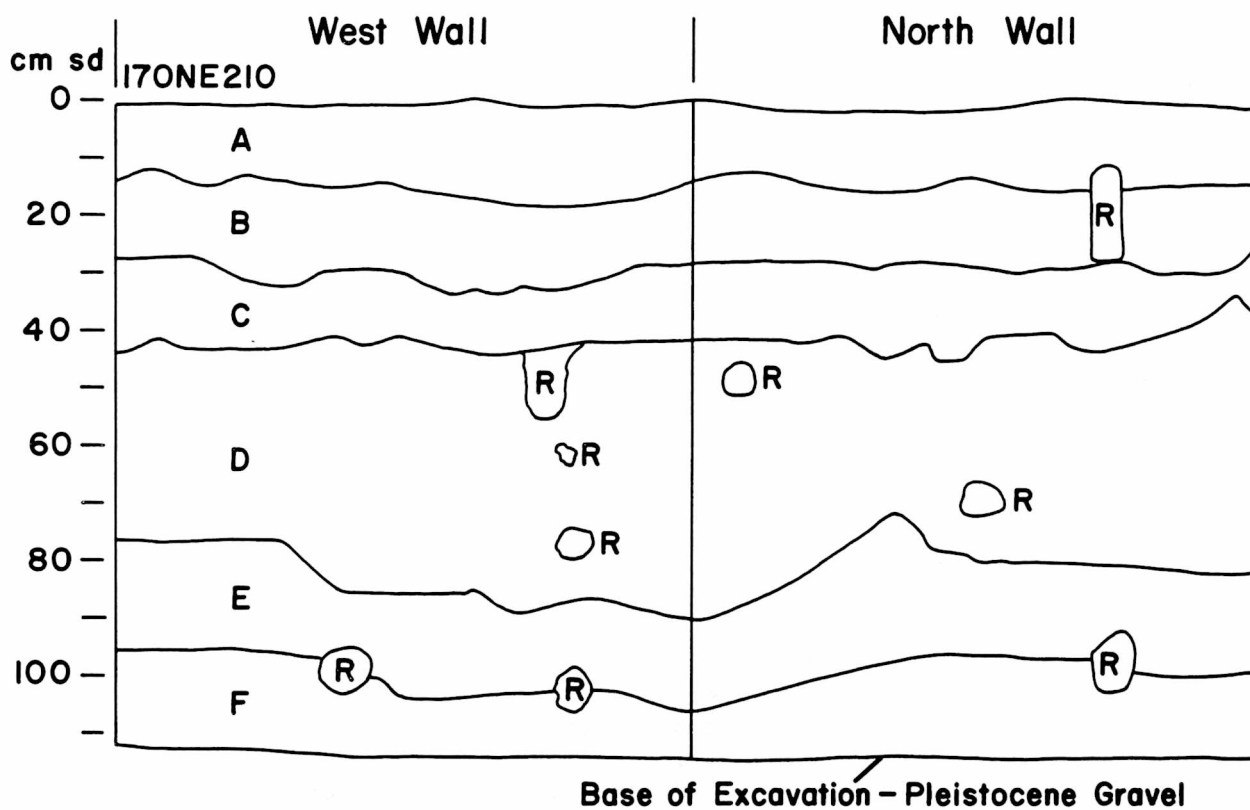
The shallow test plots dug in 1987 were of a uniform 1 X 0.65 m size. These are not formal "test excavation units", but merely subsurface sample plots of sufficient volume to yield reliable information on the density of artifacts in the plowzone. The test plots were excavated through the plowzone, which generally corresponds to the surface A horizon. Surface depths varied from as little as 16 cm to as much as 24 cm, with most averaging about 20 cm. The plowzone layer was removed as a single level regardless of thickness because of its disturbance by past cultivation activities. All sediment matrix taken from these units was waterscreened.

Deep Test Units

The deep tests consisted of standard 1 X 1 m units that were excavated into Pleistocene-age deposits (Figure 4a). These units were dug in 15 cm arbitrary levels, except for basal levels which were of variable thickness depending on the depth at which Pleistocene deposits were encountered. The 15 cm levels are in keeping with virtually all previous deep testing work by UND in the KNRI. Vertical control was maintained by reference to the ground surface at the southwestern corner of the unit. All sediment matrix from the deep tests was waterscreened. Excavation was terminated when contact with sand and gravel deposits of probable Pleistocene-age were encountered; terminal depth of excavation varied between the two sites, as might be expected.

Two deep tests were completed in the 1987 study area -- T242 in the Hotrok site and T273 in the Lower Hidatsa West site (Figure 3). Test 242 was dug to a maximum surface depth (sd) of about 114 cm. Generally speaking, the soils encountered in T242 became progressively sandier with depth. Soils with loamy textures were encountered in the upper 80 cm of the profile. Deposits of loose sand were found below this depth overlying gravels (Figures 5 and 6a). The T242 excavation was terminated at the surface of the gravel deposit. Test 273 was dug to a maximum depth of approximately 98 cm sd. It exhibits virtually the same stratigraphic profile as that recorded in T242 (Figures 6b and 7). No obvious indications of buried soils (paleosols) or deeply buried cultural deposits were found in either test. Artifactual remains appear to be restricted to the uppermost strata within the plowzone in most cases. These findings mirror those reported for previous investigations at Lower Hidatsa West.

The nearly identical stratigraphic sequences recorded in T242 and T273 are generally similar to those observed in previous deep test units at Lower Hidatsa West (cf. Toom et al. 1985:18). While imprecise profile descriptions make detailed comparisons problematic, certain general observations can be made regarding the deep stratigraphy in the 1987 study area. The upper ca. 100 cm of this area contains eolian sediments of Late Wisconsinan to Holocene-age that are linked to the Oahe Formation (Clayton et al. 1976). Underlying these surficial Oahe Formation sediments are glacial-fluvial sands and gravels interpreted as Pleistocene-age deposits of the Coleharbor Formation. Reiten (1983:38-46) has identified both of these lithostratigraphic units on a much broader scale within the confines of the KNRI. The recovery of a small pill clam valve from level 7 in T242 (90-105 cm sd) provides further evidence to support the idea that fluvial processes were responsible for the deposition of some of these lower sediments. Natural rock frequencies also increase with depth, especially in the deepest levels of the tests.



TEST 242 (DEEP TEST)

32ME412

HOTROK

0 10 50 cm

R Rodent Disturbance

PROFILE DESCRIPTION - MOIST

A - IOYR 2/2 very dark brown sandy clay (plow zone)

B - IOYR 3/1 very dark gray sandy loam

C - IOYR 3/2 very dark grayish brown loam

D - IOYR 4/2 dark grayish brown loamy sand

E - IOYR 4/3 brown/dark brown moist sand

F - IOYR 3/3 dark brown sand

Figure 5. Profile drawing of T242, a deep test unit in the Hotrok (32ME412) area.

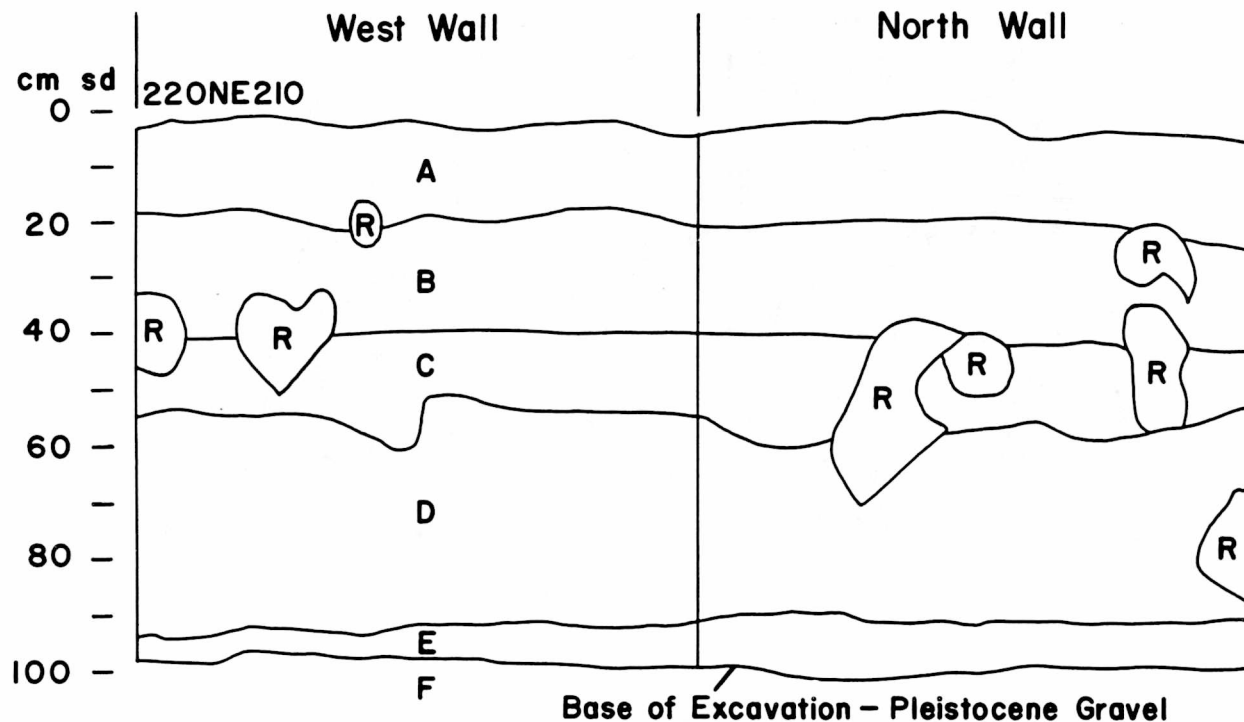


a



b

Figure 6. Photos of deep test unit profiles. a: North wall profile of T242, Hotrok (32ME412) area. b: West wall profile of T273, Lower Hidatsa West (32ME499) area.



TEST 273 (DEEP TEST)

32ME499

LOWER HIDATSA WEST

0 10 50 cm

R Rodent Disturbance

PROFILE DESCRIPTION - MOIST

A - 10YR 3/1 very dark gray loam

B - 10YR 3/2 very dark grayish brown sandy clay loam

C - 10YR 4/2 dark grayish brown sandy loam

D - 2.5Y 5/2 grayish brown compact loamy sand

E - 2.5Y 4/2 dark grayish brown loose sand

F - 10YR 3/3 dark brown sand with cobbles and gravel

Figure 7. Profile drawing of T273, a deep test unit in the Lower Hidatsa West (32ME499) area.

Strip Trenches

Strip trenching in the 1987 study area followed the completion of the test excavations described above. Strip trenches were nominally 1.53 m (5 ft) wide by 5 m long. The plowzone in the trenches was removed by a Bobcat front-end-loader, which accounts for their odd metric width (i.e., the 5 ft width of the bucket). After removal of the plowzone by the Bobcat, the floor of the strip trenches was cleaned and leveled by shovel skimming (Figure 4b). This area was then inspected for signs of subplowzone cultural features. The sediments stripped from the trenches were not screened, but a few artifacts that were observed during the stripping process were collected and returned to the laboratory for analysis.

Most strip trenches were excavated in east-west rows along north grid lines. A spacing interval of 20 m was used between the six rows of east-west strip trenches that were completed in the 1987 study area. In addition, a north-south strip trench was dug along grid line 220E (Figure 3). For purposes of data recording, the trenches were broken into 78, 5 m long strip trench segments, including 20 in the Lower Hidatsa West site and 58 in the Hotrok site (Table 1). Individual strip trench segments are numbered consecutively from 527-604 (ST527-ST604), regardless of site, following the sequence used for the 1979 test excavations at Lower Hidatsa West (Figure 3). Due to an oversight, the initial 1987 strip trench designation (ST527) is duplicated with the final number assigned to the 1979 units (cf. Toom et al. 1985:11). This minor discrepancy was remedied by adding the letter designation A to the end of the 1987 unit, making it ST527A.

Subplowzone Features

Cultural features were excavated following their human-made outlines. Features encountered during the 1987 testing program were all shallow remnants of larger features that appeared to originate in the plowzone. These were dug as a single level; all excavated matrix was waterscreened.

Test excavations in the 1987 study area located the partial remains of two features beneath the plowzone. Feature 3 was a shallow, basin-shaped pit that was partially exposed in ST587 within the Hotrok area. Only that portion of F3 that was exposed in ST587 (the approximate east half) was excavated in 1987; the remainder of F3 was excavated during the 1988 mitigation activities. Feature 19 was another shallow, basin-shaped pit that was completely uncovered and excavated in ST580 within the Lower Hidatsa West area (Figure 3).

1988 Impact Mitigation Procedures

Two types of excavation were used during the 1988 impact mitigation program in the Area B construction site: (1) uncontrolled mechanical stripping and (2) controlled feature excavation. The plowzone from the majority of the expanded Area B construction site was stripped off and the subplowzone surface of this area was examined for signs of cultural features (Figure 8). All native (Plains Village) features discovered in this manner were then excavated by controlled techniques like those employed in 1987. Feature documentation also followed the 1987 procedures (see above). A large historic (Euroamerican)

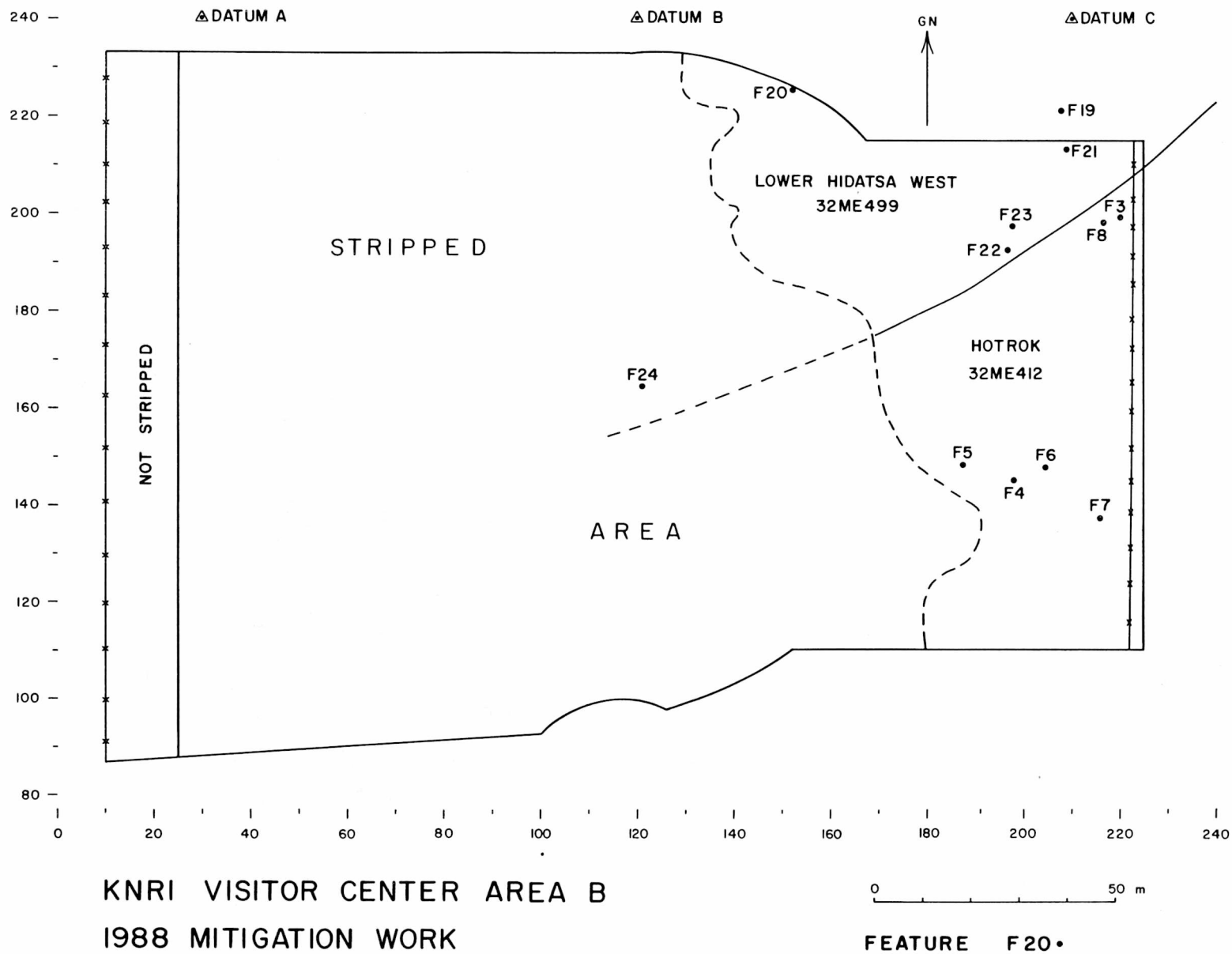


Figure 8. Map of the 1988 impact mitigation work in Visitor Center Area B.

trash pit was also subjected to controlled excavation, and the locations of certain other Euroamerican features (fence posts and wooden stakes) were plotted but not specifically excavated.

The entire expanded Area B construction site was given the temporary field designation of "KNRI-B" for purposes of the 1988 impact mitigation work. This greatly facilitated the stripping process since it eliminated the need to determine specific site areas for discovered features during fieldwork. All recorded features were later assigned to either the Hotrok site (32ME412) or the Lower Hidatsa West site (32ME499). Feature locations were mapped by triangulation from datum points established at selected grid points just beyond the northern boundary of the work area. These are labeled as Datum A, B, and C in Figure 8; only Datum B and C were actually used. Azimuth readings in the field records are stated according to "grid north", which is not equatable with magnetic or true north.

The features excavated in 1988 were given temporary field catalog numbers and recorded in a catalog book separate from that used during the 1987 excavation work. These temporary numbers were later converted in the lab to permanent catalog numbers for each site according to previously established sequences and entered in the 1987 catalog book. Permanent catalog numbers for the 1988 feature excavations include numbers 120-128 for the Hotrok site and numbers 678-682 for the Lower Hidatsa West site. Temporary feature numbers were likewise assigned to excavated features and converted to permanent feature numbers in the lab relative to each site, according to previously established site sequences. Permanent feature numbers 4-8 were assigned to the 1988 Hotrok features and numbers 20-24 were assigned to the 1988 Lower Hidatsa West features.

Mechanical Stripping

A road grader was used to mechanically strip the surface plowzone deposits from virtually all of the Area B construction site (Figure 8). Because the primary purpose of this work was the exposure and excavation of subplowzone cultural features, none of the plowzone materials were screened, and no attempt was made to recover artifacts during the stripping operation.

The mechanical stripping process involved the systematic removal of the plowzone deposits in east-west and north-south transects that were approximately 8 ft (2.4 m) wide and some 20-30 cm deep. These transects were started at the outer margin of Area B and worked progressively inward toward the center of the construction site (Figure 9a). Multiple passes were made over each transect until a clean subplowzone surface was obtained. The exposed subplowzone surface of each transect was then thoroughly inspected for evidence of intact cultural features (Figure 9b). If a transect was found to be devoid of features, or after all discovered features had been removed by excavation, the plowzone from the next inward transect was bladed-off and stockpiled in windrows on the outer transect that had just been cleared. The mechanical stripping operation continued in this manner until all of Area B had been covered, with the exception of a 15 m wide strip that was left for access along the western margin of the construction site (Figures 8 and 10a). This relatively small unstripped area was judged to have virtually no archeological potential on the basis of the present as well as previous investigations.



a



b

Figure 9. 1988 fieldwork photos. a: Road grader at work stripping the plowzone from Area B near the start of the operation (west view). b: Crew inspection of grader transect nearing completion (east view).



a



b

Figure 10. 1988 fieldwork photos. a: Overview of Area B near the end of the plowzone stripping operation (southeast view). b: A portion of the water line survey area (southeast view); town of Stanton (background); Highway 31 and road ditch (right); site 32ME1051 (center and left).

A total area of about 2.53 ha (ca. 25,260 m²) was mechanically stripped and inspected for evidence of cultural features in the Area B construction site. Of this total area, about 3803 m² was within the Hotrok site and about 2483 m² was within the Lower Hidatsa West site (Figure 8). The impact areas of both of these sites were completely stripped and searched for cultural features. The remaining area of approximately 18,974 m² pertains to what is essentially a nonsite locality to the west of the Hotrok and Lower Hidatsa West locations (Figure 8).

Effective subplowzone surface inspection of the stripped area is estimated at no less than 75%. This figure is based on the obscuration of no more than 25% of any given transect by the tracks of the road grader, occasional blade gouges, and other minor irregularities. Overlapping of transects was used to some extent to cover those areas that were obscured by the grader tracks. Even so, a figure of better than 75% effective coverage seems a realistic approximation of the impact mitigation activities in Area B.

Subplowzone Features

The subplowzone cultural features that were discovered by the mechanical stripping operation were excavated in the same manner as those that were encountered during the 1987 testing program (see above). The point of origin for all of these features was determined to be within the plowzone. Shallow features were dug as a single unit, while one deep historic pit was excavated in a series of arbitrary 20 cm levels. The remains of two cut wooden stakes were recovered from the base of the plowzone with little additional excavation and without the need of screening. Several wooden post butts marking an old fence line were found along the extreme eastern margin of Area B (Figure 8); these were not excavated nor were any of the post butts collected. One soil stain was judged to be too ephemeral to warrant artifact recovery measures. The sediment matrix from all other features was subjected to fine-mesh waterscreen recovery. Final feature numbers are assigned according to established site sequences within the Lower Hidatsa West and Hotrok areas, as was mentioned previously. Features discovered in locations beyond previously defined site boundaries were assigned to the site in closest spatial proximity.

The remains of 10 cultural features were found in the Area B construction site during the 1988 impact mitigation program. With one exception, all were situated within the established boundaries of the Hotrok or Lower Hidatsa West sites in the eastern expansion of Area B (Figure 8). Feature 24 (F24), the sole exception, was found near the center of Area B; it was closest to Lower Hidatsa West and was therefore assigned to that site. Most of the recorded features were ephemeral remnants of larger features that had been virtually destroyed in the plowzone by past cultivation activities. The only feature that was essentially intact and extended to any depth beneath the plowzone was a large historic trash pit found in the Hotrok area (F5). Five features were uncovered in or nearest to the Lower Hidatsa West area, including four diffuse patches of burned earth (F20, F21, F22, and F24) and one cut wooden stake (F23). The other five features were found in the Hotrok area. These consisted of another cut wooden stake (F4), the large historic trash pit (F5), a basin-shaped pit (F6), a diffuse area of burned earth (F7), and a diffuse charcoal stain (F8). In addition, the approximate western half of F3, a basin-shaped pit in the Hotrok area, was also excavated in 1988 although this feature was initially discovered and partially excavated in 1987, as was mentioned above.

Feature 19, a basin-shaped pit in the Lower Hidatsa West area, was discovered and completely excavated in 1987 (Figure 8).

1988 Water Line Corridor Survey

As part of the 1988 impact mitigation work related to Visitor Center construction in Area B, an intensive cultural resources inventory was conducted along a proposed utility corridor designed to carry a water line from the town of Stanton to the Area B construction site. A three-person archeological survey team performed an intensive surface examination of the road ditch and area within the road right-of-way (R-O-W) on the eastern side of State Highway 31 from North Avenue at the northwest corner of Stanton, ND, northward to the entrance road into Area B (Figure 11). The purpose of the examination was to document any archeological sites and potentially significant cultural materials that might be present within the planned water line construction corridor for the Visitor Center.

Throughout most of the survey area the R-O-W width is 70 ft (21 m) from the centerline of the road. The archeological survey covered the unpaved part of the R-O-W, an area approximately 55 ft (17 m) wide by 2350 ft (715 m) long (e.g., Figure 10b). Surface inspection of this area was completed in one pass by the survey team. Surface visibility was generally good, averaging around 25%, and varying from a low of about 5% to a high of 100% in some locations. All observed cultural features, artifacts, and potential artifacts other than recent refuse (e.g., soda cans and bottles) were marked with pin flags for later evaluation and documentation. Shovel probes or other subsurface examination techniques were not used.

Cut-and-fill road cross sections provided by the Mercer County highway engineer indicate that throughout the extent of the survey area the road pavement is placed on a fill embankment three to five or more feet (1.0-1.5+ m) in thickness. These drawings also indicate that cutting of original sediments has occurred throughout almost the full extent of the survey area within the road ditch, from the base of the fill embankment outward to the margin of the R-O-W, to depths varying from a few inches to more than three feet (0.1-1.0 m) below original grade. Thus, there is little or no opportunity for intact cultural deposits to occur within the fill embankment supporting the road pavement, while there is a possibility that shallow or deep intact cultural deposits may still exist within the less disturbed ditch bottom and ditch slope extending to the outer margin of the R-O-W.

Field inspection indicated that much of the bottom and outer slope of the road ditch was covered by a thin layer or smear of recently disturbed fill consisting primarily of pebbly loam which has been contoured to the shape of the road ditch. This material doubtless derives from recent road construction activities. In nearly all places within the R-O-W this smear of fill obscured the local sediments cut through during road construction; in a few places such sediments appeared as a light colored B soil horizon exposed at or near the bottom of the road ditch.

Seventeen nonrecent artifacts or potential artifacts were recorded in the road ditch (Table 2; Figure 11). This material consisted entirely of fragmented bone and a few flakes. In addition, an historic archeological site

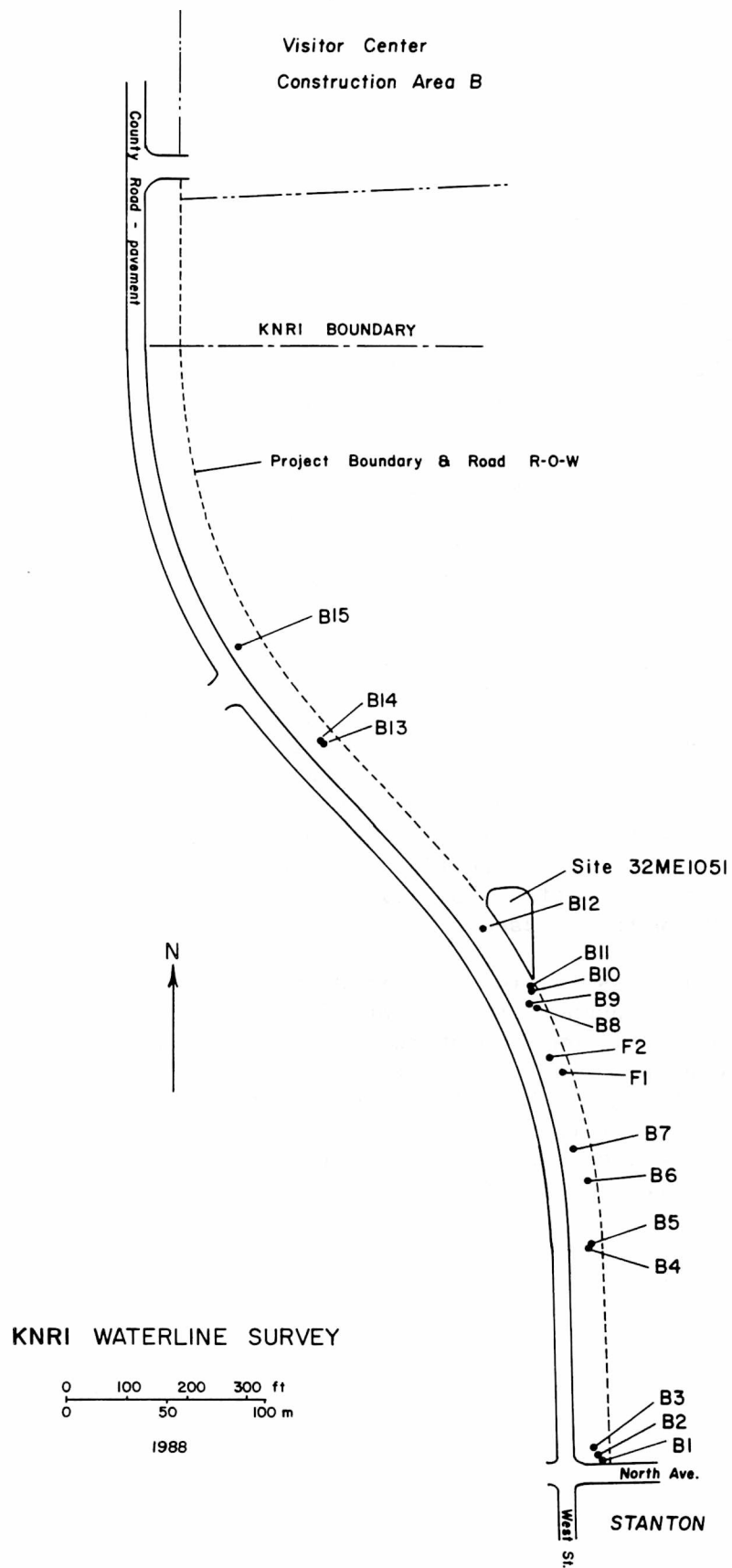


Figure 11. Map illustrating the limits and findings of the 1988 KNRI Visitor Center water line survey.

Table 2. Summary Information on Recorded Artifact Loci, KNRI Visitor Center Water Line Survey. See Figure 11 for artifact locations.

Map/Loci Designation	Description
B1	unidentifiable bone fragment.
B2	unidentifiable bone fragment.
B3	unidentifiable bone fragment.
B4	unidentifiable bone fragment.
B5	bos/bison scapula glenoid fossa fragment.
B6	bos/bison distal tibia fragment.
B7	unidentifiable bone fragment.
F1	moderately patinated Knife River flint flake.
F2	heavily patinated Knife River flint flake.
B8	unidentifiable bone fragment.
B9	unidentifiable bone fragment.
B10	unidentifiable bone fragment.
B11	unidentifiable bone fragment.
B12	unidentifiable bone fragment.
B13	bos/bison(?) scapula blade fragment.
B14	unidentifiable bone fragment.
B15	bos/bison maxilla fragment with one cheek tooth.

(32ME1051) was recorded just beyond the eastern margin of the road ditch and R-0-W (Figures 10b and 11). The scattered artifacts recorded in the ditch were all found in the recent fill covering the bottom of the ditch. This fill is thought to derive in part from gravel quarry spoils from near or within the Stanton Mound Group site (32ME104) which lies about four miles north of the project area, an area known to have produced patinated lithic artifacts and other definite cultural remains. It was concluded that the bone and lithic artifacts observed in the road ditch have no contextual integrity, and that they do not mark the presence of intact cultural deposits. No artifacts were collected during the course of the survey.

The historic archeological site (32ME1051) consists of a small, triangular area of land bounded by the road ditch on the west, an abandoned roadbed on the east, and the Chip Johnson residence on the north. This area contains a number of surface anomalies marking cultural features, including a dugout or cellar depression, a long linear depression, and several smaller depressions and vegetational anomalies. According to Mr. Johnson, the site once contained a locomotive refueling station that consisted principally of a spur rail line and fuel tanks. Mr. Johnson stated that the refueling station was removed several years ago, but he was unsure of the exact date. The facility was probably operated by the Northern Pacific Railroad prior to its merger with Burlington Northern Railroad, which now owns the property. The precise dates of operation for the facility have not been determined; operation sometime between 1912 and the mid-1900s seems a reasonable estimate. There is no evidence that the site extends east into the road ditch, and it appears that any portion of the site that might have been present in this area may have been heavily disturbed by

road construction. Because the site is not within the proposed water line construction corridor, and because it should be possible to avoid direct construction impacts to the site, its significance as an historic archeological resource has not been formally evaluated. No artifacts were collected from the historic site.

Overview of Results

The 1987 evaluative testing in the eastern expansion of Area B consisted of the excavation of two deep test units, 66 shallow test plots, and 78 strip trenches. In addition, the partial remains of two cultural features were discovered and excavated. The findings of the 1987 testing program were then used to plan impact mitigation activities throughout the Area B construction site. The presence of intact prehistoric aboriginal features beneath the plowzone in Area B was of primary concern in designing the 1988 impact mitigation work. Artifact densities in the plowzone across Area B were judged to be too low to warrant additional recovery measures, however, numbers of subplowzone features were predicted to be high enough to justify an excavation program aimed specifically at these remains.

Based in part on the results of the 1987 testing program, a preferred configuration for Visitor Center Area B was arrived at that covered some 2.75 ha (27,447 m²). Approximately 2.53 ha (25,260 m²) or about 92% of the finalized Area B construction site was completely stripped of plowzone deposits and thoroughly searched for evidence of subplowzone cultural features. Effective coverage of the stripped area is estimated at no less than 75% due to limited obscuration of the subplowzone surface during the stripping operation. A number of additional cultural features were discovered in this manner, principally within the previously established boundaries of the Hotrok and Lower Hidatsa West sites in the approximate eastern one-quarter of Area B. Locational data were recorded for all identified features. All suspected prehistoric aboriginal features were excavated if they exhibited any artifact potential after cleaning and initial documentation. A large historic (recent) trash pit was also excavated.

The surface inspection of the proposed utility corridor from Stanton to Visitor Center Area B did not reveal any significant archeological resources which will be directly impacted by the construction of a water line within the eastern R-O-W (road ditch) of ND Highway 31. All artifacts discovered within the survey area are out of context and are thought to derive from sources some miles distant. The potential for deep cultural features or buried cultural deposits could not be fully addressed by this work, however, because recent fill spread throughout the R-O-W precluded a thorough surface examination of truncated, in situ sediments in the bottom and slope of the ditch. Archeological monitoring of the excavation of the water line trench was therefore recommended in a letter report to the NPS detailing the results of the water line survey (Ahler and Toom 1988).

III. ARCHEOLOGICAL COMPONENTS AND ANALYTIC UNITS

This section contains information on the archeological deposits and components determined for the Hotrok and Lower Hidatsa West sites. Much of this discussion is drawn from previous reports (Ahler and Mehrer 1984; Toom et al. 1985), and supplemented where appropriate by the findings of the 1987-1988 fieldwork. The investigations which are the subject of the present report yielded little in the way of additional data on the component composition and research potential of the two sites, with the exception of the recognition of a historic Euroamerican component within the Hotrok area. The identified site components are in turn used to define appropriate analytic units for presenting descriptive data and structuring subsequent analyses.

Hotrok Components

The 1979 excavations at the Hotrok site revealed that artifactual remains are confined almost exclusively to the plowzone (Ahler and Mehrer 1984). The results of the 1987-1988 investigations in the Hotrok area tend to confirm this earlier finding. The near-surface cultural stratigraphy encountered at Hotrok was found to be relatively uniform. The uppermost 20-30 cm of sediment, which comprise the modern A soil horizon, contain late prehistoric and historic period cultural materials. The majority of this material occurs in the plowzone or just beneath it. A number of subplowzone cultural features, originating in the plowzone itself, are associated with the surface soil unit as well.

The presence of scattered previllage age remains is suggested by the occurrence of patinated flaking debris from plowzone contexts. Although the sample is extremely small, three pieces of Knife River flint and clear/gray chalcedony flaking debris exhibit moderate patination. Toom et al. (1985:67, 72) note the possibility of previllage deposits at Lower Hidatsa West given the recovery of patinated artifacts from the base of the plowzone and in certain deep test unit levels. These meager data point to the likelihood of ephemeral previllage deposits within the Hotrok site as well.

Data on artifact distributions by level for T242, the deep test unit into the Hotrok area, are presented in Table 3. These data give no indication of the presence of deeply buried, previllage cultural materials in that part of the Hotrok site within Area B.

Two Plains Village components were identified in the plowzone deposit at Hotrok in 1979 on the basis of a small sample of pottery: (1) a primary Heart River phase component and (2) a possible secondary component tentatively identified as Scattered Village complex (Ahler and Mehrer 1984). In addition, the presence of a previllage (preceramic) component of an unknown age was also recognized. The Heart River phase component at Hotrok is thought to relate to the major Heart River phase occupation at the nearby Lower Hidatsa Village site (Ahler and Weston 1981). The possible Scattered Village complex remains could relate to a number of nearby occupation sites, especially Forkorner (32ME413) which adjoins Hotrok on the east (cf. Ahler and Mehrer 1984). No radiocarbon dates are available for either of the Hotrok components. The Heart River phase

Table 3. Summary data on deep test unit artifactual debris from water-screened proveniences, Hotrok site (32ME412), 1987 excavations. All quantities are stated as counts, except bone which is stated in grams.

Test No./ Level No.	Native Ceramics	Stone Tools	G1-G3 Flaking Debris	G4 Flaking Debris	FCR	Bone (g)	Historic Material
T242-L1	8	-	1	10	6	-	14
L2	6	-	1	5	-	-	-
L3	-	-	-	-	-	-	2+
L4	2	-	-	-	-	-	-
L5	-	-	-	-	-	-	-
L6	-	-	-	-	-	-	-
L7	-	-	-	-	-	-	-
L8	-	-	-	-	-	-	-
Total, T242	16	-	2	15	6	-	16

+Rubber fragments, probably intrusive debris.

and the Scattered Village complex are thought to be more or less coeval, with estimated time frames of ca. A.D. 1400-1700 (cf. Lovick and Ahler 1982).

In addition to the two Plains Village components and a previllage component that were recognized as a result of the 1979 test excavations, the 1987-1988 investigations revealed the clear presence of a historic (recent) Euroamerican component in the Hotrok area. This historic component is principally found in the western part of the site within the Area B construction site. Certain historic artifacts recovered during the present investigations might also indicate the presence of an ephemeral post-contact age village component, although such an interpretation is far from certain.

The available evidence suggests the presence of a number of surficial archeological components within the Hotrok area. These potentially include, in chronological order:

1. the possibility of one or more shallow, ephemeral previllage components;
2. a primary Plains Village tradition, Heart River phase component;
3. a possible secondary Plains Village tradition component affiliated with the Scattered Village complex.
3. another possible secondary Plains Village tradition component of postcontact age (Unnamed or Knife River phase); and
4. a historic (recent) Euroamerican component.

The component makeup presented here for the Hotrok site based on the 1987-1988 fieldwork is more elaborate than the one reported previously (cf. Ahler and Mehrer 1984:70-72, 314). However, only the Heart River phase and recent Euroamerican components are considered to have any appreciable research potential. The other possible components are exceedingly ephemeral, if they exist at all, so no particular archeological significance can be attached to them. Consequently, the balance of this report relative to the Hotrok site will focus on the more prominent Heart River phase and Euroamerican components.

Lower Hidatsa West Components and Radiocarbon Dates

As at Hotrok, artifactual materials recovered from Lower Hidatsa West were largely restricted to the plowzone and the subplowzone portions of cultural features that originated in the surface soil. Scant amounts of debris were recovered from certain deep test unit levels in 1979, and these are thought to represent an ephemeral subplowzone deposit of some antiquity (Toom et al. 1985:67-72). However, Test 273, the single deep test dug into the Lower Hidatsa West area in 1987, failed to yield any evidence of deeply buried cultural materials specifically within the expanded Area B construction site (Table 4). Furthermore, no patinated flakes were recovered from near surface contexts in that portion of Lower Hidatsa West that was tested in 1987 as they were at Hotrok, although such materials are known from other parts of the Lower Hidatsa West site (cf. Toom et al. 1985).

Table 4. Summary data on deep test unit artifactual debris from water-screened proveniences, Lower Hidatsa West site (32ME499), 1987 excavations. All quantities are stated as counts, except bone which is stated in grams.

Test No./ Level No.	Native Ceramics	Stone Tools	G1-G3 Flaking Debris	G4 Flaking Debris	FCR	Bone (g)	Historic Material
T273-L1	1	-	8	15	9	2.0	-
L2	1	-	-	-	1	5.5	-
L3	-	-	-	-	-	-	-
L4	-	-	-	-	-	-	-
L5	-	-	-	-	-	-	-
L6	-	-	-	-	-	-	-
L7	-	-	-	-	-	-	-
Total, T273	2	-	8	15	10	7.5	-

When considered at face value, the component composition of Lower Hidatsa West approximates that discussed above for Hotrok. This is not surprising for two adjacent site localities. Previous investigations at the Lower Hidatsa West (Toom et al. 1985:73) have identified as many as five separate components, including, in chronological order:

1. at least two and possibly more very ephemeral previllage components;
2. a primary Plains Village tradition, Heart River phase component;
3. probable secondary Plains Village tradition components affiliated with the Knife River phase and/or an Unnamed phase intermediate to the Heart and Knife River phases;
4. a historic Native American component, which might actually reflect materials associated with the postcontact period Plains Village component(s) (i.e., Unnamed and Knife River phases); and
5. a historic (recent) Euroamerican component.

The findings reported here have little to add to the available information on the archeological components at the site. However, evidence of previllage deposits seems to be lacking in the investigated portion of the site, but this could merely reflect their very ephemeral nature as documented elsewhere. While the component composition of Lower Hidatsa West is superficially complex, the research potential of the site, like that at Hotrok, is actually much more limited. Only the primary Heart River phase component at Lower Hidatsa West is recognized as significant. All other components are far too ephemeral to be afforded any importance, with the possible exception of certain isolated features of possible postcontact-age and the recent Euroamerican component.

The more substantial pottery sample from Lower Hidatsa West points to a primary Heart River phase affiliation for the plowzone archeological deposit (Toom et al. 1985). A comparison of the ceramic ware data from Lower Hidatsa West and the adjacent Lower Hidatsa Village site (Ahler and Weston 1981) reveals a close correlation with time period 3 at Lower Hidatsa Village. Time period 3 at Lower Hidatsa Village represents the earliest occupation of the site. It, too, is attributed to the Heart River phase, with an estimated time span of A.D. 1525-1600 based on several recently acquired radiocarbon and thermoluminescence assays from the site. (This more recent chronological interpretation differs from that made in Ahler and Weston 1981 for time period 3 at Lower Hidatsa Village.) Based on this comparison and the close spatial proximity of the two sites, it is concluded that the Heart River phase component at Lower Hidatsa West is closely related both temporally and culturally to the earliest period of occupation at Lower Hidatsa Village.

Three radiocarbon (C-14) dating samples from Lower Hidatsa West were submitted in 1985 to the Radiocarbon Laboratory, Center for the Study of Earth and Man, Southern Methodist University (Table 5). It was not possible to include the results of the C-14 assays on these samples in the report on the 1979 test excavations at the site (Toom et al. 1985:61). However, the present report offers the opportunity to correct this circumstance by reporting the three C-14 dates for Lower Hidatsa West. The three samples consisted of wood and charcoal collected from large undercut storage pits in Area C (Table 5).

Table 5. Radiocarbon dating sample information, selected Area C features, Lower Hidatsa West (32ME499) (adapted from Toom et al. 1985:61).

UND Sample Number (Lab Number)	UND Catalog No.	Provenience*	Material	Weight
KNRI-74 (SMU-1574)	298 & 314	F6, L2-3, 60-95 cm sd	Wood	25.5 g
KNRI-75 (SMU-1575)	604	F17, Outer Pit, L3, 39-69 cm sd	Wood	18.0 g
KNRI-76 (SMU-1576)	265	F5, L3, 58-88 cm sd	Charcoal	7.0 g

*F = feature no., L = level no.

The two samples from F6 and F5 (KNRI-74 and KNRI-76) were expected to yield equivalent results consistent with the general Heart River phase time frame of ca. A.D. 1400-1710 (Lovick and Ahler 1982:72-73). The other sample from F17 (KNRI-75) was expected to produce a somewhat later date falling within the postcontact period (ca. A.D. 1710-1861) owing to its association with a horse bone (Toom et al. 1985:61, 121). In view of this, F17 could be affiliated with either the protohistoric Unnamed phase (ca. A.D. 1710-1750) and/or the historic Knife River phase (ca. A.D. 1750-1861) (cf. Lovick and Ahler 1982:75-78).

The radiocarbon dates produced for the three Lower Hidatsa West samples are essentially contemporaneous (Table 6). This indicates that the three features from which the samples were collected were in use at about the same time. The expectation that the sample from F17 (SMU-1575/KNRI-75) would yield a date somewhat younger than the other two samples has not been met. Averaging of coeval radiocarbon ages is appropriate and this value provides the best overall age estimate for the site occupation (Table 6). However, the individual dates and their weighted average cannot be interpreted with much precision in terms of the specific cultural phases identified in the preceding paragraph. If one wishes to use the calibration curve intercept date of A.D. 1663 for the weighted average (Table 6) to interpret the age of the site, then a late Heart River phase occupation is indicated. On the other hand, if one prefers to use the calibrated date ranges for the weighted average, then an affiliation with the Heart River phase, the Unnamed phase, and/or the Knife River phase is possible. Opting for the latter, more conservative approach, about all that can be said with any certainty on the basis of these data is that the occupation of Area C at the Lower Hidatsa West site took place sometime between ca. A.D. 1650-1780. A termination date after ca. A.D. 1780 can be safely ruled out on the basis of historic documentation related to the occupation of Lower Hidatsa Village (cf. Ahler and Weston 1981:186-187).

Table 6. Radiocarbon dates for selected Area C features, Lower Hidatsa West (32ME499). Calibration data are from Stuiver and Pearson (1986).

Lab Number (UND Sample Number)	Laboratory C-14 Age (RCYBP)	Calibrated Age Ranges and Intercepts		
		One Sigma Range	Two Sigma Range	Intercepts
SMU-1574 (KNRI-74)	210 $\pm$ 60 B.P.	A.D. 1645-1683	A.D. 1519-1588	A.D. 1663
		1739-1805	1620-1890	
		1934-1955	1907-1955	
	Maximum Range	A.D. 1645-1955	A.D. 1519-1955	
SMU-1575 (KNRI-75)	220 $\pm$ 50 B.P.	A.D. 1645-1676	A.D. 1523-1566	A.D. 1660
		1747-1799	1629-1696	
		1942-1955	1726-1818 1859-1861 1921-1955	
	Maximum Range	A.D. 1645-1955	A.D. 1523-1955	
SMU-1576 (KNRI-76)	200 $\pm$ 50 B.P.	A.D. 1651-1683	A.D. 1640-1890	A.D. 1666
		1739-1805	1910-1955	1790
		1934-1955		1949 1952
	Maximum Range	A.D. 1651-1955	A.D. 1640-1955	
Weighted Average	210 $\pm$ 30 B.P.	A.D. 1654-1673	A.D. 1644-1683	A.D. 1663
		1751-1796	1739-1805	
		1944-1954	1933-1955	
	Maximum Range	A.D. 1654-1955	A.D. 1644-1955	

Definition of Analytic Units

The analytic units (AUs) developed for the organization and presentation of artifactual data from the Hotrok and Lower Hidatsa West sites within Area B essentially correspond to the types of excavated samples from the sites. Such an approach is necessary because of the diversity of the excavation techniques employed during the 1987 testing and the 1988 impact mitigation work (e.g., screened and unscreened units), resulting in artifactual samples that are not directly equivalent and of greater or lesser analytic utility. Table 7 contains summary data on the excavated samples from Hotrok and Lower Hidatsa West that are employed as analytic units in the present report, including the identification of their primary component(s).

Table 7. Summary data on analytic units employed in the study of artifactual material recovered from Hotrok (32ME412) and Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit No.	Sample Identification	Recovery Technique	Primary* Component Composition
11	Plains Village Features	Waterscreened	Heart River Phase
12	Historic (Recent) Features	Waterscreened or Unscreened	Euroamerican
13	Shallow Test Plots	Waterscreened	Heart River Phase Euroamerican
14	Strip Trenches	Unscreened	Heart River Phase Euroamerican
15	Deep Test Units	Waterscreened	Heart River Phase Euroamerican

*Minor amounts of material from other components identified at the site can occur in any of the analytic units (proveniences).

The materials from features, shallow test plots, and shallow levels from deep test units represent the best analytic samples because of the consistency of the recovery techniques employed in their excavation and their primary association with the Heart River phase, the only significant native component identified at the two sites within Area B. The shallow test data are especially important in exploring the spatial distribution of various classes of artifacts within the two site areas under study here. For future reference, Tables 8 and 9 present information on catalog number (artifact sample) assignments to the various analytic units identified in Table 7. The five analytic units used in this report are numbered from 11-15 so as not to confuse them with analytic unit numbers applied to the Hotrok and Lower Hidatsa West sites in previous reports (i.e., Ahler and Mehrer 1984; Toom et al. 1985).

Table 8. Analytic unit organization and catalog number assignments for the Hotrok site (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit No.	Code Value	Assigned Catalog Numbers							
AU11	(Code 11)	119	120	126	127	128			
AU12	(Code 12)	121	122	123	124	125			
AU13	(Code 13)	53	54	55	56	57	58	59	60
		61	62	63	64	65	66	67	68
		69	70	71	72	73	74	75	76
		77	78	79	80	81	82	83	84
		85	86	87	88	89	90	91	92
		93	94	95	96	97	98		
AU14	(Code 14)	101	102	103	104	106	113	114	115
		116	117	118					
AU15	(Code 15)	99	100	105	107	109	110	111	112

Table 9. Analytic unit organization and catalog number assignments for the Lower Hidatsa West site (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit No.	Code Value	Assigned Catalog Numbers							
AU11	(Code 11)	677	678	679	680	682			
AU12	(Code 12)				681				
AU13	(Code 13)	648	649	650	651	652	653	654	657
		658	660	665	667	668	669	670	671
		672	673	674	675				
AU14	(Code 14)					662	676		
AU15	(Code 15)	655	656	659	661	663	664	666	

IV. LABORATORY AND ANALYSIS PROCEDURES

This chapter outlines the laboratory processing and artifact analysis procedures applied to materials collected from the Lower Hidatsa West and Hotrok sites during the 1987 and 1988 investigations in Area B. The procedures used here are fundamentally the same as those employed with other excavated materials from KNRI sites by UND. Some divergence from "standard" procedures is often necessary from one project to another to account for differences in field techniques, sample potentialities, and research goals. During the course of the two seasons of investigations reported here, differences in field techniques and sampling strategies dictated certain minor alterations and refinements to existing inventory and analytic systems. The procedures used here most closely follow those recently applied to collections from Big Hidatsa Village (32ME12) (Ahler and Swenson 1985) and Taylor Bluff Village (32ME366) (Ahler 1988).

Flotation and Light Fraction Separation

The first laboratory processing step was to separate the light and heavy material fractions in all shallow waterscreen samples and feature samples by water flotation. Virtually no organic debris was present in the deep test levels, so they were not floated. Because of the disturbed context of the shallow test plot samples (plowzone), flotation was merely used as an expedient device for removing recent organic debris to facilitate artifact sorting. The light fraction from all shallow test plots was therefore discarded without any analysis. Light fraction materials from feature contexts are retained in the collections, but virtually no identifiable remains are represented and this material is of little analytic value.

Size-Grading

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

Material recovered during the 1987 and 1988 investigations in Area B was passed through U. S. Standard Sieve Cloth screens with the following designations and opening sizes:

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

The size-grading procedure was the same for all excavation units, with the exception of samples taken from Feature 5 at Hotrok. Feature 5 was a historic trash pit. It contained quantities of large-sized artifacts, including numerous concrete chunks and metal pieces. In order to capture this extreme upper-end size variability, an additional size-grade (G00) with a screen opening of 3.000 inches (75 mm) was added to the the standard G1-5 array for Feature 5 samples alone.

A commercial mechanical shaker and nested screens were used in size-grading, with larger-sized materials hand manipulated through the G1 and G2 screens, and smaller-sized materials shaken for 30 seconds through the G3, G4, and G5 screens. Because the G5 screen has roughly the same size mesh as that used for waterscreening (16 per-inch-mesh window screen), <G5 residue represents a nonsystematic, fortuitously collected sample of material. Consequently, the <G5 residue was not used as an analytic sample, but it was retained as part of the site collection.

Sorting and Quantification

The initial stage in the sorting process involved the separation of size-graded, heavy fraction sample aggregates from each provenience unit into general material classes. During a second sorting step these material classes were further subdivided into more specific classes (e.g., stone tools were separated from chipped stone flaking debris). Table 10 summarizes the sorting specifications that were followed for the shallow test plots. Feature samples and deep test unit levels were subjected to somewhat more intensive sorting specifications (Table 11).

After completion of the initial sorting process, basic quantification of all material and artifact classes was accomplished. The goal of this process is the production of detailed artifact inventories and the generation of baseline analytic data. Artifact inventories for the two sites under study follow the coding format contained in Appendix B. The artifact inventories presented in Appendix C are based on these data and the inventory coding format.

Detailed Analyses

A number of selected artifact classes were the focus of more detailed analyses. These include native ceramics, stone tools, flaking debris, and vertebrate remains. Extended discussions of the analytical procedures applied to these artifact classes in KNRI collections can be found in Ahler and Swenson (1985:70-85) and Ahler (1988:66-73). Previous reports on the Hotrok and Lower Hidatsa West sites (Ahler and Mehrer 1984; Toom et al. 1985) were used to provide comparative information and to help establish basic analytic units. Data collection procedures and data presentation schemes employed in this study follow and build upon these existing foundations.

Because of the frequent occurrence of historic (recent) Euroamerican artifacts in the site collections, especially from Feature 5 in the Hotrok area, considerable attention was devoted to the analysis of these remains as

Table 10. Summary of sorting specifications for heavy fraction samples from shallow test plots, Lower Hidatsa West (32ME499) and Hotrok (32ME412) sites, Visitor Center Area B, 1987 excavations.

Material Classes in Initial Sort	Material or Artifact Classes in Second Sort	Size Grade Sorted From				
		G1	G2	G3	G4	G5
Modified Stone	Stone Tools	X	X	X	X	
	Chipped Stone Flaking Debris	X	X	X	X	
Pottery	Rim Sherds	X	X	X		
	Body Sherds	X	X	X		
Vertebrate Fauna	Modified Bone	X	X	X	X	X
	Unmod. Identifiable Bone	X	X	X	X	X
	Unmod. Unidentifiable Bone	X	X	X		
Shell	Modified Shell	X	X	X	X	X
	Unmod. Identifiable Shell	X	X	X	X	X
	Unmod. Unidentifiable Shell	X	X	X		
Fire-Cracked Rock	Check for Tools	X	X	X		
Unmodified Natural Clinker	Check for Tools	X	X	X		
Burned Earth		X	X	X		
Fired Clay	Without Temper	X	X	X		
	With Temper	X	X	X		
Ash		X	X	X		
Ochre/Pigment		X	X	X		
Metal	Recent Metal	X	X	X	X	X
	Trade Metal	X	X	X	X	X
Glass Trade Beads		X	X	X	X	X
Miscellaneous	Other Glass	X	X	X	X	
Aboriginal	Leather	X	X	X		
Material	Other	X	X	X		
Miscellaneous	Glass	X	X	X	X	
Recent Material	Coal Clinker and Slag	X	X	X		
	Other	X	X	X		
Natural Rock		X	X	X		
Unsorted Residue					X	X

Table 11. Summary of sorting specifications for heavy fraction samples from features and deep tests, Lower Hidatsa West (32ME499) and Hotrok (32ME412) sites, Visitor Center Area B, 1987 and 1988 excavations.

Material Classes in Initial Sort	Material or Artifact Classes in Second Sort	Size Grade Sorted From				
		G1	G2	G3	G4	G5
Modified Stone	Stone Tools	X	X	X	X	
	Chipped Stone Flaking Debris	X	X	X	X	
Pottery	Rim Sherds	X	X	X		
	Body Sherds	X	X	X		
Vertebrate Fauna	Modified Bone	X	X	X	X	X
	Unmod. Identifiable Bone	X	X	X	X	X
	Unmod. Unidentifiable Bone	X	X	X		
Shell	Modified Shell	X	X	X	X	X
	Unmod. Identifiable Shell	X	X	X	X	X
	Unmod. Unidentifiable Shell	X	X	X		
Fire-Cracked Rock	Check for Tools	X	X	X		
Unmodified Natural Clinker	Check for Tools	X	X	X		
Burned Earth		X	X	X		
Fired Clay	Without Temper	X	X	X		
	With Temper	X	X	X		
Ash		X	X	X		
Ochre/Pigment		X	X	X	X	
Metal	Recent Metal	X	X	X	X	X
	Trade Metal	X	X	X	X	X
Glass Trade Beads		X	X	X	X	X
Miscellaneous	Other Glass	X	X	X	X	X
Aboriginal	Leather	X	X	X	X	X
Material	Other	X	X	X	X	X
Miscellaneous	Glass	X	X	X	X	X
Recent Material	Coal Clinker and Slag	X	X	X		
	Other	X	X	X	X	X
Natural Rock		X	X	X		
Unsorted Residue					X	X

well. Metal, glass, and leather were individually identified as to source or maker where possible and grouped according to defined technological-functional classes. Other miscellaneous categories such as concrete, coal clinker, and wood were handled in a similar manner. Finally, faunal and floral remains associated with recent Euroamerican activities were subjected to the same set of analytical procedures as their counterparts from earlier contexts. Taxonomic identifications were provided where possible, along with information concerning human modification or alteration and the occurrence of burning in the samples.

Collection Inventory and Data Files

A collection inventory for the 1987 and 1988 Area B investigations in the Lower Hidatsa West and Hotrok sites was prepared using the data base program PC-File/R (ButtonWare 1985). Each site inventory is made up of six data files, referred to as Cards 1-6, that are capable of being interlinked using the relational capabilities of the database software program. This format was previously applied to the Taylor Bluff Village (32ME366) site collection (Ahler 1988:73-74) and it closely follows the system used to generate the comprehensive inventory for all excavated collections from KNRI archeological sites (Ahler 1987).

The two sets of six-card inventory files produced here for the Lower Hidatsa West and Hotrok sites most closely approximate the Taylor Bluff example. Data file names for Lower Hidatsa West are labeled "CRD1LHWT" to "CRD6LHWT"; whereas for Hotrok these are designated "CRD1HTRK" to "CRD6HTRK." The first five files (Cards 1-5) comprise count, weight, and presence/absence quantification data on many artifact classes. Specific details on the content of Cards 1-5 can be found in Ahler (1987:4-9). A sixth file (Card 6) contains site provenience information, which is site-specific to some extent. The format and content of Card 6 for the 1987 and 1988 investigations at the Hotrok and Lower Hidatsa West sites can be found in Appendix B of this report. The data in each of the separate files is keyed and linked by field catalog number. Thus, each catalog number represents a single record or "case" in each of the inventory data files.

Due to peculiarities in the data sets for the two sites, a number of deviations from the standard coding format discussed in Ahler (1987) were incorporated into the Lower Hidatsa West and Hotrok inventories. Some of these changes were necessary because of the large quantities of recent Euroamerican artifacts, specifically metal pieces and concrete chunks, which could not be readily accommodated within the existing code format.

The artifact and other material inventories provided in Appendix C were generated from the computer data files, as were tabular summaries for many artifact classes presented in the present report. Copies of the computer inventory files for the 1987 and 1988 Area B investigations at Lower Hidatsa West and Hotrok have been placed on IBM-PC compatible, 360K format diskettes.

V. HOTROK ARTIFACT CLASS DESCRIPTIONS AND DISTRIBUTIONS

Cultural features, portable artifacts, and other materials recovered from the 1987 and 1988 excavations in Visitor Center Area B within the Hotrok site are described in detail in this section. Quantitative and qualitative data are provided for each artifact class according to analytic unit, and interpretations of these remains are offered where possible and appropriate. Emphasis is placed on the detailed analysis of native ceramics, stone tools, chipped stone flaking debris, identifiable and modified faunal remains, and historic (recent) period artifacts. Other classes of material, which have less analytic value, are treated in a more cursory manner. Artifact densities, spatial analyses, and additional interpretations based on these considerations are covered in a subsequent section.

Features

Six subplowzone features were identified within the Hotrok area (Table 12; Figure 8). Feature 3 (F3), a basin-shaped pit, was partially uncovered in 1987 in strip trench (ST) 580. The approximate eastern half of F3, that portion exposed in ST580, was excavated in 1987; the remaining western portion of the feature was exposed and excavated in 1988 (Figure 12). The surface of the F3 basin was recognized at about 39 cm surface depth (sd) beneath a somewhat thicker area of plowzone than was typically observed in Area B. The intact portion of the basin was no more than about 12 cm deep, extending to a maximum of about 51 cm sd. The artifactual content of F3 was found to consist entirely of a central mass of fire-cracked rock (FCR) surrounded by a slightly darker soil matrix (Figure 13a). A bone fragment was mapped near the southern edge of the the feature in 1987 (Figure 12).

The remains of five other features (F4-F8) were identified in the Hotrok area during the 1988 mechanical stripping operation (Table 12). Feature 4 consisted only of a wooden stake that had been cut to a point with a metal tool and driven into the ground. This specimen, of which another example was found in the Lower Hidatsa West area (see Section VI), is believed to be of recent Euroamerican origin, likely representing some sort of land survey marker. The F4 stake was simply removed from the ground and collected without further excavation.

Feature 5, the most complete and interesting of the Hotrok features, was a rectangular-shaped, straight-sided, flat-bottomed pit (Figure 14) that was filled with recent historic debris. The surface of F5, just beneath the plowzone, was clearly marked by a white-colored stain (Figure 13b). The pit extended to a maximum depth of about 75-80 cm beneath the subplowzone surface, penetrating to the top of Pleistocene-age sand deposits. It was probably originally about 100 cm deep, with the upper 20-25 cm or so of the pit truncated and removed by plowing. The historic debris in F5, which is described in detail below, principally consisted of an upper layer of fragmented concrete (Figure 15a) and a lower layer of rusted metal items and subsistence debris (Figure 15b). Feature 5 was excavated in arbitrary, 20 cm levels because the sizes of most of the individual artifacts it contained most closely conformed to excavation levels of this thickness. Clearly, F5 served as a trash pit for some of the former Euroamerican occupants of the site. It

Table 12. Summary data on excavated features in the Hotrok site (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Feature Number	Description	Recorded Dimensions (cm)	Excavated Volume (m ³)	Estimated Percentage Excavated
3	Basin-Shaped Pit	Av. Diam. 85 Av. Depth 8	0.031	100
4	Cut Wooden Stake	Av. Length 25 Av. Width 5	Wood Removal Only	100
5	Rectangular Straight-Sided Pit	Av. 97 X 50 Av. Depth 77	0.373	100
6	Basin-Shaped Pit (Base of Shallow Pit)	Av. 54 X 50 Av. Depth 4	0.013	100
7	Burned Earth Area	Av. 62 X 49 Av. Depth 3	0.009	100
8	Diffuse Charcoal Stain	Av. 5 X 10 Av. Depth 1	No Recovery	--
Total			0.426	

was initially thought that F5 was the remains of an outhouse pit, but, much to our delight, this did not prove to be the case upon excavation.

Feature 6 consisted of what appeared to be the basal portion of a shallow, basin-shaped pit (Figure 16). Virtually all of the upper part of F6 had been destroyed by the plow; a small pocket of FCR that was found to extend beneath the perceived limits of the F6 basin is thought to have been created by the force of the plow (cf. Figure 16). The remnant of F6 was excavated as a single unit. Feature 7 was a small, thin area of burned earth that likely represents the very base of a surface fire or shallow hearth (Figure 17). It, too, was excavated as a single unit. Feature 8 consisted only of a diffuse area of charcoal-stained soil; it could not be excavated because the thin remnant of F8 was completely removed during cleaning and attempted definition.

The sample from Hotrok comprises a diverse set of feature types. Four general classes of features were identified. These include: (1) basin-shaped pits, (2) straight-sided pits, (3) small, diffuse areas of burned earth and/or charcoal staining, and (4) cut wooden stakes. The single straight-sided pit was full of historic trash and doubtless relates to the utilization of the site area in recent times by Euroamericans. The single cut wooden stake is also believed to be of Euroamerican origin. The other features identified at Hotrok are all attributed to Amerindian occupations of the site, most likely

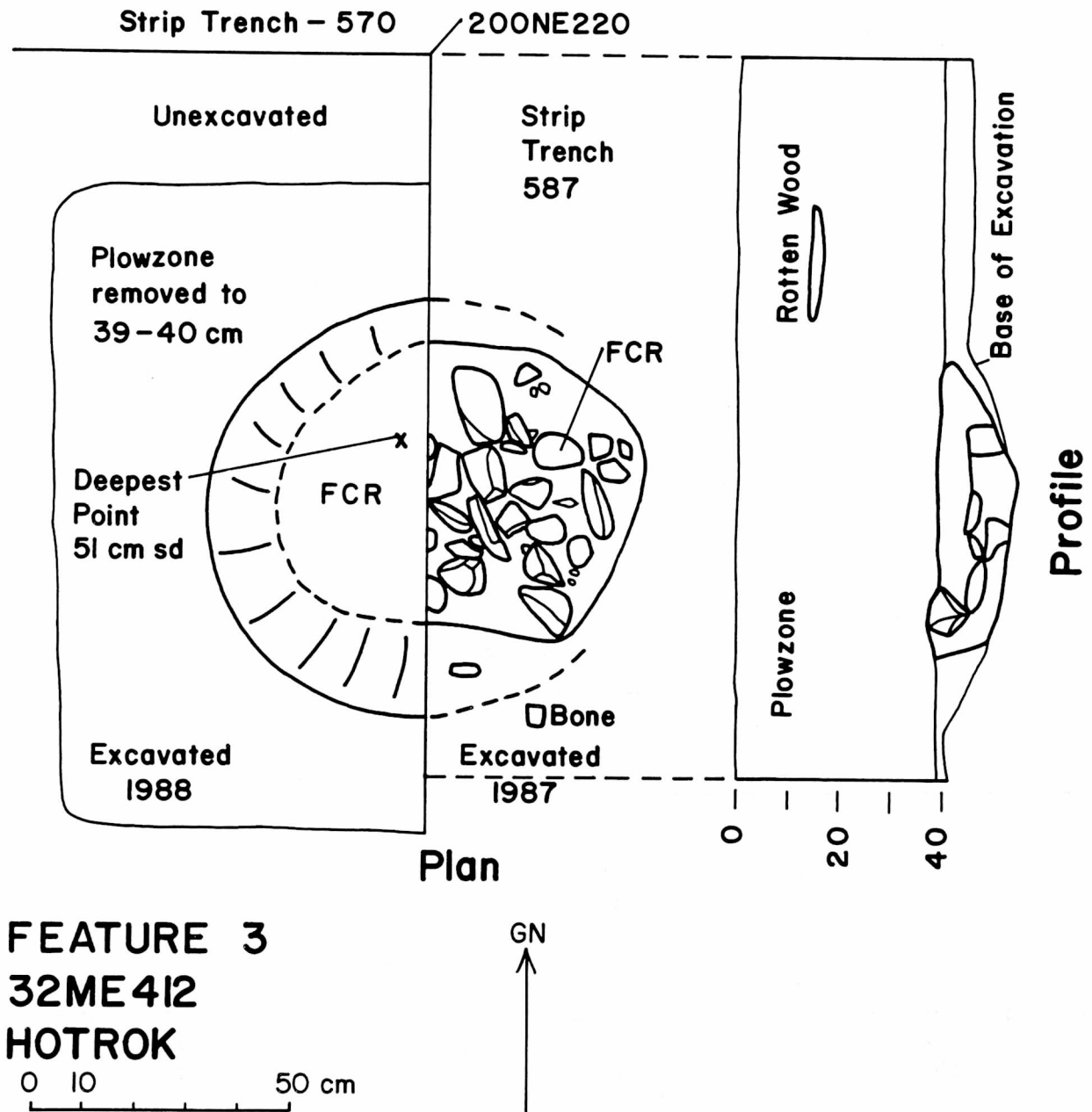
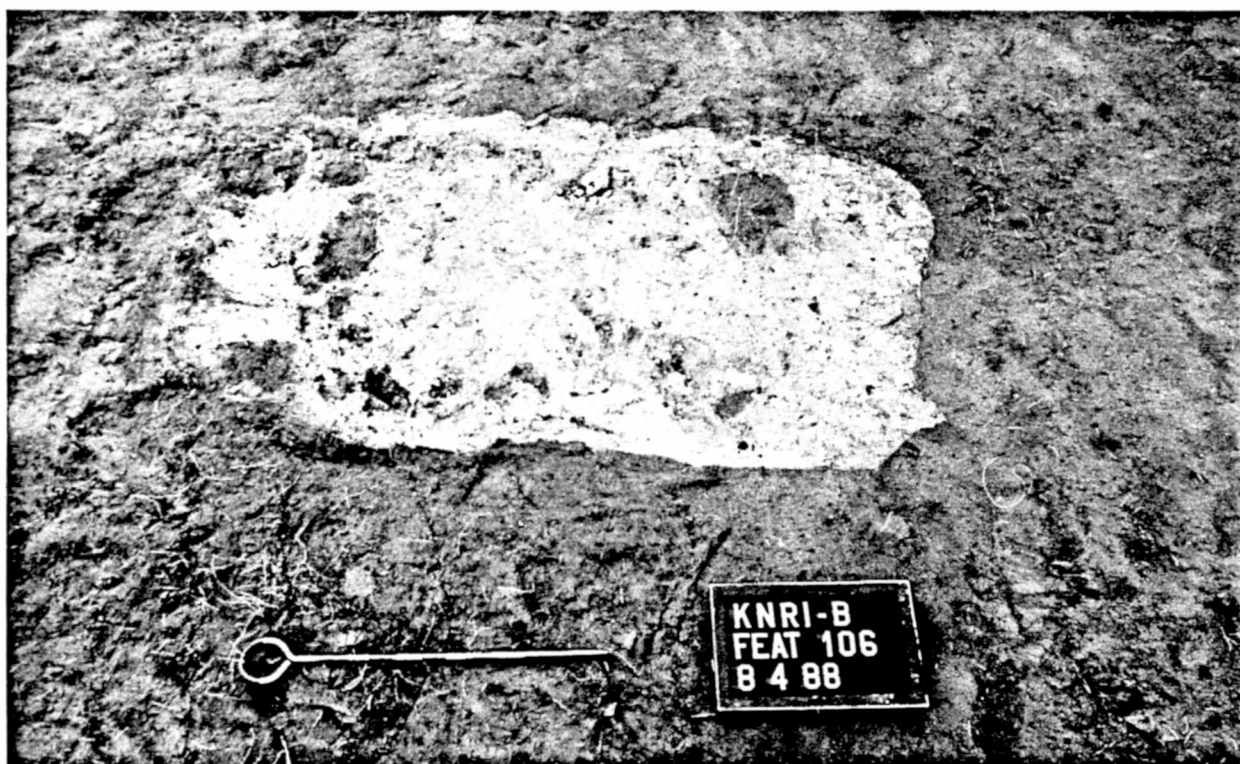


Figure 12. Plan and profile drawings of Feature 3, Hotrok (32ME412) area. East half excavated and recorded in 1987; west half excavated and recorded in 1988.



a



b

Figure 13. Feature photos in the Hotrok (32ME412) area. a: East half of Feature 3 exposed in ST587 before excavation (west view). b: Surface of Feature 5 (white-colored stain) exposed beneath the plowzone before excavation (east view).

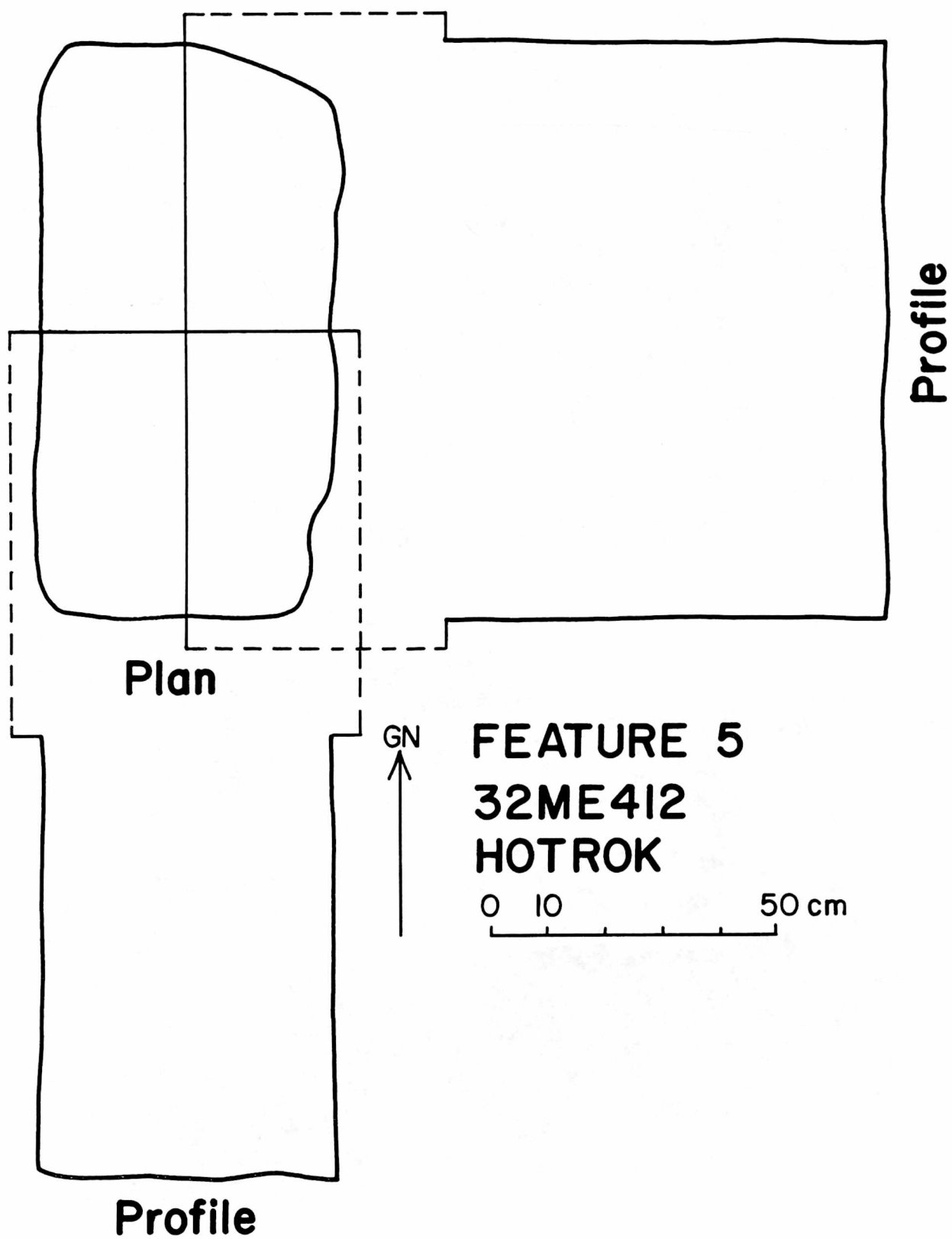


Figure 14. Plan and profile drawings of Feature 5, Hotrok (32ME412) area.



a



b

Figure 15. Feature photos in the Hotrok (32ME412) area. a: Excavation of the upper concrete layer in Feature 5 (west view). b: Excavation of the lower metal artifact and subsistence refuse layer in Feature 5 (south view).

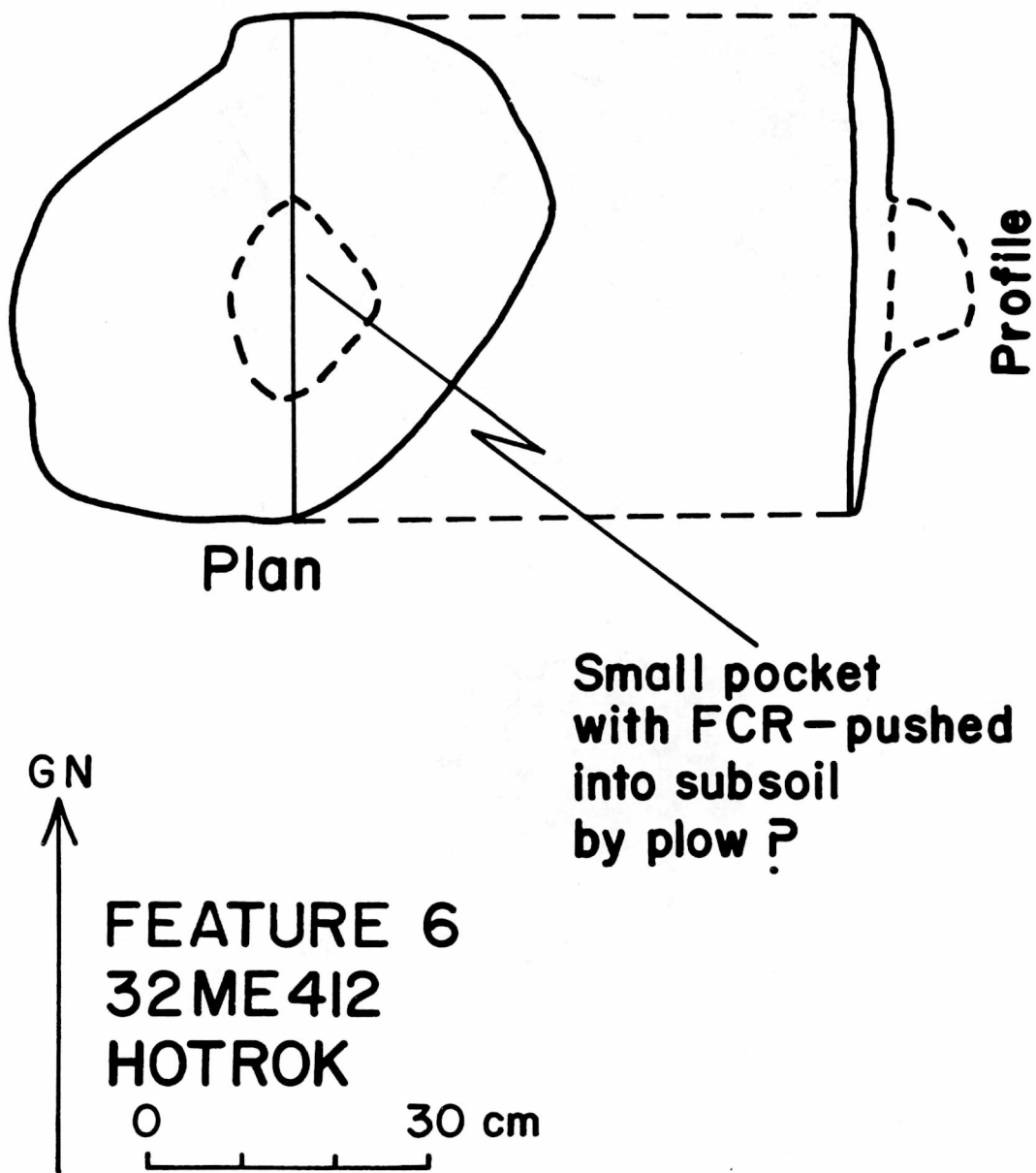
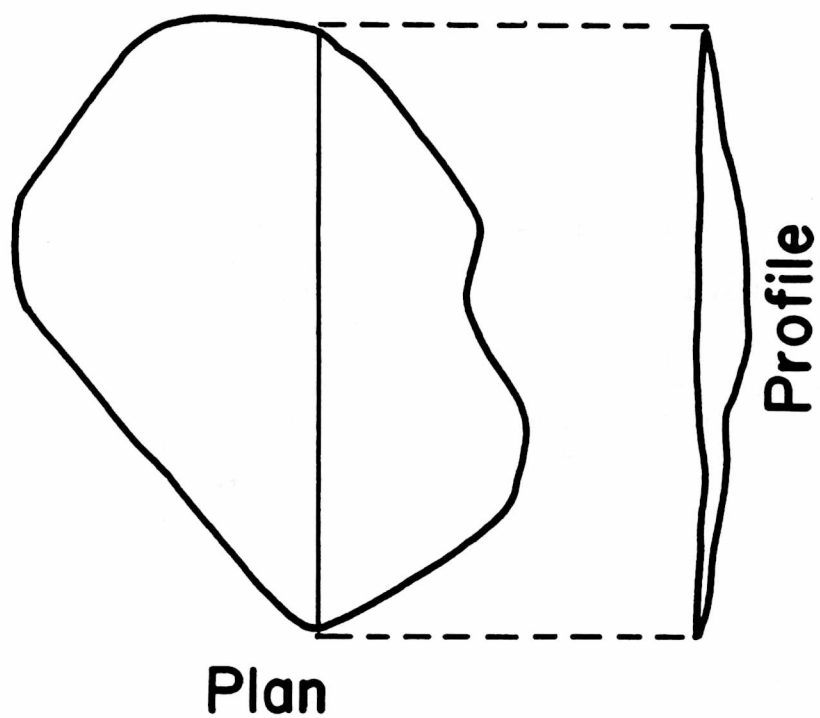


Figure 16. Plan and profile drawings of Feature 6, Hotrok (32ME412) area.



FEATURE 7
32ME412
HOTROK

0 30 cm



Figure 17. Plan and profile drawings of Feature 7, Hotrok (32ME412) area.

affiliated with the Heart River phase or some other closely related Plains Village archeological taxa. The two basin-shaped pits contained moderate amounts of native artifactual debris, consisting almost exclusively of FCR. The burned earth area and the diffuse charcoal stain were virtually devoid of artifacts; they are thought to be nothing more than the very bottom portions of surface fires or shallow hearths. The truncation of features in Area B is obviously the result of past cultivation activities, where plowing has removed and destroyed the upper portions of all shallow cultural features to depths of about 20-30 cm sd. The remaining, intact, basal portions of these features were all found at the contact between the subsoil and the plowzone.

Native Ceramics

Investigations at Hotrok produced a sample of 89 native ceramic sherds weighing a total of 78 g. This aggregate consists of eight rim sherds and 81 body sherds. Table 13 summarizes size grade and weight information by analytic unit. The smaller G3 ceramics make up the majority of the collection, although fragmentation resulting from cultivation practices does not appear to be as severe as that recorded for the Lower Hidatsa West collection (cf. Toom et al. 1985:81). The great majority of the native ceramics were recovered from shallow test plots within the plowzone (AU13). The remainder of the sherds were found in surface and near-surface levels in deep test units (AU15); none were recovered from presumed Plains Village features (AU11).

Body Sherds

The body sherd sample consists of six G2 and 75 G3 specimens, for a total of 81 sherds. In G2, body sherds with plain/smoothed surface treatment (n=3, 50.0%) slightly outnumber simple-stamped specimens (n=2, 33.3%) and tool decorated specimens (n=1, 16.7%). Among the smaller G3 sherds, five examples of trailing and one additional tool decorated specimen were recognized in the sample.

Mean sherd thickness was measured for the six G2 specimens. Smoothed/plain sherds averaged 6.70 mm; simple stamped specimens were thinner, averaging 4.80 mm in thickness. The tool decorated shoulder sherd was 5.25 mm in thickness. These latter figures fall close to that of 4.91 mm reported for prior investigations at Hotrok (Ahler and Mehrer 1984:56).

The incidence of decorated body sherds in a ceramic sample of this size is noteworthy. Such specimens are most frequently associated with Knife-River Fine ware, a rare, special-purpose pottery that has been identified in another collection from the Hotrok site in an unusually high proportion (Ahler and Mehrer 1984:71). While Knife River Fine ware was not specifically identified among the rims sherds in the 1987-1988 Hotrok ceramic sample (see below), the decorated body sherds could be from Knife River Fine vessels. Thus, the presence of decorated body sherds in this ceramic sample from Hotrok may offer some additional but admittedly very tenuous support to the contention that Knife River Fine pottery was being used during ritual or nondomestic activities at the site, or at least that the remains of such vessels were discarded here.

Table 13. Summary of native ceramic size grade data by analytic unit, Hotrok site (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		Counts				Weights (g)				
		G1	G2	G3	Total	G1	G2	G3	Total	
11	n	-	-	-	-	wt	-	-	-	-
	%	-	-	-	-	%	-	-	-	-
12	n	-	-	-	-	wt	-	-	-	-
	%	-	-	-	-	%	-	-	-	-
13	n	-	7	66	73	wt	-	19	48	67
	%	-	9.6	90.4	100.0	%	-	28.4	71.6	100.0
14	n	-	-	-	-	wt	-	-	-	-
	%	-	-	-	-	%	-	-	-	-
15	n	-	1	15	16	wt	-	2	9	11
	%	-	6.3	93.8	100.1	%	-	18.2	81.8	100.0
Total	n	-	8	81	89	wt	-	21	57	78
	%	-	9.0	91.0	100.0	%	-	26.9	73.1	100.0

Rim Sherds and Vessels

The eight identified rim sherds are thought to represent at least seven individual vessels. Included are two G2 sherds and six G3 sherds, none of which are large enough for effective illustration. All portions of vessel rims are represented, including one Zone 2 fragment, three Zone 3 fragments, two Zone 3/7 fragments, and two Zone 7 lip fragments (cf. Swenson and Ahler 1984). Both Le Beau S-Rim (n=1) and Unnamed S-Rim (n=2) wares are present in the sample. Ahler and Swenson (1985:Table B1) describe these ware groups. The majority of the specimens (n=5) consist of unclassifiable rim fragments. Descriptive information on the Hotrok rim sherds is summarized in Table 14.

The occurrence of Le Beau S-Rim pottery is linked to the primary Heart River component identified at the site, which is probably related in turn to the major Heart River phase occupation at nearby Lower Hidatsa Village (Ahler and Weston 1981). However, the Unnamed S-Rim pottery suggests, once again, the likelihood of a Scattered Village complex occupation at the site as well.

Table 14. Inventory of native ceramic wares and types, Hotrok site (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Ware	Total Collection		Classifiable Percentage	Types/Decorative Techniques	Individual Ware/Type	
	n	%			n	%
Le Beau	1	12.5	33.3	Cord Impressed	1	100.0
Unnamed Ware, S-Rim or Re-curved S-Rim	2	25.0	66.7	Cord Impressed	1	50.0
				Tool/Finger Impressed	1	50.0
				Total	2	100.0
Indeterminate (Fractured)	5	62.5	0.0	Zone 2 (neck)		
				Cord Impressed	1	20.0
				Zone 3 (S-rim)		
				Cord Impressed	2	40.0
				Zone 7 (lip)		
				L-Shaped	1	20.0
				Rounded	1	20.0
				Total	5	100.0
Total	8	100.0	100.0		8	100.0

Stone Tools

The excavations in the Hotrok area yielded seven individual stone tools, including six chipped stone implements and one ground stone implement. In addition, Feature 3 produced the remains of a mass of limestone that had been reduced to some extent by percussion flaking, resulting in several core-like fragments and a number of smaller pieces of debris. The limestone artifacts are treated as a single chipped stone tool (nonbipolar core-tool) for purposes of description, although it is uncertain, even unlikely, that the intent of the reduction of this piece was to produce usable tool materials. Rather, it is thought that the limestone piece was broken up for some other, unknown purpose. The seven actual stone tools in the sample are all single function implements.

Tool Technology

Technological classification of the tools according to analytic unit is provided in Table 15. This classification scheme has been applied to a number of stone tool collections from the KNRI (see Ahler and Swenson 1985:Table B-3 for class definitions). The small Hotrok sample exhibits some technological diversity, with seven of the eight tools representing a different technological class. Included are examples of patterned and unpatterned bifacial tools, unpatterned flake tools, core-tools, and unpatterned ground stone tools.

Table 15. Stone tool technological classes by analytic unit, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Technological Class			Analytic Unit					Total
			11	12	13	14	15	
1	Small Thin	n			1			1
	Patterned	%			25.0			12.5
	Bifaces							
2	Large Thin	n			1			1
	Patterned	%			25.0			12.5
	Bifaces							
3	Irregular	n			1			1
	Unpatterned	%			25.0			12.5
	Bifaces							
4	Patterned	n						0
	Flake Tools	%						0.0
5	Unpatterned	n			1			1
	Flake Tools	%			25.0			12.5
6	Thick	n						0
	Bifacial	%						0.0
	Core-Tools							
7	Nonbipolar	n	1			1		2
	Cores-Tools	%	100.0			33.3		25.0
8	Bipolar	n				1		1
	Core-Tools	%				33.3		12.5
9	Unpatterned	n				1		1
	Pecked/Ground	%				33.3		12.5
	Stone Tools							
10	Patterned	n						0
	Pecked/Ground	%						0.0
	Stone Tools							
Total			1	0	4	3	0	8
		%	100.0	0.0	100.0	99.9	0.0	100.0

Four of the tools were recovered from shallow test plots (AU13); three other specimens, including the ground stone tool, were found in strip trenches (AU14); and the core-like limestone objects are the only potential stone tools that were recovered from Plains Village features (AU11). As was mentioned above, the core-like limestone objects, counted here as one tool, were recovered from Feature 3. Other than the limestone specimens, whose true nature is debatable, Feature 3 contained nothing more than FCR. The deep test units failed to yield any stone tools. Most all of the technological classes represented here, excepting the bipolar core-tool, have been reported from previous excavations at the site (cf. Ahler and Mehrer 1984:Table 12).

Raw Material Variation and Technology

The six chipped stone tools in the Hotrok collection are all made of Knife River flint (KRF), while the single ground stone implement is made of natural clinker. Limestone represents another potential tool raw material, as was mentioned previously.

In terms of raw material utilization, the present collection exhibits parallels to previously recovered samples from Hotrok. Ahler and Mehrer (1984:Table 13) recorded relatively high frequencies of KRF use for certain chipped stone forms such as projectile points and unpatterned flake tools. Clinker served as stock material for the production of abrading tools.

Tool Function and Use Phase

A functional classification of the Hotrok tool sample is presented in Table 16. A more complete discussion of these functional classes is presented in Ahler and Swenson (1985) and Ahler (1988). As with the technological classification, considerable functional diversity is evidenced in the small Hotrok collection. The identified functional groups are cross-tabulated by use-phase class, thereby providing some indication of the (1) stage of manufacture and (2) trajectory of use-life for the tools. All of specimens are placed in use-phase 4 -- completely manufactured tools that were broken or exhausted during use.



Figure 18. Side-notched arrow point from Hotrok (32ME412).

One specimen is classified as a projectile point (class 01). This small, thin patterned biface served as an arrow point. It is a side-notched form made of KRF that was recovered from T220. The proximal end of the point is impact-fractured and one basal corner is missing as well (Figure 18). Interestingly, the item exhibits a very faint patination caste not usually associated with Plains Village artifacts. Morphologically, its

triangular outline with side-notches inset for ease in hafting, falls comfortably into the Plains Side-Notched category (cf. Kehoe 1966, 1973). Similar forms occur in collections from Lower Hidatsa Village (cf. Ahler and Weston 1981:Figure 13e).

Table 16. Cross-tabulation of general and specific stone tool functional classes according to use-phase class, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

General and Specific Functional Class	Use-Phase Class				Total
	1	2	3	4	
1. Projectile Points					
01 Projectile point				1	1
2. Patterned Bifacial Cutting Tools					
15 Generalized, patterned bifacial cutting tool				1	1
4. Jagged, Expedient Cutting Tools					
08 Expedient, general purpose cutting tool				1	1
5. Prepared or Regularly Modified Unpatterned Flake Tools					
23 Retouched or utilized flake used on variable material				1	1
10. Cores or Potential Cores					
21 Core				2	2
12. Bipolar Tools or Potential Tools					
25 Core/punch/wedge/chisel				1	1
13. Grinding Tools					
33 Simple hand-held abrading tool				1	1
Total	0	0	0	8	8

The pointed tip of a large KRF bifacial tool was found in T245. This specimen is interpreted to be a fragment from a patterned bifacial cutting tool (class 15). Both surfaces of the specimen are completely flaked. Based on its waxy luster, the specimen was probably subjected to thermal alteration (heat treatment) prior to final finishing.

One example of a jagged, expedient cutting tool (class 08) was recovered in T259. This unpatterned bifacial implement was made from a piece of poor quality KRF.

One multipurpose KRF unpatterned flake tool (class 23) was encountered in T239. The specimen exhibits light retouch in a shallow, semicircular concavity reminiscent of spokeshaves. A second lateral edge is also retouched. This expedient, multipurpose tool was made on a small bipolar flake.

Two stone tools functionally classified as cores or potential cores (class 21) occur in the sample. The core-like limestone objects from Feature 3 are counted here as one tool; the other specimen is a nonbipolar core fragment of KRF. Cores served as stock material for the production of other stone tools. The KRF core fragment was encountered during strip trenching operations in ST535. It was likely discarded following detachment and is placed in the use-phase class 4. The core-like limestone pieces consist of six separate fragments from a larger limestone cobble found with a quantity of FCR and other limestone debris in a basin-shaped pit (F3). These specimens exhibit evidence of having been percussion flaked. Negative flake scars are visible to some extent on all six of the core-like objects, however, the weathered condition of the limestone makes certain determinations problematic. An additional 11 pieces of this same limestone material are classed as other rock. These items are surely fragments of the same limestone piece, but they lack clear evidence of force application. As was mentioned above, the purpose or intent of the reduction of the limestone piece by percussion flaking is unclear.

One piece of nucleus from a KRF bipolar tool or potential tool was found during strip trenching in ST555. The specimen represents an exhausted bipolar core and/or a broken bipolar tool (class 25); it is classed as use-phase 4.

Finally, one piece of modified clinker was recovered in ST592. The specimen is classified as a simple hand-held grinding tool (class 33). These tools represent items which were used to abrade other materials usually during the latter stages of the production sequence. The specimen is placed in use-phase 4 owing to its small size.

In conclusion, the diverse technological and functional composition reflected in the stone tool sample is in accord with the site-type definition originally suggested for Hotrok — an off-village activity area (cf. Lovick and Ahler 1982:152-154, 240). A number of different tasks were taking place on-site involving the production and use of stone tools. These activities, however, would seem to be largely independent of those responsible for the FCR concentrations.

Flaking Debris

The chipped stone flaking debris aggregate from Hotrok consists of a total of 212 G1-4 specimens weighing 124.9 g. Table 17 gives size grade and weight data for the sample by analytic unit. The greatest numbers of flakes occur in the smallest size grade (G4), and relates directly to waterscreened excavation units. Very few larger sized flakes occur in the sample, except for a number of limestone pieces from Feature 3 (AU11). Flaking debris was recovered from near-surface (plowzone) contexts in all analytic units, with the great majority coming from the shallow test plots (Table 17). The two G4 flakes from Feature 5 (AU12), the historic trash pit, are intrusive materials that are unrelated to the use of this feature. Table 18 summarizes raw material information for two generalized size classes (G1-3 versus G4) by analytic unit. The frequency of cortical flakes for these classes is also provided along with ratios of smaller (G4) to larger (G1-3) flaking debris where possible. Inspection of these data permit examination of lithic procurement and use patterns as well as the technological derivation of these artifacts.

Table 17. Unmodified chipped stone flaking debris size grade and weight data by analytic unit, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations. Weights are stated in grams.

Analytic Unit		Size Grade				Total
		Grade 1	Grade 2	Grade 3	Grade 4	
11	n	3	2	10	-	15
	%	20.0	13.3	66.7	-	100.0
	wt	74.4	11.9	13.7	-	100.0
	%	74.4	11.9	13.7	-	100.0
12	n	-	-	-	2	2
	%	-	-	-	100.0	100.0
	wt	-	-	-	0.2	0.2
	%	-	-	-	100.0	100.0
13	n	-	1	30	145	176
	%	-	0.6	17.0	82.4	100.0
	wt	-	2.6	12.8	5.5	20.9
	%	-	12.4	61.2	26.3	99.9
14	n	-	1	-	1	2
	%	-	50.0	-	50.0	100.0
	wt	-	1.8	-	0.2	2.0
	%	-	90.0	-	10.0	100.0
15	n	-	-	2	15	17
	%	-	-	11.8	88.2	100.0
	wt	-	-	1.2	0.6	1.8
	%	-	-	66.7	33.3	100.0
Total	n	3	4	42	163	212
	%	1.4	1.9	19.8	76.9	100.0
	wt	74.4	16.3	27.7	6.5	124.9
	%	59.6	13.1	22.2	5.2	100.1

Table 18. Unmodified chipped stone flaking debris raw material type data by size grade and analytic unit, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Raw Material Type	G1-3			G4			G4/G1-3 Ratio	% by n
	weight (g)	n	cort. %	weight (g)	n	cort. %		
<u>Analytic Unit 11</u>								
37 Limestone	100.0	15	41.7					100.0
<u>Analytic Unit 12</u>								
28 Unburned KRF				0.2	2	0.0		100.0
<u>Analytic Unit 13</u>								
28 Unburned KRF	10.3	24	12.5	4.8	124	9.7	5.17	84.1
08 Clear/Gray Chalcedony	0.6	1	100.0	0.4	14	0.0	14.00	8.5
39 Burned KRF	0.3	1	0.0	0.1	3	33.3	3.33	2.3
01 Smooth Gray TRSS	0.1	1	0.0	<0.1	1	0.0	1.00	1.1
05 Porous Quartzite	0.6	2	0.0					0.6
10 Dark Brown Chalcedony	1.3	1	100.0					0.6
12 Burned Chalcedony				<0.1	1	0.0		0.6
09 Yellow/Lt. Brown Chalcedony				<0.1	1	0.0		0.6
06 Jasper/Chert				<0.1	1	0.0		0.6
13 Basaltic Materials	2.0	1	100.0					0.6
<u>Analytic Unit 14</u>								
28 Unburned KRF	1.8	1	100.0	0.2	1	0.0	1.00	100.0
<u>Analytic Unit 15</u>								
28 Unburned KRF	0.3	1	0.0	0.6	15	0.0	15.00	94.1
08 Clear/Gray Chalcedony	0.9	1	100.0					5.9

Knife River flint is the most common material in the sample followed by clear/gray chalcedony. Smaller frequencies of other stones are also represented, some by as few as a single specimen. The raw material diversity observed in the flaking debris collection is much greater than that recorded for the stone tool sample. This suggests that a number of chipped stone tools that were manufactured and/or maintained at Hotrok were removed other off-site locations prior to their discard or loss. Toom et al. (1985:115) reported a similar situation for the Lower Hidatsa West site. These data lend support to the argument that the Hotrok site functioned in one capacity as a village periphery activity area where certain activities involving stone tool manufacture, use, and/or maintenance were taking place.

The computed ratios for smaller G4 flakes versus larger (G1-3) flakes for KRF and clear/gray chalcedony materials are indicative of small tool manufacture/maintenance activities involving pressure flaking rather than percussion core reduction. However, sample sizes for many proveniences are quite meager, greatly limiting in-depth analysis. One possible exception to this pattern may be represented in Feature 3, where the remains of a limestone cobble reduced by heavy percussion were encountered. A number of core-like fragments and flaking debris generated by this activity were recovered from this basin-shaped pit, as has already been discussed. The purpose behind this core reduction operation is unknown. Limestone, the material in question, is a soft stone possessing poor conchoidal fracture properties that is not well-suited to the manufacture of chipped stone tools. The stone may have been intended as a practice piece, or was broken-up by heavy percussion blows for some other unknown purpose related to the function of Feature 3.

The recovery of small (G4) flakes derived from exotic or nonlocal stones further supports the contention that certain stone tools were being maintained on-site which are not represented in stone tool aggregate. One such piece was found in T240. This G4 specimen is a resharpening flake from a patterned unifacial tool made of an exotic reddish brown chert.

Only four burned KRF flakes are present in the sample, representing a mere 2.3% of all KRF flaking debris. This indicates that flintknapping activities rarely occurred near fires. A similar phenomenon was noted for previous samples of flaking debris from the site, strengthening the viewpoint that flintknapping operations were generally quite independent of those activities responsible for the FCR concentrations reported at the site (cf. Ahler and Mehrer 1984:66). The flake sample does however contain several specimens which exhibit characteristics usually associated with heat treatment or thermal alteration such as a lustrous, waxy appearance. This trait was noted on one of the recovered chipped stone tools as well.

Patination was another variable observed on a number of the smaller G4 flakes in the Hotrok sample. A total of four KRF specimens were patinated to some degree -- two exhibit light patination and the other two are moderately patinated. One clear/gray chalcedony flake also exhibits moderate patination. This finding suggests the possibility that older, poorly represented components of previllage-age may occur at the site.

In sum, the flaking debris aggregate from Hotrok is similar in terms of raw materials to that recorded for samples from prior investigations. The presence of clear/gray chalcedony flaking debris may be linked to a Scattered Village complex occupation in the area. Other debris is likely associated with

later occupations at nearby sites, particularly Lower Hidatsa Village. The identification of both bipolar cores and flakes would seem to point to a time of maximum site use during later periods (cf. Ahler 1986; Ahler and VanNest 1985). Finally, the occurrence of heat treated flakes in the aggregate may also be correlated with late prehistoric/protohistoric Plains Village occupations (cf. Ahler and Weston 1981:140).

Fire-Cracked Rock

Fire-cracked rock (FCR) was recovered in some frequency during the investigations. A total of 664 pieces of FCR weighing 23,298 g was found. Size grade and weight information are tallied by analytic unit in Table 19. The majority of the sample (78.5% by weight) was encountered in Feature 3 (AU11). This association corresponds to a number of larger sized (G00, G0, and G1) thermally fractured cobble fragments, primarily consisting of granitic rock, that were found in the lower remnant of a basin-shaped pit. Feature 6 (AU11), another lower remnant of a basin-shaped pit, also yielded a quantity (3951 g, 17%) of this material.

Table 19. Unmodified fire-cracked rock size grade and weight data by analytic unit, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations. Weights are stated in grams.

Analytic Unit	Counts					Weights (g)				
		G1	G2	G3	Total		G1	G2	G3	Total
11	n	75	63	385	523	wt	21360	587	298	22245
	%	14.3	12.0	73.6	99.9	%	96.0	2.6	1.3	99.9
12	n	-	-	-	-	wt	-	-	-	-
	%	-	-	-	-	%	-	-	-	-
13	n	5	18	111	134	wt	530	168	97	795
	%	3.7	13.4	82.8	99.9	%	66.7	21.1	12.2	100.0
14	n	1	-	-	1	wt	255	-	-	255
	%	100.0	-	-	100.0	%	100.0	-	-	100.0
15	n	-	-	6	6	wt	-	-	3	3
	%	-	-	100.0	100.0	%	-	-	100.0	100.0
Total	n	81	81	502	664	wt	22145	755	398	23298
	%	12.2	12.2	75.6	100.0	%	95.1	3.2	1.7	100.0

As the site name denotes, FCR was a commonly observed artifact class at Hotrok during previous reconnaissance activities (cf. Ahler et al. 1979:16-17). However, the FCR densities encountered in Area B are generally not as great as those recorded in other portions of the site, with the notable exception of Feature 3. Past cultivation activities may have aided in the breakdown of a number of the larger pieces of FCR in Area B into greater numbers of smaller sized fragments. This potential process of FCR breakdown does not appear to be as severe as for other less durable remains such as native ceramics.

Finally, a functional interpretation of FCR use at the site suggests that certain activities such as ceremonial sweating may have taken place in the vicinity, with the intentional discard of FCR remains associated with these activities taking place on-site at the Hotrok location (cf. Ahler and Mehrer 1984:71-72). Specific tasks such as aspects of food preparation occurring in concert with these aforementioned activities may also account for some of the recovered material. The original location of these actions is not precisely known, although the nearby Big Hidatsa Village would appear to be the most likely candidate.

Vertebrate Fauna and Other Subsistence Remains

The excavations carried out at Hotrok produced a quantity of vertebrate faunal remains. Within the faunal sample, all specimens are grouped as unmodified bone; no modified bone (bone tools) are represented in the collection. The unmodified bone debris have been divided into two subgroups: (1) fragmented and otherwise unidentifiable specimens and (2) those specimens complete enough to permit taxonomic identification. The unmodified bone aggregate is discussed first followed by some discussion on the identifiable remains.

Other subsistence-related remains in the Hotrok collection consist of fruit pits and egg shell. This food debris, all of which was found in the historic trash pit (Feature 5), is directly attributable to the recent Euroamerican component.

Unmodified Bone Debris

The unmodified vertebrate fauna sample consists of a total of 261 g of G1-3 bone debris. Table 20 gives size grade and weight data for the collection; these data are tallied by analytic unit. In addition, a number of smaller (G4-5) pieces of potentially identifiable bone were also sorted from the waterscreened matrix. These extremely small-sized remains are thought to be the result of processes of natural deposition, and they are not considered further in the present report. Unmodified bone debris was recovered from the shallow test plots, the strip trenches, the deep test unit, and from Features 3, 5, and 6. Much of this bone was fragmented and dispersed with no dense concentrations being recorded. As indicated, the distribution is a low density scatter.

The occurrence of burning or charring was also recorded for the sample. These data are also summarized in Table 20 by analytic unit. Burned bone debris was rarely observed in the Hotrok sample (5 g, 1.9% of the sample), and

Table 20. Unmodified bone size grade and weight data by analytic unit, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		All Bone (g)				Burned Bone (g)			
		G1	G2	G3	Total	G1	G2	G3	Total
11	wt	13	-	3	16	-	-	1	1
	*%	81.3	-	18.8	100.1	-	-	33.3	6.3
12	wt	117	35	12	164	-	4	-	4
	%	71.4	21.3	7.3	100.0	-	11.4	-	2.4
13	wt	-	17	14	31	-	-	-	-
	%	-	54.8	45.2	100.0	-	-	-	-
14	wt	31	17	1	49	-	-	-	-
	%	63.3	34.7	2.0	100.0	-	-	-	-
15	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
Total	wt	161	69	30	260	-	4	1	5
	%	61.9	26.5	11.5	99.9	-	5.8	3.3	1.9

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

when it was observed it was restricted to remains from Features 3 and 5. The burned bone in Feature 3, a basin-shaped pit remnant, was associated with a large quantity of FCR and may reflect native food preparation activities. The remains in Feature 5, the historic trash pit, are also interpreted as subsistence-related refuse. Burning was not noted for faunal remains from nonfeature proveniences.

Fifteen pieces of bone debris recovered from level 4 of Feature 5, the historic trash pit, all exhibit evidence of butchering by metal tools, including sawing (n=14, 93.3%) and cutting (n=1, 6.7%). The smoothed and flattened surfaces are thought to be produced by a butcher's meat (bone) saw. The fine, hairline cut marks visible on one bone fragment are most likely the product of a butcher's knife (cf. Binford 1981:Figure 4.14).

Further examination of the sample suggests that bone preservation in shallow, subsurface contexts at the site ranges from fair to good. Many pieces of bone exhibit evidence of leaching and surface weathering. More durable remains such as dental enamel were generally better preserved.

Identifiable Bone

The only specifically identifiable faunal specimens among the large-sized (G1-3) bone debris from Hotrok were recovered from near the bottom of the historic trash pit (level 4, Feature 5). Included among this sawed and cut bone are elements from domestic swine and possibly domestic cattle. Both of these species were introduced to the area by Euroamericans during the historic period. In this context, such remains doubtless reflect butchering and food preparation activities by or for the Euroamerican inhabitants of the site. Most of the identifiable bone comes from the ham portion of a pig (immature swine). Other cuts of meat represented include as many as seven steaks and three chops. This food debris is not particularly abundant, and the remains from only a few meals are thought to be represented in the pit refuse.

Most of the faunal remains in balance of the collection are extremely fragmented and cannot be specifically identified. Miscellaneous tooth fragments and pieces of dental enamel are probably from large mammals such as bison (B. bison) and/or domestic cattle. Most other specimens appear to represent fragmented postcranial elements from large mammals as well, particularly shaft segments from longbones and ribs.

Other Food Debris

Other food debris materials in the Hotrok collection include a number of whole and fragmentary fruit pits and many small egg shell fragments, all of which were recovered from Feature 5 (AU12). This context indicates a clear association for these remains with the historic Euroamerican component. The egg shell was most densely concentrated near the bottom of Feature 5 in level 4. It consists of approximately 1195 G3-4 sized pieces of shell with a total weight of about 19.8 g. This shell most likely derives from domestic poultry eggs, probably chicken (Gallus sp.).

Fruit pits are another food by-product found in Feature 5. They include some 142 G3-4 sized specimens that have a total weight of about 14.6 g. A number of complete and fragmentary pits were recovered from near the bottom of the pit. These almond-shaped seeds are identified as purple plum, a common domesticated variety that was frequently canned or dried and converted to prunes. None of the pits are carbonized or show other signs of burning. It is thought that they derive from the consumption of canned or dried fruit at the site. There is additional indirect evidence among the subsistence containers recovered from Feature 5 for the consumption of canned fruit at the site (see below).

Other Native Artifacts and Miscellaneous Materials

A variety of other native artifacts and miscellaneous materials were recovered from investigations at Hotrok including modified and unmodified shell remains, fired clay, charcoal, and a few contact period native artifacts obtained via the fur trade. Undoubtedly, larger samples of all these materials, as well as other artifact classes, remain in unexcavated portions of the site (cf. Ahler and Mehrer 1984:45-72).

Shell

Two classes of mollusca are represented in the meager sample from Hotrok: bivalval (Bivalvia) and univalval (Gastropoda) specimens. Some of these shell remains are associated with native activities while others are likely the result of natural processes. The bivalval group is discussed first followed by the univalval shells. The distribution of shell among the various analytic units is listed in Table 21.

One piece of modified shell was recovered from T208. The specimen is a small, arc-shaped edge segment from a circular shell bead. Given its small size and fragmentary condition, a more complete description is difficult. It appears to have been manufactured from stock material of an unidentified freshwater river mussel. The item is extremely thin (ca. 1.0 mm in thickness), suggestive of breakage following completion of manufacture. Based upon existing morphology, the recovered portion represents approximately one quarter of the entire object. Beads made from various river mussels are common occurrences in Plains Village collections from the KNRI and the surrounding region. The specimen is probably associated with later aboriginal use of the site, although possibly not with the terminal native occupation (cf. Picha 1980, 1988).

One additional G3 fragment of unmodified mussel shell weighing 0.3 g was recovered from a second, shallow, subsurface context during the investigations. Other smaller G4 fragments of freshwater mussels were noted but not separated for further analysis. These materials too are likely to correspond with native site use. Finally, one small G5 pill clam valve was recovered from level 7 of T242, in basal sandy sediments. Durable remains of these small fingernail clams can be expected in flood deposited fluvial sediments (cf. Cvancara 1983).

Table 21. Summary of shell data by analytic unit, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit	Unmodified Shell (G1-3)		Identifiable Pill Clam/Gastropod (G1-3, n)	Modified Shell (G1-5, n)
	n	wt(g)		
11	-	-	-	-
12	-	-	4	-
13	1	0.3	3	1
14	-	-	-	-
15	-	-	17	-
Total	1	0.3	24	1

A small sample of univalval shells were also recovered from various contexts at Hotrok. A total of 21 G4-5 potentially identifiable gastropods are represented. Seventeen of these are from waterscreened matrix in levels 4-7 of T242. The remaining four specimens occur in T245 (n=2) and level 4 of Feature 5 (n=2). All of these are probably natural inclusions in the matrix.

Lastly, two G4 fragments of whorl scrap from larger fossil gastropods complete the shell collection. Their small size prohibits more specific identifications and other indications of cultural modification in both cases. One was encountered in T245 and the other occurred in level 4 of Feature 5. These specimens could be artifacts or the result of natural depositional processes. Fossil mollusca served as stock material for beads and other curios among Plains Villagers in the Northern Plains (cf. Ahler and Swenson 1985:217-222; Lehmer et al. 1978:306-308).

Fired Clay

Two G3 pieces of fired clay weighing 0.3 g were recovered from Hotrok, one from T254 and one from T259. Both specimens are untempered. The use of this material at the site is uncertain. Small amounts of fired clay were reported from the 1979 excavations (cf. Ahler and Mehrer 1984:69).

Charcoal

Wood charcoal remains, largely consisting of small flecks and soil staining, were associated with certain feature samples (see above). None of these contexts produced sufficient returns for purposes of conventional radiocarbon dating. Feature 7 yielded the largest recovered fraction, a minuscule 0.1 g.

Native Trade Artifacts

Two artifacts possibly associated with native participation in fur trade activities were recovered at Hotrok. These consist of one glass bead and a segment of rolled copper. The small (2-4 mm) blue "seed bead" exhibits a characteristic rounded and tumbled appearance. This specimen was encountered in T222. A G3-sized copper item was found in T234. It is a folded and crimped, irregularly shaped piece of sheet copper, 8.7 mm in length and 3.5 mm in maximum thickness. The specimen may have been part of a larger object. Its small size prevents a more definite identification.

Fur trade related artifacts have not been previously reported from Hotrok, although they do occur in collections from nearby locations at Lower Hidatsa West (cf. Toom et al. 1985:125). The trade materials from Hotrok were recovered from nonfeature plowzone contexts rendering a specific component assignment quite difficult. These items are most likely associated with a postcontact period native occupation of the site.

Euroamerican Artifacts

A relatively large number of durable artifacts and other materials attributable to recent Euroamerican occupation of the site were recovered from the Hotrok area. The largest sample comes from Feature 5, a historic trash pit. The Euroamerican artifacts exhibit a great deal of diversity in terms of both raw materials and technological-functional characteristics. This diversity and these attributes are used to organize the description and classification of the Euroamerican artifacts from the site. Euroamerican food debris items recovered from Feature 5 (i.e., fruit pits, egg shell, and animal bone) are considered elsewhere (see Vertebrate Fauna and Other Subsistence Remains, above).

Six primary raw material classes are identified in the Euroamerican artifact aggregate, including: (1) metal, (2) glass, (3) concrete, (4) coal clinker/lignite, (5) charcoal/wood, and (6) leather. A seventh miscellaneous class includes such materials as enamel fragments, rubber, and what may be modeling clay. Metal and concrete remains are by far the most numerous and voluminous; other materials occur in far lesser quantities. The Euroamerican artifact sample is first inventoried and briefly described according to raw material. Then, following South (1977) and Steinacher (1983), a series of six generalized technological-functional groups are used to guide the detailed description and analysis of the Euroamerican materials. These groups consist of: (1) building hardware and construction material, (2) miscellaneous hardware and wood, (3) arms and munitions, (4) subsistence refuse (containers), (5) clothing and personal possessions, and (6) household goods and miscellaneous. Within each of these broader groups more specific functional and product identifications are provided where possible. This classificatory scheme serves to organize the collection in terms of the activities that these artifacts are likely associated with, or the by-products of such activities. Finally, implications for determining site structure and site chronology using recorded artifact data are discussed at the end of the section.

Raw Material Classification

The following paragraphs serve to summarize the raw material diversity for artifacts and other materials assigned to the Euroamerican component according to analytic unit. Much of this is accomplished by tabular presentation of data (Tables 22 and 23), supplemented by limited description.

Metal. Metal artifacts are among the best represented class of Euroamerican materials recovered from the Hotrok area excavations (Table 22). As mentioned previously, the majority of these items, especially the more or less intact and identifiable specimens, were encountered in the historic trash pit (Feature 5). All of the metal artifacts assigned to AU12 in Table 22 were recovered from Feature 5. Three formal categories were employed during the initial quantification process: (1) flat or irregular scrap, (2) wire scrap, and (3) formed, patterned, shaped objects. Flat or irregular scrap (referred to as can fragments and scrap in Table 22) was most common in the smaller size grades, resulting from the corrosion and breakdown of larger pieces of metal, particularly ferric (iron-based) items. Very few remains in this class were identifiable, other than to note that most are from metal cans or other

Table 22. Summary data on recent Euroamerican metal artifacts by analytic unit, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		Cans	Can Frags./ Scrap	Nails	RR Spikes	Large Nuts & Bolts	Shot	Other	Total
11	n	-	14*	-	-	-	-	-	14
	%	-	100.0	-	-	-	-	-	100.0
12	n	25	855**	2	13	22	1	10	928
	%	2.7	92.1	0.2	1.4	2.4	0.1	1.1	100.0
13	n	-	58***	2	-	1	10	6	77
	%	-	75.3	2.6	-	1.3	13.0	7.8	100.0
14	n	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
15	n	-	12***	-	-	-	2	-	14
	%	-	85.7	-	-	-	14.3	-	100.0
Total	n	25	939	4	13	23	13	16	1033
	%	2.4	90.9	0.4	1.3	2.2	1.3	1.5	100.0

*G5 sized specimens only from Feature 7; probably intrusive.

**G1-3 sized specimens only from Feature 5; G3 count estimated by average piece weight; G4-5 debris contains several thousand more very small metal fragments.

***G1-5 sized specimens.

containers of one size or another. A small amount of round wire scrap was also found, consisting mostly of pieces in the smallest size grades (G4-5). Conversely, patterned or formed metal objects were most common in the larger size grades.

Other Materials. Other materials frequently identified among the Euroamerican artifacts from Hotrok include glass, concrete, coal clinker and lignite, charcoal and wood, fruit pits, egg shell, and leather (Table 23). Glass in the collection consists of a total of 27 small-sized fragments weighing about 15.9 g. Flat (window) glass, curved (bottle) glass, and other recognizable glass shards are present in the sample. Glass was recovered from shallow test plots (AU13) and from Feature 5 (AU12).

Concrete fragments weighing a total of approximately 284.6 kg were recovered from four different excavation units. The vast majority (98.8% by weight) occurred as chunks and pieces of fill material in the upper levels of Feature 5 (AU12), the historic trash pit. The remainder, consisting

Table 23. Summary data on miscellaneous recent Euroamerican artifacts by analytic unit, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		Glass (G1-5)	Concrete (G00-2)	Coal Clinker/ Lignite (G1-3)	Wood/ Charcoal (G1-3)	Leather (G1-3)	Misc.	Total
11	n	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-
12	n	4	1632	21	30*	20**	12***	1719
	%	0.2	94.9	1.2	1.8	1.2	0.7	100.0
13	n	23	239	400	-	-	1+	663
	%	3.5	36.0	60.3	-	-	0.2	100.0
14	n	-	-	-	-	-		-
	%	-	-	-	-	-		-
15	n	-	-	-	-	-	2++	2
	%	-	-	-	-	-	100.0	100.0
Total	n	27	1871	421	30	20	15	2384
	%	1.1	78.5	17.7	1.3	0.8	0.6	100.0

*Includes material from Feature 5 and the wooden stake (Feature 4).

**Leather shoe and fragments from Feature 5.

***G4-5 sized pieces of enamel from a metal container in Feature 5.

+Piece of modeling clay (?) or a similar substance.

++Two rubber fragments.

principally of smaller-sized pieces, was taken from three shallow test plots (T209, T210, and T215; AU13) located to the south of Feature 5 (cf. Figures 3 and 8).

Fragmentary pieces of coal clinker and lignite weighing a combined total of 185.1 g are present in the collection. These were principally recovered from shallow test plots (AU13); a few pieces also come from Feature 5 (AU12).

Some uncarbonized wood and a small quantity of wood charcoal (0.2 g) occurred in Feature 5 (AU12). Most of the wood from Feature 5 (24.8 g) relates to the remains of a small wooden barrel. The distal remnant of a pointed wooden stake weighing 21.9 g was designated as Feature 4 (AU12).

Most of a leather shoe and fragments thereof occurred in Feature 5 (AU12). The more or less complete specimen and fragments weigh a total of 277.4 g.

Miscellaneous historic materials from Hotrok consist of 12 very small (G4-5) pieces of enamel from a metal container, weighing a total of 0.2 g. The enamel fragments occurred in level 4 of Feature 5. Two small pieces of what appears to be rubber were found in level 3 of T242. The rubber pieces are thought to be intrusive, possibly fragments originating from an excavator's footgear. Finally, there is a small piece of what appears to be plasticene modeling clay, or a substance like "playdough", that weighs 0.3 g. This unusual find comes from plowzone deposits in T221. It is not known if the item in question actually relates to the Euroamerican component at Hotrok or if it is intrusive.

Technological-Functional Classification

This section focuses on providing a technological and functional classification for the identifiable Euroamerican artifacts recovered from the site. Specific descriptions and identifications are offered for individual pieces whenever possible. The aim is to seek an understanding of the human behavioral correlates, as well as the site formation processes, responsible for the particular set of remains under study (cf. Schiffer 1987). This classificatory scheme is a simple organizational tool, thus some degree of overlap between and among specific classes is expected as South (1977:95-96) clearly points out. The technological-functional groupings of the recent Euroamerican artifacts from Hotrok are summarized in Table 24.

Building Hardware and Construction Materials. As the term implies, this group encompasses historic materials which are interpreted to represent remains linked to building and construction activities. Within this broad heading a series of six subgroups are delineated: (1) nails, (2) railroad tie spikes, (3) large nuts and bolts, (4) flat window pane glass, (5) rebar reinforcing rod, and (6) concrete (Table 24).

The remains of four round nails were recovered. Two occurred in T208, and the other two were found in level 1 of Feature 5. These specimens represent wire cut and "modern" machine cut forms. Additional fragments of larger gauge round wire were also identified in the sample. These materials are likely more rusted and corroded examples of this subgroup. All are common hardware sizes.

Thirteen railroad tie spikes were found in Feature 5; one was present in level 2, five occur in level 3, and the remaining seven were encountered in level 4. The specimen in level 2 is bent and was probably no longer functional without reworking. The other twelve tie spikes appear readily usable. All are typical forms with a square shank (0.5 inches width) that tapers to point. Average overall length is ca. 6.3 inches.

Twenty-three large nuts and bolts are present in the collection; all were recovered from Feature 5, with the exception of a single broken nut from T239. These specimens are believed to be railroad building hardware, as are the railroad tie spikes just described. Most of the nut and bolt combinations in the collection are similar to those that are used to join the ends of rail segments.

Table 24. Summary of identified Euroamerican artifacts by technological-functional group, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Technological-Functional Group	n	wt
<u>Building Hardware and Construction Materials</u>		
Nails	4	
Railroad Tie Spikes	13	
Large Nuts and Bolts	23	
Flat Pane Glass	3	
Rebar Reinforcing Rod	1	
Concrete	1871	284.6 kg
<u>Miscellaneous Hardware and Wood</u>		
Wire Scrap	36	
Wooden Stake	1	21.9 g
Other Patterned Metal	2	
<u>Arms and Munitions</u>		
Bullet	1	
Lead Shot	13	
Cartridge Base	1	
<u>Subsistence Refuse (Containers)</u>		
Tin Cans (more or less complete)	25	
Can Fragments (metal scrap)	939	
Bucket/Pail	1	
Pail Handle/Bail Assembly	1	
Plate	1	
Metal Enamel Scrap	12	
Bottle Glass	4	
<u>Clothing and Personel Possessions</u>		
Leather (shoe and fragments)	20	277.4 g
Shoe Nails/Tacks	2	
Clothing/Boot Eyelet	1	
<u>Household Goods and Miscellaneous</u>		
Flat Barrel Banding	2	
Round (Wire) Barrel Banding	1	
Wood Scrap	—	24.8 g
Lamp Glass	1	
Other Glass	19	
Coal Clinker/Lignite	421	185.1 g

Ten unattached (loose) nuts were recovered from Feature 5; another three were found attached to bolts. Another partial (broken) nut was found in the plowzone in T239. One nut is hexagonal and the others are square. Eight have interior diameters of 0.75 inches and the others have interior diameters of 0.875 inches. Several of these specimens exhibit beveled margins indicating that they were tightened with an instrument producing considerable torque. Two of these nuts are attached in manner opposite of what they would be if they were in use securing some material. This suggests that they were recycled, and possibly intended for some future use before being discarded in Feature 5.

The remains of nine round bolts with attached heads were found in levels 3 and 4 of Feature 5. Six specimens are 3.5 inches in length and 0.75 inches in diameter. One of these has an attached nut. The other three are slightly longer (5.0 inches) with larger diameters (0.875 inches). Two of these have square nuts attached. A tenth much longer piece of 0.875 inch diameter iron shank with a threaded end occurs in level 4 of Feature 5. The specimen is bent; it would need to be retooled to be functional.

A small amount of flat window pane glass (n=3 pieces) is present in the collection. Individual pieces occurred in T216, T221, and level 1 of Feature 5. Because of the small size and fragmented condition of many specimens, more positive identifications could not be accomplished.

One segment of 0.875 inch diameter iron rebar reinforcing rod was found in level 3 of Feature 5. The specimen is bent, probably from use. It would require restraightening before further use.

The largest class of building hardware and construction material was concrete. These remains were most densely concentrated in Feature 5 and consisted of large chunks and smaller pieces from some demolished concrete object. Size grade and data by catalog number for the larger specimens taken from Feature 5 are listed in Table 25. Several thousand smaller pieces were also recovered. The concrete in the collection was created by adding a variable mineral aggregate to the cement along with sufficient water to cause it to set. This mixture is not particularly well sorted, as if the added materials were not carefully selected and prepared in given proportions. Liberal amounts of naturally occurring stream gravels of varying size and scattered pieces of lignite comprise the mineral aggregate. Negative impressions from rebar rod were noted on several pieces along with other unidentified casts. A piece of round iron wire protruded from one specimen. The remains described here appear to have been prepared by an individual or group using locally available materials.

Several of the larger concrete pieces have patterned or shaped surfaces indicative of casting in a form. These are arc-shaped fragments derived from some complexly formed concrete cylinder or tube-shaped object. The presence of some odd angled faces and junctures, in addition to simple inside and outside curved surfaces, suggests a more complex structure than a simple cylinder or tube. An outside diameter of 110+ cm is estimated for the most complete end by refitting the available rim pieces; wall thickness at this end varies from about 9-12 cm. Wall thickness for the less complete end is estimated at 15+ cm. The overall length of the object is estimated at a minimum of 85 cm on the basis of the pieces that were deposited in Feature 5. However, the object may have been somewhat longer because it is clear that the concrete pieces in Feature 5 only represent a portion of the complete object.

Table 25. Size-grade data by catalog number for the larger concrete pieces in Feature 5, Hotrok (32ME412), Visitor Center Area B, 1988 excavations. Weights are stated in kilograms.

Catalog Number	Level		Size-Grade				Total
			G00	G1	G2	G3	
122	1	n	30	86	220	nd*	336
		wt	41.9	11.2	1.8	0.8	55.7
123	2	n	65	259	464	nd	788
		wt	80.7	51.0	3.7	1.6	137.0
124	3	n	47	105	300	nd	452
		wt	62.4	21.0	2.1	1.6	87.1
125	4	n	-	3	53	nd	56
		wt	-	0.3	0.3	0.8	1.4
Total		n	142	453	1037	nd	1632
		wt	185.0	83.5	7.9	4.8	281.2

*nd = no data; numbers of G3 concrete fragments were not recorded.

Because of the large volume and weight of the concrete pieces from Feature 5, only some of the larger specimens exhibiting shaped surfaces are retained in the site collection. These include nine top rim or end pieces, five bottom rim or end pieces, seven pieces showing an exterior seam, ten pieces showing an interior seam with some visible wear (likely from joining with another concrete object), and twelve pieces with odd or unique surfaces (Table 26). All other concrete pieces from Feature 5 were discarded.

Miscellaneous Hardware and Wood. This group comprises other miscellaneous hardware remains including (1) wire scrap, (2) uncarbonized wood, and (3) other sundry materials (Table 24). These materials are thought to represent various hardware items not necessarily directly employed in building construction.

A total of 36 pieces of wire scrap were recovered almost exclusively from Feature 5. Three of these are larger gauge round wire; two exhibit twisted eyelets at one end. This material is common iron wire. The remaining 33 are much smaller (G4-5) in size. Five appear square in cross-section; these may be fragments from smaller nails or other wire items. The other 28 specimens are small-gauge round wire scrap. Much of this material is possibly derived from window screening.

The distal, pointed end of a small-diameter wooden stake was encountered at Hotrok. This item is designated as Feature 4. Because no associated post hole was indicated during excavation, it is thought that the sharpened stake was driven into the ground. The item is historic in age (cut and pointed with

Table 26. Inventory of large concrete pieces from Feature 5 retained in the site collection, Hotrok (32ME412), Visitor Center Area B, 1988 excavations. Weights are stated in kilograms.

Saved Pieces		Catalog Number			Total
		122	123	124	
Top Rim (End) Pieces	n	3	4	2	9
	wt	6.1	6.5	5.9	18.5
Bottom Rim (End) Pieces	n	2	2	1	5
	wt	2.0	4.0	0.9	6.9
Exterior Seam Pieces	n	1	5	1	7
	wt	1.9	7.6	2.3	11.8
Interior Seam Pieces with Wear	n	1	4	5	10
	wt	0.7	10.4	9.0	20.1
Pieces with Odd or Unique Surfaces	n	4	7	1	12
	wt	9.3	6.6	1.0	16.9
Total	n	11	22	10	43
	wt	20.0	35.1	19.1	74.2

a metal tool) and probably related to a second specimen (Feature 23) found just to the north in the Lower Hidatsa West area. The remaining portion of the stake is ca. 15 cm in length, 5 cm in width, and weighs 21.9 g. Its distal end has been sharpened to a point. Both of these stakes may have served temporary markers during early land surveys in the area.

Two other small patterned metal items of undetermined function were found in Feature 5. A small G3 cylinder or band of rolled iron occurred in level 3, and a G5 piece of beaded iron was found in level 4.

Arms and Munitions. This group consists of metal items associated with weaponry and hunting gear. Included here are (1) bullets, (2) shot, and (3) cartridge cases (Table 24). These materials are most probably related to recent recreational hunting rather than directly linkable to subsistence pursuits by the Euroamerican occupants of the site.

One lead bullet from a .243 caliber cartridge was found in T215. The specimen exhibits rifling grooves around the circumference. This caliber weapon is popular for hunting game animals such as deer and antelope.

Thirteen pieces of lead shot were recovered from the site excavations, twelve from shallow plowzone contexts and one from level 4 of Feature 5. All of this material is probably from discharged shotgun shell loads of various

numbers (e.g., no. 5, 6, and 7-1/2) usually associated with the hunting of small game, particularly birds.

A cartridge base from a 20 gauge shotgun shell was recovered in T227. The specimen is stamped with "PETERS 20 HV". The discharge of this shell may account for some of the lead shot recovered from the site.

Subsistence Refuse (Containers). The subsistence refuse artifact group includes the remains of metal and glass containers which served to hold food and drink. Seven subgroups are identified in the Hotrok artifact sample: (1) tin cans, (2) can fragments (metal scrap), (3) metal buckets or pails, (4) bucket or pail handles, (5) plates, and (6) bottle glass (Table 24).

Among the metal debris recovered principally from Feature 5 were the remains of 25 more or less complete tin cans. Employing size data and method of manufacture and closure it was possible to separate the sample into several categories for further analysis. First, in terms of size, the 25 cans are divisible into three general groups: (1) two large No. 10 cans, (2) seven medium-sized cans of approximately the same size, and (3) 16 small-sized cans of three different specific sizes. The medium- and small-sized cans could not be accommodated among the standard can sizes listed in Cruess (1958:29). The two large No. 10 cans measure 6-3/16 inches in diameter X 7 inches tall. Two of the medium cans are 4-3/16 inches in diameter X 4-7/8 inches tall and the other five are 4-1/4 inches in diameter X 4-15/16 inches tall. Two of the small cans are 3-3/8 inches in diameter X 4-9/16 inches tall, 13 are 3 inches in diameter X 4-3/8 inches tall, and one whose height could not be determined has a diameter of 3-1/8 inches. Measurements are approximate owing to corrosion and the generally poor condition of the specimens.

All of the specimens are round cans that appear to have standard soldered lock seams on the sides (Cruess 1958:27). The method of end closure differs among the various can sizes, however. All of the large cans, five of the medium cans (4-1/4 inch diameter specimens), and one of the small cans (3-1/8 inch diameter specimen) exhibit modern rolled (crimped) double seam end closures (Cruess 1958:28). Two of the medium cans and all of the small cans, with one noted exception, have the soldered hole-and-cap type of end closure (Clark 1977:16). The small cans with the hole-and-cap closures are interpreted as milk cans, but the two medium cans with the hole-and-cap closures obviously contained something which required a large opening to remove, like canned fruit or vegetables.

The large No. 10 cans probably contained fruit or vegetables. Cruess (1958:29) notes that: "The No. 10 can is used for all varieties of fruits and vegetables for institutional use, i.e., for hospitals, restaurants, hotels, passenger ships, the military, and others." The medium sized cans could have contained fruit, vegetable, or meat products. It is virtually certain that 15 of the 16 small cans held condensed or evaporated milk because of their method of end closure and the small puncture-type openings on the can tops which are only large enough to allow some liquid to pass through. Clark (1977:71) comments that: "Gail Borden is one of the heroes of the tin-can era. His condensed milk, first marketed in 1856, almost single-handedly established canned goods as part of the American diet." It is not known what the other small can with the rolled double seam end closure might have contained.

One interesting characteristic of the can sample from Feature 5 is the method of opening for the various containers. The lids of the small milk cans exhibit thin slices or punctures (often multiple) oriented perpendicular to the can edges and directed inward. This means of opening is characteristically used for containers holding liquid contents. The medium and large cans exhibit wide openings for removing solid contents. The large No. 10 cans were opened by cutting a diagonal "X" in the can lid and folding back the edges to gain access to the contents. Three of the medium cans were opened by cutting a semi-circular incision along the can margin and folding back approximately one half of the lid. This similarity in idiosyncratic style for opening the metal containers suggests the possibility that only a single individual was involved.

Hundreds of metal can fragments were recovered from the bottom of Feature 5. These specimens are undoubtedly parts of opened and discarded food containers like the more or less complete specimens just described. Fragmentation is largely the result of corrosion and the crushing weight of the overlying concrete debris in the pit. Other, scattered can fragments and miscellaneous metal scrap were also found in the plowzone at the site.

One example of a small tin cylindrical bucket or pail was also encountered in Feature 5. The specimen was likely a container which originally held contents such as coffee, tobacco, or possibly peanuts. Clark (1977) illustrates a number of these small food tins and pails.

A piece of arc-shaped round iron wire interpreted to be pail handle or bail assembly was recovered from level 4 of Feature 5 as well. It was probably an attachment for the pail.

Two larger segments of a circular, shallow-bottomed, lipped object were found in Feature 5. The estimated diameter is ca. 9-10 inches and it is ca. 1.0 inch deep. This item, which is tentatively identified as a pie plate, is visible in Figure 15b, as are some of other metal artifacts discussed in this section. Objects of similar dimension and form are illustrated in various mail order catalogues from the turn of the twentieth century (cf. Dover 1969:433). It too could be the remains of another piece of formed metal of an undetermined function.

The remains of other food and beverage containers are represented by fragments of curved bottle glass. Glassware identified as coming from bottles was found in plowzone deposits from several of the shallow tests. These materials include a single amber colored fragment in T206, a piece of purplish glass in T221, and individual pieces of clear and purplish pressed glass in T239. Their small size and fragmented condition precluded further analysis. Pieces from several different glass containers occur in the sample, as evidenced by the diversity in color and size of the pieces, as well as their widespread spatial distribution. No reconstructable and more specifically identifiable glassware was recovered from Feature 5 which could aid in dating this cultural deposit.

Clothing and Personal Possessions. This group consists of articles of clothing or apparel and other sundry personal possessions. Three subgroups are delineated: (1) leather, (2) shoe nails/tacks, and (3) clothing eyelets (Table 24).

Nearly all of the leather recovered from the site is attributable to the remains of a button-up shoe recovered from Feature 5. The heel is compound, built up by nine layers of leather held together by small, square cobbler's nails lacking heads. Several pieces of the button-up upper were also found. The piece of footwear is similar in design to several styles of women's shoes illustrated in the 1895 Montgomery Ward & Company Spring and Summer Catalogue and Buyers' Guide (Dover 1969:508-510). This design appears to have been popular during the late nineteenth and early twentieth centuries in the United States. By the late 1920s this shoe style may be viewed as obsolete, as evidenced by the change in style and design for women's shoes (cf. 1927 Sears, Roebuck Catalogue, Mirken 1970:300-317). Laced uppers came to replace the button closure at this time.

The remains of two small (G4) shoe nails/tacks were found in level 4 of Feature 5. These undoubtedly are associated with the other recovered shoe parts.

One metal eyelet from a laced shoe or boot was also found in level 4 of Feature 5. The specimen does not appear to be part of the above mentioned piece of footwear.

Household Goods and Miscellaneous. Household goods is a diverse group comprising items used for storage and other domestic activities. Included here are: (1) flat and round (wire) barrel banding, (2) barrel wood scrap, and (3) lamp glass. Miscellaneous materials such as coal clinker and lignite, which could represent various domestic or nondomestic activities, are also included in this group.

The metal and wooden debris from a small barrel or similar storage container were encountered in Feature 5. Two segments of iron barrel banding were found in levels 3 and 4 of this feature. A third circular piece of round iron banding wire was recovered in level 3 as well. Associated with these material in the feature matrix were several pieces of uncarbonized wood interpreted to represent wood scrap from this barrel or container. This identification is based upon morphological characteristics of one larger specimen, and its recovery context in association with the metal remains.

A single piece of thin walled glass from T230 is tentatively identified as lamp glass from the chimney of a kerosene lamp. Other pieces may also be represented in the sample, however, their small size and fragmentary condition preclude more positive identification.

The remains of fuel from heat and light generation activities undertaken by Euroamerican settlers in the area are represented by coal clinker residue from a number of shallow tests. A total of 173.6 g of this material consisting of larger G2-3 pieces occur in the collection. Fragments of lignite recovered from various levels of Feature 5 make up the remaining 11.5 g of the coal clinker/lignite subgroup. The lignite in Feature 5 is thought to derive from the mineral aggregate used in the concrete that was recovered from the upper levels of the feature; it is not, therefore, directly linked to Euroamerican occupation per se.

Archeological and Behavioral Structure of Feature 5

A comparative analysis of the artifacts recovered from the various levels of pit matrix in Feature 5 provides clues concerning its function and use as well as its depositional history. Feature 5 obviously served as a trash pit for the Euroamerican occupants of the site. Inspection of the artifact inventory data, in terms of raw material and technological-functional composition, suggests that at least two general episodes of refuse disposal account for its formation and structure: (1) an initial deposit of subsistence-related refuse, building hardware, and various household goods overlain by (2) a final deposit of concrete debris. It seems logical to suppose that the subsistence debris preceded the building hardware and household goods in the depositional sequence, but the archeological evidence is unclear on this point.

The subsistence debris found at the bottom of Feature 5 is obviously related to food preparation and consumption activities. This debris is not especially numerous or voluminous. Overall, it would seem to represent only a few meals for several individuals or several meals for only one individual. The most frequently consumed item was canned milk. On this basis, one can infer a low intensity, short-term occupation involving one or only a few individuals for the Euroamerican component. As alluded to previously, the similarity in can opening procedures described above lends some support to the idea of idiosyncratic human behavioral patterning by a solitary individual. A person could further speculate that the gender of this lone individual was female on the basis of the identification of the single shoe in the sample as a woman's.

Building hardware and miscellaneous household items were deposited in the bottom of the pit along with the subsistence debris. Much of the building hardware can be specifically related to railroad construction (i.e., the railroad spikes and the large nuts and bolts). Such an interpretation indicates at least an indirect link to early railroad construction activities in the area, most likely the rail line located less than one mile to the southwest of the site on the west side of the town of Stanton. Following the deposition of the subsistence debris, building hardware, and household goods, a large quantity of fragmented concrete was dumped into the pit, covering the lower deposit and nearly filling the pit to the top. The concrete pieces represent the remains of some razed cylindrical object that was probably built, used, and demolished not far from the site if not actually on the site. The presence of quantities of concrete fragments in shallow test plot samples (T209, T210, and T215) some 30-40 m to the south of Feature 5 may point to the location of demolition. It would seem that the dumping of the concrete debris into the pit was intended to fill the pit, rather than being an activity whose main purpose was to dispose of the concrete itself.

Temporal Parameters

A number of the artifacts recovered from Feature 5 provide some means of dating the deposit, although they can offer only a general time frame marked by the introduction and termination dates for the particular items in question. Based on the artifacts alone, especially the tin can attributes, an early twentieth century date is proposed. The hole-and-cap tin can was introduced at

about 1895 and persisted into the 1920s (Fontana et al. 1962:66-67). Machines capable of producing crimped can lids (modern rolled double seam end closures) were not available until the early twentieth century (Clark 1977), so there is considerable evidence of overlap between the two closure techniques in the can sample from the site. The shoe remains are also consistent with an early twentieth century date. Round machine cut nails and wire cut nails were introduced in the mid-nineteenth century and continue into the present. The lack of patterned glass items and other more temporally sensitive artifacts (e.g., ceramics) in the historic artifact aggregate prohibits more precise dating. Logically, the sample post-dates (or perhaps dates to) initial railroad construction in the Stanton area which occurred in 1912 (Heinemeyer 1932:49; Huber 1982:19)

Natural Rock and Unsorted Residue

Table 27 provides summary weight data for G1-3 natural rock and the G4-5 unsorted residue fractions, tallied by analytic unit. The largest amounts of both classes by volume occurred in the lowermost levels of the deep test unit. This recovery context correlates stratigraphically with deposits consisting of fluvial and glaciofluvial sand and gravel. Natural rock of all size fractions occurred somewhat less frequently in the silty plowzone sediments.

Table 27. Weight data on natural rock and unsorted residue by analytic unit, Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		G1-3 Natural Rock Weight (g)	G4-5 Unsorted Residue Weight (g)
11	wt	39	461
	%	0.3	1.9
12	wt	60	3615
	%	0.4	14.7
13	wt	10756	14267
	%	72.2	57.8
14	wt	5	-
	%	<0.1	-
15	wt	4028	6331
	%	27.0	25.7
Total		14888	24674
		99.9	100.1

VI. LOWER HIDATSA WEST ARTIFACT CLASS DESCRIPTIONS AND DISTRIBUTIONS

Cultural features, portable artifacts, and other materials recovered from the 1987 and 1988 excavations in Visitor Center Area B within the Lower Hidatsa West site are described in detail in this section. Quantitative and qualitative data are provided for each artifact class according to analytic unit, and interpretations of these remains are offered where possible and appropriate. Emphasis is placed on the detailed analysis of native ceramics, stone tools, chipped stone flaking debris, identifiable and modified faunal remains, and historic (recent) period artifacts. Other classes of material, which have less analytic value, are treated in a more cursory manner. Artifact densities, spatial analyses, and additional interpretations based on these considerations are covered in a subsequent section.

Features

Six features were identified during the two seasons of work in Visitor Center Area B in the Lower Hidatsa West area (Figure 8). Excavations in 1987 uncovered only one feature (F19). During the course of mechanical stripping operations in 1988, five additional features (F20-F24) were recorded. Three feature types are recognized: (1) basin-shaped pits, (2) burned earth areas, and (3) a cut wooden stake (Table 28).

Feature 19 was the lower remnant of a shallow basin-shaped pit encountered at the base of the plowzone during the course of strip trench operations in ST580 (Figure 19). The surface of F19 was identified just below the plowzone at about 17 cm sd (Figure 20a). The remaining portion of the basin was approximately 14 cm thick, extending to a maximum of 31 cm sd. The basin contained fragmented bone and fire-cracked rock in a charcoal flecked and stained matrix consisting of a gravelly, humic fill. Of particular interest is the presence of turtle shell fragments in the pit fill. The darker colored feature matrix contrasted with lighter surrounding sediments. The function of this pit is thought to be related to food preparation activities. One possibility is a roasting basin.

Four burned earth areas (Features 20-22 and 24) were recorded during the mechanical stripping of plowzone overburden in 1988. These small, diffuse, irregularly shaped concentrations of reddish-stained earth are only a few centimeters in thickness and contained virtually no associated cultural debris (e.g., Figure 20b). They are thought to represent the lower remnants of small surface fires or hearths. Past cultivation activities have destroyed the upper portions of these features leaving the truncated basal portions (burned earth rinds) more or less intact at the plowzone/subsoil contact. Figures 21-23 provide plan and profile drawings for F20, F21, and F22, respectively; no such documentation was produced for F24 because of its exceedingly diffuse nature.

Table 28. Summary data on excavated features in the Lower Hidatsa West site (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Feature Number	Description	Recorded Dimensions (cm)	Excavated Volume (m ³)	Estimated Percentage Excavated
19	Basin-Shaped Pit (Shallow Remnant)	Av. Diam. 75 Av. Depth 12	0.054	100
20	Burned Earth Area	Av. 32 X 20 Av. Depth 2	0.001	100
21	Burned Earth Area	Av. 38 X 26 Av. Depth 2	0.002	100
22	Burned Earth Area	Av. 44 X 34 Av. Depth 3	0.004	100
23	Cut Wooden Stake	Av. Length 9 Av. Width 3	Wood Removal Only	100
24	Burned Earth Area	Av. Diam. 32 Av. Depth 1	0.001	100
Total			0.062	

The distal portion of a cut, pointed wooden stake (Feature 23) was also found in the Lower Hidatsa West area. A similar stake was encountered in the Hotrok area as well (Feature 4), and the two features are believed to be temporally and functionally related. Both are historic in age, as evidenced by preparation with metal tools, and affiliated in some way with the Euroamerican component(s) at the two sites. These stakes may have served as temporary markers during early land surveys in the area.

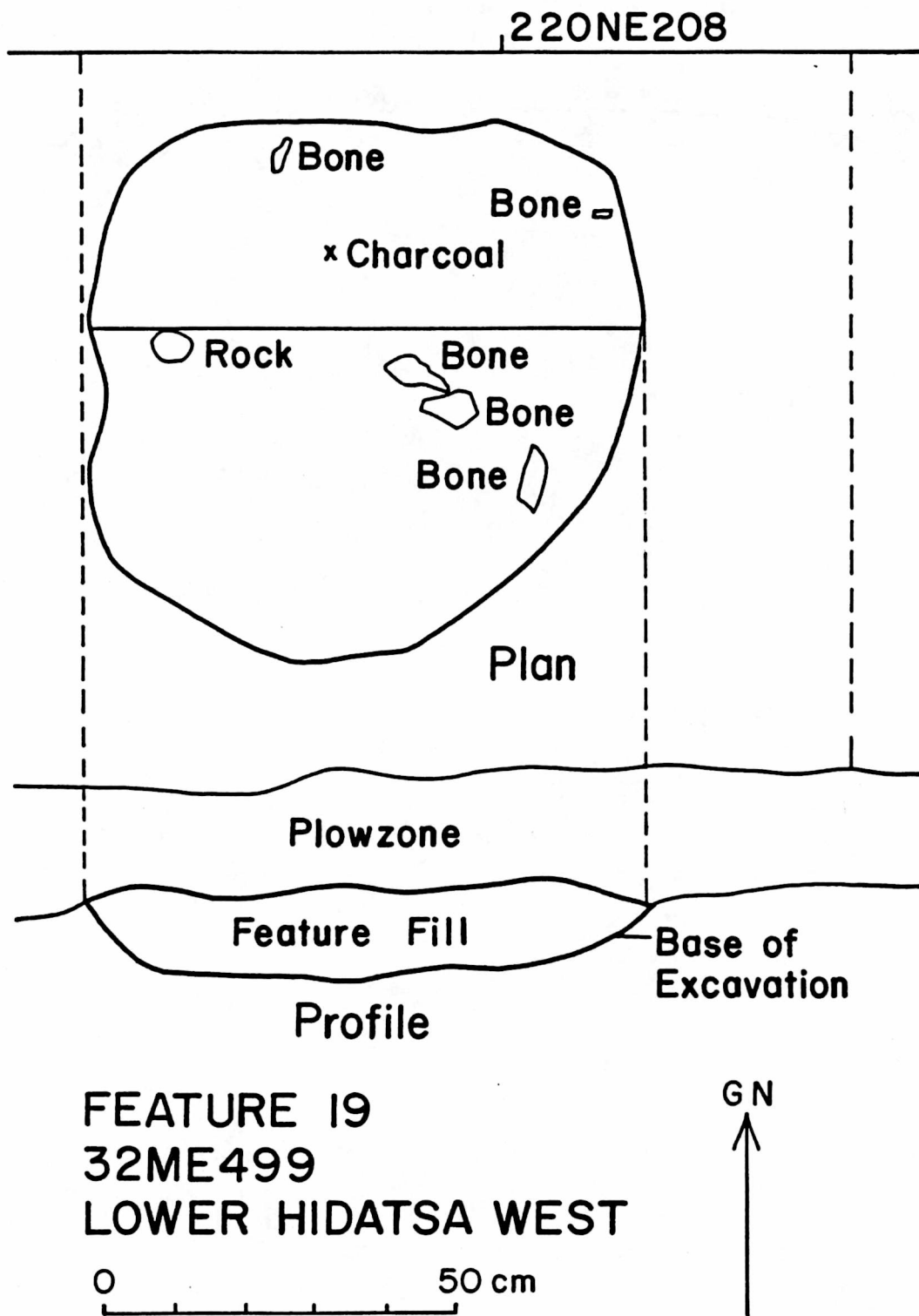
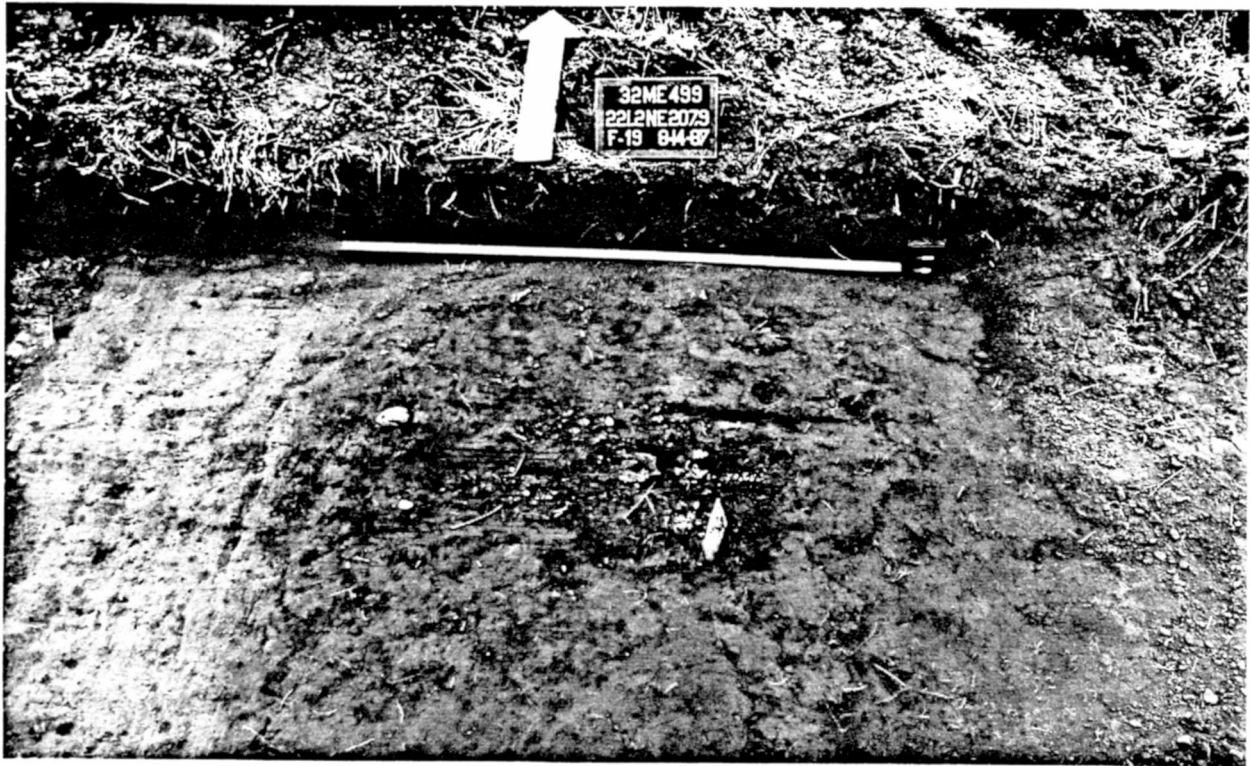


Figure 19. Plan and profile drawings of Feature 19, Lower Hidatsa West (32ME499) area.



a



b

Figure 20. Feature photos in the Lower Hidatsa West (32ME499) area.
 a: Feature 19 exposed in ST580 before excavation (north view).
 b: Basal remnant of Feature 22 (dark-colored stain, center) exposed beneath the plowzone before excavation (north view).

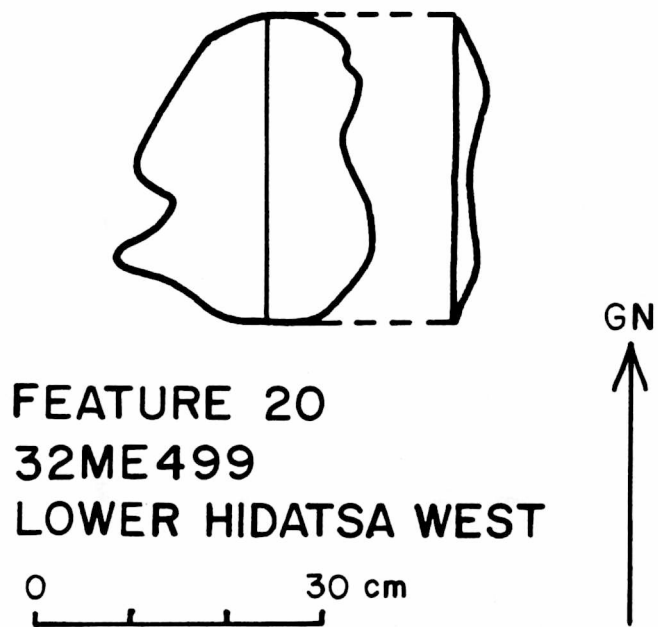


Figure 21. Plan and profile drawings of Feature 20, Lower Hidatsa West (32ME499) area.

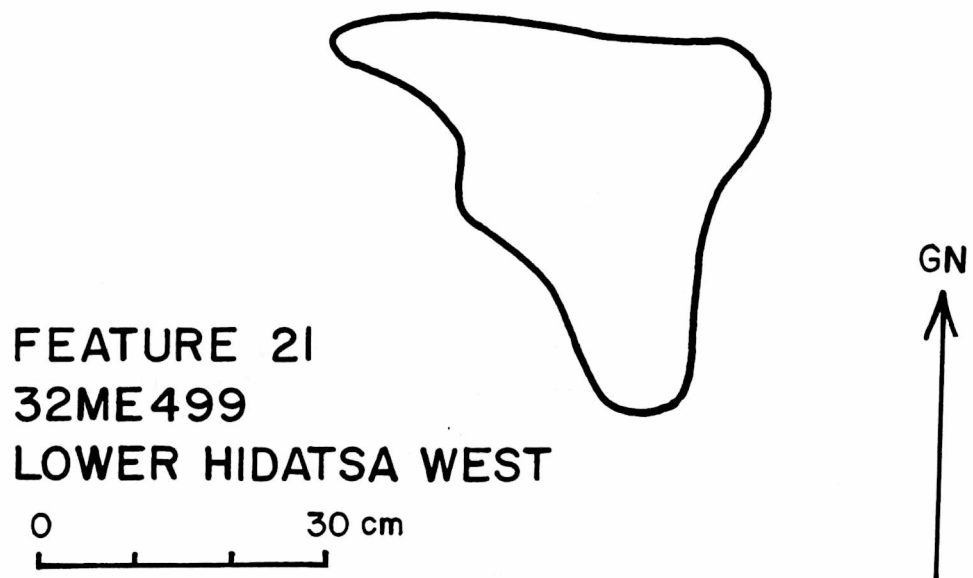


Figure 22. Plan drawing of Feature 21, Lower Hidatsa West (32ME499) area.

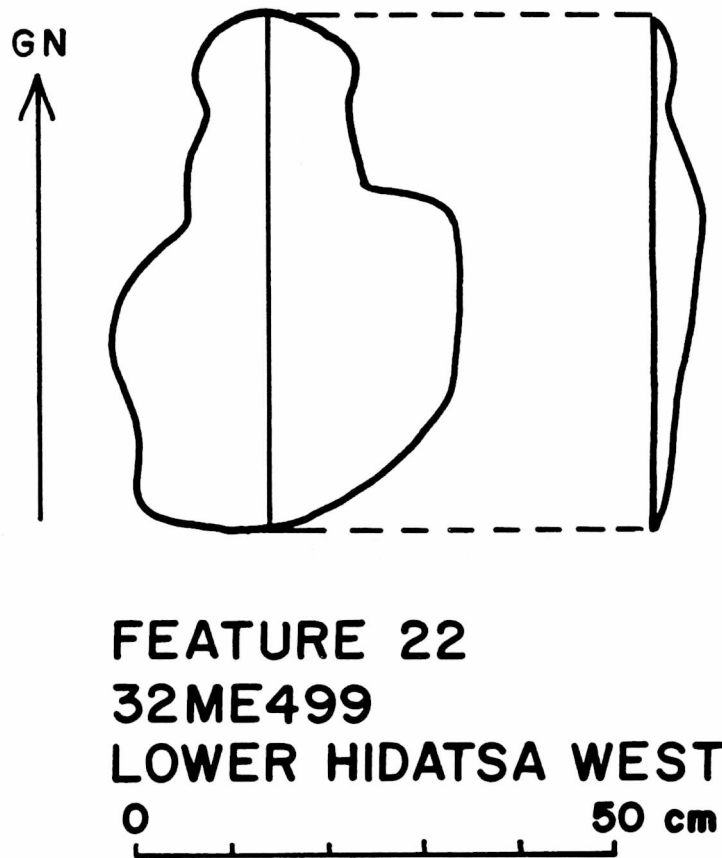


Figure 23. Plan and profile drawings of Feature 22, Lower Hidatsa West (32ME499) area.

Native Ceramics

The native ceramic aggregate from Lower Hidatsa West consists of 128 sherds weighing ca. 75 g. This total comprises nine rim sherds and 119 body sherds. Table 29 provides an inventory of count and weight information by size grade and analytic unit. As indicated by the tabular data, the sample is biased toward smaller G3 specimens. Much of this fragmentation is undoubtedly due to past cultivation activities at the site (cf. Toom et al. 1985:81). The vast majority of specimens were recovered from shallow test plot samples (AU13) within the limits of the plowzone. Only a single G3 body sherd was recovered from a Plains Village feature (AU11; F19), the remainder being from nonfeature contexts. All of the pottery is attributed to Plains Village components, particularly the primary Heart River phase occupation.

Table 29. Summary of native ceramic size grade data by analytic unit, Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		Counts				Weights (g)				
		G1	G2	G3	Total	G1	G2	G3	Total	
11	n	-	-	1	1	wt	-	-	1	1
	%	-	-	100.0	100.0	%	-	-	100.0	100.0
12	n	-	-	-	-	wt	-	-	-	-
	%	-	-	-	-	%	-	-	-	-
13	n	-	2	123	125	wt	-	9	63	72
	%	-	1.6	98.4	100.0	%	-	12.5	87.5	100.0
14	n	-	-	-	-	wt	-	-	-	-
	%	-	-	-	-	%	-	-	-	-
15	n	-	-	2	2	wt	-	-	2	2
	%	-	-	100.0	100.0	%	-	-	100.0	100.0
Total	n	-	2	126	128	wt	-	9	66	75
	%	-	1.6	98.4	100.0	%	-	12.0	88.0	100.0

Body Sherds

The body sherd collection is represented by 119 G3 specimens. The small size and fragmented condition of the sample limits detailed analysis. Surface treatment information was not systematically recorded for these smaller sherds. Preliminary inspection suggests the likely occurrence of both plain/smoothed and simple-stamped pottery. One sherd bears what appears to be trailed/incised decoration and a second exhibits tool impressed and trailed decoration from the shoulder area of a vessel. These characteristics are akin to those reported for greater numbers of larger sized sherds from prior investigations undertaken at Lower Hidatsa West (Toom et al. 1985:81) and Hotrok (Ahler and Mehrer 1984:58-59). Trailed and tool impressed decorative treatments occur on Knife River Fine pottery vessels. This ceramic ware has been suggested to represent a special-function pottery used for restricted purposes (cf. Ahler and Mehrer 1984:71).

Body sherd thickness data were not collected for G3 specimens. It is therefore not possible to explore comparisons with other larger pieces of pottery from previous investigations at Lower Hidatsa West and nearby Lower Hidatsa Village.

The greatest frequencies of pottery were recovered from adjacent sample units T270 and T271 along the northern tier of the investigated area. These two units alone produced over one half of the total ceramic sample. Sherd densities, as well as other cultural remains, are likely to increase as one approaches the confines of Lower Hidatsa Village.

Rim Sherds and Vessels

Nine individual rim sherds representing a similar number of vessels are identified in the artifact aggregate. This figure includes two G2 rims and seven G3 rims. Like the body sherds, the rim sherd sample is highly fragmented. All portions of vessel rims are represented -- Zone 7 lip sherds, Zone 2 fragments, and Zone 3 fragments (cf. Swenson and Ahler 1984). Table 30 summarizes this descriptive information for the sample. The specimens are too small for effective illustration.

Table 30 also provides an inventory of ceramic wares and types in the collection. Ahler and Swenson (1985:Table B-1) present descriptions for the identified ceramic groups. The single Le Beau S-Rim vessel identified in the collection points to a Heart River phase occupation of the site area. The other remaining eight rims could not be assigned to a named ware group. As indicated in Table 30, indeterminate specimens include four plain/smooth surfaced sherds from the neck area of the vessel based on morphology and curvature. These sherds are otherwise undecorated. The remains of two lip sherds bearing cord impressed decoration are present along with a third cord impressed sherd from an undetermined zone on the vessel rim. Finally, one vertically brushed neck sherd completes the sample aggregate.

Table 30. Inventory of native ceramic wares and types, Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Ware	Total Collection		Classifiable Percentage	Types/Decorative Techniques	Individual Ware/Type	
	n	%			n	%
Le Beau S-Rim	1	11.1	100.0	Cord Impressed	1	100.0
Indeterminate (Fractured)	8	88.9	0.0	Indeterminate		
				Cord Impressed	1	12.5
				Zone 2 (neck)		
				Plain/Smoothed	4	50.0
				Vertical Brushed	1	12.5
				Zone 7 (lip)		
				Cord Impressed	2	25.0
				Total	8	100.0
Total	9	100.0	100.0		9	100.0

The small sample of pottery from Lower Hidatsa West shares similarities in rim form and decoration with previous collections from the site as well as with ceramic remains from the nearby Hotrok site and Lower Hidatsa Village. The Le Beau ware and the cord impressed pottery are likely associated with a primary Heart River phase occupation of the area. Varieties of Le Beau and Knife River ware are among the best represented ceramics from Lower Hidatsa Village (Ahler and Weston 1981:Table 18).

The possible occurrence of Knife River Fine pottery from contexts away from Lower Hidatsa Village proper suggests that village periphery areas may have served as locations where activities involving the use of special-function pottery may have taken place, or at least the places where the remains of such vessels were discarded. Ahler and Mehrer (1984:70-72) have posited that ceremonial sweats may have included use of this pottery in certain instances.

Stone Tools

The Lower Hidatsa West stone tool sample consists of three chipped stone Knife River flint (KRF) artifacts recovered from the plowzone in two shallow test plots (AU13). The three tools are single function implements, yielding a total of three functional tool occurrences in the sample. The small size of the stone tool aggregate limits in-depth analysis. Given such constraints, each specimen is discussed individually.

A fragment from an expedient KRF flake tool was found in T249. Technologically, the specimen is an unpatterned flake tool (class 5). It exhibits use-wear damage only along a short segment of one lateral margin, which is terminated by fracture. This indicates the piece served as a utilized flake which broke during the course of use and was discarded. The tool is therefore classified according to function and use-phase as a use-phase 4, utilized flake used to saw or slice hard material (class 22).

Two other fragments of KRF flake tools were found in T271. Technologically, these specimens are also unpatterned flake tools (class 5). Both specimens were burned and damaged by heat-induced fracture subsequent to manufacture and use, therefore, both are assigned to use-phase 4. Short segments of intentional retouch are present along the remaining edges of the two tools. On this basis, they are functionally classified as retouched or utilized flakes used on variable material (class 23).

The technological composition of this small chipped stone tool sample shares characteristics with other collections from previous investigations at Lower Hidatsa West. Toom et al. (1985:87) note a high frequency of unpatterned flake tools in the tool sample from the 1979 excavations. The unpatterned flake tool class comprised 56.5% of that collection. Unpatterned flake tools are also the best represented class in a larger sample from Lower Hidatsa Village where these remains account for some 49% of the total (Ahler and Weston 1981:110). The investigated site area at Lower Hidatsa West probably functioned as a village periphery activity area where a variety of subsistence-related tasks were performed which involved the use of unpatterned, multipurpose flake tools.

KRF is the only lithic material used for chipped stone tool manufacture in this meager sample. This material also clearly dominates other larger collections from Lower Hidatsa Village (85.8%) and Lower Hidatsa West (86.4%) (cf. Ahler and Weston 1981:Table 34; Toom et al. 1985:Table 21).

Flaking Debris

The chipped stone flaking debris sample consists of 285 pieces of G2-4 debitage weighing ca. 24.9 g. A summary of size grade and weight data according to analytic unit is presented in Table 31. Flaking debris was primarily found in the shallow tests; some was also recovered from feature contexts. As indicated by the data in Table 31, most of the debitage is quite small. Only three unmodified flakes were of sufficient dimension not to pass through G2 screen with 12.5 mm (0.5 in.) openings.

Raw material and cortex information for two size classes of flaking debris (larger G1-3 versus smaller G4) are tallied by analytic unit in Table 32. Computed count ratios for batches of G4 to larger G1-3 debris are also given where applicable. These data when taken together offer clues concerning patterns of lithic utilization and facets of the stone tool technology taking place on-site in the sampled area.

The majority of the flaking debris recovered from the Lower Hidatsa West investigations is unburned KRF (Table 32). It makes up nearly 80% of the collection in AU11, AU13, and AU15. KRF is the only material represented in the meager stone tool sample. A total of nine other lithic types also occur in the flaking debris sample in much lower frequencies, often only as very small pieces. Clear/gray chalcedony is the second most frequent raw material in AU11 and AU13; this material is followed by a number of locally available lithic types. This greater raw material diversity in the flaking debris aggregate, particularly in G4, suggests that a number of tools were finished (late stage manufacture) and/or maintained on-site and were subsequently removed and discarded elsewhere. Toom et al. (1985:115) initially recognized this phenomenon during earlier investigations at Lower Hidatsa West.

The flaking debris size grade data indicate that flintknapping activities at the site consisted almost exclusively of pressure flaking and fine percussion work aimed at the final manufacture and maintenance of a variety of smaller chipped stone tools. There is virtually no evidence that heavy percussion flaking activities such as hard-hammer core reduction and large biface thinning occurred at the site. This conclusion is based upon the ratios of G4:G1-3 unburned KRF debris in the sample (Table 32). The computed ratio values are higher than the ranges of 1.63:1 to ca. 4.03:1 represented in flaking debris samples generated by replicative experiments involving core reduction and large biface thinning operations. In AU11, the G4:G1-3 unburned KRF ratio is 9.33, while in AU13 it is 13.67. These figures align more closely with the mean ratio of ca. 13.3:1 resulting from pressure flaking and light percussion undertaken during final manufacture or maintenance/resharpening operations (Ahler 1986).

Evidence of burning was recorded for some of the debris found at the site. In AU13 burned KRF comprises 12.0% of the sample. This figure suggests that some flintknapping activities occurred near hearths or that heat treatment of

Table 31. Unmodified chipped stone flaking debris size grade and weight data by analytic unit, Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations. Weights are stated in grams.

Analytic Unit		Size Grade				Total
		Grade 1	Grade 2	Grade 3	Grade 4	
11	n	-	2	3	32	37
	%	-	5.4	8.1	86.5	100.0
	wt	-	5.1	2.0	0.8	7.9
	%	-	64.6	25.3	10.1	100.0
12	n	-	-	-	-	-
	%	-	-	-	-	-
	wt	-	-	-	-	-
	%	-	-	-	-	-
13	n	-	1	18	206	225
	%	-	0.4	8.0	91.6	100.0
	wt	-	1.5	4.8	8.0	14.3
	%	-	10.5	33.6	55.9	100.0
14	n	-	-	-	-	-
	%	-	-	-	-	-
	wt	-	-	-	-	-
	%	-	-	-	-	-
15	n	-	-	8	15	23
	%	-	-	34.8	65.2	100.0
	wt	-	-	2.3	0.4	2.7
	%	-	-	85.2	14.8	100.0
Total	n	-	3	29	253	285
	%	-	1.1	10.2	88.8	100.1
	wt	-	6.6	9.1	9.2	24.9
	%	-	26.5	36.5	36.9	99.9

Table 32. Unmodified chipped stone flaking debris raw material type data by size grade and analytic unit, Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Raw Material Type		G1-3			G4			G4/G1-3 Ratio	% by n
		weight (g)	n	cort. %	weight (g)	n	cort. %		
<u>Analytic Unit 11</u>									
28	Unburned KRF	5.7	3	33.3	0.6	28	0.0	9.33	83.8
39	Burned KRF	0.1	1	0.0	<0.1	1	0.0	1.00	5.4
08	Clear/Gray Chalcedony	1.3	1	100.0	<0.1	1	0.0	1.00	5.4
17	Porcellanite				<0.1	1	0.0		2.7
35	Other Quartzite				0.1	1	0.0		2.7
<u>Analytic Unit 12</u>									
None									
<u>Analytic Unit 13</u>									
28	Unburned KRF	4.6	12	25.0	6.6	164	2.9	13.67	78.2
39	Burned KRF	1.7	7	28.6	0.5	20	5.0	2.86	12.0
08	Clear/Gray Chalcedony				0.5	13	5.0		5.8
01	Smooth Gray TRSS				0.2	5	0.0		2.2
17	Porcellanite				<0.1	1	0.0		0.4
09	Yellow/L. Brown Chalcedony				<0.1	1	0.0		0.4
07	Flattop Chalcedony				<0.1	1	0.0		0.4
13	Basaltic Materials				0.1	1	0.0		0.4
<u>Analytic Unit 14</u>									
None									
<u>Analytic Unit 15</u>									
28	Unburned KRF	1.2	4	50.0	0.4	14	7.1	3.50	78.3
39	Burned KRF	0.4	2	100.0					8.7
06	Jasper/Chert	0.1	1	100.0	0.1	1	0.0	1.00	8.7
08	Clear/Gray Chalcedony	0.6	1	100.0					4.3

KRF occurred on-site. Some quantities of burned KRF debris (4.6-8.3%) were reported from Heart River phase contexts during previous work at Lower Hidatsa West (Toom et al. 1985:Table 27).

The total absence of patinated flaking debris in the sample supports the idea that near surface cultural deposits at the site are primarily Plains Village in age. No strong evidence for earlier previllage remains occurring in shallow plowzone contexts is indicated. Nonetheless, the presence of scattered previllage materials is suspected in other parts of the site (cf. Toom et al. 1985:72).

In summary, the composition of the flaking debris aggregate is similar in several respects to that encountered in previous investigations at the site. Raw material diversity in the flake sample is higher than that recorded for the tools. The removal of certain tools for subsequent use at other locations such as Lower Hidatsa Village may account for this pattern in the data. The occurrence of small numbers of nonlocal or exotic raw materials provides evidence for continued participation in long-distance, regional trade relations during the late prehistoric/protohistoric period. The presence of Flattop chalcedony and exotic jasper/chert materials in the sample supports this contention. KRF was clearly the stone of preference for chipped stone tools, however, followed by varieties of clear/gray chalcedony.

Fire-Cracked Rock

Excavations at Lower Hidatsa West yielded quantities of fire-cracked rock (FCR). A total of 216 G1-3 pieces weighing ca. 2416 g was recovered. The greatest concentration of this material was encountered in AU11; Feature 19 produced all of the AU11 FCR. Table 33 gives size grade and weight data for the sample by analytic unit.

FCR also occurs as a thin, low density scatter in the plowzone across the site area, as evidence by the shallow test plot samples. As was mentioned above, the largest concentration of FCR was reported from a feature context (F19) situated at the base of the plowzone. The greatest numbers of specimens are represented in G3, although these makeup the smallest fraction of the total weight. Cultivation activities may account for some of this fragmentation.

Prior investigations at Lower Hidatsa West revealed that the largest quantities of FCR occurred in contained features. Toom et al. (1985:115-118) report that the majority of this material was found in undercut storage pits in other areas of the site. Present interpretation suggests a pattern of artifact discard whereby these pit features, usually associated with storage, finally served as receptacles for FCR and other refuse following their initial excavation and use. The lack of undercut storage pits in Area B may correlate with lower overall FCR frequency in this part of the site.

Turning to the question of FCR function, we can suggest that the recovered specimens represent debris generated as a by-product of processes which involve the use of heated stones. Various food preparation tasks, as well as other steam generation actions, such as those associated with sweatlodge activities, likely account for much of the FCR found at Lower Hidatsa West. The material in Feature 19 may be the by-product of food preparation. In other instances it

Table 33. Unmodified fire-cracked rock size grade and weight data by analytic unit, Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations. Weights are stated in grams.

Analytic Unit		Counts				Weights (g)				
		G1	G2	G3	Total	G1	G2	G3	Total	
11	n	6	19	88	113	wt	1239	132	64	1435
	%	5.3	16.8	77.9	100.0	%	86.3	9.2	4.5	100.0
12	n	—	—	—	—	wt	—	—	—	—
	%	—	—	—	—	%	—	—	—	—
13	n	4	8	84	96	wt	596	92	60	748
	%	4.2	8.3	87.5	100.0	%	79.7	12.3	8.0	100.0
14	n	—	—	—	—	wt	—	—	—	—
	%	—	—	—	—	%	—	—	—	—
15	n	1	—	9	10	wt	227	—	6	233
	%	10.0	—	90.0	100.0	%	97.4	—	2.0	100.0
Total	n	11	27	181	219	wt	2062	224	130	2416
	%	5.0	12.3	82.6	99.9	%	85.3	9.3	5.4	100.0

is not known if these tasks took place on-site or at other nearby locations such as Lower Hidatsa Village, with the resulting FCR debris dumped in the Lower Hidatsa West area.

Vertebrate Fauna

Faunal remains collected from the Lower Hidatsa West excavations consist entirely of unmodified bone debris. Unmodified bone includes both unidentifiable and identifiable vertebrate faunal remains which exhibit no clear evidence of modification and use as bone tools.

Unmodified Bone

Remains totaling ca. 253 g of unmodified bone debris were recovered from the excavations. A summary of bone size grade and weight information is presented in Table 34. Bone was diffusely scattered throughout the plowzone deposits in the shallow test plots. These materials are generally small-sized pieces in a highly fragmented condition resulting in large part from the effects of past cultivation activities. The largest sample of vertebrate fauna was recovered from Feature 19 (AU11). Several small (G4) identifiable elements

Table 34. Unmodified bone size grade and weight data by analytic unit, Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		All Bone (g)				Burned Bone (g)			
		G1	G2	G3	Total	G1	G2	G3	Total
11	wt	105	36	38	179	-	-	6	6
	*%	58.7	20.1	21.2	100.0	-	-	15.8	3.4
12	wt	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
13	wt	-	-	13	13	-	-	1	1
	%	-	-	100.0	100.0	-	-	7.7	7.7
14	wt	53	-	-	53	-	-	-	-
	%	100.0	-	-	100.0	-	-	-	-
15	wt	-	6	2	8	-	-	-	-
	%	-	75.0	25.0	100.0	-	-	-	-
Total	wt	158	42	53	253	-	-	7	7
	%	62.5	16.6	20.9	100.0	-	-	13.2	2.8

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

were sorted from matrix samples in the deep test unit; these are not considered further in the absence of any indications of archeological association. No larger (G1-3) bone remains or definite artifacts were associated with these isolated finds from deeper subsurface contexts.

Few bone remains exhibited evidence of burning or charring (7 g, 2.8 %), as indicated in Table 34. Burned bone includes two calcined fragments in T262; the remainder occurred in Feature 19. This shallow pit also produced quantities of FCR in a charcoal-flecked matrix.

The state of bone preservation in the shallow plowzone deposits at Lower Hidatsa West ranged from fair to good. Some pieces displayed erosion and leaching on surfaces. Toom et al. (1985:118) reported similar characteristics in a larger sample of vertebrate fauna from prior excavations. Past cultivation activities at the site have also contributed to the fragmentation process.

Identifiable Bone

A few identifiable specimens occur in the sample, all of which derive from Feature 19. Only two species are represented — bison (B. bison) and painted turtle (Chrysems picta). The bison specimens include one vertebral spine fragment, one proximal fragment of a left radius, one proximal fragment of a right radius, and one proximal fragment of a right tibia. All of the identified bison elements are thought to be from the same animal. The turtle remains consist of a number of carapace and plastron shell fragments, also believed to be from a single individual. Seven G2-3 carapace pieces and 17 G2-3 plastron pieces were recognized.

While bison bones abound in Plains Village assemblages from the KNRI and elsewhere, turtle remains are comparatively rare. Snyder (1988:202, 204) reports that heretofore the greatest number of turtle specimens occurred in the Big Hidatsa Village collection (n=12), although they comprise less than 1.0% of the total identified vertebrate fauna sample. The species identified in the Big Hidatsa collection include painted turtle (Chrysems picta).

The balance of the bone aggregate from Lower Hidatsa West consists of various unidentifiable fragments. Most of these probably come from large mammals such as bison; domestic cattle is another possibility for some this debris.

In summary, the meager faunal sample from the Lower Hidatsa West area bears certain similarities to other faunal collections from KNRI sites. The presence of copious amounts of bison bone is an important common denominator. One notable exception is the relatively large number of turtle shell fragments from Feature 19, which constitutes the largest sample of turtle remains recovered to date from a KNRI archeological site.

Other Native Artifact and Material Classes

A number of other native artifact and material classes were recovered from the excavations in the Lower Hidatsa West area. These include unmodified natural clinker, shell, charcoal, fired clay and burned earth, and a few historic native artifacts obtained through fur trade activities. Unconsolidated materials such as ash and possibly pigment were noted during excavations, but none of these remains survive in the collection.

Unmodified Natural Clinker

One G2 piece of unmodified natural clinker weighing 1.6 g was recovered from T267. The specimen likely represents debris generated during the manufacture or use of clinker abrading tools. This form of grinding/abrading implement is a common occurrence in the nearby Lower Hidatsa Village collection (cf. Ahler and Weston 1981:118). Some additional support for the village periphery activity area hypothesis is thus suggested.

A larger sample of coal clinker associated with the later Euroamerican component was also recovered. These remains are discussed below under Euroamerican Artifacts.

Shell

Freshwater mussel shells and other univalval gastropods are not well represented in the collection. Two G3 fragments of unmodified mussel shell weighing 0.5 g were recovered from T271 (AU13). Earlier investigations at Lower Hidatsa West recorded small amounts of freshwater mussel shell (cf. Toom et al. 1985:123). These materials are likely cultural, although their function in this context is unclear. The hard outer shell served a variety of uses for Plains Villagers including stock material for ornaments such as beads and pendants and tools such as scrapers, spoons and scoops, and small portable containers (cf. Picha 1988).

A sample of 28 G4-5 potentially identifiable univalval snails were recovered from the waterscreened matrix from levels 3-5 and level 7 in T273 (AU15). The vast majority (n = 24, 82.8%) occurred in level 5 of the test in a loamy sand matrix. These shell remains are undoubtedly natural inclusions in fluvial sediments. A single G4 gastropod was found in T274 (AU13). This specimen was deposited naturally as well.

Charcoal

Wood charcoal was recovered from two feature contexts at Lower Hidatsa West, but the samples are insufficient for purposes of conventional radiocarbon dating. Features 19 and 21 (AU11) yielded small charcoal samples totaling a mere 0.1 g each. Additional wood charcoal was reported during excavations of several other burn features at the site, but these remains were too small and scattered for effective recovery.

Fired Clay and Burned Earth

One G3 piece of fired clay weighing 0.2 g was found in T271 (AU13). It is untempered. A second piece of G3 burned earth weighing 0.2 g was recovered from T265 (AU13). Other smaller fragments of poorly consolidated thermally altered sediments are surely present in feature matrix from a number of the burned earth lenses recorded at the site.

Native Trade Artifacts

A small sample of native artifacts associated with fur trade activities is present in the Lower Hidatsa West artifact aggregate, consisting entirely of three glass trade beads. All of these specimens are small (2-4 mm) blue-green (turquoise) tube beads, which are commonly referred to as "seed beads". These represent single occurrences from the plowzone in T261, T262, and T269 (AU13). The T261 specimen is broken and incomplete; the other two beads are complete. Because of the small sample size involved, a more in-depth analysis is unwarranted. In terms of both size and color, these specimens are similar to those recovered previously from Lower Hidatsa West (cf. Toom et al. 1985:125).

Euroamerican Artifacts

Artifacts and other remains attributable to historic (recent) Euroamerican presence at Lower Hidatsa West occur in the collection. These include items of metal, glass, leather, wood, concrete, and coal clinker. Summary data for metal objects is provided in Table 35; an inventory of the other miscellaneous materials is presented in Table 36.

Metal

A total of 661 pieces of G1-5 recent metal was recovered from the excavations, all from shallow plowzone contexts (Table 35). The vast majority (n=624, 94.4%) consists of unpatterned pieces of flat or irregular scrap; many of these were sorted from G4-5 waterscreened matrix samples. The next most frequent group is pellets of lead shot (n=17, 2.8%), which are probably from recent sport hunting, most likely for game birds. A base from a 12 gauge Winchester shotgun cartridge was found in T257. Remains of munitions, particularly lead shot, were also reported from previous work at the site (cf. Toom et al. 1985:Table 34).

Table 35. Summary data on recent metal artifacts by analytic unit, Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		Flat Scrap	Can Frags.	Shot	Nails	Round Wire	Other	Total
11	n	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-
12	n	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-
13	n	616	5*	15	11	1	3**	651
	%	94.6	0.8	2.3	1.7	0.2	0.5	100.1
14	n	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-
15	n	8	-	2	-	-	-	10
	%	80.0	-	20.0	-	-	-	100.0
Total	n	624	5	17	11	1	3	661
	%	94.4	0.8	2.6	1.7	0.2	0.5	100.2

*Circular fragments with perforations -- hole-and-cap can lid pieces.

**One Winchester 12 Gauge "Super Speed" shotgun shell base; one cross-shaped piece from a bail assembly (?); one round rivet or eyelet.

Building hardware is represented by the recovery of 10 complete or fragmented nails. These likely include both round wire cut and "modern" machine cut forms of varying dimensions. All are common hardware sizes. One small iron brad also occurs in the sample. A single piece of small gauge round iron wire was also found; it is likely remains of fine mesh window screening.

Eight pieces of recent formed or patterned metal were also found in shallow, subsurface contexts during excavation. Five small diameter circular iron discs, or fragments thereof, were found in various shallow test plots (AU13). These exhibit central small-bore perforations. The specimens are thought to be lid fragments from hole-and-cap tin cans (cf. Clark 1977:Figure 8). One small piece of iron patterned in the shape of a cross with a small circular perforation was found. Its identification is problematic, but it may be a segment of a bail assembly for a bucket or pail handle. The seventh specimen is the shotgun shell base mentioned above. Finally, a single circular riveted eyelet completes the sample. The item may be from a tarpaulin or some piece of apparel.

Other Materials

A total of 34 G2-4 pieces of glass weighing 15.4 g were recovered (Table 36). Three forms of glass products appear to be represented. These include flat or window pane glass fragments, bottle glass fragments, and other curved glass. The flat window pane specimens are primarily clear glass, although four exhibit a greenish caste. A light patina was observed on the surface of three pieces thus radiating a pearly luster.

Three G3 fragments of suspected bottle glass were also found in T260. This identification is based on morphology and curvature. Two are purplish in caste, and the third exhibits a greenish caste. No other diagnostic traits were not observed on these items.

Finally, four small fragments of extremely thin clear glassware were recovered in T260. These may part of a formed object such as a lamp chimney or some similar item. The remainder of the collection is highly fragmented, which does not permit further in-depth analysis.

Two small pieces of leather weighing 0.2 g were found in T268. These remains are likely derived from a shoe or boot.

A total 606 small (G2-3) pieces of coal clinker weighing a total of 304.9 g was recovered from various shallow test plots (AU13) at Lower Hidatsa West. These materials are probably associated with Euroamerican settlement; their presence at the site remains unexplained, but it could relate to road construction or nearby railroad operation activities.

Construction material is represented by 3 small pieces (G2-3) of fragmented concrete weighing a total of 14.0 g that was found in T262. This unit also yielded some coal clinker residue.

Uncarbonized wood remains are represented by the fragmented basal portion of a cut and pointed wooden stake designated as Feature 23. The specimen is approximately 9 cm in length, 3 cm in thickness, and weighs 8.4 g. The tapered distal end appears to be sharpened to a point by a metal tool. No associated

Table 36. Summary data on miscellaneous recent artifacts by analytic unit, Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		Glass	Concrete	Coal Clinker	Other	Total
11	n	-	-	-	-	-
	%	-	-	-	-	-
12	n	-	-	-	1*	1
	%	-	-	-	100.0	100.0
13	n	34	3	606	2**	645
	%	5.3	0.5	93.9	0.3	100.0
14	n	-	-	-	-	-
	%	-	-	-	-	-
15	n	-	-	-	-	-
	%	-	-	-	-	-
Total	n	34	3	606	3	646
	%	5.3	0.5	93.8	0.5	100.1

*Fragments of a cut wooden stake (Feature 23) counted as one object.

**Leather fragments.

post hole was observed during excavation; the stake was likely driven directly into the ground. The stake is historic in age and possibly related to early land surveying activities in the region. A second, similar specimen was recorded in the Hotrok area (Feature 4).

Natural Rock and Unsorted Residue

A summary of G1-3 natural rock and G4-5 unsorted waterscreen residue weight data by analytic unit is provided in Table 37. The greatest volumes of these materials come from the lowermost levels of T273. The lower sediments in the deep test unit consist of fluvial and glaciofluvial sands and gravels. Natural rock occurs less frequently in the plowzone for the sampled site areas. Toom et al. (1985:128-130) reported similar depositional sequences at Lower Hidatsa West during prior investigations.

Table 37. Weight data on natural rock and unsorted residue by analytic unit, Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Analytic Unit		G1-3 Natural Rock Weight (g)	G4-5 Unsorted Residue Weight (g)
11	wt	1267	1145
	%	10.1	10.4
12	wt	-	-
	%	-	-
13	wt	4541	5522
	%	36.0	50.3
14	wt	-	-
	%	-	-
15	wt	6796	4320
	%	53.9	39.3
Total	wt	12604	10987
	%	100.0	100.0

VII. ARTIFACT DENSITIES AND SPATIAL ANALYSES

This section examines artifact densities and horizontal spatial distributions for selected classes of material from the Hotrok and Lower Hidatsa West site areas within Visitor Center Area B. Emphasis is placed on the analysis of shallow, uniform, systematic waterscreened samples (i.e., test unit plowzone samples) because these constitute the best sources of data for such studies, and because they largely correspond to the primary Heart River phase component(s) at the sites. Feature artifact densities are also considered, and certain comparisons are made to Lower Hidatsa Village where appropriate.

Artifact Densities

Volumetric artifact density data and bone ratio density data for selected classes of material recovered from prehistoric features (AU11), historic features (AU12), and shallow test plots (AU13) within the Hotrok area can be found in Table 38. The same information is presented for prehistoric features (AU11) and shallow test plots (AU13) for the Lower Hidatsa West area in Table 39. Volumetric artifact densities provide an absolute measure of the quantities material within particular stratigraphic units and archeological contexts. Bone ratios are a relative measure of quantities of artifacts in relation to another artifact class whose rate of deposition is assumed to be stable over time per unit of population at a site. The rationale behind this approach assumes that the accumulation of bone debris at a site is the direct result of subsistence activities that will remain more or less constant over time for a given level of population (cf. Ahler et al. 1980:183-185; Ahler and Weston 1981:177-178).

Volumetric data in Tables 38 and 39 reveal overall low artifact densities within both site areas. Bone debris densities are especially low, resulting in some unusually high bone ratio figures. Fire-cracked rock (FCR) was expected to be particularly dense within the Hotrok site area, considering the abundance of this artifact class in other parts of the site to the east of Area B (cf. Ahler and Mehrer 1984), but this expectation has clearly not been met. Only prehistoric features (basin-shaped pits) in that portion of Hotrok within Area B yielded appreciable quantities of FCR.

The low artifact densities for those portions of the Hotrok and Lower Hidatsa West sites within Area B are most apparent when the data in Tables 38 and 39 are compared to density data for time period 3 at Lower Hidatsa Village in Table 40. For example, at Lower Hidatsa West, native ceramic sherds were recovered at a rate of ca. $50/\text{m}^3$ in shallow test plot samples, while at Lower Hidatsa Village they were recovered at a rate of ca. $2195/\text{m}^3$ in time period 3 samples; the density of native ceramic sherds is even lower within the Hotrok area (ca. $12/\text{m}^3$). All other artifact classes in time period 3 at Lower Hidatsa Village exhibit similarly high density values by way of comparison to the test plot samples from Hotrok and Lower Hidatsa West, with the exception of historic artifacts which were not found in time period 3 proveniences at the village. Bone debris is particularly dense at Lower Hidatsa Village, with a rate of recovery per m^3 over 2000 times that recorded for shallow plowzone contexts at Hotrok and Lower Hidatsa West. Clearly, activities generating quantities of

Table 38. Selected artifact class density data for certain excavation unit types (analytic units), Hotrok (32ME412), Visitor Center Area B, 1987 and 1988 excavations.

Excavation Type/ Artifact Class	Quantity Count or Weight (kg)	Excavated Volume (m ³)	Quantity Density (per m ³)	Bone Weight Ratio (n or wt per kg bone)
<u>Prehistoric Features (AU11)</u>		0.131		
Ceramic Vessels (n)	-		-	-
Ceramic Sherds (n)	-		-	-
Stone Tools (n)	1		7.63	62.50
Flaking Debris (n)	15		114.50	937.50
Unmodified Shell (n)	-		-	-
Recent Metal (n)	14		106.87	875.00
Misc. Recent (n)	-		-	-
Glass Beads (n)	-		-	-
Fire-Cracked Rock (wt)	22.245		169.81	1390.31
Unmodified Bone (wt)	0.016		0.12	1.00
<u>Historic Features (AU12)</u>		0.373		
Ceramic Vessels (n)	-		-	-
Ceramic Sherds (n)	-		-	-
Stone Tools (n)	-		-	-
Flaking Debris (n)	2		5.36	12.20
Unmodified Shell (n)	-		-	-
Recent Metal (n)	928		2487.94	5658.54
Misc. Recent (n)	1719		4608.58	10481.71
Glass Beads (n)	-		-	-
Fire-Cracked Rock (wt)	-		-	-
Unmodified Bone (wt)	0.164		0.44	1.00
<u>Shallow Test Plots (AU13)</u>		6.194		
Ceramic Vessels (n)	7		1.13	225.81
Ceramic Sherds (n)	73		11.79	2354.84
Stone Tools (n)	4		0.65	129.03
Flaking Debris (n)	176		28.42	5677.42
Unmodified Shell (n)	1		0.16	32.26
Recent Metal (n)	77		12.43	2483.87
Misc. Recent (n)	663		107.04	21387.10
Glass Beads (n)	1		0.16	32.26
Fire-Cracked Rock (wt)	0.795		0.13	25.64
Unmodified Bone (wt)	0.031		0.01	1.00

Table 39. Selected artifact class density data for certain excavation unit types (analytic units), Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Excavation Type/ Artifact Class	Quantity Count or Weight (kg)	Excavated Volume (m ³)	Quantity Density (per m ³)	Bone Weight Ratio (n or wt per kg bone)
<u>Prehistoric Features (AU11)</u>		0.062		
Ceramic Vessels (n)	-		-	-
Ceramic Sherds (n)	1		16.13	5.59
Stone Tools (n)	-		-	-
Flaking Debris (n)	37		596.77	206.70
Unmodified Shell (n)	-		-	-
Recent Metal (n)	-		-	-
Misc. Recent (n)	-		-	-
Glass Beads (n)	-		-	-
Fire-Cracked Rock (wt)	1.435		23.14	8.02
Unmodified Bone (wt)	0.179		2.89	1.00
<u>Shallow Test Plots (AU13)</u>		2.496		
Ceramic Vessels (n)	9		3.61	692.31
Ceramic Sherds (n)	125		50.08	9615.38
Stone Tools (n)	3		1.20	230.77
Flaking Debris (n)	225		90.14	17307.69
Unmodified Shell (n)	2		0.80	153.85
Recent Metal (n)	651		260.82	50076.92
Misc. Recent (n)	645		258.41	49615.38
Glass Beads (n)	3		1.20	230.77
Fire-Cracked Rock (wt)	0.748		0.30	57.54
Unmodified Bone (wt)	0.013		0.01	1.00

bone debris were not often performed at the latter two sites, at least not within Area B.

The obvious conclusion to be drawn from these comparisons is that Hotrok and Lower Hidatsa West were occupied or utilized far less intensively and for far less duration than was Lower Hidatsa Village. This further substantiates the argument that these two sites are fundamentally different from Lower Hidatsa Village, even though the primary native cultural deposits at both are closely related temporally and culturally to time period 3 at Lower Hidatsa Village. Certain artifact classes indicate that different but complementary functional relationships existed between the Hotrok and Lower Hidatsa West sites on the one hand, and Lower Hidatsa Village on the other. Our best interpretation of the Hotrok and Lower Hidatsa West sites is that they functioned as specialized activity areas of one sort or another that were peripheral to the principal residential occupation at Lower Hidatsa Village.

Table 40. Selected artifact class density data for time period 3, Lower Hidatsa Village (32ME10). Data abstracted from Ahler and Weston (1981:Table 78).

Artifact Class	Quantity Count or Weight (kg)	Excavated Volume (m ³)	Quantity Density (per m ³)	Bone Weight Ratio (n or wt per kg bone)
<u>Time Period 3</u>		3.727		
Ceramic Vessels (n)	162		43.5	2.1
Ceramic Sherds (n)	8179		2195	104
Stone Tools (n)	613		164.5	8.0
Flaking Debris (n)	18649		5004	237
Unmodified Shell (n)	145		39	1.8
Recent Metal (n)	0		0.0	0.0
Misc. Recent (n)	0		0.0	0.0
Glass Beads (n)	0		0.0	0.0
Fire-Cracked Rock (wt)	91.50		24.55	1.16
Unmodified Bone (wt)	76.6		21.09	1.0

Artifact Horizontal Spatial Distributions

Two computer generated artifact density isoline maps were produced for Area B using the SURFER software package (Golden Software 1989). The first map (Figure 24) illustrates plowzone artifact densities for all Plains Village (native) artifacts. The second map (Figure 25) shows plowzone artifact densities for all Euroamerican (recent) artifacts. Data from the 1979 (Toom et al. 1985) and 1987 (this report) systematic, waterscreened, plowzone samples within Area B were utilized in the mapping routine (i.e., test units and test plots). These data are presented as numbers of items per square meter, which necessitated certain adjustments to the raw data from the 1987 test plots which covered only 0.65 m² each rather than the standard 1.0 m². Bone debris counts are included with the native artifact data, most if not all of which from plowzone contexts is thought to relate to utilization of the sites by Plains Villagers.

Turning first to the representation of native artifact densities in Figure 24, a clear peak can be seen in the extreme northeastern part of Area B within the Lower Hidatsa West area, especially just to the north of grid line 220N and between grid lines 160E and 200E. This finding resulted in the decision to restrict Visitor Center construction activities in this part of the Lower Hidatsa West site to the south of grid line 220N (cf. Figure 8). A minor peak can also be seen in the extreme southeastern part of Area B within the Hotrok area at 110N/200E on the grid. Beyond these two locations of relatively high artifact concentration, the balance of the two site areas within Area B exhibits artifact densities of less than 30 items/m². One can also note that the 10 item/m² isoline generally marks the western limits of the Hotrok and

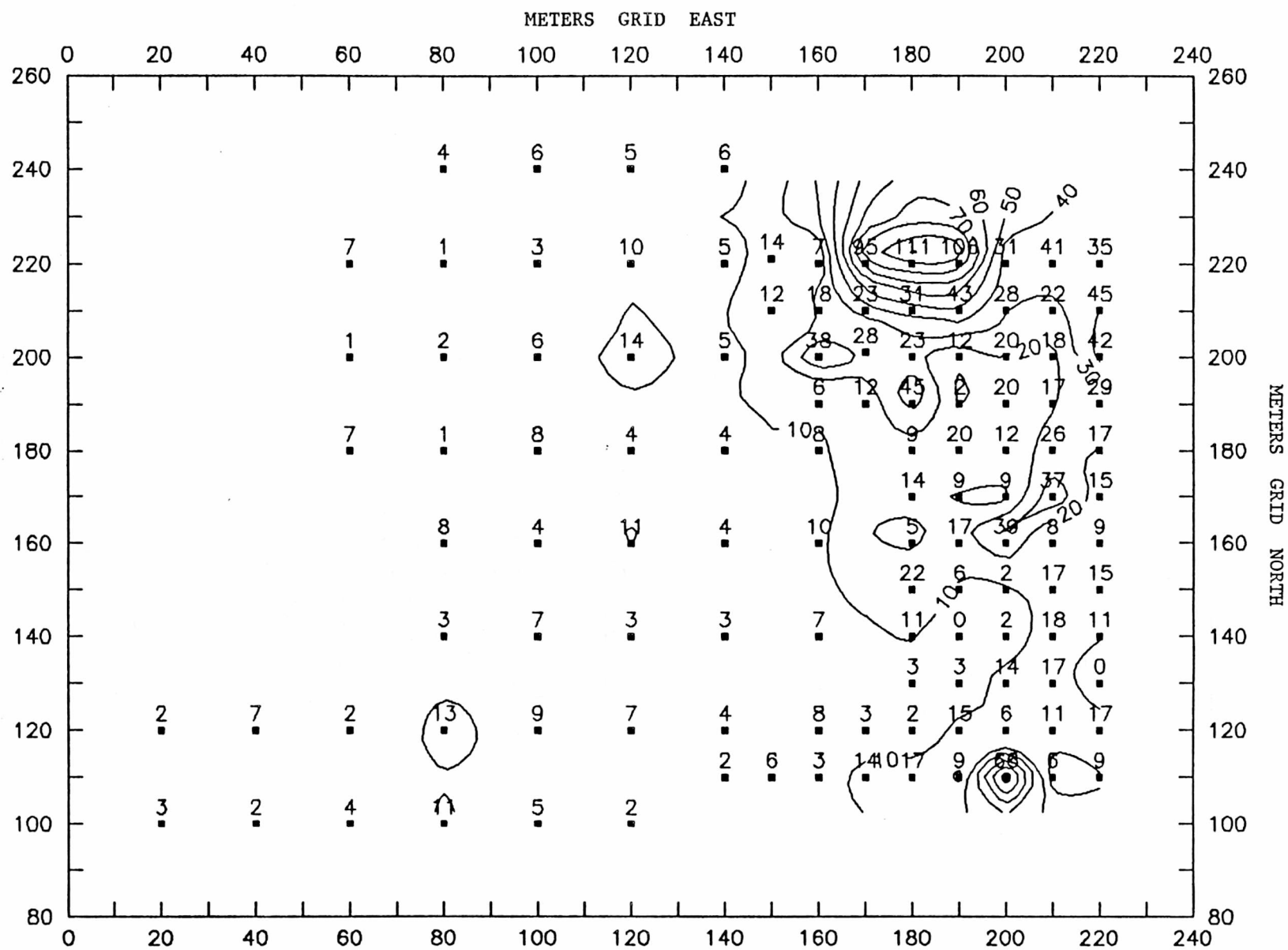


Figure 24. Isoline map of native (Plains Village) artifact frequencies per m^2 in Area B plowzone deposits. Numbers above squares indicate artifact counts per test plot.

Lower Hidatsa West sites within Area B. This site area boundary is in good agreement with other boundaries produced by similar mapping techniques using somewhat different data sets (i.e., Ahler 1979; Ahler et al. 1979; Toom et al. 1985). That portion of Area B to the west of the 10 item/m² isoline is treated as a nonsite area because of low artifact densities that are generally less than 10 items/m².

The densities of recent artifacts represented in Figure 25 show a clear north-south linear trend between grid lines 140E and 180E. A similar trend was previously noted on another recent artifact density map based on a less extensive data set (Toom et al. 1985:139). The extremely high peak in numbers of artifacts at grid points 110N/170E and 120N/170E is primarily a reflection of the thousands of small fragments of concrete that were recovered from T209 and T215. The other high-density points mainly reflect numbers of metal artifacts (largely scrap) and coal clinker. It has been speculated elsewhere that this pattern in the distribution of recent artifacts may mark an old roadway, perhaps even an abandoned and dismantled railroad line (Toom et al. 1985). However, there is little support for such an interpretation among local residents and in the available historic documentation. Still, a rather narrow, linear pattern of recent historic debris does suggest that some sort of linear feature once existed in this area and that it was related in some way to early Euroamerican settlement. In this regard, it can also be noted that scattered pieces of coal (lignite) and coal clinker and several railroad tie spikes were observed in a rather tight linear pattern in the eastern part of Area B during the 1988 mechanical stripping operation: this material was seen most often for about 10 m on either side of a north-south line running between grid points 100N/160E and 240N/150E. In addition, a slightly higher, harder patch of ground that could have been part of an old road bed was noted in the extreme southern portion of Area B during the 1988 stripping operation, more or less centered on the 160E grid line.

Collectively, these factors suggest to us the former presence of a railroad line. The present railroad line turns abruptly to the west at the town of Stanton. Local informants have indicated that this line was to run north out of Stanton to the now defunct town of Mannhaven, but it was ultimately decided to turn the line west at Stanton and the north line to Mannhaven was never built. This event was largely responsible for the decline and eventual abandonment of Mannhaven. While this scenario seems certain and we have no reason to doubt its accuracy, the archeological evidence from the Area B investigations within the KNRI does suggest that part of the north railroad line to Mannhaven may actually have been built or was at least started before the final decision was made to turn the line to the west at Stanton. If this was the case, and if a rail line was partially laid to the north of Stanton, it would seem that considerable effort was expended to remove the track and bed since no obvious evidence of their presence remains today. Perhaps these materials were removed and reused in the construction of the line to the west of Stanton after the decision not to build north to Mannhaven had been made.

VIII. SUMMARY AND CONCLUSIONS

Archeological testing in the expanded Visitor Center Area B construction site at the KNRI was conducted during the 1987 field season by UND and NPS personnel. The eastern expansion of Area B, which was found to be necessary to accommodate the final Visitor Center design, encroached on previously uninvestigated or minimally investigated portions of the Hotrok (32ME412) and Lower Hidatsa West (32ME499) archeological sites. These sites have been determined to be significant archeological resources within the KNRI. The results of the 1987 testing program indicated the need to adjust the final limits of Area B construction zone slightly southward relative to the Lower Hidatsa West site. The testing findings, as well as those of previous archeological investigations at the Hotrok and Lower Hidatsa West sites, indicated that it would be prudent to mitigate potential impacts to archeological features that might still be present in the Area B construction site. To this end, UND personnel conducted archeological impact mitigation work throughout Area B during the 1988 field season specifically targeted at the identification and excavation of intact portions of cultural features found beneath the plowzone. The discovery and proper treatment of any Amerindian (Plains Village) burials that might be present anywhere within Area B was of special concern. Particular attention was also paid to those portions of the Hotrok and Lower Hidatsa West sites within the eastern expansion of Area B, where the highest numbers of features were predicted to occur on the basis of the testing data.

Two substantive subplowzone features were discovered during the 1987 testing program, one being a fire-cracked rock filled pit remnant within the Hotrok site, and the other being a portion of a refuse pit in the Lower Hidatsa West site. No evidence for human burials was discovered during either phase of the program. The only additional substantive cultural feature identified during the 1988 impact mitigation work was the nearly complete remains of a historic (recent) Euroamerican trash pit (Feature 5) found in the Hotrok site area. Feature 5 contained a variety of recent debris, including fragmented concrete, metal artifacts (especially tin-cans and railroad hardware), and subsistence remains. This feature clearly reveals the former presence of a brief Euroamerican habitation of the western part of the Hotrok site. The precise nature of this occupation remains unknown, but it is believed to relate at least indirectly to early railroad construction in the area. Temporally sensitive artifact attributes indicate a date of occupation during the early 1900s. Initial railroad construction in the Stanton area occurred in 1912.

The 1987 and 1988 fieldwork within Area B has contributed only a little new information to our understanding of the prehistoric (and protohistoric) occupations of the Hotrok and Lower Hidatsa West sites by Plains Villagers. Present indications are that both sites functioned as specialized activity loci peripheral to the principal residential occupation at the nearby Lower Hidatsa Village site. Primary component affiliation for the village periphery activity areas at Hotrok and Lower Hidatsa West is posited to be with the precontact age, Heart River phase of the Plains Village tradition (as used Lovick and Ahler 1982). This association is based primarily on the ceramic content of the Lower Hidatsa West site plowzone sample reported by Toom et al. (1985) as compared to ceramics from the Heart River phase component (time period 3) reported for Lower Hidatsa Village (Ahler and Weston 1981). The small amount of data collected in the 1987/1988 program adds little new information

regarding component affiliation. Three radiocarbon assays from large undercut pits in the Lower Hidatsa West site (samples from the 1979 investigations but reported herein) indicate dates of about AD 1650 to 1780 for the pit features. Data from excavations at Big Hidatsa Village (Ahler and Swenson 1985) indicate that the contact period begins at about AD 1600 in the region, meaning that the dated pit features are postcontact in age and postdate the posited Heart River phase component (defined as precontact in age) at Lower Hidatsa West. The significance of the new radiocarbon dates is that they indicate a substantially longer period of fairly intensive use for the Lower Hidatsa West site than had been suggested earlier (Toom et al. 1985:146), extending from precontact to postcontact times.

A few bits of data from the present program tend to confirm the unusual artifact content attributed to the Hotrok site. The remnant of a basin-shaped pit (Feature 3) filled with fire-cracked rock but lacking substantial amounts of other kinds of refuse is highly similar to another pit remnant (Feature 2) discovered at the center of one of the surficial FCR concentrations in the 1979 testing program at Hotrok (Ahler and Mehrer 1984). Such pit features, distinctive for their lack of bone refuse and materials other than FCR, are quite rare within the primary village sites in the KNRI. This tends to further support the suggestion that functionally distinctive activities occurred at Hotrok. In addition, it can be noted that decorated body sherds occur in much higher frequencies in the 1987/1988 excavated samples from Hotrok than in the Lower Hidatsa West sample or in virtually any samples from excavated village sites in the KNRI. While based on meager samples, these data continue to suggest that the ceramic content of Hotrok is atypical of other localities in the KNRI, perhaps linked to ritual, ceremonial, or other events which did not occur on a routine basis in and around actual habitation areas.

While one can surmise that a variety of specialized activities linked to the Lower Hidatsa Village occupation took place at the Hotrok and Lower Hidatsa West sites, the available data are insufficient to reveal much about specific events and happenings. In this regard, we have a less than coherent picture of the functional workings of the settlement and activity structures developed by Plains Village peoples at the locations immediately surrounding the major village sites of the KNRI. This gap in our knowledge of Plains Village settlement-subsistence patterns suggests directions for future research at sites such as Hotrok and Lower Hidatsa West.

A small-scale archeological survey for a proposed water line route from Stanton to the Area B construction site was also conducted during the 1988 field season as part of the mitigation program. The survey area was limited to the road ditch and right-of-way along the east side of North Dakota Highway 31 from the northwest corner of Stanton to the entrance road to Area B. No surface indication of significant cultural deposits was found by the survey team within the proposed water line corridor. Archeological monitoring of the excavation of the water line trench was recommended to check for the possible presence of buried cultural deposits of potential importance that were not discovered by the surface survey.

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APPENDIX A

Pertinent Project Documents and Correspondence

PROPOSAL FOR ADDITIONAL ARCHEOLOGICAL TEST EXCAVATION AND ARCHEOLOGICAL
MITIGATION AT VISITOR/ADMINISTRATIVE FACILITY SITE B,
KNIFE RIVER INDIAN VILLAGES NATIONAL HISTORIC SITE

prepared by

Department of Anthropology
University of North Dakota, Grand Forks

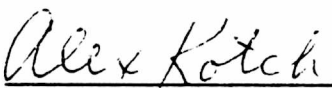
submitted to

Midwest Archeological Center
U. S. National Park Service
Lincoln, Nebraska

Proposed Project Dates: Phase 1: July 20, 1987 through February 28, 1988
Phase 2: March 1, 1988 through May 31, 1989

Funding Level: Phase 1: \$11,962.00
Phase 2: \$25,869.00
Total Cost: \$37,831.00

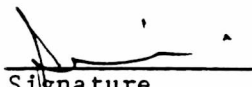
Endorsements:

 6/19/87

Signature Date
Dr. Alex Kotch, Director
Research and Program Development

 6/19/87

Signature Date
Dr. Stanley A. Ahler
Principal Investigator

 6/19/87

Signature Date
Dr. John A. Williams, Chair
Department of Anthropology

PROPOSAL FOR ADDITIONAL ARCHEOLOGICAL TEST EXCAVATION AND ARCHEOLOGICAL
MITIGATION AT VISITOR/ADMINISTRATIVE FACILITY SITE B,
KNIFE RIVER INDIAN VILLAGES NATIONAL HISTORIC SITE

Introduction

This document is prepared in response to several recent planning decisions made in regard to anticipated construction of a visitor/administrative (v/a) facility at the Knife River Indian Villages National Historic Site (KNRI). At a May 26-27, 1987 on-the-ground meeting at the KNRI involving National Park Service (NPS) personnel from several offices, it was determined that the original site B selected for construction of the v/a facility would be too small to accommodate the current building design. It was proposed that the site B construction zone be expanded substantially to the east. The approximate location of this expanded construction area was noted on a map supplied in a June 1, 1987, memorandum from Michael Holm, Area Manager, KNRI, to Tom Thiessen, archeologist at the Midwest Archeological Center (MWAC). In these recent discussions it was noted that the expanded site B area encroached substantially upon a portion of the Lower Hidatsa West site (32ME499) and the Hotrok site (32ME412). Both sites have been test excavated (but not in the proposed new construction area) and found to contain significant archeological deposits (Ahler 1979; Toom, Ahler and Falk 1985; Ahler and Mehrer 1984:45-72).

In a follow-up meeting on June 9-10, 1987 in Grand Forks, North Dakota involving representatives from MWAC, Knife River, Theodore Roosevelt, and the University of North Dakota (UND), it was decided that the level of information available from the new impact area in the above two named sites was insufficient to develop a detailed plan for necessary archeological mitigation activities, and that additional archeological evaluative and planning work should be conducted as soon as possible. It was agreed that UND personnel should proceed immediately with preparation of a proposal and work plan for test excavations, mitigation planning, and probable mitigation activities in the expanded site B construction location. Upon development of a suitable proposal and work plan, this work would proceed under a supplement to the master cooperative agreement between UND and the NPS regarding archeological investigations on NPS properties within the state of North Dakota. The present proposal is therefore prepared and submitted in accordance with agreements made in the June 9-10, 1987 meeting.

Project Objectives

The proposed investigations are organized into two phases, 1 and 2. Phase 1 deals with the task of conducting additional evaluative test excavation in the expanded site B construction zone and of using the information gained to develop a more detailed mitigation plan for the modified site B zone. Phase 2 deals with execution of the actual archeological mitigation activities in the revised site B area, including fieldwork, data analysis, and reporting. In this proposal we can be relatively specific about objectives, methods, scheduling and costs for phase 1 activities, but we can generate only a general, minimum plan of action for phase 2. We expect the phase 2 work plan to be modified and made much more specific upon completion of phase 1

investigations.

Specific objectives for phase 1 include: (1) Execution of a systematic test excavation program in the expanded site B v/a facility location. (2) Preliminary analysis of the recovered artifact data sufficient to generate a letter report addressing the basic question of the feasibility of and added impacts from construction specifically within the expanded site B location; this letter report will be submitted by UND to the NPS. (3) Based on the preliminary analysis and letter report, the NPS construction planning team will finalize the precise location of the v/a facility within site B, and will communicate this finalized location to UND personnel. (4) UND personnel will then develop a more precise plan and related cost estimate for final archeological mitigation activities to be conducted in site B; this plan will be submitted by UND to MWAC.

Specific objectives in phase 2 will include: (1) Execution of an archeological mitigation program in the designated construction area within site B. Fieldwork for this program is likely to include stripping of the plowzone in the construction site and excavation and recovery of artifacts from exposed subplowzone cultural features. Fieldwork may include systematic excavation of some sample of the plowzone in areas known to contain interpretable artifacts occurring in relatively high densities. (2) Artifact analysis and preparation of a final report on archeological activities in the site B location. Analysis and reporting will integrate data from artifacts collected in the phase 1, evaluative, program with those recovered in the phase 2, mitigation, program.

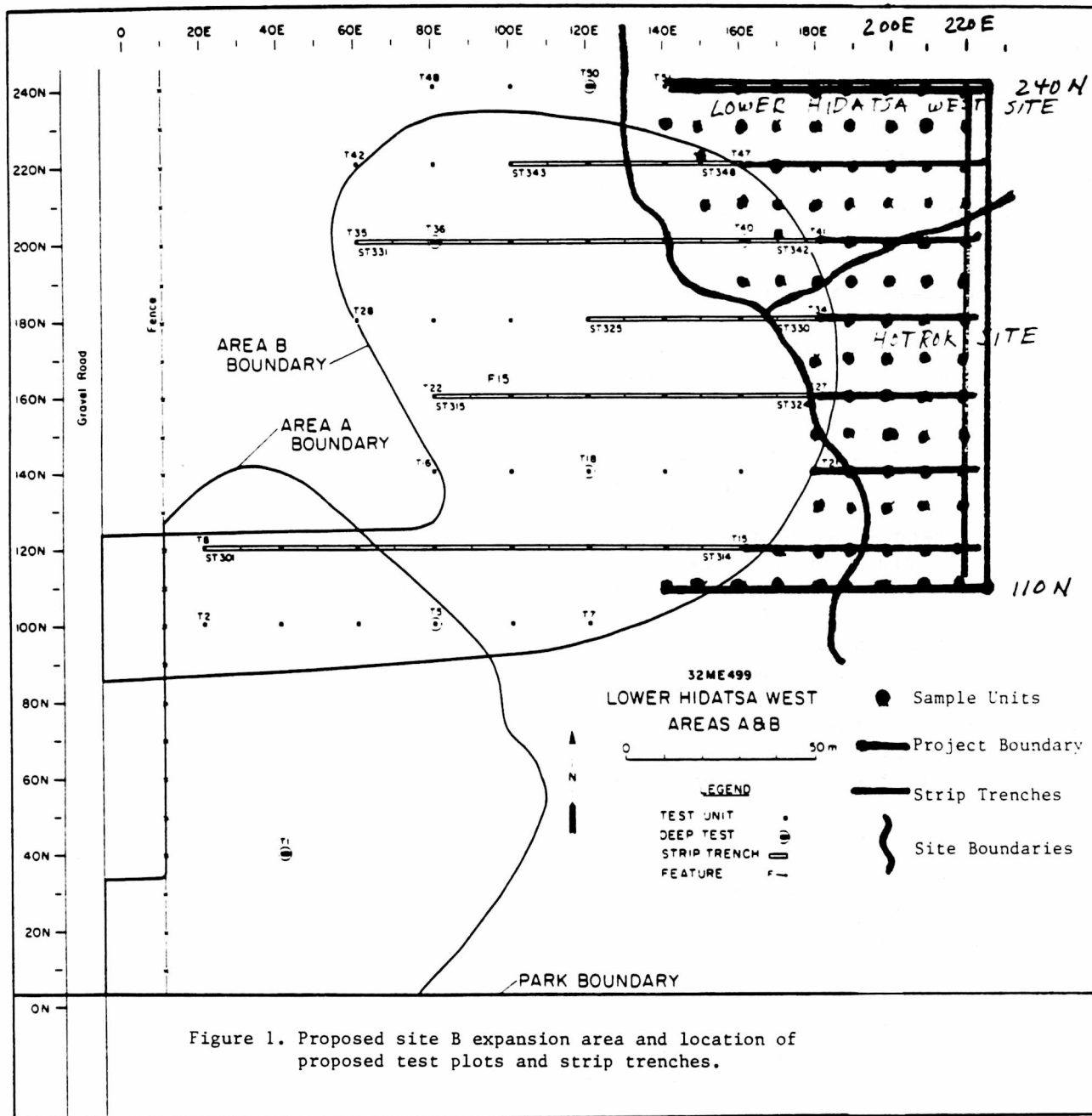
Phase 1 Work Plan

Methods

In the June 9-10, 1987, meeting it was agreed that additional test excavation would occur in an area bounded on the north, east, and south by grid lines (from the 1979 site grid) chosen to fully accommodate the expanded site B area as designated in the June 1, memorandum from Holm to Thiessen. It was decided that we should investigate a rectangular area, rather than the curved area shown in the memo, so that minor adjustments could be made in the final boundary location without concern.

Figure 1 shows the site B boundary as it was drawn and investigated in 1979 (Ahler 1979; Toom et al. 1985:10), as well as the proposed new area of investigation. The new investigation area is bounded on the north by grid line 240N, on the south by grid line 110N, on the east by grid line 225E (which coincides approximately with an old fenceline through the area), and on the west by the original site B boundary or grid line 140E. This expanded investigation zone has an area of ca. 0.71 hectares or about 1.8 acres lying outside the site B zone investigated in 1979. The original site B study zone has an area of ca. 1.63 hectares or about 4.0 acres.

The expanded study area lies almost entirely within two recorded archeological sites, overlapping substantially the southern part of the Lower Hidatsa West site (32ME499) and overlapping the western one-third of so of the Hotrok site (32ME412). Figures 7 and 8 in Ahler et al. (1979) show that surface artifacts are moderately dense in the impacted portion of 32ME499 but are



significantly more dense in the impacted part of 32ME412. In the latter case, densities are comparable to surface densities recorded in the site C development zone in the north-central part of site 32ME499 (Ahler 1979). On the basis of similarities in surface artifact densities, we might then expect to use the excavation data from site C in the Lower Hidatsa West site (reported in Ahler 1979; Toom et al. 1985) as a rough guide to what could be expected to occur in the overlapped western part of the Hotrok site in the new expansion area.

The overall plan for phase 1 fieldwork in expansion site B is patterned very closely after than used in site C as reported in Ahler (1979) and Toom et al. (1985). Because recorded surface artifact densities are moderately high throughout almost all of the expanded site B zone, we propose to conduct relatively close interval systematic sampling of the plowzone deposits in expanded site B to determine the actual density of artifacts in that area and to determine the composition of artifact assemblages. From these data we expect to develop an idea of the spatial structure of artifact scatters in the expanded site B, and to plan mitigation activities accordingly. We propose systematic hand excavation of plowzone deposits from sample units located on a 10 m square grid throughout expanded site B (see Figure 1). Approximately 86 such units will be excavated and processed in the field with fine-mesh waterscreen recovery. This is a sampling design similar in arrangement and spacing to that applied in site C. Excavation plots will be 1 x 0.65 m in size, rather than the 1 x 1 m units excavated in 1979. This will speed excavation time somewhat without a major loss in the reliability of the artifact density data gained from the sample plots. The plowzone will be removed from these plots in mass in a single level, and the soil will be placed in wheelbarrows and trucked to the Knife River for waterscreen processing and drying.

In addition to the systematic 1 x 0.65 m sample plowzone plots, we will also excavate two controlled 1 x 1 or 1 x 2 m test excavation units to substantial depth below the plow zone to test for the presence of buried, subplowzone cultural remains. One such unit will be excavated within each of the two archeological sites in the expansion area.

A third field activity in the expansion area will be excavation and removal of the plowzone in a series of strip trenches. These trenches will be ca. 1.2 m (4 ft) wide and of varying lengths; they will be located approximately as shown in Figure 1, oriented east-west, and spaced 20 meters apart on north-south intervals. One lengthy north-south trench will be excavated along the 220E grid line in order to bisect the central part of the Hotrok site. The strip trenches will be mechanically excavated with a Bobcat front end loader, with the floors shovel skimmed and examined for cultural features. The purpose of strip trenches will be to rapidly expose a substantial area below the plowzone, thereby exploring for the presence of cultural features which are deep enough to be preserved below the cultivation line. All discovered features will be mapped and systematically excavated. If human burials occur in the expansion area in any density, we can expect to discover the presence of burial pits in the strip trenching operation. Systematic artifact recovery will not be applied to the plowzone sediments removed from the trenches. All excavations will be backfilled at the close of fieldwork.

Upon completion of fieldwork, waterscreened samples will be returned to the lab in Grand Forks where analysis will be conducted. Samples will be

floated for removal of extraneous organic matter and then size-graded. Preliminary sorting will be conducted to remove and count ceramics and chipped stone artifacts. Working maps of the densities of these selected artifact classes will be prepared. These will be compared to data on feature type, location, and density data from the strip trenches, and this collective preliminary information set will be used to prepare the letter report to the NPS. In this letter report we will specifically address the issue of the presence or absence of human burials in the test excavation data and the question of whether mitigation costs are likely to rise substantially above the projected levels for the expansion area. The latter determination will be based on plowzone artifact density and typology data and feature density data.

With the letter report in hand, the NPS construction planning team will make a final decision on the precise shape and location of the site B construction zone. When the UND staff obtains this information from the planning team, we will proceed with preparation of a detailed mitigation plan and related cost estimate for archeological mitigation in site B. This mitigation plan will be based on quantitative data from the phase 1 excavation program, but its preparation will not involve complete analysis and technical reporting of artifacts from those activities. Those subjects will be treated in the comprehensive mitigation report which will be prepared after execution of phase 2 mitigative fieldwork.

Scheduling and Logistics

The target period for execution of the phase 1 fieldwork is between the dates of July 20 and August 28, 1987. Fieldwork will be conducted over roughly 13 working days. Artifacts will be transported to Grand Forks, and the initial processing and sorting of artifacts (particularly from the plowzone test plot samples) will proceed immediately after the close of fieldwork. The letter report assessing the feasibility of construction in expansion site B will be submitted to the NPS by September 30, 1987. Selection of the final construction site location by the NPS construction planning team is expected to occur sometime during the fall or winter of 1987. Artifact sorting and quantification for the phase 1 investigations will be completed in this period, as well. Recommendations for the detailed mitigation plan and related cost estimate will be submitted by UND to MWAC within 30 days after receipt from the NPS of a map accurately delineating the precise boundary of the area to be developed for the v/a facility within site B. It is expected that this map will be made available to UND no later than March 1, 1988.

The UND field team will stay in rented quarters in Stanton. All activities on the project will be closely coordinated with the Area Manager at KNRI and with a designated project contact at MWAC. The UND field team will expect to use some of the existing tools and equipment at the maintenance shop at KNRI for fabrication of screens and construction of temporary waterscreen facilities. The first two-three days on site will be taken up with preparatory activities such as equipment upgrading, waterscreen facility installation, and site gridding. If a human burial is discovered during excavation, the remains will not be further disturbed and the KNRI Area Manager and the MWAC project contact person will be notified immediately of the discovery.

Personnel

The proposed project will be conducted under the overall direction and supervision of Stanley A. Ahler, the UND project director and principal investigator. The field crew will consist of six persons, all having prior archeological field experience. The field crew will be directly supervised by Steve DeVore who is a member of the MWAC staff. The other five crew members will be persons employed through UND.

Lab work will require short-term efforts from an archeological assistant to conduct size-grading, flotation, sorting, and quantification. Ahler will oversee this effort, will write the phase 1 letter report, and prepare the detailed phase 2 mitigation plan and refined phase 2 cost estimate.

Budget

An itemized budget for phase 1 activities is found on the following page. This budget includes only costs to be incurred by UND and does not include contributions to the program by MWAC. MWAC will supply the project field supervisor (Steve DeVore) and will pay his salary and fringe benefits. MWAC will also supply one of the two project vehicles and per diem for DeVore.

PHASE 1 ITEMIZED BUDGET

	Estimated Cost
FIELDWORK	
<u>Salaries and Wages</u>	
Field Assistants (5)(13 days @ \$45/day)	\$ 2925.00
<u>Fringe Benefits</u>	
Field Assistants (10% of salaries and wages)	293.00
<u>Lodging</u> (local house rental, 1.0 month)	500.00
<u>Food</u> (5 persons)(15 days)(\$10.00/day)	750.00
<u>Vehicle Rental</u> Pickup Truck (1500 mi @ \$.18)	270.00
<u>Equipment Rental</u> Bobcat Loader (1 wk @ \$600/wk)	600.00
<u>Expendable Supplies</u> Film, developing, screen and pump repair, lumber, gas, oil, diesel fuel, markers, bags, boxes, graph paper, etc.	600.00
Subtotal Direct Field Costs	\$ 5938.00
<u>Indirect Costs</u> Off-campus rate of 22.1% of total direct costs	1312.00
Total Field Costs	\$ 7250.00
LABORATORY COSTS	
<u>Salary and Wages</u>	
S. Ahler (0.5 mo @ \$3055/mo)	\$ 1528.00
Laboratory Assistant (1.25 mo @ \$1100/mo)	1375.00
<u>Fringe Benefits</u>	
S. Ahler (20.0% of salaries and wages)	306.00
Lab. Assistant (10% of salaries and wages)	138.00
<u>Phone, Postage</u>	30.00
<u>Expendable Supplies</u> Bags, markers, forms, etc.	50.00
Subtotal Laboratory Direct Costs	\$ 3427.00
<u>Indirect Costs</u> On-campus rate of 37.5% of total direct on-campus costs	1285.00
Total Laboratory Costs	\$ 4712.00
Total Estimated Phase 1 Costs	\$ 11962.00

Phase 2 Work Plan

Methods and Personnel Requirements

Activities in phase 2, the mitigation phase, can be broken into two parts, those occurring in the field, and those occurring in the laboratory setting. A detailed work plan for either setting cannot be set forth without the information to be gained from phase 1 activities. Nevertheless, a minimal plan of action can be proposed based on the investigations which have already occurred within the original v/a facility site B and in nearby site C.

For purposes of developing a minimum plan of action, we will assume that artifact density in site B will be too low to justify hand excavation of plowzone sediments within either of the two archeological sites, Lower Hidatsa West (32ME499) or Hotrok (32ME412). Working under such an assumption, we will develop a working mitigation program very similar in procedure to that proposed for site B in 1979 (Ahler 1979:19):

1. Removal by heavy equipment of the entire plowzone from site B, exposing any possible intact cultural features at the base of the plowzone deposits.
2. Detailed archeological mapping of the spatial distribution of all exposed subplowzone features.
3. Hand excavation of all features likely to yield meaningful cultural data; waterscreen processing for recovery of all excavated feature artifacts.
4. Artifact analysis and preparation of a final technical report on all archeological investigations in site B.

We can use the data from the original site B investigations as a guide for estimating the scope of fieldwork in the modified, expanded site B. The original investigations led to an estimate that roughly 43 (+20) cultural features could be expected to occur within the site B area (1.63 ha), in a density of about 26 features per hectare. The area of expanded investigation in site B is ca. 0.71 hectare. If a similar feature density occurs in the expansion area, we will expect to find about 19 additional features in the site B expansion area, bringing the total expected feature occurrence in the original and expanded areas combined to about 62 features.

Several facts suggest that a feature density substantially higher than the 26 per hectare (the density in original site B) can be expected to occur in the expansion area. Among these facts are the substantially higher surface artifact densities known to occur throughout most of this expansion area, particularly within the Hotrok site. Excavations in site C within the Lower Hidatsa West site have indicated that subplowzone features are relatively more dense in areas with higher surface artifact density. From the site C testing, we know subplowzone features occur in a density of about 123 per hectare in the sampled areas. In addition, subplowzone features are already known to occur within the Hotrok site where portions of two features were discovered in an excavation covering 59 square meters within the central part of that site (Ahler and Mehrer 1984:47-51). This yields a feature density of about 254 per hectare in that excavation area.

These facts suggest that, realistically, we should expect to find more than 19 cultural features in the expansion area. We can somewhat arbitrarily double this figure to about 38, and for purposes of developing a working plan, can estimated that, minimally, 80-81 cultural features will be encountered in the total site B construction area. This is a figure roughly twice as great as the original feature count of 43 anticipated in the original site B zone. Because the mitigation field effort is directly geared to the number of features encountered, we now expect the mitigation work effort in the total modified site B area to be about two times as great as was estimated for the original site B area in 1979 (Ahler 1979:19).

Under the proposed minimum plan, field investigations for phase 2 mitigation will require a team of about four persons working for a two-week period. These will be UND staff members, including the project director and three field assistants. The activities of this work team will be logistically closely coordinated with a heavy equipment operator who will carefully and systematically strip the plowzone from all parts of the site B impact zone. The stripping operation will be conducted in spurts, intermingled with the necessary mapping and excavation activities of the archeological crew as cultural features were encountered and removed. Eventually, all the stripped plowzone fill will be replaced and smoothed to grade. Because of the complex interaction required between the equipment operator and the archeological crew, it will be necessary to retain the operator on-site throughout the two week duration of the fieldwork.

As in the phase 1 program, all field activities, including particularly any discovery of human burials, will be fully coordinated with the Area Manager at KNRI and with the project contact person at MWAC.

Upon completion of the field activities, artifact analysis will be conducted in Grand Forks and a detailed technical report on all aspects of the project, including both phase 1 and phase 2 activities, will be prepared. Analytical methods will be similar to those followed in other KNRI excavation projects. For purposes of developing a minimum work plan, we will assume that most cultural features encountered will be very ephemeral in nature and will not have high volumes nor contain high densities of multiple classes of artifacts. Under these assumptions, few specialized studies such as radiocarbon analysis and intensive analysis of vertebrate faunal remains will be required in the artifact analysis phase of the work. Upon completion of the analysis, an inventory of recovered artifacts will be generated similar in format and structure to the existing computerized inventory for all excavated collections from the KNRI. This computerized data file, along with specialized artifact class data files for pottery, stone tools, and glass beads, will be prepared for submission to MWAC along with all other project records. All artifacts will be bagged and boxed for storage in a manner compatible with the remainder of the KNRI archeological collections. The analytic and reporting work will require about a two-month effort from an experienced laboratory assistant, a 0.5-month effort from a data entry person dealing with the computerized inventories, a 0.75-month effort from a draftsman/photographer, and about a one-month effort from the project principal investigator. The project principal investigator will be the main author of the technical report.

Scheduling

Phase 2 fieldwork will be completed by June 30, 1988, contingent upon receipt by UND of a detailed map of the final site B impact zone by March 1, 1988 and agreement upon a detailed mitigation plan and cost estimate by April 1, 1988. The required copies of the technical report will be submitted by UND to MWAC no later than May 31, 1989; these copies could be submitted up to four months sooner than that, if necessary and if agreed upon in the modified project supplemental agreement. All project records, notes, maps, slides, photographs, negatives, illustrations, computerized collection and specimen inventories, and artifact and specimen collections generated as a result of this work will also be submitted by UND to MWAC by May 31, 1989.

Budget

The cost estimate on the following page for phase 2 investigations is based on the preceding discussion of fieldwork which does not assume the necessity for hand excavation and controlled artifact recovery from plowzone deposits. Furthermore, this cost estimate is also based on the assumption that no more than about 80 cultural features will be encountered in the total site B area and that those features will for the most part be very ephemeral in nature and will not contain large amounts of complex artifact classes. This cost estimate can therefore be considered as a minimum estimate for mitigation activities, based on a field and laboratory effort about two times as great as that proposed in the mitigation plan for the original site B investigation (Ahler 1979:19).

Should the phase 1 investigations demonstrate that plowzone artifacts occur in sufficient density and variety in any investigated part of the expansion area to allow meaningful functional, chronological, and/or spatial interpretation of cultural activities, then it is likely that controlled hand excavation of some portion of the plowzone in either or both of the impacted archeological sites will be recommended. Also, if the phase 1 investigations show that assumptions about low feature densities and low artifact return from features are unreliable for the expansion zone, then additional mitigation efforts aimed at excavation of more features and more complex analytic tasks will also be required. The bottom line is that the mitigation program should be designed to salvage available and meaningful cultural data which will otherwise be destroyed in the construction process. If the archeological situation proves more complex than we have assumed here, then a new and more costly mitigation plan than that outlined here will have to be developed and implemented. Such a mitigation plan will probably be similar in general procedure to the plan originally proposed for facility site C which was investigated in 1979 (Ahler 1979:34-38).

The present cost estimate includes the rental of heavy equipment and operator necessary to strip the plowzone in site B. Heavy equipment costs were not included in the original site B mitigation budget estimate (Ahler 1979:19,20). As noted previously, because of the logistical complexities of having the archeologists and the operator working together within a confined area, and the need to redistribute the topsoil upon completion of the archeological work, it will be necessary to retain the equipment operator on call throughout the duration of the fieldwork.

PHASE 2 ITEMIZED BUDGET

	Estimated Cost
FIELDWORK	
<u>Salaries and Wages</u>	
Project Director (S. Ahler)(0.5 mo @ \$3055/mo)	\$ 1528.00
Field Assistants (3)(0.5 mo @ \$960/mo)	1440.00
<u>Fringe Benefits</u>	
S. Ahler (20% of salaries and wages)	306.00
Field Assistants (10% of salaries and wages)	144.00
<u>Lodging House Rental</u> (1.0 mo @ \$500/mo)	500.00
<u>Meals</u> (75 person-days @ \$10/da)	750.00
<u>Vehicle Rental</u>	
Pickup Truck (1500 mi @ \$.18/mi)	270.00
Van (1200 mi @ \$.30)+(15 days @ \$6/day)	450.00
<u>Heavy Equipment Rental</u> Bottom Loader or Scraper (10 days)(8 hrs/day)(\$60/hr)	4800.00
<u>Expendable Supplies</u> Film, developing, screen and pump repair, lumber, gas, oil, diesel fuel, markers, bags, boxes, graph paper, etc.	500.00
Subtotal Direct Field Costs	\$ 10688.00
<u>Indirect Costs</u> Off-campus rate of 22.1% of total direct costs	2362.00
Total Field Costs	\$ 13050.00

LABORATORY COSTS	
<u>Salary and Wages</u>	
S. Ahler (1.0 mo @ \$3208/mo)	\$ 3208.00
Laboratory Assistant (2.0 mo @ \$1150/mo)	2300.00
Draftsperson (0.75 month @ \$1250/mo)	938.00
Data Manager (0.5 mo @ \$1200/mo)	600.00
<u>Fringe Benefits</u>	
S. Ahler (20.0% of salaries and wages)	642.00
All Others (25%of salaries and wages)	960.00
<u>Phone, Postage</u>	75.00
<u>Expendable Supplies</u> Bags, markers, forms, etc.	100.00
<u>Report Preparation</u> Printing, halftones, duplicating	500.00
Subtotal Laboratory Direct Costs	\$ 9323.00
<u>Indirect Costs</u> On-campus rate of 37.5% of total direct on-campus costs	3496.00
Total Laboratory Costs	\$ 12819.00
Total Phase 2 Costs	\$ 25869.00

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ANTHROPOLOGY
BOX 8254 UNIVERSITY STATION
GRAND FORKS NORTH DAKOTA 58202
701 777 3008

September 27, 1987

Dr. F. A. Calabrese
Midwest Archeological Center
U. S. National Park Service
Federal Building - Rm 474
100 Centennial Mall North
Lincoln, Nebraska 68508

Dear Dr. Calabrese:

This letter constitutes an interim report submitted by the University of North Dakota (UND) to the U. S. National Park Service (NPS) regarding a summary of field activities, preliminary analysis, and recommendations concerning recent archeological investigations by UND at the proposed expanded visitor/administrative (v/a) facility Site B in the Knife River Indian Villages National Historic Site (KNRI). This letter report is submitted in accordance with stipulations in Supplemental Cooperative Agreement No. CA-6115-7-8023 under Master Cooperative Agreement No. CA-6000-7-8015 between UND and the NPS.

Fieldwork

The project was initiated on Monday, July 27, 1987, when UND received the notice to proceed from the Midwest Archeological Center (MWAC). Full implementation of the field program was delayed approximately two days due to procedural foul-ups regarding completion of the Section 106 compliance process. The effect of these foul-ups on the UND field program has already been spelled out in a letter from Ahler to Calabrese dated August 14, 1987, and such detail will not be repeated here.

By Wednesday, July 28, it became apparent to the UND staff that the northern margin of the the area marked on the ground by the NPS for consideration as the v/a facility Site B location in fact lay more than 20 meters south of the Site B boundary originally demarcated by the NPS for investigation in 1979. Thus, it was apparent that the Phase 1 fieldwork plan set forth for the current project by the UND staff, based on the 1979 Site B location, in fact involved some land substantially to the north of the area actually being considered for Site B expansion by the current NPS planning team. This inconsistency was brought to the attention of the KNRI staff, and on Monday, August 3, the UND crew was informed by the KNRI staff that the scope of the present project should be truncated by 20 meters on the northern edge. That is, we were told to investigate as far north as the 220 north grid line rather than to the 240 north grid line as spelled out in the UND project proposal. The modified work plan then involved sampling and excavation between the 110N and 220N grid lines and between the original Site B boundary and the 225E grid line. This area is referred to herein as the study area.

The fieldwork was fully under way by August 3 and continued as planned with few serious interruptions for the next two weeks. Excavations were backfilled by August 15, and the field camp was closed and all excavated collections and

Dr. F. A. Calabrese
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notes were transferred to Grand Forks on Tuesday, August 18, 1987.

Fieldwork involved four major tasks: (1) excavation of systematically located plowzone waterscreen samples; (2) excavation of controlled test units for examination of stratigraphy and subplowzone cultural deposits; (3) mechanized excavation of strip trenches to expose a sample of subplowzone cultural features; and (4) controlled excavation of any discovered cultural features. All of these tasks were completed as planned.

A total of 66 plowzone samples measuring 1.0 x 0.65 meter in size and ca. 15-18 cm deep were removed and processed with waterscreen recovery. These were systematically located on 10 meter grid intervals throughout the designated study area. No definite subplowzone cultural features were found within any of the plowzone sample plots.

Two 1.0 x 1.0 meter test pits or controlled excavation units were excavated in arbitrary levels from the surface to Pleistocene age deposits. These units were located at grid points 170NE210 and 220NE210. These test units extended to 1.14 meters and 0.98 meters below surface. Excavated matrix from these units was processed with waterscreen recovery.

Seven strip trench segments, each 1.5 meters in width and varying from 40 to 110 meters in length, were excavated with a Bobcat front-end loader with a five foot wide bucket. Six of these trenches were oriented east-west and were placed on 20 m north-south intervals on the 120N, 140N, 160N, 180N, 200N, and 220N grid lines. The seventh was oriented north-south and was placed near the east margin of the study area on the 220E grid line. The plowzone was removed from these trenches to a depth of ca. 20 cm without any attempt at artifact recovery, and the floors were cleaned and examined for artifacts and subplowzone cultural features. Two cultural features were discovered in this manner, one located at grid point 199NE220 and the second at 221NE208.

One cultural feature (Feature 3 within the Hotrok site, 32ME412) consisted of a basin-shaped concentration of fire-cracked rock and other artifacts about 60 cm in diameter and about 20 cm thick. The second cultural feature (Feature 19 within the Lower Hidatsa West site, 32ME499) consisted of a shallow basin-shaped concentration of fire-cracked rock, animal bone, and other artifacts about 80 cm in diameter and about 15 cm thick. The portions of the two cultural features lying within the strip trenches were completely excavated and the feature matrix was processed with waterscreen recovery. No features which could be interpreted as human burial pits were discovered in the study area.

Analysis

Flotation, size-grading, preliminary sorting, and initial quantification of all plowzone sample plots have been completed. Similar tasks are under way for the deep test unit samples and the feature samples. Counts of all artifacts associated with Native American use of the study area are available for the plowzone sample plots. This data set includes counts for pottery, modified stone, vertebrate faunal remains, fire-cracked rock, fired clay, shell, and

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glass trade beads. Modified stone (chipped stone tools and flaking debris combined) is the most common artifact class, and fire-cracked rock is the second most common artifact class in the plowzone samples.

Densities of total Native American plowzone artifacts can be computed for the sample plots, expressed in terms of total counts per square meter excavation area. A wide range in plowzone artifact density occurs within the study area, varying from a minimum of 0 artifacts in two sample plots in the south-central part of the study area to maximum values of 102, 111, and 112 artifacts per square meter in three sample plots along the northern margin of the study area. A mean plowzone artifact density of 22.3 items per square meter can be computed for the 68 plowzone samples including the two controlled excavation units within the 1987 study area.

It is useful to display these plowzone artifact density values in the form of a map which conveys spatial variation in artifact density. Such a display occurs on the enclosed Map 1. This figure expresses the artifact density variation as a series of isolines or contour lines of equal artifact density based on either 10- or 20-count intervals. The isoline map clearly indicates that a general pattern occurs within the study area in which density values generally increase toward grid north and are highest along the northern margin of the study area. This pattern was predicted beforehand based on point-quarter surface artifact density plots. One isolated high-density plot (66 artifacts per square meter) occurs near the southern margin of the study area. Map 1 also shows the location of the discovered cultural features (F3 and F19); it can be seen that these features occur in areas with relatively high plowzone artifact densities along the northern and eastern margins of the study area. Also shown on Map 1 are the boundary of the original Site B study area, as demarcated in 1979, and various datum points along the park boundary.

Specific items of interest discovered within the plowzone include a fragment of a shell disk bead found in Test 208 at the southern margin of the study area and a single human tooth found in Test 246 in the east-central part of the study area. These items are marked on Map 1.

Present analysis of controlled test unit data indicates that artifacts occur in extremely low frequency in subplowzone deposits and that no detectable cultural horizons were encountered in the excavations extending below the plowzone. This information is compatible with the results of all other deep tests conducted in the general area.

Present analysis indicates that the two cultural features contain mostly fire-cracked rock as well as modest amounts of identifiable animal bone, chipped stone remains, and organic remains. The features appear to be Plains Village period in age, but little more can be said at the present time regarding specific cultural associations.

Discussion and Recommendations

Three questions are of primary importance at the present time regarding the

Dr. F. A. Calabrese
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archeological/cultural content within the study area: (1) Is artifact density and content within the plowzone sufficiently great to require that controlled, salvage excavations of plowzone deposits be conducted as a part of the archeological mitigation program in Site B? That is, does the existing Phase 2 mitigation plan need to be modified to include controlled plowzone excavations? (2) In the same vein, are discovered feature densities within the study area great enough to require a modification of the existing Phase 2 mitigation plan? (3) Is there any new evidence for the presence of human burials within the study area which should be considered while planning and executing Phase 2 mitigation and construction activities in Site B?

Regarding the first question, artifact densities are extremely low to very low throughout the study area with the exception of density values at several locations along the northern margin on the 220N grid line. A very localized zone of moderately high artifact density definitely occurs on the northern margin of the study area, as illustrated by the isoline plot (Map 1). An overall density of 22.3 artifacts per square meter has been noted for the plowzone in the study area. It can further be noted that if the northernmost tier of seven sample plots on the 220N grid line is segregated from the remaining sample plots, the northern tier exhibits a mean density value of 64.6 artifacts per square meter while the remaining 61 plots to the south exhibit a mean density value of only 17.4 items per square meter.

It can be noted that this mean value of 64.6 items per square meter for the northern tier of sample plots is comparable to density values within several artifact concentrations which were discovered in the plowzone in v/a facility Site C (Area C) which was investigated in 1979 (Ahler 1979:34; Toom et al. 1985:Fig. 49). In the case of Site C, it was determined that these artifact densities were sufficiently high to allow meaningful archeological interpretation of the plowzone artifact assemblage. Accordingly, the mitigation plan proposed for Site C called for hand excavation and waterscreen recovery of selected samples of plowzone sediments in several high density loci within Site C (Ahler 1979:37).

A similar approach to mitigation is deemed appropriate for a small part of the present Site B. If construction activities are going to disturb the high artifact density area along the northern edge of the present study area, then the mitigation plan should involve some controlled hand excavation and artifact recovery from the plowzone within that restricted area. Specifically, such excavation would occur in the area bounded by grid lines 160E, 200E, 215N, and 220N. If carried out, this would mean an expensive addition to the present Phase 2 mitigation plan, and therefore, an activity which should be avoided if possible. Because this high artifact density area lies on the extreme northern margin of the study area, a simpler solution is to recommend that construction simply be planned to avoid any disturbance along the northern margin of the study area.

Accordingly, I have marked on Map 1 a "preferred construction zone" which excludes the small area having highest plowzone artifact densities. I recommend that construction disturbance be confined to this preferred zone and that it not occur in the small part of the study area east of the 160E grid

line and north of the 215N grid line. Note that the preferred construction zone includes all of the area previously included within the original Site B study boundary and an additional area to the west and northwest which, on the basis of extremely low surface artifact densities, is also thought to contain no significant plowzone archeological deposits. Note also that the preferred construction zone is drawn to avoid disturbance of the Lobodi site (32ME411) just to the south, a location thought to contain one or more human burials.

Regarding the topic of mitigation planning for subplowzone cultural features in the Site B area, the new evidence indicates that features occur in the study area in moderately low density. Two features were discovered in strip trenches having a total area of about 585 square meters. This can be projected directly to compute a feature density of 34 features per hectare within the study area. This density figure is well within the working estimates used to develop the existing Phase 2 mitigation plan. Therefore, the new evidence regarding cultural features in the study area requires no modification of the existing Phase 2 mitigation plan.

Regarding the topic of human burials, no evidence was discovered which would confirm the presence of human burial, in pits, or disturbed, within the study area. However, the two items noted above, the human tooth and the shell bead, both discovered in the plowzone, do suggest indirectly the possibility of human burials in the general vicinity of the proposed Site B construction area. The shell bead is very similar to another bead and two shell disks found in 1978 within the confines of the nearby Lobodi site (32ME411); the shell artifacts were found on the surface in that location in proximity to a human tooth and what appeared to be small fragments of human bone (Ahler, Weston, and Mehrer 1979:43). Another perforated shell bead has recently been found by KNRI staff members within the confines of the Lobodi site. The general material content at the Lobodi site strongly indicates the presence of a human interment at that location, partially or completely disturbed by cultivation (Ahler, Weston, and Mehrer 1979:46).

The shell bead discovered within the study area, some 40 meters northeast of the Lobodi site, suggests the possibility that additional human interments may exist, undiscovered, within the study area. The presence of a human tooth within the study area, some 90 meters farther to the northeast of the Lobodi site, suggests the same possibility. This possibility has long been recognized by the KNRI staff and NPS planners. The present discoveries provide no conclusive evidence of human interments within the expanded Site B construction zone, but they do underscore the need to fully examine that area for human interments during the mitigation phase of the project so that inadvertent disturbance of such remains can be fully avoided or otherwise appropriately handled.

In summary, the present evidence from the recently completed field and analytic work indicates that the existing plan for Phase 2 mitigation activities within the Site B construction zone should be adequate to offset the impact to cultural resources within the area, provided that a very small part of the expanded Site B study area can be avoided during construction. If construction activities can be confined to the preferred construction zone marked on Map 1,

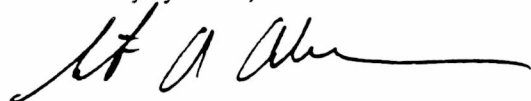
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then funding presently allocated for the Phase 2 mitigation program should be sufficient to accomplish the necessary tasks. If project planners deem that it is necessary to disturb the northernmost five meters of the expanded study area, then additional excavation, not presently planned for, will have to be incorporated into the Phase 2 mitigation plan. Such an alternative would probably require additional funding above the level already allocated.

In a final note, I would like to mention the topic of constructed, full-scale earthlodges which are presently being considered as part of the interpretive program for the KNRI. As with other constructions, it would seem appropriate to locate such earthlodges in areas where necessary archeological mitigation work has occurred beforehand. It seems likely that the NPS will want to locate such earthlodges in proximity to the planned v/a facility. If that is the case, then the NPS planning team will probably want to incorporate the earthlodge construction site(s) into the overall Site B construction plan which UND will then use to develop the final Phase 2 mitigation plan which will be implemented during the summer of 1988.

If there are any questions regarding the status of the project and the recommendations provided herein, please do not hesitate to call. Thank you for your assistance, and for that of other NPS personnel such as Steve DeVore who so capably handled the field program, and for your continuing cooperation on this project.

Sincerely yours,

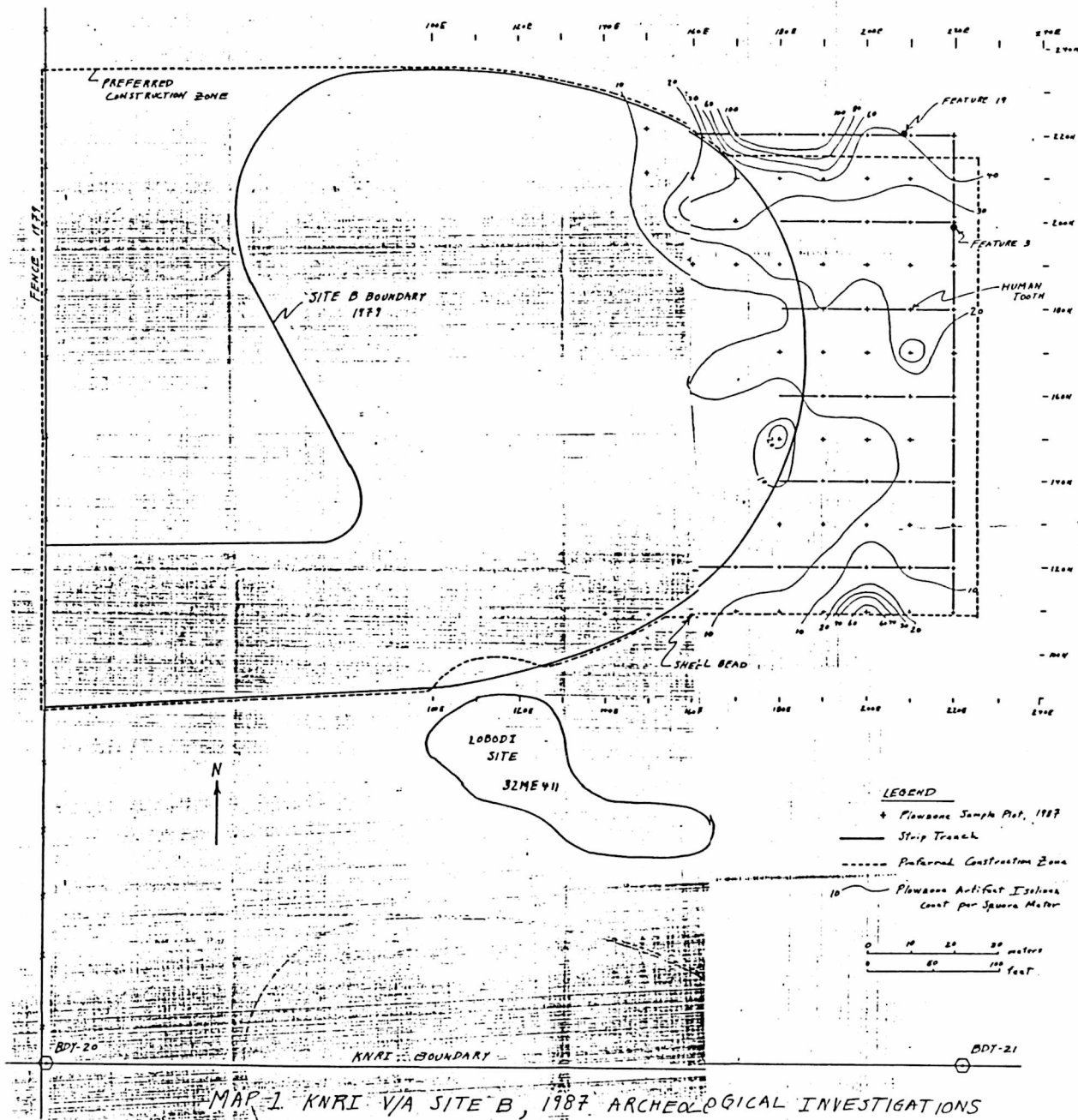


Stanley A. Ahler
Associate Professor

Encl: Map 1: project plan/isoline density map/preferred construction zone

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MAP-1 KNRI V/A SITE B, 1987. ARCHEOLOGICAL INVESTIGATIONS

DETAILED WORK PLAN FOR MITIGATION OF IMPACTS ON CULTURAL RESOURCES BY
VISITOR CENTER CONSTRUCTION AT SITE B,
KNIFE RIVER INDIAN VILLAGES NATIONAL HISTORIC SITE

prepared by

Department of Anthropology
University of North Dakota, Grand Forks

submitted to

Midwest Archeological Center
U. S. National Park Service
Lincoln, Nebraska

Proposed Project Dates: July 16, 1988 through May 31, 1989

Proposed Cost: \$3,488.00 in addition to funding presently allocated
under Supplemental Cooperative Agreement CA-6115-7-8023.

Endorsements:

Alex Kotch 05-26-88
Signature Date
Dr. Alex Kotch, Director
Office of Research and Program
Development

Stanley A. Ahler 5/26/88
Signature Date
Dr. Stanley A. Ahler
Principal Investigator

Signature Date
Dr. Fred Schneider, Acting Chair
Department of Anthropology

DETAILED WORK PLAN FOR MITIGATION OF IMPACTS ON CULTURAL RESOURCES BY
VISITOR CENTER CONSTRUCTION AT SITE B,
KNIFE RIVER INDIAN VILLAGES NATIONAL HISTORIC SITE

Introduction

The selected location for construction of the proposed visitor/administrative (V/A) facility at Site B within the Knife River Indian Villages National Historic site (KNRI) overlaps with parts of two archeological sites, Lower Hidatsa West (32ME499), and Hotrok (32ME412). Extensive evaluations have occurred at both sites, and both sites have been determined to contribute to the listing of Knife River Indian Villages Archeological District on the National Register of Historic Places. For that reason, archeological activities must occur within the proposed V/A construction area in order to mitigate the negative effect of construction on the significant resources thought to occur in each site. The following document outlines a detailed plan for the execution of such archeological activities. This document has been prepared in accordance with stipulations regarding "Phase 2" investigations in Supplemental Cooperative Agreement No. CA-6115-7-8023 under Master Cooperative Agreement No. CA-6000-7-8015 between the University of North Dakota (UND) and the U. S. National Park Service (NPS).

Intensive surface examination and two episodes of systematic test excavation have occurred within the Site B, V/A construction area. Surface observations (Ahler et al. 1979) indicate a sparse scatter of aboriginal artifacts throughout most of the area, with an increase in artifact densities to the east and northeast within the boundaries of the Hotrok and Lower Hidatsa West archeological sites. Subsurface strip trenching and systematic excavations on 10- and 20-meter intervals confirm these surface patterns. Tests in 1979 (Ahler 1979; Toom et al. 1985:26,135) located one cultural feature (an ash concentration) and documented artifact densities ranging from zero to 38 n/m². Excavations in 1987 (letter report from S. A. Ahler to F. A. Calabrese, dated 9/27/87) in an expanded construction area slightly farther to the east located two cultural features and documented plowzone artifact densities ranging from zero to 112 n/m² with a mean of ca. 22 n/m². Limited analysis indicates that the two cultural features found in 1987 contain mostly fire-cracked rock as well as modest amounts of identifiable animal bone, chipped stone remains, and organic remains. The features appear to be Plains Village period in age. No direct evidence of human burials occurs anywhere within the investigated Site B area. No evidence of significant subplowzone cultural horizons has been discovered in the Site B area.

Following the 1987 field investigations, the UND archeological team identified a boundary for a "preferred construction zone" for the V/A facility (Map 1 in the letter report from S. Ahler to F. A. Calabrese, dated 9/27/87). This zone excluded a small part of the test excavated area within the Lower Hidatsa West site (east of grid line 160E and north of grid line 215N) which produced particularly high plowzone artifact densities. The preferred construction zone was defined to encompass areas producing no evidence of significant plowzone artifact deposits and to intentionally exclude areas where plowzone artifact densities were high enough to suggest the need for artifact

recovery from the plowzone. The preferred construction zone includes all of the area previously included within the original Site B study boundary (Ahler 1979), an extension to the east, and an additional area to the west and northwest which, on the basis of extremely low surface artifact densities, is also thought to contain no significant plowzone archeological deposits. The preferred construction zone boundary was also drawn to avoid disturbance of the Lobodi site (32ME411) just to the south, a location thought to contain one or more human burials. It was recommended in the letter report that all construction activities be confined to the preferred construction zone.

In a memorandum to the Chief of the Midwest Archeological Center (MWAC), dated April 11, 1988, the Superintendent of the KNRI indicated that archeological mitigation activities should proceed which would cover the entire "preferred construction zone" as delineated in the 1987 UND letter report. Accordingly, the Chief of MWAC requested that UND develop a detailed mitigation plan focused specifically on the cultural resources within this zone (letter from F. A. Calabrese to S. Ahler, dated 4/18/88). The following work plan is developed in response to that request and provides a detailed plan of action for archeological work in the designated Site B construction zone. In addition, NPS officials have identified the project utility corridor as being confined to the county road right-of-way between the project site and the town of Stanton. The NPS has requested that UND archeologists examine this utility corridor for visible cultural resources; this task will also be conducted as part of the present work plan.

Proposed Fieldwork

The general location of the project is shown on Map A, attached. The designated utility corridor consists of the county road right-of-way extending from the southwest corner of the construction area to the northwest corner of the town of Stanton. The corridor is approximately 120 ft in width and 3/4 miles in length.

As part of the present fieldwork plan the full road right-of-way from the construction zone to the town of Stanton will be intensively examined for evidence of cultural resources. No archeological sites are presently recorded along this corridor, and based on topography, no major archeological sites are expected to occur here. The full right-of-way on either side of the present road surface will be carefully inspected by a team of two archeologists. All visible artifacts or other evidence of archeological resources will be documented on maps, and North Dakota archeological site forms will be completed if necessary. Areas of lesser and greater prior disturbance by road construction within the present right-of-way will be noted. A letter report will be produced which summarizes all evidence for intact or disturbed cultural resources discovered within this right-of-way and which summarizes data on the extent of prior disturbance within the right-of-way. These data can then be used by the NPS to plan utility line placements which will have the least impact on known or potential cultural resources.

The following discussion deals specifically with planned field investigations within the main construction zone, exclusive of the utility corridor. Map B, attached, provides a detailed contour map of the main project construction area, illustrating the project boundary as indicated by the heavy

black line. This map and the project boundary are derived from a superposition of the "preferred construction zone" onto a half-foot contour map provided by the project Central Team, Denver Service Center (a map transmitted to Ahler from MWAC on 4/4/88). Except for the utility corridor investigations, all archeological investigations and all subsequent construction activities will be conducted within the area outlined by the project boundary on Map B, attached. Hereinafter, the term "project boundary" explicitly refers to the area designated on Map B and excludes the utility corridor.

All available evidence from prior archeological investigations indicates that the only significant cultural resources occurring within the project boundary are the undisturbed, subplowzone remnants of cultural features of Native American origin. Present evidence indicates that these features can be expected to contain fire-cracked rock, ash, animal bone, pottery, and other cultural artifacts dating from the Plains Village period. Based on analysis of contents of features excavated in Site C, just to the north within the Lower Hidatsa West site (Toom et al. 1985), it is reasonable to expect these features to relate to occupation and use of nearby permanent earthlodge villages, such as Lower Hidatsa Village, and to special-function activity areas such as the adjoining Hotrok site. All archeological investigations in the Site B, V/A facility area will focus on recovery of artifacts and data from these subplowzone features. No systematic recovery of artifacts from the plowzone will occur, nor will any further explorations for subplowzone, earlier cultural components.

The mitigation fieldwork plan for work within the designated project boundary (Map B) has the following components:

1. Removal by heavy equipment of the entire plowzone from the project area, exposing all intact cultural feature remnants at the base of the plowzone deposits.
2. Detailed archeological mapping of the spatial distribution of all exposed subplowzone features.
3. Hand excavation of all features likely to yield meaningful cultural data, with waterscreen processing for recovery of all excavated feature artifacts.
4. Replacement of excavated plowzone sediments to the original contour, again using heavy equipment.

We can use the data from test excavations as a guide for estimating the scope of fieldwork within the project boundary. The 1979 investigations led to an estimate of roughly 26 features per hectare within the major portion of the Site B construction zone. Using an approximate area of 2.1 hectares, this yields a rough estimate of 55 features within the central and western part of the construction zone. The 1987 investigations along the eastern project margin encountered higher feature and artifact densities, with a mean of about 48 features per hectare encountered here. With an area of about 0.6 hectare, roughly 29 features can be expected to occur in the eastern margin of the project area. Together, these figures suggest that about 84 subplowzone features will be located in the entire project boundary area. This is a very crude estimate, and the final count is thought likely to lie somewhere between 50 and 100 features.

Field investigations will involve a team of four archeologists and a heavy equipment operator(s) working intensively for roughly a three-week period. The archeological activities will be closely coordinated with the heavy equipment operator(s) who will carefully and systematically strip the plowzone from all parts of the Site B impact zone within the designated project boundary (Map B). The stripping operation will be conducted in stages, sequenced with the necessary mapping and excavation activities of the archeological crew as cultural features were encountered and removed. Discovered features will be mapped into the existing site grid and excavated as units, with all excavated matrix hauled by wheelbarrow and truck for processing at a nearby waterscreen facility. By the close of the field project all the stripped plowzone fill will be replaced and smoothed to grade. The archeological team will not reseed the construction area when work is finished due to the imminence of visitor center construction, scheduled to occur in 1989.

The plowzone will be removed by heavy equipment consisting of a road patrol or blade machine with a 14 or 16 foot blade. The plowzone soil will be removed in alternating strips spaced slightly closer than the width of one blade cut, with the spoil thrown to the side in a windrow. Alternating strips will be cut in large blocks throughout the project area and the strips or transects will be backfilled as each is cleared of archeological features. Then the alternate strips or transects will be bladed off, examined for cultural features, and backfilled. The pace of plowzone removal will be monitored closely from the outset. If necessary to complete the job on time, a paddle wheel scraper with about a 10 cubic yard capacity will be added to the project to be used in place of or in addition to the blade machine. If the paddle wheel scraper becomes the primary earthmoving machine, the project area will be marked off in six to eight subareas and fill from one area will be used to backfill an adjacent area as it is cleared of archeological features. The designated plan for plowzone removal will result in maximum efficiency and effective cultural feature exposure with minimum impact on archeological resources.

The activities of the archeologists and the heavy equipment operator(s) will conform to certain conditions specified by the NPS. All heavy equipment traffic and stockpiling of removed plowzone fill will be confined to the designated project boundary as marked on Map B. Pickup trucks and cars may use other rights-of-way or traffic areas only as designated by the Superintendent of the KNRI. The work area will be kept in a condition conducive to the safety of workmen and the public and neat in appearance. Waste will not be allowed to accumulate in the project area.

All field activities will be fully coordinated with the Superintendent of the KNRI and with the designated Project Supervisor at MWAC. Should human burials be encountered, the operations will cease immediately and the Superintendent at the KNRI and the Project Supervisor at MWAC will be immediately notified.

Proposed Analysis and Reporting

As noted previously, the results of investigations in the utility corridor will be documented in a letter report from UND to the Project Supervisor at MWAC. This information will also be conveyed verbally by the UND field director to

the Superintendent of the KNRI while fieldwork is ongoing. The letter report will contain locational information on any intact or disturbed cultural resources discovered within the utility corridor, copies of any completed site forms, and an evaluation of the corridor regarding areas within the corridor having evidence for lesser or greater prior disturbance and areas having lesser and greater potential for existence of significant, intact cultural resources. This will be the only report produced on the utility corridor investigations described herein.

Upon completion of the field activities within the main construction area, artifact analysis will be conducted in Grand Forks and a detailed technical report on all aspects of the project, including both the 1987 test excavations (Phase 1) as well as the 1988 mitigation activities (Phase 2), will be prepared. Analytic methods will be similar to those followed in other KNRI excavation projects. Based on available evidence, it is assumed that most cultural features encountered will be very ephemeral in nature and will not have high volumes nor contain high densities of multiple classes of artifacts. Under these assumptions, few specialized studies such as extensive radiocarbon analyses and intensive analyses of vertebrate faunal remains are anticipated for the analytic phase of the work. It is assumed that no more than two radiocarbon samples will be processed and that vertebrate faunal identifications and all other analytic tasks can be conducted by the designated project personnel working with available comparative collections at UND. The main focus in the analysis and reporting will be on sorting and routine quantification of standard artifact and material classes, derivation of culture-historic information from available diagnostic artifacts such as pottery rim sherds and projectile points, and preparation of documentary data in the form of maps and profiles regarding the type and spatial locations of all cultural features encountered in excavations. Plowzone artifact density data from the 1979 excavations will be combined with data from the 1987 testing to develop density isoline maps for various artifact classes for the entire project area.

The primary research emphasis in the archeological program will be placed on determining the age and functional orientation of cultural activities which occurred within the project boundary. This information will be developed through an assessment of diagnostic artifacts in conjunction with data on feature type and content. We are particularly interested in evidence of architectural remains which have survived the cultivation process, such as drying stages or ceremonial structures which may have been built at some distance from the main villages. Also of particular interest will be evidence for material or food processing activities (stone artifact manufacture, pottery firing, food roasting pits) which for a variety of reasons might have been conducted outside the village proper. Functional comparisons will be made between the archeological content within the project area and in other nearby areas with much more intensive cultural activity such as Lower Hidatsa Village proper and the central part of the Hotrok site. Through this process we expect to gain information on the spatial structuring of activity patterns, both within and immediately peripheral to the main village settlements, as well as in nearby areas which from the surface exhibit minor evidence of cultural content.

During the analysis, an inventory of recovered artifacts will be generated using the database program PC-File/R (ButtonWare 1985). This data file will be similar in format and structure to the existing computerized inventory for all

excavated collections from the KNRI as reported in Ahler (1987a). This computerized data file, along with specialized artifact class data files for pottery, stone tools, and glass beads, will be submitted to MWAC in conjunction with the final technical report. All artifacts will be bagged and boxed for storage in a manner compatible with the remainder of the KNRI archeological collections, as reported in Ahler (1987b).

Personnel

The mitigation work will be conducted under the overall supervision of the principal investigator, Stanley A. Ahler. The fieldwork and analysis will be directly supervised by Mr. Dennis L. Toom. Toom will be the primary author of the final technical report. Toom is well-qualified for this task. He has extensive experience in archeological field investigations within the KNRI (e.g., the Taylor Bluff project, Ahler 1988), and he has prepared a final report on the 1979 testing investigations in V/A Sites A, B, and C (Toom et al. 1985).

Ahler will be involved in initiation of the field program. The primary field crew will consist of Toom and three archeological field assistants. The earthmoving activities will be conducted by an equipment operator(s) working under subcontract to UND; the equipment operator(s) will coordinate all of their on-site activities through Toom.

The laboratory analysis and reporting phase of investigations will require minor supervisory efforts from Ahler, substantial efforts from Toom and a laboratory assistant/data base manager, and short-term effort from a photographer/draftsperson.

Scheduling

Initial fieldwork activities will occur during the week of July 24-30, 1988. Activities at that time will include setup of the field camp, consultations with the KNRI Superintendent and other park personnel, location and setup of waterscreening facilities, re-establishment of the mapping grid over the project area, marking of the project boundary with steel posts (post supplied by the KNRI), marking of plowzone stripping transects and subareas, and intensive surface examination of the utility corridor. Plowzone stripping, feature identification, and all excavation work will be conducted during the first half of August, 1988. Fieldwork is scheduled for completion by about August 16, 1988. The letter report on utility corridor investigations will be submitted to MWAC by September 15, 1988. Recovered artifacts will be shipped UND facilities at Grand Forks immediately after the close of fieldwork. Laboratory analysis and report preparation will be conducted during the winter and spring of 1988-1989. The required copies of the final technical report and one diskette copy of all data files will be submitted to MWAC on or before May 31, 1989. Original copies of all archeological records and photographs generated by the project will also be submitted to MWAC by May 31, 1989. All artifacts generated by the project will be transmitted to the appropriate unit of the National Park Service at the time of submission of the final report, or will otherwise be temporarily stored at UND beyond that date under a separate

agreement between UND and the NPS developed specifically for that purpose.

Budget

A revised, itemized budget for the Phase 2 investigations described herein is found on the following page. This budget is intended to replace the original, preliminary budget for Phase 2 investigations on page 11 in the original project proposal prepared by UND and incorporated into Supplemental Cooperative Agreement No. CA-6115-7-8023.

The revised budget for Phase 2 investigations reflects several changes, including addition of the utility corridor investigations, allowance for several other necessary field activities prior to earthmoving, a more precise estimate of earthmoving costs, inclusion of funds for limited radiocarbon analyses, reorganization of project personnel costs occasioned by the major role that Dennis Toom is proposed to play in the project and the concomitantly diminished role for Ahler, and application of revised UND indirect costs rates which have been federally negotiated and determined applicable for proposals generated during the period July 1, 1987 through June 30, 1988.

The revised budget calls for a total commitment of \$29,357.00 in funds for Phase 2 investigations. This reflects an increase of \$3,488.00 over the total of \$25,869.00 currently committed by the NPS for Phase 2 studies through the current Supplemental Cooperative Agreement No. CA-6115-7-8023. UND requests that the existing cooperative agreement be modified to increase the funding in the amount of \$3,488.00, and a SF-424 Federal Assistance Form is being submitted along with this work plan in order to facilitate this request.

REVISED ITEMIZED BUDGET FOR PHASE 2 INVESTIGATIONS

FIELDWORK

Salaries and Wages

S. Ahler (0.25 mo)(\$3055/mo)	\$ 764.00
D. Toom (0.8 mo)(\$2000/mo)	1600.00
Field Assistant (1)(0.8 mo)(\$1100/mo)	880.00
Field Assistants (2)(0.5)(\$950/mo)	950.00

Fringe Benefits

S. Ahler (@ 20%)	153.00
All others (@ 15%)	515.00

Lodging Rent and Utilities (1 mo)(\$500/mo) 500.00

Meals (88 person-days @ \$10.00/day) 880.00

Vehicle Rental

Pickup truck (1500 mi @ \$0.18/mi)	270.00
Wagon/Minivan (1200 mi @ \$0.25/mi) + (18 days @ \$5/day)	390.00
Sedan (650 mi @ \$0.21/mi) + (8 days @ \$4/day)	169.00

Earthmoving Subcontract 4320.00

Expendable Supplies (film and developing, screen and
pump repair, lumber, gas, oil, markers, bags,
boxes, graph paper, etc.) 500.00

Subtotal Direct Field Costs \$11891.00

Indirect Costs Off-campus rate of 22.0% of total direct
costs 2616.00

Total Field Costs \$14507.00

ANALYSIS AND REPORTING

Salaries and Wages

S. Ahler (0.25 mo)(\$3055/mo)	\$ 764.00
D. Toom (2.0 mo)(\$2000/mo)	4000.00
Advanced Arch. Assistant/Data Base Manager (1.5 mo)(\$1200/mo)	1800.00
Photographer/Draftsperson (0.5 mo)(\$1250/mo)	625.00

Fringe Benefits

Ahler (@ 20%)	153.00
All Others (@ 30%)	1928.00

Radiocarbon Analysis (2 samples @ \$300 ea) 600.00

Phone/Postage 75.00

Expendable Supplies (plastic bags, markers, forms, etc.) 200.00

Report Preparation (printing, halftones, duplicating) 500.00

Sutotal Analysis Costs \$10645.00

Indirect Costs On-campus rate of 39.5% of total direct
costs 4205.00

Total Analysis Costs \$14850.00

Total Revised Phase 2 Project Cost \$29357.00

References Cited

Ahler, S. A.

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- 1987a Description of Computerized Data Files from Phase I Archeological Investigations at the Knife River Indian Villages National Historic Site. Department of Anthropology, University of North Dakota. Submitted to the Midwest Archeological Center, National Park Service, Lincoln.
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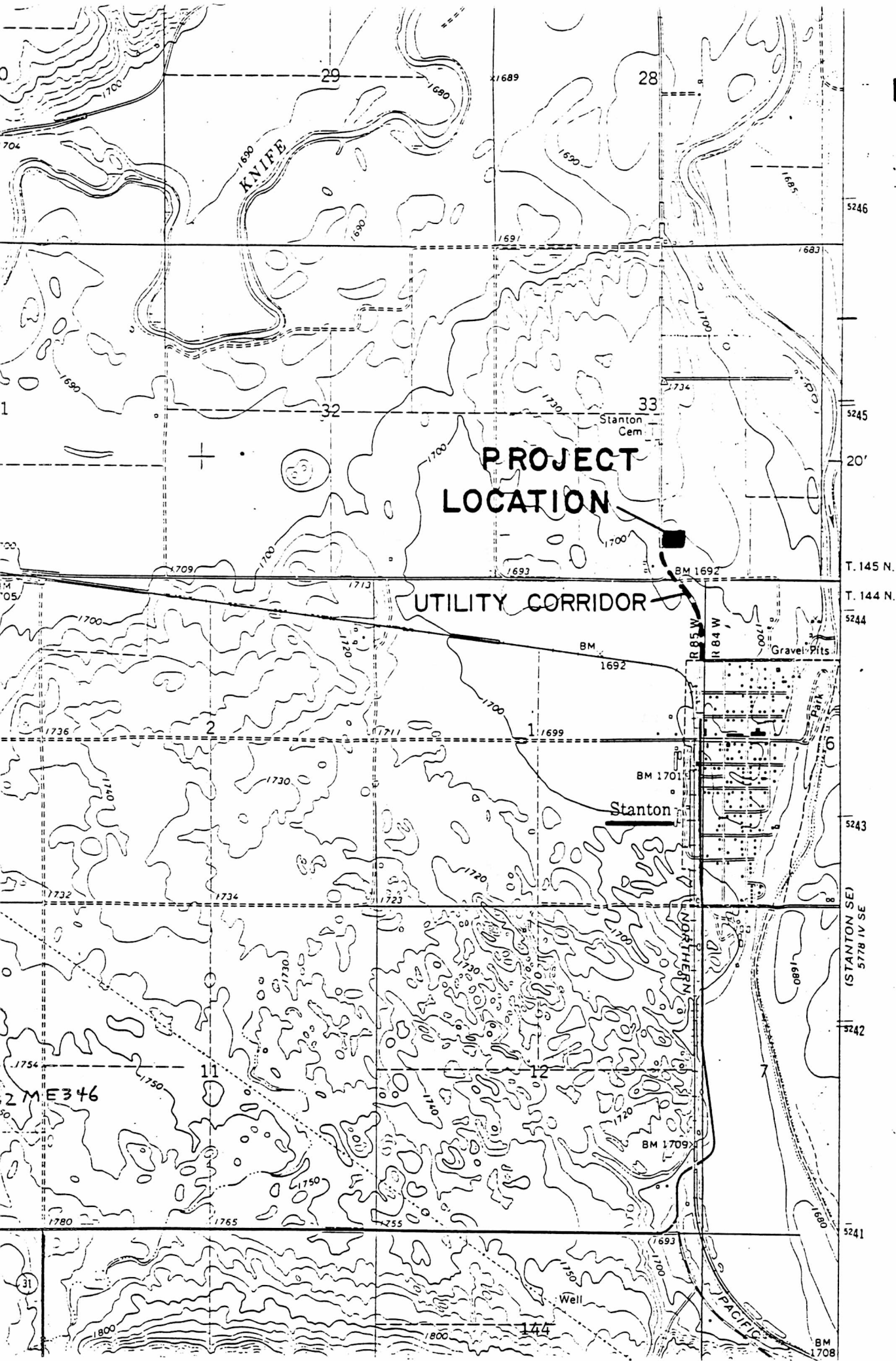
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MAP A



145

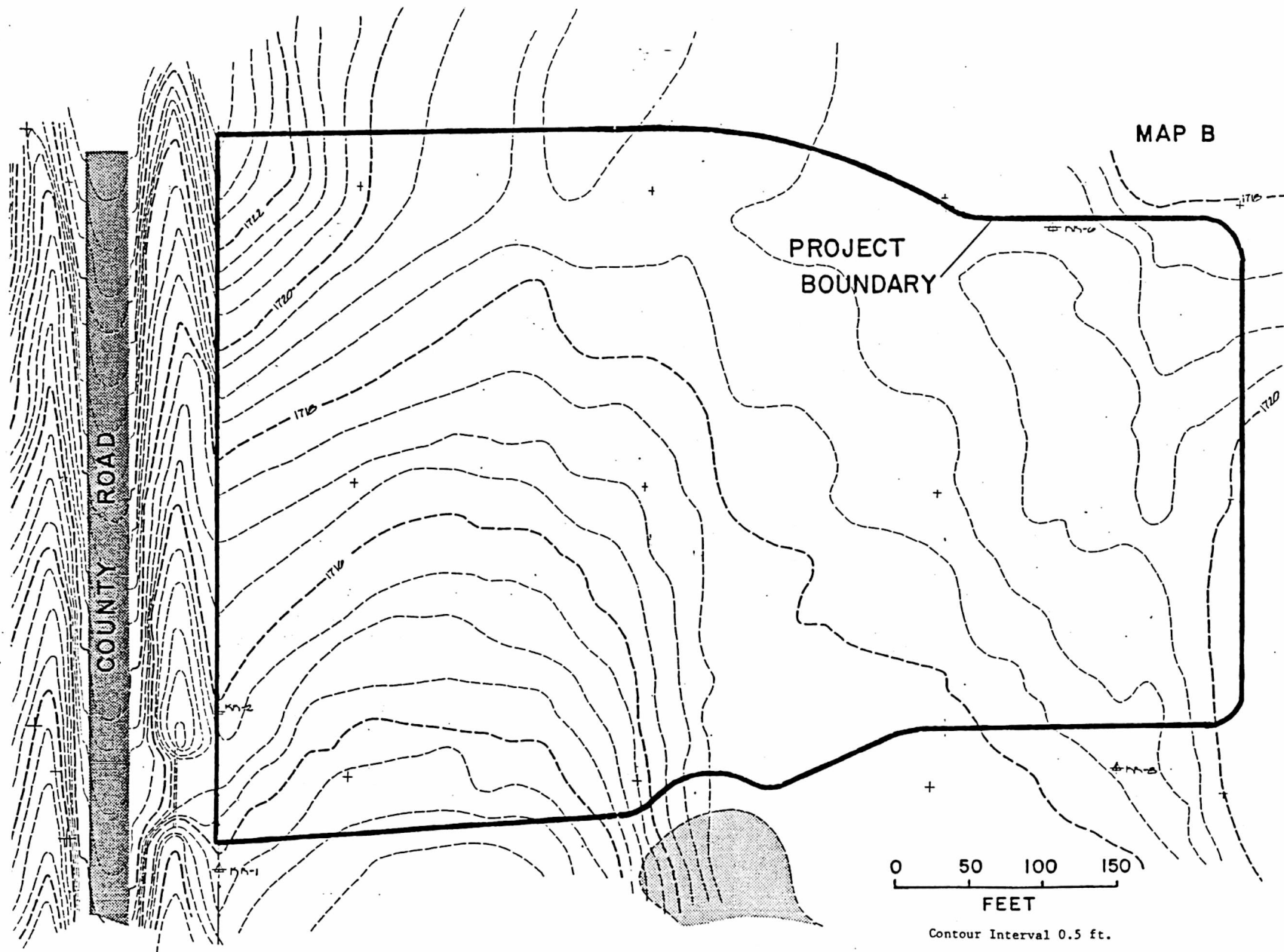
COUNTY ROAD

PROJECT
BOUNDARY

MAP B

0 50 100 150
FEET

Contour Interval 0.5 ft.



APPENDIX B

Card 6 Provenience Code Format and Key

Table B-1. Provenience code format and key, Hotrock (32ME412) and Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations.

Variable (Field Label)	Field Size	Field Code	Field Code Value
Site Number (SITENO)	6.0	66 110	Hotrock (32ME412) Lower Hidatsa West (32ME499)
Site Area (AREA)	4.0	9	Visitor Center Area B
Excavation Unit (EXUNIT)	6.0	206-274 527-604 999	test unit numbers strip trench numbers general road grader stripping
Excavation Level (EXLEVEL)	7.0	01-XX 99	levels 1-XX general plow zone (level 1)
Analytic Unit (ANUNIT)	6.0	11 12 13 14 15	Plains Village feature Historic feature shallow test unit (1 X 0.65 m) strip trench deep test unit (1 X 1 m)
Feature Number (FEATNO)	6.0		32ME412, 1987-1988 feat. nos. 32ME499, 1987-1988 feat. nos.
Feature Level (FLEVEL)	6.0	01-XX	levels 1-XX
Feature Type (FTYPE)	5.0	0 1 2 9	unknown, not applicable basin-shaped pit straight-sided pit other
Containment (CONTAIN)	7.0	0 1 2	unknown, not applicable uncontained contained, in feature
Recovery (RECOV)	5.0	0 3	not screened (NS), not applicable (NA) water screened (WS), 1/16 inch mesh

Table B-1. Provenience code format and key, Hotrock (32ME412) and Lower Hidatsa West (32ME499), Visitor Center Area B, 1987 and 1988 excavations (continued).

Variable (Field Label)	Field Size	Field Code	Field Code Value
Catalog Series (SERIES)	6.0	0	University of North Dakota/ National Park Service: 1979, 1987-1988
Batch Number (BATCH)	5.0		blank (unassigned)
Excavated Volume (EXVOL)	5.3		entered to 0.001 m ³ (liters)

APPENDIX C

Artifact Inventory Summary Data

Table C-1. Inventory of all recovered artifacts and other materials according to analytic unit, catalog number, and excavation unit, Hotrok (32ME412), 1987 and 1988 excavations.

Analytic Unit	UND Catalog Number	Excavation Unit	Level	Excavated Volume cu m	Recovery	Stone Tools n	Flaking Debris n	Rim Sherds n	Body Sherds n	Modified Bone n	ID Bone G1-3 n	ID Bone G4-5 n	Unmodified Bone g	n
11	119	587	01	.015	WS	0	0	0	0	0	0	1	1	1
11	120	NA	01	.016	WS	0	15	0	0	0	0	0	1	4
11	126	NA	01	.013	WS	0	0	0	0	0	0	0	14	5
11	127	NA	01	.009	WS	0	0	0	0	0	0	0	0	0
11	128	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
12	121	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
12	122	NA	01	.097	WS	0	1	0	0	0	0	2	0	0
12	123	NA	02	.097	WS	0	1	0	0	0	0	0	1	1
12	124	NA	03	.097	WS	0	0	0	0	0	0	1	0	0
12	125	NA	04	.082	WS	0	0	0	0	0	10	0	164	25
13	53	206	01	.141	WS	0	1	0	0	0	0	0	0	0
13	54	207	01	.154	WS	0	1	0	0	0	0	0	1	2
13	55	208	01	.134	WS	0	1	0	0	0	0	0	0	0
13	56	209	01	.147	WS	0	1	0	0	0	0	0	0	0
13	57	210	01	.188	WS	0	0	0	0	0	0	0	0	0
13	58	212	01	.141	WS	0	3	2	9	0	0	0	0	0
13	59	211	01	.127	WS	0	6	0	0	0	0	0	0	0
13	60	213	01	.134	WS	0	1	0	0	0	0	0	0	0
13	61	216	01	.134	WS	0	0	0	0	0	0	0	0	0
13	62	214	01	.147	WS	0	2	0	1	0	0	0	1	3
13	63	215	01	.144	WS	0	2	0	0	0	0	0	0	0
13	64	217	01	.134	WS	0	9	0	0	0	0	0	0	0
13	65	218	01	.127	WS	0	4	0	0	0	0	0	0	0
13	66	219	01	.134	WS	0	0	0	3	0	0	0	0	0
13	67	220	01	.141	WS	1	6	0	2	0	0	1	0	0
13	68	221	01	.114	WS	0	1	0	0	0	0	0	0	0
13	69	222	01	.147	WS	0	0	0	0	0	0	0	0	0
13	70	223	01	.137	WS	0	0	0	9	0	0	0	0	0
13	71	224	01	.124	WS	0	6	0	5	0	0	0	0	0
13	72	225	01	.127	WS	0	0	0	0	0	0	0	0	0
13	73	226	01	.127	WS	0	0	0	0	0	0	0	0	0
13	74	227	01	.141	WS	0	1	0	0	0	0	0	0	0
13	75	228	01	.131	WS	0	6	1	4	0	0	0	0	0
13	76	232	01	.134	WS	0	0	0	0	0	1	0	1	1
13	77	230	01	.107	WS	0	4	0	0	0	0	0	0	0
13	78	231	01	.127	WS	0	4	0	0	0	0	0	0	0
13	79	233	01	.127	WS	0	2	1	1	0	0	0	0	0
13	80	235	01	.131	WS	0	8	0	1	0	2	0	1	2
13	81	234	01	.127	WS	0	5	0	1	0	1	0	1	1
13	82	236	01	.114	WS	0	4	1	16	0	0	0	0	0

Table C-1. Inventory of all recovered artifacts and other materials according to analytic unit, catalog number, and excavation unit, Hotrok (32ME412), 1987 and 1988 excavations.

UND Catalog Number	Modi- fied Shell n	Unmodi- fied Shell n	Fire- Cracked Rock >G3 g	Fired Clay >G3 g	Charcoal/ Wood g	Glass Beads n	Trade Metal n	Recent Metal n	Misc. Recent n	Unmodi- fied Clinker n	Natu- ral Rock g	Unsorted Residue g
119	0	0	12746	.0	.0	0	0	0	0	0	4	283
120	0	0	5548	.0	.0	0	0	0	0	0	31	153
126	0	0	3951	.0	.0	0	0	0	0	0	1	13
127	0	0	0	.0	.0	0	0	0	0	0	3	12
128	0	0	0	.0	.0	0	0	0	0	0	0	0
121	0	0	0	.0	21.9	0	0	0	0	0	0	0
122	0	0	0	.0	.9	0	0	7	352	0	46	566
123	0	0	0	.0	1.4	0	0	4	814	0	0	786
124	0	0	0	.0	17.4	0	0	127	549	0	0	1115
125	0	4	0	.0	5.4	0	0	790	1325	0	14	1148
53	0	0	0	.0	.0	0	0	1	1	0	183	379
54	0	0	1	.0	.0	0	0	2	10	0	145	188
55	1	0	0	.0	.0	0	0	4	21	0	388	368
56	0	0	12	.0	.0	0	0	0	1395	0	885	1292
57	0	0	26	.0	.0	0	0	0	105	0	1072	748
58	0	0	96	.0	.0	0	0	0	0	0	158	361
59	0	0	0	.0	.0	0	0	0	0	0	90	93
60	0	0	242	.0	.0	0	0	0	0	0	223	356
61	0	0	1	.0	.0	0	0	2	29	0	197	164
62	0	0	0	.0	.0	0	0	1	0	0	123	224
63	0	0	0	.0	.0	0	0	11	1337	0	728	984
64	0	0	7	.0	.0	0	0	0	0	0	62	103
65	0	0	0	.0	.0	0	0	0	1	0	92	178
66	0	0	3	.0	.0	0	0	0	0	0	25	152
67	0	0	35	.0	.0	0	0	1	0	0	106	143
68	0	0	1	.0	.0	0	0	1	20	0	124	183
69	0	0	1	.0	.0	1	0	1	1	0	60	110
70	0	0	0	.0	.0	0	0	2	0	0	64	160
71	0	0	0	.0	.0	0	0	0	1	0	128	257
72	0	0	0	.0	.0	0	0	0	0	0	182	233
73	0	0	0	.0	.0	0	0	0	0	0	28	99
74	0	0	0	.0	.0	0	0	1	0	0	201	355
75	0	0	1	.0	.0	0	0	1	0	0	203	297
76	0	0	0	.0	.0	0	0	0	0	0	176	232
77	0	0	6	.0	.0	0	0	3	20	0	115	127
78	0	0	0	.0	.0	0	0	0	0	0	83	107
79	0	0	8	.0	.0	0	0	0	0	0	183	300
80	0	0	0	.0	.0	0	0	1	0	0	83	122
81	0	0	35	.0	.0	0	1	1	1	0	92	203
82	0	0	3	.0	.0	0	0	0	2	0	253	307

Table C-1. Inventory of all recovered artifacts and other materials according to analytic unit, catalog number, and excavation unit, Hotrok (32ME412), 1987 and 1988 excavations (continued).

Analytic Unit	UND Catalog Number	Excavation Unit	Level	Excavated Volume	Recovery	Stone Tools	Flaking Debris	Rim Sherds	Body Sherds	Modified Bone	ID Bone G1-3	ID Bone G4-5	Unmodified Bone
				cu m		n	n	n	n	n	n	n	g n
13	83	238	01	.111	WS	0	4	0	0	0	0	0	0 0
13	84	243	01	.154	WS	0	2	0	0	0	1	0	2 3
13	85	237	01	.134	WS	0	2	0	1	0	0	0	0 0
13	86	239	01	.127	WS	1	6	0	1	0	0	0	0 0
13	87	241	01	.134	WS	0	3	0	3	0	0	0	0 0
13	88	244	01	.114	WS	0	6	0	0	0	0	0	1 3
13	89	240	01	.141	WS	0	6	0	0	0	0	0	0 0
13	90	245	01	.127	WS	1	6	0	0	0	1	1	1 1
13	91	246	01	.121	WS	0	14	0	0	0	1	0	5 2
13	92	247	01	.134	WS	0	4	0	1	0	0	0	13 1
13	93	252	01	.127	WS	0	5	1	6	0	0	0	0 0
13	94	251	01	.127	WS	0	1	0	0	0	0	0	0 0
13	95	254	01	.161	WS	0	8	0	1	0	0	0	1 1
13	96	253	01	.161	WS	0	2	0	0	0	0	0	0 0
13	97	258	01	.132	WS	0	9	0	0	0	0	0	0 0
13	98	259	01	.147	WS	1	20	1	2	0	0	0	3 2
14	101	535	01	NA	NS	1	0	0	0	0	0	0	0 0
14	102	534	01	NA	NS	0	1	0	0	0	0	0	0 0
14	103	539	01	NA	NS	0	1	0	0	0	0	0	0 0
14	104	555	01	NA	NS	1	0	0	0	0	0	0	0 0
14	106	562	01	NA	NS	0	0	0	0	0	0	0	1 1
14	113	592	01	NA	NS	1	0	0	0	0	0	0	0 0
14	114	592	01	NA	NS	0	0	0	0	0	0	0	31 1
14	115	592	01	NA	NS	0	0	0	0	0	0	0	0 0
14	116	592	01	NA	NS	0	0	0	0	0	0	0	0 0
14	117	590	01	NA	NS	0	0	0	0	0	0	0	7 1
14	118	587	01	NA	NS	0	0	0	0	0	0	0	10 1
15	99	242	01	.150	WS	0	11	1	7	0	0	0	0 0
15	100	242	02	.150	WS	0	6	0	6	0	0	0	0 0
15	105	242	03	.150	WS	0	0	0	0	0	0	0	0 0
15	107	242	04	.150	WS	0	0	0	2	0	0	0	0 0
15	109	242	05	.150	WS	0	0	0	0	0	0	0	0 0
15	110	242	06	.150	WS	0	0	0	0	0	0	1	0 0
15	111	242	07	.150	WS	0	0	0	0	0	0	0	0 0
15	112	242	08	.090	WS	0	0	0	0	0	0	0	0 0

Table C-1. Inventory of all recovered artifacts and other materials according to analytic unit, catalog number, and excavation unit, Hotrok (32ME412), 1987 and 1988 excavations (continued).

UND	Modi- fied	Unmodi- fied	Fire- Cracked	Fired	Charcoal/ Wood	Glass	Trade	Recent	Misc.	Unmodi- fied	Natu- ral	Unsorted
Catalog	Shell	Shell	Rock	Clay		Beads	Metal	Metal	Recent	Clinker	Rock	Residue
Number	n	n	>G3 g	>G3 g	g	n	n	n	n	n	g	g
83	0	0	16	.0	.0	0	0	0	0	0	237	253
84	0	0	10	.0	.0	0	0	1	0	0	211	285
85	0	0	1	.0	.0	0	0	0	1	0	586	556
86	0	0	42	.0	.0	0	0	3	253	0	96	254
87	0	0	0	.0	.0	0	0	1	3	0	283	341
88	0	0	3	.0	.0	0	0	0	1	0	69	168
89	0	0	0	.0	.0	0	0	4	2	0	129	161
90	0	3	1	.0	.0	0	0	1	3	0	574	571
91	0	0	1	.0	.0	0	0	0	4	0	214	299
92	0	1	3	.0	.0	0	0	8	4	0	209	261
93	0	0	3	.0	.0	0	0	1	1	0	195	267
94	0	0	0	.0	.0	0	0	4	3	0	274	319
95	0	0	8	.2	.0	0	0	0	2	0	170	350
96	0	0	6	.0	.0	0	0	1	2	0	701	820
97	0	0	21	.0	.0	0	0	0	0	0	121	238
98	0	0	202	.1	.0	0	0	17	4	0	235	299
101	0	0	0	.0	.0	0	0	0	0	0	0	0
102	0	0	0	.0	.0	0	0	0	0	0	0	0
103	0	0	0	.0	.0	0	0	0	0	0	0	0
104	0	0	0	.0	.0	0	0	0	0	0	0	0
106	0	0	0	.0	.0	0	0	0	0	0	0	0
113	0	0	0	.0	.0	0	0	0	0	0	0	0
114	0	0	0	.0	.0	0	0	0	0	0	0	0
115	0	0	0	.0	.0	0	0	0	0	0	5	0
116	0	0	255	.0	.0	0	0	0	0	0	0	0
117	0	0	0	.0	.0	0	0	0	0	0	0	0
118	0	0	0	.0	.0	0	0	0	0	0	0	0
99	0	0	3	.0	.0	0	0	14	0	0	544	710
100	0	0	0	.0	.0	0	0	0	0	0	231	388
105	0	0	0	.0	.0	0	0	0	0	0	159	380
107	0	2	0	.0	.0	0	0	0	0	0	154	337
109	0	8	0	.0	.0	0	0	0	0	0	65	215
110	0	6	0	.0	.0	0	0	0	0	0	457	716
111	0	1	0	.0	.0	0	0	0	0	0	1071	1830
112	0	0	0	.0	.0	0	0	0	0	0	1347	1755

Table C-2. Inventory of all recovered artifacts and other materials according to analytic unit, catalog number, and excavation unit, Lower Hidatsa West (32ME499), 1987 and 1988 excavations.

Analytic Unit	UND Catalog Number	Excavation Unit	Level	Excavated Volume cu m	Recovery	Stone Tools n	Flaking Debris n	Rim Sherds n	Body Sherds n	Modified Bone n	ID Bone G1-3 n	ID Bone G4-5 n	Unmodified Bone g	n
11	677	580	01	.054	WS	0	31	0	1	0	29	0	179	110
11	678	NA	01	.001	WS	0	2	0	0	0	0	0	0	0
11	679	NA	01	.002	WS	0	3	0	0	0	0	1	0	0
11	680	NA	01	.004	WS	0	1	0	0	0	0	1	0	0
11	682	NA	01	.001	WS	0	0	0	0	0	0	0	0	0
12	681	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
13	648	249	01	.121	WS	1	5	0	0	0	0	0	0	0
13	649	248	01	.134	WS	0	2	0	0	0	0	0	0	0
13	650	250	01	.114	WS	0	14	2	7	0	0	0	0	0
13	651	256	01	.124	WS	0	4	0	1	0	0	0	0	0
13	652	255	01	.107	WS	0	10	0	5	0	1	0	1	1
13	653	257	01	.134	WS	0	8	0	0	0	0	1	1	1
13	654	267	01	.114	WS	0	24	0	1	0	0	0	0	0
13	657	274	01	.121	WS	0	21	0	1	0	0	0	0	0
13	658	271	01	.107	WS	2	32	1	30	0	0	0	0	0
13	660	272	01	.114	WS	0	6	0	8	0	0	1	1	3
13	665	269	01	.121	WS	0	12	1	4	0	0	1	2	6
13	667	268	01	.127	WS	0	6	0	0	0	1	0	1	2
13	668	266	01	.147	WS	0	5	0	2	0	0	2	1	3
13	669	264	01	.127	WS	0	18	0	5	0	0	0	1	1
13	670	265	01	.134	WS	0	10	1	5	0	1	0	1	1
13	671	270	01	.121	WS	0	25	4	33	0	0	0	1	1
13	672	263	01	.114	WS	0	5	0	11	0	0	0	2	1
13	673	262	01	.134	WS	0	7	0	1	0	1	0	2	4
13	674	261	01	.134	WS	0	6	0	0	0	3	0	1	3
13	675	260	01	.147	WS	0	5	0	2	0	0	0	0	0
14	662	565	01	NA	NS	0	0	0	0	0	0	0	0	0
14	676	580	01	NA	NS	0	0	0	0	0	0	0	53	1
15	655	273	01	.155	WS	0	23	0	1	0	1	0	2	5
15	656	273	02	.145	WS	0	0	0	1	0	0	1	6	1
15	659	273	03	.150	WS	0	0	0	0	0	0	0	0	0
15	661	273	04	.150	WS	0	0	0	0	0	0	0	0	0
15	663	273	05	.150	WS	0	0	0	0	0	0	1	0	0
15	664	273	06	.150	WS	0	0	0	0	0	0	1	0	0
15	666	273	07	.090	WS	0	0	0	0	0	0	0	0	0

Table C-2. Inventory of all recovered artifacts and other materials according to analytic unit, catalog number, and excavation unit, Lower Hidatsa West (32ME499), 1987 and 1988 excavations.

UND	Modi- fied Shell n	Unmodi- fied Shell n	Fire- Cracked Rock >G3 g	Fired Clay >G3 g	Charcoal/ Wood g	Glass Beads n	Trade Metal n	Recent Metal n	Misc. Recent n	Unmodi- fied Clinker n	Natu- ral Rock g	Unsorted Residue g
677	0	0	1435	.0	.1	0	0	0	0	0	1232	1124
678	0	0	0	.0	.0	0	0	0	0	0	0	1
679	0	0	0	.0	.1	0	0	0	0	0	1	3
680	0	0	0	.0	.0	0	0	0	0	0	33	15
682	0	0	0	.0	.0	0	0	0	0	0	1	2
681	0	0	0	.0	8.4	0	0	0	0	0	0	0
648	0	0	30	.0	.0	0	0	50	4	0	189	231
649	0	0	12	.0	.0	0	0	118	71	0	910	481
650	0	0	4	.0	.0	0	0	30	130	0	163	397
651	0	0	1	.0	.0	0	0	6	2	0	265	484
652	0	0	3	.0	.0	0	0	4	34	0	192	256
653	0	0	303	.0	.0	0	0	12	1	0	311	251
654	0	0	2	.0	.0	0	0	20	9	1	144	268
657	0	1	1	.0	.0	0	0	2	6	0	135	302
658	0	2	268	.2	.0	0	0	14	0	0	165	219
660	0	0	1	.0	.0	0	0	6	1	0	317	289
665	0	0	45	.0	.0	1	0	0	13	0	173	322
667	0	0	1	.0	.0	0	0	9	55	0	29	61
668	0	0	39	.0	.0	0	0	1	1	0	156	328
669	0	0	5	.0	.0	0	0	12	0	0	213	254
670	0	0	1	.2	.0	0	0	20	7	0	190	298
671	0	0	23	.0	.0	0	0	86	132	0	211	323
672	0	0	2	.0	.0	0	0	54	24	0	298	325
673	0	0	1	.0	.0	1	0	26	26	0	120	196
674	0	0	4	.0	.0	1	0	101	33	0	334	125
675	0	0	2	.0	.0	0	0	79	95	0	26	112
662	0	0	0	.0	.0	0	0	0	0	0	0	0
676	0	0	0	.0	.0	0	0	0	0	0	0	0
655	0	0	232	.0	.0	0	0	10	0	0	429	452
656	0	0	1	.0	.0	0	0	0	0	0	174	208
659	0	1	0	.0	.0	0	0	0	0	0	198	276
661	0	2	0	.0	.0	0	0	0	0	0	175	291
663	0	24	0	.0	.0	0	0	0	0	0	256	318
664	0	0	0	.0	.0	0	0	0	0	0	700	548
666	0	1	0	.0	.0	0	0	0	0	0	4864	2227

